Worldwide Equipment Guide

This Worldwide Equipment Guide (WEG) describes the spectrum of worldwide equipment and system trends in the Complex Operational Environment (COE). Tier Tables provide baseline examples of systems with counterparts in other capability tiers. Other systems are added to offer flexibility for tailoring the force systems mix. Substitution Tables offer other system choices versus baseline examples.

The OPFOR in the COE should also include options for portraying “hybrid threat”. Hybrid threat is defined as:

…the diverse and dynamic combination of regular forces, irregular forces, terrorist forces, and/or criminal elements, all unified to achieve mutually benefitting effects.

The OPFOR may use conventional weapons; however regular and irregular forces may also employ improvised systems, as described throughout this guide. Upgrade tables are included to capture WEG systems changes reflecting contemporary upgrade trends. Systems and technologies in Chapter 10, Countermeasures, Upgrades, and Emerging Technology, can be used in simulations for Near-Term and Mid-Term scenarios.

The pages in this WEG are designed for use in electronic form or for insertion into loose -leaf notebooks. This guide will be updated as often as necessary, in order to include additional systems, variants, and upgrades that are appropriate for OPFOR use.

We have attempted to make the information available more user friendly, easily accessible, and concise. Therefore, much of the narrative on some systems has been updated and edited. If you have questions on the presentation of information or anything else included in this guide, contact the help desk.

WEG Tier Table

The OPFOR organization and equipment must support the entire spectrum of Contemporary Operational Environment in U.S. forces training. The COE OPFOR includes “hybrid threats”, and represents rational and adaptive adversaries for use in training applications and scenarios. The COE time period reflects current training as well as training extending through the Near Term. This chapter deals with current time frame systems. Lists of equipment on these tables offer convenient baseline examples arranged in capability tiers for use in composing OPFOR equipment arrays for training scenarios. For guidance on systems technology capabilities and trends after 2018, the user might look to Countermeasures, Upgrades, and Emerging Technology. Those tables offer capabilities tiers for Near and Mid-Term.

OPFOR equipment is broken into four “tiers” in order to portray systems for adversaries with differing levels of force capabilities for use as representative examples of a rational force developer’s systems mix. Equipment is listed in convenient tier tables for use as a tool for trainers to reflect different levels of modernity. Each tier provides an equivalent level of capability for systems across different functional areas. The tier tables are also another tool to identify systems in simulations to reflect different levels of modernity. The key to using the tables is to know the tier capability of the initial organizations to be provided. Tier 2 (default OPFOR level) reflects modern competitive systems fielded in significant numbers for the last 8 to 28 years.

Systems reflect specific capability mixes, which require specific systems data for portrayal in U.S. training simulations (live, virtual, and constructive). The OPFOR force contains a mix of systems in each tier and functional area which realistically vary in fielded age and generation. The tiers are less about age of the system than realistically reflecting capabilities to be mirrored in training. Systems and functional areas are not modernized equally and simultaneously. Forces have systems and material varying 10 to 30 years in age in a functional area. Often military forces emphasize upgrades in one functional area while neglecting upgrades in other functional areas. Force designers may also draw systems from higher or lower echelons with different tiers to supplement organizational assets. Our functional area analysts have tempered depiction of new and expensive systems to a fraction of the OPFOR force. The more common modernization approach for higher tier systems is to upgrade existing systems.

Some systems are used in both lower and higher tiers. Older 4x4 tactical utility vehicles which are 30 to 40 years old still offer effective support capability, and may extend across three tiers. Common use of some OPFOR systems also reduces database maintenance requirements.

Tier 1 (Date of Introduction after 2013) Systems are new or upgraded robust state-of-the-art systems marketed for sale, with at least limited fielding, and with capabilities and vulnerabilities representative of trends to be addressed in training. But a major military force with state-of-the-art technology may still have a mix of systems across different functional areas at Tier 1 and lower tiers.

Tier 2 (Date of Introduction 2012-1992) Reflects modern competitive systems fielded in significant numbers for the last 8 to 28 years, with limitations or vulnerabilities being diminished by available upgrades. Although forces are equipped for operations in all terrains and can fight day and night, their capability in range and speed for several key systems may be somewhat inferior to U.S. capability.

Tier 3 (**Date of Introduction 1991-1971)** Systems that date back generally 29 to 49 years. They have limitations in all three subsystems categories: mobility, survivability and lethality. Systems and force integration are inferior. However, guns, missiles, and munitions can still challenge vulnerabilities of U.S. forces. Niche upgrades can provide synergistic and adaptive increases in force effectiveness.

Tier 4 (**Date of Introduction before 1971)** Systems reflect 50 year-old systems, some of which have been upgraded numerous times. These represent Third World or smaller developed countries' forces and irregular forces. Use of effective strategy, adaptive tactics, niche technologies, and terrain limitations can enable a Tier 4 OPFOR to challenge U.S. force effectiveness in achieving its goals. The tier includes militia, guerrillas, special police, and other forces.

Please note: ***No force in the world has all systems at the most modern tier.*** Even the best force in the world has a mix of state-of-the-art (Tier 1) systems, as well as mature (Tier 2), and somewhat dated (Tier 3) legacy systems. Many of the latter systems have been upgraded to some degree, but may exhibit limitations from their original state of technology. Even modern systems recently purchased may be considerably less than state-of-the-art, due to budget constraints and limited user training and maintenance capabilities. Thus, even new systems may not exhibit Tier 1 or Tier 2 capabilities. As later forces field systems with emerging technologies, legacy systems may be employed to be more suitable, may be upgraded, and continue to be competitive. ***Adversaries with lower tier systems can use adaptive technologies and tactics, or obtain niche technology systems to challenge advantages of a modern force.***

A major emphasis in an OPFOR is flexibility in use of forces and in doctrine. This also means OPFOR having flexibility, given rational and justifiable force development methodology, to adapt the systems mix to support doctrine and plans. The tiers provide the baseline list for determining the force mix, based on scenario criteria. The OPFOR compensates for capability limitations by using innovative and adaptive tactics, techniques, and procedures (TTP). Some of these limitations may be caused by the lack of sophisticated equipment or integration capability, or by insufficient numbers. Forces can be tailored in accordance with OPFOR guidance to form tactical groups.

An OPFOR force developer has the option to make selective adjustments such as use of niche technology upgrades such as in tanks, cruise missiles, or rotary-wing aircraft, to offset U.S. advantages (see WEG Chapter 15, Equipment Upgrades). Forces may include systems from outside of the overall force capability level. A Tier 3 force might have a few systems from Tier 1 or 2. The authors will always be ready to assist a developer in selecting niche systems and upgrades for use in OPFOR portrayal. Scenario developers should be able to justify changes and systems selected. With savvy use of TTP and systems, all tiers may offer challenging OPFOR capabilities for training. The Equipment Substitution Matrices can help force designers find weapons to substitute, to reflect those best suited for specific training scenarios.

How To Use Guide

The WEG is organized by categories of equipment, in chapters. The format of the equipment pages is basically a listing of parametric data. This permits updating on a standardized basis as data becomes available. For meanings of acronyms and terms, see the Glossary. Please note that, although most terms are the same as in U.S. terminology, some reflect non-U.S. concepts and are not comparable or measurable against U.S. standards. For example, if an OPFOR armor penetration figure does not say RHA (rolled homogeneous armor) do not assume that is the standard for the figure. If there are questions, consult the Glossary, or contact us.

System names reflect intelligence community changes in naming methods. Alternative designations include the manufacturer's name, as well as U.S./NATO designators. Note also that the WEG focuses on the complete weapon system (e.g., AT-4/5/5B antitank guided missile launcher complex or 9P148 ATGM launcher vehicle), versus a component or munition (9P135 launcher or AT-4/5 ATGM).

Many common technical notes and parameters are used in chapters 3 through 6, since the systems contained in those chapters have similar weapon and automotive technologies. Chapters 2 (Infantry Weapons), 7 (Engineer and CBRN) and 8 (Logistics), offer systems with many unique parameters and therefore may not be consistent with those in other chapters.

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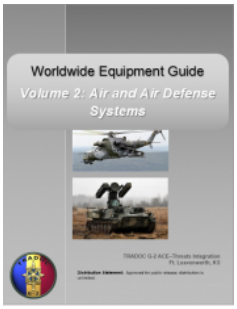
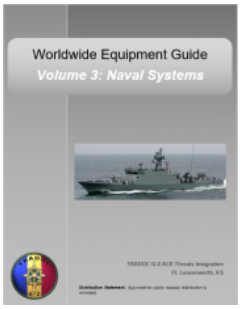
  Volume 1: Ground Systems

- 

  Volume 2: Air and Air Defense Systems

- 

  Volume 3: Naval Systems

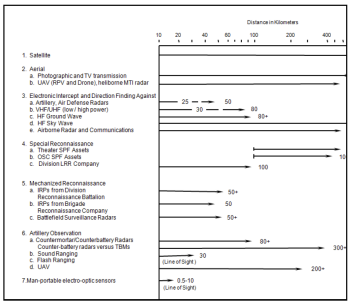
Units of Measure

The following example symbols and abbreviations are used in this guide:

- (°): degrees (of slope/gradient, elevation, traverse, etc.)
- GHz: gigahertz—frequency (GHz = 1 billion hertz)
- hp: horsepower (kWx1.341 = hp)
- Hz: hertz—unit of frequency
- kg: kilogram(s) (2.2 lb.)
- kg/cm2: kg per square centimeter—pressure
- km: kilometer(s)
- km/h: km per hour
- kt: knot—speed. 1 kt = 1 nautical mile (nm) per hr.
- kW: kilowatt(s) (1 kW = 1,000 watts)
- liters: liters—liquid measurement (1 gal. = 3.785 liters)
- m: meter(s)—if over 1 meter use meters; if under use mm
- m3: cubic meter(s)
- m3/hr: cubic meters per hour—earth moving capacity
- m/hr: meters per hour—operating speed (earth moving)
- MHz: megahertz—frequency (MHz = 1 million hertz)
- mach: mach + *(factor)* —aircraft velocity (average 1062 km/h)
- mil: milliradian, radial measure (360° = 6400 mils, 6000 Russian)
- min: minute(s)
- mm: millimeter(s)
- m/s: meters per second—velocity
- mt: metric ton(s) (mt = 1,000 kg)
- nm: nautical mile = 6076 ft (1.152 miles or 1.86 km)
- rd/min: rounds per minute—rate of fire
- RHAe: rolled homogeneous armor (equivalent)
- shp: shaft horsepower—helicopter engines (kWx1.341 = shp)
- mm: micron/micrometer—wavelength for lasers, etc.

Volume 1: Ground Systems

Chapter 1: Reconnaissance



Reconnaissance represents all measures associated with organizing, collecting, and studying information on the enemy, terrain, and weather in the area of operation. Aggressive, continuous reconnaissance allows the timely accomplishment of combat missions with minimum losses. Poor reconnaissance can lead directly to failure.

The OPFOR term that addresses the totality of reconnaissance activities is RISTA (reconnaissance, intelligence, surveillance, and target acquisition). Therefore, RISTA **DOES NOT** equal the US term, C4ISR (command, control, communications, intelligence, surveillance, and reconnaissance). For information on OPFOR command and control (C2), see Chapter 9.

The OPFOR commits significant resources to reconnaissance. Prior to hostilities, the OPFOR will already have developed an intelligence picture and expected military courses of actions. While the OPFOR practices similar intelligence and reconnaissance disciplines (HUMINT, SIGNINT, IMINT, etc.) as the US, the OPFOR conducts RISTA with different assets, focuses, and methodologies. Reconnaissance platforms must be able to operate in all spheres: ground, surface, below surface, air, space, naval, and littoral areas. The OPFOR fields reconnaissance assets at all echelons and products derived from those assets are used for actions on the battlefield.

This chapter describes ground maneuver forces and specialized ground troops (special purpose forces-SPF) reconnaissance assets. The most basic sensors are lasers/optics/electro-optics used by infantry units (see Chapter 2). When linked with a radio, these basic sensors can be used for unit reporting and other HUMINT reports. There are also dedicated reconnaissance assets with data sheets in other chapters.

- Aerial reconnaissance (Rotary-Wing and Fixed Wing aviation chapters in Volume 2)
- Air defense reconnaissance, early warning, and target acquisition (Air Defense chapter in Volume 2)
- Artillery target acquisition (Artillery chapter)
- Engineer reconnaissance (Engineer chapter)
- NBC reconnaissance (Chemical chapter)
- Signals reconnaissance (Information Warfare chapter)
- Unmanned aerial vehicles (UAV chapter in Volume 2)

The reconnaissance effort depends upon sensor technologies for location, surveillance, and acquisition. Most units will employ a mix of older and newer systems, with recon vehicles, portable sensors, and man-portable sensors. The most prolific sensor on the battlefield is the human eye. Range is a critical factor. The table below gives general range capabilities.

The most prolific reconnaissance discipline is HUMINT reports generated by ground units. Much of this reconnaissance effort consists of tactical recon missions executed by maneuver units in their operational area. Any unit can generate reconnaissance. The OPFOR will exploit civilian information and acquisition assets for reconnaissance purposes. While OPFOR units may operate reconnaissance vehicles, most will have possess the ability to operate dismounted observation posts (OP). These dismounted OPs may possess similar capabilities as vehicle mounted patrol vehicles. The OPFOR will used many types of vehicles for reconnaissance including motorcycles, all-terrain vehicles, or civilian vehicles. The OPFOR will use equipment such as multi-spectral concealment materials, navigation equipment, light-weight laptop computers, and long-range communications/digital transmission systems while conducing reconnaissance.

RISTA Key Technology Trends

Military forces continue to field new RISTA systems and upgrade old legacy systems. These systems can be found in both reconnaissance, tactical, and fir support units.

System Category	Technology Trend	Vol/ Page	System Example	Ref Page

Ubiquitous Handheld RISTA System	Remote electronic optics (EO)/3d generation thermal sight, 30x zoom precise location, video link, & graphic net	V1/1-17	Sophie MF	V1/1-32
	EO bionics with forward looking infrared (FLIR) camera, laser rangefinder (LRF), and goniometer for precise target location	V1/1-19	ADAD	V1/1-23
	LADAR optical augmentation scans & detects enemy weapon sights	V1/1-21	Mirage 1200	V1/1-21
	Robotic hand-thrown camera with PDA display, & robot/ball mount	V1/1-25	Macroswiss	V1/1-18
	Camera grenade (rifle, RPG, AGL) remotes in-flight image to display	V1/1-25	SPARCS	V2/4-8
RISTA Dismount Team Assets	Man-portable II camera net to display monitor & alert system	V1/1-17	Nighthawk	V1/1-18
	Site spy cameras with remote-display images on monitor	V1/1-18	NG-30	V1/1-17
	EO Laser target designator guides laser homing round to 10+ km	V1/1-20	DHY-307	V1/1-20
	Man-portable radar with 24 km range and LPI frequency	V1/1-22	Squire	V1/1-22
	Multi-sensor unattended ground sensors with remote monitor display	V1/1-24	CLASSIC 2000	V1/1-24
	Hand-launch UAVs/micro-UAVS for infantry, SPF, RISTA, AT, etc.	V1/1-26	Zala 421-08	V2/4-6
	Masted 50+x EO, 3d generation thermal sights & other sensors for real-time nets	V1/1-6	ATM	V1/4-9
RISTA Vehicles	Integrated weapons with sensor pods for combat reconnaissance vehicles	V1/1/6	BRM-3K	V1/1-11
	Mast-mounted motorized LPI radars & real-time digital transmission	V1/1-7	HJ-62C	V1/1/13
	Remote add-on turrets & radar modules for vehicle conversion	V1/1-7	Stalker	V1/1-7
Aerial RISTA Systems	Powered airship or aerostat with video camera or other sensor arrays	V1/1-23	TAOS/Sky Media Pro	V2/7-2
	Helicopter/weapon-launch UAV munitions for real time intel/targeting	V1/1-26	R-90	V2/1-8
	Helicopters & FW with real-time MTI; synthetic aperture radar	V2/2-21	Horizon	V2/2-21

Other RISTA Assets	INFOWAR, UAV, aerial & HUMINT assets tactically linked & fused	V1/1-7	HJ-62C	V1/1-13
	Handheld & embedded GNSS receivers for in-view displays	V1/1-14	Magellan GPS	V1/1-14
	EO laser RF weapon sights with 3d generation day & night capability	V1/1-14	IS-2000	V1/2-30
	Acoustic sensors quickly detect vehicles, weapons & aircraft	V1/1-21	HALO	V1/1-21
	Trip-wire charges, mines, or sensor-fused grenade launchers	V1/1-23	AJAX	V1/1-23
	Artillery/aerial-delivered & hand-emplaced UGS display in intelligence net	V1/1-24	BSA	V1/1-24
	Weapon launched sensor munitions for aircraft & artillery	V1/1-26	R-90	V2/1-7
	Laptop display data transmission systems, encryption, and satellite communication (SATCOM)	V1/1-30	Kredo-M1	V1/1-30

Reconnaissance Vehicles

The OPFOR conducts continuous and pervasive reconnaissance activity in all phases of military operations. To accomplish their reconnaissance, the OPFOR uses a variety of vehicles based on the enemy threat and the mobility desired. The spectrum of reconnaissance vehicles range from old systems ill-suited for modern requirements to mobile, lethal, and survivable systems equipped with complex sensor arrays and communication equipment. Some vehicles may work alone or as part of a patrol.

The vehicle most used for reconnaissance is an unarmored 4 X 4 wheeled rive *tactical utility vehicle* or TUV (see the Infantry chapter for examples). The US M151 or Jeep was originally designed as a reconnaissance vehicle and many countries still favor a similar system due to their small size, speed, and maneuverability in a variety of terrain. Some countries have upgraded their reconnaissance vehicles to something similar to the US HMMWV or British Land Rover.

Reconnaissance vehicles are designed or other vehicles are modified to fit the role desired, force requirements, and the terrain in which the vehicle needs to operate. The vehicles may be unarmed except for small arms carried by the personnel in the vehicle or other larger weapons such as a machine gun or automatic grenade launcher (AGL) may be mounted on the vehicle. Many TUV chassis are poorly suited to adding additional armor for protection of the crew. The additional weight compromises the other positive aspects of the vehicle.

The *armored scout car* is sometimes better suited for reconnaissance than the TUV. These wheeled vehicles offer good road mobility, and better all-terrain off-road mobility than other vehicle types. The vehicle can be based on a truck, armored personnel carrier, or indigenous chassis to handle the added armor requirements while maintaining good mobility. Many of these vehicles may resemble a TUV, but are designed from the ground up for reconnaissance missions. The armor is often light and the wheels are vulnerable to nearly all weapons. Other improvements may be amphibious capability such as with the French VBL and VBR and larger caliber weapons. Examples of these vehicles include the British Fox, Hungarian FUG-66, and Russian BRDM-2.

In heavy combat or when a larger number of soldiers is needed, the OPFOR will often use modified Infantry Fighting Vehicles (IFV) or Armored Personnel Carriers (APC) as a reconnaissance vehicle. Other countries have produced specialized combat reconnaissance vehicles (CRV) designed to operate ahead of the forward line of troops (FLOT), not to initiate combat, but survived if attacked. These CRVs often sacrifice space for soldiers to gain increased mobility, additional sensors, or increased C2 capacity. Many CRVs use tracks instead of wheels, but the wheeled vehicles have amphibious capabilities the tracked vehicles do not. Examples of CRVs include the Russian BRM-3K, the British Scimitar, and the Austrian Pandur RECCE vehicle.

A newer generation came about with the addition of mast mounts and multi-sensor suites to create a *sensor reconnaissance vehicle*. These vehicles are not designed to operate forward of the FLOT, but behind the lines using cover while providing continuous data to ground forces. These vehicles feature powerful multi-sensor arrays using masts from five to 10 meters high provide longer-range surveillance with less vulnerability to enemy fires. Most of these sensor vehicles are built on an IFV or APC chassis provides the space for three to five work stations. These vehicles can also serve as an intelligence coordination and analysis center. These vehicles are likely to move less often than a CRV. Examples of these sensor reconnaissance vehicles include the Czech Snezka and Chinese Type 85 with HJ-62C radar. There are also sensor vehicles available for specific branches such as the Russian PRP- 3//PRP-4M for artillery units and the Russian Sborka for air defense units.

Many countries are not using their limited defense dollars not on producing new reconnaissance vehicles, but on improving the

sensor suites and mounted them on other vehicles such as the Israeli Rafael Stalker or the French VBL. Some countries are going as far as putting sensors on motorcycles or all-terrain vehicles. See the Infantry chapter for various types of these vehicles are available.

Since reconnaissance forces often operate far away from other friendly units, they need to defend themselves. Some countries have developed vehicles for such purpose with enough firepower, but still can complete the reconnaissance requirements. Examples include the British Saladin Armored Car and the Austrian Pandur Fire Support Vehicle. The main guns on thse vehicles can range from 57 mm to 105 mm on the South African Rooikat. These vehicles are often modified versions of a basic IFV, APC, or other armored vehicle modified to make the vehicle most suitable for reconnaissance vehicles. Some of the more common reconnaissance vehicles are on the following data sheets.

Sensor Technologies for Tactical Ground Forces



Magellan Blazer 12 Commercial Handheld GPS Device

Reconnaissance units use a mixture of high and low technologies. As noted in TC 7-100.2, Opposing Force Tactics, forces may perform tactical reconnaissance using designated reconnaissance units/soldiers or maneuver unit soldiers. Sensors span an increasing wider segments of the electromagnetic spectrum while integration C2, navigation systems, data processing, and fusing technologies. Developers offer more compact packages, platforms, sensor integration, and mobility systems for greater situational awareness, better operational security, and shorter response time than ever before.

Reconnaissance starts with *location* and *navigation*. Instruments include survey instruments (i.e, Bulgarian PAB-2A theodolite), aiming circles or goniometers, GPS receivers, maps, compasses, terrain data, and inertial guidance systems. Commercial equipment such as the Magellan handheld GPS units are sufficient for most forces. Other more advance equipment such as navigation data for laser rangefinders (LRF) and improved communications with digital interface ensure precise navigation.

The primary battlefield sensor is still the human eye, but human vision receives much help. Weapons sights are often used. See the Infantry chapter for day and night weapon sights. Almost all reconnaissance forces use optics such as sights, binoculars, or telescopes to increase viewing capacity. Most of these sights operate in the visual light (0.4-0.75 µm) electro-magnetic (EM) spectrum. Binoculars can vary in features and

magnifications and usually zoom from 7-12 (x) power. For longer-range day acquisition, the OPFOR uses spotting telescopes (Celestron and Swarovski models) with 60 x zoom capability. Other features could include anti-fogging lens coatings, camouflage netting, tripods for better stability or binocular periscopes (German RWDL) for covert viewing.

Night-time observation systems which operate in the visual band spectrum are all daylight observation systems similar to the human eye and therefore require visual light illumination to see. The Infantry chapter discusses the capability of using starlight, moonlight, or street lights to enable the average soldier to see greater distances. Illumination support equipment includes spotlights, flashlights, or pyrotechnics (grenades, illumination rounds) to bring light to dark spaces. Specialized devices are available, such as the Universal Tactical Light, which can be mounted on weapons and is located near the weapon's trigger. Fires or other improvised lighting offer illumination support. To ensure operational security, the OPFOR will usually not use artificial illumination until the fire fight is underway.

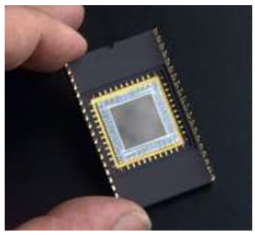


Universal Tactical Light mounted on a pistol

Reconnaissance personnel on today's battlefields have increased their use electro-optical (EO) systems to convert an image into a digital electronic signal that is sent to a display circuit (i.e., photocathode tube or micro-channel plate) for viewing. While optical zoom lens are still critical, EO cameras require almost no focal length or mirrors reducing their size and bulk. Polymers

and composite material produce ergonomic devices that are easier to hold with image processing/transmission capabilities for rapid exploitation and dissemination. Zoom capacity can reach 84 x or more allows rapid detection at 10 km or more in distance for selected targets. Day and night EO technologies include TV cameras can convert video imagery into an RF signal to transmit it to a receiver/display unit. Tripod-mounted or aircraft sensor pods can acquire targets at 10-30+ km in distance. Larger systems allows vehicles and aircraft to mount sensors with even longer ranges, better resolutions, and longer transmission ranges.

ELECTRO-MAGNETIC SPECTRUM AND SENSOR TECHNOLOGIES			
Light Band	**Alternate Name**	**Microns**	**Technologies**
Ultraviolet	UV/Black Light	0.01 – 0.40	Mercury Arc
Visible Light	Daylight	0.40 – 0.75	Eye, Optics, TV, Charged- Coupled Device (CCD)
Near Infrared	NIR	0.75 – 1.30	CCD, Image Intensifiers (II), Active IR
	Shore-Wavelength IR	1.30 – 3.00	Active IR
Mid-Infrared	Mid-Wavelength IR	3.00 – 6.00	Thermal
Far Infrared	Long-Wavelength IR	6.00 – 15.00	Thermal/Forward Looking Infrared (FLIR)



Charged-Coupled Device (CCD)

All night-time observation systems that operate outside of the visual spectrum are EO systems. CCD offers some capability during dawn and dusk and periods of adverse weather that create low light levels. Sub-component improvements offer night vision devices that are clearer, more compact, more resistant to glare, require less power, more time between service, with new features including laser pointers, better zoom, greater magnification, or electronic zoom capability. Commercial grade viewers offer affordable alternatives to military systems. *Electronic zoom* (EZ) can expand images to multiply the optical zoom by a factor of 3-8 x resulting in magnification of 60-100+ x in affordable systems. This doubles or triples the acquisition range, but could reduce image clarity in the highest EZ modes.

One inexpensive digital technology is the charged-coupled device (CCD) used in many video camcorders and some cameras operate in the near IR

(0.75 – 1.3 µm) band. These CCDs generally lack ability to see in absolute darkness, but most (Bushnell Night- Hawk) offer superior day vision, video capability, and can be used in “low-light-level” (LLL) conditions. There are some 20-80 x CCD binoculars claim a day acquisition range of 10 km (8 km for man-sized targets).

The following table notes the evolution and variety of viewing sensors meld EO with other technologies used by reconnaissance as well as other ground force units.

EVOLUTION OF OPTICS AND EO SENSORS: GROUND FORCES APPLICATIONS		
Surveillance and Observation	**Added Technology**	**Weapons Target Acquisition**
Binoculars Theodolites Telescopes	Optics (Lenses and Reticles)	Day Sights (Telescopes & Collimators)
Day/Night Viewers Digital Cameras Video Recorders	Electro-Optics	Day Sights Night Sights
Laser Rangefinders (LRF)	Laser Technology	Laser Aiming Sights & Pointers
Laser Illuminators “Radars”		FCS Optical Augmentation
Digital Survey Sets	Navigation/Unit Location (GPS, Computer, LRF, Goniometer)	LRF Fire Control Systems

UAV Drone Remotely Piloted Vehicle (RPV)	Rocket Motor/Airframe	Fiber-Optic Guided Missiles Attack UAVs Laser-Homing Missiles
Micro-UAV; Canister Launch UAV Artillery/Rocket Launch UAV TV Recon Grenades, Projectiles, or Rounds	Artillery/Grenade/Canister Launcher	Attack UAVs Laser-Homing Munitions, Rockets Laser Target Designators
Unattended Ground Sensors (Cameras) Multi-Sensor Pods (Vehicles/UGS) Passive IR (Autotracker) Alerters	Remote Cameras/Acoustics (Motor Drive Actuator/Controls)	Side-Attack Mine Sensor Units Unattended Anti-Tank Grenade Launchers (ATGL) Sensors
Unmanned Ground Vehicles (UGVs)	Robotic Cameras (Robotic Chassis)	UGVs with guns, ATGLs, or ATGMs Robotic Mines



Night Vision Goggles

Night *Infrared Viewers* operate in the 0.75 – 2.00 µm band employ active light sources such as IR spotlights and this technology is easily detectible by adversaries with night vision systems. Therefore, the use of this technology has declined as the passive mode range is limited creating limited practical value. Passive night technology such as II can be found in the Infantry chapter. This technology is now in its 3rd generation, but some companies are claiming a 4th generation technology. This technology continues to expand due

to requirements from hunters, police, and the military. Night vision goggles (NVGs), such as the Malaysian NG-30, allows for hands-free operations such as for driving with many affordable ($200+) for the Nighthawk. The cheaper NVGs, however, may not offer as many features as those designed specifically for the military. Some cameras fuse II and CCD together for effective and affordable day/night use. Many night scopes, night views, and NVGs are not weapon's sights, but can be used to improve accurate firing. These devices can be used to detect targets or queue new targets for weapons. An assistant with an NVG could use a visual light pointer to designate targets for the weapons operator to engage.

A newer night vision technology called *thermal imagery* (TI) is now challenging II in popularity as it surpasses the former in range and resolution. TI can "see" any object with temperature different than the background objects so TI can operate in absolute darkness. TI, however, does possess some limitations.

- Shapes are sometimes converted into images not readily recognized based on the human's visual frame of reference.
- At certain times of the day, the temperature changes may alter shapes or render objects invisible.
- Lack of heat from selected targets means the TI may not see objects in the foreground or background, which helps to provide contrast and context to the observer.
- Generally TI are bulkier than II and require bulky and noisy coolant bottles or power supplies.
- TI sensors are usually more expensive than II sensors.



Handheld Thermal Imager

TI does offer several significant advantages as TI is particularly sensitive to temperatures of warm-blooded animals, vehicle engines, solar-heated metal surfaces, and running gear from moving vehicles. Even after a vehicle stops, the residual engine heat renders a clear TI image for an hour or more. Second, TI usually provides faster and easier detection than II. Many TI systems use cameras operating in the mid-IR band (3.00 – 6.00 µm) with ranges up to 2 to 3 km. FLIR, operating in the far-IR (6.00 – 15.00 µm) band, offers superior clarity and range (3-4 km) for most applications making it the preferred technology.

Due to increased production and competition, the cost has declined so TI is affordable for priority weapons such as ATGM launchers, tanks, and IFV. In Tier 1 and Tier 2 forces, TI is commonly used in reconnaissance vehicles.



Shakhin Thermal Imaging Scope

Over the years, TI has improved so it can be categorized by generation like II. The current proliferation of mercury- cadmium-telluride and SPRITE detector staring arrays increased ranges to 5+ km while improving the discrimination of the images. A recent development is the uncooled TI

that eliminates the bulky coolant bottle. An even more recent 3rd generation system combines II and FLIR to fuse them into one clear image. Reduction in the size of parts including microcircuits and imagers have produced portable TI viewing systems. In Tier 1 and 2 reconnaissance units and selected other units, key sensors and dismounted personnel will possess Sophie thermal binoculars with the II/FLIR upgrade. Some reconnaissance units may employ ATGM thermal sights for battlefield surveillance. The larger the system, the longer range and better clarity of most IR systems.

The miniaturization of camera technologies through CMOS

(complementary metal-oxide semi-conductor) transistors and the spread of commercial products offer fertile ground for new military reconnaissance applications. EO systems, such as the Bushnell Nighthawk CCD Viewer and Digital Imaging System 22 x 60 spotter scope offers video output could be transmitted to computers or goniometer systems. These cameras allow remote viewing options. “Nanny-cams” such as the XCam2 or British Spy Vision can monitor close-in areas such as urban streets and then transmit the images. Tactical applications could include hand-thrown cameras such as the Macroswiss. Other off-the-shelf technology such as digital cameras, camera cell phones, and binocular CCD imagers possess military applications.



Leica Vector Laser Rangefinder (LRF)

Lasers are important for measurement, location, and target acquisition. The most important of these is the *laser rangefinder* or LRF. The LRF is used to measure distances to targets, surveying, or self-location—all important in firing both direct and indirect fire weapons. Many fire control systems on crew-served weapons or on combat vehicles include an in-viewer LRF that provides data into the FCS computer for target acquisition. Dismounted

soldiers can used a hand-held LRF as as the Leica Vector or Aselan LH-7800 binoculars can precisely measure ranges out to 10 km. Some binocular LRFs, such as the Eloptro LH-40C and Russian 1D18, can range targets to 20 km limited only by line-of-sight and the subject’s size. Some of these hand-held systems such as the Bushnell Lytespeed with a 1 km range cost less than

$300.

One of the biggest benefits of lasers integrated into EO systems is increased responsiveness as the optics, EO, acoustics, radars, and other sensors can provide accurate location without the need for a second azimuth to solve an intersection problem. The time required to obtain the second azimuth could allow the target to escape if they are moving. Targets can be precisely located and engaged with only one azimuth, a laser snap, and a simple ballistic computer.

The *goniometer* uses LRF technology and is similar to the old aiming circles used in artillery and mortar units to fire indirect fire. The goniometer surveys itself into position on a tripod base with an azimuth viewer. Most

goniometers are illuminated for night-time use, carry a GPS mount, and a simple computer (or programmable calculator) to determine self-location, directions, and elevations/deflections. Some goniometers are linked to a digital transmission system or have one built right into the system. A binocular LRF could be mounted on top to sight and range objects, targets, and

registration points. Night sights can be added for 24-hour operations. The system can be referred to as a goniometer system, a fire control system (Vetronix Mortar FCS-MORFIRE), a forward observer system or FOS (OIP Delft), an observation station (Leica Digital), a targeting system (Sure Strike), or other names. The modern goniometer-based LRF FOS for the OPFOR is the SG12 with GPS, Leica 21 LRF with 12 km range, thermal night sight, computer interface, and digital data transfer. The entire time to emplace the system is under two minutes.



Aiming Circle

An *aiming circle* can be used for similar purposes with the same accuracy, but only when all of the separate components (LRF, GPS, computer, digital transmission system) are present. Often, a goniometer-based system can be more responsive, move more quickly, and produce greater accuracy than an aiming circle. Any OPFOR aiming circle should be regarded as the base for an observation system. Most dismounted forces worldwide will use an aiming circle or goniometer-based system. Due to its size and ability to be broken down, the goniometer system is portable and easily carried almost anywhere on the battlefield. In the past, 100 meters was considered accurate. With the new systems, accuracy is now one to five meters creating the ability to call in precise fire against a target.

Multi-sensor suites fuse together a variety of recent technologies to create sensors that integrate day/night detection, location, and target acquisition. Most suites are found on vehicles, but suites can be created by dismounted personnel in observation posts (OP) linking the various systems together. The Eloptro LH-40C LRF can link GPS with a computer link for the viewer image to determine range,

bearing, and elevation before sending the data through a digital transmission. The LH-40C does not need a goniometer base for precise target location.



French DHY-307 Laser Target Designator (LTD)

The *laser target designator* (LTD) is the next step in laser evolution. The LTD can guide semi-active homing bombs, artillery, naval gun rounds, mortar projectiles, rockets, and ATGMs directly onto their target. The seeker on the munitions directs the round onto the “laser splash” aimed on the target. Some LTDs, such as the Russian 1D26, can be carried by a single operator. Most LTDs include a tripod mount with other sub-assemblies such as a built-in LRF or night sight, for easy carrying by a team of two to three soldiers. It is likely that as technology increases, lighter materials will be used to create LTDs making them lighter weight and more easily carried for use by dismounted units. There have even been laser-homing grenades developed for squad ATGLs for well over a decade.

In some LTD-based FCS such as the French DHY-307, the LTD replaces the goniometer for an OP. The LTD FCS may contain such features as an encoded beam to ensure only one hit per target, counter-measures against the enemy looking for lasers, GPS, night sights, and the other sub-components found in a goniometer- based FCS. Most laser munitions can be used with most LTDs. Tier 1 and 2 OPFOR observers will operate the DHY-307 with a designation range of 10 km instead of goniometer-based system. OPFOR recon and AT observers possess the ability to call in laser rounds through man-portable LTDs with a night range out to 5 km with an accuracy of 1 m.



PEQ-15 Laser Aimer

The *laser aimer* as discussed in the Infantry chapter or *laser pointer* are used by ground units to shoot direct fire weapons or point out targets to other personnel. The pointers, however, emit light and offer a risk of exposure to a prepared adversary. Thus, the pointers are only used when the fire fight

begins when the using unit possesses fire superiority.

A recent laser technology is the laser locator (also known as the "laser radar" or LADAR or when linked into a weapons fire control system as "optical augmentation) that uses light detection and ranging (LIDAR) to



Leica HDS-3000 LIDAR

detect and measure ranges. LIDAR can operate in the active or passive mode. In the active mode, it employs a laser to scan in the observed sector, scanning in a band pattern similar to radar. The aligned IR viewer then looks for IR light generated by laser light reflected by optics and sights. Although the LADAR operating in an active mode creates a narrow laser beam, it limits the beam spread beyond the scanned target. Passive use of LADAR is more difficult because it depends on the use of light close to or behind the viewer in the right frequency with sufficient brightness and the right angularity for the viewer to detect down-range reflections. An example

of LADAR is the Mirage 1200 hand-held "lens detector" with a range up to 1200 m. Laser filters on optics can reduce the effectiveness of detection by LADAR. Reconnaissance vehicles and aircraft employ LADARs for day and night imagery.



Ground Vehicular Laser Locator Designator

For many years, reconnaissance units have detected the enemy through the process of "triangulation." When 2 or more azimuths are obtained from known locations of a particular target, the target's location can be determined by drawing the lines on the map to determine where the lines intersect. This intersection is the target's location. The system previously had some limitations as the time delay from receiving the two locations with azimuths could provide faulty information, especially if the target was on the move. Recent technology can exploit this old methodology. Precise self-location with GPS, computers, digital map displays, and digital data links from different sensors can provide the two locations with the azimuths in a matter of seconds, providing both sensors are aimed at the same target.

Acoustic sensors are also found on the battlefield including multi-directional microphones, directional microphones, sound-ranging arrays, vehicle arrays, which intersect azimuths to locate sound sources including guns, helicopters, and combat vehicles. Artillery sound-ranging systems include the Russian AZK-5 and AZK-7, Swedish Soras 6, and the British HALO all use microphones digitally linked to automated processors for rapid calculation of enemy firing locations. Sensitive microphones on various Israeli Helispot systems, including autonomous acoustic vehicles, enable them to detect and locate enemy helicopters in flight. Man-portable Air Defense Systems (MANPADS) units also use acoustic sensors to determine target locations.

The military continues to find new applications for *radar* systems, whether they are battlefield surveillance systems mounted on tripods, carriages, weapons, vehicles, aerial platforms, or even trees. New technologies such as miniaturization, millimeter-wave (MMW), improved power supplies, links to laptop computers offer other new applications. Compact radars such as the Fara-1 offer man-portable carrying capability and attachment to weapons, such as automatic grenade launchers (AGL) for fire direction. Slightly larger systems include the Thales Squire two-man radar system with a 24 km operating range that is portable in packs. Tripod-mounted radars such as the Credo-1E can link to digital nets with the ability for easy emplacement or displacement.

The major disadvantage of radar is the system actively emits a signal the enemy can locate through Electronic Warfare (EW) or other systems making the radar vulnerable to attack. Squire is a low probability of intercept (LPI) radar due to its extremely low peak power. Other LIP features include phased array with lower power levels for detectors, reduced side lobes, and operating frequencies outside of most radar intercept system bandwidths. The most common frequency bands for land radar systems have been the I and J bands. In recent years, new radar technologies have been field to add LIP features to reduce intercept vulnerability. Airborne radar such as Horizon use moving target indicator (MTI) and synthetic aperture radar (SAR), and Doppler processing with secure stand- off for missions. MMW radars (30+ GHz) offer precise acquisition and fire control, compact size antennas, and lower signal detectability.

Two other technology trends are on the rise—*remote sensors* and *robotic sensors*. Remote sensors are generally immobile, although they may be able to change their field of view in order to see as required. A simple remote sensor is a side-attack mine, such as an anti-tank disposable grenade launcher placed along an expected advance for vehicles and linked to an autonomous acoustic sensor unit, such as AJAC. As the enemy approaches, usually along a road, the device will launch a grenade, thus audibly signaling the vehicle's approach. Robotic sensors can relocate to perform their mission. Civilian applications have led to a wide variety of remote cameras, remote actuators on robotic systems, and the use with unattended ground sensors including acoustic, IR, seismic, tripwire-

electronic, and magnetic. Key technology constraints include detectability shortfalls, power supply and battery limitations, and signal transmission inadequacies, but the issues are in the process of being resolved. Use of fused sensors means more accurate, timely, and complete reports. Rechargeable batteries, acoustic.IR wake-up, miniaturization, and increased sensor sensitivity all make the use of remote sensors and sensor suites practical as well as marketable.

The British Radamec 1000L system is an example of a *remote camera* with limited operator presence to detect targets. Other applications include cameras tethered from concealed vehicles and operated through the vehicle power system. New technologies include passive IR scanning cameras with auto-track and alert algorithms such as the French Sirene or British ADAD IR units emplaced on the battlefield to link into sensor nets and monitor sensitive avenues of approach and unit flanks. Early systems include air defense sensors such as ADA, Sirene, or the hand-held Swedish IRS-700. A tethered *aerostat balloon* can hold a remote camera platform to increase surveillance beyond the line-of-sight. The Israeli TAOS system uses a gimbaled, stabilized, multi-sensor platform with a CCD and thermal camera for day or night use. Radar and laser illuminator applications are optional with the ground station mounted on a trailer. Ground forces are also adapting commercial camera network technologies to create a *surveillance camera network* that can monitor wide areas on the battlefield. These systems include the CELTICS, TACS, and Gamma 2000—all produced by Israel.



Robot with Camera

The use of an *unattended ground sensor* (UGS) by the US dates back to the Vietnam War where the UGS units were placed to detect enemy presence and movement. Some of these sensors were "break-wire" that generated a signal when broken. While the most common UGS is acoustic, other UGS units can monitor seismic, magnetic, infrared, or RF activity. Some UGS units can sleep to save energy and the size can vary from a few centimeters to a few inches in size. Relay systems may be required to forward the signal to the monitoring station. By analyzing the location and pattern of signals, the operator is cued to initiate additional battlefield surveillance activities in selected areas. Examples of UGS units include the Thales Miniature Intrusion Sensor (MIS) and Rafael. Current technology reduces false alarms such as from animals wandering in the area. Emplacement is important as if placed in too open of an area, the UGS can be seen. If placed in an urban or defilade position, the signal may not reach the monitoring station. Larger UGS units may be placed at road junctions, river crossing sites, and other important locations. Examples of the larger UGS units include the ATE UGS, Steel Eagle, Gateway, and Boden- Sensor-Ausstattung (BSA). The Thales CLASSIC 200 has been sold t over 39 countries for military, border control, police, and commercial purposes with a complete network with monitor, acoustic, cameras, and other sensors. Possible roles for the UGS include perimeter protection, route monitoring, and point surveillance. Emerging UGS technologies include linking to other sensors, mine activation, remote

weapons system operation, and autonomous cueing to conduct precision targeting. A subset of the UGS is the *remotely-delivered sensor* that delivers reconnaissance rounds through a weapons system such as artillery or mortars. These rounds, once fired and activated, can provide target location, acquisition, and post-mission battle damage assessment. Cameras provide a low-cost method to obtain immediate view beyond the line-of-sight, over the hill, or behind the foliage, with a reduced risk of being seen. The Israeli IMI recently debuted a Refaim rifle grenade containing a camera that can transmit pictures back to the launching unit as the round descended on its target. A 40-mm under-barrel rifle grenade launcher can fire the Israeli Firefly that transmits video and sound back to a digital radio and laptop computer. In addition to their anti-tank role, fiber-optic ATGMs can use their camera to provide video footage for analysis by reconnaissance units.

Robotic sensors consist of single or multiple sensors mounted on robots or unmanned ground vehicle (UGV) chassis. Previous applications include the exploration of the ocean floor, other planets, and inaccessible areas

such as caves or volcanoes. The police often uses a robotic sensor for surveillance in hostile situations as well as examining contamination areas such as the Chernobyl nuclear plant. A military version is the tracked Matilda with a day TV camera used in Afghan caves, clearing minefields, and checking for potential IEDs. The OPFOR can use robotic sensors for surveillance and patrols in urban or open terrain to reduce troop vulnerability. A simple application is to use robots controlled from reconnaissance vehicles or nearby personnel. A robotic chassis features EO viewers for guidance and surveillance, such as a TV camera with an RF or cable link; GPS in-view readouts; a thermal or II night channel; and LRF. A robot can carry other sensors including acoustic microphones, NBC samples, radar, or weapons. Other robotic examples include the British tracked Wheelbarrow mine detection system or the Giant Viper wheeled line charge launcher vehicle that tows its own charge trailer. The German company, Telerob, produces tracked robots for industrial, police, and military applications. The Russian SPC robot can employ a number of sensors.


American RQ-11 Man-Portable UAV

The earliest robotic sensors on the modern battlefield were unmanned aerial vehicles (UAV). See Volume 2 for additional information on UAVs. UAVs can perform pre-programmed (drone) or operator control (remotely piloted vehicle—RPV) missions. The on-board TV camera and its ability to transmit the images to a ground station are the core of the UAV mission. In the last few years, unmanned combat aerial vehicles (UCAV) have appeared to attack located targets. A UAV ground station can consist of only a notebook computer or PDA as a terminal. Due to the high cost of airplanes and the training required to become a proficient pilot, UAVs are an excellent way to work through budget constraints and lack of an efficient manned air force. Recent or expanded technology for UAVs include the following:

- *Man-portable UAVs* are light weight and can be carried in a backpack and launched by hand such as the German Carolo, Russian Pustelga, or French K100.
- *Micro-aerial Vehicles* (MAV) use radio-control (RC) model plane technology where some of these are not larger than a man's hand.
- *Improvised UAVs* using RC aircraft.
- *Vehicle/robotic launch UAVs* including canister launchers such as the Israeli Skylite UAV or the UAV the French are looking for their next LeClerc tank upgrade.
- *Weapons-launched UAVs* such as the Russian R-90 300- mm launched by the 9A152-2 MRL can loiter for 30 minutes while transmitting imagery to an artillery command and reconnaissance vehicle (ACRV).
- LTD UAV where the UAV substitutes as the laser designated in lieu of a soldier or vehicle.

Battlefield monitoring systems require the use of cable links or RF data transmission equipment, and display arrays such as those found in vehicles modified into ground stations. These systems can fuse various technologies, including commercial equipment, together to obtain the best situational awareness possible for the user.

Technology limitations will continue to challenge reconnaissance operations, but solutions will be found. Commercial applications will continue to cross over into the military as forces with limited budgets will continue to use off-the-shelf technology for military purposes. The OPFOR will supplement new technology with low technology to conduct their reconnaissance operations. Innovative military forces can use niche technologies and aggressive manned reconnaissance units to conduct battlefield surveillance operations. The battlefield surveillance networks will consist of personnel, organic sensors, vehicles, UGS, remote sensors, UAVs and any other reconnaissance assets available. Effective equipment, sound organization and planning, commitment to the OE variables, and effective reconnaissance tactics can enable the OFPRO to gain greater situational awareness within their operational area, and to challenge enemy capabilities to achieve tactical surprise.

Chapter 2: Infantry Weapons

Chapter 2 provides the basic characteristics of selected infantry weapons either in use or readily available to the OPFOR and therefore likely to be encountered by US forces in varying levels of conflict.

The chapter is divided into two categories small arms and recoilless weapons. Small arms covers, in order, assault and battle rifles, sniper/anti-material rifles, automatic grenade launchers, under-barrel and hand held grenade launchers, light machineguns, general-purpose machineguns, and heavy machineguns. The second category, recoilless weapons, contains the most proliferated disposable launcher rocket propelled grenades and reloadable launcher RPGs and recoilless rifles. While originally limited to shoulder-fired unguided antitank weapons such as the Russian 40-mm Antitank Grenade Launcher RPG-7V, the utility of shoulder-fired weapons has expanded to include multi-purpose systems such as the Swedish 84-mm Recoilless Rifle Carl Gustaf M2, and many other systems. This field of weapons is often labeled “antitank” and also includes “bunker-buster” warheads, and weapons which can be fired from within confined spaces such as the German 67-mm Disposable Antitank Grenade Launcher (Armbrust) due to no or minimal back blasts. New, disposable launcher Tier 1 anti-armor systems such as the RPG-28, 32 and 30 have also been added. The RPG-30, in particular, is designed to defeat both Explosive Reactive Armor (ERA) and Active Protective Systems (APS) via a sub-caliber device that upon firing reaches the target milli-seconds before the main 105mm HEAT tandem warhead rocket. The RPG 28 is a heavy, 125mm tandem warhead weapon that will penetrate in excess of 1000mm of rolled, homogenous armor (RHG), after defeating ERA. Both are formidable anti-armor systems, which can be easily employed by the individual Soldier or insurgent.

An enduring battle-tested, lethal, shoulder-fired weapon is the Russian Infantry Rocket Flame Weapon RPO-A Series (RPO-A/D/Z) capable of firing either a smoke, incendiary, or a thermobaric warhead to 600 meters. At 200 meters it is accurate to 0.5 m2. The thermobaric warhead has a blast effect corresponding to a round of 122-mm HE artillery. Due to the relative low cost, availability, versatility, transportability, trainability, and lethality of this category of infantry weapons, trainers should expect to encounter these systems in larger numbers with increasing levels of lethality, penetration, and utility.

Updates and changes also include the following: the SMLE and Moisan-Nagant bolt action rifles have been deleted from the WEG. The Heckler and Koch G3 and Fabrique Nationale FN battle rifles have been added due to their proliferation throughout parts of Africa, South America, and the Indian sub-continent. Additionally, the Chinese bull pup assault rifle QBZ-95 has been added along with the Russian Federation’s SV-98 sniper rifle.

Crew-served infantry weapons which require a vehicle, or which limit mobility, have been moved to the Antitank and Anti-Armor chapter (6).

Chapter 3: Infantry Vehicles

Infantry vehicles include all military vehicles designed for use by infantry and other tactical units. They vary from unarmored multi-role vehicles to specialized armored vehicles. Mechanized infantry units often use light armored fighting vehicles (LAFV) designed as infantry squad carriers. Infantry units use large numbers of vehicles, armored and unarmored, for support missions. Due to budgetary constraints, some forces also use commercial vehicles or military vehicles considered obsolete by other militaries. The US Army will likely encounter infantry forces with a mix of older, newer, and upgraded infantry vehicles in their next battle.

Vehicle Classification: The infantry can use LAFVs, multi-purpose support vehicles, specialized vehicles or commercial vehicles to transport soldiers. In wartime, the OPFOR will use all systems available to execute the mission. This chapter is divided into three sections: armored infantry carriers, fire support vehicles (FSV), and combat support vehicles (CSV).

Armored infantry carriers, also known as armored fighting vehicles (AFV) are normally divided into two types: armored personnel carriers (APC) and infantry fighting vehicles (IFV). In both types, a small crew of two or three soldiers stay with the AFV while a dismount team of five or more soldiers can conduct missions on foot. Normally, most AFVs carry a total of ten soldiers, but some AFVs can carry more while others less. The difference between the APC and the IFV is the APC is a “battle taxi” that dismounts the soldiers outside of direct fire range while the IFV is designed to fight with soldiers onboard to and through the objective. To qualify as an IFV, the vehicle must be able to carry a team or squad; contain enough armor to protect the occupants from light machine guns; feature a medium cannon or automatic grenade launcher (AGL) that can defeat enemy armor vehicles; shoot on the move; possess the mobility to stay with tanks while traveling on roads or across country. Many manufacturers call their vehicles various names to make them sound like an IFV, but are not. The addition of a medium cannon to an APC does not make it an AFV unless it possesses the other characteristics. Some AFVs may be dropped from the air to be used by paratroopers on the ground. Some sources will describe a vehicle as a medium armored vehicle (MAV) or a heavy armored vehicle (HAV). The term MAV will not be used in this chapter and HAVs are often AFVs built on the same track system as a tank so they can stay up with the armor. The term heavy infantry fighting vehicle (HIFV) or heavy armored personnel carrier (HAPC) refers to the vehicles protection capability, not the vehicle’s weight. For information on HAVs mounted with some type of cannon, see Chapter 4.

AFVs normally are differentiated based on three categories: mobility, survivability, and lethality. Some AFVs travel on wheels while others travel on tracks. While not a necessity, most IFVs operate on tracks in order to travel the same terrain as tanks as

the tracks more evenly distribute the vehicle's weight. Wheeled vehicles are more likely to succumb to mobility kills than tracked vehicles as tires are susceptible to punctures. Two flat tires on the same side of the vehicle may bring the vehicle to a complete stop. Survivability is the ability of the vehicle to protect its occupants and remain operational. Survivability is based on the vehicle's armor thickness, type (modern such as reactive armor), and style (slope). Adding armor to an AFV may reduce its mobility and creates a dilemma between survivability versus mobility. Lethality is based upon the AFV's weapon systems and the weapons' ability to penetrate other vehicles' armor. Increasing the size of a main gun on a vehicle, however, often reduces its mobility. Some AFVs may feature a turret, 1-man or 2-man, but others will not. AFVs often operate auxiliary weapons such as coaxial mounted machine guns (fire in the same direction as the main gun), turret-mounted machine guns, AD machine guns, or an AGL.

Many infantry units also field FSVs featuring air defense (AD), anti-tank (AT) weapons, or mortars to guard their formations against aerial or armor threats. These vehicles may be used by chemical detection teams, field artillery forward observer teams, or Many of the AT systems are discussed in Chapter 5. The OPFOR may use civilian four-wheeled drive vehicles, sport utility vehicles, or commercial vans adapted for military roles. This chapter has been reordered to put vehicles with similar characteristics together.

Selection Matrix for Infantry Carriers in a Military Force: Facts which impact the selection of the right vehicle for use in a military force may vary based on budget constraints, industrial base limitations, or political-military-industrial alliances. The following table offers engineering and employment considerations for use in selecting vehicles. An OPFOR squad is 9 to 10 personnel, counting the vehicle crew. Team size is 3 to 4, counting the vehicle crew. Infantry in this context includes SOF, insurgents, criminals and any other maneuver forces.

Factor	Tracked IFV	Wheeled IFV	Tracked APC	Wheeled APC	Light Wheeled APC	Armored Tactical Utility Vehicle	Light Strike Vehicle
Role	Fight with Squad onboard/ dismount; provide lethal fires	Fight with Squad onboard/ dismount; provide lethal fires	Carry Squad to dismount point; give covering fire	Carry Squad to dismount point; give covering fire	Carry Squad to dismount point; provide fire protection	Team carrier and multi-role functions; fire protection	Team carrier and multi-role functions; fire protection
Costs (1-10 with 10 being high)	9 to 10	8 to 10	3 to 5	4 to 7	1 to 3	1 to 3	1 to 3
Weight (mt)	@ 20 to 35	@ 20 to 25	@ 11 to 13	@ 10 to 15	@ 6 to 8	@ 4	@ 1.5
Time Deploy & Movement	Fast dash; slow over distance	Slow dash; fast over distance	Fast dash, slow over distance	Medium dash; fast over distance	Medium dash; fast over distance	Medium dash; fast over distance	Fast dash; fast over distance
Terrain	Good off-road; most swim	Poor off-road; some swim	Good off-road; all swim	Fair off- road; all swim	Medium off-road; most swim	Good off-road; most swim/high ford	Good off-road; most high ford
Threat to Vehicle (Frontal Protection)	Aircraft, AFV, AT weapon, mine/IED, artillery, flame, some obstacles 20 mm rd	Same as left; 5.56+mm MG to tires, obstacles 14.5 mm rd	Same as left; some obstacles 12.7 mm rd	Same as left; 5.56+ mm MG to tires; many obstacles 12.7 mm rd	Same as left, some obstacles 7.62 mm rd	Same as left; a few obstacles 7.62 mm rd	Same as left; almost no obstacles 5.56 mm rd
Targets for On-Board Weapons	All targets; 30-mm gun; ATGM; AGL; MG	All targets; 30-mm gun; ATGM; AGL; MG	Aircraft; LAV; 12.7 to 30 mm gun; MG; personnel	Aircraft; LAV; 12.7 to 30 mm gun; MG; personnel	Aircraft; LAV; 12.7 gun; MG; personnel	Aircraft; LAV; 7.62 to 12.7 gun; MG; personnel	Aircraft; LAV; 7.62 to 12.7 gun; MG; personnel
Support Required	High fuel use; load limits for aircraft	Medium fuel use; load limits for aircraft	Low fuel use; most aircraft loadable	Low fuel use; most aircraft loadable	Low fuel use; most aircraft loadable	Low fuel use; most aircraft loadable	Low fuel use; most aircraft loadable

Social Impact	Road size; noise; maneuver damage	Road size; block traffic if stuck	Road size; road noise	Road size; block traffic if stuck	No major	No major	No major
Example	BMP-2M	BTR-90M	Type 85	BTR-80A	Otokar Cobra	VBL	Spider

Chapter 4: Main Battle Tanks

This chapter contains a representative open source sample of main battle tanks (MBTs) in regions

covered by US combatant commands. This MBT selection is not comprehensive; however, the capabilities of vintage and modern tanks are significant indicators of organizational capabilities that adversaries can array against the United States.

A unit commander, scenario developer, curriculum developer, and/or other leader can use the WEG to configure a required level of Threat capability in an opposing force (OPFOR) as described in US Amy Regulation 350-2, *Operational Environment and Opposing Force Program* (2015). Practical application includes U.S. Army training, professional education, and leader development. The spectrum of WEG characteristics is descriptive—not prescriptive—and facilitates creating robust, realistic, and relevant Threat conditions in U.S. Army learning and capabilities development (CD) initiatives.

Many modern MBTs have a four-person crew of tank commander, gunner, loader, and driver. When an autoloader is part of the main gun system, the MBT has a three-person crew of tank commander, gunner-loader, and driver. Most modern MBTs mount a 105-mm to 125-mm main smoothbore gun, although limited types of MBT mount a rifled gun rather than smoothbore gun. Some MBT also have the capability to launch antitank guided missiles from their gun. Most tanks can typically stow at least 40 main gun rounds in the tank. Those tanks with an autoloader allow for immediate automatic loading of about half of the on-board ammunition.

As an integrated system of systems, evaluation of a main battle tank [some professional descriptions compare and contrast tanks as medium tank or main battle tank based on tonnage] analyzes efficiency and effectiveness from a holistic perspective. Capability and vulnerability can be evaluated in several ways depending on context and intended purpose. The WEG descriptions employ three functional categories of major subsystems to gauge overall MBT effectiveness:

- Mobility.
- Survivability.
- Lethality.

Mobility considers the relationship between improved automotive performance efficiency and the combat-load weight of a MBT. Vehicle fuel cell capacity and the type of terrain traversed affect expected norms for cruising range. MBT with on-board fuel cells can typically run for distances between 450 and 600 kilometers (km). Diesel is the norm for engine fuel among modern MBT; however; some tanks have a multi-fuel engine which can run on kerosene, diesel, and/or specific types of benzene. Vehicles with an auxiliary power unit (APU) improve MBT fuel economy during temporary halts or operating in stationary positions. Improved diagnostic upgrades alert the crew for corrective actions needed to sustain availability of an MBT subsystems.

Vehicle weight for an MBT can range from 40 to 70 tons. Several tanks described at times as medium tanks are included in this sample as main battle tanks. For example, the T90A is approximately 47 tons, the Leopard 2A6 is approximately 55 tons, and the Challenger 2 approaches 70 tons. Improvements to suspension systems, transmissions, and tracks complement automotive performance. Upgrading systems with modular components reduces inoperative time for repair and maintenance.

Survivability combines functional improvements to composite or spaced tank hull armor that include mine-protection appliqué, active-reactive and/or passive appliqué armor for the turret, glacis, flanks, and rear, and various forms of stand-off caging or mesh screens that degrade the effect of antitank weapon hits and armor penetration. Appliqué armor and explosive reactive armor (ERA), now a norm for improving protection, substantially increases vehicle weight.

Camouflage systems include methods for reducing detection by optical, infrared, and radar technologies. On-board sensors can include mine detection and laser or radar acquisition warning receivers that automatically activate MBT defense and/or interception systems. Some MBTs mount television cameras for crew 360-degree visual awareness of near surroundings and enhance local security.

A pressurized nuclear-chemical-biological (NBC) system provides crew protection in upgraded tanks for the modern NBC-contaminated battlefield. Air conditioning in some MBTs enhance systems readiness and sustainment of crew readiness in heat-extreme climates.

Other survivability enhancements can include entrenching blades for MBT self-emplacement in defensive positions, mine-clearing plows and rollers, vehicle smoke emission systems, and aerosol or smoke-obscurant grenade launcher systems. Tank survivability considers the context of operating as a *combined arms* team. Some upgrade suites include an external

intercommunication telephone on the MBT's exterior for coordinating with infantry operating alongside the MBT. Armor and infantry typically operate as a team to optimize the tactical advantages that each element provides the other team member.

Lethality considers more than the main gun and auxiliary weapons systems. In addition to weapon efficiency, lethality is related to the MBT's ability to acquire and track a target, its weapon system effective engagement range, and crew situational awareness of multiple concurrent targets available for engagement. Improved command and fire control systems can include integrated thermal viewfinders for tank commander and gunner, laser rangefinders, and digital communications. Integrated command and control interconnects a network of sensors, imagery, navigation, and information systems that facilitate situational awareness and tactical understanding of an operational environment (OE).

Upgrades to lethality can include main gun and/or gun-missile capabilities, improved stabilization and fire control systems, and improved ammunition effects. Critical considerations to these upgrades include linking fire-on-the-move capability to MBT stabilization systems, rate of fire, integrated sights, target acquisition ranges, and weapons ranges to include maximum effective and maximum ranges. Lethality incorporates factors relevant to gun sights, gun precision, type of gun mount, and specific round caliber ballistics as components of maximum aimed range and maximum effective range.

Improved main gun munitions addressed in the *WEG* incorporate ongoing research and development of kinetic energy (KE) rounds with a dart-like penetrator (armor-piercing, fin-stabilized, discarding sabot (APFSDS) and/or high-explosive antitank (HEAT) multi-purpose rounds that use a shaped-charge for armor penetration. The *WEG* reflects a variety of ammunition capabilities, such as electronically-fuzed rounds for use against helicopters, or canister rounds for use in close combat. HEAT-multipurpose (MP) rounds can also be used against anti-materiel and antipersonnel (AP) targets. In comparing tank-on- tank main gun ammunition lethality, kinetic energy rounds are more lethal against composite or spaced armor than high-explosive antitank rounds gauged at the same penetration value. Ammunition upgrades are trending toward more efficient propellants with improved effects and armor penetration.

In terminology, *ready rounds* are stored for easy retrieval either inside the turret or in bustle compartments, to sustain a consistent rate of main gun fire. In listing available ready-rounds in the tank turret, the number of rounds does not typically include the ability to add an additional round in the breach. *Stowed rounds* are rounds that are either outside the tank's autoloader, or in compartments that preclude immediate retrieval during a main gun engagement. For an OPFOR MBT, the typical mix of main gun rounds on board a tank is 50% antitank and 50% for use against other targets. The OPFOR ammunition unit basic load and ammunition combat load will vary based on tactical and operational considerations of a particular training, education, or leader development condition.

A heavy machinegun auxiliary weapon in or on the tank turret trends toward a remote-controlled weapon station (RCWS) configuration to provide the ability to fire the weapon while the crewman remains protected inside the turret. Auxiliary weapon mounts often allow high-angle fire for air defense and use in built-up urban areas and/or highly inclined slopes in rural terrain. Armor shielding for the loader's machinegun, when mounted on the turret, improves protection when the machinegunner is exposed outside a turret hatch.

Summary. Improvements in MBT capabilities are typically upgrade packages rather than new tank models for production. Current evidence underscores increasing fiscal costs for research and development, testing, and production of MBT systems. Visual identification of MBT capabilities is often difficult due to the variance in upgrades to internal systems of an MBT. However, a significant decision in obvious MBT development is the ongoing field trials of the Russian Federation *Armata* family of armored chassis vehicles. The T-14 MBT within this modernization initiative provides major improvements to MBT capabilities that were constrained previously due to the vintage T-72 series hull, turret, automotive, and weapon system configurations. Professional observers in the near future will witness if the Russian Federation fields a T-14 fleet as a significant main battle tank adversary. The principle states with major indigenous tank production industry are analyzing how a fielded T-14 fleet affects their future research and development for MBT upgrade programs to counter such a threat.

The MBT WEG tier tables present examples of state-of-the art to vintage MBTs with capabilities and vulnerabilities based on upgrades to basic tank model functions of mobility, survivability, and lethality. For example, selective main gun capabilities in some models can be augmented with an anti-tank guided missile (ATGM) capability to achieve extended range and effects beyond the main gun effective range.

Leaders adapt data in the WEG to tailor an OPFOR with robust, realistic, and relevant Threat conditions for a challenging environment to U.S. Army learning and capabilities development (CD) initiatives.

Chapter 5: Anti-tank and Anti-Armor Systems

As armored combat vehicles added more protection and ascended in importance on the battlefield, so

did systems designed to stop them gain importance. The umbrella term ***antitank*** (AT) originally denoted systems specifically designed to destroy tanks. Today it is more broadly constructed. Modern combat is combined arms combat. Mechanized forces include other armored combat vehicles, such as armored reconnaissance vehicles, infantry fighting vehicles, armored personnel carriers, etc. In order to address the whole spectrum of threats on the modern battlefield, new systems are being

developed and older systems redesigned. Examples are ***heavy armament combat vehicles (HACVs)*** and ***heavy combat support vehicles***.

Tank armor protection continues to increase, but another way to defeat them is to defeat associated systems. Tanks cannot survive or achieve their tactical objectives without support from other armored systems. The more recent term ***anti-armor*** may supplant the current term because antitank weapons which cannot penetrate tank armor can still be effective threats to defeat or damage more lightly armored fighting vehicles. With upgrades and innovative tactics, even older, seemingly obsolete weapons can be used as opposing force (OPFOR) anti-armor weapons.

The OPFOR places a high priority on destroying enemy vehicles. It will use all available assets (organic and improvised) for the effort. The spectrum of AT and anti-armor weapons includes aircraft, artillery, NBC assets, sniper rifles, and air defense systems. Many OPFOR countries employ antitank weapons for roles other than antitank, including AT guns against personnel and soft targets, and ATGMs against personnel and rotary-wing aircraft.

Critical factors for destroying vehicles are abilities to slow, canalize, and stop them by engaging them with lethal fires and ambushes. Mines, explosives, IEDs, other obstacle systems, and terrain restrictions can be used in concert with AT weapons.

Antitank guns (AT guns) include towed and self-propelled AT guns (aka ***SPAT*** or tank destroyers). A number of guns were designed as field guns, with multi-role capability as both artillery and antitank guns. The modern focus on maneuver warfare has brought a slight decline in development of uniquely antitank guns. Thus, the 85-mm D-44 gun, which can be used as artillery, is effective for use in an antitank role. Although recent systems have been developed, the number fielded has not kept pace with production of armored combat vehicles. Nevertheless, their effectiveness and selected armies' continued reliance on linear positional battles and protracted defenses have kept a large number of these systems in inventories. Based on numbers fielded and likelihood of their threat to US forces, only towed antitank guns were included.

Upgrades for towed guns are available. These include night sights, such as passive image intensifier sights and thermal sights for the Russian 100-mm MT-12. This is a robust antitank weapon with a high rate of fire and rapid mobility. Note the Russian innovation in the MT-12R AT gun with a radar-directed all- weather fire control system. Improved ammunition is critical for continued effectiveness of antitank weapons. The MT-12 and its variants can fire a variety of modern ammunition, including the Russian gun- launched ***antitank guided missiles*** (ATGMs), Kastet and Arkan.

The ATGM is the singular greatest threat to tanks today. These systems are distinguished from other antitank weapons in that they are guided to the target. Most employ SACLOS guidance (see Glossary). An operator holds crosshairs on the target, and the missile tracker directs the missile to that point. There are a wide variety of countermeasures (such as smoke and counter-fire, due to long flight time and operator vulnerability) for use against ATGMs. Thus, a 90% probability of hit is a technical figure, and does not mean a 90% probability of success. On the other hand, there are a variety of counter-countermeasures which the ATGMs, launchers, and operators can use to increase the chance for success. Tactics, techniques, and procedures in the antitank arena are critical to mission success.

Armor protection for many modern tanks has outpaced some older AT weapons. However, ATGMs offer improved size, range, and warhead configurations to destroy even the heaviest tanks. Notable trends include increased proliferation and variety of man-portable and portable ATGM launchers. These include shoulder-launched, short-range systems, such as the French Eryx, and copies of former Soviet systems, such as the AT-3/Malyutka ("Suitcase" SAGGER). Some so-called portable launchers (AT-4/5, TOW, and HOT) have outgrown portability weight limits, and must be carried in vehicles and only dismounted short distances from carriers. But newer compact systems are being fielded, e.g., Spike-MR and Kornet-MR.

Although there are special-built ***ATGM launcher vehicles***, the most numerous launcher vehicles are common chassis adapted by adding a pintle mounted, manually loaded and launched ATGM. Adaptation is simple, so they are not described here. Nearly all ATGM launchers are high-level threats to vehicles and rotary-wing aircraft in the US Army. They can also be used against personnel and materiel targets. The variety of launch platforms is increasing. UAVs are being adapted to launch ATGMs for responsive attacks against NLOS/BLOS targets.

Recent trends include new ATGM technologies for increased range and lethality. The most common type of lethality upgrade is the addition of a nose precursor or tandem warhead. Recent options include missiles for wider battlefield lethality—BLOS/NLOS systems, and long-range ATGMs to attack targets previously considered invulnerable. NLOS guidance technologies include fiber optics (to see through the missile eye BLOS) and semi-active laser homing (for dismounted soldier/vehicle/aircraft/UAV-mounted laser target designators to select targets). Others have "fly-over, shoot-down" mode to fly behind a hill and fire an explosive-formed penetrator (EFP, in the shape of a cannon kinetic-energy penetrator round) downward through the relatively soft top of armored vehicles. Improvements include improved guidance, resistance to countermeasures, reduced smoke/noise signatures, and increased range. Night sights are common, including thermal sights. Many countries are looking at active protection system (APS) CM systems. Already, some ATGM have counter-countermeasures to defeat all APS.

The chapter groups systems in order of mobility and unit level, from dismounted or man-portable weapons, to ground-mounted or towed weapons, to tracked or wheeled vehicle-mounted weapons. Weapon systems in this chapter represent likely or possible threats against US Army forces.

Antitank and Anti-Armor Systems: Key Technology Trends

Military forces worldwide continue to field new anti-armor systems and upgrade legacy systems. Modern tanks can be fitted with increased armor protection, countermeasure systems, and survivability support systems. Thus new antitank systems and upgrades are being fielded to challenge those protection upgrades. Most weapons on the battlefield have some anti-armor capability. A variety of multi-role (MR) weapons have been fielded with lethal AT capability. Similarly, many AT weapons are used to defeat other targets.

System Category	Technology Trend	System Example
Recoilless Weapons	Electro-Optical LRF fire control system (FCS) with II/thermal sight Precision munitions and missiles for recoilless crewed weapons New munitions (tandem HEAT, longer range, multi-purpose use) Small light launch tubes and disposable canisters to extend length Rapid disassembly into components for dismount team portability	Simrad LP101 M40 with LAHAT SPG-9M Rcllss gun RPG-29 Mtd ATGL M79 Rcllss gun
AT Guns	New FCS can include radar-directed fire control New munitions include homing round and gun-launched ATGMs Auxiliary propulsion units for local moves Increased protection for AT gun vehicles (see HACVs) HACVs with similar weapons lethality to tanks	MT-12R AT gun 2S25 AT gun MT-12/MT-12R Type 63A light tank 2S25 SPAT gun
ATGMs	EO/thermal FCS with LRF and encoded beacon to counter jammers Missiles include thermobaric multi-use, improved tandem, top attack New guidance modes extend range for missiles to BLOS and NLOS Back-blast reduction for use in confined spaces KE missiles/rounds with short time-of-flight to defeat active protection Light man-portable medium-range high-lethality ATGMs Remote add-on vehicle turrets with EO optics and multi-launchers	Konkurs-M (AT-5B) AT-13 Spike-LR Eryx Starstreak MILAN-ADT VBL-Kornet
Multi-role Weapons	Multi-role systems and munitions in other units to defeat armor Multi-role (AD/AT) missiles for air defense and anti-armor use Multi-role missile vehicles for AD, AT, and infantry units Multi-role gun/missile systems and heavy combat support vehicles	Strix IR Mortar rd Starstreak BMP/Kliver BMPT
Other AT Weapons	Mines and IEDs include remote controlled and scatter mine systems Flame weapons for use against armor and vehicle subsystems Improvised weapons for use against vehicles and personnel Wide variety of weapons to defeat wheels on armored vehicles	RPO-A grenade Molotov Cocktail PKM machinegun UMZ Mine scatter

Spectrum of Weapons and Munitions Effective Against Armored Vehicles

Military forces will use a wide variety of weapons to defeat armored systems and degrade their operations. The WEG describes MR weapons in various locations. Common weapons in combat units will engage various targets, including armored vehicles. With emphasis resulting from modern urban combat; demand for improved weapons and munitions against armored vehicles is increasing.

The challenge in defeating modern tanks is extremely difficult, with their high amount of armor protection and high mobility. Antitank subunits/units are found in infantry and armor battalions, brigades, and divisions, and in other combat units as needed. AT units are specially designed to support infantry, armor, and other units in combat, and are often task organized in combined arms groups. With limited armor protection and vulnerability to ground weapons, AT systems do not separate from supported maneuver units. AT unit weapons include the following:

- Crewed recoilless guns and launchers
- Towed AT guns
- HACVs (aka SPAT, etc.)
- Man-portable and shoulder launch ATGMs
- Portable and ground mount ATGMs
- ATGM launcher vehicles, and
- NLOS ATGM launcher vehicles

The most prolific anti-armor and antitank systems are in units other than AT units. By number, most are found in infantry, mechanized infantry, tank units, and in special purpose forces units, but can also be in irregular and hybrid forces. They include the following assets.

Branch	System Type	Example	Lethality D/K if hit*	Remarks
Infantry,	ATGL	Pzf 3-IT600	Tk and LAV=K	Tandem HEAT, HE, Bunker-B
SOF, etc.				Tandem HEAT
(Also irregular or, hybrid	ATDL Shoulder ATGM	RPG-27 Eryx	Tk and LAV=K Tk and LAV=K	Tandem HEAT, HE IR/seismic sensor, RF/wire
forces)	ATGL/IED remote fuze	SIRA sensor,	LAV=K, Tk=K	cmd
		Salamander		
Infantry Vehicles and other	IFV main gun and ATGM	AMX-10P/MILAN	LAV=K, Tk=K	APDS round, ATGM Tandem
LAVs	Infantry fire spt	BMP/Kliver	LAV=K, Tk=K	Gun, ATGM, MANPADS
	vehicle	BMP-3M	LAV=K, Tk=K	See also HCSV
	Heavy IFV/IFSV			
Tanks	Main Gun and ATGM	T-90S	LAV=K, Tk=K	Rounds and ATGM

Maneuver units receive support for various combat missions and phases. ATDLs are treated as ordnance stored with other ammunition, then disseminated as needed to infantry and other users depending on mission and battle conditions. Engineer assets and units will support maneuver units in the defense and conducting ambushes (by delivering or laying mines to slow or stop enemy forces, so that they can be engaged with AT/anti-armor weapons). Infantry companies and battalions may have organic weapons platoons for AT/anti-armor fire support. Combat units can call for AT unit support, anti-armor mortar/artillery fires, and aircraft strikes.

A shift to using more light armored vehicles (LAVs) has led to production and deployment of a wide array of anti-armor and multi-role weapon systems for use against LAVs. Threats to mobility are also greater with wheeled LAVs. The table on the next pages shows some of these.

Multi-Role (MR) and Anti-Armor Weapons and Munitions to Counter Armored Vehicles

Branch	System Type	Example	Lethality D/K if hit*	Remarks
Infantry, SOF, etc. (also irregular and hybrid forces)	Rifle, Machinegun Hand grenade Grenade Launcher Anti-materiel rifle MR ATGL/ATDL Flamethrower/FAE Air-to-Surface rkt lchr Improvised explosives Multi-role missile	SVD with AP rd Molotov cocktail QLZ-89 with DP Barrett M2A1A PF-89A Shmel-M reusable lchr C-5K (S-5K hand lchr) IED, “sticky bombs” Starstreak	LAV=D, Tk=D LAV=K, Tk=K LAV=K LAV=D, Tk=D LAV=K LAV=K, Tk=D LAV=K LAV=K, Tk=D Heli, LAV=K	Vs tires, optics, engine, etc. Blind optics, secondary blast Penetrate/damage tires/wheels Calibers from .338 to 23 mm HE or thermo with penetrator RPO for napalm, RPO-A FAE Improvised and shop-made Designs and fuzing vary widely Infantry Bn, also AT, AD units
Support Vehicles	AD/AT fire spt vehicle Combat recon vehicle Flame unit spt vehicle ASR launcher vehicle	Armored Starstreak BRM-3K BMO-1 with 30 RPO-A BMD/Aviaagregat S5K	LAV=K LAV=K, Tk=K LAV=K, Tk=D LAV=K, Tk=D	Weapon priority - self-defense Also BMO-T on tank chassis RS, 12x rkts, poss SAL PGM

Artillery/Mortars	Frag/HE round/rkt Flame/FAE rocket Dual-Purpose ICM SAL-homing rd/rkt IR fuzed/homing rd/rkt MMW-homing rd/rkt Scatter mine rockets/rds Jammer rockets/rds	152/155mm and others 9A152 FAE rocket 152/155 mm and others 120-mm Kitolov-2 Motiv-3M/others Universal sub/others 122-mm 9M28K 122-mm 9M519	LAV=K, Tk=K LAV=K, Tk=K LAV=K LAV=K, Tk=K LAV=K LAV=K LAV=K, Tk=D Effectiveness K	Near miss or hit can destroy More heavy MRLs have FAE. Top atk, duds vs tracks/wheels Cannon, mortars, MRLs, others 120 mm mrtr, 122 mm MRL 120 mm mrtr122/220/300 MRL For BM-21 MRL For BM-21 MRL
Engineers	Mines/IEDs Side-attack mine Mine scatter vehicle Line-charge vehicle Other obstacles	Controlled minefield esp. TM-83 fuzed plate mine UMZ vehicle or pods MTK-2, ZRP-2 dismount Concertina, trenches, etc.	LAV=K, Tk=K LAV=K LAV=K, Tk=K LAV=K Tk=D Effectiveness K	Large IED EFP, etc. Also TEMP-10 top attack PKM for dismounts, 1/7-29 Cmd det, belly attack, esp whls To stop, slow, divert vehicles
Flame Weapons	Flame/FAE launch veh Incendiary rounds See Artillery/Mortars	TOS-1 with FAE rocket API-T, thermobarics	LAV=K, Tk=K LAV=K, Tk=K	Stationary targets behind cover Ignite fuel tanks, engine, etc.
Aircraft	Cluster bomb DPICM /napalm bomb SAL/TV guided bomb SAL rocket IR fuzed/cluster bomb Air-launched missile Aircraft guns to 30-mm Mine scatter pod	RBK-250/PTAB-2.5KO ODAB-500PM FAE KAB-500L, -500Kr S-13Cor 122 mm RBK-500U/SPBE-D Kh-25 series Fixed, pod, and turret KMGU	LAV=K LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=D LAV=K, Tk=D	Also RBK-500U/PTAB Also ZAB-500 napalm 195 kg explosive area charge Also 57/68/80/240/320 mm EFP top attack submunitions Guidance TV, SAL, IR Twin and Vulcan auto-cannon Or mine ladders for TM-62
UAVs	Attack UAV UCAV UAVs for attack Spt	Harpy/CUTLASS Hermes 450S/Mikholit Camcopter S-100	LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K	Can also be a cruise missile Guns, grenades, and ATGMs LTD for gun rds, rkts, ATGMs
Theater Missiles	Theater ballistic missile Cruise missile	Iskander Harpy/CUTLASS	LAV=K, Tk=K LAV=K, Tk=K	ICM= large APAM with Frag UAV camera or GPS guidance
Air Defense	AD guns and cannon AD missile Multi-role missile	57-mm S-60 Pantsir-S1-0 (SA-22) Starstreak/Starstreak II	LAV=K, Tk=D LAV=K, Tk=D LAV=K	All can target ground vehicles. 2S6, Sosna, SA-11 FO also Outfly/outshoot target, no CM
Others	Heavy multi-role missiles Naval gun rounds/rkts Coastal gun SAL-H Underwater mines	Hermes-A AK-130 130-mm guns Firn-1 130-mm round KPDM-4 anti-landing sys	LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K LAV=K, Tk=K	UAV designates, SAL, IR Can fire SAL-H vs shore targets Bereg, also on ships (above) Magnetic fuzed wide area mine

- FAE (fuel-air-explosive) includes thermobaric HE, with high heat and overpressure effects similar to FAE.
- ICM (improved conventional munitions are canistered submunitions. DPICM are ICM with AT shaped charge and Frag-HE effects.
- SAL= semi-active laser-homing, guided round using a laser target designator operated by a dismount, or on a vehicle,

RW, or UAV.
- IR fuzed rounds hold sensor-fuzed submunitions which can disperse, each aiming at a vehicle, and firing EFPs into the vehicle tops.
- IR homing munitions can lock onto vehicle hot areas to home in for top attack with a HEAT or large HE warhead.

Threats to Vehicle Mobility

Below is an unclassified listing of example organizations, weapons, and TTP which can be used to immobilize, disable, and destroy military vehicles. They can range from older, less effective systems, to modern Tier 1 or Near Term systems noted as upper range. Additional pertinent information is contained in other locations of the WEG, Ground Systems, Volume I:

- “APC and IFV Trends”
- “Kinetic Energy Threats to Light Armored Vehicles”
- “Multi-role Weapons and Munitions Against Armored Vehicles”
- “Emerging Technology Trends”

Enemy exploitation of tactical vehicle mobility limitations

The enemy will continue to capitalize on the single greatest vulnerability of most combat vehicles. That is limitations on their ability to transit terrain other than on hard surfaces (like a parking lot or road) and on other improved surfaces. That vulnerability and its cascading effects costs lives. Technical decisions in vehicle design may dictate weapons operability (shoot on move ability and speed), off-road speed, water crossing capability, and even weather considerations in mobility. Tactical decisions in using vehicles with limited road, urban, or off-road mobility can affect success and lives. A rational innovative enemy can be sufficiently informed to combine local knowledge with understanding of tactical and technical vulnerabilities for successful and lethal TTP.

Contrary to accepted beliefs, the inability of the vehicles to protect their occupants is not the primary cause of these deaths. Any protection, including any amount of armor, can be breached, bypassed, neutralized, destroyed, or otherwise mitigated. The greatest vulnerability is the ability of an enemy to determine the exact route troops will travel, define when it will travel, how it will travel, how fast it will travel, etc. This ability to define who, what, why, and where to attack provides the enemy enormous tactical advantages which are magnified in complex terrain. It not only allows an enemy to control the tempo and all aspects of attack, it allows them to attack at their own convenience. The analytical sophistication required to achieve this massive advantage is analogous to determining which route a train will take.

The primary purpose of a vehicle, any vehicle, is to transport something from point A to point B, when and where you need to. The primary purpose should never be to only protect. That’s not the reason for having a vehicle—mobility is. Previously the term “tactical” or “combat” was used only to describe vehicles designed to and capable of operating off-road and transiting cross-terrain under combat conditions. Obviously neither term is appropriate for accurately describing the current class of vehicles used by many modern forces today.

Weapons

- Machinegun (12.7 mm and up will penetrate many light armored vehicles above, and below, wheel wells, 7.624R/51 mm below wheel wells and wheels)
- Machineguns can puncture vehicle tires (even those with run-flat) to immobilize or slow them. Most armored vehicles require repair with 2 or more tire hits per vehicle side.
- Anti-materiel weapons (12.7 – 20-mm HE), ballistic computers (w/laser rangefinder), advanced thermal optics, 1-shot 1-kill capability (12.7 mm range 2,500+ m, 14.5-mm and 20-mm range 2,000+m).
- Automatic Grenade Launchers 30/-35/40-mm. Ballistic computer, electronic fuzed air-burst munitions (ABM). Precise DP/HEAT fires out to 2500+ m. 35-mm Chinese QLZ-87 can penetrate 80 mm (3.2 inch) armor. HEAT round defeats 200+ mm armor. Delivers UGS, multi-spectral smoke, comms jamming grenades, robot option. Radar guidance linked (Fara-2 radar). Perfect weapon for neutralizing dismounted troops, which are especially vulnerable when dismounting from vehicles.
- Most anti-armor weapons can disable/destroy most light armored vehicles. In use by over 25 countries, standoff 100m+, penetration 950mm+, IR sensor activation and detonation.
- Off-route mines/Side-attack mines (AT or anti-vehicle). Panzerfaust-3T tandem, (penetrates 800mm+ at 400m+), w/SIRA sensor package w/fusing (acoustic/IR), Fire Salamander has 4 x Pzf- 3 series launchers on tripod with remote controlled TV camera and other sensors, also auto- launch. Others TM-83, TEMP-30 sensor-fuzed mine.
- Ubiquitous shoulder-fired antitank grenade launcher /AT systems up to 125-mm, tandem-HEAT, Dual purpose, RPG-7V/Type 69, RPG-18/22/26/27/28/29/Hashim, CH PF-89/98, (from 300-mm to 1,100mm+ penetration-ranges from 200m - 800m),
- Antitank Grenade Launcher (Long Range), 125-mm tandem HEAT 1000 m, 1,300+armor penetration, TV/thermal sights, laser designator 5 km range, GPS corrected rounds.

- ATGM. Any antitank guided missile will destroy light armored vehicles - some from 8,000 meters out (AT-14 Kornet-E 5,500 to meters with 1,200-mm) and Starstreak II (dual-role

MANPADS/anti-armor system with hypervelocity, laser beam-rider guidance, auto-tracker, very high Ph, armor penetration to 120-mm + for all LAVs, out to 8,000 meters). The other end of the spectrum is the (infantry) light-weight (14 kg) shoulder-fired ATGM Eryx with a range of 600 meters and penetration of 900 mm.

- Recoilless-rifles will destroy most light armored vehicles. Carl Gustaf M2/M3 84-mm, Type 65/65-1, M67 90-mm, B-10 82-mm, B-11 107-mm, Chinese PF-98 120-mm, M40 106-mm with tandem HEAT, ballistic computer sight, range to 2,000+ m, armor penetration 700+ mm, upgrades in progress. High PH/PK. R&D to add ATGM capability.
- Antitank Disposable Grenade Launchers 67 - 80mm HEAT to 300 m and 630 mm armor, HE anti- personnel effects. Some low signature, no smoke/flash, fire from enclosed spaces (rooms, sewers, etc). To 125-mm tandem HEAT 350m range, 1000+ mm tandem HEAT.
- Multi-purpose and/or bunker buster weapons will destroy most vehicles. PF-89A, SMAW HEPD, AT8 Bunker Buster, C90-CR-BM (M3), TBG-7V, BASTEG, Carl Gustaf.
- Any anti-tank hand-grenade has the capability to immobilize or destroy light armored vehicles. It is dependent of placement and angle of attack of the grenade.
- Improvised Multi-role Man-portable Rocket Launcher (AD/Anti-armor). Improvised 57-mm air- to-surface high velocity rockets (formerly aircraft rocket pods). Range 1,500m+ 400mm armor penetration, proximity fuze, and 20m lethal radius.
- Robotic weapons platforms and tracked grenade launchers and ATGM launchers
- Fixed- and rotary-wing aircraft
- CBRN attack. Some vehicles use collective protection, whereas others require masks.
- Thermobaric systems or warheads. Any hit by one of these warheads can disable or destroy a vehicle. The thermobaric warhead on RPO-A, RShG-2, WPF-89-1 and 2, Shmel-M, or TBG warhead on RPG-7V and RPG-29 have demolition effect equal to a round of 122-mm or higher HE artillery. The complex blast/ overpressure is particularly lethal in enclosed spaces such as building, tunnels, sewers, and even vehicles with hatch open (or other blast access), etc. The GM-94 is a smaller hand-held thermobaric launcher. Some mine-clearing systems (UR-77) use thermobarics for clearing lanes and are particularly effective in clearing streets (of enemy) in urban areas. The use of thermobaric warheads is proliferating and has expanded into rockets and artillery.
- Flame/napalm and other incendiaries. The trend is away from flame throwers to encapsulated weapons, bombs, bomblets, etc. RPO-Z, RPO. At a very minimum these weapons will disable sensors, optics etc externally mounted on the vehicle. Any flammable material, POL, packs, fuel lines, ammo on a vehicle exterior may cause it to catch fire. Field expedients are very easy to manufacture and use, such as fougasse.
- Lasers to blind/damage both vehicle (electronic optics, and sensors) and crews (eyes).
- Use of robotics and other remote-operated platforms proliferates significantly by 2015.
- Corrosive cloud or micro-fiber cloud munitions can corrupt and damage vehicle engines.

Obstacles

- The greatest obstacles remain natural and man-made terrain features. Their impact is also compounded by weather effects. Thus rain can turn a field impassible to wheeled vehicle units and mud can immobilize tracked vehicles with high ground pressure.
- Conventional mines, controlled minefields, IEDs, and other explosive devices. They include mines, EFP, and sensor fuzes, also undetectable materials (e.g., plastic/alloys).
- Multi-spectral smoke/obscurants (e.g., Russian ZD-6 grenade), dust from HE fires, etc.
- Some examples of adaptive obstacles are:
    - Communications (or other electric) wire and concertina as an expedient obstacle. Both hinder or stop wheeled and tracked vehicles by wrapping around axles and tangling up tracks and road wheels. Det cord is also very effective. Once it wraps around portions of the vehicle, it is then detonated.
    - Improvised obscurants (grass, trees, POL, buildings) smoke can screen the enemy and defeat or degrade vehicle sights.
    - Local population as civilian shields to hide infiltrators, attackers, or just to swarm U.S. units looking for water, medicine, or food, etc. and slow movement.
    - Improvised mobility obstacles. Rubble, civilians, holes, disabled vehicles.
    - Defilade and side slope restrictions as sites for front/rear vehicle attack, or to utilize non- lethal slippage measures (grease, oil residue or mud troughs), and ambush attack.

- IED or body decoys to slow unit and conduct ambush.
- Flooding or alter the flow of water (rivers, dams, etc.), open fire hydrants etc.
- Punji stakes (innovation--place punji stakes and/or det cord in a ditch. When the enemy arrives ambush them from the same side of the road/trail. The enemy will turn towards the fire and jump into the ditch to return fire. When they enter the ditch and land on the stakes, blow the det cord). Boulders rolled or blown into valleys.
- Abatis (fallen trees, telephone poles, wrecks, etc.).
- Debris (vehicles, rubble).
- Trenches, craters, or ditches (dug by hand or blown by demolitions).
- Blow (or cut) a hole in a frozen river. Put tree logs in the water, cover with sticks and tarp and camouflage (snow). The logs continually agitate the water to keep it from freezing.
- Armored vehicles drive across the frozen river and fall in the ice hole.
- Prepare (and camouflage) the frozen river with demolitions prior to the arrival of the enemy armored column. Detonate when the armored vehicles are in midstream. Artillery targeting with MRLs will have the same effect (or use both).
- Induce avalanches in snow covered passes.
- In extreme cold, put water on dangerous portions (or steep grades) of mountain roads.

For information on conventional or generic obstacles see FM 90-7, "Combined Arms Obstacle Integration," http://www.globalsecurity.org/military/library/policy/army/fm/90-7/index.html and FM 90-7 (Army Field Manual), Combined Arms Obstacle Integration (10 Apr 2003) (Change 1) or http://www.everyspec.com/ARMY/FM+-+Field+Manual/ FM_90-7_14502/.

RISTA (UAV/UCAV, Robotic radars and camera, UGS, Manned FOs, and SOF)

- RISTA selects ambush/obstacle sites, target tracking and selection, priority target attack.
- Target acquisition and links to Integrated Fires Command, direct/indirect fires, ATGMs.
- SOF/UAV/FOs with NAI/TAIs and sensor-shooter links to artillery, mortars, ATGMs.
- Laser designators guide artillery, naval, aerial, ATGM, mortar rounds to moving targets.
- Direct attack by attack UAV/UCAV w/ATGM or precision homing submunitions.
- The ease of operation, size, and simple design of tactical UAVs lends itself to field expedient modification. Converting this UAV into a munitions delivery system (improvised attack UAV) is not difficult and offers several tactical advantages.
- Improvised (remote control aircraft-based) attack UAVs, with IED/munition attached.
- Robotic cameras locate close to mine/IED detonation points to precisely trigger them.

Information Warfare

For additional information see Chapter 10 and TC 7-100.2

- Information Attack. Alter or deny key information, Data manipulation (navigation, tracking, weapons, sensors, timing, etc). Disinformation.
- Computer Warfare: Disrupt, deny, or degrade the enemy's computer networks and information flow. Hacking, denial of service, malicious software (including adjusting clocks), etc. Insert viruses, spurious digital data, or hacking to manipulate computer information.
- Exploit reliance on extended communications and data links. Disrupt communications and data links (LIWA). Jamming communications connectivity (input and output).
- Electronic Warfare
    - Exploit, disrupt, deny, and degrade the enemy's use of the electromagnetic spectrum, especially C2 and RISTA. Wide area radar jammers.
    - GPS jamming. A 4-25 W power portable jammer has a 200-km radius. Can be delivered by artillery and/or mounted on UAV, civilian vehicles, or virtually anywhere including people, and/or farm animals.
    - Communications and data link jamming. Artillery and mortar rounds for local jamming. Wide area comms jammers.
    - Electronics vulnerable to "smart dust" which destroys electronic circuitry (computers, C2, sensors, navigations, etc.) by airborne penetration and short-circuiting the system. Delivered by rocket, UAV, other aircraft, possibly artillery. Access through computer cooling system.
    - Graphite Munitions and "blackout bombs." 400-500 kg cluster bombs/warheads with graphite strands to short out transmission stations and power grids. Can be delivered by UAVs, aircraft, rockets, and cruise missiles.

EMP and High Power Microwave.

- Use EMP (esp. non-nuclear) and High Energy High Radio Frequency Weapons (HERT) to target *circuit boards*. Circuit boards are the most vulnerable component of modern electronics.
- *EMP/HPM.* Missile, artillery, and UAV delivered EMP. This is will destroy all intravehicular electronics and battlefield digitization functionality in vehicular weapons. The specific target is circuit board systems, the internal connections of which require little EMP to disrupt and/or destroy. Electrical power is shared among propulsion, survivability, lethality,

and auxiliary systems, along with multipurpose sensors, and all fusion and integration functions of each type of system.

- *Tactical EMP.* Enhanced warhead consisting of a hybrid EMP/HEAT warhead employed on ATGM, 70-mm rockets, and MRL rockets. This hybrid warhead will knock out a tank even if it does not penetrate armor, ignition, communications, or other electronics. Power output will be measured in hundreds of megawatts for microseconds. The e-warhead would also knock out other electronic systems. Applications may extend into infantry shoulder-fired rockets that could cause an electronic "soft kill" of armored vehicles.

Enemy tactics, techniques, and procedures

To degrade vehicle mobility, the enemy will:

- Always use (appropriate) portions of several basic principles. 1. Quick concentration (dispersed to avoid detection then come together for the attack, 2. Surprise, 3. Violent attack, often only three to four minutes, 4. Quick clearing and securing, 5. Quick withdrawal/dispersion, often disappearing back into the population from which they came.
- Attack with numerous hunter-killers teams (up to 10 per vehicle), approximately 4-5 persons per team armed with 1 or more AT/Antiarmor weapons, sniper rifle, 7.62-mm GPMG, RPO-A/TBG- 7V (thermobaric and/or flame weapons), AT grenades, assault rifles.
- Attack fixed sites prior and set ambushes (often complex) along the relief (quick reaction) force's likely avenues of approach.
- Attack units when they temporarily halt to refuel or conduct other activities. Attack tactical refueling operations whenever possible. The optimal attack occurs during transfer of fuel from tankers/refuelers to vehicles. This may set fire to both the tanker and the combat vehicle, also catching the combat crew outside their vehicle. Attack as units (squad and above) return to garrison, as they will be short of fuel and ammo, the troops lax, tired, and complacent after days or weeks of searching for, and not finding, the enemy.
- Use other "swarming" attacks (often involving civilians timed with complex attack).
- Halt or slow movement (obstacles, decoys, feints, remote weapon) to facilitate attacks.
- Use snipers to force crew members to operate "buttoned-up", instill tenacity, and impede mobility while dismounted.
- Whenever possible use complex attack composed of several synchronized elements. Example is anti-armor (ATGM and/or AT guns) ambush in conjunction with mines, artillery, and small arms fires.
- Converge attacks, probes; events from multiple directions, and possibly multiple dimensions, by numerous elements on a single target (and/or location or sensor) overwhelm the sensors ability to provide accurate data.
- Create conditions forcing vehicle troops to dismount prematurely, into infantry ambush.
- Attack vehicle beneath, above, or beyond weapons' platform ability to elevate or depress (high or close-in). CQ swarming effective and lethal.
- Exploit the high (elevation), low (close-in, depression), and rear "dead" spaces of the vehicle. These are areas that either cannot be observed, and/or, fired upon by the crew. Examples of the high dead space is the inability of the crew to view and/or bring fire on the higher floors of a building, or the enemy firing from the high sides of valley walls, enemy attacking from the rear of the vehicle.
- Focus light weapons attacks on most vulnerable areas of vehicle, rear, tires and very light armor below wheel wells and between tires, lightly armored top. Wheels are extremely vulnerable and
- easy to damage/disable. Without the wheels (especially the front steering wheels) the vehicle is disabled. External fuel tanks, flammables, ammo are vulnerable.
- Attack logistic supplies and support elements critical to operation of the vehicle (class IX parts, Fuel delivery means, vehicle mechanics and technicians, etc.)
- Kill/attack contractors maintaining/servicing/fueling vehicles or disrupt their operations
- Target power generation systems supporting all C4I systems, forcing operations in a degraded mode, and challenging analog backup skills.
- Manufacture events, riots, or demonstrations staged to block or impede vehicles used in (medical) evacuation or redirect response forces.
- Capture vehicles to exploit situational awareness through tactical internet intrusion.
- Use night vision devices, flares, and IR screens to offset enemy night vision advantage.
- Utilize poor visibility (smoke, sand, weather) conditions to offset superior vehicle optics.
- Change the nature of the conflict. Prime example is from political to religious.
- Hug enemy forces to offset their indirect fire and precision strike advantage.
- Create shortages or overloads by continual attacks on convoys, LOCs, MEDVAC, etc. and/or planting mines. All of these must then be secured by escorting units.
- Neutralize or destroy external antennas, optics, and sensors.
- Numerous synchronized attacks designed to overwhelm or over-saturate the enemy's ability to successfully deal with the attack.
- Prioritize targeting of low density specialty vehicles such as ambulances, mine- and/or route clearing and water/gap crossing (mobility/counter-mobility), POL vehicles fire support, etc. The elimination of these impacts the entire unit capability.
- Mimic Battlefield Combat Identification Systems to find, fix, close with, and destroy vehicles. Same with "friendly

markings.”

- Exploit the vehicle inability to traverse obstacles, roadblocks, rubble piles, holes, ditches, wrecked vehicles, and mines.
- Exploit vehicle inability to self-extract or to reposition other U.S. vehicles off the route.
- Exploit the large turning radius of the vehicle. This facilitates successful rear and rear-oblique attacks as well as trapping two or more vehicles together.
- Use multi-spectral smoke, especially in difficult terrain with poor road, surfaces, recognizable terrain, or in target rear areas during onset of attack.

Vehicle considerations which translate directly into either tactical strengths or weakness.

- Most considerations relate to mobility subsystems, apart from other subsystems. Mobility includes many specific automotive capabilities, e.g., road speed, cruising range, and swim capability. Stopping in high threat areas means increased P-hit, and likely troops dismount. One hit means more strikes follow; so mobility is critical, and speed is critical. Acceleration ability permits a vehicle to react to perceived threats, especially in close terrain (e.g., urban). High road speed can permit vehicles to emplace before threats appear.
- Navigation ability facilitates choice of fastest, most open, and safest route.
- Ability to operate in multiple differing physical combat environments. Turbine engine operates better in temperate-cold terrains. Diesel is better in temperate-hot. Turbine engine has problems with sand clogs, and requires more fuel. Diesel fuel is less flammable. Some engines are designed to accept varying grades and types of fuel.
- Military forces must be able to operate effectively in rivers, swamps, hilly terrain, snow, and coastal areas which fall into its area of operations. *Ground pressure* is less important on paved roads; but low ground pressure is critical for trafficability on wet, icy, or loose soil and uneven terrain. Tracks have lower ground pressure than wheels. More wheels mean less ground pressure (e.g., 10x10 vs 4x4). For tracked vehicles, six road wheels mean less than 5. Wider tracks reduce ground pressure. Some vehicles can lower auxiliary wheels (BRDM-2). Others can add rubber tracks for periods of off-road use.
- Wheeled vehicles with armor have higher ground pressure. They are limited in off-road capability and speed, and in soil composition usage. They are more subject to failure on tire loss, or in uneven terrain with ditches or bumps. They are more limited in soft soil, such as areas where vehicles have preceded them.
- Front/rear tire track too wide (wide track). While a wide tire track is efficient in desert and in other open terrain, it is not suitable in areas that are terraced for farming or have dikes, etc. For example, HUMVEEs do not work off-road in terrain such as South Korea/South East Asia/Philippines, agricultural regions, etc. The tire track is too wide causing the vehicle to slide off the side of the paddy path/road or to bottom out. These “wide “vehicles are virtually useless in some areas of the world such as some forests of Europe, jungles, and other close terrain areas.
- Factors such as side slope, gap crossing capability, etc. may seem esoteric; but those limitations cause accidents that kill and injure soldiers when moving off-road around hills and across ditches and rubble, trees, disabled vehicles, etc., and on roads as well. Limitations deny movement areas or slow movement and increase vulnerability time.
- Side-slope angle capability (reduces roll-over). This threat limits movement and may kill crew members. Factors for high slide slope capability include a low profile and low roll center (pivot point between the wheels), low center of mass (usually dictated by the height of the armor on the vehicle), wheel/track width of the vehicle, and tire characteristics. If the center of mass is much higher than the roll center, the vehicle can roll more easily if the vehicle slips to road shoulders, ditches, or holes. If the vehicle is wider, roll is less likely. Wheeled vehicles are generally higher than tracked counterparts, more limited in side-slope capability, and more subject to tipping or roll-over when off-road. Stiff, higher pressure, low profile tires offer roll resistance. Vehicles with heavy high turrets, like many western main battle tanks, have poorer side slope capability. Older low profile tanks have superior capability.
- Tracked vehicles, especially smaller ones, are more suitable on forest trails.
- Self-extraction, with winches facilitates greater use in areas with rubble and streams.
- Lighter vehicles are more deployable, for air insertion and water transport closer to their destination, limiting surface travel distance and the associated vulnerability to threats. Vehicle height and width are critical functions for moving rapidly and safely through urban areas, forests, jungles, and through tunnels. Dimensions and weight must be considered in crossing bridges, and for air deployability. Wheeled vehicles are generally higher than comparable tracked vehicles. They may have higher ground to hull clearance for mine resistance, and higher freeboard for swim capability. Also, wheeled vehicles may be lighter, which permits operability over bridges with weight restrictions.
- Tire vulnerability, especially steering tires, to small arms, ditches, det cord, etc. Avoid overloading with too much added armor, ammunition, etc., which reduces mobility.
- For fording operations, amphibious tracked vehicles are generally better-suited in conditions of high water speed and uneven surface. Some vehicles have high-ford design for deep-fording, even underwater. Some vehicles have winches to assist in fording.
- Wheeled vehicles with central tire inflation system (CTIS) operate better off-road. Vehicles with run-flat tires plus CTIS may puncture tires from inside when hitting bumps.
- Turning radius, (high radius requires backing). Tracked vehicles can pivot on one track, for vehicle-length turning radius, even in defilade areas.
- Wheeled vehicles may be able to swim in areas where tracked vehicles cannot. But they may be challenged in entering and exiting water, due to lack of traction in low water and wet/muddy shores. Vehicles with hydro-jets swim at higher speed. A few vehicles with bowplanes and hydrajets can hydroplane at high-speed in amphibious landings.

- 360 degree 3-dimensional visual and/or electronic (rear TV, etc.) observation. Inability to see 360, especially rear view (for high speed backing/and threat) can challenge movement and limit situational awareness in. Optics must elevate declinate sufficiently close-in and distant awareness. They must also be able to operate in obscurant conditions.
- Reduced movement noise (especially engine and tracks) reduces warning time for threats. This factor is less significant in open terrain, more in closed (e.g., cities and defilade).
- Reduced visual/IR signature during movement (conformal nets, side skirts, screens, etc.), will reduce detectability and vulnerability to weapons in open terrain.
- Power/battery augmentation aids stops and moves. Solar or auxiliary power units add power for less noise and IR signature. Hybrid drive adds power and rapid acceleration.
- Weapons elevate and depress sufficiently to handle targets four stories high and very close-in enemy. If they cannot they may move behind infantry during movement.
- Communications compatibility (host country, digital vs. analog, frequency management).
- Collision and fratricide avoidance require IR marker lights and paint, and BCIS networks.
- CBRN protection system (Overpressure, vehicle mask system, or individual masks).
- Mine-clearing or neutralizing capability can cause speed reductions or stops enroute. Advance clearing requires electro-magnetic decoys, unmanned vehicles, and engineer assets.

Kinetic Energy Threats to Light Armored Vehicles

Summary

Military forces worldwide generally recognize that LAVs are increasingly being used not only as armored personnel carriers and infantry fighting vehicles, but as chassis for expensive and specialized systems critical to success of the mechanized ground force. Despite a variety of efforts to increase armor protection and adapt countermeasure systems for LAVs, most munitions considered to have anti-armor effects will continue to be able to defeat light armor. Recent developments in guns, munitions, and mounts add new weapons and upgrade capabilities of older weapons to challenge LAV protection.

LAV vulnerabilities

All armored vehicle designs, light or heavy, are compromises among competing requirements for mobility, survivability, and lethality. Designers of LAVs must accept armor protection limitations further than with heavy armored vehicles to meet additional requirements such as reduced cost, swim capability, and light weight for air deployability. From their inception, LAVs have been vulnerable to a wide array of munitions from antitank weapons to aerial munitions, artillery Frag-HE rounds, vehicle main gun/machineguns, mines, air defense munitions, and infantry munitions.

In the last decade, a variety of countries including the U.S. have redesigned LAV armor packages to resist shaped charge and high-explosive threats. But such measures exact a high cost in weight and at best only reduce the chances of penetration and vehicle system kill. These munitions (especially mines and improved shaped-charges) remain a threat to LAVs. The single munition type that is most effective against LAVs will continue to be High-Explosive (HE); because that term is generally shorthand for Fragmentation-High-Explosive (Frag-HE). Most Frag-HE and HE artillery, mortar, and heavy gun rounds have sufficient fragmentation to damage a tank or destroy most LAVs with a near miss. It is generally expected that in a Frag- HE near miss of an IFV, fragmentation effects will cause some type of kill (firepower, mobility, or catastrophic). That same near miss will usually destroy a lighter APC.

Energetic armors (such as ERA), and countermeasure systems have less effect against kinetic energy munitions. The best counter continues to be more armor, and the weight constraint limits protection. All LAVs have surfaces that can be penetrated by 12.7 -mm rounds, and all have equipment vulnerable even to infantry small arms.

A general rule on the battlefield is that a stopped vehicle in close combat has a short lifespan. The greater the vehicle mobility, the better chance it has to escape a kill zone . Adversaries train to target armored vehicle engine locations. Well-aimed fires can damage the engine from side or rear, for a mobility kill, and initiate fires and secondary explosions .

A recent shift toward wheeled LAVs exposes the vulnerability of wheels . Tires of wheeled vehicles are vulnerable to all weapons, from rifles to fragmentation. Tires can be penetrated by any small arms. Rubble, abatis, and other loose materials can halt wheeled vehicles, as Russian BTR -80s

experienced in Chechnya. Trenches, scattered nails, caltrops, spike strips, etc. can initiate KE tire blow-outs. Run-flat tires and added wheels (6x6, 8x8, and 10x10) can reduce but not eliminate mobility problems. Tires on steering wheels are critical; one or two penetrations can slow or stop the most modern vehicle, especially off-road. Rounds aimed at wheels can be effective even when they miss. Wheel well areas expose crews and passengers, and are rarely protected beyond 7.62 - mm rounds.

Military forces worldwide recognize the difficulty in directly engaging heavy armored vehicles, and the risk in exposing themselves to obtain a catastrophic kill. An increasing variety of weapons for dismounted infantry and vehicles use KE munitions to penetrate the armor of LAVs. New specially designed weapons are being developed to attain lesser kills (mobility, firepower, communications, and function) to degrade effectiveness of the vehicle as a "system of systems". Due to limited room, much of the crew's gear may be stowed on the outside of the vehicle, and is vulnerable to fires. A favorite tactic is to

attack sensors (sights, remote sensors, radar, or links to them). Remote weapons and external boxes are vulnerable to a variety of fires. Sniper fires and even rocks can damage sights to blind weapons of the most modern LAFVs.

Another vulnerable part of the LAV system is personnel. Personnel may ride outside of the vehicle, where they are exposed and vulnerable to all weapons. Drivers and personnel operating open weapons can be targeted, especially from higher angles. Concussion from munitions impacting on vehicles may not seriously damage the vehicle; but they can cause armor pieces or mounted equipment to rebound inside and kill or injure personnel. Blasts underneath vehicles can transfer shock through floor-bolted seats and break the backs of crew and passengers. Therefore, a critical part of vehicle design is in securing seats and materiel in vehicles. Also KE hits to ammo compartments and external tanks may not penetrate hull armor, but can start catastrophic fires. Hard jolts can injure soldiers inside. Thus, concealed trenches, slides from "non-lethal" road slimes, or deliberate collisions are kinetic energy threats to personnel in LAVs.

Weapons for dismounted infantry

They include sniper rifles and machine guns (7.62 mm and 12.7 mm). Machine guns and sniper rifles can be used with obstacles to slow the vehicles and deliver sufficient fires to vulnerable areas to obtain a kill (mobility, firepower, or catastrophic), or to kill crewmen and degrade its effectiveness. A variety of general-purpose machine guns can be dismounted and can penetrate some armors, tires, and exterior materials on LAVs. Mini-guns, such as 7.62-mm man-portable type, can swarm rounds at 1,200 rounds per minute. New ammunition includes sub-caliber sabot rounds for 7.62 and 12.7- mm weapons (such as the .50-cal SLAP), and improved armor-piercing rounds such as the Chinese tungsten alloy-core round. These traditional technologies defeat all current active protection systems.

A*nti-materiel sniper rifles (12.7 mm or .50 cal).* These rifles are integral to any modern battlefield. Although often categorized as sniper rifles (and capable of being used against personnel), they are generally employed as anti-materiel rifles. The most widely proliferated of these rifles are: the U.S. Barrett M82A1/M95 .50 cal semi-automatic rifle, the Croatian MACS M2-1/M3 (12.7-mm bolt action), and the Russian V-94 (12.7-mm semi-auto). The Barrett M82A1 is employed by all U.S. military forces as well as forces of 27 other countries, including Belgium, Chile, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Philippines, Portugal, Saudi Arabia, and UK. The Saboted Light Armor Penetrator (SLAP) round fired from the M82A1 can penetrate 19 mm (.75 in) of armor @ 1,500 m. It can also fire a multi-purpose round (See M82A1 data sheet). Approximately 25 variants of 12.7-mm sniper/anti-materiel rifles are available.

Larger-caliber Anti-materiel Rifles (14.5 to 20-mm). A trend in the past ten years has been towards larger- caliber anti-materiel rifles. The Croatian RT20 20-mm “hand cannon” is the most prevalent (range 1,800 m). It can chamber either an HE or API round. The RT20 was developed primarily to penetrate the armored casing around the thermal sight head on M84 tanks (a 20-mm round was the smallest caliber that could penetrate the casing). During the war in the former Yugoslavia, M84s were frequently deployed to detect Croatian infantry moving at night, so a method of removing their night-vision capability was found with this RT20 “hand cannon”.

Other anti-materiel rifles readily available are:

- US M98 cal .338 Lapua Magnum (1,400 m and twice the penetration of 7.62-mm)
- NTW 14.5-mm (range 2,300 m)
- Hungarian Gepard M3 14.5-mm (range 1,000 m)
- Austrian Steyr IWS 2000 15.2-mm (range 1,000 m, 19 gram tungsten carbide dart)
- South African NTW 20-mm (range 1,500 m)
- Finnish Helenius APH RK20 20-mm bolt-action gun

Guns for light vehicle applications (7.62 mm to 23 mm)

Several countries mount guns on light carriers, such as motorcycles, fast-attack vehicles, and light utility vehicles such as HMMWVs, UAZ-467, and Land Rover. The Russians advertise the Gear-Up motorcycle with mounts for a variety of auto grenade launchers and machineguns. Several combat support vehicles for military security patrols have weapons mounted on light mounts, such as a pick-up truck or a possible towed or ground mount. Guns ranging to

14.5 mm (such as Russian Arzamas GAZ-53971 van for use of internal and other security forces) may also be mounted.

Recently China displayed a "dune buggy" with a 23-mm chain gun mounted to the overhead roll bar, for manual aiming and operation. The gun fires standard antiaircraft ammunition and recent APDS rounds, and has a thermal night sight. This gun could also mount on remote vehicle turrets, for use against air and ground targets. Oerlikon went one step farther with an infantry application for the KBB 25-mm auto- cannon. The break-apart mount actually permits infantry pack carry. It did not catch on. However, the very low profile weapon can also be towed, carried in an all-terrain vehicle, or off-loaded for ground mount. The profile is so low that the firer should dig a pit to operate it. This is a developed potential threat to all LAVs.

LAV main guns

Armored personnel carriers and combat support vehicles (7.62-mm to 30-mm). There is an increasing variety of APCs with 7.62-

mm, 12.7-mm, and 14.5-mm guns, designed for the traditional "battle taxi" role. A parallel trend is for the increased use of wheels vs tracks. But on selected APCs and on combat support variants, many countries are replacing those guns with 20, 23, 25, or 30-mm guns; and the number of drop-in turrets available has exploded. Improved Oerlikon APDS and APFSDS ammunition has extended the life of 20-mm and 23-mm gun applications. The Vulcan mini-gun and modern auto- cannons in 20-mm can overwhelm a specific area of LAV armor at a high rate of fire. Multi-barrel 23-mm cannons can do the same thing. New cannon for 30-mm rounds (in several round designs) include the Ukrainian KBA-2, Russian 2A72, and Bushmaster II. Improved 30-mm rounds offer 100+ mm penetration at 1000 m (120 mm for 8-rd burst). Recently German Mauser displayed the RMK-30 recoilless gun. The light recoil gun permits accurate high-rate aimed fire to a range of 3,000 m, with a variety of ammunition including APDS and APFSDS on very light vehicle mounts.

Infantry fighting vehicles, Tanks, and fire support vehicles (20+ mm). Most IFVs feature auto-cannons in the 20-30 mm range, with a rate of fire of 500-700 rd/min, but a practical rate of fire of 100-250 rd/min. Aimed fire is generally confined to bursts, with a substantial dispersion. As armors have increased, the current trend is a shift in gun size toward 30-50 mm. A number of 35 mm guns, including the South African EMAK auto-cannon or Swiss Oerlikon 35/1000 revolver cannon (1,000+ rd/min rate of fire) have been offered for use in IFV upgrade turrets.

A 35-mm round doubles the penetration of 30-mm rounds. Swedish Hagglunds went a step farther with the 40-mm cannon on the CV9040 IFV. Italian Otobreda offers the T60/70A 60-mm gun turret for the Dardo IFV. The cannon features precision semi-automatic fires rather than automatic, but fires as rapidly as the target can be acquired. Penetration is well over 150 mm at 2000 m. The next trend (by around 2010) is cased-telescoped ammunition (CTA), which permits a 30-mm gun to achieve KE effects comparable to that of a 35-mm or 40-mm gun.

Tanks and heavy armored combat vehicles (HACVs)

Any KE round of a 57+mm gun will damage and probably destroy a LAV. Canister and APERS (anti-personnel) rounds fired from tank guns, antitank guns, or HACVs guns can damage or destroy LAVs.

Other KE threats

Mines and Improvised Explosive Devices (IEDs). Belly attack mines can include kinetic energy penetrator mines, which defeat even mine-resistant vehicles. Side-attack sensor-fuzed mines include Russian plate mines with aimed directional fragmentation. Other mines and IEDs have warheads which produce an explosively formed penetrator (EFP, shaped like a sabot penetrator), to defeat light to heavy armor, depending on design. Such mines include the Russian TM-83 and TEMP-30 sensor-fuzed mine. Other mines and IEDs (e.g., PD Mi-Pk) can produce multiple EFPs. Even blast effects from mines and IEDs can cause severe kinetic energy damage by flipping over vehicles, causing material to toss about inside and killing or injuring personnel.

Frangible rounds. The frangible armor-piercing discarding sabot (FAPDS) round design uses a brittle rod which can penetrate armor, then shatter after penetration, to spread varying sized fragments within the target. It flies with similar ballistics (including range and high velocity) to a KE round, but with effects of a Frag-HE round. Although most are currently designed for anti-aircraft use against thin armors, some are effective (with tailored brittleness, size, and design) for use against improved LAVs, such as IFVs.

Programmable fuze rounds. The Swiss Oerlikon 35-mm AHEAD round for use against aircraft uses an electronic fuze that is calibrated by a laser rangefinder, the fire control computer, and an electronic setter within the gun. At the pre-set time, the round fires a volley of KE sub projectiles forward (in the manner of 00 buckshot), with overall range to 5,000 m. Technology variants are being tested against ground vehicles. The AHEAD technology is available with other sizes of rounds, such as 30-mm PMC308. Russian HEF rounds for BMP-3M (100-mm) and T-80K tank (125 mm) employ the same technology, with range to more than 7,000 m. Russian rounds also permit an adjusted trajectory, in which they over-fly the vehicle and blast fragments outward and downward against the thin top armor of armored vehicles.

Artillery-delivered KE munitions. Artillery rounds include Russian 122-mm and 152-mm cannon rounds with top-attack flechettes, which can cover a wide area. They can damage and penetrate most LAVs.

Sensor-fuzed artillery rounds, e.g., Russian Motiv-M, German SMART-155, and US SADARM can fire an EFP into the vehicle top for a sure penetration and kill.

Kinetic energy missiles. Prototype KE ATGMs are in various stages of development. High-velocity missiles (HVMs) offer a heavy armor overmatch against the heaviest armors with long range (5-7 km) and short flight times (4 km in 1-2 seconds). One HVM system that is a current threat to LAVs is, in fact, Starstreak (MANPADS and multi-role missile, page 5-52 below). Starstreak uses laser-beam rider (LBR) guidance and shoulder, vehicle, or helicopter launch. Lethal mechanism is 3 darts - each a LBR Mach 4 HVM with high- penetration (125 mm) and HE blast. These can slam a helicopter target out to 7 km in 2-7 seconds, and have been successfully tested against light armored vehicle targets. A vehicle launcher version, Armored Starstreak, uses the Alvis Stormer LAV chassis and 8 launchers. Any Starstreak launcher is a threat to LAVs. The missile defeats almost all known countermeasures, including APS.

Future Developments in KE Attack

For the 40-mm CTA gun on the aborted US FSCS/ British TRACER programs, there was a proposal to modify the Starstreak dart into a KE missile round to fit in the autoloader, as an ATGM for use against LAVs and aircraft. The gun is fitted on the recently displayed Lancer proposed for reconnaissance vehicle and IFV and designs.

ATGMs exist with fly-over top-attack mode and EFP for target kill. The US Javelin is a successful fielded example. Other fly-over (Swedish Bill, Bill-2) ATGMs and top-attack (Israeli Spike/Gill) ATGMs with shaped- charge warheads have been fielded. The British fly-over sensor fuzed MBT-LAW ATGL employs a HEAT warhead. These designs are steps toward future soldier systems with fly-over EFP warheads for KE attack.

Attack UAVs and Micro-UAVs are being developed. A French proposal for Leclerc 2015 includes tank- launched attack micro-UAVs. The UAV kill mechanism is a top-attack EFP, which would easily penetrate LAV top armor.

Conclusions

Fighting vehicle developers have found a variety of upgrades to improve light armored vehicles. However, they are more useful in protecting the vehicle during travel to the combat zone. All of these innovations offer marginal increase in protection against modern anti-armor weapons in close combat. Even expensive high-technology approaches, such as active protection systems, will not protect against many KE munitions which threaten LAVs. In close terrain, high defilade and urban areas, combat vehicles (including tanks and LAVs) are very vulnerable on their flanks and rear. Many modern IFVs have lost their firing ports and have limited awareness or firepower to address those directions.

Technical Implications: The vehicles need weapons and sensors to address all threats for 360°, and at high and low angles of fire. Remote weapon stations and periscopes for the dismountable infantry can be added. Additional protection can be added, for use against selected high lethality weapons, such as antitank grenade launchers. Other assets are gun shields for crewmen which are partially out of vehicles, or remote fire control systems which can be operated from the inside. Side skirts and better mine/wheel well protection are needed.

Tactical Implications: Technical AT considerations may force changes in tactics for mechanized infantry and crews of combat support systems. Tactics must exploit firepower, integration, and protection in the combined arms force as well as adaptive use of cover, concealment, and deception. Assaults across open areas against light forces can lead to disaster. Movement must employ speed, cover/concealment, and mutually supporting fires. Once a squad dismounts, it may have to precede the vehicle to protect it from

anti-armor weapons, not follow and use it for protection. Although some tacticians differentiate IFVs from APCs, claiming that IFV squads can fight from the vehicle, that distinction is insignificant in close terrain, and in the face of modern AT weapons. These are only some of the responses to the spectrum of threats to light armored vehicles today. See Chapter 15, Upgrades, for additional responses.

Recoilless Weapons for Modern Warfare

In past decades, recoilless weapons were considered lethal and formidable antitank assets. Recoilless antitank grenade launchers (ATGLs) for squads have seen tremendous improvements (see Chapter 1). But, as tank armor has improved, most of the crewed systems for use by AT teams operating above squad level have seen fewer upgrades. Today, many of those crewed AT weapons are considered obsolescent. However, upgrades are available; and new weapons are now fielded. With more changes, crewed recoilless weapons can be effective.

One advantage of recoilless systems is their utility. They offer a variety of munitions, including HEAT, HE, flechette, and others, to service most battlefield targets. Some recoilless launchers (aka, recoilless guns or rifles, or mounted grenade launchers) are light enough for easy transport in light vehicles, with ability against infantry while outranging most infantry weapons. A well-proliferated example is the SPG-9/9M, with HE range beyond 4,000 m.

Recoilless weapons are limited by certain design and operational considerations. The bore size limits size of rounds and their ability to penetrate modern tank armor. However, many offer sufficient penetration to defeat other armored and unarmored vehicles (which outnumber tanks on the battlefield). Those systems are best used to augment other forces in a fight.

A key value is in their general lethality. With a higher rate of fire than most antitank guided missile (ATGM) launchers at 5 or more rounds per minute, they are useful as a fire support asset that can augment fires of other weapons against various targets. Most lack the range of ATGMs. All lack the precision. But these multi-role systems can digest various rounds to defeat vehicles, then kill exiting personnel with large HE blast munitions. In a close fight or ambush, many of these weapons can kill any vehicle other than a main battle tank (MBT) from any aspect. Some can also damage or kill MBTs from the side or rear. As we have noted for infantry antitank grenade launchers (ATDLs), crewed weapons include new ones, and upgraded munitions with tandem HEAT warheads which can kill all tanks from the side or rear (see table).

A number of features have improved precision of these weapons. A variety of electro-optical sights can be mounted on these

weapons. SPG-9M and SPG-29 Mounted can use the Russian 2Ts35 laser- rangefinder sight or a widely marketed lightweight ballistic computer sight such as the Simrad IS2000. Adaptable night sights include II sights like Simrad KN250F, and various compact thermal sights. A challenge to all grenades is their relatively slow velocity, which reduces hit probability (Ph) against moving vehicles. Some have high velocity (600 m/s for Italian Folgore, 700 for SPG-9) and flat trajectories to increase Ph vs movers.

A few manufacturers are looking for improved accuracy munitions. The ultimate solution is to add ATGM launch capability to recoilless launchers. Israeli IAI has offered to produce a version of the LAHAT for use in the 90 mm M40 recoilless rifle. Even the best recoilless round cannot kill a modern tank from the frontal aspect. Any ATGM exiting a bore of <150 mm has a low probability to defeat MBT front armor. But a top- attack tandem warhead missile, e.g., a 90 mm version of LAHAT for the M40 launcher offers probable

major damage (or catastrophic kill) against an MBT turret or hull. Other vehicles would expect a catastrophic kill. Israeli IAI has offered development of the ATGM variant. In a beyond line-of-sight (BLOS) environment, ATGM capability dramatically increases effectiveness of this type of weapon.

Another limitation for recoilless weapons is their detectability. Most have high smoke and noise signatures in the backblast. Most are fairly tall and must be hand-loaded from a standing or kneeling position, which exposes the team to counter-fires. Older weapons are heavy enough to require breaking down and loading into vehicles for moves, limiting their ability to shoot and move quickly. One example of poor mobility is the old Russian B-10 (at 85 kg towed carriage, 72 without). With an anti-armor range of 400- 1,000 m, the first shot had better be accurate and lethal, or the crew is in serious trouble. Thus many users only employ these older weapons in combined arms defenses and ambushes, to augment other fires.

Some old launchers have been modified to reduce weight, plus break down into components for dismounted moves. The Chinese Type 65 is a lighter weight version of B-10, at 28 kg, and uses improved ammunition. The Serbian M79 variant also weighs less than 30 kg. With improved sights, it has an anti- armor range of 670-1,000 m. Better range aids survivability.

Several newer recoilless weapons have been designed for reduced weight, lower operating profile, and reduced move and setup times. Examples include RPG-29 Mounted (next page) and the Serbian M90. The best of the modern lightweight crewed launchers may be the Chinese 120-mm PF-98. Although it operationally resembles RPG-29, it is actually an amalgam of features from a variety of modern systems. Like the RPG-29, it comes in shoulder-launch version or tripod-mount crewed version. The launcher appears to be directly derived from the Montenegro/Serbian 120-mm M90. However, they followed the Russian design by adding a lightweight tripod, and a canistered grenade which attaches to the launcher to extend its length. The ammunition is another amalgam, with warheads which could be derived from recent Carl Gustaf rounds, and a rocket motor that resembles a scaled up RPG-29 motor. The sight is a modern EO/LRF ballistic computer sight. The result is a state-of-the-art launcher with 800/2,000 m range, 800+ mm penetration, light weight (<18 kg loaded), and competitive precision.

Rapid mobility, as noted earlier, is a critical factor for survivability and utility of these weapons. Since most legacy systems cannot be easily adapted for mobility, an alternative use is to mount them on vehicles. They offer good lethality to protect vehicles; and the vehicles facilitate launch-and-move operations, without downtime for disassembly. Examples include fire support versions of BTR-50 and Czech OT-21 APCs, and various weapons on the BTR-152 armored transporter. They have also been fitted on a motorcycle and on boats.

A good weapon for ground and vehicle mounts is the Russian SPG-9, which has been seen pintle-mounted on a UAZ-469 TUV. The launcher is well proliferated, and seen several upgrades. On the SPG-9M upgrade, 2Ts35 or other more modern LRF ballistic sights are available. AT ranges are 1,300 m for improved HEAT, and 1,000 for tandem HEAT. The best of these weapons for vehicle mount is the US M40 106 mm recoilless rifle. The Bofors Retrofit Kit updates it into a modern and effective fire support weapon. Sights include the CLASS laser sight, and others. Munitions include flechette, HEP-T, and tandem HEAT. Addition of the LAHAT ATGM (above) would greatly expand its lethality. With these and other expected upgrades, and with new designs in production, we can expect to see recoilless weapons employed against U.S. forces for many more years.

Chapter 6: Artillery Systems

This chapter provides the basic characteristics of selected artillery weapon systems, artillery reconnaissance, and artillery command and control (C2) systems in use or readily available to the OPFOR. Therefore, systems discussed in this chapter are those likely to be encountered by U.S. forces in varying levels of conflict. The selection of artillery systems is not intended to be all-inclusive, rather a representative sampling of weapons and equipment supporting various military capabilities.

This update is divided into the following categories¾artillery command and reconnaissance, towed cannon, self-propelled cannon, multiple-rocket launchers, mortars and combination guns, and artillery ammunition.

Artillery Weapons: Rocket Launchers

Compared to cannon, rocket launchers (RLs) are relatively uncomplicated, easy to operate and maintain, and are highly mobile. Single-tube RLs vary from 107 mm (Type 85) to 544 mm (Luna-M/FROG-7). Single- tube RLs of 122-mm or less are man-

portable for use by dismounted troops.

The majority of RLs are multiple rocket launchers (MRLs). The OPFOR categorizes MRLs as medium-caliber (100 – 220 mm), and large-caliber (220 mm and larger). The OPFOR uses MRLs to deliver heavy fire on important targets at decisive moments in a battle. They offer an economical means to deliver massive, destructive fires on an area-type target in a very short period of time. The principal disadvantage of some MRLs is that excessive dispersion does not permit direct, close support to maneuver elements. For sudden massive strikes, MRLs may execute salvo fire from the launchers. These flexible assets may fire as battery and battalion groups or as platoons or autonomous weapons. MRLs can provide the initial area coverage fires, while cannons and mortars either maintain fire at a steady volume or attack high-value point targets. MRLs are also excellent weapons for counter-battery fire, especially when the enemy uses large-area dispersion for survivability.

The MRL is an excellent area coverage weapon, and its rapid ripple fire is an excellent delivery system for high-explosive (HE), volumetric explosive (VEX), and smoke projectiles; chemical agents; and submunitions. The OPFOR often dedicates some MRLs with scatterable mines to lay on-demand mine fields. Improved munitions, e.g., guided projectiles enable MRLs to fire multiple salvos strikes from autonomous platoons or launchers, with lethal results against point targets or small target nodes.

Chapter 7: Engineer Vehicles

Chapter 8 of the *Worldwide Equipment Guide* (WEG) provides the basic threat characteristics for selected engineering equipment and systems. The engineer chapter discusses the following topics: landmines, minelaying systems, mine-clearing systems, route clearing systems, and “gap-crossing” systems either in use or readily available to the OPFOR and therefore likely to be encountered by US forces in varying levels of conflict in the future.

The list of engineer systems within this chapter is not meant to be encyclopedic. This chapter provides the US training community with a list of representative engineering (systems based) capabilities that allow scenario developers and the rest of the training community to create a dynamic threat to prepare today’s warfighter for tomorrow’s battlefield.

The chapter is divided into three major categories¾***The Land Mine Primer, the Unmanned Ground Vehicle (UGV) Primer, and WEG Sheets on mobility engineering assets***. The Land Mine Primer focuses on counter-mobility and examines types of mines, minefields, emplacement or mine delivery methods. The UGV Primer discusses provides an UGV overview and of how certain systems are used for detect hazards and supporting the defeat of explosive devices such as mines. The third section consists of WEG sheets on mobility engineering assets such as but not limited to bridge crossing and mine clearing assets.

Land Mine Primer

The widespread proliferation and use of landmines on today’s battlefield can be contributed to a combination of a number of factors, which include the following: the ability to easily mass produce items, the development of plastic devices, improved battlefield delivery systems, and ongoing research with regards to sophisticated fuzes. The advances in mass production techniques and the associated reduction in per-item cost along with the simplicity of manufacturing/automated production make landmines extremely easy and relatively inexpensive to produce. Technological improvements have also affected landmines in the form of the widespread use of plastic in the construction of the devices. This development has rendered metal detectors mostly ineffective for locating newer plastic-cased mines (unless the manufacture intentionally places a mass of metal in the mine). Remotely delivered mines have expanded the capability for quickly changing the tempo of battle with relation to counter mobility tactical actions and reinforcing defensive positions.

1. Types of Minefields

The following are basic types of OPFOR minefields: antitank (AT), antipersonnel (AP), mixed, decoy, and antilanding. AT minefields are the primary types of OPFOR engineer obstacle and serve to destroy or disable armored vehicles. They are primarily established in belts consisting of multiple rows on avenues that are favorable for tanks in front of the forward edge and on the flanks. Where difficult terrain is available, minefield belts will be tied into terrain obstacles to reduce the mine requirement. The OPFOR sets up conventional AP minefields on the forward edge of friendly defensive positions, in front of AT minefields, or along dismounted avenues of approach. Mixed minefields consist of both AP and AT mines. Decoy minefields are a significant form of deception to slow movement or deceive as to true unit locations. Antilanding minefields prevent landings by amphibious, airborne, or heliborne assault forces.

Minefields can also be categorized by their technical method of activation—uncontrolled, controlled, and intelligent. Controlled minefields consist of landmines with electronic switches that allow the operator (controller) control over the operational status of the minefield. The operator can change the status of the landmines either by a direct hardwire link or by radio. An entire minefield can be emplaced and turned on or off, as necessary to best support OPFOR operations. On a smaller scale, select passages in a conventional minefield can contain controllable landmines, allowing for the option of clearing safe lanes. The addition of selectable, anti-removal, and self-destruct features to controlled mines enhance flexibility and overall effectiveness.

Intelligent minefields have advanced technology that allows minefields to switch on and off and to deactivate at a certain time.

When used in conjunction with unmanned ground sensors (UGS) they can communicate via and communications link and be activated remotely. Other advancements include acoustic and infrared signature activated mines. While many of these concepts are in the developmental stage, the technological means are available and have the potential to deploy as needs arise. They will be composed of “wide area coverage” mines.

2. Types of Mines

Mines may be AT/anti-vehicle, AP, antihelicopter, or area mines. They may also be defined by the manner in which they are emplaced such as scatterable (remote), or side-attack (generally AT or anti-vehicle) or their area coverage. As noted earlier for minefields, the OPFOR makes distinctions between controlled mines (command-operated by hard wire or radio linkage) and uncontrolled mines.

Side-attack mines are autonomous weapons that attack targets from the side as they pass by. These include anti- vehicle, anti-personnel, and anti-helicopter mines. They vary among manufactured side-attack mines, side-attack improvised explosive devices, and mines created by attaching manufactured or improvised sensor units to anti- tank grenade launchers (ATGLs) and anti-tank disposable launchers (ATDLs). Some side-attack mines can be used

for multiple roles. For instance, directional fragmentation mines and IEDs can be used against personnel and vehicles. Some like the MON-100 can tilt upward for anti-helicopter use.

Current developments in side-attack landmines use mature technology from other weapon programs. Since side- attack landmines have increased areas of coverage, the number required to hinder mobility of enemy forces is greatly reduced. Uses for these landmines include harassment throughout the area of operation and reinforcement of conventional minefields to make "cleared" lanes unsafe. Special Purpose Forces (SPF) and security patrols can also use these mines to economically cover multiple avenues of approach to alert on enemy encroachments. These types of mines can be used in ambush’s kill zones.

Antitank

Conventional antitank mines, such as the TM-62 AT mine, are those that are emplaced either by hand or by mechanical means. These will continue to be the primary landmine threat throughout the foreseeable future. They are readily available to armies and insurgency groups worldwide and are inexpensive and effective. These mines are normally buried just below the surface of the ground but can be surface laid or buried with up to 30 cm of cover. Antitank mines can vary in size from as small as 1.4 kg for a scatterable mine (PTM-1S) to over 20 kg for a side attack mine (TM-83). The category of antitank mines includes side-attack and anti-vehicle mines.

Side-attack antitank

Commonly called “off-route mines”, side-attack mines are an integral part of the adaptive battlefield and date back to the LGM trip-wire AT mines of the Vietnam War era. Today there are at least 18 different side-attack mines in use by 22 countries. Ten more side-attack mines are under development. Within the next few years these weapons will have proliferated to every combat environment. Some mines have been out fitted with acoustic and infrared signature detonation capabilities. The Polish Agawa comes in two variants, the legacy contact-fuzed MPB-ZK and the new non-contact, acoustic-activated MPB-ZN. Some mines and IEDs have warheads which produce an explosively formed penetrator (EFP), a metal sabot which penetrates light to heavy armor, depending on design. EFPs were used in the Iraqi theater against US and coalition forces. The majority of usage of such systems were by Shia Militias. Such mines include the Russian TM-83, and TEMP-30 sensor-fuzed mine. Sensor fuzed ATGL or ATDL based mines can also be effective. A shoulder-fired AT weapon placed on a tripod and fitted with an IR sensor can kill moving targets up to 100 meters away. Current warhead technology in these weapons allows penetration of up to 950 mm of rolled homogeneous armor.

Anti-vehicle

Many smaller antitank mines, or larger antipersonnel mines, have been developed (or modified) to severely damage or destroy vehicles other than tanks with a few pounds of high explosives or fragmentation. These may be either trucks, tactical utility vehicles such as UAZ-469, or light armored combat vehicles such as BTRs.

Side-attack sensor-fuzed mines such as Russian platter mines direct fragmentation to damage or destroy vehicles. Other mines and IEDs (e.g., PD Mi-Pk) initiate multiple EFPs for KE penetration. Blast effects from mines and IEDs can inflict kinetic energy damage by flipping over vehicles, bending metal, and tossing material about inside to kill or injure personnel.

Antipersonnel

Antipersonnel landmines injure by either blast or fragmentation. The small antipersonnel mine contains no more than a pound (usually only a few ounces) of high explosive. Blast injures by the force of the charge. The loss of a foot or a leg is the common result. Fragmentation mines contain hundreds to thousands of pellets. Plastic-cased landmines pepper their victims with small particles of plastic that are not detectable with x-

rays, making complete cleansing of wounds extremely difficult and increasing the risk of infection and amputation. On the battlefield, the modern AP mine is used to—

- Inflict personnel casualties.
- Hinder soldiers in clearing AT minefields.
- Establish defensive positions.
- Deny access to terrain.

Anti-helicopter

The modern attack helicopter, with increasing agility and weapons payload, is able to bring enormous firepower to bear on enemy forces. To counter this threat, a new type of mine—the antihelicopter mine—was developed. By borrowing technologies from the side-attack and wide-area landmines, antihelicopter mines may make use of acoustic fuzing to locate and target potential low-flying targets at significant distances. Their multiple-fragment warheads are more than capable of destroying light-skinned, non-armored targets at closer ranges.

A simple antihelicopter mine can be assembled from an acoustic sensor, a triggering IR sensor, and a large directional fragmentation mine. More advanced mines use a fairly sophisticated data processing system to track the helicopter, aim the ground launch platform, and guide/fire the kill mechanism toward the target. As the helicopter nears the mines, the acoustic sensor activates or cues an IR or MMW sensor. This second sensor initiates the mine when the helicopter enters the lethal zone of the mine. A typical large fragmentation warhead is sufficient to damage soft targets, such as aircraft. Alternate warhead designs include high-explosive warheads and single or multiple explosively formed penetrators.

Area Coverage

The terms “area” and “wide area” mines are often confusing and misleading. Mines classified as area mines range from antipersonnel “bouncing Betty” mines to side-attack mines, directional fragmentation mines “claymores”, and possibly antihelicopter mines. Wide area coverage mines with sophisticated fuzing and possibly a limited communications capability are weapons of the future and have not been fielded. The Polish Agawa MPB-ZN is a wide area coverage AT mine with an acoustic activated target detection range of around 150m and its EFP is described as effective against 100 mm of rolled homogenous steel armor at distances of 50 m.

3. Emplacement or Delivery Methods

In the past, landmines were generally emplaced manually one at a time. Mass mine delivery and distribution systems permit the rapid placement of large quantities of mines. Landmine emplacement vehicles are designed to automatically arm and bury a landmine every 3-10 meters. Landmines also may be placed with artillery, rockets, or aircraft at a rate of hundreds, even thousands, of mines per minutes. Emplacement means may be manual, mechanical, or remote. Manual emplacement is not possible when there is little time or during high-speed maneuver operations. Therefore, mechanical and remote means are more prevalent.

Manual

The OPFOR manually emplaces minefields when

- There is no contact with the enemy.
- Mechanical minelayers are unavailable.
- It is inadvisable to use mechanical minelayers because of terrain restrictions.

Mechanical

OPFOR engineers rely extensively on mechanized minelayers. These can bury or surface-lay AT mines. The layout of mechanically emplaced minefields is the same as those emplaced by hand. Mines can also be emplaced by helicopters or vehicles with the use of chutes (slides). Mine chutes can also be used to assist manual burial emplacement or to surface-lay mines.

Scatterable Mines

Known as “scatterable mines” in the US, other countries call them “remotely-delivered”. They are landmines emplaced through a variety of means and are designed as such to be delivered by aircraft, tube artillery, multiple rocket launchers, missiles, ground vehicles, or they can be hand-thrown. Scatterable mines are not a standard item except in well-equipped armies of the world. While the number of countries possessing scatterable mines continues to increase, there will continue to be many areas of the world where scatterable mines are not a threat through the far term.

Minefield emplacement is progressing from manually and mechanically emplaced minefields to the more flexible and dynamic remotely, scatterable minefield. The ability to remotely deliver mines allows a rapid response with thousands of landmines at

any point on the battlefield. Since many scatterable landmines feature self-destruct and anti-disturbance fuzing, they are well suited for operations that deny terrain for a specific period. After the allotted time has expired, the terrain can once again be used by friendly forces. Scatterable mines may be delivered by the following methods:

Artillery

Multiple rocket launchers are the primary means of remote minelaying. The principal advantage of MRL mine delivery is its ability to quickly emplace large minefields in a single volley, while minimizing exposure to enemy targeting and weapon systems. Both AP and AT mines can be delivered by artillery (which may include cannon and mortar rounds).

Ground Vehicles

Within recent years the trend has been to mount scatterable-mine dispensers on ground vehicles. Both AP and AT mines can be launched from ground vehicles. This also gives the engineers the ability to re-seed or reinforce an obstacle without entering the minefield itself.

Infantry

Lower level OPFOR infantry units may employ man-portable remote mine dispensers. These man- portable dispensers, weighing only a few pounds, are ideal for installing small, defensive, AP or AT minefields. Infantry-fired ground dispensers allow low-level units to remotely emplace minefields to protect their fighting positions, flanks, and boundaries between units, or to cover firing lines and gaps in combat formations. They can quickly close breaches in existing protective minefields and increase the density of mines on armor avenues of approach.

Aerial

Both AT and AP minefields can be laid using aerial minelaying systems. Bombers and fighter-bombers can lay remotely delivered minefields in the operational depths. Ground-attack aircraft lay these minefields in the enemy's tactical depths. Helicopter minelaying systems are used to emplace small mine belts or large barrier minefields in the execution of army or division offensive or defensive maneuver plans. This type of aerial minelaying is normally conducted over friendly territory along flanks or in rear areas.

When supporting an airborne or air assault landing, helicopters may lay mines on enemy territory. Helicopter mine chutes are a tool available to even low-technology helicopter forces for installation on a variety of helicopters by low echelon maintenance units and rapidly dispensing conventional anti-tank mines in areas inaccessible to even

rapidly moving ground vehicles. Placement of a limited number of side-attack or conventional AT/AP mines along likely movement routes allows the OPFOR to harass traffic, slow movement rates, cause casualties, and affect enemy morale.

4. Fuzes

Some types of fuzes, such as pressure fuzes, are used in both AT and AP mines while other fuzes tend to be linked to more specific types of mines. For example, acoustic sensors are generally used with antihelicopter and advanced off-route mines while magnetic, tilt-rod, or seismic fuzes are used with AT mines. Most AT mines are detonated by the pressure of a vehicle driving over a buried mine or by the movement of a tilt rod attached to the mine.

Pressure and tilt-rod AT mine fuzes (contact fuzes) are being complemented and in certain cases replaced by mines with magnetic, optical, seismic, and acoustic influence mines. Some mines have a second fuze well to facilitate the installation of an antihandling fuze. Conventional antihandling devices and target-sensing fuzes have evolved into sophisticated booby traps, which virtually assure grievous injury or death to the de-miner. Some landmines may be detonated by metal detectors; others explode when their fuzes detect light when lifted from the ground. One version of the "Bouncing Betty" is activated by an array of seismic detectors. Other mines, for example the US M18A1, will accommodate a variety of fuzes, including tripwire and command detonation. Other mines, especially antihelicopter mines use a combination of sensors/fuzes to acquire the helicopter and initiate the mine when the helicopter enters the lethal zone. The following is a list of fuzes:

Pressure

The pressure fuze is the most common type of fuzes for both AT and AP mines. Also known as the contact fuze, it may require only a few ounces pressure to active the mine or as much as several hundred pounds. **Trip Wire.** Also called pressure release, these fuzes may be attached to a thin wire stretched across a path or route. When the victim or vehicle passes and breaks the wire, the mine is detonated. Trip wires are used mainly with AP and side-attack mines.

Magnetic

Most armored vehicles contain a large quantity of steel and therefore create large magnetic disturbances that signal their presence to a magnetic influence fuzed landmine.

Optical

An optical fuze, using a small infrared or ultra-violet transmitting diode on a

surface-placed landmine, sends a detonation signal with it senses light reflecting from the hull of a tank. **Radar.** A small, micro-electronic radar can sense the underside of a tank by the magnitude and location of the radar reflection.

Seismic

Mines can be equipped with sensors that detect the vibrations caused by the weight and track movement of tanks or by the noise they make.

Acoustic

When a system approaches, antihelicopter or advanced off-route mines use an acoustic sensor to activate or cue an IR, seismic, or MMW sensor.

Infrared

IR sensors are generally used against vehicles, ground and aerial.

Explosive Charge Minefield Breaching Systems

Minefield breaching explosive line charge systems are in use throughout the world. These systems provide the maneuver commander a method to expeditiously breach antitank or antipersonnel minefields. Once identified on the battlefield however, these systems can become a priority target. Some systems, single or double line, are mounted on tanks while others are mounted on trailers, armored vehicles, and trucks. Some other systems are man-portable. The larger vehicle and trailer-mounted systems are designed to clear lanes through minefields/obstacles, large enough for the passage of ground combat vehicles. Man-portable (infantry) systems clear passage for at least one person to transit. The explosive filled lines are usually connected to a launcher by a cable, fired over a minefield (within which it lands) and then detonated to create a breach through the minefield.

Standoff between the explosive charge and launcher varies. For instance, the Japanese CX has a standoff of 800 meters from the launcher.

Truck or Trailer Mounted Mine breaching Systems
Motorized and infantry units may have either wheeled or towed antitank mine breaching systems. While some of these systems can be dismounted, most are fired from the
back of cargo trucks or from trailers.

Name	Country of Origin	Chassis	System (or Shell) Weight (kg) Overall: Rocket: Explosive Explosive/m	Range (m)	Length (m)	Standoff (m)	Effectiveness Lane Width (m): Lane Length (m) Lane clearing time (min)	Type Launcher/# Line Charges	Rocket Diameter (mm)	Operators	Explosive Type /#/ Notes
UR-83P	FSU	Truck (ZIL-131) or trailer	Dimensions (m) (ready for launch) • Length: 1.5 • Width: 1.5 • Height: 2.6 Launcher Wt (kg): • Total: 230 • Packaged: 360 • Charge: 1,380	440	114		LL: 115 LW: 6 Assembly time by engineer squad (min): 90	Line UZP-83 charge		2	portable dismountable

Type 81	CH	EQ-240 Truck chassis	Loaded: 5,112 Unloaded: 4,082 Exp: unk Exp/m: unk	3,000	na	2,900 +	LL: 60+ LW: 10+	10 tube	2,530	3	HE, FAE ea round clears 18 m radius in AP.
The Type 81 mineclearing rocket system consists of a 10-tube launcher mounted on the rear of a modified EQ-240 chassis. Rockets are loaded manually by three persons. The Chinese have stated that this system is effective against AP mines, but its effectiveness against AT mines is unknown. The range of this system is 3,000 meters, which provides the system with a maximum standoff of approximately 2,900 meters. Each round clears an 18-meter radius within an AP minefield. The Type 1987 has 24 launch tubes and is mounted on a Type 59/69 tank chassis.											

Tracked-Vehicle-Mounted Systems

Systems mounted on the rear of tanks increase the survivability of the platform and therefore increase the likelihood that it may be successfully employed prior to its destruction. The use of a tracked chassis as the launch carrier gives the system the same mobility and maneuverability on the battlefield as mechanized units; however, use of these systems does not allow tanks or mechanized vehicles to conduct a “Blitzkrieg” type rush across the minefield. Systems found in armor and mechanized divisions will generally be mounted on tracked vehicles due to mobility requirements. Although these minefield breaching systems may (or may not) be mounted on tanks they do not belong to the maneuver commander. They are engineer assets and are found in rather limited numbers. Two of these systems are in the Mine clearing Platoon, Mine Warfare Company, Division Engineer Company, and Engineer Battalion of a mechanized/armored division, engineer brigade, or Corps. Further information on these elements can be found in TC 7-100.2.

Tracked-Vehicle-Mounted Systems

Name	**Country of Origin**	**Chassis**	**System (or Shell) Weight (kg)** Overall: Rocket: Explosive Explosive/m	**Range (m)**	**Length (m)**	**Standoff (m)**	**Effectiveness** Lane Width (m): Lane Length (m) Lane clearing time (min)	**Type Launcher/# Line Charges**	**Rocket Diameter (mm)**	**Crew**	**Explosive Type /#/ Notes**
Type 84	CH	Tank or other armored vehicle	OA: 800 Rocket: unk Exp: 400 Exp/m: 5	300	80	200	LL: 60 LW: 5	1	unk	unk	Line charge
The Type 84 mounts in a box on the rear of a tank or other vehicle. Inside the box is a rocket in a launch rail attached to the box lid, an 80-meter-long explosive hose, and a drag chute. The rocket pulls the explosive hose over the minefield or other obstacle, arming the fuze in flight. After a short delay, the hose explodes leaving a cleared path. The box is automatically discarded after firing. With a published range of 300 meters and a length of 80 meters, the standoff of the system is estimated to be approximately 200 meters.											
Type 762	CH	Type 83, 152-mm tracked howitzer	OA: unk Rocket: 760 Exp: 400 Exp/m: 3	1,000	130	800-900	LL: 130 LW: 12-22	2	425	unk	line charge. 32 charges 12 kg ea
The Type 762 is a twin-rail rocket launcher mounted on a Type 83, 152-mm tracked howitzer chassis. It carries two 425-mm GSL 211 mineclearing rockets. The warheads on GSL 211 rockets contain an explosive line charge that is extracted during flight. The line charge is composed of 32 fixed-interval explosive charges, each weighing 12 kg. When the explosive charge is at a specific height above the minefield, specially designed detonation fuzes at the head and tail of the line charge activate and simultaneously detonate the charges. The system is equipped with an ordinary rangefinder with questionable accuracy; it is uncertain how the system will perform when deployed over a minefield.											
SVO	CZ	BMP-1	Shell size: Length (mm): 1,457 Dia (mm): 246 Weight (kg): 42				LL: 100-120 LW: 5 Time btwn rounds (sec): 2.5	24 explosive rockets			fuze initiation rod length (m): .3
The Czech Republic’s SVO is an armored, tracked, mine clearing vehicle used for combat breaches of AT and mixed minefields. The breach is conducted by the launching of mine clearing shells in a specific pattern in order to detonate all the mines along a pathway through the minefield. The entire system is contained in a modified BMP-1 chassis. The turret on the chassis has been removed and exchanged for a rocket firing platform. The firing platform contains 24 launch rods angled at different elevations and deflections in order to provide full warhead coverage for a path through the minefield. The front half of the compartment is for storing and launching the warheads, the other is the operator’s position. The shells fit over the 24 launch rods and are projected into the air by the initiation of explosive cartridges. Piezoelectric fuzes located at the base of the fuze extension rods detonate the shells .3 meters above the ground. The SVO reportedly has a 95% probability of initiating single impulse, nonblast resistant, pressure-fuzed mines.											
UZ-67	F S U	2S1 mod	weight (kg): 2,400		93	200 and 350	LL: 75-80 LW: 6 Time: 3-5	2	unk	2	basic load of 2 line charges
UZ-77	F S U	2S1 mod	unk		93	200 and 500 water 200	LL: 80-90 LW: 6 Time: 3-5	2	unk	2	basic load of 2 line charges

Man-Portable Rocket Propelled Line Charges

Many countries and some insurgent groups produce small (1 or 2 man-portable) explosive line charges with a wide variety of capabilities and performance. Mechanized infantry units normally do not have these since the tracked vehicles clear a way for the dismounted infantry. The basis of issue of these systems for use by dismounted (or regular) infantry units is generally three per infantry battalion; nine per brigade/regiment; 27 per division. They are used only in the primary avenue of attack (or as a deception). Battlefield employment dictates that the line is fired and detonated. The infantry then moves as quickly as possible (probably under fire) along the cleared path ensuring they do not step on any uncovered/ unexploded mines. The line charges may be carried by one or more soldiers therefore the overall weight of the charges is important. The bullet trap line charge delivery method realizes a significant weight savings by eliminating the additional weight of a rocket. The soldier simply uses his standard issue weapon to deliver the detonating cord/hose across the minefield. This places limitations on the length and weight of the delivered charge. A typical “infantry explosive minefield breaching system” is the FSU ZRP-2. It is a mine demolition charge designed to blast lanes through AP minefields. The ZRP-2 consists of a detonating cable, powder rocket engine, connecting cable, fuze, braking cord, launching table, launching device, anchor and carrying pack. The charge is launched into an AP minefield with the aid of launching device UP-60 from a position prepared on the ground surface. The charge is detonated remotely by a mechanical fuze. The charge is straightened in the minefield manually with the braking cord while the fuze retarder is burning.

ZRP-2 (FSU) Mine demolition charge	
Type	extended, single-line, made of detonating cable DKR-150A
Weight of set (kg)	50 packaged, 34 in pack
Crew, men	1 or 2
Length of charge (m)	60
Charge launching range (m)	140-160
Size of passage through AP minefield (m)	55 length x 0.4 width
Launch preparation time (min)	5

Infantry Line Charges				
Name	**Country**	**Delivery Method**	**Explosive Weight (kg/m)**	**Length (m)**
Type 73	China	Rocket	2.40	106
Type 74	China	Rocket	2.40	100
Type 81	China	Rocket	0.10	100
Type 84	China	Rocket	0.40	28
ODMIRA-60	Czech Rep	Rocket	NA	60
FATEH-1	Egypt	Rocket	0.42	120
Comet No 3001	Germany	Rocket	0.10	72
Comet No 3010	Germany	Rocket	0.57	53
Ladder 80	Germany	Rocket	NA	70
Unknown	Iraq	Bullet trap	NA	40
POMINS I	Israel	Bullet trap	0.27	50
POMINS II	Israel	Rocket	NA	50
Type 70	Japan	Rocket	1.41	136
Unknown	North Korea	Rocket	NA	180
Clap/M	Pakistan	Rocket	0.05	300
M/60	Sweden	Rocket	NA	150
Unknown	South Africa	Rocket	NA	35

Unknown	South Africa	Rocket	NA	120
RAMBS	UK	Bullet Trap	0.02	40
RAMBS 2	UK	Bullet Trap	unknown	60
ROMANS	UK	Rocket	unknown	50

UGV Primer



Figure 1: Inspector Mid-Sized Robot, Poland

Unmanned Ground Vehicles or UGVs have been in service for close to forty years, detecting hazards, marking and clearing roads, and supporting the defeat of explosive devices such as mines, and explosive hazards. This mission traditionally was performed by combat engineers such a Sappers and explosive ordnance disposal (EOD), personnel and specialized police forces. The work can be extremely dangerous as it requires human contact with potentially lethal explosive devices, and hazardous materials. For this reason, UGVs have found a niche in identifying, disarming and disposing of explosives and other hazardous materials while providing combat engineers the standoff distance necessary to increase survivability. It is estimated that the global market for these types of devices will increase to $8.26 billion by the year 2020.

UGVs are credited with reducing ground troop's exposure to danger through a combination of tactics, techniques, and procedures (TTP) used to leverage this new technology. Some of the new technology that is emerging from this sector includes UGVs that are self-aware, multi-functional, energy efficient, and can operate in a variety of terrain. There are a variety of systems on the market that are designed for explosive disposal ranging in size and capability. The categories are mini, mid, and large size UGVs. Most explosive disposal UGVs fall into the Mid-sized category, as they are easy to remotely control, have a small enough profile to provide access to an emplaced explosive device, while at the same time being large enough to manipulate the devices in order to disable them. Some larger UGVs are being used in other types of combat Engineer support activities such as route clearance, and logistics support. These UGVs can look like modified tractors or forklifts with a special sensors for identifying targets, rollers and scoops to defeat mines or remove obstacles.

Many UGVs have tracked belt and wheel system for driving over complex terrain in all types of weather. UGV's that perform reconnaissance functions usually move with relatively large treaded wheels for speed and maneuverability. Usually logistical UGVs are have wheels in order to keep supplies close to maneuver units on the battle field. Legged robots like Boston Dynamics Legged Squad Support System, (LS3) otherwise known as Big Dog, attempt to achieve an all-terrain capability through the employment of a quadrupedal gait. The Big Dog program has been "shelved" by the US Marines.

Challenges with UGVs are mainly with maintaining reliable command and control links between the device and the operator. This critical link, requires the operator to gaze into a computer screen while interpreting everything the UGV sees with its usually limited optical sensor. While the operator is engaged in controlling the UGV the Soldier is unable to perform other security duties and has limited situational awareness. One way to handle this

problem is to make UGVs self-aware by installing automatic target recognition (ATR), algorithms that instruct the device on how to approach and defeat obstacles. Additionally the onboard data base is loaded with the most current map data and a satellite based navigation system in order for the device to move autonomously to its target. The link between robot and operator will not be completely severed in the near future as artificial intelligence is unable to build into the device's electronics the ability to make decisions in a complex combat environment, so operators will still be needed to have a way to give commands and establish control when necessary.

Chapter 8: Logistics

This chapter provides the basic characteristics of selected logistics vehicle and trailers. This chapter provides the basic characteristics of selected trucks, maintenance vehicles, and other logistic equipment readily available to the OPFOR. It includes a representative vehicle from the light, utility, medium, and heavy truck categories. Later updates of this guide will include data on a wider selection of trucks, trailers, vans and other logistical equipment.

Chapter 9: C2 and INFOWAR

Command and Communications C2

This chapter provides basic characteristics of selected tactical command and control (C2) systems either in use or readily available to the OPFOR. Critical C2 equipment

Many foreign militaries are leveraging advances in automated technologies in order to use increasing amounts of data across all warfighting capabilities. Increases in processing power and broadband technologies through commercial research and development make real time situational awareness and communications on the move a tangible objective for many foreign forces. The emergence of rudimentary Integrated Battlefield Management Systems (IBMS) in tier three forces represents this global trend. Net Centric operations are viewed worldwide as a key element of modern military operations, an IBMS is a system that integrates multiple command and control formats as well as sensor data into one display that improves situational awareness through multiple sources.

There are a variety of technologies available to achieve improved situational awareness through network enabled battlefield systems. Foreign forces will incorporate various modern systems into the C2 structure and will rely on manual operators to fuse them to legacy systems.

Incorporating commercial telecommunications and internet service to meet strategic, operational and tactical objectives represents one of the most important aspects of the foreign forces information warfare (INFOWAR) campaign. In tier one and tier two forces, the level of automated interoperability can be integrated across many levels of command through domestically produced systems designed for military use. These systems are equivalent to friendly system capabilities. This selection of systems is not intended to be complete; rather, it is representative of the types and capabilities that are currently fielded or available.

Command systems in the WEG are initially limited to command vehicles, such as the listed BMP-1KSh.

While the focus of the communications equipment for this chapter is primarily tactical communications systems and the more recently fielded IBMS systems, this chapter does include limited information on satellite communication systems (SATCOMs), navigation (NAV) systems, and weather systems. Satellites have added a new dimension to the battle space in the past few decades especially in terms of SATCOM and NAV capabilities.

There are currently over a thousand operating satellites orbiting the earth, with more than half having a primary mission of supporting communication and navigation efforts both commercially and militarily world-wide. See the Tables 2-4 for specific information on examples of these satellites, their owners/operators, and users.

Table 1: Tactical Communications Systems

System	Country of Origin	Description	Frequency Range (MHz)	Digital?	FH?	Range (km)	Power Output
Panther-V	UK	Vehicle/Manpack VHF/UHF	30-108	Yes	Yes	50	50W
Jaguar-V	UK	Vehicle/Manpack VHF	30-88	Yes	Yes	50	50W
R163-50U	Russia	Vehicle VHF	30-80	Yes	No	40	30W
R173M	Russia	Vehicle VHF	30-80	No	No	30	20W
M3TR	GE	Vehicle/Manpack	1.5-512	Yes	Yes	50	50W
RF5000	US	Vehicle HF	1.6-30	Yes	Yes	75	400W
XK2000	GE	Vehicle HF	1.5-30	Yes	No	75	150W
R123M	Russia	Vehicle HF/VHF	20-52	No	No	30	22W
Panther-P	UK	Hand-held Squad/Platoon	30-88	Yes	Yes	10	5W
TRC5102	France	Hand-held Squad/Platoon	30-88	Yes	No	7	2W
ACH42	S. Afr.	Hand-held Squad/Platoon	45-68	No	No	7	2W
R31K	Bulgaria	Hand-held Squad/Platoon	44-54	No	No	5	1W
RL402	Swe/Nor	MMW Radio Relay	225-1850	Yes	Yes	Network	N/A
R423-1	Russia	Troposcatter Relay System	4400-4700	No	N/A	Network	N/A

KSR8	Hungary	Microwave Relay System	8000	Yes	N/A	Network	N/A
R161-5	Russia	HF Radio Station	1.5-30	No	No	3000	5kW
Scimitar-H	UK	HF SPF Radio	1.6-30	Yes	Yes	500	20W
PRC138	US	HF SPF Radio	1.6-80	Yes	Yes	500	20W
PVS5300	UK	HF SPF Radio	2-30	Yes	No	500	20W
PRC104	US	HF SPF Radio	2-30	No	No	500	20W

Table 2: Communication Satellites

Name of Satellite System	Country of Operator/Owner	Users	Class of Orbit	Comments
Amos	Israel	Military/ Commercial	GEO	C-band, Ku-band, and Ka-band transponders.
Apstar	China	Commercial	GEO	C-band and Ku-band transponders.
AsiaSat	China	Commercial	GEO	C-band and Ku-band transponders.
Chuangxin	China	Government	LEO	Prototype of advanced telecommunications satellite for LEO.
Express	Russia	Commercial	GEO	C-band, Ku-band, and L-band transponders.
Gonets	Russia	Commercial/Government	LEO	UHF.
Meridian	Russia	Military	Elliptical	C-band transponders.
Raduga	Russia	Military	GEO	C-band transponders.
Rodnik	Russia	Military	LEO	UHF.
Thuraya	United Arab Emirates	Commercial	GEO	C-band and L-band transponders.
Yahsat (Y1A)	United Arab Emirates	Military/ Commercial	GEO	C-band, Ku-band, and Ka-band transponders.
Zhongxing	China (PR)	Military/Government	GEO	Ku-band transponders.

Table 3: Navigation Satellites

Name of Satellite System	Country of Operator/Owner	Users	Comments	Class of Orbit
Beidou	China	Military	Navigation/Global Positioning	GEO
Compass	China	Military	Navigation/Global Positioning	GEO
Glonass	Russia	Military/ Commercial	Navigation/Global Positioning	MEO
Parus	Russia	Military	Navigation	LEO

Table 4: Weather Satellites

Name of Satellite System	Country of Operator/Owner	Users	Comments	Class of Orbit
Electro	Russia	Government	Meteorology	GEO
Haiyang	China	Government	Meteorology	LEO
Meteor	Russia	Government	Meteorology	LEO

Note: Additional information exists for all these satellites to include perigee, apogee, eccentricity, inclination, period, mass,

power, launch site, and launch vehicle and is available on request.

INFOWAR

INFOWAR is defined as specifically planned and integrated actions taken to achieve an information advantage at critical points and times. The goal is to influence an enemy's decision-making through his collected and available information, information systems, and information-based processes, while retaining the ability to employ friendly information, information-based processes, and systems to control the use of the electromagnetic spectrum at critical locations and times in the battle space or to attack the enemy.

All INFOWAR elements are mutually supporting. INFOWAR occurs through the combinations of seven elements:

- Electronic warfare (EW).
- Deception.
- Physical destruction.
- Protection and security measures.
- Perception management.
- Information attack (IA).
- Computer warfare.

EW capabilities allow foreign forces to exploit, deceive, degrade, disrupt, damage, or destroy sensors, processors, communications, and command and control (C2) nodes. Information supremacy, delay, and denial, or distortions of the adversary's use of the electromagnetic spectrum and information infrastructure are the objectives. Electronic warfare (EW) is a perfect example of the integrated nature of foreign forces INFOWAR elements. The EW section in this chapter provides basic characteristics of selected systems either in use or readily available to the foreign forces.

Computer warfare includes capabilities that allow the foreign forces to conduct network warfare (NETWAR) to attack and exploit information systems by attacking key information technology systems within cyberspace, and to conduct network operations (NETOPS) to establish and protect C4ISR networks and information. In NETWAR the foreign forces obtains access through social engineering processes such as phishing schemes but can also employ complex technologies to intercept communications through man in the middle (MITM) attacks and hack into a system remotely. Once access is obtained, foreign forces will attempt to degrade the system or to exploit the system to collect intelligence. Some forms of attack can be launched unexpectedly through a data driven attack known as a "drive-by- download" that is embedded into a website or uploaded to a commonly used system, the victim in these cases releases malware by attempting to access what is believed to be a legitimate site or program. There are various methods used to accomplish this for the purpose of releasing viruses and other malware designed to give the attacker control over the victim's computer. The methods used to gain access involve highly developed social engineering techniques and or network attacks such as a spoofed email account or a false website.

Because these types of attacks are launched by the end user they are a concern since the attack is able to legitimately pass through various electronic defense systems such as firewalls. If access is obtained an electronic beachhead is established on the infected computer exposing the rest of the network to further attacks such as distributed denial of service attacks that overwhelm internet servers. Attacks can include vandalizing or

sabotaging a website, downloading sensitive information or degrading a key war fighting function through the release of malware.

Cyber espionage describes those INFOWAR actions that involve collecting sensitive and proprietary information such as plans, capabilities or personal data. The threat will exploit poor information technology security that exposes sensitive data to risk of exploitation or manipulation.

Information attack is a type of action that focuses on the intentional disruption or distortion of information in a manner that supports accomplishment of the mission. Unlike computer warfare attacks that target the information systems, information attacks target the information itself. Attacks on the commercial Internet by civilian hackers have demonstrated the vulnerability of cyber and information systems to innovative and flexible penetration, disruption, or distortion techniques.

Computer warfare consists of attacks that focus specifically on the computer systems, networks, and/or nodes. This includes a wide variety of activities, ranging from unauthorized access (hacking) of information systems for intelligence-collection purposes, to the insertion of malicious software (viruses, worms, logic bombs, or Trojan horses). Such attacks concentrate on the denial, disruption, or manipulation of the infrastructure's integrity. Terrorist organizations use a variety of encryption techniques such as embedding communications into innocuous computer applications in order to transmit data in a surreptitious manner. Other methods are the use of code words to conceal the meaning of topics and swapping Subscriber Identity Module (SIM) cards or cell phones to prevent electronic surveillance systems from identifying the user of a particular phone.

Evolving mobile technology has increased the portability of battlefield automated systems improving the integration and capabilities of many military functions. The proliferation of these capabilities increases the military's dependence on mobile

devices and the networks that support them. Referred to as the “edge of the network,” mobile systems provide improved situational awareness. However, the complexity associated with these enhancements in functionality, has introduced additional vulnerabilities. Vulnerabilities associated with wireless networking, and the need to support an expanding list of military applications, make mobile technology an important, feasible and valuable target for INFOWAR operations. Mobile devices share many of the vulnerabilities of personal computers. However, the attributes that make mobile phones easy to carry, use, and modify as well as comparatively low security standards open them to a range of attacks.

This selection of systems is not intended to be complete; rather, it is representative of the types and capabilities that are currently fielded or available. Later WEG updates will include equipment for other elements of INFOWAR operations. For more information on the INFOWAR tactics techniques and procedures see chapter 7 of TC 7-100.2 OPFOR Tactics.

Table 5: Tactical Electronic Warfare Systems

System	Country of Origin	Description	Frequency Range (MHz)	Vs. GPS?	Vs. FH?	Range (km)	Power Output
MEERKAT-S	UK	ESM/ELINT	2-40,000	No	Yes	500km	Passive
WEASEL 2000	UK	ESM/ELINT	.5-10,000	-	Yes	500km	Passive
EULe	Germany	ESM/ELINT	.9-3,000	-	Yes	450km	Passive
MCS90 TAMARA	Czech Rep	ESM/ELINT	820-3,000	-	No	450km	Passive
R-703 /709	Russia	ESM/ELINT	1.5-2,000	Yes	n/a	Unk	Unk
CICADA-C	Germany	Mounted ESM/ECM HF/VHF/UHF	.525-3,000	Yes	Yes	100km	10kw
TRC274	France	Mounted ESM/ECM HF/VHF/UHF	20-3,000	Yes	Yes	150km	4kW 1.2kW on the move
GSY1800	S. Africa	Mounted ESM/ECM HF/VHF/UHF	1-3000	Yes	Yes	100km	(ECM: 1kW)
PELENA-6	Russia	Mounted ECM HF/VHF/UHF	20-1,000	No	No	60 km	60W
R-330 ZH	Russia	Mounted ECM HF/VHF	100-2000	Yes	No	60km	1kW
CICADA-R	Germany	Mounted ESM/ECM HF/VHF/UHF	6,000-18,000	No	Yes	100km	1kW
LIMAN P2	Ukraine	Mounted ECM VHF/UHF	225-1,215*	Yes	Yes	100km	Unk
R-934B	Russia	Mounted ECM VHF/UHF	100-400	No	No	50km	500W
BOQ-X300	Sweden	Mounted ECM S/C/X/Ku/K	2-40,000	Yes	n/a	Unk	Unk
CBJ-40 BOME	France	Mounted ECM S/C/X/Ku	2-20,000	Yes	n/a	Unk	Unk
PELENA-1	Russia	Mounted ECM S/C	1,000-4,000	Yes	n/a	250 km	Unk
SPN-2/4	Russia	Mounted ECM X/K	6,000-17,500	No	No	130km	(ECM: 1kW)
SGS2000	Germany	Mounted ESM/ECM HF/VHF/UHF	1.5-1000	No**	Yes	100km	(ECM: 1kW)
JN-1102	China	Mounted ECM VHF (UAV Mounted)	20-500	No	Unk	Unk	Unk
BARRAGE	France	Mounted ECM VHF (UAV Mounted)	1-3000	Yes	No	Unk	Unk
AJ-045A	Bulgaria	Mounted ECM VHF (UAV Mounted)	20-100	No	No	10km	Unk
HUMMEL	Germany	Mounted ESM/ECM VHF	20-80	No	Yes	100km	(ECM: 1kW)
STORM-H	France	Manpack ECM HF/VHF/UHF/ SHF	20-470	No	No	5km	1kW (est.)

EL/K 7029/A/B	Israel	Mounted ESM /VHF /UHF/ESM	116-400	-	Yes	100km	Passive
ORION	Russia	ELINT	200-18,000	-	No	400km	Passive
AVTOBAZA-M	Russia	ELINT	200-18,000	-	No	400km	Passive

*Liman does not DF in the 960 to 1,215 MHz range

**SGS 2000 frequency range can be extended up to 3000MHz

Chapter 10: Countermeasures, Upgrades, and Emerging Technology

Chapter 10 includes information on countermeasure techniques, weapon system upgrades, and emerging

technology. The section on countermeasures will detail how the OPFOR can employ a variety of countermeasures in order to secure the advantage over the enemy. The section on weapon system upgrades provides an overview of the types of upgrades common OPFOR weapons systems have. The section on emerging technology highlights advancements of weapon system technology for near- and mid-term time periods.

Countermeasures

Countermeasures (CMs) are survivability measures to preserve the integrity of assets and personnel by degrading enemy sensors and weapons effectiveness. These measures often fit within the US Army term CCD (camouflage, concealment and deception) or within the OPFOR term C3D (camouflage, cover, concealment and deception). Decoys used by tactical units within branch operations are designed to aid survivability, and are considered to be countermeasures. Countermeasures can take the form of tactical CMs (or reactive measures), or they can be technical CMs. The variety of tactical CM changes with new unit tactics techniques and procedures (TTP), to adapt to a given situation, within rules of engagement. This document focuses on technical CM. In specialized branches new technical CMs continue to appear.

Modern forces will upgrade systems with selected countermeasures. Many CMs noted are intended to protect combat vehicles from anti-armor sensors and weapons. Although the below CM can be used to counter precision weapons, many were developed for use against conventional weapons. Priorities for countermeasures are dictated by the goals of survival, mission success, and maintaining effectiveness. The first CM priority is to avoid detection until you can control the events. Among goals for using countermeasures, the highest is mission success.

Survival ("Don't Be Killed") is defined holistically, including the following requirements in order of priority: operating system or network survival, vehicle survival, vehicle avoidance of major damage, crew survival, and vehicle avoidance of minor repair. A compatible suite of countermeasures may be limited to a more modest goal, to preserve a measure of effectiveness, even at the risk of system survival. Effectiveness in this context could be defined as - ability to effectively execute the immediate and subsequent missions, until system or subsystem failure interrupts this process. Effectiveness includes: crew effectiveness, mission success, operating system effectiveness, and vehicle/soldier readiness for employment.

Several factors must be considered when selecting countermeasures:

- Countermeasures should be fielded and mounted on systems with a holistic and rational approach to assure survivability. The rational developer will focus his countermeasures with the highest priority given to assure protection against the most likely and most lethal threats. However, with changing threat capabilities over time, and conflicting priorities, the current CM mix may not be successful. Most CM are responses to specific perceived threats, and are limited by cost and weight budget concerns. With the modern reliance on precision weapons, military forces may develop complex and expensive countermeasure "suites" to degrade their effects.
- Some countermeasures can degrade a variety of sensors and weapons capabilities. They can be grouped by threat to be countered, such as artillery or ATGM CMs. Others are more adversary and technology-specific, and may not be fielded until that technology is fielded. Driven by threatening technologies, designers may launch a short-response program to produce or purchase countermeasures for rapid mounting.
- The R&D process has led to the development of counter-countermeasures, intended to negate the effects of CMs. However, at some level, these are also CMs. To avoid confusion on labeling, these will also be called countermeasures.
- When countermeasures are added to a vehicle or within close proximity, they must be mutually compatible and compatible with other subsystems. Thus issues such as electromagnetic interference and self-blinding with smokes must be considered.
- Although a variety of countermeasures are now marketed, many technical and financial factors can negate their advantages. Countermeasure development may be restricted due to resource, technology, and fabrication limitations, which vary by country and time frame. Budget limitations may limit fielding of feasible and valuable CM, or compel

selection of less capable countermeasures. For instance, active protection systems can counter some weapons; but they are expensive, hazardous to soldiers, and ineffective against many weapons. Thus they may be unsuitable and unlikely for application to many systems. OPFOR users should consult the POC below for assistance in selecting CMs for a specific system.

- Countermeasures will not replace the need for armor protection and sound tactics.

Lethality Component versus Countermeasure Responses

This table is intended to assist in selection of CM and understanding the categorization for use in upgrade schemes. Many of the more widely-fielded countermeasures are designed to degrade a variety of sensors and munitions, for minimal upgrade cost. Thus, countermeasure types may be repeated under several functions. Because new technologies are emerging rapidly, and systems are finding applications which can place them in several CM types, the placement of CMs can be somewhat arbitrary. Use against artillery vs ATGMs vs ground vehicle weapons will vary. The following list of CM can be used for artillery, air defense, antitank, armor, aircraft, theater missile, and other systems, depending on the platform, gun, sensor, and munition configuration of the system.

Capability to Be Degraded	Type of Countermeasure
Detection and location	Camouflage: nets, paints, fasteners for added natural materials Cover: entrenching blades, hole-blast device, underground facilities Concealment: screens, skirts, thermal engine covers, scrim, other signature reduction Deformers, engine exhaust diversion, other signature alteration measures Aerosols: smoke and flares, water spray systems Decoys, clutter, and acoustic countermeasures Counter-location measures: GPS jammers, laser and radar warning systems
C2/sensor-shooter links	See Information Warfare (IW) Chapter
Platform or weapon	Counterfire: directional warning systems, laser radars, for rapid response Directed energy weapons (DEW), such as high-energy lasers System prioritization for hard-kill, e.g., anti-helicopter mines (See Ch 7)
Weapon sensors and fire control	CCD as noted above. Directed energy weapons, such as low-energy lasers (LEL) Electro-optical countermeasures (EOCMs)
Submunition dispensing/activation	Global positioning system (GPS) jammer Fuze (laser/IR/RF), RF barrage jammers, acoustic jammers
Precision munition and submunition sensors	CCD as noted above. False-target generator (visual, IR, RF/acoustic) Electromagnetic mine countermeasure system, to pre-detonate or confuse Fuze jammers (laser/IR/RF), RF barrage jammers, acoustic jammers
Munition/submunition in-flight, and its effects	Sensors to detect munitions: MMW radars, RF/IR/UV passive sensors Air watch and air defense/NBC warning net, to trigger alarm signal Active protection systems, for munition/submunition hard kill Cover, additional armor to reduce warhead effects
Other system effects	Miscellaneous CM (See below)

Countermeasures against sensors

Type Countermeasure	Countermeasure	Example	Application
Camouflage	Camouflage nets Camouflage paints, IR/radar/and laser-absorptive materials/paints Fasteners, belts for attaching natural materials	Russian MKS and MKT Salisbury screen rubber epoxy Chinese "grass mat" set	Variety of vehicles Variety systems Uniforms and vehicles
Cover	Natural and manmade cover, civilian buildings Entrenching blade to dig in vehicles Hole-blast devices for troop positions, spider holes Underground facilities, bunkers, firing positions	Tree cover, garages, underpasses T-80U tank, BMP-3 IFV, 2S3 arty Hardened artillery sites, bunkers	TELs, vehicles, troops IFVs, tanks, SP arty Infantry, SOF Iraqi and NK sites

Concealment	Screens, overhead cover for infantry (conceal IR/visible signature) Canvas vehicle cover, to conceal weapons Thermal covers, vehicle screens Scrim, side skirts and skirting around turret	Colebrand netting Cover on Chinese Type 90 MRL Kintex thermal blanket over engine French "Ecrim" track cover scrim	Infantry, weapon, sensor Truck-based weapons For combat vehicles Combat vehicles
Deformers/signature modification	"Wummels" (erectable umbrellas to change/conceal shape/edges) Exhaust deformers (redirect exhaust under/behind vehicle) Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc)	Barracuda RAPCAM/TOPCAM Russian exhaust deflectors Track pads, road wheel/exhaust change Cat-eyes, Luneburg lens	Vehicles, sites, weapons Combat vehicles Tracked, other vehicles Tracked, other vehicles
Aerosols	Visual suppression measures, smokes, WP rounds Multi-spectral smokes for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Toxic smokes (irritants to disrupt infantry and weapons crews) Water spray systems (to reduce thermal contrast)	Smoke generators, fog oil, S-4, RPO-D ZD-6 Smoke grenades (visual/IR) WP rounds, Galix 6 flare system, Adamsite and CN in smoke mix Add-on kits for vehicles	Blinding, screening Vehicle protection Combat vehicles, arty Smoke generators Recon, C□, AD, arty
Decoys	Clutter (civilian/military vehicles, structures, burning equipment) Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance, sensors)	Log site, truck park, tank farm, derricks IMT-72 “dummy tank”, Shape Intl Corner reflectors, KFP-1-180 IR heater Acoustic tape/speaker systems	Artillery, combat vehicles TBM, vehicle decoys Vehicle/site radar decoys Vehicles, sites
Counter-location measures	Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM)	Aviaconversia GPS jammer SPN-2 truck-borne jammer set Slovenian LIRD laser warner	Infantry and others tactical/operational area Combat vehicles

Countermeasures Against Weapons and Weapon Sensors

Type Countermeasure	Countermeasure	Example	Application
Added protection (supplements to armor in reaction to specific capability)	Armor supplements (ERA, screens, bar or box armor, sand bags) Armor skirts over road wheels Mine rollers, plows and flails Vehicle belly armor, raised or redesigned belly design, skirt Vertical smoke grenade launchers (to counter PGM top attack)	Barracuda, SNPE ERA KMT-5, KMT-6	
EOCM	Use EOCMs such as IR jammer/IR searchlights to redirect ATGM	KBCM infrared CM system	Combat vehicles
False-target Generators	Acoustic jammers and directed acoustic countermeasure Laser false-target generator (against semi-active laser homing) Electromagnetic mine countermeasure system, counters fuzes	In development, can be improvised In development	To distract acoustic seekers Combat vehicles

Jammers	Altimeter jammer (counters submunition dispersion altimeter) Fuze jammers (to spoof RF proximity fuzes on munitions) Incoherent infrared jamming (to jam IR fuzes on munitions) GPS jammers to confuse navigation and course correction systems	SPR-1 armored ECM vehicle	High priority sites, CPs etc.
Active countermeasures	Active protection systems, for munition hard kill. High energy laser weapons to destroy munitions or sensors Low energy lasers to blind or dazzle. Radio-frequency weapons to burn electronics and detonate munitions Directed MGs	Arena hard-kill system ZM-87 laser weapon VEMASID counter-mine system	Tanks, recon vehicle, IFVs AT, AD systems
Counterfire/ Threat response warners	Directional warning system (locate laser/radar, to direct weapons) Employ sensors (RF/IR/UV - to detect munitions) Acoustic directional systems (to detect munitions) Laser radars (laser scanner to locate optics and direct weapons) Directed energy weapons (against optics) Anti-helicopter mines (against aircraft) Employ air watch/security, AD, NBC, nets to trigger alarm signal Dazzle grenades (temporarily blind personnel)	Pilar acoustic detection system Star-burst grenades	Infantry
Miscellaneous CM	Optical filters to degrade effect of battlefield lasers. Pulse code/thermal CCM beacons on SACLOS ATGMs (to counter EOCM)	HOT-3 ATGM	

Countermeasures By Functional Area And Type System

Functional Area	System	Type Countermeasure	Countermeasure
Infantry, Special Forces, Reconnaissance, Military Police/Security	Dismounted soldier, Utility vehicle troops	Camouflage Cover Concealment Aerosols CM Operational Technologies	Camouflage nets Fasteners, belts for attaching natural materials Natural and manmade cover, civilian buildings Hole-blast devices for troop positions, spider holes Underground facilities, bunkers, firing positions Screens, overhead cover for infantry (conceal IR/visible signature) Visual suppression measures, smoke grenades, WP rounds Multi-spectral smokes for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Vertical smoke grenade launchers (to counter PGM top attack) Toxic smokes (irritants to disrupt infantry and weapons crews) Acoustic directed counterfire system Dazzle grenades (temporarily blind personnel)

Mechanized Infantry, Reconnaissance, Military Police/Security, Antitank	Armored personnel carrier Armored scout cars (Less costly LAVs) Light tanks Self-propelled AT Guns(HACVs)	Camouflage Cover Concealment Deformers/signature modification Aerosols Counter-location measures CM Operational Technologies	Camouflage paints, IR/radar/and laser-absorptive materials/paints Fasteners, belts for attaching natural materials Natural and manmade cover, civilian buildings Underground facilities, bunkers, firing positions Armor supplements (stand-off screens, bar armor, sand bags) Thermal covers, vehicle screens Scrim, side skirts and skirting around turret Exhaust deformers (redirect exhaust under/behind vehicle) Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc) Visual suppression measures, smokes, WP rounds Multi-spectral smoke grenades for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Toxic smokes (irritants to disrupt infantry and weapons crews) Clutter (civilian/military vehicles, structures, burning equipment) Laser, IR, and radar warning systems (to trigger move/CM) Beyond line-of-sight modes Remote-controlled missiles and guns Mine rollers, plows and flails Air watch/security, AD, NBC, nets to trigger alarm signal Optical filters to degrade effect of battlefield lasers. Encoded SACLOS ATGMs (to counter EOCM)

Air Defense, Artillery, Radar units, Theater Missile Units, Aviation, Headquarters,	Command and communications vehicles, Radars, missile launchers, Aircraft (High value targets)	Camouflage Cover Concealment Deformers/signature modification Aerosols Counter-location measures Decoys CM Operational Technologies	Camouflage paints, IR/radar/and laser-absorptive materials/paints Natural and manmade cover, civilian buildings Entrenching blade to dig in vehicles Underground facilities, bunkers, firing positions Canvas vehicle cover, to conceal weapons when not in use Thermal covers, vehicle screens Scrim, side skirts and skirting around turret "Wummels" (erectable umbrellas to change/conceal shape/edges) Exhaust deformers (redirect exhaust under/behind vehicle) Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc) Visual suppression measures, smokes, WP rounds Multi-spectral smoke grenades for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM) Clutter (civilian/military vehicles, structures, burning equipment) Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance, sensors) Anti-helicopter mines (against aircraft) Beyond line-of-sight modes Non-ballistic launch modes Anti-radiation missiles Low energy lasers to blind/dazzle optics on designators/aircraft Encoded laser target designators to foil false target generators Radio-frequency weapons - burn electronics/detonate munitions High energy laser weapons to destroy munitions or sensors Laser false-target generator (against semi-active laser homing) Altimeter jammer (counters submunition dispersion altimeter) Fuze jammers (to spoof RF proximity fuzes on munitions) Incoherent infrared jamming (to jam IR fuzes on munitions) GPS jammers to confuse navigation and course correction systems Optical filters to degrade effect of battlefield lasers

Information Warfare/ Deception Units	IW vehicles	Camouflage Cover Deformers/signature modification Aerosols Counter-location measures Decoys	Camouflage paints, IR/radar/and laser-absorptive materials/paints Natural and manmade cover, civilian buildings Underground facilities, bunkers, firing positions "Wummels" (erectable umbrellas to change/conceal shape/edges) IR/radar deformers (in combination with RAM and RAP, etc) Visual suppression measures, smokes, WP rounds Multi-spectral smoke grenades for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM) Clutter (civilian/military vehicles, structures, burning equipment) Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance, sensors)
All Units	Combat support vehicles (Light strike vehicles, Tactical utility vehicles, Motorcycles, ATVs, Armored CSVs, etc), Trucks	Camouflage Cover Concealment Deformers/signature modification Aerosols Decoys CM Operational Technologies	Camouflage paints, IR/radar/and laser-absorptive materials/paints Fasteners, belts for attaching natural materials Natural and manmade cover, civilian buildings Underground facilities, bunkers, firing positions Armor supplements (ERA, screens, bar or box armor, sand bags) Thermal covers, vehicle screens Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc) Multi-spectral smoke grenades for IR and or MMW bands, Flares, chaff, WP, to create false targets, disrupt FLIR Clutter (civilian/military vehicles, structures, burning equipment) Air watch/security, AD, NBC, nets to trigger alarm signal Acoustic directed counter-fire system

Equipment Upgrades

Armed forces worldwide employ a mix of legacy systems and selected modern systems. In the current era characterized by constrained military budgets, the single most significant modernization trend impacting armed forces worldwide is upgrades to legacy systems. Other factors impacting this trend are:

- A need for armed forces to reduce force size, yet maintain overall force readiness for flexibility and adaptability.
- Soaring costs for modern technologies, and major combat systems.
- Personnel shortages and training challenges.
- Availability of a wide variety of upgrade packages and programs for older as well as newer systems.
- New subsystem component technologies (lasers, GPS, imaging sensors, microcircuits, and propellants), which permit application to platforms, weapons, fire control systems, integrated C2, and munitions old and new.
- An explosion of consortia and local upgrade industries, which have expanded worldwide and into countries only recently introduced to capitalism.

The upgrade trend is particularly notable concerning aerial and ground vehicles, weapons, sensors, and support equipment. From prototype, to low-rate initial production (LRIP), to adoption for serial production, minor and major improvements may be incorporated. Few major combat systems retain the original model configuration five or more years after the first run. Often

improvements in competing systems will force previously unplanned modifications.

Upgrades enable military forces to employ technological niches to tailor their force against a specific enemy, or to integrate niche upgrades in a comprehensive and well-planned modernization program. Because of the competitive export market and varying requirements from country to country, a vehicle may be in production simultaneously in many different configurations, as well as a dozen or more support vehicle variants fulfilling other roles. In light of this trend, OPFOR equipment selected for portrayal in simulations and training should not be limited to the original production model of a system, rather a version of the system that reflects the armed forces strategic and modernization plans and likely constraints that would apply.

The adaptive OPFOR will introduce new combat systems and employ upgrades on existing systems to attain a force structure that supports its plans and doctrine. Because the legacy force mix and equipment were selected in accordance with earlier plans and options, use of upgrades versus costly new acquisitions will always be an attractive option. A key consideration is the planned fielding date. For this document, the most widely portrayed OPFOR time frame is the current Contemporary Operational Environment. Only upgrades currently available (or marketed with production and fielding expected in the near term) are considered in COE Tiers 1-4. Also, system costs and training and fielding constraints must be considered. However, in the Emerging Technology Trends section of this chapter, we anticipate a wide variety of upgrades that could be currently applied to fielded systems.

The selection of equipment upgrades is not a simple matter. Most forces have limited budgets, competing upgrade priorities, and a substantial inventory of outdated equipment. A specific subsystem upgrade (gun, fire control system, etc.) may only slightly improve a generally obsolete system. Another option is an upgrade package, with compatible subsystem upgrades. The surest approach is to refurbish a system

into a new model with all application problems resolved. A critical factor is assurance that the modernized equipment is tested and successful. The best test remains performance in combat.

The following tables describe selected upgrades available for system modernization. The lists are not intended to be comprehensive. Rather, they are intended to highlight major trends in their respective areas. For instance, for armored combat vehicles, the focus is on upgrades in mobility, survivability, and lethality.

The category of survivability upgrades includes countermeasures (CM). The CM upgrades can apply not only to branch-specific systems (tanks, IFV, and artillery), but to general use systems subject to similar threats. An example of this is the proliferation of smoke grenade launchers on artillery and reconnaissance vehicles.

Implementation of all upgrade options for any system is generally not likely. Because of the complexity of major combat systems and need for equipment subsystem integration and maintenance, most force developers will chose a mix of selected upgrades to older systems, as well as limited purchases of new and modern systems. Please note that systems featured in this document may be the original production system or a variant of that system. On data sheets, the variants section describes other systems available for portrayal in training and simulations. Also, equipment upgrade options (such as night sights) and different munitions may be listed, which allow a user to consider superior or inferior variants. Within the document chapters, multiple systems are listed to provide other substitution options. Of course there are thousands of systems and upgrade options worldwide, which could be considered by an adaptive OPFOR.

An OPFOR trainer has the option to portray systems or upgrade packages not included in the OPFOR Worldwide Equipment Guide, to reflect an adaptive thinking OPFOR. In future WEG updates, the authors will expand on the upgrade tables with names and descriptions of upgrade options and specific systems applications which have been noted in the current document. Chapter authors are available to assist users in selecting reasonable upgrade options for system configuration in specific force portrayals.

OPFOR Antitank Weapon Upgrades

GRENADE LAUNCHER	TOWED AT GUN	GROUND ATGM LAUNCHER

Improved AT and dual-purpose rifle grenades permit riflemen to supplement shoulder-mount grenade launchers. Accurate low trajectory longer range grenades for shoulder launchers Parachute-drop overhead camera grenades for shoulder/ground launch Tripod, bipod, pintle mounts convert launchers for vehicle/ground use Take-apart AT grenade launchers or disposable launch tubes Larger, more lethal disposable AT grenade launchers supplement grenadier reusable launchers at critical times. Reduced noise, smoke, and flash signature grenades for AT launchers Improved reusable sights for disposable launchers, including ballistic computer/laser rangefinder sights Image intensifier/thermal night sights Counter -charge AT grenades for firing from inside of buildings Dual-purpose (HE/AT) longer range rounds HE longer range rounds Multi-purpose (HE/AT/anti-bunker) rounds Tandem shaped-charge (HEAT) warhead Thermobaric Frag-HE warhead Guided (SAL-H) grenades for shoulder/ground/vehicle launchers UPGRADE PRIORITY Computer/LRF FCS II night sights Tandem AT grenades, HE/DP grenades, thermobaric grenades	Auxiliary propulsion unit for local movement Take-apart capability for lighter guns Improved gun and recoil system Ballistic computer/laser rangefinder sights MMW radar target auto-tracker day/night FCS Image intensifier/thermal night sights Automated battle management system with graphic flat panel display Indirect fire rounds/FCS for fire support role Increased DF range, new tank/AT gun rounds Improved, heavier , more lethal , and longer range APFSDS-T round Tandem or triple-charge HEAT round Improve Frag-HE round and DPICM submunition Canister/flechette round New type lethalities (DPICM submunition, etc.) Gun-launched ATGM (100 mm+) , including tandem HEAT UPGRADE PRIORITY APU and take-apart for lighter guns Improved gun and recoil system Improved sights, 1st gen thermal night sights Automated battle management system Improved ammunition, inc ATGM.	Man-portable/ground launch and shoulder launch Take-apart launcher and sub-systems Pintle mount/dismount for variety of vehicles/platforms 1st or 2nd generation thermal night sights Extended range missiles Soft-launch for use from bunkers and buildings Launcher countermeasures (CM), such as reduced noise, smoke, flash SACLOS Guidance CCM, e.g., pulsed codes Increased ATGM velocity/reduced flight time New guidance modes: Semi-active laser beam rider and laser-homing, Fiber-optic guided missile (FOG-M) guidance, Fire and forget imaging infrared seeker, Radar homing, Multi-mode (FOG/IR homing, etc.) Helicopter stand-off launch using ground guidance High velocity MANPADS missiles used for AT Larger warhead/tandem warhead HEAT ATGM Sensor-fuzed EFP/HEAT top-attack Thermobaric HE warhead, for new applications UPGRADE PRIORITY Take-apart launcher, with pintle mount Improved 1st gen thermal night sights SACLOS CCM Reduced signature Improved ATGMs (tandem HEAT, etc.)

OPFOR Light Armored Vehicle Upgrades

COMBAT SUPPORT VEHICLE	APC/IFV, INFANTRY FIRE SUPPORT VEHICLE	ATGM LAUNCHER VEHICLE

Used/adapted for various roles, e.g., infantry (less than squad), combat support, and support vehicles. Most are light, 4x4 wheeled, van or light utility vehicle; but auxiliary wheel, 6x6 or tracked versions exist. Many of these are being converted to or replaced by mine-resistant vehicles. Included are motorcycles, ATVs, and light strike vehicles (e.g., jeep-type 4x4 vehicles or recreational dune buggies). Gun trucks, riot control vehicles, and amphibious/over-snow all terrain vehicles are used. Add encrypted voice and digital data capability. Graphic display battle management system Central tire inflation system and/or run-flat tires GPS hand-held or bracket mount Ford capability, swim capability desired Hybrid (diesel/electric) drive kits Add-on light armor, mine protection desired CM, such as multi-spectral smoke grenades Laser warning receiver desired 7.62-14.5-mm MG or 20-40-mm automatic grenade launcher main weapon Remote or overhead weapon station (RWS/OWS) Individual weapons, RPG, MANPADS, or ATGM launcher for secondary weapons Day sight and II or thermal night sight UPGRADE PRIORITY Light armor and smoke grenade launchers Remote MG or auto grenade launcher Day/night (thermal sights), RPG GPS, secure comms	Must be able to carry a squad Higher horsepower diesel engine GPS and inertial land navigation, graphic display battle management system, IFF Swim or deep ford (due to armor increases). Amphibious conversion with compartments for high sea state capability. Add-on armor, ERA, and improved mine protection. Fire and blast suppression CM, e.g., multi-spectral smoke grenades, LWR Firing ports (or forego due to armor increases, use periscopes or side and rear view cameras) IFV/IFSV: 20-100 mm stabilized gun, and 2-man turret. Active protection system (APS) or defensive aids suite (DAS). Upgraded FCS: Cdr's independent viewer, 2-plane stabilized TV sights, 1 - 2 gen FLIR. Upgraded secondary MG or grenade launcher with superior sights (integrated, high- angle, night). Additional remote MGs/AGLs for high-angle fires security. Improved KE, HEAT, Frag-HE rounds, ATGMs APC/IFSV: Includes truck/light vehicle conversions Remote weapon station or 1-man turret with high-angle-of fires 7.62-23 mm MG, grenade launcher (some with 20-30-mm auto-cannon and ATGM launcher) UPGRADE PRIORITY Add-on armor, ERA, LWR, new grenades Add auto grenade launcher, upgrade ATGM, and KE round to APFSDS. FCS, stabilized sights, Imp 1st gen FLIR	Use APC/IFV wheeled/tracked chassis or tank chassis, with mobility and protection upgrades, Side and rear-view cameras Graphic display battle management system CM, e.g., multi-spectral smoke grenades, LWR Active protection system or other DAS. 1-2 man turret, or turretless design. Alternative design: 1- 5 pedestal/turret or mast- elevated ATGM launchers on remote or overhead weapon station (RWS/OWS) Autoloader or manual loader under armor Multiple ATGM launch and targeting capability Improved ATGMs, as noted in above table, or RF, laser-beam rider, SAL-H/IIR ATGMs 7.62-12.7-mm MG secondary arms FCS with commander's independent viewer, 2-plane stabilized sights, TV, and target tracking. Use 1st or 2nd gen FLIR Most common ATGM vehicles are combat support vehicles with pintle-mount ATGM launcher (see above table for ground launcher). Recent development: motorcycle with sidecar and pintle-mount ATGM launcher UPGRADE PRIORITY RWS multiple ATGM launchers (APC/IFV/tank conversion), pintle-mount for light combat support vehicles (motorcycle, ATV, LSV, TUV, truck, etc.) Stabilized sights and 1st gen thermal sights Improved ATGMs

OPFOR Reconnaissance And Assault Vehicle Upgrades

RECONNAISSANCE VEHICLE	HEAVY ARMORED COMBAT VEHICLES	MAIN BATTLE TANK

Light recon vehicle: Combat support vehicle with light armor and TV, thermal sights, Add encrypted voice and digital data capability Combat recon vehicle: See IFV upgrades, e.g.: GPS and inertial land navigation. Digital real-time link to subscriber map overlay display, IFF, force tracker battle management system, Swim capability, winch, central tire inflation for wheeled Upgraded FCS: Cdr's independent viewer, 2-plane stabilized TV camera sights, 1 - 2 gen FLIR Elevated battlefield surveillance radar/TV/FLIR sensor suite with TV, encrypted voice, and digital data transmission capability Launch UAVs and/or robots (unmanned ground vehicles) CM, e.g., multi-spectral smoke grenades, LWR, IR/radar skirts Active protection system (APS) or other defensive aids suite (DAS). 20-100 mm gun with 2-plane stabilization, and 2-man turret. Improved secondary MG or automatic grenade launcher and sights. Man-portable SAMs (MANPADS) for self-protection Named and targeted areas of interest link to indirect fire and missile units for real-time targeting. Laser target designator guides munitions. Sensor vehicle: APC/IFV or combat support vehicle and mast- mounted sensor pod: radar, thermal and TV Encrypted voice SATCOM/digital data systems UPGRADE PRIORITY Add higher HP diesel engine Add-on armor, ERA, LWR, new grenades Imp 1st gen FLIR, gunner and commander, Add auto grenade launcher, upgrade ATGM, and KE round to APFSDS. Elevated sensor suite and transmission capability.	Distinction among heavy recon, infantry fire support, assault gun, light tank has blurred APC/IFV chassis with increased armor and higher horsepower diesel engine. GPS and inertial land navigation, graphic display battle management system, IFF Swim or deep ford capability Add-on armor, ERA, improved mine protection, fire and blast suppression. CM, e.g., multi-spectral smoke grenades, LWR Side and rear-view cameras for security Active protection system (APS) or other defensive aides suite (DAS). 76-125 mm tank gun with 2-plane stabilization, Improved MG or auto grenade launcher, sights FCS with commander's independent viewer, 2-plane stabilized sights, TV, and target tracking. Use of 1st or 2nd generation FLIR. Side and rear-view cameras Improved KE, electronic fuzed Frag-HE, and tandem HEAT rounds Gun-launched ATGMs (100+ mm) UPGRADE PRIORITY Add higher HP diesel engine Add-on armor, ERA, LWR, new grenades Imp 1st gen FLIR, gunner and commander, Larger stabilized gun, gun-launch ATGM, and KE round to APFSDS.	Higher horsepower diesel engine power packs and add-on reserve fuel tanks GPS and inertial land navigation, graphic display battle management system, IFF Deep ford snorkel capability Welded turret, blow-out panels, ERA, improved mine and turret protection, fire and blast suppression. CM suite, including multi-spectral and vertical smoke grenade mix, LWR, VEESS capability Active protection system (APS) or other defensive aides suite (DAS), self-entrenching blade Side/rear-view security cameras Tank gun with 2-plane stabilization FCS with commander's independent viewer, 2-plane stabilized sights, TV, and target tracking. 2nd or 3rd generation FLIR. Auto-tracker. Hunter-tracker FCS. Heavier and longer range APFSDS-T rounds, electronic fuzed Frag-HE, and tandem HEAT rounds Gun-launched ATGMs and IR homing rounds (100+ mm). Semi-active laser homing munitions permit ATGMs to deliver indirect fire precision strikes. Improved remote-firing MG, high-angle AD sights UPGRADE PRIORITY Add higher HP diesel engine Land navigation and deep ford snorkel Add-on armor, ERA, CM suite Imp stabilization and FCS, 1st gen FLIR, Remote MG, Imp ammo (sabot, Frag-HE, and HEAT) Gun-launch ATGM.

OPFOR Artillery Upgrades

ARTILLERY RSTA/C2 SUPPORT	TOWED AND SELF-PROPELLED CANNON	MULTIPLE ROCKET LAUNCHER

Automated secure digital joint C2 network with SATCOM, linking artillery, air, EW, and reconnaissance units Integrated artillery recon vehicle with sensor mast Reconnaissance strike and fire complexes Forward air controllers linked to artillery units Artillery surveillance vehicles with ground surveillance radars, sensor suite and networked Observation teams with goniometers, thermal sights, digital comms, and laser target designators Artillery links to selected special purpose forces Acoustic vehicle detection and location Phased array counter-battery radars, networked to automated artillery net, with increased range, lower probability of error, windows-based man-machine interface Target-acquisition UAVs, networked to artillery net Automated battle management equipment use for towed and SP guns, mortars and MRLs Navigation system with GPS/inertial update, linked to automated net UPGRADE PRIORITY Integrated artillery recon vehicle, sensor mast Reconnaissance strike and fire complexes Target-acquisition UAVs, networked Observation teams, radars, acoustic sensors	Conventional munitions, e.g., controlled fragmentation, proximity and multi-option fuzes, special munitions, and propellant s (modular propellants) Artillery delivered high precision munitions e.g., SAL-H, sensor-fuzed, course corrected, terminal-homing IR Self-Propelled: Automated fire control with barrel cooling and thermal warning systems Auxiliary power unit Mobility and weight improvements, Muzzle velocity analyzer CM, such as smoke grenade launcher and LWR Upgrade to 52-caliber cannon for longer range Truck-mounted high-mobility systems with long-range cannons Towed: Addition of auxiliary propulsion unit On board technical fire control computer Reduced weight and emplace/displace times Muzzle velocity analyzer Onboard or portable digital linked fire control computer Upgrade to 52-caliber cannon for longer range UPGRADE PRIORITY Mobility and weight improvements On-board navigation and fire direction systems Use of modular propellant Procurement of ADHPM Overall range and accuracy improvements	Mobility and weight improvements, truck-based launchers which conceal the MRL signature Rapid emplace-displace and response capabilities CM, such as smoke grenade launcher and LWR On-board computer-based fire direction and land navigation systems, which permit autonomous launcher, platoon, and battery operations Tube-launched UAVs linked to the launchers and to the fire control network for real-time acquisition Improved lethality improved conventional munitions and special purpose (mines, jam, etc,) munitions Extended-range and course- corrected rockets, as well as addition of artillery/cruise missiles Computer-based fire control system for electronically-fuzed rockets Artillery delivered high precision munitions (ADHPM), e.g., sensor fuzed, laser- homing rockets Special munitions, such as FASCAM, chemical warhead, RF jammer rockets Mine clearer and fuel-air explosive rocket MRLs UPGRADE PRIORITY Autonomous/ semi- autonomous launcher Countermeasures Improved munitions, e.g., extended range, DPICM and thermobaric ADHPM, e.g., sensor-fuzed munitions and course corrected rounds or rockets

Emerging Technology Trends

In order to provide a realistic OPFOR for use in Army training simulations, we must describe the spectrum of contemporary and legacy OPFOR forces in the current time frame, as well as capabilities in emerging and subsequent operational environments (OEs). This chapter does not predict the future, rather notes emerging adversary capabilities which can affect training.

The OPFOR timeframes for emerging OPFOR are: 2015-2020 (Near Term) and 2021-2028 (Mid-Term). The subsequent time frame is "future" OPFOR time frame. Time lines were determined in part to assist in building OPFOR systems and simulators and for use in Army training simulations. The timeframes are arbitrary and selected for ease in focusing and linking various trends. However, they also generally match force developments for U.S. Army forces, as well as thresholds in emerging and advanced technologies which will pose new challenges to military force planners and developers.

In these time frames, the mix of forces will continue to reflect tiered capabilities. The majority of the force mix, as with all military forces, will use legacy systems. Periods 2015 and after will also see new OPFOR systems and whole new technologies. The most notable difference between the OPFOR force mix and U.S. forces is that the OPFOR will have a broader mix of older systems and a lower proportion of state- of-the-art systems. Rather, OPFOR will rely more on adaptive applications, niche technologies, and selected proven upgrades to counter perceived capabilities of their adversaries. Force developers for OPFOR will retain expensive legacy systems, with affordable upgrades and technology niches. A judicious mix of equipment, strategic advantages, and sound OPFOR principles can enable even lesser (lower-tier) forces to challenge U.S. military force capabilities.

The OPFOR systems must represent reasonable responses to U.S. force developments. A rational thinking OPFOR would study force developments of their adversaries as well as approaches of the best forces worldwide, then exploit and counter them. Thus worldwide and adversary equipment upgrades will trigger OPFOR forces to modify their equipment and tactics to deter, match, overmatch, or counter those changes.

OPFOR Technologies And Emerging Operational Environments

As noted in Chapter 1 on COE OPFOR, the adaptive OPFOR will introduce new combat systems and employ upgrades on existing systems to attain a force structure which supports its plans and doctrine. Because a legacy force mix and equipment were

historically selected earlier in accordance with plans and options, upgrades versus costly new acquisitions will always be an attractive option. A key consideration is the planned fielding date. To project OPFOR capabilities in the future, we should look at the technologies in various stages of research and development today, as well as those in the concept stage for applications in the Future OPFOR time frame. Military engineering experience has demonstrated that the process of formulating military requirements, as well as technology, engineering, and budgeting factors can dramatically affect equipment modernization time lines. In addition, scientific discoveries and breakthroughs in the civilian sector have greatly contributed to the so-called "Revolution in Military Affairs", which has increased the capability for battlefield awareness, integration, timeliness, and lethality. The table below shows OPFORs in emerging and Future OEs, and some considerations.

Considerations in Determining Emerging OPFOR Technologies by Time Frame

OPFOR Consideration	Near-Term (2015-2020)	Mid-Term (2021-2025)
Challenging OPFOR	Emerging OPFOR	Objective OPFOR
Technology Source	Current marketed/fielded systems and subsystems	Recent major weapons, upgrade applications
Budget	Constricted but available for niche technologies	Improved, some major system acquisitions
Implications for OPFOR equipment	Many subsystem upgrades, BLOS weapons, remote sensors, countermeasures	More costly subsystems, recent major weapons, competitive in some areas.
Implications for OPFOR tactics and organization, Implications for U.S.	COE tactics with contingency TTP updates. Slight subunit changes add BLOS and AT systems for integrated RISTA and strikes.	Integrated RISTA with remotes. Strikes all levels. Combined arms integrated in small units for increased lethality and autonomy.

The information revolution has also decreased response time in which system developers in the military marketplace can seize a new technology and apply it in new systems or in upgrades to older systems. The following technologies and possible applications of those technologies will influence R&D as well as

fielding decisions for future force modernization and expected OPFOR capabilities to be portrayed in future operating environments.

Technologies And Applications For Use By OPFOR: Near And Mid- Term

TECHNOLOGY CATEGORY	TECHNOLOGY	TECHNOLOGY APPLICATION
Psychological Operations	Mood altering aerosols Reproductive terrorism Non-lethal technologies	Military and civilian targets, for short- term and long-term goals.
Information Operations: Sensors	Higher-resolution multispectral satellite images New sensor frequencies for acquisition New sensor frequencies operational security Use of other light bandwidths (ultraviolet, etc) Passive detection technologies and modes Auto-tracking for sensors and weapons Image processing and display integration Micro-sensors/imaging system miniaturization Unmanned surveillance, target acq/designation Multispectral integrated sensors and Multispectral integrated transmission modes Precision navigation (cm/mm three-dimension) Undersea awareness (sensors, activity) Underground awareness (sensors/mines)	High-intensity use of LITINT (internet, periodicals, forums) Increased use of information from commercial, industrial, scientific and military communities Increased use dual-use technologies
Information Operations: Computers and Comms	Low-Probability-of-Intercept communications New power sources and storage technologies: Micro-power generation Energy cells Advanced Human/Computer Interface Automatic Language Translators	New communities (Blogs, flash mobs, etc, to coordinate and safeguard comms) Secure encryption software New communications tools (internet and subscriber links)

Electronic Attack	Anti-Satellite weapons for RF, EMP, Hard kill Wide area weapons (EMP graphite bombs, etc) EMP Precision (small area) weapons Computer Network Attack Worms, viruses, trojan horses Net-centric warfare Spoofing sensors Spoofing/Intercepting data stream/ spyware	Attack electronic grid or nodes at critical times
Chem/Bio/ Radiological Attack	Dirty bombs Genetic/Genomic/DNA tagging to assassinate Genetic/Genomic/DNA targeting for Bio attack Designer Drugs/Organisms/Vectors Biologically based chem (Mycotoxins) Anti-materiel corrosive agents and organisms	Agricultural attack (animal and plant stocks and supplies) Use of tagging to incapacitate political leaders.
Physical Attack	Mini-cruise/ballistic missiles for precision, surgical strikes, and widespread use Atk UAVs (land, sea, undersea-UUV, Micro-aerial vehicles-widespread use Swarming for coordinated attack Notebook command semi-autonomous links Vehicle launch for NLOS attack/defense Multi-mode guidance: pre-programmed/ guided/homing New types of warheads Wider area/different effects Tailorable warhead effects Precision Munitions Course-corrected/guided/homing Widespread - almost all weapons Loiter/IFF DEW Blinding/high energy lasers RF Weapons against electronics RF against people, vs structures/systems Directed acoustic weapons	
Sustainment, Protection	New battery/power cell technologies Neurological performance enhancers Better lightweight seamless body armor Personal actuators, exoskeletons, anti-RF suits Active armor and active protection systems Countermeasures to defeat rounds and sensors Counter-precision jammers, esp GPS All-spectrum low observable technologies Anti-corrosives Biometric prosthesis and cybernetics Robots assist dismounts, sensors, and logistics Robotic weapon systems	Battlefield fabrication of spare parts Airborne/ship borne refineries Potable water processing systems Transportable power generation systems

OPFOR Capabilities: Near-Term And Mid-Term

The next table provides projected system description and capabilities for analysis of the OPFOR environment facing U.S. forces in subsequent time frames. Data for the first timeframe (2013-2019) reflects generally known systems and subsystems, with their introduction to the emerging OPFOR adversary force. Timelines reflect capability tiers for systems which may be fully fielded (not Interim Operational Capability or First Unit Equipped) in brigade and division unit levels during respective time frames.

The systems projections are not comprehensive, and represent shifting forecasts. They may accordingly shift as we approach the specified time frames. Once we get beyond the turn of the decade, our current view of the future trends becomes less specific. Therefore, the second column (Mid-Term 2021-2028) focuses more on technologies¾less on defined systems.

The columns can be treated as capability tiers for specified time frame OPFOR. Please note: ***No force in the world has all systems at the most modern tier.*** The OPFOR, as with all military forces worldwide, is a mix of legacy and modern systems. Thus the emerging OPFOR force comprises a mix of COE time frame Tier 1-4 systems and newer systems. One would expect that some Near- or Mid-term adversaries with lower military technology capabilities could move up one or two capability tiers from (for instance) current COE capability Tier 4, to COE Tier 2. The most likely upgrade for emerging OPFOR used in most training simulations would be to move the OPFOR from COE Tier 2 to Tier 1, with added niche emerging systems.

We have previously stated that an OPFOR force can portray a diverse force mix by separating brigades and divisions into different tiers. The OPFOR also has the option of incrementally adding higher tier systems to lower tier units, as selective upgrades. Because most of the below systems in the 2015-2020

column are currently fielded, an adversary might also incrementally upgrade COE Tier 1 or 2 units by adding fielded assets from 2015-2020 as described in that column. However, until that time frame, we cannot assure beforehand when all of those technologies will appear. Again, the tables are not predictive. The OPFOR force designer may choose a middle road between current Tier 1-4 and future systems; in many countries they are upgrading legacy and even recent systems to keep pace with

state-of-the-art systems. Thus they may look to subsystem upgrades such as noted in Chapter 15.

If a specialized system for specific role is missing from the table below, continue to use the OPFOR system noted in Tiers 1-4. Please remember that these projections reflect "possible" technology applications for future systems. They incorporate current marketed systems and emerging technologies and subsystems, may be combined in innovative ways. The table below is not a product of the US intelligence community, and is not an official US Army forecast of future "threats". It is approved only for use in Army training applications and simulations.

Future OPFOR (2028 and after) is described in various portrayals. But it is generally FOUO or classified and is not included in the WEG.

OPFOR Capabilities: Near- And Mid-Term

SYSTEM	NEAR-TERM OPFOR (FY 15-20)	MID-TERM OPFOR (FY 21-28)
INFANTRY WEAPONS		
Infantry Assault Rifle	Rifle 6.8mm to 600 m day/night, w/EO LRF/pointer computer sight. Fire around corner sight EO link. Under-barrel grenades 600 m (CS gas, HEDP, EO recon, starburst, HE airburst, concussion). Rifle grenades 400m: HEAT, DP, smoke	On-bipod range 600 m. Sight on all weapons link to laptop/PDA/NVG/ helmet viewer w/real-time RF link. Multispectral smoke, TV/II recon/ atk rd, tandem HEAT grenades. Remote fire platform, 60m link.
Thermobaric grenades and Magazine grenade launcher	43-mm 4-round hand-held launcher for urban fight to 350m. Thermobaric grenades, also for hand throw, underbarrel.	Range 600 m for hand-held and under-barrel launchers, night sight. Add flechette, TV/II recon grenade.
AT/AP Hand Grenade	HEAT/Frag, 165-mm penetration, 20 m Frag radius, 20 m range, weighs 1.1 kg. Rifle grenades: HEAT 150mm to 300m	Hand grd to 40 m. Dual purpose bullet-thru rifle grd, no recoil, 150mm/Frag 20 m, 3 in belt pack.
Squad Machinegun	7.62x54 mm, frangible/sabot rds 1,300m. EO/3 gen II computer LRF sight 1,500m.	Add MMW radar, 5 km detection.
Combat Shotgun (replace one assault rifle)	12-gauge pump or semi-auto, 12 rds. Short and long change-out barrels, day/ night sights. Variable choke. Shells: HE, AP-sabot, door-buster, starburst, slug, concussion, frangible, flechette/anti-UAV	Time fuzed focused fragmentation airburst rd for use against dug in personnel, aircraft and UAVs. Multispectral smoke, CS grenades. TV/II recon rounds to 400 m.
Sniper Rifle Light	Bolt action, 7.62 mm rd, 15 lbs max weight with ammo. 10X optic w/2 gen II night channel. Range to 1000m.	Ballistic EO holographic LRF sight. Fused IR/FLIR channel 1,500m. Remote fire robot. Laser designator
Anti-Material Rifle (AMR) or Sniper Rifle (Heavy)	Semi-auto .50 cal. Weight 25 lbs. AMR/ anti-armor range 1,800 m. Armor pen 20 mm. As sniper rifle, range 1,000-1,500 m. Frangible multipurpose rd (AP 11 mm, incendiary 20 fragments). EO sight (20x) with 3 gen II night channel.	Ballistic EO holographic laser range-finder sight. Night sight fused IR/FLIR. Range 2,500+ m. Remote fire platform-60m link or weapon robot option. Laser designator.
Automatic Grenade Launcher (AGL)-Light	35mm man portable launcher with 6/9/12- round drums. HEAT grenade range 600 m 80mm penetration. Frag-HE grenade range 1,500m. Buckshot grenade. EO day/ 3 gen II night sights. 1 per infantry squad	Air-burst munition (ABM), ballistic sights. EO and Fused IR/FLIR sight. Remote fire. Multispectral smoke grenades. Recon, HEAT/HE TV- guided atk grenades to 1,000 m
Automatic Grenade Launcher (AGL)-Heavy Weapons squads and vehicles	40 x 53 mm weight 17 kg. Range 2,200m. Ballistic fire control computer w/ EO sight. Dual-purpose grenade, HE with 60mm armor penetration. Buckshot round. Electronic fuzed HE air-burst munition (ABM). 32/48-round cans. Thermal night sight, range 2,200 m.	HEAT rd defeats 200+ mm armor. EO/ fused IR/FLIR sight. Multispectral smoke, unattended ground sensor (acoustic, seismic RF), and comms jam grenades. Robot option. Mount on all maneuver/recon vehicles. TV/IR attack grenades.
Multi-purpose Grenade Launcher (disposable)	76mm thermobaric HEAT, 250m range, 440 mm penetration. Reusable II sight.	Range to 400m. Fire from enclosed spaces. Nil smoke, little noise.

Antitank Grenade Launcher (disposable)	125mm tandem HEAT 300m range, 1000+ mm. Shoulder fired. Nil smoke.	Multipurpose DP effects, 500 m. Reduced recoil-enclosed spaces.
Antitank Grenade Launcher (ATGL - medium range) Mid-Term: Expand to AD/AT Missile Launcher	60mm launch tube, from enclosed spaces. Tandem warhead (1,150 mm to 600m), dual purpose 1700m. Ballistic LRF/3 gen II night sight to 1,500 m. Remote launch tripod. Nil smoke. High velocity 57-mm DP high vel rocket 1,000m, 300 mm pen	SAL-H, TV/IR-guided grenades to 1,000 m. Fused IR/FLIR night sight. ADAT KE dart fits converted launcher. Range 4 km. Laser designator 5 km, including artillery and mortar rounds.
Antitank Grenade Launcher (long range) Mid-Term: Expand to AD/AT Missile Launcher	125mm tandem HEAT 800+m range, 1100+ mm. HE-Thermobaric grenade to 1700 m. LRF computer sight. EO day/3 gen II Night sight. Nil smoke. Remote-fire platform option. Tripod and bipod.	SAL-H/TV/IR-guided: HEAT and HE grenades 1,200 mm. ADAT SAL/LBR KE dart to 4 km. EO and fused IR/FLIR sight, laser designator to 5 km for arty/mortar rds.
Remote-fire Platform and Weapon Robot or Laser Target Designator (LTD) Robot	Man-portable, <15 kg, 60m Laptop/PDA link. EO/3 gen II sight. MG/AGL/rifle. LTD robot TV/2nd gen FLIR, 10km range	Tracked, 24 kg, 2 hour charge, fused II/FLIR 10 km, 10 km rg RF link. LTD has 3rd gen FLIR, range 15km
Acoustic Targeting System (ATS)	Backpack/vehicle triangulates on aircraft, vehicle weapons to 6 km, MGs 2.5 km. Helmet mount to 800 m. Light display.	Increased range (10 veh weapon, 5 MG). Add auto-return fire for MG. Link to veh weapons/nets auto-slew
General Purpose and Air Defense Machinegun	12.7mm low recoil on ground tripod. Chain gun version on light vehicles, ATV, motorcycle, etc. TUV/LAV use RWS. Remote operated ground or robot version. Frangible rd 2 km, sabot 2.5 km. RAM/RAP/IR camouflage/ screens. TV/FLIR fire control. Lightweight MMW radar 5 km. Display link to AD azimuth warning net. Emplace in 10 sec. RF/radar DF set. ATS control option.	Stabilized gun and sights. Remote-operated computer FCS with PDA or laptop. Fused FLIR/ II to 5 km. Frangible, sabot rds to 3 km. Laser dazzler blinds enemy. Micro-recon/ heli atk UAVs. Robot version. Some light/AD vehicles replace w/ 30-mm recoilless gun on RWS. AHEAD round 4 km, FCS 10 km. Add-on ADAT missile launcher
Man-portable attack UAV (NLOS Backpack Munition)	2.5 kg tube launch with PDA, CCD/IR image, 10 to km and 155 m altitude, at 100-160 km/hr, with 10 min loiter, in-flight arm for HE charge, NLOS dive attack vs moving/static targets	Ranges to 20 km with 40 min loiter. Remote, air, ground, water craft, vehicle launch. 3rd gen thermal view. AT/AP remote sensor mines.
Infantry Flame Weapon	Reusable thermobaric 90-mm grenade (2/lchr) to 800 m. Effects = 152mm artillery rd. Targets personnel, bunkers, LAVs, etc. Nil smoke. EO/II night sight	Precursor (200 mm pen) DP grd. Computer LRF day/night sight. SAL- H guided. Remote fire and robot option. Use in enclosed space
Vehicle/Man-portable Close Protection System (CPS)	Smoke grenade launchers can use multi- spectral smoke, CS smoke, Frag-HE grenades, range 3-40 meters, depending on angle. ATS control. Man-portable.	Man-portable remote control launcher. Quick load 3-6 grenades. Other Grds: CS gas, HE, AT/AP mines. 2-4 pods/vehicle.
Infantry Weapon Night Sight (Night Optical Device-NOD)	3d gen II night vision goggles/sights/ IR pointers for riflemen range 1,000. AGLs, MGs, sniper rifles/AMRs, ATGLs to 1,500m. FLIR recon sensors 3,000 m.	Uncooled 3rd gen FLIR (thermal and II combined) NVGs and weapon sights infantry 600m. Priority weapon sights 2,000+ m.
INFANTRY WEAPONS		
Armored Personnel Carrier (APC)	8x8 wheeled chassis. Add ERA. 30-mm gun (and imp rd), coax MG. FOG NLOS ATGM lchr 4 km. Thermobaric ATGM. FLIR. 2 remote 7.62-mm MGs and 40 mm ABM AGL. CPS and ATS. Attack UAV launch	10x10 wheeled hybrid drive. Box ERA. CPS. Fused FLIR/II sight 13 km. 30-mm recoilless chain gun, RWS. Air-burst rds. ADAT KE missile and NLOS ATGM to 8 km. TV/IR attack grenades.

APC Fire Support Vehicle (Weapons Squad APC or Infantry Support Vehicle [1/ pltn or company], or Company Command Vehicle in Mech APC Bn)	Wheeled 8x8 chassis with ERA. 100mm & 30mm guns, 40 mm ABM AGL, auto- tracker, hunter-killer FCS. Gun-launch ATGM NLOS (SAL) 8 km fire on move. 30 and 100-mm HE elec fuzed rd 7 km. Imp 30-mm rd. 12.7 mm AD MG, 2 remote 7.62 MG. ADAT KE msl lchr 7+ km. Laser designator 10 km. CPS, ATS.	Above chassis & drive, ERA, fused FLIR/II sight. 100mm KE/600 CE protection. Cased telescoped gun 45-mm. ADAT KE dart rd 4 km, SAL/LBR ATGM 8-12 km. CPS. Micro-UAVs recon/attack. Tunable laser designator to 15 km. Radar/ MMW radar. SATCOM. Atk grds
APC Air defense/Antitank (ADAT) Vehicle	APC Bn and Bde MANPADS btry, selected other units	See AIR DEFENSE
Infantry Fighting Vehicle	2-man turret, amphib tracked. Add ERA. 30mm gun (sabot, 110+mm pen). Frag-HE Electronic-fuzed ammo 5 km. Buckshot rd for UAVs. 40-mm ABM AGL, 4 x fiber-optic guided ATGM 8 km launch on move, 2nd gen FLIR. Auto-track, hunter-killer FCS. Remote MGs 12.7mm, 2 x 7.62. Laser designator 15 km. CPS/ATS	Hybrid drive. Box ERA 100mm KE /600 CE. 45-mm CTG. Fused FLIR /II sight 13 km. ADAT dart rd 4 km. SAL/LBR ATGM 8-12 km. MMW radar. Micro-UAVs recon/atk. Radar warner, laser radar. Tunable LTD 15 km. CPS. 2 remote MGs, 1x 12.7. TV/IR attack grenades
IFV ADAT Vehicle IFV Bn/Bde MANPADS	IFV chassis and APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
Heavy Infantry Fighting Vehicle (Heavy IFV in Heavy Bn, Infantry Fire Support Vehicle, or IFV Company Command Vehicle, as Required)	2-man turret, amphib tracked, Box ERA. Auto-track, hunter-killer FCS, ATGM lch on move. 100 and 30mm guns. 100 mm HEAT, DPICM rounds. 40mm ABM AGL, NLOS (LBR/SAL) ATGM 8+km lch-on-move. 30/100-mm HE electronic fuzed rd 7 km. 30-mm buckshot rd for UAVs. AD 12.7mm MG, 2 remote 7.62 MG. Laser designator 15 km. CPS/ATS	Hybrid drive. Armor and box ERA protects 300mm KE/800 CE. 45-mm CTG, KE, HE, ADAT rds. KE missile 8 km. Micro-UAVs recon/ atk. CPS. Fused FLIR/II sight 13 km. ATGM 8- 12 km. Tunable laser designator to 15 km. Radar/ MMW warners. AGL, 2 remote MGs, 1x 12.7. TV/IR atk grds
HIFV ADAT Vehicle HIFV and Amphib Bn/Bde	HIFV chassis with APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
Main battle tank	Welded turret, 3rd gen ERA, more armor. 125mm gun, bigger sabot (800+mm pen), LBR ATGM 6 km. SAL/IR-homing rd to 5 km in 1 sec, SAL-H ATGM 8 km.. Improved 2nd gen FLIR (7 km) and 50X Day/night sights. ATGM fire on move. Auto-tracker, laser radar, laser dazzler blind sights. Focused frag HE rd for heli, light AT targets. HEAT-MP, DPICM sub munitions rds. IR/MMW CM. Active suspension. CPS/ATS. Controls robot	Reduced remote turret, compartmented crew, electronic/ceramic armor, 500 mm top/mine armor. Laser/radar warners. Hybrid drive. CPS/ATS/APS. Sabot defeats 1000 mm KE. KE ATGM to 12 km. Tunable LTD to 15 km. ADAT msl 8 km. Fused 3rd gen FLIR/II sight 100 X to 13 km. MMW FC. Atk/recon micro-UAV, atk grds. Controls a robot tank.
Tank Robot (Near Term) Robotic Tank (Mid-Term)	Tracked LTD tank robot fits on platoon cmd tank when unused. Light armor, MMW/ IR screens - no signature. It designates SALH ATGMS and rds.	1/2 size MBT. Driver seat for pre- battle. Armor, weapons, mobility/ survivability (CPS/ATS/APS) same as tank. ATGM launch veh version
Tank ADAT Vehicle Tank Bn/Bde MANPADS	Tank chassis and APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
Armored Tactical Utility Vehicle (TUV)	4x4 swims, 1/4 mt amphib trailer, Remote 12.7-mm MG and 40-mm AGL). Multirole (mech/recon/C4/AD/AT/security/ log). Run-flat, central tire inflation. CPS/ATS	6x6 hybrid drive, mine protection. 30-mm gun, RWS (see APC). Recon masted radar/fused FLIR/II sights. Smoke, recon/atk grenades. CPS.
Armored TUV ADAT Vehicle Infantry, SF, other units	12.7-mm MG, 2x lchr FOG/ IR-homing ATGM, EO/FLIR sight, manpack ADAT lchr. AD net azimuth warning. CPS/ATS	See above. Tunable laser designator, range 15 km. Radar warning receiver. MMW radar.
MANPADS Vehicle	Bn/Bde, insurgents. Truck, TUV, ATV. Remote launch, EO/thermal sight. Azimuth warner. Smoke/ATS	See Air Defense
Light Strike Vehicle	4x4 rear engine, 4-person, 2 m ford. 35-mm AGL, 12.7-mm MG, and 40-mm ATGL. ATS	Light armor/mine shields. Hybrid drive. Amphib (Bladders). 30-mm gun RWS (see APC). ATGM 8 km.

Light Strike Vehicle ADAT	4x4 rear engine, 4-person, 2 m ford. 35-mm AGL, 12.7-mm MG, KE LBR Msl. FOG/IR-hom ATGM 4 km. ATS	Light armor/mine shields. Hybrid drive. Amphib (Bladders). 30-mm gun RWS (see APC). ATGM 8 km.
Tactical Motorcycle Motorcycle ADAT version	Low noise diesel engine, 35-mm AGL Swim sacks. MMW/IR camouflage and screen. ATS	Continuous rubber track. FOG/ IR-homing ATGM, imp MANPADS. Track conversion in snow/swamp.
All-Terrain Vehicle (ATV) and ATV ADAT	6x6, 4-person capacity, 3.5 mt payload. Swim. Has 12.7-mm MG, 35-mm AGL. ADAT, AT, other roles. Amphib trailer. Track conversion in snow/swamp. ATS	8x8. Mine protection. Hybrid electric/diesel drive. Snap-on cab for cold weather etc. 23-mm light chain gun on pintle mount.
RECONNAISSANCE, INTELLIGENCE, SURVEILLANCE, TARGET ACQUISITION		
Binocular Laser rangefinder and Goniometer	Handheld 20km detection, 5-7km recognition, GPS. Thermal channel (below) goniometer, computer - digital transmit	See Thermal Binoculars (below). Heads-up display links to terminal. Transmit images to net.
Helmet Cam	Soldier camera link to laptop/PDA 2 km. NVG feed. Remote mast-mount.	Improved night viewer with 3 gen II or thermal. Nigh range 2 km.
Thermal Binoculars	Uncooled 2 gen FLIR. 2x electronic zoom (EZ), image stabilization. Detect 9 km (13 EZ), recognition 3.5 km (5.5 EZ)	Add LRF, laser pointer, internal GNSS. Fused FLIR/II camera. FOs call indirect fires 10-13 km, 6+ with precision, direct fire 5.5 km+. IDs heli at 7 km w EZ, detects at 13 km
Laser Target Designator/ Rangefinder (Manportable)	Man-portable, encoded, designate SAL-H rounds, bombs, ATGMs to 10 km. 2 gen thermal sight. Mounts on sensor robot	Tunable laser designator with encoded pulse to 15 km. Mounts on sensor robot
Observer Sensor Suite For Recon, SPF, Security, Anti- tank, Air Defense, Artillery (Dismount, ATV, Motorcycle, Vehicle)	Goniometer/laser designator base. Laptop or radio link. GPS, thermal laser range-finder binoculars, manpack radar. Aircraft azimuth warner. Net with UGS, remote camera, micro-UAVs.	Mount on Sensor Robot. Increased range, encryption, SATCOM. Fused FLIR/II night sight. Tunable encoded LTD to 15 km designates for all SAL- H munitions.
Laptop Computer for Digital Sensor Network	System accesses sensor links: video cameras tactical units, UGS monitor, maps/unit status displays, azimuth and alert nets. Digital data links, microphones for discussion, ground station terminal. Access encrypted internet links, long-range cordless and SATCOM phones. Terminal to remote-detonate mines and control minefields.	Personal data assistant for dismount use or for mounting in or linking to weapon FCS. Solar rechargeable batteries, extended range on links with retransmission UAVs. Use for hand-off control of UAVs, in-flight munition retargeting. Fuse UAV, weapons, cameras, TV recon grde image, battle management data.
Surveillance radar	Man-portable low probability of intercept GS radar to detect/classify vehicles 30km, detect personnel 18km. Netted digital/graphic display.	Remotely operated, on a mast, with man-portable day/night EO sensor suite or from concealed base.
Mortar and Grenade Recon Rounds TV/IR attack grenades: Mid-Term	82 mm mortar round with a CCD TV camera to 5,700 m, aerial NLOS zoom view to laptop for 20 sec. Rifle/hand- held/AT grenades with TV cameras send video to PDA or laptop on descent.	Mortar rds (81/120), grenades with slewable fused FLIR/II and zoom. 40mm AGL grd 2,200 m. Shotgun grds. Recon, TV/IR attack grenades (HEAT/HE) from vehicle 82-mm smoke grenade launchers to 1,000m
Unattended Ground Sensor Set	Netted, acoustic, seismic, magnetic, IR. Acoustic sensor UGS array extends 12 km, for accuracy within 3m.	Robotic sensors with sleep mode, underground concealed hide position (self-relocate, dig in). Nil visual/IR/MMW signature.
Remote Cameras and Sensors	Motorized, masted, with constant-on, command-on or acoustic/seismic wakeup. 20-30km link range. CCD measures and in-ground mount. 2 gen FLIR day/night passive scan.	Robotic sensor entrenched and concealed. On wake-up, mast rises to RISTA mode. Integrated net digital display, link to sensor robots and robotic weapons.

Smart Dust	Rocket/UAV/aircraft scattered crush sensors emit for 1/2 hour.	Scatterable, attach to metal. Acoustic/crush/seismic. Emit 1 hour.
Sensor Robot	Man-portable tracked robot w/cameras in multi-sensor pods (acoustic/EO/ seismic) w/wake-up. Transmits image to monitor. Camera range 3 km. RAM. Laser designator direct munitions 10 km	Solar charge and vehicle quick charge, longer charge capability. Camera/link range 20-30 km. Self- entrench. Composition chassis and RAM is undetectable to sensors.
Acoustic sensor vehicle	Vehicle mounts microphones or dismount array, DFs/acquires aircraft, vehicles, or artillery. Rapid queuing and netted digital display. Range 10 km, accuracy 200m. Three vehicle set can locate artillery to 30 km with 1-2% accuracy in 2-45 sec. DF/ cueing rate 30 targets/min.	Range extends to 20-30 km with 10 m accuracy. Micro-UAVs with microphones to supplement the network in difficult terrain. Track and engage multiple targets. Range and accuracy SAB. Hybrid electric/diesel drive.
Wheeled Armored Reconnaissance Vehicle (ARV)	4x4 and 4 aux wheels, low profile. 12.7- mm AD MG. NLOS FOG ATGM 8 km Multi-sensor mast, 2nd gen FLIR. GS radar classify vehicles 30 km, detect person 18km, laser designator 15 km, UGS, laser radar, MANPADS, ATGM. CPS/ ATS. Conformal MMW-IR net, MMW/IR grds. Canister UAV 10 km.	Hybrid drive. IFF. Fused FLIR/II to 24 km. Micro-UAV range 35 km. 30 mm recoilless chain gun on RWS (see APC). SAL/LBR ATGM 8-12 km. Tunable LTD 15 km. Multi-spectral smoke launcher and recon and TV/IR attack grenades to 1,000 m. Sensor robot. CPS.
Tracked Reconnaissance Vehicle	2-man turret, 30-mm gun, 12.7-mm AD MG, MANPADS, ATGM. Masted multi- sensor suite, 2 gen FLIR, laser radar, auto- tracker, laser target designator direct arty /mortar rds/bombs, ATGMs 15 km. GPS/ inertial nav, digital data. Radar detects vehicles 30 km, personnel 18. UGS net. Canister UAV. CPS/ATS	Hybrid drive. Fused FLIR/II to 24 km. IFF, Micro-UAVs to 35 km. 45 mm CT gun. ADAT KE round 4 km. SAL/LBR ATGM 8-12 km. Multi-spectral smoke launcher and recon and TV/IR atk grenades. Tunable laser designator 15 km. Sensor robot. CPS.
Long-range sensor vehicle	Tracked vehicle with elevated sensor suite on pod. Day/night TV, MMW radar detect to 45 km vehicle, 20 km personnel. 2 gen FLIR Net to UGS, UAVs, etc. Digital links to arty, AT, AD, recon, etc. 12.7-mm AD MG. Laser target designator to 15 km. CPS/ATS.	Longer range, increased target handling/transmission capacity. Manpack AD/AT LBR missile to 8 km. Fused FLIR/II to 24 km. Tunable laser designator to 15 km. Hybrid electric/diesel drive. CPS. Recon and TV/IR atk grenades.
Ground or Vehicle Launch Mini- UAV	2-backpack system. Man-portable ground launcher, and laptop terminal. Vehicle- launch from rail or canisters. TV/FLIR. Range 35 km, 3-hr endurance.	IR auto-tracker. Laser designator. Cassette launcher for vehicles. Signal retransmission terminal. Bus dispense micro-UAVs, UGS, mines
Micro-UAV	Hand-launch 4-rotor, 4 kg, 5 km/1 hr, GPS map/view on PDA/netbook. Atk grenade	< 1 kg for dismount sqd/tm, 2 km range. Add grenade for atk UAV
Heliborne MTI Radar	Range 200 km, endurance 4 hrs.	Range 400 km. Add SAR mode.
Commercial Satellite Imagery	Resolution 5 m for IR, SAR also available. <2 days for request. Terminal on tactical utility vehicle at division. Can be netted to other tactical units.	Response time reduction (to <6 hours). 1-m resolution.
ANTI-TANK		
Manpack Air Defense and Antitank (ADAT) Kinetic-Energy Missile Launcher (also listed in Air Defense)	Co/Bn substitute for ATGMs and AD. Targets helicopters and LAVs. Shoulder launch missile with 3 KE LBR submissiles 8 km, 0 m altitude. Submissiles have 25- mm sabot/HE warhead. Nil smoke. Mount on robotic launcher (below). FLIR night sight.	Fits in 45-100mm guns. Defeats all targets up to 135 mm KE. Range 8 km, time of flight 6 sec. Fused FLIR/II sight 10 km. Launch from enclosed spaces. Can mount on robotic ADAT launcher or ADAT Robot vehicle (below).
Man-portable ATGM Launcher (Also pintel/vehicle dismount)	SACLOS guided to 3 km. Tandem warhead defeats 1,200mm. Thermal sight. Jam-proof low noise/smoke. Fire from enclosed spaces. Can mount on robotic launcher (below)/vehicles.	Twin ATGM remote ground veh/ launch station with auto-tracker. Fused FLIR/II sight 5 km. NLOS /IIR homing missile to 4 km. Can use ADAT missile. Laser dazzler

Ground Turret	Ready-made hole mount turret for hoist installation, w/12.7 mm MG, 4 km ATGM launcher, thermal night sight, and radar absorbent/IR reflective paint on cover. Invisible until activated.	Add remote/unmanned pop-up turret. FOG-M top-attack or IIR-homing attack 8 km. Tandem warhead 1,300 mm. Fused FLIR/II sight to 10 km. CPS
Ground/ Vehicle Pintle Mount ATGM Launcher	Combat support vehicle with portable robotic twin launcher (below). FOG-M top- attack or IIR-homing direct attack 4 km. Tandem warhead defeats 1,000+ mm. Thermal sight 5 km range. Low noise/smoke, countermeasure-resistant.	Range increase to 8 km and 1300 mm penetration. Thermobaric ATGM. Fused FLIR/II sight to 10 km. Launch from enclosed spaces. Laser dazzler. ADAT robot vehicle.
Robotic ADAT Launcher ADAT Robot Vehicle	Pintle mount shoulder/ground/ATV/ vehicle launch. Robotic launcher-60 m link. Twin auto-tracker. Operator in cover/spider hole. MMW/IR absorbent screen and net for operator, launcher and surrounding spall. CPS/ATS.	Masted 4-launcher, hybrid drive to self-entrench, then move to launch point. Fused FLIR/II sight to 10 km. Remote link 10 km. Most AD and AT host vehicles have 2 control stations and 2 robots. ATGM same as above. CPS.
Towed Antitank Gun	125mm gun, larger sabot (700+mm), LBR/SAL-homing ATGM 8 km. Stabilized FCS sights, auto-tracker. Auxiliary propulsion unit. TV day sight with (32x). Combined MMW radar and 2nd gen thermal night sight (5-7 km). Add SAL-H/IR HEAT rd 5 km in 1 sec, HEAT-MP, DPICM submunition round. ATS.	Remote unmanned gun with cassette, towed, dug into position, netted into AT net. Concealed position (retractable base and IR/MMW concealed). Fused FLIR/II sight to 10 km. KE ATGM (8 km), direct link to micro-UAVs and UGVs). Laser dazzler
Heavy Recoilless Gun, 106 mm and Recoilless Gun Vehicle (RGV)	TOW or RGV on TUV. Tandem HEAT round 700+mm 3 km. SAL-H, tandem ATGM (1,000+ mm), 8 km dive attack. .50- cal spotter rifle to 2,500 m. Laser designator. Computer sight, 2gen FLIR. HE, flechette rounds. RGV CPS/ATS.	HEAT rd 900+mm. Remote weapon system mount for APC, IFV, and TUV chassis. Fused FLIR/II sight to 10 km. Nil smoke/noise. Tunable laser designator for SAL munitions 15 km. Hybrid drive for RGV.
Self-Propelled Antitank Gun	Amphibious airborne tracked, 125 mm gun, larger sabot (700+ KE), SAL ATGM to 8 km. SAL-H/IR HEAT rd 5 km in 1 sec, DPICM submunition round , focus frag HE rd. Stabilized TV day sight (32x), 2 gen FLIR 5 km, auto-tracker. Laser designator 15 km. CPS/ATS.	Hybrid drive. MMW FC radar, NLOS ATGMs (8/12 km), direct link to micro-UAVs, UGVs). Fused FLIR/II sight 10 km. Micro-UAVs recon/atk. Laser dazzler. Tunable LTD 15 km. CPS, TV/IR attack grenades
Tracked ATGM Launcher Vehicle	Box ERA 300mm. NLOS/IIR ATGM launcher on IFV. 1,300 mm dive attack, 8 km. HE Thermobaric ATGM. Low noise/ smoke signature. 12.7-mm AD MG. Laser designator to 10 km. CPS/ATS. Manport ADAT KE missile launcher.	Imp ERA (300mm KE, 600 CE). Hybrid drive. NLOS/KE ATGMs LBR/SAL defeats 1,300mm at 8/12 km. EMP option. Fused FLIR/II 13 km. 2-target auto-track. Launch on move. Laser dazzler. Micro-UAV atk/ recon. 2 robots. Atk grds.
Wheeled ATGM Vehicle	4x4 Armored TUV with same launcher system as above. CPS/ATS.	Same launcher as above. Hybrid drive. Robot vehicle.
Airborne Infantry ATGM Launcher Vehicle	Airborne/amphib tracked light armored. Same launcher as above. CPS/ATS.	Same launcher as above. Hybrid drive, ERA, atk grds. Robot veh.
Heavy ATGM launcher Vehicle	Tracked, 6 lchrs, SAL-homing ATGM 1,400mm dive attack, 10 km. Warheads HEAT, Multi-purpose (HEAT/Frag-HE). 12.7-mm MG. Jam-proof auto-tracker, Laser designator 15 km. CPS/ATS.	Hybrid drive. Add IIR homing, 12 km range, EMP, and thermobaric. Warheads. Fused FLIR/II 13 km. Laser dazzler. Designator UAV 30 km range and 3-hr loiter. Atk grds
Heavy ATGM Launcher Vehicle (and Land Attack Cruise Missile - LACM)	Tracked vehicle with 16 x SAL-homing ATGMs, Hybrid drive. RF-guided phase, 40 km. Fused FLIR/II acq to 10 km. MMW TA radar to 40 km. Warhead: 28-kg Frag-HE=1,300 mm penetration. UAV to 40 km with LTD (15 km range). FW and boat mounts. Anti-heli radar guided or SAL-homing. Atk grds.	Hybrid drive. Guidance adds radar or IIR homing. Warheads: Multi-purpose (HEAT/ Frag-HE) defeats 1,400mm), Bus for sensor-fuzed sub munitions, EMP warhead. Laser designator UAV range 100 km, 3-hr loiter time.

Attack UAV	Hit-to-kill system. Day/night 60+ km, up to 2 hours. GNSS/inertial navigation, TV/FLIR, Frag-HE warhead. They include an anti-radiation variant.	Cargo UAV 100 km dispenses IR/ MMW/SAL DP (600mm HEAT) sub munitions, EMP munitions, SAL ATGMs – UAV LTD 30 km.
Attack UAV Launcher Vehicle	Hit-to-kill UAV launch from modular launcher, 18 UAVs. GNSS/inertial nav, to 500 km. First version anti-radiation homing. Added TV guided and multi-seeker attack (hit-to-kill) UAV. Laser designator range 15 km. CPS/ATS.	Hybrid drive. Bus reusable UCAV with 4 ATGMs to 10 km, SAL-H bombs, or bus dispensing 16 terminally-homing sub munitions (with MMW/ IR seekers, or laser- homing DP sub munitions). CPS. LTD
Micro-Attack UAV	Hand or canister -launch UAV with TV and FLIR guidance to 10 km, 100-600 m altitude, with .25-.5 kg warhead.	Cassette/smoke grenade launcher launch for tactical vehicles. Recon and attack (top-attack) UAVs.
Mini-Attack UAV	Hand or vehicle canister -launch UAV with TV and FLIR guidance to 35 km, 100-600 m altitude, 1-4 kg warhead.	Cassette launcher launch for tactical vehicles. Recon and attack (DP with tandem 600 mm top-attack).
Man-portable Mortar	Conventional munitions, 82mm FRAG-HE 6.7 km, RA 13.0 km. SAL-H 6.7 km. Day/night direct/indirect fire sight. GPS. Prox fuze. Tandem ATGM 7 km.	Increased range and accuracy. Ballistic computer sight. Fused FLIR/ II 10 km.Self-lay. Dual guided (diff GNSS course correct/SAL) 13 km
Towed Mortar Upgrade	120-mm FRAG-HE – 9 km. Prox fuze. ADHPM: SAL-H and IR-homing HEAT – 9 km, Sensor-fuzed – 7 km. Night capable direct/indirect fire sight, self-lay.	Improved range/precision. Ballistic computer sight. Fused FLIR/II 10 km. Dual guided round (differential GPS corrected, SAL) to 12 km.
Towed Combination Gun	GPS gun lay/nav system. Frag-HE range 8.1 km (and prox), RAP 12.8, HEAT 1 km, SAL-H 12.8. Mortar rds SAB.	Automated fire control, Fused II/ FLIR 13 km. Autonomous lay, diff GNSS. Auxiliary propulsion unit.
Self-Propelled Combination Gun	120-mm gun/mortar system. GPS gun lay. Cannon Frag-HE (prox fuze option) 13 km, -RAP 18, HEAT 1 km. All mortar rounds. ADHPM: Mortar SAL-H and IR-homing 9 km, Sensor-Fuzed 7 km. Cannon SAL-H rd 9 km. CPS/ATS.	IFV chassis. Hybrid drive. Laser designator 15 km, diff GPS, automated FCS, autonomous lay. Fused FLIR/II 13 km. SAL-H, GPS rounds 12 km. SAL tandem HEAT ATGM to 20 km. APS
Towed Medium Gun-Howitzer	FRAG-HE - 30 km, FRAG-HE BB - 39 km, Artillery delivered high precision munitions (ADHPM): SAL-H - 25 km, Sensor-Fuzed – 27 km. GPS 40 km	Autonomous lay/fire direction. Enhanced lethality, differential GPS corrected munitions (and sensor-fuzed) 60 km.
Self-Propelled Medium Gun-Howitzer	45-cal gun. GNSS/inertial land nav, self emplace, FC. Munitions: FRAG-HE – 30 km, FRAG-HE base bleed - 39 km. ADHPM: SAL-H - 25 km, Sensor-Fuzed –27 km, GPS-corrected 40 km.	Automated fire control. Barrel cooling, thermal warning systems. Autonomous lay/fire direction. Differential GNSS corrected rds (and sensor-fuzed) 60 km.
Self-Propelled Medium Gun-Howitzer Tracked	Ford depth 5.5 m. 40-cal gun. GPS/ inertial land nav, self emplace and FC. FRAG-HE 23 km, FRAG-HE rocket ast 31.5 km. SAL-H rd 25 km, Sensor-Fuzed rd 27 km, GPS corrected 40 km	Automated FC. Autonomous lay/FD. Barrel cooling, thermal warning systems. Differential GNSS course corrected rds (and sensor-fuzed) 60 km.
Self-Propelled Medium Gun	Conventional munitions, FRAG-HE-BB – 30.5 km, FRAG-HE-RA–40 km. ADHPM: SAL-H - 25 km, Sensor-Fuzed – 24 km. GPS corrected 40 km.	Automated FC, barrel cooling and thermal warning, autonomous fire direction. Diff GNSS corrected rounds (and sensor-fuzed) 60 km.
Manportable Single Round Rocket Launcher	122mm FRAG-HE – 10.8 km. SAL-H, Sensor fuzed 10.8 km. On tripod	Increased range and accuracy. Enhanced lethality.
Rocket Launcher Pod (107mm) For Use on Improvised/ Modified Launch Platforms	6-tube (2x3 rockets) pod mounts on cart, vehicle (e.g., amphibious/airborne APC), or ground stand. Remote launch fire control. Cart/vehicle 1-3 pods. GNSS. Range 8.5 km. Limited lateral launcher adjustment (move vehicle). Mines and DPICM warhead option.	Improved launcher mount with servo-motors and remote computer FCS and in-view GNSS data. Munitions include: EMP, smoke, UGS, SAL- homing HE, tandem HEAT, recon, chem. Use with laser designator. Range 10 km.

SP Medium Rocket Launcher (100mm to 220mm)	122mm 50-tubes. Self-emplace (GNSS/ inertial nav). Onboard FCS. Munitions: Frag-HE 90° precision fall 40 km, GPS course-corrected DPICM and Frag-HE 36 km, RF jammer rd 18.5, SAL-H rkt 32 km, Sensor fuzed 33 km.	Extended range. Increased accuracy and lethality. Course corrected diff GPS/ inertial) in DPICM, multi-role (HEAT, HE, incendiary). Motorized spades for quick displace.
SP Heavy Rocket Launcher (220-240 mm)	Self-locating launcher, 16 tubes. GNSS/ inertial nav. Onboard fire direction. Rockets: 220mm FRAG-HE –43 km, DPICM, Chemical. Thermobaric – 43 km ADHPM: Sensor-Fuzed – 43 km	Increased accuracy. Enhanced lethality. MRL can launch cruise missiles, UAVs. Diff GNSS Course corrected munitions (DPICM, sensor fuzed, mines) to 70 km.
SP Heavy Rocket Launcher (240-300 mm and larger)	Self-emplace 300-mm 12-tube launcher. GNSS/inertial nav, onboard FCS. Inertial course-corrected rockets 100 km: mines, DPICM, Chemical, and Thermobaric. Sensor-Fuzed 90 km, UAV rocket 90 km	Range (100+ km). Differential GPS lnchr, GNSS course-corrected rkts. Enhanced lethality. Launch cruise missiles (attack UAVs) and recon UAVs to 470 km.
Weapon Locating Radar Vehicle (Counter Mortar/ Counter-Battery Radar)	Detection range with low error rate Mortar: 30 km, Cannon artillery: 20-25km, Rocket: 40km, Tactical Missile: 55km.	Faster computer processors with digital links, differential GNSS, and decreased radial error
ENGINEER		
Improvised Explosive Device (IED)	Command (RF, wire) arm/detonate. Also sensor armed/fuzed. Large shaped charge, EFP, daisy chain arty rds, large IED, mine converted to cmd/SF. Defeat RF jammers, magnetic detectors.	Fuzes and radio links which can convert explosive devices and materials into intelligent IED fields (see intelligent minefield)
Minelayer, Towed	Lays 10 to 12 mines per min. Lines 20/40 m apart. Can also lay controllable minefields.	Advanced sensors. Target discrimination. Can lay intelligent mines.
Minelayer Vehicle	Armored chassis w/7.62mm MG, lays 1,000 m AT field with 5m between mines. Lay controllable mines. CPS/ATS	Add vehicle mount mine launchers. Also lays intelligent minefields. Hybrid electric/diesel drive.
Infantry Portable Scatterable Minelaying System	Remotely lays AT/AP mixed minefield 200- 400m square from a distance up to 1090m. At platoon. 6 lb, 5 min set-up. Controllable mines.	Add intelligent mines. ATGL and AGL-delivered mines.
Scatterable Mines	Deliver by artillery, cruise missile, UAV, rotary or fixed-wing aircraft. Non-metallic case, undetectable fill, resistant to EMP and jammers, w/self-destruct.	Advanced multi-sensor mines with wake-up and target discrimination. Prox fuze mines. Controlled minefields and intelligent mines.
Artillery Scatterable Mine Rounds and Rockets	Cannon, MRL, mortar, gun/mortar. 122- mm MRLs can fire AT and/or AP mines and covers 24-81 hectares.	Extended range. Controlled minefields (RF link)
Remote Mine Launcher Pod System (Vehicle, trailer, ground)	APC w/180 x 140-mm pods, scatters mines, UGS, jammers, CS gas, and smoke grenades, 30-60m from pod. Can lay field AT/AP 1-1.2km x 30-120m. CPS/APS	Multi-sensor mines with wake-up, target discrimination. Controlled minefields, intelligent mines. Prox fuze mines (up to 540) 2 km 10 sec
Off-Route Mines (Side-Attack and Top-Attack)	Autonomous weapons that attack vehicles from the side as the vehicles pass. 125- mm Tandem HEAT (900+ mm). Target speed 30-60 km/h, range 150m acoustic and infrared sensors.	Sensor-fuzed EFP 600mm KE top attack. Remote or sensor actuated (controller turn-on/off), 360-degree multi-sensor array. Hand/ heli/ UAV/arty/ATGL mortar emplace.
Controlled Mines and Minefield	AT/AP, machine emplaceable. Armed, disarmed, detonated by RF command. Chemical fills and non-metallic cases are undetectable. With CM and shielding, negate jammers/pre-detonating systems.	Control may be autonomous, based on sensor data and programmed in decision logic, or by operators monitoring with remote nets.

Smart Mines	Wide-area munitions (WAM) smart autonomous, GPS, seismic/acoustic sensors. AT/AV top-attack, stand-off mine. Lethal radius of 100 m, 360°. Hand-emplace	Discriminate targets. Reports data to a monitor, evaluate target paths, built-in logic. Use GPS to artillery/ heli-emplace. Non-nuclear EMP or HPW options
Unexplosive Ordnance (UXO)	Artillery cannon or rocket DPICM sub munitions in impact pattern.	Unused blue remote-launch precision munition pods may be seized and used against them.
Intelligent Minefields (including Non-nuc EMP, Jam, and HP Microwave)	Developmental programs and not proliferated	Self-healing, autonomous monitoring of obstacle integrity. Advanced sensors, target discrimination, built-in logic. Non-nuclear EMP or HPW.
Engineer Reconnaissance Vehicle	Tracked IFV chassis. Amphibious- recon equip: sonar, NODs, rangefinder, soil analyzer, gyrocompass, underwater mine detection. CPS/ATS	Hand-held and vehicle-mounted ground-penetrating radars for mine detection. Hybrid electric/diesel drive. CPS
Obstacle Clearing vehicle	Tank chassis, NBC-protected, dozer (3.8m), crane (2mt), scoop/ripper, and mine detonator. CPS/ATS	Hybrid electric/diesel drive.
Vehicle or Towed Line Charge Mineclearing System	Mounted on truck, IFV, APC, TUV or tank. Rocket launch 10 tubes HE or FAE, to 3km. Breach lanes 10x60m.	
Line-Charge Mineclearing Vehicle	Clears lane 6x9 m. 2 line charges. CPS/ATS.	Hybrid electric/diesel drive.
INFORMATION WARFARE		
Lightweight Mobile ESM/DF	0.7-40 GHz, ESM/DF	SATCOM intercept capabilities
Electronic Warfare Radio Intercept/DF /Jammer System, VHF	Intercept, DF, track & jam FH; identify 3 nets in non-orthogonal FH, simultaneous jam 3 fixed freq stations (Rotary/fixed wing/UAV capable)	Integrated intercept/DF/jam for HF/VHF/UHF
Radio Intercept/DF HF/VHF/UHF	Intercept freq range 0.1-1000 MHz. (Rotary/fixed wing/UAV capable)	Wider Freq coverage. SATCOM intercept. Fusion/cue w/other RISTA for target location/ID
Radio HF/VHF/UHF Jammer	One of three bandwidths; 1.5-30/20- 90/100-400 MHz, intercept and jam. Power is 1000W. (Rotary/fixed wing/UAV capable)	Increased capability against advanced signal modulations. UAV and mini-UAV Jammers.
Portable Radar Jammer	Power 1100-2500W. Jam airborne SLAR 40-60km, nav and terrain radars 30- 50km. Helicopter, manpack.	UAV and long range fixed wing jammers.
High-Power Radar Jammer	Set of four trucks with 1250-2500 watt jammers at 8,000-10,000 MHz. Jams fire control radars at 30-150 km, and detects to 150 km.	UAV jammer and airship jammer. Hybrid electric/diesel drive.
Portable GNSS jammer	4 -25 W power, 200-km radius. Man-portable, vehicle & airborne GNSS jammers, airship-mounted jammers	Man portable, vehicle & airborne (UAV) GNSS jammers-increased range and power, and improvements in antenna design
Arty-delivered and ATGL-launch Jammer	HF/VHF (1.5-120 MHz), 700m Jamming radius, est. (1-hr duration). 300 m for ATGL-launched version	Increased capability against advanced signal modulations
Missile and UAV-delivered EMP Munition	Cruise missiles and ballistic missile unitary warhead and submunition.	Increased capability against advanced signal modulations
Artillery-delivered and Manpack EMP Munition	Cannon (152/155-mm), rocket (122/220 /300-mm), and mortar (82/120-mm).	Increased power, capability, and range.

Cruise Missile Graphite Munitions and Aircraft "Blackout Bombs"	400-500 kg cluster bombs/ warheads with graphite strands to short out transmission stations and power grids.	Rocket precision and UAV-delivered munitions.
EMP Mine	Larger EMP mine. Effective radius 350 m, irregular/ disruptive 500 m.	See intelligent minefields and smart mines
COMMAND AND CONTROL		
Radio, VHF/FM, Frequency-hopping	30-88 MHz, 100 hps, channels: 2,300, Mix of analog and digital radios, tactical cellular/digital phone, all nets digitally encrypted. Burst trans. UAV Retrans	Digital radios, tactical cellular/digital phone, and satellite phones, all nets encrypted
Radio Relay Station, VHF/UHF,	60-120/390-420 MHz, range 30-40km per hop LOS	Digital communications networks. Network management station, automated battlefield management system
Command Post Vehicle, Division (wheeled and tracked versions)	4xHF/VHF high power, 1x VHF, 75- 2000km. Digital comms, graphics, voice back-up. SATCOM digitally encrypted.	Completely digital comms net thru all levels, fiber-optic cables. Networked automated, secure, and integrated battle management system
DECEPTION & COUNTERMEASURE SYSTEMS		
Armored Vehicle Decoy, Mobile	Towed trailers & decoy heater units, and flares. Used in concert with obscured target vehicle for positioning near target to divert homing munitions. Radar (and motorized) corner reflectors. Inflatables, tethered, move w/air currents.	Acoustic decoys w/seismic effects. Multi-spectral (high-fidelity) decoys powered for acoustic and IR signatures. Linked to vehicle warning systems
Armored Vehicle Decoy, Stationary	Multi-spectral (high-fidelity) erectable/ inflatable vehicle mock-ups, w/heaters & motorized radar corner reflectors	Acoustic decoys w/seismic effects. Multi-spectral decoys powered acoustic/IR signatures
Vehicle and Weapon System Camouflage and Concealment	Tactical vehicles have MMW/IR paint and conformal nets, multi-spectral grenades, side skirts, thermal blankets, Thermal screens, laser/radar warners, acoustic engine & track noise modifiers.	Add mist thermal image concealment systems.
Camouflage and Concealment for Dismounts	Thermal screens and pop-up stands conceal from overhead, front, side visual/ thermal day/night vs MMW & IR. Face masks/ gloves. Foxhole blast devices.	Ready-made spider hole covers, invisible to visual/ MMW/ IR sensors. Remote control option
Air Defense System Decoy	Manufactured and improvised decoys used with decoy emitter. Covered by AD systems in air defense ambushes.	Multispectral simulators of varied gun and missile systems mounted on robotic chassis.
Air Defense System Decoy RF Emitter	Expendable RF remote emitters with signal to match specific nearby radars, to trigger aircraft self-protection jammers.	Mounted on robotic chassis.
Non-Lethal (or Less Lethal) Weapons	Acoustic directed energy system, sticky foam, rubber bullets, acoustic disrupters	RF crowd disruption emitter. Water cannons. Laser dazzlers
ROTARY WING AIRCRAFT		
Attack Helicopter	30-mm auto-cannon, 8 NLOS FOG/IIR- homing ATGMs, range 8 km. Two pods semi-active laser homing (SAL-H) rockets 80mm (20x 8 km) or 122mm (5x 9 km). 2x LBR KE ADAT msl (warhead w/3 KE submissiles, 8 km range). Laser designator 15 km. UAVs to 30 km. 2nd gen FLIR auto-tracker. Radar and IR warners and jammers, chaff, flares	Tandem cockpit, coax rotor, 30-mm auto-cannon. 8 x RF/SAL-H ASMs to 18 km (28+kg HE=1300+mm), 2x SAL-H rocket pods (80mm or 122mm), 2 ADAT KE msl 8 km, and 2x MANPADs. 1/3 have ASM to 100 km. Fire control with fused II/ FLIR to 30 km, and MMW radar, link to ground LTD. Radar jammer. Atk and LTD UAVs to 30 km.

Multi-role Medium Helicopter and Gunship	24 troops or 5000kg internal. Medium transport helicopter. Range 460km. 30- mm auto cannon, 8 FOG-M/IIR ATGMs to 8 km, 40 x 80 mm laser-homing rockets, 4 AAMs. ATGM launchers can launch mini- UAVs and more AAMs. Mine pod option. Day/night FLIR FCS.	Fused FLIR/II to 15 km. 6x SAL-H ATGMs 18 km, 2 AAMs, 2 x 80/ 122-mm SAL-H rocket pods (20 or 5 ea). Laser designator to 15 km, and links to ground LTD. Aircraft survivability equipment (radar jammers and IR countermeasures).
Multi-role Helicopter and Gunship	12 troops (Load 400 kg internal, 1,600 external. Range 860 km. 23 mm cannon, 2 AAM, 4 SACLOS ATGMs to 13 km, TV/FLIR, day/night. Mine delivery pods	Launch 6x SAL-H ATGM to 18 km, 28+kg HE warhead. 2 x AAM Air-to-surface missile to 100 km. Pod w/7x SAL-H 90-mm rockets. Fused FLIR/II to 15 km. ASE
Light Helicopter and Gunship	3 troops (Load 750 kg internal, 700 external). Range 735 km. 20 mm cannon, 1 x 7.62mm MG, 6 SAL-H ATGMs to 13 km, 2 AAMs. FLIR night sight. Laser target designator. Mine pods	Launches 4x SAL-H ATGMs, to 18 km range. Fused FLIR/II to 15 km.
Helicopter and Fixed- Wing Aircraft Mine Delivery System	Light helicopter pod scatters 60-80 AT mines or 100-120 AP mines per sortie. Medium helicopter or FW aircraft scatters 100-140 AT mines or 200-220 AP mines per sortie.	Controllable and intelligent mines for aircraft delivery. Larger aircraft can hold multiple pods.
FIXED WING AIRCRAFT		
Intercept FW Aircraft	30-mm auto-gun, AAM, ASM, ARMs TV/laser guided bomb. 8 pylons Range 3,300 km. Max attack speed: Mach 4.	Stealth composite. ASE. Max G12+ All weather day/night. Unmanned option
Multi-Role Aircraft	30-mm gun, AAM, ASM, ARM pods, guided, GPS, sensor fuzed bombs, 14 hard points. Thrust vectoring. FLIR	Improved weapons, munitions. Unmanned option. ASE all radars. Max G12+ All weather day/night
Ground-Attack Aircraft	Twin 30-mm gun, 8 x laser ATGMs 16 km 32 kg HE, 40 SAL-H 80mm rockets, ASMs, SAL-H and GPS sensor fuzed bombs, AA- 10 and KE HVM AAM. 10 hard points. Range 500+km. FLIR	Stealth composite design. ASE. Unmanned option. Max G12+ 80-mm/122-mm rockets SAL-H, SAL- H ASM (28+kg HE=1300+ mm), to 40 km, 2 gen FLIR, radar jammer, day/night
OTHER MANNED AERIAL SYSTEMS		
High-altitude Precision Para- chute and Ram-air Parachutes	High-altitude used with oxygen tanks. Ram-air parachute includes powered parachute with prop engine.	Increased range and portability. Reduced signature. Increased payload.
Ultra-light Aircraft.	Two-seat craft with 7.62-mm MG, and radio. Folds for carry, 2 per trailer.	Rotary-winged, two-seat, MG, 1/ trailer. Auto-gyro, more payload.
UNMANNED AERIAL VEHICLES		
UAV (Brigade) It may also be employed in other units (e.g., artillery, AT missile, and naval)	Rotary wing, TV/FLIR/auto-tracker, with LRF and LTD designates targets to 15 km. Flies 180 km/6 hours, 220 km/hr, 2- 5,500 m alt, 100 kg payload. Can carry 2 AD/anti-armor missiles+MG for atk	Range extends to 250 km. Increased payload. Attack version can carry 2 SAL-H ATGMs (12 km range) or 1+ 4 70-mm SAL-H rockets (7 km, defeats 200 mm).
UAV (Divisional)	Day/night recon to 250 km. GNSS/inertial nav, digital links, retrans. SLAR, SAR, IR scanner, TV, ELINT, ECM suite, jammer/ mine dispensers. Laser designator 15 km.	Increased range, endurance. Diff GNSS. Composite materials, low signature engine. SATCOM Retrans relay links. Attack sub munitions.
UAV (Operational)	Day/night recon to 400+km. GNSS/ inertial nav with digital links. SLAR, SAR, TV, IR scanner, ELINT, ECM suite. Jammer option. Mine dispense. Laser target designator 15 km. Retrans/relay	Increased ranges, endurance. Diff GNSS. High altitude ceiling (35 km) option. Retrans/ relay/SATCOM links. UAV attack sub munitions. Laser target designators.

Unmanned Combat Aerial Vehicle (on Operational UAV platform)	Medium UAV with 4 ATGMs (fly out 10 km), laser guided bombs. Laser designator 15 km. Mine dispensers. GPS jammer, EW jammers. Range 400+ km.	Stealth composite design. ASE. Twin dispensers (pylons) with 16 terminally-homing sub munitions, MMW/IR seekers. Range 500+ km
THEATER MISSILES		
Short-Range Ballistic Missile Transporter-Erector Launcher (TEL) and Cruise Missile (CM) Launcher	Twin launch autonomous vehicle (GPS/ inertial nav, self-emplace and launch). Range 450 km. Non-ballistic launch, separating GPS corrected reentry vehicle (RV) with decoys, CCD, 10-m accuracy. ICM, cluster, nucs. EMP warhead. CM option. TEL may convert to 6 x CM TEL (500 km, 3-m accuracy, below radar). Vehicle decoys. Vehicle has visual/MMW/ IR signature of a truck.	Missile improve range (TBM 800 km, cruise 1,000), with 1-m accuracy. TBM has GNSS-corrected maneuvering RV. Warheads for both include terminal-homing sub munitions, precision cluster munitions, EMP. Cruise missiles pre-program or enroute waypoint changes. Countermeasures include penetration aid jammers.
Medium-Range Ballistic Missile	Autonomous vehicle. Separating maneuvering warhead to 1300 km. GNSS,10-m CEP. Warheads include ICM, cluster, EMP, nucs. Penaids include decoys, jammers. Visual/MMW/IR signature of a truck.	Range 2,300 km, 1-m CEP. Differential GNSS, terminal homing, separating warhead. Warheads include EMP, terminal-homing cluster munitions. Non-ballistic launch and trajectory
Land-attack SAM system (secondary role for system)	The SAM system uses its EO sight and LRF (short/med range, strat “hittiles”)	Range extends with SAM ranges. Passive operation with TV/FLIR.
Cruise Missile Launcher Vehicle (Multi-role) Category includes specialized cruise missiles, long-range ATGMs, and SAM systems to engage targets at 12+ km.	Includes truck with 24 missile launchers. Range is 40 km. 28-kg Frag-HE warhead =1,300 mm penetration. Pre-program phase GNSS/inertial nav is used. LTD to 25 km range. Thermal night camera to 10 km. Support UAV with LTD is used. FW, RW, and sea-launch options.	Range 100 km. Penetration aids (countermeasures). IR Terminal- homing warhead or IR-homing submunitions can be used. Armored/ tracked launcher will mount 16 x 40 km missile launchers.
Cruise Missile Cassette launcher Vehicle	Off-road truck, GPS nav for autonomous ops. 16/lchr. Range 470 km; preprogram GNSS inertial guidance, with in-course correction, 10 CEP. Munitions include cluster munitions, thermobaric, chemical, DPICM/mine submunition scatter.	Launcher fire direction. Supersonic missile Diff GNSS/ inertial nav, 1-m CEP. Range 900 km. EMP warhead option. Warheads include homing cluster munitions. Penetration aids-countermeasures.
AIR DEFENSE		
General Purpose and Air Defense Machinegun	12.7mm low recoil for ground tripod. Chain gun light strike vehicle, ATV, motorcycle, etc, on pintle. TUV/LAV use RWS. Remote operated ground or robot option. Frangible rd 2 km, sabot 2.5 km. RAM/RAP/IR camouflage/ screens. TV/FLIR fire control. Lightweight MMW radar 5 km. Display link to AD azimuth warning net. Emplace 10 sec. RF/radar DF set. ATS control option.	Stabilized gun and sights. Remote-operated computer FCS with PDA/ laptop. Fused II/ FLIR 5 km. Frangible, sabot rds to 3 km. Laser dazzler blinds sights. Micro-recon/ heli atk UAVs. Robot mounts MG. Some light and AD vehicles replace gun with 30-mm recoilless chain gun on RWS, fires AHEAD round 4 km, plus Add-on ADAT missiles.
Improvised Multi-role Man-portable Rocket Launcher (AD/Anti-armor)	4-tube 57-mm launcher with high-velocity dual-purpose rockets. EO day/ night sight. Blast shield. Range 1,000 m. Penetration 300 mm, 10 m radius.	Prox fuze, 1,500 m range. Penetration 400 mm, 20 m radius.
Man-portable SAM launcher	6 km day/night range/ 0-3.5 km altitude all aircraft, velocity mach 2.6. Thermal night sight. Proximity fuze, frangible rod warhead (for 90% prob hit and kill). Approach/ azimuth link to AD warning net. Twin launcher vehicle quick mount. Nil smoke. Mount on robotic AD/AT launcher. RF/radar DF set on helmet.	Warhead/lethal radius increased air/ground targets. Improved seekers - not be decoyed by IR decoys/jammers. Fused II/ FLIR 10 km. Launch from enclosed spaces. Laser dazzler. Optional AD/AT LBR KE warhead missile – 8 km. Mount on AD/AT robot vehicle

MANPADS Vehicle Conversion Kit (Lt Stk Veh, Van, recon TUV, truck, etc)	Twin launcher and ADMG on improvised IR SAM vehicle. Day/night IR auto track FCS, MMW radar. Display link AD net. RF/radar DF set to 25 km. Camouflage	Replace launcher with 3-missile launcher: 2x ADAT KE SAMs, 1x IR SAMs. Total 6 missiles, (3+3)
Manpack Air Defense and Antitank (ADAT) Kinetic-Energy Missile Launcher (also listed in Anti-tank)	At company/Bn, can replace ATGMs and SAMs. Targets heli and LAVs. Missile has 3 KE LBR darts (submissiles) 8 km, 0 m altitude. Camo screen. Dart is 25-mm sabot with HE sleeve. Nil smoke. Fits on robotic ADAT launcher. Helmet RF/radar DF.	Larger sabot kills all targets up to 200 mm (KE) armor. Range 8 km, time of flight 5 sec. Fused II/ FLIR 10 km. Launch from enclosed spaces. Can mount on 3x remote launcher w/ IR auto-tracker, which. fits on AD/AT robot vehicle
Towed/Portee/Vehicle Mount AA Short Range gun/missile system	2x23mm gun. MMW/IR Camou/screen. Frangible rd to 3,000 m (17mm pen). Onboard radar/TV fire control, ballistic computer, 5 km MMW radar, thermal night sight, auto-tracker, net azimuth warner. Add twin MANPADS. RF/radar DF set, 25 km. RWS on veh hull/turret. CPS/ATS.	Replace with twin 30-mm recoilless chain gun, range. Frangible, sabot, AHEAD rds to 4 km. TV/fused II/FLIR auto-tracker 10 km. MMW radar, Twin MANPADS/ADAT KE missile 8 km) lchr. APU to 15-kph self relocation. Robotic option. Laser dazzler.
Air Defense System Decoys (visual decoy, decoy emitter)	See DECEPTION & COUNTERMEASURE SYSTEMS	
Brigade gun/missile turret for mount on tracked mech IFV, wheeled mech APC, truck (motorized) chassis	Twin 30-mm gun, APFSDS/frangible rds 4 km. 30-mm buckshot rd for UAVs. Mounts 4x hyper-velocity LBR-guided SAMs to 8 km, 0 m min altitude. Passive IR auto- tracker, FLIR, MMW RADAR. 2/battalion. Track/launch on move. Targets: air, LAVs, other ground targets. RF/radar DF set with 25 km range. CPS/ATS.	Dual mode (LBR/radar guided) high velocity missile, 12 km, 0 m min altitude. Auto-tracker, to launch and fire on move. Phased array radars. Fused II/FLIR to 19 km. Twin 30-mm recoilless chain gun with AHEAD-type rds to 4 km. Micro recon/heli atk UAVs. TV/IR attack grenades.
Divisional gun/missile system on tracked mech IFV, wheeled mech APC, truck (motorized) chassis	Target tracking radar 24km. TV/FLIR. 8 x radar/EO FCS high velocity missiles to 18 km/12 at 0 m min altitude. Auto-track and IR or RF guided. 2 twin 30mm guns to 4 km. 30-mm buckshot rd for UAVs. RF/radar DF. CPS/ATS	Hybrid drive. Missile 18 km at 0 m, can kill LAVs. Fused II/FLIR auto- tracker 19 km, launch on move. Radar 80 km. Home on jam. Twin 30-mm recoilless chain gun with electronically fuzed air-burst rds to 4 km. Micro-recon/heli-atk UAVs. TV/IR attack grenades.
APC Air defense/AT Vehicle in APC Bn (Company Command Vehicle, MANPADS Vehicle in Bn/Bde)	1-man turret on 8x8 chassis. 30mm gun, 30-mm buckshot rd for UAVs. 100-X TV, 2 gen FLIR. 2x LBR ATGM lchrs 6 km, 2x veh MANPADS lchrs. Two dismount teams. 1x MANPADS lchr, 1x ADAT KE lchr. Total 18 msls. 12.7-mm MG. RF/radar DF to 25 km. CPS/ATS.	10x10 chassis, hybrid drive, box armor. Gun 30-mm recoilless gun on RWS. Ammo includes AHEAD-type to 4 km. Add 2 veh launchers for 5 HVM AD/AT (KE LBR) missiles, 8 km. Anti-helicopter surveillance/attack micro-UAVs. Fused II/FLIR 10 km. MMW radar. TV/IR attack grenades.
IFV ADAT Vehicle IFV Bn/Bde MANPADS	IFV chassis with features noted above. APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
HIFV ADAT Vehicle HIFV Bn/Bde MANPADS	HIFV chassis with features noted above. APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
Tank ADAT Vehicle Tank Bn/Bde MANPADS	Tank chassis with features noted above. APC ADAT weapons and upgrades	See AIR DEFENSE, APC ADAT for weapons and upgrades
Towed Medium Range AA gun/missile system	35mm revolver gun 1,000 rd/min. Gun rds: frangible, HE prox, electronic-fuzed. 4 SAMs/lchr, 45 km, 0 min altitude. Radar 45 km for 4 tgts. Resists all ECM. 2 gen FLIR auto-tracker to 20 km. RF/radar DF 25 km. SAM modes include active homing, home-on-jam. RAP/RAM/IR camo. CPS/ATS	Hybrid-drive auxiliary power units for local moves. Improved FCS, phased array radar, low probability of intercept, and acq to 80 km. Fused II/3rd gen FLIR auto-tracker to 35 km in day/night all-weather system. Ability to track and engage 8 targets per radar.

Medium-range ground SAM system	Tracked lchr. Radar to 150 km. 4 x radar- homing SAMs to 45km, 0 m min altitude (4 targets at a time). Home on jam. Use as cruise missile - priority ground tgts to 15 km, water 25 km. Fused 3rd gen FLIR auto-tracker. RF/radar DF. CPS/ATS	Hybrid drive. Improved FCS with radars and EO fused II/3rd gen FLIR day/night all-weather system to range 50 km. Radar range 200 km.
Strategic SAM System	Cross-country truck launchers, 1 x track- via-missile SAMs 400 km, at Mach 7. 1x ATBM/high maneuver missile to 200 km. Also 8 x “hittile” SAMs to 120 km. Modes are track-via-missile and ARM (home-on-jam). All missiles 0 m to 50 km altitude vs stealth aircraft/UAVs/ ASMs. All strat/op missiles in IADS. Local IADS all AD. Battery autonomous option. Over-the- horizon TA radar veh to 400 km. Mobile radar to 350 km. Site CM, decoys.	Off-road trucks and tracked with hybrid drive. All missiles Mach 7. 1 x “big missile to 500 km. OTH radar to 600 km range with 5-min emplace- displace. Targets include all IRBMs. Increased target handling capacity (100/ battery in autonomous operations).
Operational-Strategic SAM System	Same as above on tracked chassis. Mobile FOs all batteries. AD radars on airships.	Same as above on tracked chassis.
Anti-helicopter Mines (Remote and Precision Launch)	In blind zones force helos upward or deny helo hides and landing zones. Range 150m. Acoustic and IR fuse, acoustic wake-up, or cmd detonation. Directed fragmentation. Precision-launch mines use operator remote launch, proximity fuze for detonation. RF/radar DF.	Stand-alone multi-fuse systems. Remote actuated hand-emplaced mines with 360-degree multi-sensor array, pivoting/orienting launcher, 4- km IR-homing missile. Operator monitors targets and controls (turns on or off) sections, mines or net.
Helicopter Acoustic Detection System	Early warning of helicopters. Acoustic sensors to 10km, 200m CEP. IR sensors can also be linked to air defense net.	Range 20 km, 50 m CEP. Track and engage multiple targets. Digital link to AD net, AD unit, IADS.

Military Technology Trends 2028

Year 2028 is a demarcation line for focusing on future military technologies. Even with the "Revolution in Military Affairs", most major technology developments are evolutionary, requiring one or more decades for full development. Subsystem upgrades can be added in less time. Most of the technologies noted below are in conceptual or early developmental stage or fielded at this time. Many exist in limited military or commercial applications, and can be easily extrapolated to 2028 and the near future time frame. Over this period and beyond, military forces will see some legacy systems fade to obsolescence and be replaced, or be relegated to lesser roles or lower priority units. Most will be retained and updated several times. New systems and technologies will emerge, be developed, become widely implemented, mature, and reach evanescence, requiring updates.

Infantry
• Infantry with improved weapons/sensors as primary lethal agent for combined arms • Weapon-delivered remotely-guided sub munitions and sensors for infantry weapons • Day/night sensors integrated, netted, with UAVs, robotics, and direct links to fire support • Visual/IR/MMW materials with signature management to avoid detection • Increased lethality weapons and precision for man-portable and vehicle weapons, robotic weapons • Increased range and effectiveness for use in Beyond Line-Of-Sight (BLOS) and MOUT operations • Tube launch UAVs, UCAVs, and remote overhead camera munitions for vehicles and dismounts limit collateral damage
Armor
• Tank crew in hull, with insensitive ammunition, electromagnetic armor, and active protection systems • Hybrid (diesel/electric) drive, and MMW/IR signature management • Overhead guns and missiles, electro-thermal chemical gun, and cased telescoped rounds • BLOS precision 12+km, 1,500+ mm lethality, KE missiles, and sensor/attack UAVs and robots • Infantry carrier remote weapons manned by passengers for 360° all-aspect protection • Heavy combat support vehicles/Heavy IFVs option to accompany tanks/IFVs • Micro-UAVs, attack UAVs, and UCAVs for vehicle launch
Anti-Armor
• Increased penetration (1,500+ HEAT/1,000+ KE), including lightweight capability for infantry • Infantry homing grenades with top-attack EFP or tandem • KE hypervelocity missiles/missile rounds 10+ km vehicles. KE ATGMs for infantry • Laser designators on AT grenade launchers, also used for precision artillery/air/naval rounds/ATGMs • Attack UAVs and laser target designator UAVs for precision strikes throughout the battle zone

Artillery
• Autonomous operation/rapid self-emplace/displace with integrated netted FCS • Precision munitions: laser/IR/MMW homing, EFP multi-sensor fuzed • Inertial/GPS/muzzle-velocity radar course-correction on conventional rounds/rockets • Combination guns integrate tactical unit BLOS fires and strikes
Sensors
• Multi-spectral immediate all-weather sensor transmission with real-time display • Remote unmanned sensors, weapon-launch and robotic sensors and manned sensors • Sensor nets integrated and netted from team to strategic and across functional areas • Micro-UAVs and remote overhead camera munitions for vehicles and dismount teams
Aircraft
• Continued but selective use of FW and rotary wing for stand-off weapons, sensors • Aircraft critical for transport, minelaying, jamming, other support missions • Laser designators on AT grenade launchers, also used for precision artillery/air/naval rounds/ATGMs
Other Aerial Systems
• High-altitude UAVs, long-endurance UAVs, and UCAVs seamlessly integrated with other intelligence and support systems • Recon/attack low-signature UAVs and UCAVs and stand-off munitions at all levels down to squads • Ballistic missiles with non-ballistic trajectories, improved GNSS/homing re-entry vehicles, precision sub munitions, EMP • Shift to canister launchers of tactical cruise missiles with precision homing and piloted option, cluster warheads, EMP • Laser designators on AT grenade launchers, also used for precision artillery/air/naval rounds/ATGMs • Airships and powered airships for long-duration and long-range reconnaissance, and variety of other roles • Increased use of ultra-lights and powered parachutes
Air Defense
• Integrated Air Defense System with day/night all-weather RISTA access for all AD units • Improved gun rounds (AHEAD/guided sabot) and missiles (anti-radiation homing, jam-resistant) • Autonomous operation with signature suppression, counter-SEAD radars and comms • Shoulder-launch multi-role (ADAT) hypervelocity missiles/weapons immune to helicopter decoys and jammers, • Micro-UAVs and airships for multi-role use includes air defense recon and helicopter attack • Acquisition/destruction of stealth systems and aerial munitions and ground rockets to 500+ km
Information Warfare
• Jammer rounds most weapons, electro-magnetic pulse rounds, weapons of mass effects • UAVs, missiles and robots carry or deliver jammers/EMP/against point targets and for mass effects • Multi-spectral decoys for most warfighting functions • Computer network attack and data manipulation
Access Denial
• Use of nuclear/bacteriological/chemical weapons to deny entry, access to areas or resources • Use of media and public opinion for access denial • Remotely delivered RF-controlled, smart and wide-area remote delivered sensor-fuzed and mines and IEDs defeat jamming
Non-lethal Weapons
• EMP/graphite/directed energy weapons to degrade power grid, information networks, and military systems • Space-based data manipulation to deny adversary use of satellite systems • Population control effects (acoustic devices, bio-chemical and genetic weapons, resources attack, dirty bomb) • Anti-materiel agents and organisms (microbes, chemicals, dust, and nanotech) • Countermeasures, tactical and technical, in all units to degrade enemy sensor and weapon effectiveness.

Chapter 11: Irregular Forces

The conflict spectrum in the Complex Operational Environment includes not only modernized systems in upper tier forces but also older systems in less developed forces. Forces all across the capability spectrum use older, cheaper or improvised weapons because that is what they are able to procure, afford or require to blend in with their environment. Generally, Irregular forces are lightly armed attack troops and their equipment is not based on what they want or in some cases need but what is available. The equipment of an Irregular threat actor tends to improve over time as they increase their lines of supply, which complements their usual strategy of lassitude.

Irregular forces are armed individuals or groups who are not members of the regular armed forces, police, or other internal security forces (JP 3-24). Irregular forces can be insurgent, guerrilla, or criminal organizations or any combination thereof. Any

of those forces can be affiliated with mercenaries, corrupt governing authority officials, compromised commercial and public entities, active or covert supporters, and willing or coerced members of a populace.

Arms Procurement

To maintain a force that is prepared to deal with its security challenges requires an equipment program of acquisition and procurement. Irregular forces do not usually have the luxury of the acquisition methods available to states such as internal manufacture or purchase through international defense agreements. There are laws and regulations that govern the control of military equipment such as the Arms Export Control Act and International Traffic in Arms Regulations (ITAR) specifically to stop Irregular forces and large criminal organizations from obtaining military grade equipment. Despite all the obstacles Irregular forces can acquire weapons from regional military sources, through purchase on the black market or fabricate them internally.

Regional Procurement

An Irregular force has a number of ways in which it can procure weapons and explosives regionally. The most dangerous Irregular forces are those that are supplied directly from an external country. Hezbollah are a recipient of support from Iran and Syria, and what began with caution and relatively small amounts of weapons in the 1980's has become a strategic alliance that supplies short-range precision guided munitions such as the Fateh-100 or the M-600.

Areas of instability, corruption, state weakness and long running conflict can be awash with uncontrolled weapons that are easy to procure. In 2003, Iraqi forces abandoned their positions as the coalition forces advanced on Baghdad, they left military bases and storage depots unguarded. Millions of tons of weapons and explosives were left for the taking by anybody. These weapons fueled the insurgency that followed.

Weapons and explosives can be taken using force or guile from legitimate government sources in the Irregular actors AO. Much of Boko Haram's (BH) military hardware is stolen from the Nigerian Army. BH fighters have conducted raids against remote military outposts and looted ammunition bunkers. In addition BH sympathizers in the Army have been accused of leaving armory doors unlocked which has left the militants well- armed.

Illicit Arms Trade

Insurgents, Guerrillas, armed gangs, and terrorists can all multiply their force through the use of illegally acquired firepower but an alternative to seizing weapons by force is to purchase them unlawfully through the Black Market. It is important not to underestimate the magnitude of the Black Market as

it is possible to purchase top of the line tanks and radar systems with the latest technology. The illicit circulation of small arms, light weapons and their associated ammunition alone values around $1bn a year.

The arms market is a good example, for all the wrong reasons of increasing globalization. The illicit arms trade takes maximum advantage of all the open trade developments including minimized custom regulations and relaxed border controls which leads to easier movement. The faking of shipping manifests or end-use certificates, bribing officials and concealing arms as humanitarian aids are common practice. The structure of the small arms black market is complex and stretches across the globe and the activities of the black market arms dealer's stretch to other trans-national criminal organizations, like drug and human traffickers.

Sources of small arms supplies to the black market are varied but most weapons start off the legal side and then get diverted to the illegal sphere. Small arms can enter illegal circulation through theft, leakage and divergence. The management of government's stockpiles is an acute problem and a prominent source of the illegal weapons in circulation. Stockpiles consist of obsolete and surplus weapons that are often collected as part of a disarmament program and not destroyed. Much of the international focus and funding is on the destruction or containment of chemical weapons stockpiles and the destruction of post conflict and legacy mines and thus small arms stockpiles remain comparatively under the radar and uncontrolled.

Improvised Weapons

Improvised weapons can be everyday objects made from non-military materials utilized without alteration, such as machetes, pocket knives or baseball bats. These weapons are characterized as primitive but continue to be effective. Systems encountered in Vietnam such as punji stakes, Malayan Gates and blowguns are an example of using natural materiel in an innovative way for the accomplishment of a military task such as an obstacle to movement.

Some seemingly ubiquitous military systems can be missing from an Irregular threat actor's arsenal because they are not suited to the fight. In Iraq heavy mortars were absent because coalition counter battery fire could quickly and accurately destroy the large caliber hard-to move equipment. Instead the Insurgents chose to repeatedly fire Type 63 107mm rockets at coalition bases. The Type 63 was self-stabilizing and could be fired from a simple ramp, it was easy to conceal and could be set on a timer thus reducing the danger to the shooter.

Improvised weapons include also include flame and incendiary devices to ignite fuels and ammunition supplies. Fuel-air-explosive IEDs or "Molotov cocktails" have been employed in almost all conflicts, and an air droppable version of incendiary devices known as “barrel bombs” have been seen in a recent conflict. These improvised bombs include large containers filled with flammable and shrapnel producing material and are pushed from a helicopter over a variety of military and civilian targets.

Improvised weapons are most associated with less robust forces, but they can also be the most effective method of accomplishing the mission. Military or non-military materials could be used to trigger major disasters such as forest or urban fires, breached dams or levees to initiate floods. The list of improvised weapons available and there methods of employment are limited only by human imagination.

The most populous class of improvised weapons is the improvised explosive device (IED). Any explosive devices can be used to make a type of IED, they can be of various design with differing amounts of explosive fill and different detonation mechanisms. Historically, the most numerous IEDs encountered on the battlefield use hand grenades, these can be rigged by wedging them into objects to act as camouflage or by tying them to trip wires. Often grenades are hidden on bodies, weapons, or objects to be picked up by soldiers. Artillery rounds are also favored for IED construction for their larger size, they can be placed in vehicles and delivered to target with

devastating accuracy, examples of Vehicle Bourne IED’s range in size from a bicycle to a dump truck. Mines have long had capability for sophisticated fuzing and remote control units seen in some IEDs. Both mines and IEDs can be converted for command-arming and detonation, and for precision sensor fuzing.

Many IEDs are not made from military munitions. Bulk explosives (such as Dynamite, TNT, C-4, etc.) are used in IEDs. Terrorists such as the shoe bomber and anti-Israeli groups used Triacetone Triperoxide (TATP), precisely because it is highly sensitive. The most common explosive in the US is ammonium-nitrate fuel oil (ANFO, an insensitive slurry mixed onsite with the bulk of the mix as common fuel oil) for mining and road construction. The slurry can then be poured or pumped deep into spaces where other explosives cannot fit. Explosives can be improvised from common materials. In 1995 domestic terrorist Timothy McVeigh created a home-made variant of ANFO in a VBIED (vehicle-borne IED, with “volumetric explosive” effects) to blow up the Murrah Building in Oklahoma City. Questions and comments on data listed in this chapter should be addressed to:

Chapter 12: Chemical, Biological, Radiological, and Nuclear (CBRN) Weapons

This section provides a basic primer for threat characteristics for selected CBRN Weapons/agents/platforms. This portion also discusses the following topics: overview of OPFOR’s rational on CBRN weapons, CBRN Threats, and WEG sheets representative of blister agents, nerve agents, choking agents, biotoxins, and decontamination platforms. These types of threats discussed in this segment are either in the real world and or readily available and therefore likely to be encountered by US forces in varying levels of conflict in the future. CBRN weapons can be used by a hybrid threat and is not limited to regular actors, but also irregular and criminal elements.

The list of CBRN systems/agents within this chapter is not meant to be encyclopedic. This chapter will be further developed with additional agents in upcoming editions. This edition of the CBRN chapter provides the US training community with a list of representative capabilities that allow scenario developers and the rest of the training community to create a dynamic threat to prepare today’s warfighter for tomorrow’s battlefield.

The section is divided into two major categories¾***The CBRN Primer and WEG Sheets on CBRN assets/systems***. The CBRN primer provides insight into how the OPFOR composite views CBRN weapons. The second section of the primer address current CBRN threats. The WEG sheets (section) examine types of agents, and decontamination systems.

This portion of the WEG is broken into two distinct but connected narratives. The first section discusses the OPFOR’s rationale with regards to usage of CBRN systems. This OPFOR segment will not go into considerable depth on OPFOR tactics due to the fact that this subject is addressed in detail in Training Circular (TC) 7-100.2 chapter 13 (CBRN and Smoke). The second piece of this narrative discusses CBRN threats and has supporting CBRN related WEG sheets.

OPFOR and CBRN Issues

This section consists of a number of significant excerpts from TC 7-100.2 in order to provide a basic context for OPFOR CBRN related topics (for additional information on the subject of OPFOR CBRN and smoke tactics see the link in the above paragraph).

Key points on the OPFOR’s CBRN issues:

- The OPFOR maintains a capability to conduct chemical, nuclear, and possibly biological or radiological warfare.
- The OPFOR is most likely to use chemical weapons against even a more powerful enemy.
- The OPFOR is equipped, structured, and trained to conduct both offensive and defensive chemical warfare.
- The OPFOR is continually striving to improve its chemical warfare capabilities.
- The OPFOR views chemical defense as part of a viable offensive chemical warfare capability.

- The OPFOR use the threat of numerous methods of CBRN delivery systems as an intimidating factor.
- The OPFOR could use CBRN against a neighbor as a warning to any potential enemy.
- The OPFOR uses the fact that CBRN weapons place noncombatants at risk as a positive factor.
- The OPFOR may threaten to use CBRN weapons as a way of applying political, economic, or psychological pressure by allowing the enemy no sanctuary.
- The OPFOR might use CBRN weapons either to deter aggression or as a response to an enemy attack.
- The OPFOR will use CBRN weapons on own troops in order to reach overarching objectives.
- The use of INFOWAR at every echelon is a key component in the OPFOR's CBRN program.
- The OPFOR may develop and employ radiological weapons.
- The OPFOR has nuclear capabilities.

CBRN Delivery Systems

The OPFOR has surface-to-surface missiles (SSMs) capable of carrying nuclear, chemical, or biological warheads. Most OPFOR artillery is capable of delivering chemical munitions, and most systems 152-mm and larger are capable of firing nuclear rounds. Additionally, the OPFOR could use aircraft systems and cruise missiles to deliver a CBRN attack. The OPFOR has also trained special-purpose forces (SPF) as alternate means of delivering CBRN munitions packages.

The Effects of CBRN on the Battlefield

The use of CBRN weapons can have an enormous impact on the battlefield and in peacetime and wartime operational environments. These types of weapons are a subset of weapons of mass destruction (WMD). WMD are weapons or devices intended for or capable of causing a high order of physical destruction or mass casualties (death or serious bodily injury to a significant number of people). The casualty-producing elements of WMD can continue inflicting casualties on the enemy and exert powerful psychological effects on the enemy's morale for some time after delivery. Conventional weapons e.g., precision weapons or volumetric explosives) can also take on the properties of WMD.

Real World Threats CBRN Primer

Classifying of chemical agents

- Lethal agents
- Nonlethal agents
- Persistent: Agent that remains able to cause casualties for more than 24 hours to several days or weeks.
- Non-Persistent: dissipates and/or loses its ability to cause casualties after 10 to 15 minutes.

Subcategories of agents as the following:

- **Nerve:** Occupational Safety & Health Administration (OSHA) defines as highly toxic chemicals called "organophosphates" that poison the nervous system and disrupt bodily functions which are vital to an individual's

Types and Characteristics Chemical Agents

		PERSISTENCE	PERSISTENCE		ENTRANCE	
TYPE OF AGENT	**SYMBOL**	**SUMMER**	**WINTER**	**RATE OF ACTION**	**VAPOR/AEROSOL**	**LIQUID**
NERVE	GA,GB,GD	10 min-24 hr	2hr-3 days	Very Quick	Eyes, Lungs	Eyes, Skin, Mouth

- **Blister agents:** OSHA defines blister agents or "vesicants" are chemicals which have severely irritating properties that produce fluid filled pockets on the skin and damage to the eyes, lungs and other mucous membranes. Symptoms of exposure may be immediate or delayed until several hours after exposure.

Types and Characteristics Chemical Agents

		PERSISTENCE	PERSISTENCE		ENTRANCE	
TYPE OF AGENT	**SYMBOL**	**SUMMER**	**WINTER**	**RATE OF ACTION**	**VAPOR/AEROSOL**	**LIQUID**
BLISTER	HD, HN	3 days ~ 1 wk	Weeks	Slow	Eyes, Skin, Lungs	Eyes, Skin
	L, HL	1-3 days	Weeks	Quick	Eyes, Skin, Lungs	Eyes, Skin, Mouth
	CX	Days	Days	Very Quick	Eyes, Lungs, Skin	Eyes, Skin, Mouth

- **Biotoxins:** OSHA defines as biological agents include bacteria, viruses, fungi, other microorganisms and their associated toxins. They have the ability to adversely affect human health in a variety of ways, ranging from relatively mild, allergic reactions to serious medical conditions, even death.

Properties of Selected Biological Agents

BW Agents[1]	Likely Methods of Dissemination	Transmissibility Person-to-Person	Infectivity	Lethality[2]	Stability[3]
Anthrax (inhalation)	Spores in aerosols	None	Moderate	High	Spores are highly stable
Brucellosis	1. Aerosol 2. Sabotage (food supply)	None	High	Low	Long persistence in wet soil and food
Cholera	1. Sabotage (food/water supply) 2. Aerosol	Negligible	Low	Moderate to high	Unstable in aerosol and pure water; more so in polluted water
Glanders	Aerosol	DNA	DNA	DNA	DNA
Melioidosis	Aerosol	Negligible	High	Variable	Stable
Plague (Pneumonic)	1. Aerosol 2. Infected Vectors	High	High	Very high	Less important because of high transmissibility
Psittacosis	Aerosol	Negligible	Moderate	Very low	Stable
Shigellosis	Sabotage (Food/Water Supply)	DNA	DNA	DNA	DNA
Tularemia	Aerosol	Negligible	High	Moderate if untreated	Not very stable
Typhoid Fever	1. Sabotage (food/water supply) 2. Aerosol	Negligible	Moderate	Moderate if untreated	Unknown
Q Fever	1. Aerosol 2. Sabotage (food supply)	None	High	Very low	Stable
Rocky Mountain Spotted Fever	1. Aerosol 2. Infected Vectors	None	High	High	Not very stable
Trench Fever	1. Aerosol 2. Vector	None	DNA	Low	DNA
Typhus Fever	1. Aerosol 2. Infected vectors	None	High	High	Not very stable
Chikungunya	Aerosol	None	High	Very low	Relatively stable
Crimean-Congo Hemorrhagic Fever	Aerosol	Moderate	High	High	Relatively stable
Dengue Fever	Aerosol	None	High	Low	Relatively unstable
Eastern Equine Encephalitis	Aerosol	None	High	High	Relatively unstable
Western Equine Encephalitis	Aerosol	None	High	Low	Relatively unstable
Ebola Fever	Aerosol	Moderate	High	High	Relatively unstable
Far Eastern Tick-borne Encephalitis	1. Aerosol 2. Milk	None	High	Moderate	Relatively unstable
Hantaan Virus (Korean HFV)	Aerosol	None	High	Moderate	Relatively stable
Junn Hemorrhagic Fever	Aerosol	DNA	DNA	DNA	DNA

Properties of Biological Agents

- **Choking agents:** The Center for Disease Control and Prevention (CDC) defines choking agents or pulmonary agents as chemicals that cause severe irritation or swelling of the respiratory tract (lining of the nose, throat, and lungs). Chart not available.
- **Systemic/Blood Agents:** The Center for Disease Control and Prevention (CDC) defines blood agents as poisons that affect the body by being absorbed into the blood. Chart not available.

OTHER TOXIC CHEMICALS

In addition to traditional chemical warfare agents, the OPFOR may find creative and adaptive ways to cause chemical hazards using chemicals commonly present in industry or in everyday households. In the right combination, or in and of themselves, the large-scale release of such chemicals can present a health risk, whether caused by military operations, intentional use, or accidental release.

Toxic Industrial Chemicals

Toxic industrial chemicals (TICs) are chemical substances with acute toxicity that are produced in large quantities for industrial purposes. Exposure to some industrial chemicals can have a lethal or debilitating effect on humans. They are a potentially attractive option for use as weapons of opportunity or WMD because of—

- The near-universal availability of large quantities of highly toxic stored materials.
- Their proximity to urban areas.
- Their low cost.
- The low security associated with storage facilities.

Employing a TIC against an opponent by means of a weapon delivery system, whether conventional or unconventional, is considered a chemical warfare attack, with the TIC used as a chemical agent. The target may be the enemy’s military forces or a civilian population.

Volume 2: Air and Air Defense Systems

Chapter 1: Rotary Wing Aircraft

This chapter provides the basic characteristics of selected rotary-wing aircraft readily available to the OPFOR. The sampling of systems was selected because of wide proliferation across numerous countries or because of extensive use in training scenarios. ***Rotary-wing aircraft*** covers systems classified as light, attack, multirole, transport, and reconnaissance aircraft. Rotary wing aircraft can be used for a variety of roles, including attack, transport, direct air support, escort, target designation, security, reconnaissance, ambulance, anti-submarine warfare (ASW), IW, airborne C2, search and rescue (SAR), and anti-ship.

Because of the increasingly large numbers of variants of each aircraft, only the most common variants produced in significant numbers were addressed. If older versions of helicopters have been upgraded in significant quantities to the standards of newer variants, older versions may not be addressed. Helicopters can be categorized into capability tiers. Upgrades may designate different configurations of the same aircraft in different tiers. Technology priorities include multirole capability, more lethal weapons with longer range, ability to operate in all terrains, survivability/countermeasures, and sensors for day/night all-weather capability.

Helicopters can be configured for various combat missions (attack, direct air support, escort, target designation, etc.). The best armed combat helicopters are ***attack helicopters***, which may be used for all combat missions (including attack, direct air support, escort, anti-ship, etc), and some non-combat missions (transport, reconnaissance, SAR, etc). ***Helicopter gunships*** (combat configurations of multirole helicopters) can be used for all combat and non-combat missions, but are less suitable for attack missions against well-defended targets. Some of these missions can be executed by armed multirole helicopters.

The weapon systems inherent to the airframe are listed under Armament. They use various weapon mounts, including fuselage or turret nose gun, external mounted pylons (or hardpoints), and cabin weapons, including door guns. Pylons can mount single munitions, launchers or pods, sensor pods, or fuel tanks.

Munitions available to each aircraft are noted, but not all may be employed at the same time. Munition selection is based on mission and flight capability priorities. Munitions include bombs, missiles (ATGMs, air-to-surface missiles/ASMs, air-to-air missiles/AAMs), or rockets (single or in pods), mine pods, and automatic grenade launchers. For helicopter missions, other weapons and more ammunition can be carried in the passenger compartment. The most probable weapon loading options are also given, but assigned mission dictates actual weapon configuration.

Tables on aircraft weapons and aircraft-delivered munitions (ADMs) are at pages 2-22 to 2-26.

ROTARY WING AIRCRAFT WEAPONS AND AIRCRAFT- DELIVERED MUNITIONS (ADM)

A wide variety of weapons and munitions can be employed on rotary- wing aircraft for use against aerial, ground, and waterborne targets. Weapons can be generally categorized as guns, launchers, and dispensers. Munitions are primarily rounds, rockets, missiles, bombs, grenades, mines, and torpedoes (see the tables below). However, new technologies continue to emerge, and are expanding the ability of aircraft to deliver lethality and execute other missions for and against military forces. Technology trends for more lethal air attack include abilities to: launch reconnaissance UAVs to support their missions in roles such as target selection and designation, launch attack UAVs, and add new weapons and munitions for long-range precision attack. The following weapons and munitions apply to RW systems in this chapter. Fixed-wing aircraft can use these munitions and a variety of heavier ones.

GUNS							
Mount/Gun Name	**Producing Country**	**Caliber or mm/Type**	**Barrels (if 2+)**	**Mount, Fixed or Turret/ Pod (Fixed)**	**# of Rounds/ Rds per Min**	**Munition Types (Other Than Ball-T, API-T, HEI-T)**	**Munition Range (m)/ Lethality (penetration-mm)**
AA-52	**France**	**7.62 MG *1**	**1**	**Pod**	**500+/900**		**1,200 heavy barrel**
M134	**U.S.**	**7.62 Mini- gun**	**6**	**M27or Mini-TAT turret, M18 pod**	**1500/2,000, 4,000**		**1,500 m**
PKM	**Russia**	**7.62 MG**		**Cabin, rear**	**Varies/250practical**		**1,000/ 8 at 500 m**

PKT	**Russia**	**7.62 MG**		**Nose fixed, rear, pod**	**3,800/250 practical**		**2,000/ 8 at 500 m**
AN/M2	**U.S./Others**	**.50-cal MG**	**1**	**Door pintle, or fixed, pod**	**/750-850**	**APFSDS-T, SLAP**	**1,800**
NSV-T	**Russia**	**12.7 MG**	**1**	**Door pintle or fixed, pod**	**/800**	**Incendiary, Duplex-T *2**	**2,000/20 at 500, 13.2 at 1,000**
YakB-12.7	**Russia**	**12.7 Gatling**	**4**	**USPU-24 chin turret GUV-8700 pod**	**1,470/4,500 750/4,500**	**Incendiary, Duplex-T *2**	**2,000**
M197	**U.S.**	**20 Gatling**	**3**	**Nose turret**	**/750**		**1,500**
M 621	**France**	**20 Cannon**	**1**	**THL-20 turret, pod, right side fixed *3**	**100+/650**	**APDS**	**1,500-2,000 m**
9A669 GUV 9A624 9A622	**Russia**	**23 Cannon 7.62 Mini- gun**	**2 4**	**Pod with 3 guns, the 23- mm, and 2 x 7.62 mini-guns**	**750/300 or 3,400 2200/**	**Frangible, APFSDS-T**	**2,500+/16 at 1,000 m for Frangible 2,000/ 8 at 500 m**
GSh-23L Type 23-3	**Russia China**	**23 Cannon**	**2**	**USPU-24 chin turret NPPU-24 right side *3 UPK-23-250 pod fixed *3**	**470/3,400 470/4,300 250/300 or 3,400**	**Frangible, APFSDS-T**	
NS-23KM	**Russia**	**23 Cannon**	**2**	**Right side fixed**	**550 practical**	**Frangible, Frag-HE, CC*4 APFSDS-T**	**2,500/19 @ 1000 m API-T**
2A42	**Russia**	**30 Cannon**	**1**	**NPPU-280 chin turret**	**460/250/200 or 600**	**Frangible, Frag-HE, CC*4 APFSDS-T**	**4,000/45 at 2,000 m for APFSDS-T**
GSh-30K	**Russia**	**30 Cannon**	**2**	**Right side fixed**	**250/varies to 2,600**	**Frangible, Frag-HE, CC*4 APFSDS-T**	**4,000/45 at 2,000 m for APFSDS-T**

**1 Early versions of AA-52 were in 7.5 x 54 mm.*

**2 Duplex round has 2 cartridges, to double fire saturation in the beaten zone.*

**3 Gun (on fuselage or in a pod) has a fixed base mount, but can flex in elevation. An example is the UPK-23-250 flexible gun pod, which can depress guns to 30 degrees.*

**4 CC is a 30mm canister round with 28 sub-projectiles for use against soft targets and personnel with increased fire saturation in the beaten zone.*

AERIAL ROCKETS								
Name	**Producing Country**	**Caliber (mm)**	**Guidance No/Yes**	**Pod Name (# per pod)**	**Munition Nomenclature**	**Lethal Munition Type**	**Munition Range (m)/Lethality (penetration)**	**Comments**
SNIA	**France**	**50**	**No**	**/28**	**500+/900**			

S-5	**Russia Others**	**57**	**No/SAL-H**	**UB-9 UB-16-57 UB-32**	**S-5K, KO, KP, KPB S-5, S-5M, S-5OM S-5Cor**	**HEAT-Frag, Frag-HE Frag-HE HEAT SAL-H**	**2,000/200 4,000 4,500 7,000/200**	**SAL-H: Semi-active Laser-Homing, aircraft with a laser target designator.**
SNEB	**France**	**68**	**No/SAL-H**	**Heli TDA 68- 12C/12 Heli TDA 68-22C/22**	**Type 253 Type 26P Type 24, 26**	**HEAT-MP Frag-HE APERS**	**1,600/INA 1,600**	**There are reports of SAL-H capability - see above**
S-8	**Russia Others**	**80**	**No/SAL-H**	**B-8V7/7 B-8V20A/20 B-8M1/20**	**S-8KOM S-8T S-8DM S-8BM S-8ASM S-8Cor**	**HEAT-Frag Tandem HEAT Frag HE APHE Flechette HEAT SAL-H**	**4,000/400 antitank 4,000/600+ antitank 4,000/HE fuel-air 2,200/2 m concrete + HE INA 8,000/ 400**	**SAL-H see above. Other assets, such as aircraft or ground '*forces with LTD can laze rockets to target. S-8PM with jammer*'**
Hydra-70/ 2.75 inch rkt	**U.S. '*Others*'**	**70**	**No**	**M260/7, M261/19**	**M151 and M229 M261 M255A1**	**HE HE-MPSM Flechette**	**8.8/M151 10-lb Warhead, M229 17-lb 7,000/9 DP submunitions**	**MPSM is multipurpose, '*programmable time fuze. SAL-H in R&D.*'**
S-13	**Russia Others**	**122**	**No/SAL-H**	**B-13R/5 B-13L/5**	**S-13 S-13-OF S-13DF S-13T S-13Cor**	**HEAT Frag-HE HE thermobaric APHE HEAT SAL-H**	**4,000/3 m soil, 1 m concrete +HE 3,000/Frag-HE 6,000/equal to 40 kg of TNT 4,000/6 m soil, 1 m concrete + HE 9,000/700**	**SAL-H see above**
S-24B	**Russia**	**240**	**No/SAL-H Inertial**	**/1**	**V-24APD RV-24 S-24BMZ**	**Frag-HE PD fuze Frag-HE prox fuze Frag-HE**	**2,000/23.5 kg warhead**	**SAL-H option see above Fuze conversion kit with fins**
S-25	**Russia**	**340**	**No/SAL-H**	**O-25/1**	**S-25-OFME S-25L S-25LD**	**Frag-HE prox fuze HE SAL-H HE SAL-H**	**2-4,000/190 kg warhead 7,000/150 kg HE warhead 10,000/150 kg HE, 8 m CEP**	**SAL-H see above S-25LD can also use TV or IR-homing**
Type 90-1	**China**	**90**	**No**	**/7**	**Type 90-1**	**Frag-HE**	**7,000**	**Chinese**

ANTITANK GUIDED MISSILES (ATGMS)

Name	Producing Country	Rate of Fire (#/min, based on range)	Guidance	#/Pod	Munition Nomenclature (If different)	Munition Type	Munition Range (m)/ Penetration (mm)	Comments
AT-2c	**Russia**	**3-4**	**RF SACLOS**	**2**		**HEAT, HE**	**4,000/650**	
AT-3c and AT- 3e	**Russia Others**	**2-3**	**Wire SACLOS**	**1 or 3**	**AT-3c, AT-3E**	**HEAT (comments), HE**	**3,000/520, 800 AT-3e**	**AT-3e has Tandem HEAT. Other Countries make copies/variants.**
AT-6/Shturm-V	**Russia**	**3-4**	**RF SACLOS**	**4 *1,2**		**HEAT, HE**	**5,000/650**	

AT-6b/Shturm-V1	**Russia**	**3-4**	**RF SACLOS**	**4 *1,2**		**Tandem HEAT, HE**	**6,000/1,000**		
AT-6c/Shturm-V2	**Russia**	**3-4**	**RF SACLOS**	**4 *1,2**		**Tandem HEAT, HE**	**7,000/1,000**		
AT-9/Ataka	**Russia**	**3-4**	**RF SACLOS**	**4 *1,2**		**Tandem HEAT, HE, AA frangible rod**	**6,000/1,100**	**Expected upgrades include 8-km range, IR/radar homing. See *1.**	
Krizantema/AT-15	**Russia**	**4-6**	**RF ACLOS/LBR**	**4**		**Tandem HEAT**	**6,000/1,250+ERA (1,500+)**	**2 simultaneous, separate targets**	
AT-16/Vikhr-M	**Russia**	**2-3**	**Laser-beam rider**	**8 *2, 3**		**Tandem HEAT/HE *2**	**10,000 /1,200 *3**	**Proximity fuze on/off per target.**	
Hellfire	**U.S./UK**	**2-3**	**SAL-H *5**	**4 *3**	**Hellfire, Hellfire II**	**Tandem HEAT + HE *2**	**Hellfire II 8000/1300+ equiv**		
Hermes-A	**Russia**	**2-2**	**Inertial/RF/SAL-H *5**	**6**		**Tandem HEAT + HE *2**	**18,000/1300+ equiv**	**28 kg warhead, 40 km version due**	
HOT	**Europe**	**3-4**	**Wire SACLOS**	**2, 3, 4**	**HOT-2, HOT- 3**	**Tandem HEAT**	**HOT 3 4000/1250+**		
LAHAT	**Israel**	**2-4 *4**	**SAL-H *5**	**4**		**Tandem HEAT**	**13,000/1,000+ Dive attack**		
Mokopa	**South Africa**	**2-4 *4**	**SAL-H *5**			**Tandem HEAT**	**10,000/1,350+**	**Variant of Hellfire**	
Red Arrow-8F	**China**	**3-4**	**Wire SACLOS**	**2 or 4**		**Tandem HEAT**	**4,000/1,100**		
Spike-ER	**Israel**	**2-3**	**Fiber-Optic *5 and IIR homing**	**2 or 4**		**Tandem HEAT**	**8,000/1,000+ Dive attack**		**AKA: NTD, Dandy. ER stands for Extended Range**
TOW/BGM-71	**U.S./Others**	**3-4**	**Wire SACLOS**	**2 or 4**	**TOW-2**	**Tandem HEAT**	**TOW 3750/900+**	**2**	**2-missile pod on MD-500. Other countries make copies/variants.**

**1. AT-6 and variants, and AT-9 and variants, are interchangeable in launchers for each other.*

**2. Launcher pods can also launch AA-16, AA-18, or AA-18S air-to-air missiles, decreasing the number of ATGMs in the pod for a given mission.*

**3. AT-16 and Hellfire II have combined HEAT and HE warheads for multi-role use. The AT-16 also has proximity fuse that can be engaged in-flight for aircraft and materiel targets.*

**4. With semi-active laser homing (SAL-H) guidance, launcher craft can hand off missile control to another designator, and launch other missiles without delays from missile flight time.*

**5. Guidance modes such as SAL-H and fiber-optic can be categorized as non-line-of-sight, whereby the launcher craft can be outside of view of the target, and can avoid return fires.*

**6. For additional information on antitank and anti-armor missiles, see Vol 1 Chapter 6.*

AIR-TO-AIR MISSILES (AAMS)							
Name	**Producing Country**	**Also SAM or ATGM *1**	**Guidance**	**Pod Name (# per pod)**	**Munition Type**	**Munition Range (km)/Warhead (kg)**	**Comments**
AA-2C or D/ATOLL/R-13M	Russia		IR-homing	/1, 2	Frag-HE	8/7.4	AIM-9L upgrade phasing out
AA-8/APHID/R-60M	Russia		IR-homing	/1	HE Continuous rod prox	8 low altitude/3.5	Upgrade missile with DU rod
AA-11/ARCHER/R-73 RMD1	Russia		IR-homing	/1	HE Continuous rod prox	30/7.4	
AA-11/ARCHER/R-73 RMD2	Russia		IR-homing	/1	HE Continuous rod prox	40/7.4	
SA-7b/Strela- 2M	Russia/Others	MANPADS SAM	IR-homing	/1	Frag-HE	5/1.15	
SA-14/Strela-3	Russia/Others	MANPADS SAM	IR-homing	/1, 2, 4	Frag-HE	6/1.0	
SA-16/Igla-1	Russia/Others	MANPADS SAM	IR-homing	/1, 2, 4	Frag-HE	5.2+/1.27	
SA-18/Igla	Russia/Others	MANPADS SAM	IR-homing	/1, 2, 4	Frag-HE	6/1.27	
SA-24 (SA-18S)	Russia	MANPADS SAM	IR-homing	/1, 2, 4	Continuous rod, prox fuze	6+/2.5	Aka: Igla-S/Igla-Super
AIM-9L/Sidewinder	U.S./Others	Veh/towed SAM	IR-homing		Frag-HE	17.7/9.5	
AT-6c and AT-9/Ataka	Russia	Veh ATGM	RFSACLOS	/4, 8 *1 *2	Tandem HEAT	7/7.4, 6/7.4 Ataka	Penetration 1,000-1,100 mm
Ataka 9A2200 Missile	Russia	Veh ATGM	RFSACLOS	4, 8 *1 *2	Continuous rod, prox fuze	6/	Also fit AT-6 launchers
AT-16/Vikhr-M	Russia	RW ATGM	Laser-beam rider	/8 *1 *2	HEAT/HE with prox on/off	10,000 /INA	Penetration 1,300+ mm
Mistral 2	France	Veh/pedestal SAM	IR-homing	ATAM/1, 2	Frag-HE, prox	6/3	On Gazelle
Spike-ER	Israel	Veh/man-port ATGM	FOG_M, IIR-homing	/4 *1 *2	Tandem HEAT	8.0/INA	Penetration 1,000+ mm
Starstreak	UK	AD/AT or multi- role	Laser-beam rider	ATAS/4 *1	3 x Sabots with Frag-HE	7/.9 kg per submissile	3 x high-velocity submissiles
Stinger	U.S./Others	Veh/MANPADS SAM	IR-homing	ATAS/4, 2	HE	4.5+/1.0	
TY-90/Yitian	China	Veh-launch SAM	IR-homing	/2, 1	HE, frangible rod	6/3	Too large for MANPADS use

**1. All ATGMs can be used to engage helicopters hovering or flying low and slow, esp. nap-of-the-earth mode (35 km/hr or less). These ATGMs can engage RW aircraft at all times.*

**2. ATGM launcher can substitute 1 or more SAMs.*

AIR-TO-SURFACE MISSILES (ASMS)

Name	Producing Country	Mission	Guidance	#/Pod	Warhead Type	Munition Range (km)/ Penetration (mm)	Comments
AS-10/KAREN/Kh-25ML Kh-25-MR Kh-25-MT Kh-25MTP	Russia	Tactical Tactical, AT Tactical, AT Tactical, AT	SAL-H RF-Guided TV-Guided Thermal-Guided	1	Frag-HE/90 kg Frag-HE/90 kg Frag-HE/90 kg Frag-HE/90 kg	20/ 10/ 20/ 20/	
AS-12/KEGLER/Kh-25MP	Russia	Anti-radar	Passive-homing	1	90 kg	40/	
AS-12/AS.12	France	Tactical, AT, Anti-ship	Wire SACLOS	2	SAPHE, 28 kg	7/	
AS-17/KRYPTON/Kh-31P	Russia	Anti-radar	Passive homing	1	90 kg	100/	
AS-17/KRYPTON/Kh-31A	Russia	Anti-ship	Active radar	1	90 kg	50/	
C-701	China	Anti-ship, land attack	TV, IR-homing	4	SAPHE, 29 kg	20/	MMW-homing tested
Hermes-A	Russia	Tactical, AT	Inertial/RF/SAL-H	6-8	Frag-HE, 28 kg	40/1300+	100 km version due
Sea Skua	UK	Anti-ship	Semi-active Radar	1	SAPHE, 28 kg	25/	
Guided Rockets see pg 2-23	Russia		SAL-H				

** Systems designed for use with laser guidance are generally called missiles. However, some rockets can be adapted with SAL-H modifications for near-ASM range and precision.*

BOMBS1

Name	Weight (kg)	Guidance (if any)	Type	Nomenclature Specific Bomb	Warhead or Submunition/# if more than 1/Nomenclature/Type	Munition Range (m)/ Lethality (penetration-mm)	Comments
GBU-100	120		ASW Depth Bomb		HE 100 kg		
SZV	94	Underwater Acoustic	ASW Depth Bomb		HEAT 19 kg	600 m in depth	Steers on glide fins
FAB-100	117		General Purpose	M80	HE 39 kg		
OFAB-100	100		Blast-Frag		Frag-HE 60 kg		
FAB-250	250		General Purpose	M79	HE 105 kg	30 radius	

OFAB-250	250		Blast-Frag		Frag-HE 210 kg		
RBK-250 Glide bomb (Dispenser)	273		Cluster Cluster	RBK-250-275AO-RBK-250AD-1	150 AO-1sch bomblets /60 AO-2.5 RT AP bomblets /30 PTAB-2.5KO HEAT bomblets Chemical bomblets	4,800 m2 destructive area	Like MK-118
ZAB-250	250		Incendiary		200 kg Napalm		
KhB-250			Chemical		200 kg Sarin, VX, mustard, etc		
FAB-500/M62	500		General Purpose		HE 450 kg		
OFAB-500	515		General Purpose		Frag-HE 155 kg		
OFZAB-500	500		General Purpose		Frag-HE Incendiary 250 kg		
ODAB-500PM	520		Fuel-Air Explosive		193 kg		
KAB-500Kr	560	TV guided	Precision Attack		Concrete-piercing 380 kg, 200 kg chg	1500 m2 destructive area	
KAB-500L	534	SAL-H	Precision Attack		HE 400 kg with 195 kg of charge	1500 m2 destructive area	
RBK-500U Glide bomb (Dispenser)	504 500 520 427 334 525 525 525 500 467		Cluster	RBK-500AO OAB-2.5RT PTAB PTAB-1M ShOAB-0.5 BETAB-500ShP OFAB ZAB PPM SPBE-D	108/ AO-2.5 APAM ICM/bomblets 126/ 5RTM APAM 352/ PTAB HEAT bomblets 60/ PTAB-2.5KO HEAT bomblets 268/ PTAB-1M HEAT bomblets 565/ 0.5 ShOAB-0.5 AP bomblets 10/ BETAB-M concrete piercing bomblets 10/ OFAB APAM bomblets 168/ ZAB incendiary bomblets 48/ PPM mines 15 IR sensor-fuzed 14.5 kg bomblets Chemical bomblets	6,400 m2 destructive area 210 m2 destructive area 210 mm penetration top- atk 300 m x 400 m/210 mm top atk 300 m x 400 m Runway penetrators EFP top-attack2	Improvement over the RBK-500
ZAB-500	500		Incendiary		480 kg Napalm		

**1. Only Russian RW aircraft in this chapter employ bombs. Thus, all bombs listed are Russian.*

**2. EFP - Explosively-formed penetrator*

Other ordnance includes sub munition and mine dispensers, minelayer ramps, automatic grenade launchers, anti-ship torpedoes, anti-submarine mines, and torpedoes. Selected RW aircraft can launch UAVs; therefore a near-term capability will be ability to launch attack UAVs or UCAVs and guide them to engage targets.

Chapter 2: Fixed Wing Aircraft

This chapter provides the basic characteristics of selected fixed-wing aircraft readily available to COE OPFOR

across the spectrum of joint operations. This sampling of systems was selected because of wide proliferation across numerous countries or because of already extensive use in training scenarios. Additional data sheets addressing other widely proliferated aircraft will be sent with further supplements to this guide. Many foreign militaries are leveraging advances in automated technologies in order to use increasing amounts of data across all warfighting capabilities. Increases in processing power and broadband technologies through commercial research and development make real time situational awareness and communications on the move a tangible objective for many foreign forces. The emergence of rudimentary Integrated Battlefield Management Systems (IBMS) in tier three forces represents this global trend. Net Centric operations are viewed worldwide as a key element of modern military operations, an IBMS is a system that integrates multiple command and control formats as well as sensor data into one display that improves situational awareness through multiple sources.

Because of the increasingly large numbers of variants of each aircraft, only the most common variants produced in significant numbers were addressed. If older versions of airplanes have been upgraded in significant quantities to the standards of newer variants, the older versions were not addressed.

Fixed-Wing Aircraft generally covers the systems that will affect the planning and actions of the ground maneuver force, aircraft commonly employed by the OPFOR when in close proximity to enemy ground forces, as well as strategic aircraft. This chapter classifies aircraft as fighter/interceptor, strike, ground- attack, multi-role, bombers, special-role, and transport aircraft. Multi-role aircraft are able to support missions across each of the categories. This chapter encompasses many aircraft which may have a dual civil/military application. It does not include, however, aircraft designed and used primarily for civil aviation.

The munitions available to each aircraft are mentioned, but not all may be employed at the same time. The weapon systems inherent to the airframe are listed under armament. The most probable weapon loading options are also given, but assigned mission dictates actual weapon configuration. Therefore, any combination of the available munitions may be encountered.

A wide variety of upgrade programs are underway. The FW aircraft variants noted are only a small representation of those available. For instance, application of GPS and commercial GPS map display units permits even the oldest aircraft to have precision location. Night vision systems coupled with the high level of night illumination existing in most areas of the world permit night use of older aircraft. Even though some weapons require linked effective night sights, many weapons, such as bombs (including sensor-fuzed), standoff GPS programmed cruise missiles, and munitions using remote guidance (such as semi-active laser- homing munitions guided by laser target designators) permit older aircraft to launch the munitions and rely on others to guide them to target. Other aerial systems can substitute for FW aircraft to execute what were FW missions. These include rotary-wing aircraft, unmanned aerial vehicles (including attack UAVs and UCAVs), improvised systems such as airships, and cruise missiles.

Many data sheets for joint systems were provided by Mr. Charlie Childress of JFCOM.

Chapter 3: Unmanned Aerial Vehicles

An aviation technology which has seen the greatest expansion of research, development, and fielding activity in recent years is the unmanned aerial vehicle (UAV). According to a 2015 research report by the Rand Corporation there are 960 UAVs being produced by 270 companies in 57 countries. They also claim that in the past two years the number of UAVs has gone up 40% with the number of UAV companies entering the market increasing by 20% and the number of countries involved up by 50%. Another market study from the Teal Group in 2014 estimated UAV spending will nearly double over the next decade from current worldwide UAV expenditures of $6.4 billion annually to $11.5 billion, totaling almost $91 billion in the next ten years.

Despite defense budget cutbacks, UAVs are projected to see steady growth as users continue to seek their versatility, robustness, and feasibility. Reasons for expanding the use of these systems are their capabilities to extend our vision and reach over any terrain, against any force, with fewer restrictions, dangers, and support requirements as opposed to manned systems. Since they are unmanned they can go into areas where risk to crews might hinder a mission. Uses for UAVs have also expanded beyond their initial RISTA mission, to include, security patrolling, delivery of information warfare (INFOWAR) systems (e.g., jammers), communications retransmission, attack, counter-air harassment of enemy aircraft, and remote materials delivery. Advances in lightweight materials, imagery systems, and navigation technologies, particularly commercial, have lowered costs and facilitated these changes.

This chapter provides characteristics of selected UAVs in use or readily available to the OPFOR. UAVs discussed are those likely to be encountered by U.S. forces in various environments and levels of conflict, or are representative of the range of systems fielded and available. The selection of UAVs is not intended to be all-inclusive.

UAVs come in various types, sizes, and levels of complexity, each having their own purpose and advantage in an operational environment. For example, fixed-wing, propeller-driven platforms excel in endurance and range. Jet-propelled UAVs trade endurance and maneuverability for speed. Rotary-wing UAVs can carry relatively large payloads, offer the best

maneuverability, and trade higher initial cost for long-term reliability and reduced casualty rates.

A UAV is a system comprised of self-propulsion, maneuver capability, and guidance. Current UAV sizes range from large high-altitude long endurance (HALE) aircraft, to tactical mini-UAVs (MUAVs), which can now mount a stabilized gimbaled payload with multiple sensors. A rapidly expanding trend is the proliferation of MUAVs and micro-aerial vehicles (MAVs) for use at the lower tactical levels as well as civilian applications. The MAVs are normally hand launched, hard to detect, easy to use, and relatively inexpensive to purchase.

Among the most critical considerations for selecting UAVs are their operating range, operating altitude, and endurance (e.g. flight time). Tactical and operational systems must be reusable so the operating radius is critical. UAVs must at least range beyond the longest weapon range to provide warning time. Those not directly supporting weapons must have more range and time to observe larger areas. Usually,

fixed-wing systems are better suited for covering wide areas and rotary-wing for supporting tactical weapons and operating in defilade areas.

Diverse transport and launch configurations are available for UAVs. Israeli helicopters have carried Skylite A UAVs in ATGM racks, and launched them to survey areas where there may be some risk. The Skylite A has also be canister-mounted to fit on vehicles for launch at short halts, or launch from mortars. Another likely mini-UAV launch platform in the near-term (1-5 years) are airships (e.g. powered blimps and air defense aerostat balloons). Naval ships are using UAVs; and submarines have demonstrated their use while operating at periscope depth.

Several terms have recently been used to categorize UAVs and other unmanned aerial surveillance systems. However, the terms listed below should be understood to avoid confusion.

- The acronym, UAS, is currently used in some U.S. communities, with different meanings, but usually as unmanned aerial sensors, to emphasize the wide range of UAV designs available for U.S. force requirements, with a focus on RISTA applications.
- For some users, unmanned aerial sensors is an umbrella term which can include UAVs (vehicles both guided and self-propelled), as well as related technologies (e.g. unmanned aerial sensors other than UAVs). Thus, related technologies include remotely launched sensor munitions, with still cameras or video-cameras which sense and emit while in their trajectory. Another related technology are airships, such as balloons, with sensor pods mounted on them. The majority of airships are aerostats tethered to fixed sites or to vehicles, for long-term (days) or short-term (minutes) operations while others can be propelled. The above UAS terms are primarily used as sensors, but can be used in other roles such as air to surface attacks with guided missiles. Thus the term UAS is still misleading.
- Some organizations also use UAS to mean unmanned aerial systems, or unmanned aircraft systems**.** Selected sources have used one of these meanings as well as the one above the same paragraph, for the same system. Each meaning can exclude some aspect of the other or include one beyond the other. An aerial sensor may not be an aircraft, and an aerial system may have roles beyond that of a sensor. The OPFOR community should be wary of confusion between these two very different meanings for the same acronym**.**
- Because of the potential confusion with the acronym UAS, the OPFOR will avoid it. The WEG will use descriptions of specific technologies, such as UAVs, airships, etc., and generically precise categories like weapon-delivered aerial sensor munitions.

Mini-UAVs and Micro-UAVs for Use in Military Forces

On the modern three-dimensional battlefield, military forces are developing missions for UAVs at all echelons and in many branches, for combat and supporting units. Tactical UAVs can be supplemented with lighter shorter-range UAVs at battalion and below. Air defense, anti-tank, artillery, theater missile, and other units with stationary facilities requiring security patrols can use these UAVs to execute the mission while reducing personnel and vehicle requirements.

System categories and descriptions can be vague and even contradictory. Producers, users, and publications use varied categorizations. For example, UAVs may be termed small UAV, short-range UAVs. International terms gaining the most use are mini-UAV (MUAV) and micro-aerial vehicles (MAVs). MUAVs are typically less than 25 kg and MAVs are typically less than 5 kg in weight. As UAVs have decreased in size, weight categorizations have also decreased.

Currently many MUAVs and the majority of MAVs are easily damaged. They must be low in cost and treated as disposable. A few, however, (e.g. rotary craft like the Russian Zala 421-12) offer stable flight control and designs with good survivability. The Zala 421-12 is used with security forces. Virtually all use electric motors for near silent operation at altitudes of 300 meters or less. Initial costs, repairs and maintenance are factors. They must be integrated into communications schemes and air space restrictions. Some training is required. Nevertheless, as in the commercial sector, the military sector has found a growing need for them. Paramilitary and special-purpose forces use these and other UAVs.

There is also growing interest in the development of MAVs. Key reasons for the interest include a widespread need for

inexpensive aerial sensors to observe small areas rapidly. Commercial and scientific applications have resulted in an increase in development programs. Many are hand-size; but most conventional designs with front-mounted propeller have problems in control, wind stability, payload, range, and crash worthiness. Slightly larger sized hand-launched craft like the Zala 421-21, or MAVs close to the 5 kg limit offer better capability. Battery powered rotary-engine designs, especially multi-motors, have the most potential. The 6-rotor MAV 421-21 is stable with a 15 km range; GLONASS navigational feed, and notebook display.

Some Tier 1 forces have MUAVs in tactical battalions and companies. By the near term, forces will have MUAVs or MAVs in platoons. Squads and teams will carry MAVs or other aerial sensors (e.g., weapon- delivered sensors). By mid-term vehicles and dismounted squads and teams will have their own MAVs and small attack munitions will be fitted or optional. In addition to regular forces there is also a growing use by irregular forces to use these type of UAVs. Recent use by ISIS has shown that they use MAVs not only for surveillance but also for targeting and propaganda video footage. It is predicted that other irregular forces will use these inexpensive MAVs for similar purposes.

Chapter 4: Equipment Upgrades, Countermeasures, and Emerging Technology Trends

EQUIPMENT UPGRADES

Armed forces worldwide employ a mix of legacy systems and selected modern systems. In the current era characterized by constrained military budgets, the single most significant modernization trend impacting armed forces worldwide is upgrades to legacy systems. Other factors impacting this trend are:

- A need for armed forces to reduce force size, yet maintain overall force readiness for flexibility and adaptiveness
- Soaring costs for modern technologies, and major combat systems
- Personnel shortages and training challenges
- Availability of a wide variety of upgrade packages and programs for older as well as newer systems
- New subsystem components (lasers, GPS, imaging sensors, microcircuits, and propellants) which permit adaptation of new technologies to platforms, weapons, fire control systems, integrated C2, and munitions
- An explosion of consortia and local upgrade industries that have expanded worldwide and into countries only recently modernized or still in transition.

The upgrade trend is particularly notable concerning aerial and ground vehicles, weapons, sensors, and support equipment. From prototype, to low-rate initial production (LRIP), to adoption for serial production, minor and major improvements may be incorporated. Few major combat systems retain the original model configuration five or more years after the first production run. Often improvements in competing systems will force previously unplanned modifications.

Upgrades enable a military to employ technological niches to tailor its force against a specific enemy, or integrate niche upgrades into a comprehensive and well-planned modernization program. Because of the competitive export market and varying requirements from country to country, a vehicle may be in production simultaneously in many different configurations, with a dozen or more support vehicle variants concurrently filling other roles. In light of this trend, OPFOR equipment selected for portrayal in simulations and training need not be limited to the original production model of a system, but may also employ other versions that incorporate the armed force's strategic and modernization plans, along with likely constraints that would apply.

The adaptive OPFOR will introduce new combat systems and employ upgrades on existing systems to attain a force structure which supports its plans and doctrine. Because the legacy force mix and equipment were selected in accordance with past plans and options, upgrading an existing system will often present an attractive alternative to costly new acquisitions. A key consideration is the planned fielding date. For this document, the OPFOR planning time-frame is current to near-term. Thus, only upgrades currently available (or marketed, with production capability and fielding expected in the near term), are considered. Also, system costs and training and fielding constraints should be considered.

The following tables describe selected upgrades currently available for system modernization. These lists are not intended to be comprehensive. Rather, they are intended to highlight major trends in their respective genres. With armored combat vehicles, for instance, the focus is on upgrades in mobility, survivability, and lethality.

The category of survivability upgrades includes countermeasures (CM). Depending on their applicability and availability within the contemporary operating environment, the CM upgrades can apply not only to systems associated initially with specific branches (tanks, IFVs, and air defense guns), but over time to other systems that are vulnerable to similar threats. An example of this is the proliferation of smoke grenade launchers tailored for use with artillery and air defense vehicles.

Implementation of all upgrade options for any system is generally not feasible. Because of the complexity of major combat systems and the need for equipment subsystem integration and maintenance, most force developers will chose a mix of selected upgrades to older systems, augmented with limited purchases of new and modern systems. Please note that systems featured in this document may be the original production system or a variant of that system. On data sheets, the **VARIANTS** section describes other systems available for portrayal in training and simulations. Also, equipment upgrade options (such as night sights) and different munitions may be listed, which allow a user to consider superior or inferior variants. Within the

document chapters, multiple systems are listed to provide a range of substitution options. Of course there are thousands of systems and upgrade options worldwide that could be considered for adoption by an innovative OPFOR.

OPFOR trainers have the prerogative to inject systems or upgrade packages not included in the OPFOR Worldwide Equipment Guide (WEG), in order to portray an adaptive, thinking OPFOR. In future WEG updates, we will expand the upgrade tables to include by-name descriptions of upgrade options and specific systems applications that have been noted elsewhere throughout the document. Our functional area analysts are available to assist OPFOR planners in selecting reasonable upgrade options that tailor system configurations to specific force portrayals.

OPFOR AIR DEFENSE SYSTEMS UPGRADES

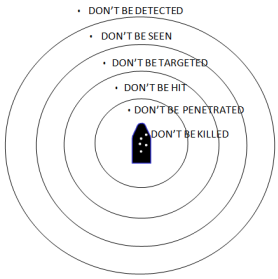
AIR DEFENSE GUN/GUN-MISSILE SYSTEM	MANPORTABLE AIR DEFENSE SYSTEM	SURFACE-TO-AIR MISSILE SYSTEM
Light AD vehicle: Combat support vehicle with light armor and TV, thermal sights, AD machine gun. Add encrypted voice and digital data capability, azimuth plotting board alert system and overhead launch turret or MANPADS. MMW radar for detection and possible fire control. High velocity laser beam rider MANPADS ranges to 7+ km, 0-5 km alt Armored AD vehicle: See IFV upgrades, e.g. Improved armor and suspension, 2-man turret. CM, e.g. multi-spectral smoke grenades, LWR Upgraded FCS: Cdr's independent viewer, 2-plane stabilized TV, auto- tracker, FLIR, multi-mode targeting (TV/radar, day/night modes). Dual- mode (TA/FC) low probability of intercept radar with longer range. Reduced radar mean-time to detect and system response time. Links to AD network, encrypted voice, digital data transmission capability, computer display GPS, and inertial land navigation, IFF. Improved multiple auto-cannons to 30 mm, with stabilized guns and fire-on-the-move capability. Improved rounds, e.g. electronic- fuzed HE, APFSDS-T, and frangible or canister rounds. Two-stage high-velocity laser beam- rider AD missiles with MMW radar, to out-range helicopter launch missile systems. Kinetic-energy missiles for use in AD role, and against ground vehicle targets. Altitude is 0-6 km. Range 0-8 km. Jam capability is 0. **UPGRADE PRIORITY** Improved day/night optics and radar Light AD/MANPADS and MG Battalion AD fire support vehicle with HV launcher and MANPADS dismount teams Armored brigade AD vehicle with overhead turret and: High-velocity missiles 30-mm stabilized auto-cannon MMW TA radar Automated secure links to AD network	Vehicle, ground platform, helicopter mounts, missiles in disposable launch tubes Early warning datalinks and alert display boards for mount on launcher. Upgraded IFF capabilities. FLIR night sight Improved missiles and seeker heads with better counter-countermeasure resistance. Proximity/PD fuze. Thrust-vectoring capability, all-aspect engagement capability, strap-on imaging infrared or thermal sights Improved larger warheads and blast/frag effects, base fuzing or propellant for increased blast Increased range to 7 + km. Improved aerodynamics, fuels, and materials, for increases in speed, reduced smoke signature, maneuverability, and accuracy ½ of missiles are high velocity ADAT missiles with laser beam rider KE missile and 3 LBR sub-missiles to 7 = km, 0 – 5 km altitude, and nil countermeasure vulnerability. Integrate AD defense with anti-helicopter mines **UPGRADE PRIORITY** Improved sights and warning display boards Prox Fuze MANPADS with Strap-on II/FLIR, improved seekers, warheads, propulsion, wider FOV, IR CCM/Flare rejection capability Add ½ High velocity ADAT missiles MMW radar	Improved vehicle or platform launcher for rapid emplacement/displacement CM e.g. multi-spectral smoke, LWR Upgraded FCS: 2-plane stabilized TV gunner sights, 1 – 2 gen FLIR, multiple target engagement capability, All-weather fire control, multi-mode targeting, with TV and radar, day and night. Improved EW and target acq radars, longer range, low probability of intercept, and signal processing in radars Reduced radar mean-time to detect, and system response time Links to AD network, encrypted voice, digital data transmission capability, computer display GPS and inertial land navigation, and graphic display battle management system, IFF Missiles with SACLOS, ACLOS radar, IR or multi-band terminal seekers, more lethal warheads, longer range, maneuverability with improved counter-countermeasure resistance Vertical missile launch **UPGRADE PRIORITY** Improved FCS with day/night optics and radars, and multi-target capability and modes Automated secure links, digital AD network Improved missiles and guidance CM protection from jamming and ARMs

OPFOR AERODYNAMIC SYSTEM UPGRADES

ROTARY-WING AND FIXED-WING AIRCRAFT	UNMANNED AERIAL VEHICLE (UAV)	THEATER MISSILES

Older airframes and utility helicopters can add upgraded sensors and weapons. Service life extension programs Western upgraded avionics, fire control computers, sights, and technology readily available to retrofit into existing older airframes Emerging belief in upgrade of existing platforms rather than developing new airframes, primarily due to financial constraints Two-seat conversions for adding weapons officers and multi-role use Development of quieter, more efficient main and tail rotor blades and more powerful engines to increase performa**n**ce and load capacity Digital data-linking with ground systems and air defense networks Increased use of millimeter wave, FLIR, and NVG technologies to allow greater night/ weather weapons delivery and mission completion Self-protection jammers and IIR vs pyrotechnic IR seeker decoys Laser altimeters replace radar altimeters to reduce RF detectability Added weapon mounts to increase mission load capacity Improved weapons and munitions, including ATGMs, air-to-surface missiles, rockets and precision bombs Laser seekers and designators for missile/rocket/bomb conversion GPS course-corrected munitions (bombs and missiles) UAV launch capability, permits them to precede aircraft or replace them in high threat areas **UPGRADE PRIORITY** MMW, FLIR, and NVG technologies GPS and SAL-H munitions Upgraded avionics Service life extension programs Conversion to multi-role systems	Extend operational radius and endurance Reduce sensor-shooter timeline Continued development of micro- UAVs dwell time and image quality Advanced imagery fusion from multiple UAVs Real-time teaming between manned/unmanned fixed-wing aircraft Enhanced third-generation image intensifiers and second-generation thermal imagers may be available to limited countries. Multiple sensors will be employed on the same platform for enhanced target detection under all-weather conditions and may be linked to weapon delivery platforms. Integrated laser target designators for smart munitions in priority target areas Multiple sensors for chemical and biological agents will be employed on this platform and may be linked to comms platforms. Precision attack variants, such as anti-radiation UAVs for radar attack SATCOM stand-off navigation and sensor communications Miniaturization and reduced weight of munitions **UPGRADE PRIORITY** Extend operational radius and endurance Obtain improved EO capability Reduce sensor-shooter timeline Laser target designator integration	Ballistic missile Improved launchers (swim capability, multiple missile capability, reduced signature) Reduced preparation time, emplace and displace times, shoot and scoot operation Launcher countermeasures: decoys, missile non-ballistic launch trajectory, smokeless solid fuel Autonomous operations or increased interval between launchers Missile countermeasures (e.g., non-ballistic trajectory, penetration aids, separating warhead, multiple maneuvering re-entry vehicles) Automated secure digital C2 network, linking with artillery, air, EW, and reconnaissance units Navigation system with GPS/inertial update, linked to automated net, and homing options Extended range missiles, some to 500+ km Multi-sensor or other improved homing, especially GPS with increased accuracy (10-50 m CEP) Advanced munitions (cluster munitions, FAE, jam, thermobaric munitions, biological, electro-magnetic pulse, anti-radiation missiles), larger payloads Cruise missiles (CMs) with pre-programmed multiple waypoints, and manned guidance option CM multi-seeker modes, including GPS, loiter and radar/IR homing, SAL-H, cluster PGM warheads **UPGRADE PRIORITY** 10-50 CEP with GPS Improved smokeless solid fuel Separating warhead and larger payloads Decoys

COUNTERMEASURES



Countermeasures (CMs) are survivability measures that enhance the protection of assets and personnel by degrading enemy sensors and weapons effectiveness. These measures often fall under the rubric of the US Army term CCD (camouflage, concealment and deception) or within the OPFOR term C3D (camouflage, cover, concealment and deception). Decoys used by tactical units within branch operations are designed to aid survivability, and are considered to be countermeasures. Countermeasures can take the form of tactical CMs (also called reactive measures), or technical CMs. The various types of tactical CM change, alongside new unit tactics techniques and procedures (TTP), allowing adaptation to a given situation in compliance with prescribed rules of engagement. This document focuses on technical CMs. In certain specialized branches the development of new technical CMs is persistent and ongoing.

Modern forces will upgrade existing systems by augmenting them with selected force protection countermeasures. Many CMs

noted are intended to protect combat vehicles from anti-armor sensors and weapons. Although the CMs shown below can be used to counter precision weapons, many were originally developed for use against conventional weapons. Priorities for countermeasures are dictated by the goals of survival, mission success, and maintaining effectiveness. The first CM priority is to avoid detection until you can control the events. Among goals for using countermeasures, mission success is the most important.

COUNTERMEASURE PRIORITIES

Survival ("Don't Be Killed") encompasses the following prerequisites in order of priority: operating system or network survival, vehicle survival, vehicle avoidance of major damage, crew survival, and vehicle avoidance of minor repair. A compatible suite of countermeasures may be limited to a more modest goal, to preserve a measure of effectiveness, even at the cost of system survival. Effectiveness in this context could be defined as: ability to successfully execute the immediate and subsequent missions, until system or subsystem failure interrupts this process. Effectiveness includes: crew effectiveness, crew fitness, mission success, operating system effectiveness, and vehicle/soldier readiness for employment.

Several factors must be considered when selecting countermeasures.

- Countermeasures should be fielded and mounted on systems with a holistic and rational approach to assure survivability. The rational developer will focus his countermeasures, assigning the highest priority to protection against the most likely and most lethal threats. However, evolution of threat capabilities over time, in combination with conflicting priorities, can prevent success of the current CM mix. Most CM are responses to specific perceived threats, and limited by prohibitive costs and budget constraints. With the modern reliance on precision weapons, military forces may seek out complex and expensive countermeasure "suites" to degrade their opponents' capabilities.
- Some countermeasures can diminish or neutralize the effects of numerous sensors and weapons. These CM can be categorized based on generic types of threats, such as artillery or ATGM. Others are more adversary technology-specific, and may only become available once the technology in question makes its appearance in the Operational Environment. Pressure from new and threatening technologies may compel designers to launch short-response programs to expedite the fielding of adaptive countermeasures.
- The R&D process has led to the development of counter-countermeasures, intended to negate the effects of CMs. However in a certain context these too fall under the rubric of CMs. To avoid confusion with semantics, the WEG regards all of them as countermeasures.
- When countermeasures are added to a vehicle or in close proximity to it, they must be mutually compatible and also compatible with other relevant subsystems. Accordingly issues like electromagnetic interference and self-blinding with smokes should also be taken into account.
- Although a variety of countermeasures are now marketed, many technical and financial factors can negate their advantages. Countermeasure development may be restricted due to limitations in resources, technology, and fielding capacity. All will vary by country and time frame. At times budget limitations may compel fielding of CM that fall short of desired standards. For instance, active protection systems can counter some weapons; but they are expensive, hazardous to soldiers, and ineffective against many weapons. Thus they may be unsuitable for application to many systems. OPFOR users should consult the appropriate WEG chapter POC if assistance is needed to adopt CMs against a specific system.
- Countermeasures will not replace the need for armor protection and sound tactics.

LETHALITY COMPONENT VERSUS COUNTERMEASURE RESPONSES

The intent of this table is to assist in selecting CM and understanding the categories used in upgrade schemes. Many of the more widely-fielded countermeasures are designed to degrade a variety of sensors and munitions, for minimal cost. Thus, countermeasure types may be replicated across several functions. Because new technologies are emerging rapidly, and systems are being applied throughout several CM modes, the placement of CMs can be somewhat arbitrary. CM uses against artillery, ATGMs, and mounted ground vehicle weapons systems will vary in type. The following list of CM can be used for artillery, air defense, antitank, armor, aircraft, theater missile, and other systems, depending on the platform, gun, sensor, and munition configuration of the system.

Capability to Be Degraded	Type of Countermeasure

Detection and location	Camouflage: nets, paints, fasteners for added natural materials Cover: entrenching blades, hole-blast device, underground facilities Concealment: screens, skirts, thermal engine covers, scrim, other signature reduction Deformers, engine exhaust diversion, other signature alteration measures Aerosols: smoke and flares, water spray systems Decoys, clutter, and acoustic countermeasures Counter-location measures: GPS jammers, laser and radar warning systems
C2/sensor-shooter links	See Information Warfare (IW) Chapter
Platform or weapon	Counterfire: directional warning systems, laser radars, for rapid response Directed energy weapons (DEW), such as high-energy lasers System prioritization for hard-kill, e.g., anti-helicopter mines (See Engineer Chapter)
Weapon sensors and fire control	CCD as noted above. Directed energy weapons, such as low-energy lasers (LEL) Electro-optical countermeasures (EOCMs)
Submunition dispensing/activation	Global positioning system (GPS) jammer Fuze (laser/IR/RF), RF barrage jammers, acoustic jammers
Precision munition and submunition sensors	CCD as noted above. False-target generator (visual, IR, RF/acoustic) Electromagnetic mine countermeasure system, to pre-detonate or confuse Fuze jammers (laser/IR/RF), RF barrage jammers, acoustic jammers
Munition/submunition in-flight, and its effects	Sensors to detect munitions: MMW radars, RF/IR/UV passive sensors Air watch and air defense/NBC warning net, to trigger alarm signal Active protection systems, for munition/submunition hard kill Cover, additional armor to reduce warhead effects
Other System Effects	Miscellaneous CM (See below)

COUNTERMEASURES AGAINST SENSORS

Type Countermeasure	Countermeasure	Example	Application
Camouflage	Camouflage nets, Camouflage paints, IR/radar/and laser- absorptive materials/paints Fasteners, belts for attaching natural materials	Russian MKS and MKT Salisbury screen rubber epoxy Chinese “grass mat” set	Variety of vehicles Variety of systems Uniforms and vehicles
Cover	Natural and manmade cover, civilian buildings Entrenching blade to dig in vehicles Hole-blast devices for troop positions, spider holes Underground facilities, bunkers, firing positions	Tree cover, garages, underpasses T-80U tank, BMP-3, IFV, 2S3 arty Hardened artillery sites, bunkers	TELs, vehicles, troops IFVs, tanks, SP arty Infantry, SOF Iraqi and NK sites
Concealment	Screens, overhead cover for infantry (conceal IR/visible signature) Canvas vehicle cover, to conceal weapons Thermal covers, vehicle screens Scrim, side skirts, and skirting around turret	Colebrand netting Cover on Chinese Type 90 MRL Kintex thermal blanket over engine French “Ecrim” track cover scrim	Infantry, weapon, sensor Truck-based weapons For combat vehicles Combat vehicles
Deformers/signature modification	“Wummels” (erectable umbrellas to change/conceal shape/edges) Exhaust deformers (redirect exhaust under/behind vehicle Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc.)	Barracuda RAPCAM/TOPCAM Russian exhaust deflectors Track pads, road wheel/exhaust change Cat-eyes, Luneberg lens	Vehicles, sites, weapons Combat vehicles Tracked, other vehicles Tracked, other vehicles

Aerosols	Visual suppression measures, smokes, WP rounds Multi-spectral smokes for IR and/or MMW bands Flares, chaff, WP, to create false targets, disrupt FLIR Toxic smokes (irritants to disrupt infantry and weapons crews) Water spray systems (to reduce thermal contrast)	Smoke generators, fog oil, S-4, RPO-D ZD-6 Smoke grenades (visual/IR) WP rounds, Galix 6 flare system Adamsite and CN in smoke mix Add-on kits for vehicles	Blinding, screening Vehicle protection Combat vehicles, arty Smoke generators Recon, C2, AD, arty
Decoys	Clutter (civilian/military vehicles, structures, burning equipment Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance sensors)	Log site, truck park, tank farm, derricks Shape International decoys Corner reflectors, KFP-1-180 IR heater Acoustic tape/speaker systems	Artillery, combat vehicles TBMs, SAMs, radars Vehicle/site decoys Vehicles, sites
Counter-location measures	Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM)	Aviaconversia GS jammer SPN-2 truck-borne jammer set Slovenian LIRD laser warner	Infantry and others Tactical/operational area Combat vehicles

COUNTERMEASURES AGAINST WEAPONS AND WEAPON SENSORS

Type Countermeasure	Countermeasure	Example	Application
Added protection (supplements to armor in reaction to specific capability	Armor supplements (ERA, screens, bar or box armor, sand bags) Armor skirts over road wheels Mine rollers, plows, and flails Vehicle belly armor, raised or redesigned belly design, skirt Vertical smoke grenade launchers (to counter PGM top attack)	Barracuda, SNPE ERA KMT-5, KMT-6	
EOCM	Use EOCMs such as IR jammer/IR searchlights to redirect ATGM	KBCM infrared CM system	Combat vehicles
False-target Generators	Acoustic jammers and directed acoustic countermeasures Laser false-target generator (against semi-active laser homing) Electromagnetic mine countermeasure system, counters, fuzes	In development, can be improvised In development	To distract acoustic seekers Combat vehicles
Jammers	Altimeter jammer (counters submunition dispersion altimeter) Fuze jammers (to spoof RF proximity fuzes on munitions) Incoherent infrared jamming (to jam IR fuzes on munitions) GPS jammers to confuse navigation and course correction systems	SPR-1 armored ECM vehicle	High priority sites, CPs, etc.
Active Countermeasures	Active protection systems, for munition hard kill High energy laser weapons to destroy munitions or sensors Low energy lasers to blind or dazzle Radio-frequency weapons to burn electronics and detonate munitions Directed MGs	Arena hard-kill system ZM-87 laser weapon VEMASID counter-mine system	Tanks, recon vehicles, IFVs AT, AD systems

Counterfire/Threat response warners	Directional warning system (locate laser/radar, to direct weapons) Employ sensors (RF/IR/UV –to detect munitions) Acoustic directional systems (to detect munitions) Laser radars (laser scanner to locate optics and direct weapons) Directed energy weapons (against optics) Anti-helicopter mines (against aircraft) Employ air watch/security, AD, NBC, nets to trigger alarm signal Dazzle grenades (temporarily blind personnel)	Pilar acoustic detection system Star-burst grenades	Infantry
Miscellaneous CM	Optical filters to degrade effect of battlefield lasers Pulse code/thermal CCM beacons on SACLOS ATGMs (to counter EOCM)	HOT-3 ATGM	

COUNTERMEASURES BY FUNCTIONAL AREA AND TYPE SYSTEM

Functional Area	System	Type Countermeasure	Countermeasure

Air Defense, Artillery, Radar units, Theater Missile units, Aviation, Headquarters	Command and communications vehicles, radars, missile launchers, aircraft (High value targets)	Camouflage Cover Concealment Deformers/signature modification Aerosols Counter-location measures Decoys CM Operational Technologies	Camouflage paints, IR/radar/and laser-absorptive materials/paints Entrenching blade to dig-in vehicles Underground facilities, bunkers, firing positions Canvas vehicle covers, to conceal weapons when not in use Thermal covers, vehicle screens Scrim, side skirts, and skirting around turret “Wummels” (erectable umbrellas to change/conceal shapes/edges Exhaust deformers (redirect exhaust under/behind vehicle Engine and running gear signature modification (mask sound) IR/radar deformers (in combination with RAM and RAP, etc.) Visual suppression measures, smokes, WP rounds Multi-spectral smoke grenades for IR and/or MMW bands, flares, chaff, WP, to create false targets, disrupt FLIR Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM) Clutter (civilian/military vehicles, structures, burning equipment) Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance, sensors) Anti-helicopter mines (against aircraft) Beyond line-of-sight modes Non-ballistic launch modes Anti-radiation missiles Low energy lasers to blind/dazzle optics on designators/aircraft Encoded laser target designators to foil false target generators Radio-frequency weapons – burn electronics/detonate munitions High energy laser weapons to destroy munitions or sensors Laser false-target generator (against semi-active laser homing) Altimeter jammer (counters submunition dispersion altimeter) Fuse jammers (to spoof RF proximity fuzes on munitions) Incoherent infrared jamming (to jam IR fuzes on munitions) GPS jammers to confuse navigation and course correction systems Optical filters to degrade effect of battlefield lasers

Aircraft Units Reconnaissance UAVs Theater Missile Units	Helicopters Fixed-wing aircraft UAVs Attack UAVs Missiles	Camouflage Decoys Counter-location measures CM Operational Technologies	Camouflage paints, IR/radar/and laser-absorptive materials/paints Launcher decoys Flares, chaff, WP – decoy seekers, create false targets, disrupt FLIR Clutter (civilian/military vehicles, structures, burning equipment) Jam Radars Stealth materials and coatings GPS jammers to confuse navigation and course correction systems Jam IR sensors and seekers with laser/IR devices Fuze jammers (to spoof RF proximity fuzes on munitions) Radio-frequency weapons – burn electronics/detonate munitions Laser, IR, and radar warning systems (to trigger move/CM) Low energy lasers to blind or dazzle Optical filters to degrade effect of battlefield lasers Encoded CCM beacons on SACLOS ATGMs (to counter EOCM) Stand-off precision munitions (maneuvering) Beyond-line-of-sight and over-the-horizon modes Non-ballistic launch modes for missile launcher/missile survival Anti-radiation missiles to counter radars and aircraft Maneuvering re-entry vehicle (with warhead) for ballistic missiles
Information Warfare/ Deception Units	IW vehicles	Camouflage Cover Deformers/signature modification Aerosols Counter-location measures Decoys	Camouflage paints, IR/radar/and laser-absorptive materials/paints Natural and manmade cover, civilian buildings Underground facilities, bunkers, firing positions “Wummels” (erectable umbrellas to change/conceal shapes/edges) IR/radar deformers (in combination with RAM and RAP, etc.) Visual suppression measures, smokes, WP rounds Multi-spectral smoke grenades for IR and MMW bands; flares, chaff, WP, to create false targets, disrupt FLIR Degrade GPS by jamming to reduce precision location capability Jam radars/IR sensors Laser, IR, and radar warning systems (to trigger move/CM) Clutter (civilian/military vehicles, structures, burning equipment)

All Units	Combat support vehicles (Light strike vehicles, Tactical utility vehicles, Motorcycles, ATVs, Armored CSVs, etc.), Trucks	Camouflage Cover Concealment Deformers/signature modification Aerosols Decoys CM Operational Technologies	Low to high-fidelity (multi-spectral) decoys Radar/IR decoy supplements (to add to visual/fabricated decoys) Acoustic countermeasures (to deceive reconnaissance, sensors Camouflage paints, IR/radar, and laser-absorptive materials/paints Fasteners, belts for attaching natural materials Natural and manmade cover, civilian buildings Underground facilities, bunkers, firing positions Armor supplements (ERA, screens, bar or box armor, sand bags) Thermal covers, vehicle screens Engine and running gear signature modification (change sound) IR/radar deformers (in combination with RAM and RAP, etc.) Multi-spectral smoke grenades for IR and/or MMW bands; Flares, chaff, WP to create false targets, disrupt FLIR Clutter (civilian/military vehicles, structures, burning equipment Air watch/security, AD, NBC, nets to trigger alarm signal Acoustic-directed counter-fire system

Emerging Technology Trends

In order to provide a realistic OPFOR for use in Army training simulations, we must describe the spectrum of contemporary and legacy OPFOR forces in the current time frame, as well as capabilities in emerging and subsequent operational environments (OEs). This chapter does not predict the future, rather notes emerging adversary capabilities which can affect training.

The OPFOR timeframes for emerging OPFOR are: 2015-2020 (Near Term) and 2021-2028 (Mid-Term). The subsequent time frame is "future" OPFOR time frame. Time lines were determined in part to assist in building OPFOR systems and simulators and for use in Army training simulations. The timeframes are arbitrary and selected for ease in focusing and linking various trends. However, they also generally match force developments for U.S. Army forces, as well as thresholds in emerging and advanced technologies which will pose new challenges to military force planners and developers.

In these time frames, the mix of forces will continue to reflect tiered capabilities. The majority of the force mix, as with all military forces, will use legacy systems. Periods 2015 and after will also see new OPFOR systems and whole new technologies. The most notable difference between the OPFOR force mix and U.S. forces is that the OPFOR will have a broader mix of older systems and a lower proportion of state- of-the-art systems. Rather, OPFOR will rely more on adaptive applications, niche technologies, and selected proven upgrades to counter perceived capabilities of their adversaries. Force developers for OPFOR will retain expensive legacy systems, with affordable upgrades and technology niches. A judicious mix of equipment, strategic advantages, and sound OPFOR principles can enable even lesser (lower-tier) forces to challenge U.S. military force capabilities.

The OPFOR systems must represent reasonable responses to U.S. force developments. A rational thinking OPFOR would study force developments of their adversaries as well as approaches of the best forces worldwide, then exploit and counter them. Thus worldwide and adversary equipment upgrades will trigger OPFOR forces to modify their equipment and tactics to deter, match, overmatch, or counter those changes.

OPFOR Technologies And Emerging Operational Environments[edit]

As noted in Chapter 1 on COE OPFOR, the adaptive OPFOR will introduce new combat systems and employ upgrades on existing systems to attain a force structure which supports its plans and doctrine. Because a legacy force mix and equipment were historically selected earlier in accordance with plans and options, upgrades versus costly new acquisitions will always be an attractive option. A key consideration is the planned fielding date. To project OPFOR capabilities in the future, we should look at the technologies in various stages of research and development today, as well as those in the concept stage for applications in the Future OPFOR time frame. Military engineering experience has demonstrated that the process of formulating military requirements, as well as technology, engineering, and budgeting factors can dramatically affect equipment modernization time lines. In addition, scientific discoveries and breakthroughs in the civilian sector have greatly contributed to the so-called "Revolution in Military Affairs", which has increased the capability for battlefield awareness, integration, timeliness, and lethality. The table below shows OPFORs in emerging and Future OEs, and some considerations.

Considerations in Determining Emerging OPFOR Technologies by Time Frame[edit]

OPFOR Consideration	Near-Term (2015-2020)	Mid-Term (2021-2025)
Challenging OPFOR	Emerging OPFOR	Objective OPFOR
Technology Source	Current marketed/fielded systems and subsystems	Recent major weapons, upgrade applications
Budget	Constricted but available for niche technologies	Improved, some major system acquisitions
Implications for OPFOR equipment	Many subsystem upgrades, BLOS weapons, remote sensors, countermeasures	More costly subsystems, recent major weapons, competitive in some areas.
Implications for OPFOR tactics and organization, Implications for U.S.	COE tactics with contingency TTP updates. Slight subunit changes add BLOS and AT systems for integrated RISTA and strikes.	Integrated RISTA with remotes. Strikes all levels. Combined arms integrated in small units for increased lethality and autonomy.

TECHNOLOGIES AND APPLICATIONS FOR USE BY OPFOR: NEAR AND MID-TERM

TECHNOLOGY CATEGORY	TECHNOLOGY	TECHNOLOGY APPLICATION
Psychological Operations	Mood altering aerosols Reproductive terrorism Non-lethal technologies	Military and civilian targets, for short-term and long-term goals
Information Operations: Sensors	Higher-resolution multispectral satellite images New sensor frequencies for acquisition New sensor frequencies for operational security Use of light spectrum bandwidths (ultraviolet, etc.) Passive detection technologies and modes Auto-tracking for sensors and weapons Image processing and display integration Micro-sensors/imaging system miniaturization Unmanned surveillance, target acquisition/designation Multispectral integrated sensors and Multispectral integrated transmission modes Precision navigation (cm/mm three-dimension) Undersea awareness (sensors, activity) Underground awareness (sensors/mines)	High-intensity use of LITINT (Internet, periodicals, forums) Increased use of information from commercial, industrial, scientific, and military communities Increased adoption of dual-use technologies
Information Operations: Computers and Comms	Low-Probability-of-Intercept communications New power sources and storage technologies: Micro-power generation and Energy cells Advanced Human/Computer Interface Automatic Language Translators	New communities (Blogs, flash mobs, etc., to coordinate and safeguard comms) Secure encryption software New communications tools (Internet, social media and subscriber links)
Electronic Attack	Anti-Satellite weapons for RF, EMP, Hard kill Wide-area weapons (EMP, graphite bombs, etc.) EMP Precision (small area) weapons Computer Network Attack (worms, viruses, Trojan horses) Net-centric warfare (spoofing sensors, spoofing/intercepting data stream/spyware)	Attack electronic grid or nodes at critical times
Chemical/Biological/Radiological Attack	Dirty bombs Genetic/Genomic DNA tagging to assassinate Genetic/Genomic/DNA targeting for Bio attack Designer Drugs/Organisms/Vectors Biologically based chemicals (Mycotoxins) Anti-materiel corrosive agents and organisms	Agricultural attack (animal and plant stocks and supplies) Use of tagging to eliminate political leaders

Physical Attack	Mini-cruise/ballistic missiles for precision, surgical strikes and widespread use Attack UAVs (land, sea, undersea UUVs) Micro-aerial vehicles-widespread use Swarming for coordinated attack Notebook-command semi-autonomous links Vehicle launch for NLOS attack/defense Multi-mode guidance systems: preprogrammed/guided/homing New types of warheads (wider area/different effects; tailorable warhead effects) Precision Munitions: Course-corrected/guided/homing; widespread – almost all weapons; Loiter/IFF Directed Energy Weapons (DEW): Blinding/high energy lasers; RF weapons against electronics; RF against people, vs. structures or systems; Directed acoustic weapons	
Sustainment, Protection	New battery/power cell technologies Neurological performance enhancers Better lightweight body armor Personal actuators, exoskeletons, anti-RF suits Active armor & protection systems Countermeasures to defeat rounds and sensors Counter-precision jammers, especially GNSS All-spectrum low-observable technologies Anti-corrosives Biometric prosthesis & cybernetics Robot-assisted dismounts/sensors/logistics Robotic weapons systems	Battlefield fabrication of spare parts Airborne/shipborne refineries Potable water processing systems Transportable power generation systems

PROJECTED OPFOR CAPABILITIES: NEAR-TERM AND MID-TERM

The next table provides projected OPFOR systems descriptions and capabilities that may confront US and coalition forces in future operating environments. Data for the first timeframe (2015-2020) reflects systems and subsystems already known to exist, and assumes their introduction to the emerging OPFOR adversary force. Timelines reflect capability tiers for systems which may already be fully fielded (not Interim Operational Capability or First Unit Equipped) in brigade and division-level units during the respective time frames indicated.

The systems projections are not comprehensive, and represent shifting forecasts. They may accordingly shift further as we approach the specified time frames. Because clarity diminishes as projections attempt to discern enemy capabilities beyond the turn of the present decade, current views on future trends become less specific for the out-years . Accordingly, the second column (Mid-Term 2021-2025) focuses more on technologies, and less on defined systems.

The columns can be treated as capability tiers for OPFOR operating within specified time frames. Please note: No force in the world possesses all systems at their most modern tier. The OPFOR, as with all military forces worldwide, is a mix of legacy and modern systems. Thus the emerging OPFOR force comprises a mix of COE time frame Tier 1-4 systems and newer systems. One would expect that some Near- or Mid-term adversaries with lower military technology capabilities could move up one or two capability tiers from (for instance) current COE capability Tier 4, to COE Tier 2. The most likely upgrade for emerging OPFOR used in most training simulations would be to move the OPFOR from COE Tier 2 to Tier 1, selectively adding some new systems that reflect emerging niche technologies.

We have previously stated that an OPFOR can portray a diverse force mix by separating brigades and divisions into different tiers. The OPFOR also has the option of incrementally adding higher tier systems to lower tier units, as selective upgrades. Because most of the systems shown below in the 2015-2020 column are currently fielded, an adversary might also incrementally upgrade COE Tier 1 or 2 units by adding fielded assets from 2015-2020 as described in that column. However, as time progresses through that period, we cannot be sure beforehand when and if all of those technologies will come online. Again, the tables are not predictive. The OPFOR force designer may choose a middle road between current Tier 1-4 and future systems; in many countries they are upgrading legacy and even recent systems to keep pace with state-of-the-art improvements. Thus they may look to subsystem upgrades discussed earlier in this chapter.

If a specialized system for a specific role is missing from the table below, continue to use the OPFOR system noted in Tiers 1-4. Please remember that these projections reflect "possible" technology applications for future systems. They incorporate currently marketed systems and emerging technologies and subsystems, and thus may be combined in innovative ways. The table below is not a product of the U.S. intelligence community, and is not an official U.S. Army forecast of future "threats". It is

approved only for use in Army training applications and simulations.

Future OPFOR (2025 and after) is described in various media, but is generally FOUO or classified and is not included in the WEG.

PROJECTED OPFOR CAPABILITIES: NEAR – AND MID – TERM

RECONNAISSANCE, INTELLIGENCE, SURVEILLANCE, TARGET ACQUISITION

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Smart Dust	Rocket/UAV/aircraft emit signals for ½ hour that neutralize sensors	Scattered dust attaches to metal; acoustic/crush/seismic. Emits 1 hour
Acoustic sensor vehicle	Vehicle mounts microphones or dismount array, DFs/acquires aircraft, vehicles, or artillery. Rapid queuing and netted digital display. Range 10 km, accuracy 200m. Three-vehicle set can locate artillery to 30 km with 1-2% accuracy in 2-45 sec. DF/queuing rate 30 targets per minute.	Range extends to 20-30 km with 10 m accuracy. Micro-UAVs with microphones to supplement the network in difficult terrain. Tracks and engages multiple targets. Hybrid electric/diesel engine.
Ground or Vehicle Launched Mini- UAV and Micro UAV	Dual backpack system. Man- portable ground launcher, and laptop terminal. Vehicle-launch from rail or canisters. TV/FLIR. Range 35 km, 3-hour endurance.	IR auto-tracker. Laser designator. Cassette launcher for vehicles. Signal retransmission terminal. Dispenses micro-UAVs, UGSs mines.
Micro-UAV	Hand-launched 4-rotor, 4kg, 5 km/1 hr, GPS map/view on PDA/netbook. Atk grenade.	< 1kg for dismounted sqd/team, 2 km range. Add grenade for atk UAV.
Airborne (Heliborne) MTI Surveillance Radar	Range 200 km, endurance 4 hrs.	SAR mode added. Range to 400 km.
Commercial Satellite Imagery	Resolution 5 m for IR, SAR also available. < 2 days for request. Terminal on tactical utility vehicle at division. Can be netted to other tactical units.	Response time reduction (to , 6 hours). 1-m resolution.

ANTI-TANK

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Manpack Air Defense and Antitank (ADAT) Kinetic-Energy Missile Launcher (also listed in Air Defense)	Co/Bn substitute for ATGMs and AD. Targets helicopters and LAVs. Shoulder launched missile with 3 KE LBR submissiles 8 km, 0 m altitude. Submissiles have 25-mm sabot/HE warhead. Nil smoke. Mounted on robotic launcher (below). FLIR night sight.	Fits into 45-100-mm gun-tubes. Defeats all targets up to 135 mm KE. Range 8 km, time-in-flight 6 sec. Fused FLIR/II sight 10 km. Launch from enclosed spaces. Can mount on robotic ADAT launcher or ADAT Robot vehicle (below)
Robotic ADAT Launcher ADAT Robot Vehicle	Pintle mounted, shoulder/ground/ATV/vehicle launched. Robotic launcher-60 m link. Twin auto-tracker. Operator in cover/spider hole. MMW/IR absorbent screen and net for operator, launcher, and surrounding spall. CPS/ATS.	Masted 4-missile, hybrid drive. Self-entrenches, moves to launch point. Fused FLIR/II sight 10 km. Remote link to 10 km. Most AD and AT vehicles have 2 control stations, 2 robots. ATGM is SAB. CPS.
Attack UAV	Hit-to-kill system. Day/night 60+ km, up to 2 hours. GNSS/inertial navigation, TV/FLIR, Frag-HE warhead. They include an anti- radiation variant.	Cargo UAV 100 km dispenses IR/MMW/SAL DP (600-mm HEAT) submunitions, EMP munitions, SAL ATGMs – UAV LTD 30 km.
Attack UAV Launcher Vehicle	Hit-to-kill UAV launched from modular launcher, 18 UAVs. GPS/inertial nav, to 500 km. First version anti-radiation homing. Added TV guided and multi-seeker attack (hit-to-kill) UAV. Laser designator range 15 km. CPS/ATS.	Hybrid drive. Bus reusable UCAV with 4 ATGMs to 10 km, SAL-H bombs, or bus dispensing 16 terminally-homing submunitions (with MMW/IR seekers, or laser-homing DP submunitions). CPS. LTD.

Micro-Attack UAV	Hand or canister-launched UAV with TV and FLIR guidance to 10 km, 100-600 m altitude, with .25-.5 kg warhead.	Cassette/smoke grenade launcher launch for tactical vehicles. Recon and attack (top-attack) UAVs.
Mini-Attack UAV	Hand or vehicle canister-launched UAV with TV and FLIR guidance to 35 km, 100-600 m altitude, 1-4 kg warhead.	Cassette launcher launch for tactical vehicles. Recon and attack (DP with tandem 600 mm top-attack).

ENGINEER

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Scatterable Mines	Deliver by artillery, cruise missile, UAV, rotary or fixed-wing aircraft. Non-metallic case, undetectable fill, resistant to EMP and jammers, with self-destruct.	Advanced multi-sensor mines with wake-up and target discrimination. Prox fuze mines. Controlled mine- fields and intelligent mines.
Off-Route Mines (Side-Attack and Top-Attack)	Autonomous weapons that attack vehicles from the side as the vehicles pass. 125-mm Tandem HEAT (900+ mm). Target speed 30-60 km/h, range 150m, acoustic and infrared sensors.	Sensor-fuzed EFP 600mm KE top attack. Remote or sensor-activated (controller turn-on/off), 360-degree multi-sensor array. Hand/heli/UAV/arty/ATGL mortar emplace.
Controlled Mines and Minefields	AT/AP, machine emplace able. Armed, disarmed, detonated by RF command. Chemical fills and non-metallic cases are undetectable. With CM and shielding, can negate jammers/pre-detonating systems.	Control may be autonomous, based on sensor data and programmed into decision logic, or by operators monitoring with remote nets.
Smart Mines	Wide-area munitions (WAM) smart autonomous, GNSS, seismic/acoustic sensors. AT/AV top-attack, stand-off mine. Lethal radius of 100 m, 360 degrees. Hand-emplaced.	Can discriminate among targets. Reports data to monitor, evaluates target paths, built-in logic. Uses GNSS to arty/heli-emplace. Non- nuclear EMP or HPW options.

INFORMATION WARFARE

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Electronic Warfare Radio Intercept/DF/Jammer System, VHF	Intercepts, DF, tracks & jams FH; identifies 3 nets in non-orthogonal FH, simultaneously jams 3 fixed freq stations (Rotary/fixed wing/UAV capable)	Integrated intercept/DF/jam for HF/VHF/UHF
Radio Intercept DF/HF/VHF/UHF	Intercept freq range 0.1-1000 MHz. (Rotary/fixed wing/UAV capable)	Wider Freq coverage. SATCOM intercept. Fusion/cue wuth other RISTA for for target location/ID
Radio HF/VHF/UHF Jammer	One of three bandwidths; 1.5-30/20-90/100-400 MHz, intercept and jam. Power is 1000W. (Rotary/fixed wing/UAV capable)	Increased capability against advanced signal modulations. UAV abd mini-UAV Jammers
Portable Radar Jammer	Power 1100-2500W. Jams airborne SLAR 40-60 km, nav and terrain radars 30-50 km. Helicopter, manpack.	UAV and long range fixed wing jammers
High-Power Radar Jammer	Set of four trucks with 1250-2500 watt jammers at 8,000-10,000 MHz. Jams fire control radars at 30-150 km, and detects to 150 km.	UAV jammer and airship jammer. Hybrid electric/diesel drive.
Portable GPS jammer	4-25 W power, 200 km radius. Man- portable, vehicle & airborne GPS jammers, airship-mounted jammers.	Man-portable, vehicle & airborne (UAV) GPS jammers-increased range and power, and improvements in antenna design.
Missile and UAV-delivered EMP Munition	Cruise missiles and ballistic missile unitary warhead and submunition	Increased capability against advanced signal modulations

Cruise Missile Graphite Munitions and Aircraft “Blackout Bombs”	400-500 kg cluster bombs/warheads with graphite strands to short-out transmission stations and power grids	Rocket precision and UAV-delivered munitions

COMMAND AND CONTROL

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Radio, VHF/FM, Frequency-hopping	30-88 MHz, 100 hps, channels: 2,300; mix of analog and digital radios, tactical cellular/digital phone, all nets digitally encrypted. Burst trans. UAV Retrans	Digital radios, tactical cellular/digital phone, and satellite phones, all nets encrypted

DECEPTION AND COUNTERMEASURE SYSTEMS

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Air Defense System Decoy	Manufactured and improvised decoys used with decoy emitter. Covered by AD systems in air defense ambushes	Multispectral simulators of varied gun and missile systems mounted on robotic chassis
Air Defense System Decoy RF Emitter	Expendable RF remote emitters with signal to match specific nearby radars, to trigger aircraft self-protection jammers	Mounted on robotic chassis

ROTARY WING AIRCRAFT

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (FY 2021-2025)
Attack Helicopter	30-mm auto-cannnon, 8 NLOS FOG/IIR-homing ATGMs, range 8 km. Two pods semi-active laser homing (SAL-H) rockets 80mm (20x 8 km) or 122mm (5x 9 km). 2x LBR KE ADAT msl (warhead w/3 KE sub-missiles, 8 km range). Laser designator 15 km. UAVs to 30 km. 2nd gen FLIR auto-tracker. Radar and IR warners and jammers, chaff, flares	Tandem cockpit, coax rotor, 30-mm auto-cannon. 8 x RF/SAL-H ASMs to 40 km (28+kg HE=1300+mm), 2x SAL-H rocket pods (80mm or 122mm), 2 ADAT KE msl 8 km, and 2x MANPADs. 1/3 have ASM to 100 km. Fire control fused II/FLIR to 30 km, and MMW radar, link to ground LTD. Radar jammer. Atk and LTD UAVs to 30 km
Multi-role Medium Helicopter and Gunship	24 troops or 5000kg internal. Medium transport helicopter. Range 460 km. 30-mm auto-cannon, 8 FOG-M/IIR ATGMs to 8 km, 40 x 80 mm laser-homing rockets, 4 AAMs. ATGM launchers can launch mini-UAVs and more AAMs. Mine pod option. Day/night FLIR FCS	Fused FLIR/II to 15 km. 6x SAL-H ATGMs 18 km, 2 AAMs, 2 x 80/122-mm SAL-H rocket pods (20 or 5 ea). Laser designator to 15 km, and link to ground LTD. Aircraft survivability equipment (radar jammers and IR countermeasures).
Multi-role Helicopter and Gunship	12 troops (Load 400 kg internal, 1,600 external). Range 860 km. 23 mm cannon, 2 AAM, 4 SACLOS ATGMs to 13 km, TV/FLIR, day/night. Mine delivery pods	Launches 6x SAL-ATGM to 18 km, 28+kg HE warhead. 2 x AAM, Air- to-surface missile to 100 km. Pod w/7x SAL-H 90-mm rockets. Fused FLIR/II to 15 km. ASE
Light Helicopter and Gunship	3 troops (Load 750 kg internal, 700 external). Range 735 km. 20 mm cannon, 1 x 7.62mm MG, 6 SAL-H ATGMs to 13 km, 2 AAMs. FLIR night sight. Laser target designator. Mine pods	4xSAL-H ATGMs, 18 km range. Fused FLIR/II to 15 km
Helicopter and Fixed-Wing Aircraft Mine Delivery System	Light helicopter pod scatters 60-80 AT mines or 100-120 AP mines per sortie. Medium helicopter or FW aircraft scatters 100-140 AT mines or 200-220 AP mines per sortie.	Controllable and intelligent mines for aircraft delivery. Larger aircraft can hold multiple pods.

FIXED WING AIRCRAFT

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
Intercept FW Aircraft	30-mm auto-gun, AAM, ASM, ARMs TV/laser guided bomb. 8 pylons Range 3,300 km. Max attack speed: Mach 4.	Stealth composite. ASE. Max G12+ All weather day/night. Unmanned option.
Multi-Role Aircraft	30-mm gun, AAM, ASM, ARM pods, guided, GNSS, sensor fuzed bombs, 14 hardpoints. Thrust vectoring. FLIR.	Improved weapons, munitions. Unmanned option. ASE all radars. Max G12+ All weather day/night.
Ground-Attack Aircraft	Twin 30-mm gun, 8 x laser ATGMs 16 km 32 kg HE, 40 SAL-H 80mm rockets, ASMs, SAL-H and GNSS sensor fuzed bombs, AA-10 and KE HVM AAM. 10 hardpoints.Range 500+km. FLIR.	Stealth composite design. ASE. Unmanned option. Max G12+ 80- mm/122-mmrockets SAL-H, SAL-H ASM (28+kg HE=1300+ mm, to 40 km, 2 gen FLIR, radar jammer, day/night.

OTHER MANNED AERIAL SYSTEMS

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
High-altitude Precision Parachute and Ram-air Parachutes	High-altitude used with oxygen tanks. Ram-air parachute includes powered parachute with prop engine.	Increased range and portability. Reduced signature. Increased payload.
Ultra-light Aircraft	Two-seat craft with 7.62-mm MG, and radio. Folds for carry, 2 per trailer.	Rotary-winged, two-seat, MG, 1/trailer. Auto-gyro, more payload.

UNMANNED AERIAL VEHICLES

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
UAV (Brigade) It may also be employed in other units (e.g. artillery, AT missile, and naval)	Rotary wing, TV/FLIR/auto-tracker, with LRF and LTD acquires targets to 15 km. Flies 180 km/6 hours, 220 km/hr, 2-5,500 m alt, 100kg payload. Can carry 2 AD/anti-armor missiles +MG for attack.	Range extends to 250 km. Increased payload. Attack version can carry 2 SAL-H ATGMs (12 km range) or 1+4 70-mmSAL-H rockets (7 km, defeats 200 mm).
UAV (Divisional)	Day/night recon to 250 km. GNSS/inertial nav, digital links, retrains. SLAR. SAR, IR scanner, TV, ELINT, ECM suite, jammer/mine dispensers. Laser designator 15 km.	Increased range, endurance. Diff GNSS. Composite materials, lower signature engine. SATCOM Retrans/relay links. Attack sub- munitions.
UAV (Operational)	Day/night recon to 400+km. GNSS/inertial nav with digital links. SLAR, SAR, TV, IR scanner, ELINT, ECM suite. Jammer option. Mine dispensers. Laser target designator 15 km. Retrans/relay.	Increased ranges, endurance. Diff GNSS. High altitude ceiling- 35 km option. Retrans/relay/SATCOM links. UAV attack sub-munitions. Laser target designators.
Unmanned Combat Aerial Vehicle (on Operational UAV platform)	Medium UAV with 4 ATGMs (range 10 km), laser-guided bombs. Laser designator 15 km. Mine dispensers. GNSS jammer, EW jammers. Range 400+ km.	Stealth composite design. ASE. Twin dispensers (pylons) with 16 terminally-homing sub-munitions, MMW/IR seekers. Range 500+ km.

THEATER MISSILES

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)

Short-Range Ballistic Missile and Cruise Missile Launcher	Twin launch autonomous vehicle (GNSS/inertial nav, self-emplace and launch). Range 450 km. Non- ballistic launch, separating GPS corrected reentry vehicle (RV) with decoys, CCD, 10-m accuracy. ICM, cluster, nukes. EMP warhead. EMP warhead. Some convert to 6-Cruise missile launch capability (500 km, 3- m accuracy, below radar). Vehicle decoys. Vehicle has visual/MMW/IR signature of a truck	Improved missile range (TBM 800 km, cruise 1,000) with 1-m accuracy. TBM has GNSS-corrected maneuvering RV. Warheads for both: terminal-homing sub-munitions, precision cluster munitions, EMP. Cruise missiles pre-program or enroute waypoint changes. Countermeasures include penaid jammers.
Medium-Range Ballistic Missile	Autonomous vehicle. Separating maneuvering warhead to 1300 km. GNSS 10-m CEP. Warheads: ICM, cluster, EMP, and nukes. Penaids include decoys, jammers. Truck visual/MMW/IR signature.	Range 2,300 m, 1-m CEP, Diff GNSS, terminal homing, separating warhead. Warheads include EMP, terminal-homing cluster munitions. Non-ballistic launch and trajectory.
Cruise Missile Cassette launcher vehicle	Off-road truck, GNSS for autonomous ops. 16/lchr. Range 470 km; preprogram GNSS inertial guidance, with in-course correction, 10 CEP. Munitions include cluster, chemical, thermobaric, DPICM, and scatterable mine sub-munition	Launcher fire direction. Supersonic missile Diff GNSS/inertial nav, 1-m CEP. Range 900km. EMP warhead option. Warheads include homing cluster munitions. Penetration aids-countermeasures.
Cruise Missile/AD Missile (Multi- role) Launcher Vehicle Category includes specialized cruise missiles, long-range ATGMs, and SAM systems to engage targets at 12+ km.	Truck with 24 launchers. Range 100 km. 28-kg Frag-HE warhead = 1300 mm. AT Preprogrammed GNSS/inertial nav phase. LTD veh range 25 km. Thermal camera to 10 km. Radar 40 km. Support UAV with LTD. FW/ship/anti-ship versions. Anti-heli RF guided MMW radar.	Penetration aids (countermeasures). IR Terminal- homing warhead or IR-homing sub-munitions can be used. MMW lock- on before/after launch.
Land-attack SAM system (secondary role for system)	The SAM system uses its EO sight and LRF (short/med range, strat “hittiles”).	Range extends with SAM ranges. Passive operation with TV/FLIR.

AIR DEFENSE

SYSTEM	NEAR-TERM OPFOR (2015-2020)	MID-TERM OPFOR (2021-2025)
General Purpose and Air Defense Machinegun	12.7 mm low recoil for ground tripod. Chain gun light strike vehicle, ATV, motorcycle, etc., on pintle. TUV/LAV use RWS. Remotely operated ground or robot option. Frangible rd 2 km, sabot 2.5 km. RAM/RAP/IR camouflage/screens. TV/FLIR fire control. Lightweight MMW radar 5 km. Display link to AD azimuth warning net. Emplace 10 sec. RF/radar DF set. ATS control option.	Stabilized gun and sights. Remotely operated computer FCS with PDA/laptop. Fused II/FLIR 5 km. Frangible, sabot rds to 3 km. Laser dazzler blinds sights. Robot mount and micro-recon/heli atk UAVs. Some light/AD vehicles replace gun with 30-mm recoilless chain gun on RWS firing a HEAT round 4 km; add-on ADAT missile launcher.
Improvised Multi-role Man-portable Rocket Launcher (AD/Anti-armor)	4-tube 57-mm launcher with high- velocity dual-purpose rockets. EO day/night sight. Blast shield. Range 1,000 m. Penetration 300 mm, 10 m radius.	Prox fuze, 1,500 m range. Penetration 400 mm, 20 m radius.
Man-portable SAM launcher	6 km day/night range/ 0-3.5 km altitude all aircraft, velocity mach 2.6. Thermal night sight. Proximity fuze, frangible rod warhead (for 90% prob hit and kill). Approach/azimuth link to AD warning net. Twin launcher vehicle quick mount. Nil smoke. Mount on robotic AD/AT launcher. RF/radar DF set on helmet.	Warhead/lethal radius increases for air/ground targets. Improved seekers – cannot be decoyed by IR decoys/jammers. Fused II/FLIR 10 km. Launch from enclosed spaces. Laser dazzler. Optional AD/AT LBR KE warhead missile – 8 km. Mounted on AD/AT robot vehicle.

MANPADS Vehicle Conversion Kit (Lt, Stryker, vans, recon TUV, truck etc.)	Twin launcher and ADMG on improvised IR SAM vehicle. Day/night IR auto-track FCS, MMW radar. Display link AD net. RF/radar DF set to 25 km. Camouflaged.	Launcher replaced with 3-missile launcher: 2x ADAT KE SAMs, 1x IR SAMs. Total 6 missiles (3 & 3)
Manpack Air Defense and Antitank (ADAT) Kinetic-Energy Missile Launcher (also listed in Anti-tank)	At company/battalion, can replace ATGMs and SAMs. Targets helicopters and LAVs. Missile has 3 KE LBR darts (sub-missiles), 8 km, 0 m altitude. Camo screen. Dart is 25-mm sabot with HE sleeve. Nil smoke. Fits on robotic ADAT launcher. Helmet RF/radar DF.	Larger sabot kills all targets up to 200 mm (KE) armor. Range 8 km, time of flight 5 sec. Fused II/FLIR 10 km. Launched from enclosed spaces. Can mount on 3x remote launcher w/ IR auto-tracker, which fits on AD/AT robotic vehicle.
Towed/Portaged/Vehicle Mounted AA Short Range gun/missile system	2x23mm gun. MMW/IR camouflage/screen. Frangible round, range 3,000 m (17mm pen). Onboard radar/TV FC with ballistic computer, 5 km MMW radar, thermal night sight, auto-tracker, net azimuth warner. Twin MANPADS.RF/radar DF set, 25 km. RWS on veh hull/turret. CPS/ATS.	Replaced with twin 30mm recoilless chain gun. Frangible, sabot, AHEAD rnds to 4 km. TV/fused II/FLIR auto- tracker 10 km. MMW radar, twin MANPADS/ADAT KE missile (8 km) launcher. APU for self-relocating or robotic mount. Laser dazzler.
Air Defense System Decoys (visual decoy, decoy emitter)	See DECEPTION & COUNTERMEASURE SYSTEMS	
Brigade gun/missile turret for mount on tracked mech IFV, wheeled mech APC, truck (motorized) chassis	Twin 30-mm gun, APFSDS/frangible rds, 4 km. 30- mm buckshot rd for UAVs. Mounts 4x hyper-velocity LBR-guided SAMs to 8 km, 0m min altitude. Passive IR auto-tracker, FLIR, MMW RADAR. 2 per battalion. Track/launch on the move. Targets: air, LAVs, other ground. RF/radar DF set 25 km range. CPS/ATS.	Dual mode (LBR/radar guided) high velocity missile, 12 km, 0m min altitude. Auto-tracker (launch/fire on move). Phased array radars. Fused II/FLIR 19 km. Twin 30-mm recoilless chain gun with AHEAD type rds to 4 km. Micro recon/heli atk UAVs. TV/IR attack grenades.
Divisional gun/missile system on tracked mech IFV, wheeled mech APC, truck (motorized) chassis	Target tracking radar 24 km. TV/FLIR. 8x radar/EO FCS high velocity missiles to 18 km/12 at 0 m min altitude. Auto-track and IR or RF guided. 2 twin 30 mm guns to 4 km. 30-mm buckshot rd for UAVs. RF/radar DF. CPS/ATS.	Hybrid drive. Missile 18 km at 0 m, and kill LAVs. Fused II/FLIR auto- tracker, launch on move. Radar 80 km. Home on jam. Twin 30-mm recoilless chain gun, electronic fuzed air-burst rds to 4 km. Micro- recon/heli-atk UAVs. TV/IR atk grenades.
APC Air Defense/AT Vehicle in APC Bn (Company Command Vehicle, MANPADS Vehicle in Bn/Bde)	1-man turret on 8x8 chassis. 30 mm gun, 30-mm buckshot rd for UAVs. 100-X TV 2 gen FLIR. 2x LBR ATGM lchrs 6 km, 2x veh MANPADS lchrs. 2 dismount teams. 1xMANPADS lchr, 1xADAT KE lchr. Total 18 missiles. 12.7-mm MG. RF/radar DF to 25 km. CPS/ATS.	10x10 whld hybrid drive, box armor. 30-mm recoilless gun RWS. Add AHEAD-type 4 km, 2 veh launchers for 5 AD/AT KE LBR HV SAM 8 km. Anti-helicopter surveillance/atk micro-UAVs. Fused II FLIR 10 km. MMW radar. TV/IR atk grenades.
IFV, HIFV, or Tank ADAT Vehicle in Bn/Bde MANPADS	Vehicle on IFV, HIFV, or tank chassis with above features and weapons.	See AIR DEFENSE, APC ADAT above for weapons and upgrades.
Towed Medium Range AA gun/missile system	35mm revolving gun 1,000 rd/min. Rds: frangible, HE prox, electronic- fuzed. 4 SAMs/lchr, 45 km, 0 m min alt. Radar 45 km, 4 tgts. Resists all ECM. 2 gen FLIR auto-tracker 20 km. RF/radar DF 25 km. SAM includes active homing, home-on- jam. RAP/RAM/IR camo. CPS/ATS.	Hybrid-drive auxiliary power unit short moves. Improved FCS, radars phased array low probability of intercept acq to 80 km. Fused II/3rd gen FLIR auto-tracker to 35 km in day/night all-weather system. Track and engage 8 targets per radar.
Medium-range ground SAM system	Tracked lchr. Radar to 150 km. 4x radar-homing SAMs to 45 km, 0 m min altitude (4 targets at a time). Home on jam. Use as cruise missile – priority ground tgts to 15 km, water 25km. Fused 3rd gen FLIR auto-track. RF/radar DF. CPS/ATS.	Hybrid drive. Improved FCS with radars and EO, fused II/3rd gen FLIR day/night all-weather system to range 50 km. Radar range 200 km.

Strategic SAM System	Cross-country truck launchers, 1 x track-via-missile SAMs 400 km, at Mach 7. 1x ATBM/high maneuver missile to 200 km. Also 8 x “hittile” SAMs to 120 km. Modes are track- via-missile and ARM (home-on-jam). All missiles 0 m 50 50 km altitude vs stealth aircraft, UAVs, and SAMs. All strat/op missiles in IADS. Local IADS all AD. Battery autonomous option. Over-the- horizon (OTH) TA radar vehicle to 400 km. Mobile radar 350 km. Site CM, decoys.	Off-road trucks or tracked with hybrid drive. Most units, launchers have 2 big missiles+8 small “hittile” missiles ranging 200 km, altitude 0 m – 50 km. All missiles Mach 7. OTH radars operate on the move 600 km range. Targets include all IRBMs. Increased target handling capacity (100/battery in autonomous operations).
Operational-Strategic SAM System	Same as above on tracked chassis. Mobile FOs all batteries. AD radars on airships.	Same as above on tracked chassis
Anti-helicopter Mines (Remote and Precision Launch)	In blind zones force helos upward or deny helo hides and landing zones. Range 150m. Acoustic and IR fuse, acoustic wake-up, or cmd detonation. Directed fragmentation. Precision-launch mines use operator remote launch, proximity fuze for detonation. RF/radar DF.	Stand-alone multi-fuse systems. Remote actuated hand-emplaced mines with 360-degree multi-sensor array, pivoting/orienting launcher, 4- km IR-homing missile. Operator monitors targets and controls (turns on or off) sections, mines or net.
Helicopter Acoustic Detection System	Early warning of helicopters. Acoustic sensors to 10km, 200m CEP. IR sensors can also be linked to air defense net.	Range 20 km, 50 m CEP. Track and engage multiple targets. Digital link to AD net, AD unit, IADS.

MILITARY TECHNOLOGY TRENDS FOR VOLUME 2 SYSTEMS IN 2025

Year 2025 is a demarcation line for focusing on future military technologies. Even with the "Revolution in Military Affairs", most major technology developments are evolutionary, requiring one or more decades for full development. Most of the technologies noted below are in conceptual or early developmental stages, or fielded at this time. Many exist in limited military or commercial applications, and can be easily extrapolated to 2025 and the near future time frame. Throughout this period and beyond, military forces will see some legacy systems become obsolete, then either be replaced, or relegated to lesser roles with lower priorities. Most will be retained and updated several times. New technologies will emerge and be widely adopted, only to be overtaken by still more modern technologies that will drive OPFOR modernization. Additional technologies/adaptations not yet conceived will surface with little warning, be quickly adopted, and significantly impact OPFOR force structure.

SENSORS

- Multi-spectral immediate all-weather sensor transmission with real-time display
- Remote unmanned sensors, weapon-launch and robotic sensors and manned sensors
- Sensor nets integrated and netted from team to strategic and across functional areas

AIRCRAFT

- Continued but selective use of FW and rotary wing for stand-off weapons, sensors
- Aircraft critical for transport, minelaying, jamming, other support missions
- Light aircraft and UAVs adapted with multi-sensor pods for real-time fused intelligence and laser target designation

OTHER AERIAL SYSTEMS

- High-altitude UAVs, long-endurance UAVs, and UCAVs seamlessly integrated with other intelligence and support systems
- Recon/attack low-signature UAVs and UCAVs and stand-off munitions at all levels down to squads
- Ballistic missiles with non-ballistic trajectories, improved GNSS/homing re-entry vehicles, precision submunitions, EMP
- Shift to canister launchers of tactical cruise missiles with precision homing and piloted option, cluster warheads, EMP
- Airships and powered airships for long-endurance and long-range reconnaissance, and variety of other roles
- Increased use of ultra-lights and powered parachutes

AIR DEFENSE

- Integrated Air Defense System with day/night all-weather RISTA access for all AD units
- Improved gun rounds (AHEAD/guided sabot) and missiles (anti-radiation homing, jam-resistant)

- Autonomous operation with signature suppression, counter-SEAD radars and comms
- Shoulder-launch multi-role (ADAT) hypervelocity missiles/weapons immune to helicopter decoys and jammers,
- UAVs and airships for multi-role use includes air defense recon and helicopter attack
- Acquisition/destruction of stealth systems and aerial munitions and ground rockets to 500+ km

INFORMATION WARFARE

- Jammer rounds most weapons, electro-magnetic pulse rounds, weapons of mass effects
- UAVs, missiles and robots carry or deliver jammers/EMP/against point targets and for mass effects
- Multi-spectral decoys for most warfighting functions
- Computer network attack and data manipulation

ACCESS DENIAL

- Use of nuclear/bacteriological/chemical weapons to deny entry, access to areas or resources
- Use of media and public opinion for access denial
- Remotely delivered RF-controlled, smart and sensor-fuzed mines and IEDs defeat jamming

NON-LETHAL WEAPONS

- EMP/graphite/directed energy weapons to degrade power grid, information networks, and military systems
- Space-based data manipulation to deny adversary use of satellite systems
- Population control effects (acoustic devices, bio-chemical and genetic weapons, resources attack, dirty bomb)
- Anti-materiel agents and organisms (microbes, chemicals, dust, and nanotech)
- Countermeasures, tactical and technical, in all units to degrade enemy sensor and weapon effectiveness.

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Chapter 5: Unconventional and SPF Aerial Systems

Chapter 5 includes information on unconventional and SPF aerial systems.

The conflict spectrum in the Contemporary Operational Environment includes forces across the capability spectrum. They will use specially-designed military technologies, as well as improvised weapons and other systems. They will also employ all available assets for innovative applications.

That creativity will also extend into the vertical dimension. Increasingly, as modern forces are able to gain air superiority, adversaries will seek innovative ways to deny airspace, while operating in that airspace. They will increasingly turn to innovative and improvised systems. Aerial roles will include reconnaissance for ground forces and for air defense and air attack.

Improvised air and ground systems will also be used for air defense. Creativity in air defense includes decoy and camouflage arrangements. The threat from rotary-wing aircraft has led to responses such as obstacle systems in likely landing zones, use of mines, and improvised explosive devices (IEDs). New technologies such as unmanned aerial vehicles (UAVs) can be used in counter-helicopter roles. The list of improvised weapons available is limited only by human imagination.

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Airships in Military Applications



Airships (“lighter-than-air” craft) have been used in warfare since the 1800s, when balloons offered elevated platforms for

military observers. Airships are increasingly used in civilian venues and offer capabilities for military use. Primary roles are:

- Communication support
- Support to electronic warfare (EW) and artillery units
- Surveillance platforms
- Air defense support

With their low cost, low upkeep, commercial availability, and ability to stay aloft with minimal signature for substantial periods, they will offer more and wider uses for military forces.

Airships can be categorized as non-rigid, semi-rigid, and rigid. Non-rigid describes balloons and blimps.

Balloons can be of various shapes but without internal structure except air pockets for shaping. Most are round. ***Blimps*** (see right) generally fit the characteristic shape. Blimps can orient better in wind than round craft. Airships which are moored to a winch on the ground or on a vehicle are also ***aerostats***. Semi-rigid airships have some struts or framing, but use inflation to fill part of the structure. Rigid airships have their overall structure supported with framing. Some aerostats, especially larger ones, are semi-rigid or rigid.



Dirigibles are airships powered by electric or internal combustion engines, and are rigid or semi-rigid***.*** Their max speed varies up to70 km/hr. ***Zeppelins*** are special-designed airships trademarked by a German company.

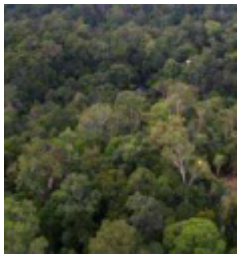


Airships come in various shapes and sizes. They are made of varied materials, mostly PVC or UV-treated nylon. Wind speed should not exceed 25-35 km/hr during flight. Although they can be filled with hydrogen, hot air, etc., the vast majority use helium. Helium can be produced by generators in ground stations or in trailers, compressed in tanks, and distributed to airship users. Helium tanks will sustain a small airship for days. Most airships can absorb several hits while remaining aloft. Most rips and bullet holes can be easily and quickly repaired. An electric hoist can be vehicle-mounted for stationary launch, frequent relocation, and re-launch.

Support to Communications. Balloons can be used in a manner similar to ancient use of pennants and mirrors, to passively signal change in conditions or start an action, while avoiding intelligence and jamming systems. Commercial users often use balloons to trail streamers behind or stretched to the ground to draw attention and mark location of an activity. They can

mark location of an LZ, flight corridor, or a registration point for navigation or fires.





Balloons can be used for rescue missions. The below helikites are offered for military uses. A jungle backpack includes aerostat, valve, helium bottle, line, handle, strobe light, bag, and instructions.





Some signal intelligence and communications units have the option of using aerostats to raise antennae for increased operating range. British Allsopp developed the Mobile Adhoc Radio Network (MANET), with three steerable Low Visibility Skyhook Helikites bearing ITT Spearnet radios to 65-m height. They demonstrated that an infantry radio, usually limited to 1 km range, can send video data (with a 15 kg helikite backpack) to a receiver 10 km away. The set can also be used to retransmit, or to control UAVs in almost any terrain. The company claims that antenna altitude could rise up 500 m.

Electronic warfare units can use aerostats to raise antennae on jammers and recon systems. A simple method would be to attach a jammer round on a cable. A GPS jammer could be mounted on a vehicle-based aerostat or on a dirigible moving within protected zones. Artillery units have long used weather balloons in meteorological units to supply data for calculating fire adjustments. Those units also have helium generators for supplying the gas.

The most widely-used role for airships is reconnaissance. In the U.S. Civil War, balloon gondolas were used by some military observers. Today some military and civilian forces use large aerostat balloons with cameras for border and aerial surveillance. Some sporting events use blimps and dirigibles to feed TV imagery for real-time broadcast. Survey, engineering, and land use organizations also use airship sensor products. The elevated view offers a long-range unobstructed field of view, and extended viewing duration. With the proliferation of small and medium-size commercial balloons, stabilized and gimbaled sensor mounts, and smaller high-resolution optical systems, use of improvised systems is expanding.



Technologies developed for commercial and recreational video-photography, and for remote military sensors and robot systems can be readily adapted to airships. Thus airship-mounted sensor arrays vary from a simple camera or camcorder hung underneath to day/thermal video-camera or TV transmitting real-time to a palm pilot or laptop, or over a digital net. Gondolas can have a camera bar, stabilized mount, or even a gimbaled sensor ball with multiple sensors, laser-rangefinder (LRF), auto-track, and 60+ power digital/optical zoom. Navigation can include GPS location, ground-based location with a LRF, or inexpensive in-viewer display.


Controllable Camera Mount

The easiest and most numerous applications would be to attach a camera or camcorder underneath. On page 7-7 is a demonstrated sensor set for RC aircraft. It can be mounted on aerostat balloons less than 1-m for quick over-the-hill surveillance. A separate cord can be attached to the camera or balloon to orient it in the desired direction.


Mount on a Camera Bar


Gimbaled Ball

Manufacturers such as Inflateable4less offer small aerostat blimps (3-m, below) which can carry a camera. Range for an HF transmitter can limit distance to a ground station (2 km for a low-cost unit); but a hand-held display unit can operate from a vehicle.





Mini-zepp blimps come in sizes 6-13 m, for use as aerostats or as dirigibles. The dirigibles include 2 electric motors and a gas-powered motor. Options include a video head and HF transmission system. In event of a power failure, a cable drops to the ground for recovery.



The Skymedia Pro aerostat system is offered for $4,999. It includes:

- 2.4-m urethane-coated ripstop nylon balloon
- Highly precise camera bar (210° tilt pan, 2 x 360° zoom shoot carbon fiber camera platform)
- HF transmitter on the platform (2 km range)
- A remote control unit, system integrated (HF receiver patch antenna LCD color display 13 cm) -- a suitcase with all necessary chargers, battery, etc.

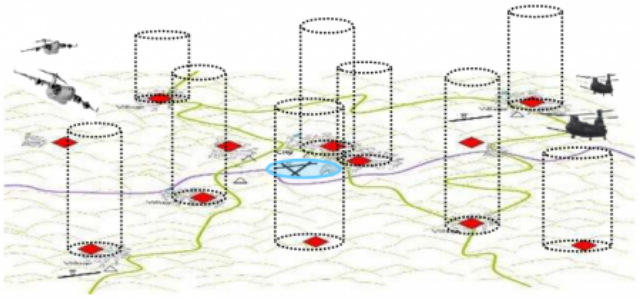
As airships become better-controlled and more stable, other sensors can be added to the payload. An airship could be used in tactical reconnaissance units to mount a small light-weight radar antenna, such as on the FARA-1E (Vol 1, pg 4-29). The Israeli Speed-A stabilized payload system with automated EO/thermal imager and laser rangefinder fits on lightweight airships.



Air defense units will use airships in above roles. Airship antennae can extend the range of tactical AD radio nets. Airship-mounted camera systems can detect helicopters flying at low altitudes (using forest canopy for cover) earlier than their ground-based counterparts. Airships could also raise a cordon of light-weight radar antennae over obscured approaches for early detection of helicopters and other threats.

Another air defense use can be resurrected from the World War II era using modern airships as barrage balloons. They can deny low-level airspace to enemy aircraft by:

- Forcing aircraft to fly at higher altitudes, thereby decreasing surprise and attack accuracy,
- Limiting direction of attack, permitting more economical use of AD assets, and
- Presenting definite mental and material hazards to pilots by cables and airships.



During WWII in 1944, the UK had 3,000 aerostats operating. During the Blitz, 102 aircraft struck cables (66 crashed or forced landings), and 261 V-1 rockets were downed. The blimps were 19 m long. Modern more compact airships offer more flexible options, with fast vehicle-mount winches, powered dirigibles, and lighter and stronger cables. Although modern aircraft have better sensors (such as thermal sights for night use), most airships have no thermal signature and can be camouflaged and concealed for rapid rise with minimal visual signature. Latest recorded catastrophic collision of an aircraft with aerostat cable was 2007 in the Florida Keys. The Iranians have demonstrated air mines, barrage balloons with explosive charges.

The tether cable and loose lines are the main threat to low- flying aircraft. Tether cables are next to impossible to detect in

either day or night conditions, and can be steel, Kevlar, PBO or nylon. Type and length of tether material is determined by lift capacity of the balloon. Multiple loose lines and/or tethers may be suspended from the balloon. Short-notice balloon fields can be emplaced in 10-20 minutes, and raised or lowered with fast winches in 1-5. Netting, buildings, and trees can be used to conceal inflated balloons between uses. Smaller (e.g., 1-m) inflated shaped balloons can be used in target shaping, altering appearance of buildings, vehicles, weapons, etc. They can also be raised as AD aerostats.

Although some balloons will use concealment, others will be clearly displayed to divert aircraft, or trigger a response and draw aircraft into air defense ambushes. Captured marker balloons can divert search and rescue aircraft into ambushes. Balloons can be used in deception as decoys to draw aircraft away from high-value targets.

Two areas where airships are most effective in air defense are urban and complex terrain.



Remote-Controlled Aircraft and Micro-UAVs for Military Use



A wide variety of unmanned aerial vehicles are available in commercial and military sectors for use in military roles. However, cost can be a limiter for wide use. Some forces have turned to use of ***micro-UAVs***, in order to more widely distribute assets for close-in aerial surveillance. There is a burgeoning array of commercial and military options for these aerial systems. The term micro-UAV is open to wide variation, from palm size, to 1-2 meters. They can be almost as costly as mini-UAVs (up to $150,000 per set), or can cost only a fraction of that ($10,000 per set for a Russian Pestulga set). For even lower cost (and reduced capability), some forces turned to remote-controlled (RC) aircraft.

These aircraft can be used for several roles, including surveillance, electronic warfare, and attack. Some use gas engines; but others are battery-powered. Most are composed of wood, plastic, or composite materials, with almost no radar signature. With camouflage and a flying altitude of more than 100 meters, most have almost no acoustic, visual, or thermal signature, and would be very hard to shoot down with current weapons. The greatest threat to them is shotguns. The surveillance role is obvious, with range of 1 or 2 km and flight range varying from a 0.5 kilometer (RC aircraft) to 10-100 km for some micro-UAVs. Beyond surveillance, other roles include electronic warfare (mounting a pocket-size GPS jammer onboard), and attack (with onboard IED charges or grenades). Piloted aircraft do not like to fly where UAVs may operate. Thus micro-UAVs can be used in air defense to challenge/attack incoming aircraft. Micro-UAVs can fly harassing flights over military and civilian targets in a PSYOPS role. Low cost of the systems means that they can be used as reusable or disposable assets, with ample re-supply.

Hobbyists have been flying RC aircraft for decades. In the last decade, camera technology has advanced to the point that commercial applications for the technology have been used. They permit acquisition of affordable aerial views of buildings, wildlife areas, industrial sites, and terrain, which otherwise would require expensive use of aircraft. Military applications have been used. Tamil Tigers in Sri Lanka were found to have two aircraft with small cameras mounted inside.





A recently demonstrated RC aircraft conversion with video camera showed potential of this technology. The aircraft had a 20-km 900MHz telemetry link and 32-km flight path. Navigation data from GPS permitted precise aircraft location and image orientation. Sharp PDA for display and flight recording was used. The same imagery system could be used with airships.



The Nokia N95 camera was displayed in an RC aircraft system described as “your personal Google Earth”. It features the Multiplex EasyStar battery-powered RC aircraft with a 1.37-m wingspan, weighing 680 grams. With a GPS display unit and hand-held Optic 6 RC terminal, the system is ready to use in 10 minutes. Initial system assembly from kit, set-up, and training time is 2 hours. Pict’Earth software is used to download imagery.

There are now clubs and internet forums for radio-controlled UAVs. More robust recreational aircraft are being marketed. An example is the E2 Electronic Surveillance Infrared UAV from Imaging1. The battery-powered craft (with pusher prop) is a flying wing configuration 1.85 m wide, weighing 2.7 kg. It can fly 3 hours (up to 160 km) and 1,500 m in altitude. Standard payload (up to 2.7 kg) is a CCD camera. It features autonomous take-off and landing. Thermal camera is optional. Cruise speed is 30 knots. With graphite construction, this craft offers durability for military and law enforcement applications.

A Russian micro-UAV is the Pustelga, which they call a “flying micro-vehicle” (FMV). The composite aircraft weighs less than 0.3 kg, and is hand launched. The whole system, with battery-powered UAV weighs less than 5 kg. It features a TV camera, laptop terminal, inertial/GPS navigation, digital map and azimuth display. With a skeletal frame, it has virtually no visual or acoustic signature. The “strike version” can mount a charge for attack missions.

Other micro-UAV programs are underway. These will yield even smaller systems for military applications. Most MAVs are intended as disposable sensors, for hand or canister launch from ground units or vehicles. Attack versions are being considered, with hit-to-kill attack profiles. Use of loiter and “swarm” behaviors have been demonstrated for MAV control.

Powered Parachutes, Paragliders, Hang Gliders, and Wingsuits



Often military, paramilitary, and insurgent forces will attempt to operate in areas where they do not control the skies. At key times forces will attempt to surreptitiously emplace teams behind enemy lines. To do so quickly may require the use of aircraft. But aircraft flying beyond unit can be detected, and perhaps engaged, endangering the mission and exposing inserted teams.



Aids for airborne insertion permit troops to more accurately land at the intended point and at the same time mask their landing location. Assets include the use of rotary-wing aircraft, and low-flying low- signature fixed-wing aircraft (see, An-2/Colt, pg 3-35). Terms ***parachute, paraglider,*** and ***hang glider***, are not standardized, and are used indiscriminately. They are sometimes classed as ultralight aircraft; but the link is random and due in part to sharing of facilities and the sky.

Parachuting has greatly advanced with development of the cruciform shaped (rectangular) steerable canopies, which can stay aloft longer and offer glide ability (3-4:1 glide angle)

to veer from the aircraft flight path and land precisely at selected landing points. Their superior lift permits them to launch from heights, e.g., cliffs, bridges, or balloons. These parachutes can take off from the ground at lower speeds as well as descend at a slower rate than older round chutes with a soft landing, usually erect and without injury. With their drogue-type pilot chute to open the main chute, they can launch from a towing boat or vehicle. An unattached cart can bear the chutist in a tow launch. Without propulsion,

parachutes lack the lift and glide ability to stay aloft for a prolonged period after launch. Chutes tethered to a towing system are called ***Parasails.***

A spin-off technology is the ram-air parachute, also commonly known as a ***Paraglider.*** The airfoil design has two layers of fabric with an open front to catch air and inflate the semi-rigid structure. Like parachutes, paragliders use nylon, which is subject to UV ray degradation.

Medium performance canopies are rectangular, whereas high- performance canopies are elliptical, weighing 55-139 kg. Some are triangular wing structures, with greater glide angles (5-6:1) to extend flight distance for longer range and stay aloft longer. For experienced users, the technology offers capabilities beyond those of parachutes. They are also more subject to mishap. Poor wind can limit performance. User mistakes, and wind turbulence can result in catastrophic results, such as spin or



canopy collapse. Another phenomenon is “cloud suck”, which can carry the chutist to 9 km or more, where temperatures can drop to -40 ○ Fahrenheit. A chutist can also carry a reserve parachute. In most cases, a collapsed paraglider will recover on its own in about 100 m. Glide speeds can mean faster landing speeds with paragliders.



An adjunct to parachuting or paragliding is ***powered parachuting*** or ***powered paragliding***. This can involve a backpack ***paramotor,*** which can propel and steer troops. Units for parachutists generally require 40 to 70 hp. ***Powered parachutes (PPC)*** convert parachutes into aerial vehicles. With them, troops can stay aloft for long periods and long distances. The paramotor is mounted on the chutist’s back, and is surrounded by a cage. A user can launch from a stationary standing position, and land erect. Most use a gasoline engine, and weigh 20-37 kg. With easily assembled cages, the motors can be transported in the trunk of a car. A

Chinese electric paramotor, the Yuneec ePAC, is in pre-production testing and will likely soon be marketed.





When linked with paragliders, paramotors transform them into ***powered paragliders (PG)*** to fly 100 kilometers on a tank of gas. Paramotors for paragliders need a power range of only 15 to 30 hp. The equipment can be set up in 15 minutes. Disassembly into 3-4 parts takes about 3 minutes. Flight speed is 32-40 km at 150-5,500 meters altitude. They generally cannot launch from standstill.

An efficient design for military units is to suspend a ***trike*** under the canopy and mount the paramotor onto it. Then the operator is freed to fly the craft; and can suspend combat gear to the frame. Some are erected at launch site, whereas others are solid welded structures. Trikes require larger parachutes than for parachutists or paragliders (discussed

below). The chutes have 30 cells, compared to a normal design with 13. Wind and gust should not exceed 10-15 mph in flight. Paragliders and parachutes with trikes usually take off and land from paved surfaces; however, parachute versions have lower stall speeds, and can use unpaved areas as well. One example of a commercial trike is the Powrachute Sky Rascal. The one-seat craft weighs 105/117 kgs, with 40 or 52-hp engine, max payload of 136/159 kgs, and air speed of 67-90 km/hr. Typical trike specifications are as follows:

- Continuous flight capability: ~3hrs w/ 10gal fuel tank
- Take off distance: < 30 meters
- Flight speed: 40 – 111 km/hr
- Flight elevation: up to 5,500 m AGL (150-450 typical)
- Range: Approx. ~185 km round trip
- Glide Ratio: 4-5:1
- Cost: Single Seat $6000 - $10000 USD, Two Seat: $15000 - $20000 USD
- Payload: Up to 1,100 kg (varies by engine type, GVW, and canopy)
- System Assembly / Disassembly: ~10 min w/ 1 person
- Training: 5 – 7 days





Various other structures have been added to powered paragliders, including rubber inflatable boats (RIBs, Vol 3, pg 3-11), pontoons (right) , and wheeled cab designs. A new feature for PPC is Rapid Launch Amphibious Powered Parachute, a rectangular ram-air canopy with helium-filled chambers forming a balloon. The rigid canopy lifts even at standstill, permitting launch from stationary position. Various mounts are permitted, but the one displayed with Rapid launch is a catamaran boat.



Missions with these craft include reconnaissance, insertion, and delivery of critical materials. Trikes can also be used to launch parachutists. With night vision goggles, GPS, coordination with ground support, and nighttime illumination along flight routes, they can operate at night. Illuminated areas are safer for take-off and landing. For powered PPCs and PGs, most of the time, altitude is low (less than 500 m) to reduce likelihood of detection. Flight time is about 2-2.5 hours between refills. With refills and ground support, the craft can fly hundreds of kms. A passenger on a trike could use a laptop or PDA controller to operate small UAVs to fly ahead or conduct area surveillance along the flight path. A paramotor FARP can be as simple as a pickup truck with communications and 5-gallon fuel cans at a pre- coordinated point. Powered parachutes and paragliders are similar to ultra-light aircraft in that reliability, operator errors, wind conditions, and landing/take-off conditions can cause accidents and injuries. However, because of their slower speed and superior lift, consequences of PPC and PG accidents are usually less severe than with ultra-light aircraft.

Powered parachutes and paragliders are an inexpensive alternative to UAVs, or they can be used in conjunction with them. Iran, India, Pakistan, China, Cuba, and Lebanese Hezbollah have all demonstrated either a PPC or PG capability. In 2002 Beijing's China Central Television showed members of Special Forces reconnaissance militia using trikes and a powered paraglider with a small rubber boat similar to a small Zodiac RIB. In 2014 Hamas had plans to use Paragliders as "flying suicide bombs". Authorities in Spain, India, and Norway have also uncovered plots to use paragliders as weapons or to transport fighters into restricted territory.



Hang gliders can be classified as paragliders. Some hang gliders use rectangular parachutes or paragliders, or paraglider wings to bear them when aloft. Higher performance hang gliders use erectable Dacron rigid wings or triangular structures, with bars underneath. The operator lies prone underneath. Hang gliders offer glide angles of up to 20:1, for long flight times and distances. The wing above can block the user's skyward view; so some use transparent material to expand viewing area. Many hang gliders use erectable struts, which can be disassembled and fit into a tube 6 m long, for vehicle mount. A few makers, such as Wills Wing and Finsterwald, offer structures which can fit into 2-meter tubes and inside of vehicles.

Triangular wing paragliders with paramotors are often included in the category of ultra-light aircraft, and operate with similar capability and vulnerabilities.

Another recreational development with possible application to military actions is the ***wingsuit*** (aka ***jumpsuit***). Developed for base jumping, the suit permits a user to glide to earth, and then pop a parachute for a safe landing. Obviously, there is risk associated with this arrangement, with flight speeds of 80-200 km/h and glide ratios of 2-3:1. Training is critical. With schools, clubs, and competitions, designs vary greatly. Brands include Phoenix-Fly, V3, and many others, plus experimental and privately made creations. The jet-powered Go Fast has demonstrated a safe landing without parachute. Wingsuits permit SOF to insert personnel with less visible signature and shorter vulnerability time than those on paragliders. Wingsuits can deploy from 2-man ultralights or trike-powered paragliders, enabling insertion personnel to exit the aircraft quickly. Military designs include the German Gryphon, which has been demonstrated and displayed at exhibitions. With rigid wings and jets, it is intended to offer 40 km range and payloads for military missions. In the Near Term, more composites and inflatable sections may add rigidity for stabilization. It is likely that military versions will offer safer and practical designs for tactical roles.

Ultralight Aircraft and Military Uses



Recreational use of ultralight aircraft has generated a myriad of activities and flying organizations worldwide. Their designs are much less regulated than conventional aircraft, which has led to thousands of makes and designs. They require much shorter and less developed airfields than other aircraft, with few organizational procedures, with primary focus on operational procedures to fly the aircraft.

Many operate on water, to ease dangers of takeoff and landing. In many cases, these are the only craft that can operate in some remote areas. At right is one of several craft operating in the Nepalese mountains. Ultralight aircraft are generally cheap to operate and operators can be trained in a matter of days. The craft can travel for thousands of kms, stopping only for refueling. A number of them can hold more than two persons as well as several hundred kilograms of cargo.

Key descriptors that set ultralights apart from other aircraft are that they are manned, are smaller than conventional aircraft, and are powered. The most common configurations are the following:



- Hang-glider type with a paramotor and seat,
- Smaller conventional wing-over-cab design, and
- Rotary-wing design.

Powered hang-glider type ultralights are easy to produce, maintain, and fly. They were an outgrowth of the expansion in recreational hang-gliding. Designs widely differ; but they usually use Dacron fabric, and a triangular wing design. Similar versions employ conventional wings with swept angles. They are light and require less fuel than other designs. If the paramotor were to fail, the craft can glide to a landing.





Most ultralights have rigid structures; but many combine those structures with fabric wings and shock units. Many are fitted for water take-off and landings. The Italian Polaris FIB (left) has sold more than a thousand units in several models throughout Asia, Europe, and in the U.S. The FIB 2001 Flying Inflatable Boat is an upgraded design using a Lomac RIB hull and weighting 58 kg. It is fitted with a 48-hp Rotax 503 twin-cylinder 2-stroke engine selected for noise suppression. Other FIBs include the

503 (right), with a tandem overhead wing.



Conventional tandem wing-over-cab designs vary from finished craft with attractive designs, dashboard gauges, and shocked retractable landing gear, to Spartan frame structure. The Fotos Seamax is an example of the former. For military use, the craft are apt to be closer to the latter, but with additional features. Military craft are apt to have an open cockpit design with two seats, light weight, ample cargo capability for military gear, and ruggedized for long use and wear and tear of possible combat conditions in difficult weather and terrain. The craft should also be able to accommodate night missions. An example of this kind of craft is Quicksilver Sport 2S (see data sheet next page).



Ultralight helicopters are made mostly in the U.S., Russia, and European countries. They have been sold in other areas. Many are often referred to as gyrocopters and rotorcraft. Most are built from kits, and are 1-seater designs. The Russian K-10 (left) was an early craft used to support Naval icebreakers. An example of a more finished design is from the Italian firm Elisport. The Kompress (Angel CH-7) is a single-seat craft with a 65-hp Rotax 582 engine. It weighs 1,078 lbs, with 2.5 hrs endurance. There are a few 2-seaters available. Civilian and military roles for these rotorcraft include ambulance duty, surveillance, search and rescue, agricultural spraying, etc. Some military versions are equipped to fly unmanned.



Ultralight aircraft vary widely in their reliability and capabilities. All are more subject to weather and terrain considerations than conventional craft. Recently a Hamas-operated ultralight craft broke up off the coast of Israeli in the Mediterranean Sea. Even well-designed craft are subject to adverse events. Nevertheless, these craft offer cost-effective aerial use by civilian and military organizations.



Today ultralight craft are employed in military operations. Most common military missions are insertion of special operating forces, reconnaissance, patrol and quick-reaction units, and delivery of materiel in difficult terrain. They generally have reduced signatures. They can fly low (below radars), and land in areas where conventional fixed-wing aircraft cannot land. Military versions of these craft are used in various countries, including India, Iran, and China. Iran produces ultralight aircraft in a variety of designs. The Iranian Saba Airline Company ultralight is offered for sport flying, short-haul freight, crop dusting, fire fighting, urban taxi service, police patrolling, as well as military roles. The Saba Company offers an unmanned version of its craft for military surveillance. Ultralights could also launch small UAVs, conduct jamming missions, retransmit signals, and attack targets. Craft useable for crop dusting could also deliver chemical agents.

Chapter 6: Theatre Missiles

In an era of increased emphasis on lethality and protection against manned aerial forces, military forces world-wide are seeking to extend their deep-attack capabilities by means other than manned aircraft. Thus, new missile systems are being fielded. The trend among military forces for acquisition of theater missiles has expanded with the growth of regional rivalries and the strategy of using long-range strike capability to gain regional leverage. Theater missiles are generally categorized among two types - ballistic missiles (BMs) and cruise missiles (CMs). They are launched from ground launchers, aircraft, or naval vessels. These systems are designed for deep strike missions¾beyond those of close battle assets. Where missiles are subordinate to the ground force commander, they will be used as another strike asset to support his plan. They may be used for purposes other than execution of conventional strike missions, such as delivery of mines, and information warfare missions.

Theater ballistic missiles (TBM) are an expanding threat to U.S. soldiers, allies, and interests in regions where military forces are deployed, such as South Korea, Japan, Iraq, or Afghanistan. The trend among military forces for acquisition of theater missiles has expanded along with the growth of regional rivalries and the strategy of using long-range strike capability to gain regional leverage. TBM provide the OPFOR commander the ability to strike a target(s) 3,000 km (1,864 mi) away with a nuclear warhead or with an array of conventional warheads.

The role of cruise missiles (CMs) has changed. Prior to the 1990s, fielded designs were generally limited to ***anti-ship missiles*** **(**WEG Naval Vol 3, Littoral Chapter). Improved in guidance systems, propulsion, warhead options, launch platforms, and affordable designs have vaulted CMs to the role of the first option for deep attack against point and small area targets.

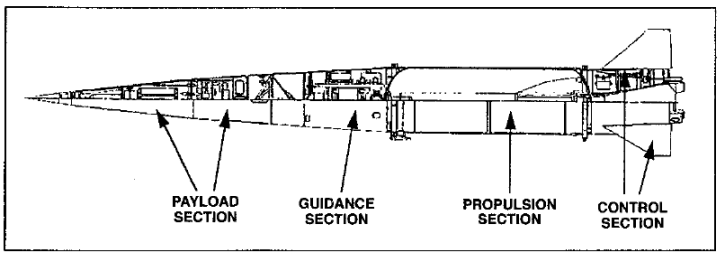
New missile systems have been developed which do not fit in the BM or CM category. These are long-range missiles flying non-ballistic trajectories with a mix of pre-programmed phase and options for manned guidance, loitering in the target area, as well as separate homing by GPS, radar or passive RF seeker, and/or IR/MMW homing. These systems may also be categorized as non-line-of-sight antitank guided missiles (NLOS ATGMs), or as unmanned combat aerial vehicles (UCAVs). They can be launched from ground vehicle launchers, ships, and/or aircraft. Some are developed as anti-ship missiles. Most have high-explosive warheads for multi-role use; and are large enough to kill armored targets and bunkers. They will supplement lethal strikes against high-value targets, including moving targets.

Systems featured in this chapter are the more common systems, or represent the spectrum of missile systems which can threaten US Army forces or interests within an operational environment.

Theater ballistic missiles (TBMs) employ a high-atmosphere or exo-atmospheric ballistic trajectory to reach the target. Because of the high cost and limited numbers of these systems compared to artillery, they will be used against high-priority targets at critical phases of a conflict, or against political targets. Selected OPFOR forces with limited numbers of missiles may hold them in a separate missile unit at echelons above the supported ground force commander. The most critical component of a theater ballistic missile system, which defines its capabilities and limitations, is the missile. Unlike rockets, all missiles have guidance or homing for precision strikes. Missiles are generally classified according to their range¾

- Short-range ballistic missile (SRBM), 0-1,000 km.
- Medium-range ballistic missile (MRBM), 1,001-3,000 km.
- Intermediate-range ballistic missile (IRBM), 3,001-5,500 km.

Numerous countries are adding technologies to extend range and improve accuracy of ballistic missile systems. Approaches for improve range include increased use of solid fuel, lengthening missiles for increased fuel and longer burn time, improving motors (in the propulsion section), using more efficient solid fuel motors, and employing smaller and lighter warheads. Key additions for precision are maneuvering re-entry vehicles (RVs), and GPS. Below is an example of a modern missile (Russian Tochka- U SRBM) and its major components.



Mobility

These missiles employ a high-atmospheric or exo-atmospheric ballistic trajectory to reach the target. Most TBMs follow a set course that cannot be altered after the missile has burned its fuel. However some have the capability for non-ballistic trajectories and precision maneuver. Ballistic missiles have three categories of propellant for engines, which are liquid, hybrid, or solid, effect the distance a missile can travel and the CEP, or accuracy.

The majority of TBMs are able to launch from the ground, or naval assets. Missile ground launch platforms vary from fixed ground launchers, trailer launchers, mobile launch complexes (numerous vehicles) and transporter erector launcher (TELs). Fixed ground launchers may include hardened underground sites. Mobile ground launchers vary from older systems with simple modifications, to specialized vehicles designed for operation in all types of terrain. Newer launchers may incorporate

improved mobility to reduce vulnerability to location by terrain analysis and intelligence preparation of the battlefield.

Lethality

Critical lethality considerations for TBMs include range, precision, munitions options, and responsiveness. The missile system is selected for a mission based on its ability to reach the target within targeting timelines, and its ability to deliver effective lethality on the target. Improved heavy multiple rocket launcher systems with course correction and increased-lethality warheads have replaced TBMs as preferred strike systems against selected deep targets. For instance, a Russian 9A52 MRL can deliver twelve 300-mm rockets 70-90 km with near-missile precision and minimal preparation time. However, a modern TBM can deliver twice the payload a farther distance with better precision against critical heavy targets.

The warhead (within the payload section) is the munition, the lethality mechanism which is selected for that strike mission and around which the system is designed. Many countries acquired ballistic missiles specifically to deliver weapons of mass destruction (WMD) against civilian targets such as urban centers. For such a mission, a less accurate system with a large payload capacity is sufficient for the mission. A substantial proportion of SRBM and some MRBM designs are copies or variants of the former-Soviet SCUD-B/SS-1c. Although these systems lack accuracy and responsiveness of some the newer systems, they can deliver large lethal payloads against fixed targets or targets whose limited mobility permits them to be stationary long enough for the TBMs' operational timelines.

Warhead developments include separating warheads, multiple warheads, maneuvering reentry vehicles (RVs), navigating and homing warheads, varied lethal and electronic warhead fills, warhead buses (e.g., submunitions), and warheads with countermeasures (penaids). Improved precision, in-flight targeting updates, warhead seekers, penaids, and other upgrades will further challenge theater missile defense assets to prevent strikes against priority targets.

Newer TBM designs with improved range, accuracy and operational considerations have been fielded. All missiles have some type of inertial guidance. Accuracy ranges 300 - 500m CEP for older systems, to less than 50m CEP for some advanced systems. These include several missiles with 10 m CEP. Some missiles add global navigation satellite systems (GNSS, e.g., GPS) for improved precision. Thus, older design systems can see immediate upgrades with that change. Further precision (5-9 m) is added with infrared (IR) or radiation-homing seekers.

Another critical consideration for effectiveness of TBMs is their responsiveness. Keys for timely delivery include target location, fire mission calculation and transmission, launcher and missile operational timelines. Therefore, modern missile system support equipment can include computerized fire control, location/navigation system (such as global positioning systems), as well as dependable secure communications. A key technology for increased TBM responsiveness is the use of solid fuel propellant, which removes the need for fueling a liquid fuel missile prior to launch. That step can increase preparation time at the firing point, and delay use or compel use when changing battlefield situation changes the mission. Solid fuel missiles are more consistent and reliable; and the modern trend is toward solid and away from liquid.

Operational timelines for missile crews of fixed launchers as well as mobile TELs are addressed in three phases: (1) time from leaving the hide to launch, (2) time from launch to leaving launch point, (3) and missile trans-loading time prior to next launch. These times are based on technology requirements as well as sound tactics. Steps in the launch sequence based on technology include surveying the launch site, launch coordination, emplacing the launcher,

preparing the launcher and missile for launch, initiating safety measures, and the launch. Post-launch sequence includes displacement of the launcher, and displacement of support equipment. Missile transloading is executed far from the launch site; therefore time includes travel time, service to the launcher, fueling liquid-fuel missiles for the next launch if the next launch is less than 24-48 hours, planning coordination, then movement time to the next launch area (but not to the launch point). Additional time is included in TBM operational time lines because of survivability tactics, as noted below.

The warhead (within the payload section) is the munition, the lethality mechanism, which is selected for that strike mission and around which the system is designed. A number of newer TBM designs with improved range, accuracy and operational considerations including maneuvering reentry vehicles (RVs) have been fielded. Modern warhead developments include nuclear and chemical warheads, separating warheads, and multiple warheads. TBM can also deliver a wide variety of conventional munitions. Some examples are HE, anti-radiation (ARM), fuel-air-explosive (FAE), DIPCM, ICM cluster munition, varied lethal and electronic warhead and EMP fills, warhead buses (varied submunitions), precision navigating and homing warheads (such as IR homing). Countermeasures, including separating and maneuvering warheads, penaids, and other technical measures will further challenge the capability of theater missile defense assets to prevent strikes against priority targets.

Survivability

Technologies for increased missile reliability include almost total conversion from liquid to solid fuel. Some missiles are

canisterized to protect them prior to use and permit easier handling and loading. With increased use of GPS correction and computer digital loading of propulsion system commands, possibilities of misfire and guidance failure are greatly reduced.

The high lethality of the missiles and their launchers means that both are considered by their adversary to be high priority targets for defeat and destruction. Therefore, the OPFOR can be expected to employ a variety of tactical and technical countermeasures to protect them. Tactical countermeasures include: using the missile's long range to outrange most adversary systems, use of hides (such as hardened artillery sites and terrain near the launch point or at trans-loading points to reduce exposure time, high mobility (high speed or all-terrain chassis) to move rapidly and reduce exposure time, use of OPSEC and deception operations (decoys, launch

site emission control measures, movement in clutter, surge operations, etc.), and reduced launch sequence timelines (pre-surveyed site, pre-arranged communications, etc. These steps may sacrifice accuracy for reduced exposure time. More modern launchers will have a minimal preparation time between emplacement and execution of a fire mission.

Technical survivability measures for missiles include: improved coatings and camouflage patterns separating re-entry vehicles, non-ballistic trajectories (to foil trajectory prediction), cluster munitions, and penetration aides (such as jammers in warheads). Technical survivability measures for launchers include:

improved coatings and camouflage patterns and nets, high mobility (to expand useable launch areas), self-survey capability (to minimize emplace time), short displacement time (<5 min), rapid launch sequence, non-ballistic trajectories (to foil back-tracking for counter-battery fires), employment of high- fidelity decoys, and SATCOM encrypted digital burst communications. These measures are intended to degrade the enemy's detection, targeting, impact or effectiveness kill, and lethality effects.

Other Considerations

State-of-the-art TBMs can cost more than a million dollars each. If the systems are not accurate enough, or if the enemy has ABM capabilities, those TBMs may not have a high assurance of success, and may not be a factor in the OPFOR plan. Thus, budgetary, political, and military considerations affect TBM decisions. The OPFOR may limit its missile requirement to systems used to gain regional political leverage by targeting civilian targets. Given the budget limitations and systems costs impacting most military forces in recent years, the OPFOR will likely have a mix of older and newer systems and selected upgrades. They may also balance the mix of TBMs with other, less costly, long-range precision strike assets. These can include ***precision artillery rockets***, ***precision artillery missiles***, non-line- of-sight antitank guided missiles (NLOS ATGMs), ***unmanned combat aerial vehicles (UCAVs)***, and ***cruise missiles***. Cruise missiles (CM) are discussed in the section beginning at pg 5-11.

Conclusions

Updates to both launch platforms and missiles systems are allowing the threat to become increasingly mobile and accurate. The extended range of both missiles and their mobile platforms create a dangerous combination providing a potential adversary the ability to launch missiles and strike well beyond preconceived ranges. These assets are a critical component of deep strike mission planning for conventional forces. They are also used as an asymmetrical political tool for use in affecting strategic power calculus in peacetime international struggles.

Foreign Theater Ballistic Missiles

System Type	SRBM	SRBM	SRBM	SRBM	SRBM	SRBM	SRBM	MRBM	IRBM	Technologies & Trends
Name/ NATO Name Designator	Tochka-U SCARAB SS-21 Mod 3	M-7 B610 CSS-8	SCUD-B SS-1c	SCUD-B Mod 2 SS-1c Mod 2	M-11 DF-11 CSS-7	SCUD-C SS-1d	M-9 (export) DF-15 CSS-6	Nodong-1	DF-3 CSS-2	More SCUD variants
Producing Country	Russia	China	Russia North Korea	Russia	China	Russia North Korea	China	North Korea	China	Technology Transfer
Proliferation (countries)	At least 11 all variants	At least 2	At least 20	At least 1	At least 2	At least 5	At least 1	At least 1	At least 2	Increased proliferation
Type Launcher	TEL	TEL	Fixed, TEL	Fixed, TEL	TEL	Fixed, TEL	TEL	TEL	Fixed, Mobile complex	Mobile/decoy launchers
Propulsion	Single-stage Solid	Single-stage (est) Solid	Single-stage Liquid	Single-stage Liquid	Single-stage Solid	Single stage Liquid	Single-stage Solid	Single-stage Liquid	Single-stage Liquid	Non-ballistic trajectory
Range Min-Max (km)	20-120	50-150	50-300	300	50-300	500	200-600	170-1,300	1,500-3,000+	Increased range
Guidance	Inertial	Inertial	Inertial	Inertial IR homing	Inertial	Inertial	Inertial	Inertial	Inertial	Multi-sensor Homing

Accuracy (m) (Max Range)	5-10 IR-Hmg 15 without	150	1,000	50	300	<800	600	4,000	2,000-2,500	Improved Guidance
Payload (kg)	480	190	1,000	600	800	700	500-600	770	1,500-2,150	Separating multiple RVs
Warheads	HE, Chem, ARM, Nuc, IR Homing, APAM, ICM, EMP, DPICM	HE, Chem	HE, Chem, Nuc	Separating HE, Nuc	Separating HE, Nuc poss Chem	HE, Chem	Separating. HE, Nuc poss Chem Poss Fuel-Air Submunitions	HE, Chem poss Nuc	HE, Nuc, or 3 separating reentry vehicles (RVs)	Cluster, Volumetric, Submunitions BW warheads ARM, EMP
Comments	TEL is amphibious 2 msls/TEL	Modified SA-2 SAM Tracked TEL	Technology widely used	Previously called SCUD-E Requires compatible IR imagery	Exported as M-11	SCUD-B variant Russia limited production	Mod 2 range 1000 km DF-15B CEP 150-500 m DF-15C CEP 35-50 m	SCUD-B variant ND-2 IRBM variant Poss export	Variants with varied warheads and ranges Towed launcher Lengthy prep time	Autonomous operation, Penaids*/ Counter-measures, Reduced prep /displace times

* *Penaids - Penetration aids, such as RF jammer*

Cruise Missiles

In the global arena many countries, including potential Threats to the U.S., are procuring cruise missiles (CM) as an inexpensive alternative to ballistic missiles and aircraft. CMs are economical and accurate delivery systems that can be used to deliver conventional, and nuclear, chemical and biological warheads. CM proliferation poses an increasing threat to U.S. National security interests. As the technology matures further, both State actors and non-state actors are becoming increasingly able to acquire cruise missile and effectively employ CM capabilities. The Hezbollah 2006 cruise missile attack on the INS Hanit illustrates the danger to units that are not technically prepared to meet this challenge.

Many older CMs are still used in less capable military forces. They fly a straight course to target with relatively slow speed (subsonic), are vulnerable to early detection, and can be shot down. Due to imprecision in guidance systems and the difficulty of flying long distance overland to ground targets, they are used as ***anti-ship missiles***. But in most forces they are being replaced by newer systems.

Cruise missiles (CM) are unmanned precision aerodynamic munitions with warheads propelled by rocket motors or jet engines, and designed to consistently fly a non-ballistic trajectory to the target. The diagram below illustrates the four main components of a basic cruise missile: (1) a propulsion system, (2) guidance and control system, (3) airframe, and (4) payload. CMs may have booster rockets which fall off after fuel is depleted. Then turbofan engine engages, the tail fins, and air inlet, and wings unfold. At the target the missile either dispenses its submunitions or impacts the target and is destroyed.



The overall sophistication of CMs has increased greatly with technological advancements. This is especially true with regard to guidance systems in the era of more capable Global Navigation Satellite Systems (GNSS) like GPS, Russian GLONASS, Chinese Beidou and the European Galileo. These advanced guidance systems, in combination with autonomous onboard systems, have allowed CMs to become more accurate in acquiring targets. The basic CM guidance controls consist of one of four different systems (below) that direct the missile to its target. Most newer CMs use a combination of systems to provide redundancy and precision in a combat environment.

1. Inertial Guidance System (IGS) tracks acceleration via accelerometers from missile movement compared against a known first position, usually the launch position to determine current location.
2. Terrain Contour Matching (TERCOM) uses a radar or laser altitude system, and compares terrain features enroute to a pre- loaded 3-D map terrain database.
3. GNSS (e.g., GPS), uses satellites and an onboard receiver to verify the missile's position.
4. Digital Scene Matching Area Correlation (DSMAC) uses a camera and image correlator to identify the target (good versus moving targets).

The most effective mix is IGS on the airframe, with TERCOM and/or GNSS with multiple route waypoints. Upon arrival in the target area, the missile can loiter or home based on warhead identification of target DSMAC, GNSS, or radiation confirmation. Some CMs can change route and target assignment while enroute, to maximize their effectiveness.

Technology of CMs is changing; and their role is expanding. CMs are relatively mobile and easy to conceal. Even after launch the missiles can avoid detection by traveling at low altitude, under many radar horizon and use terrain masking until the CM reaches the target. The newer CMs present even greater challenges to aircraft and air defense assets by integrating stealth features that make them even less visible to radars and infrared sensors. CMs can take roundabout routes to engage their targets, and are usually programmed to circumvent known defenses and engage targets from gaps in radar and SAM coverage. Modern cruise missiles offer flexibility for different configurations, and for air, sea, and ground-launch. In the COE, ground-launched CMs (GLCMs) can fly to targets within artillery range to support artillery fires, or deep to attack high-value ground targets. A CM's size, alterable course, and unique low flight profile makes it a convenient system for dispensing chemical or biological agents, for jamming, and for designating targets with an LTD. Examples of applications include *Exocet* and *Apache*. Swedish Bofors, South African Denel, and German LFK offer similar systems.

CMs used against ground targets are referred to as ***land-attack cruise missiles*** (***LACMs***). They can be ground, ship, or air-launched. Precision guidance has permitted rapid growth of multi-role ***air-launched cruise missiles*** **(ALCMs)**, for use against various naval and ground targets. ALCMs for land-attack are included in WEG chapters on aircraft (9 and 10) or in later issues. Cruise missiles vary in size, range (25-2,500+ km), and warhead payload. Larger ones can actually be manned bomber aircraft loaded with ordnance and controlled by a remote pilot system. An innovative modern small CM is the Harpy (pg 5-13), which can launch 18 missiles from a truck “cassette launcher”. The BrahMos (pg 5-14) is an example of an operational level supersonic GLCM system, with future applications on other platforms. Initial uses are against ships, as well as high value nodes, such as airfields, C4, and missile launch sites. BrahMos ALCM and ship-launched versions are due out soon.

Other Options for Land-Attack

The overall decline in military budgets is likely to restrict the number of high-technology cruise missiles for land-attack to strategic and operational-strategic systems. For operational level, newer and lower-cost technologies such as semi-active laser-homing (SAL-H) and fiber-optic guidance (FOG), coupled with preprogrammed inertial/GNSS navigation, offer more precision long-range strike systems for forces with somewhat constricted budgets. Examples are Nimrod and Hermes. These systems are extensions of ATGM technologies, but with fire control mechanisms which resemble those of precision-guided artillery (see Vol 1, pgs 6-72 to 75). An example of a bridge system is the Israeli Nimrod 3 (SAL-H), which is listed with the NLOS ATGMs; but its range (55+km) places it in the same range band as precision guided artillery. Better-equipped forces (Tiers 1 and 2) have some AT units for long-range AT strikes, and perhaps in artillery units in the Integrated Fires Command (IFC), against high value targets. A Russian counterpart is Hermes SAL-H missile (initially 18 km) also listed with NLOS ATGMs. By Near Term it will range 100 km, for strikes against deeper high-value targets and guided by UAVs with laser target designators.

Another type of affordable technology cruise missile has emerged—the attack UAV. UAVs differ from cruise missiles in that an operator can guide the aerial vehicle, using its downloaded camera view and ground station controls. Most early ones used less precise pre-programmed inertial guidance, but with camera guidance for a precise hit-to-kill terminal phase. High UAV costs delayed fielding for these attack UAVs. However, the difference has become more discrete with GNSS-based route programming on the approach and return phases to reduce operator fatigue. Thus the UAV operator can focus his attention to the attack phase. Most attack UAVs (see pg 3-15) use less precise programmed guidance than CM (e.g., the Italian/former Iraqi Mirach 150), since they have camera guidance for a precise hit-to-kill terminal phase. As systems have become more robust, recent attack UAVs now offer precise GNSS, with capability for dozens of waypoints and capability for immediate changes, better-stabilized camera guidance, and IIR or MMW radar-homing for the terminal phase, similar to CMs. High UAV costs similar to CM may limit their fielding. Still, modern CM like Israeli Delilah offer programmable navigation and camera view guidance for the terminal loiter/attack phase, similar to most attack UAVs. More successful were anti-radiation missiles (ARMs), such as Harpy (pg 5-13), special-designed to destroy high-value radar targets.

New technologies and a continued requirement for unpiloted deep strike systems have accelerated R&D activity offered new attack systems. Smaller, more effective, and less costly systems are available. They can be separate weapons, canister/MRL launched, or dispensed from bus UAVs as munitions/submunitions. Some use GNSS phase, camera guidance, and IIR or MMW radar-homing terminal guidance, which will blur the lines between attack UAVs and CMs. Recently, UCAVs as ordnance delivery platforms have been fielded (such as Hermes 450 with Mikholit missiles, see pg 4-18). New longer-range NLOS ATGM systems (see Vol 1, pg 6-75) can also serve in the role of cruise missiles. These, attack UAVs and UCAVs will compete with CM for most battlefield targets to a range of 200 km.

The potential for adaptation of new technologies into attack UAVs or LACMs strains current paradigms for weapon system boundaries. Artillery rocket launchers can launch course-corrected (or maneuvering) rockets or missiles. The Russian R-90 reconnaissance UAV demonstrates the viability of such a vehicle for future attack variants. Russian developers also have demonstrated a niche capability, claiming that SA-11 variant (Buk-M1 and Buk-M1-2) SAMs can be used to attack high-value ground and sea targets. Modern LACMs, as well as adaptive applications such as the ones noted, can bridge requirements of ATGMs, artillery, SAMs, and TBMs for OPFOR deep attack.

Selected Non-Ballistic Land-Attack Systems

System Name	Producing Country	Proliferation (countries)	Type Launcher	Propulsion	Range Min/Max (km)	Guidance	Accuracy (m)	Warhead Types	Payload (kg)	Comments
Nimrod	Israel	At least 3	Tracked veh	Missile	0.8-26	Semi-active	Home to	HEAT	15 kg	Dive attack
Nimrod 3			or TUV	motor	0.8-55	laser Inertial mid-course	beam (1)	(800 mm)	warhead	Requires laser designator
Mirach-150 UAV (poss)	Italy, Iraq	At least 5	Ground veh ramp	Turbojet	up to 470	Radio and pre-program	INA	HE est	INA	Attack version of recon UAV
Polyphem/TRIFOM Polyphem-S (Naval) Triton, torpedo based	Consortium France Germany Italy	In final testing in 2002	Ship, MRL-type, Truck, TUV/ATV	Missile motor	60 TRIFOM 100 future Triton 15	Fiber-optic Infrared. Pre-program mid-course phase	Guide to target (1)	HEAT + Frag/HE	20-25 kg warhead	ATGM version expected. Concept for remote launch canister and TV control link
Brahmos and Yakhont	India Russia	At least 2	Truck, ship, FW (due)	Ramjet	290	GPS/Inertial	<20	Frag-HE	250	Supersonic
R-90	Russia	1	MRL	Rocket	90	Camera	.5	HE		Adjust fire, BDA
Harpy	Israel	At least 5	Truck	Rocket	500	GPS, Radar	1	Frag-HE	18-22	
Delilah	Israel	At least 1	Truck, ship, FW	Turbojet	250	GPS/Inertial	1	HE	30	Waypoints, loiter

Chapter 7: Air Defense Systems

The increased effectiveness of aerial systems in modern warfare continues to drive a corresponding commitment for most forces to improving air defense forces, tactics, and technologies to counter them. Air defense (AD) is organized to address all capabilities of adversary aerial systems which can be used against a force. In addition, AD is integrated with other units (information warfare (INFOWAR), tactical units, ground reconnaissance, and aircraft units) to counter aerial threats. The AD plan means a force-wide strategy with active and passive all-arms counters, first to negate the effects of aerial systems, and second to destroy aerial systems when possible.

Air defense utilizes a variety of systems including: fixed-wing and rotary-wing aircraft, ballistic and cruise missiles, unmanned aerial vehicles (UAVs), unmanned aerial combat vehicles (UCAVs), air- delivered munitions (such as missiles, rockets, bombs, etc.), ground-launched rockets, and airships. For nearly a century, as developers of aerial systems developed new capabilities, AD developers responded with new tactics and technologies to counter them. In turn, aerial forces responded to the AD. Both sides of this antagonistic struggle continue fielding new technologies, counter-tactics, and countermeasures, even counter-countermeasures.

The AD forces are finding new ways to integrate those changes with more aggressive planning and organization. AD requires integration of separate functions: reconnaissance, target acquisition, C4, and battle management, and target engagement – often with those assets separated by several kilometers. Assets for each can be vulnerable to physical attack, with links vulnerable to INFOWAR deception. Thus, AD forces continue updating systems and fielding new ones. As with aerial threats, AD is finding new missions and approaches for success.

Because of their ability to move and strike in any terrain and weather, aerial forces are generally the aggressors. Key capabilities for modern aerial assets must be addressed. The most challenging are traditional ones, but with new and greater technologies. They are:

- Suppression of enemy air defense (SEAD), for AD destruction, and INFOWAR attack (including jamming and cyber-attack).
- Surges, with multiple aircraft, multiple types of systems, and multi-aspect approaches,
- Strikes, with improved precision surveillance (satellites) and weapons (ballistic missiles),
- Stealth, in aircraft design, UAVs and UCAVs, and use of terrain flight profiles.

AD depends on efficient C2 for responsive, integrated, and survivable counters to enemy aerodynamic weapons. Because increased threats from stealth, surges during air operations, aerial long- range weapons, and more forces are using improved C2 to form integrated air defense systems (IADS). However, the increased challenges to air defense C2 also require ability

operate autonomously or in small units.

Key aspects of AD effectiveness against surges are: use of redundant overlapping systems with varied C2 and RISTA nets, digitally linked and autonomous batteries, increased responsiveness, increased missile loads, and improved missiles for single missile kill per target. Modern battle management centers in IADS can de-conflict targets and maximize AD effects.

Sensors are a critical component of AD systems, since they perform surveillance and tracking functions against fleeting targets. Radars have dramatically improved, and receive the most attention among AD sensors. But increasingly, acquisition packages use multiple sensors, including acoustics, electro-optics, etc. In recent AD weapons, radars are integrated with passive sensors, such as optics, electro-optics, TV cameras, night vision sights, auto-trackers, and laser rangefinders. Throughout the force, air approach/attack warners are used, and may be linked with man-portable AD systems (MANPADS). Night sights are now common on weapons such as machineguns and MANPADS.

Weapons trends focus on guns and missiles, e.g., fitting both onto one chassis. Guns and missile launchers are increasingly more mobile and reliable under all conditions. They are becoming better integrated for responsive operation at AD brigade, in small units, and down to the single weapon. Most systems have onboard C2 and passive electro-optical (EO) acquisition systems which permit them to operate precisely and autonomously, and slew quickly.

Improved long-range AD (LRAD) and medium-range AD (MRAD) surface to air missile (SAM) systems feature increased velocity and acceleration, high-G turn capability, and precision for use in ballistic missile defense (BMD). Short-range air defense (SHORAD) systems include the use of high velocity missiles (HVM), which can intercept high-speed anti-radiation missiles (HARMs). AD use of low probability of intercept (LPI) radars and signature reduction technologies challenge the ability of aggressors to locate and engage the systems.

Many SHORAD upgrades can counter low-flying helicopters using covert tactics and cruise missiles (CM). New technologies include laser and radio frequency weapons, and hypervelocity kinetic energy missiles. Modern MANPADS can be found in lower-tier forces. Improved missiles with proximity fuzes can fly lower to kill helicopters flying at nap-of-the-earth. New munitions such as frangible or electronically fuzed rounds increase gun lethality. Modular missile launchers and remote operated guns can transform vehicles or towed chassis into AD systems. MANPADS launchers can mount on vehicles with improved sensors and C2 links for robust AD support. Upgrade sensors and weapons can rejuvenate older AD systems.

The greatest threat to AD is the use of stealth systems. New missile systems with multi-spectral nets and phased-array radars are being used to better detect stealth aircraft. Updated early warning radars and newer INFOWAR passive RF systems are being linked into IADS. AD aircraft, nets with substantial numbers of aerial observers, unattended sensors, and nets of modern infrared sensors are also used.

The priority for countering air threat applies force-wide. Most OPFOR weapons and sensors, including infantry and vehicle guns can engage helicopters and other AD targets. More weapons are multi- role or air defense/antitank (AD/AT). All machineguns can be used for AD. The OPFOR mixes legacy

systems, improvised weapons, and recent equipment to improve AD across the AO. Modernization trends cover all aspects of the AD network, including SHORAD and long-range AD (LRAD).

Air Defense Command and Control and RISTA in Training Simulations

Portrayal of combat systems capabilities in training simulations is never exact, and often may display serious limitations which hamper realism. Portrayal of air defense is particularly challenging because effective AD requires timely and effective integration of weapons, support assets, C2, and skillful planning. Budget constraints, hardware, and other limitations can impact portrayals. The OPFOR is required to be ***reasonable, feasible, and plausible***. These priorities equally apply in OPFOR air defense systems portrayal. The following describes OPFOR air defense technologies and capabilities to be addressed in training simulations.

Responsive, efficient, effective, and survivable air defense requires effective C2 in weapons units and the IADS. Flexible and integrated C2 is particularly difficult to portray in simulations. These divergent priorities are in conflict. The AD system must link weapons with sensors. It begins with the individual air defense system, with the fire control system providing autonomous C2. Increasingly, forces are providing autonomous capability for AD systems.

Many forces are producing mobile AD battle management centers. At the tactical level, they are in armored command vehicles (ACVs) for AD batteries and battalions. Tier 1 and 2 AD units have ACV/radar vehicles (e.g., Sborka). They can also be used in separate batteries plus link to the IADS. A modern ACV can receive, process, and pass a message in seconds (roughly 15, 4 for digital links), with parallel multi-function processing and multiple addressees (6-12). Older ACVs, e.g., PPRU, use analog voice and/or digital data links with longer processing/ transmission times. An IADS with analog C2 is still an IADS, but may be a less responsive one. An IADS is physically dispersed for autonomous action, yet operationally integrated as required.

Air defense organizations balance capability with survivability by managing an array of sensors to provide full 360° coverage, surveillance in depth, with long-range assets supported by mobile reconnaissance assets and overlapping search sectors. The

system requires: centralized linkage of various gun, missile, and gun/missile units, and coordination with AD aircraft units. Units will be relocated and re-assigned to prevent gaps in coverage. Airborne warning and command systems (AWACS), and other airborne air defense assets (aerial patrols, etc.) will be used. The IADS integrates AD nets and links them with other RISTA nets (air, ground recon, artillery, etc.) to fuse the battle picture, cue AD assets, and warn of approaching aircraft throughout the force. An IADS provides early warning (EW), assures that weapons resources are efficiently assigned to service all targets at the maximum possible stand-off, and reduces delay for vehicle halt and weapon response time. It also provides target acquisition (TA) data during jamming, avoids fratricide for aircraft operating in the area, and reduces redundant fires.

Missions are netted through the IADS with battery/battalion radars, command posts, longer- range radars for battle management at brigade and above, and various other sensors (acoustic, infrared, TV, visual, and other technologies). Modern EW units use long-range radars located behind the forward area to see for hundreds of miles, and use radar signal parameters to reduce jamming and terrain restrictions. These radars feed approach warnings throughout the net so that most AD systems can operate passively and not reveal their locations until the moment of engagement. They help facilitate AD ambushes by transmitting aircraft locations and allowing weapons radars to radiate only at the last minute when air targets are within range. Many SAM systems can use the IADS digital feed instead of their radars for passive operations.

The primary detection and acquisition system for an air defense unit is radar. Radars can more easily detect and track aircraft with less operator input than other sensors (e.g., EO sights). Radars are usually categorized by function and functions usually correlate to certain frequency bands. Older early warning (EW) radars generally operate in low frequency bands (A-E), for longer detection ranges. They can track targets and cue precision sensors to support an IADS.

Air Defense Radar Bands in the Electromagnetic Spectrum			
NATO Band	US Band	Low-End Freq (GHz)	Wavelength
A		0.0	
B		0.25	Decimetric
C		0.5	
D	L	1	
E	S	2	Centimetric
F	S	3	
G	C	4	
H		6	
I	X	8	
J	Ku	10	
K	K, Ka	20	Millimetric
L	L	40	
M		60	
X		8-12	

AD units employ a mix of radar systems operating at different frequencies in varied intervals with some radiating while others surveil passively. More mobile radar systems are being fielded with ability to quickly employ radars or operate radars while moving. Target acquisition (TA) radars are used to acquire aerial targets (and assign them to the fire control system for launch) often operate in I and J bands. Other bands offer precision and range while undetectable at scanned frequencies. Fire control (FC) radars (which track missiles and targets and direct weapons to target) often operate in H-J bands, but can operate in less detectible bands. Many more modern systems use dual-mode/multi-mode radars that can simultaneously perform EW, TA, FC or combination, with (automatic) target tracking during the engagement. For the OPFOR, unless air missions are scheduled, free-fire zones do not require IFF checks. Thus, most OPFOR sectors are free-fire zones and the OPFOR AD usually launches on first detection.

Radar performance is affected by technical factors such as: functional requirement (EW, TA or fire control), type (phased array vs continuous wave or pulse), operating paramaters (fan angle, power levels, operating time, frequency, etc), mount (stationary, mobile, missile mount on active homing missiles), target (radar cross section, countermeasures, speed, altitude, etc), and environment (curvature of the earth, terrain, weather, etc). Performance is also affected by tactical considerations of the target (aircraft dispersion, their use of stand-off weapons, etc), requirements for support systems, and survivability tactics for the radar (narrowing beam width, limited operation times, passive modes, frequent moves, etc.)

Increasingly, IADS also use passive sensor systems such as acoustic-triggered unattended ground sensors, remote-operated EO systems with auto-trackers, radio-frequency direction-finders, and sensors operating in other regions of the electro-magnetic spectrum. Acoustic sensors include acoustic arrays such as the HALO stationary microphone complex. They also include vehicle systems such as Israeli Helispot with microphones mounted onboard or dismountable. Russian sound-ranging systems (AZK-5, -7, etc.) can detect helicopters. Links from nearby units (recon, maneuver, artillery, etc.) can also supplement AD sensors.

An affordable low-technology response to air threats is AD observation posts (OPs). Forward OPs can support EW radars as well as AD OPs in tactical units. They can also include special purpose forces or civilian supporters near airfields or helicopter FARPs that can engage aircraft or notify AD units. Assets may include day/night observation systems, remote IR cameras, acoustic sensors (such as sound-ranging systems), anti-helicopter mines, and MANPADS. In Tiers 1 and 2 they will use laptop computer terminals and digital links to pass data. Sensors can include man-portable radars such as FARA-1. These OPs use goniometer-based laser range-finders, GPS, and radios for precise location and warning, and rapid reporting. In Tiers 1 and 2, MANPADS operators have azimuth warning systems which alert them day and night to approaching aircraft. In lower tier forces, radars can be supplemented with forward OPs (perhaps with binocs, compass and radio) to cover defilade areas and masked areas of approach. In the Near Term OPs will have micro-UAVs to detect and attack helicopters or chase them off.

An IADS does not limit autonomous fires, rather provides early warning and reduces delay for vehicle halt and weapon response time. Because the enemy will attack C2 nodes and detected AD radars, most AD systems and subunits must be able to operate passively and autonomously with mobility and dispersion. It also provides target acquisition data for AD during jamming, avoids fratricide for aircraft operating in the area, and reduces redundant fires.

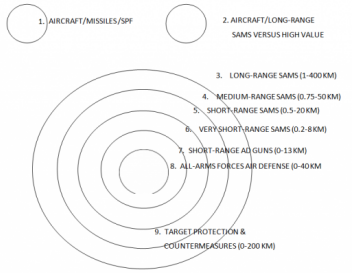
Most air defense systems have passive EO sights for use when radars cannot be used. They include TV day sights, infrared or thermal night sights, and target and missile trackers. Sights can have zoom capability with 24-50 + power, acquisition range equal to or greater than a radar, and minimum altitude down to the ground (0 meters). Range may be limited, however, by line-of-sight. Thus, EO range is comparable to a targeted aircraft's EO sensor acquisition range.

An IADS can operate as low as brigade level with AD working in concert with other units and other echelons. Even when a formal IADS is not established responsive and coordinated AD is possible. For instance FOs can notify AD weapons of enemy approach and direction. The FARA-1 radar can easily be mounted onto AD guns for day/night operation. Anti-helicopter mines can be used to cue AD ambushes. Innovations such as remote weapons and sensors and portable digital FCS are updating older AD weapons, permitting them to link to IADS. Battery ACVs such as Sborka feature EW/TA radars for RISTA and link to IADS.

Air Defense Systems and Domains

In modern warfare, the initial air operation is considered to be the critical component to success against modern enemy forces. That operation is expected to disrupt or destroy critical C3 nodes, exploit vulnerabilities in the air defense nets, and facilitate widespread aircraft and missile strikes against military targets. That operation would include stealth precision aircraft, missile strikes, and rotary wing aircraft flying low level deep strike missions. These would be generally conducted prior to entry of ground and naval forces in order to facilitate early entry safely. In modern forces using aggressive planning, the air defense plan will be designed in detail to counter each aspect of the air operation. Thus, the air defense operation must begin prior to the air operation to deny it success and insure integrity of the threatened forces and area. Air operation forces and air defense forces continue to see changes in plans, tactics, and equipment to counter the other’s advantages, while operating within modern military budget constraints. A number of forces are choosing to reduce the size of costly fixed-wing aircraft, while increasing the sizes of theater missile and air defense forces, to deny adversaries air superiority. Trends noted on page 6-13 affect systems, fielding choices, and capabilities in all AD domains.

There are at least nine air defense plan domains with distinct missions, tasks, weapons, sensors, and phases in the air defense operation. Actions may require simultaneous effort in all nine domains. It is an all-arms effort involving more than just air defense forces. Range figures for these systems are general, variable, and changing with overlaps.



Domain 1

The plan calls for a combination of pre-emptive, reactive, and passive air defense measures being conducted simultaneously. Surveillance assets, especially forward observers, will be deployed around all potential adversary landing areas, including helicopter lighting points, to monitor activities. In the initial phase, and later as the adversary’s aircraft reach forward locations,

pre-emptive measures will be conducted by IW and deep-attack assets to degrade the adversary's air operations before they even reach defended airspace. Forces will attack airfields and helicopter lighting points and FAARPs with air-launched stand-off weapons, ballistic and cruise missiles, and special purpose forces. At critical phases of the operation, they will disrupt satellite systems and attack adversary long-range surveillance assets.

Domain 2

Generally, AD air and ground forces will attempt to engage and disrupt enemy air activities as early and distant as possible to decrease the chance for enemy air success. Air intercept aircraft and long-range AD (LRAD) systems will attack reconnaissance aircraft, AWACS aircraft, SEAD aircraft, and bombers. Because of curvature of the earth limitations on SAMs, aircraft will operate at altitudes below the minimum altitudes of the SAMs, at ranges of 250 km, or more. Special nets of radars and passive Electronic Support (ES) systems will be created specifically for detection of stealth aircraft and cruise missiles, flying at lower altitudes.

The AD plan includes flexible prioritization of AD systems to deal with key events, such as enemy surges, ballistic missile and cruise missile strikes, and AD forces to survive air and SEAD operations, and ground forces attacks. The two main deployment priorities are site defense and area defense, and they activate as targets come into range. Forces hold out a portion of LRAD/MRAD launchers for site defense against ballistic missiles. Even when aircraft reach the range of MRAD systems, LRAD may service targets while MRAD SAMs conduct AD ambushes, monitor the IADS, and use passive electro-optical fire control systems (FCS).

Domain 3

Long-range SAMs (pg 6-79) include Russian and Chinese missile systems, e.g., SA-5, SA-10, SA- 12, SA-20b, SA-21, SA-23, and HQ-11. These upgraded and new systems are networked with long-range early warning radars and electronic support measures (ESMs) to form the base for operational IADS. In the past, the size of the missiles limited them to selected roles, like counters to high priority aircraft (Domain #2), long range defense versus small formations (Domain #3), and anti-ballistic missile defense of high priority sites (Domain #9). However, several LRAD systems are being modified to fit canisters of "small missiles", to counter surges and all air targets in the other domains (#4-8) as well.

A wide variety of RISTA assets including forward observers, HUMINT assets and RISTA systems support AD operations. Early warning systems have lost appeal in certain AD circles, but are still useful. They operate in low bands outside of bandwidth of most radar detection systems, and have long detection ranges. Many are being modernized with multi-target precision tracking, and digital transmission and display systems. As aircraft approach the range of AD weapons, they are acquired by EW radars, which conduct IFF queries and feed intelligence to the Integrated Air Defense Systems (IADS). There is one overall IADS for the force. But other overlapping area and AD brigade IADS are used in case the central IADS is defeated by enemy SEAD. The IADS battle management center will select target acquisition radars to conduct surveillance and track targets, update the plan, and assign new targets. New phased-array TA radar and battle management systems have interface and networking features toform autonomous IADS, and autonomous firing units down to the battery level, and challenge SEAD and evasive aircraft tactics. As aircraft approach the targets, noted at 9, they have entered engagement zones of not one, but many types of AD systems and RISTA nets, each linked to the IADS and its RISTA nets. Thus, they are detected by multiple radar frequencies, ground observers, vehicle EO/IR acquisition systems, sound-ranging assets, and AD Infowar (IW) assets. Although the diagram depicts concentric circles with a single epicenter, defended forces are arrayed throughout the area; and multiple MRAD/SHORAD epicenters and assets overlap.

Domain #4

Most MRAD systems in Domain #4 (pg 6-71) are Russian, e.g., SA-3, SA-4, SA-6, SA-11, and Buk-M1-2. Some are highly mobile and can move with ground forces and challenge air surge capabilities of expected adversaries. Because of their high cost which approaches that of LRAD, most MRAD systems

in used are older. But a number of users are updating them to approach modern capabilities, to counter short-range ballistic missiles, cruise missiles, stealth aircraft, and low-flying helicopters. Other countries are looking at the possibility of adapting LRAD systems to handle surge requirements and reduce the need to upgrade or produce MRAD systems. Other forces, e.g., Israelis (Spyder), Italians (Aspide 2000), and Indians (Akash) designed systems that in some cases are more affordable and mobile.

Domain #5

The short-range SAMs in Domain #5 include a wide array of systems produced and exported throughout the world. Leading producers include China, Russia, the US, and many European countries. Although the systems in this domain include semi-mobile towed systems, most are vehicle mounted and can be brought into action from the move in 0.5-5 minutes. Many can move with supported maneuver forces. Others cover critical assets which are likely air targets. Some are assigned to cover areas with defilade terrain and man-made features which could be approaches by aircraft flying contour or nap-of- the-earth (NOE) profiles. These systems have substantial missile inventories to respond during enemy surges. Many modern SAMs are configured as gun-missile systems (pg 6-34), to engage almost all aerial targets (including cruise missiles, UAVs, air-to-ground

missiles, and helicopters flying NOE).

Domain #6

The very-short-range systems in Domain #6 also called Man-portable SAMs, or Man-portable Air Defense Systems (MANPADS). They can be dismounted; however, some vehicle mounted systems have been developed which use the same missiles. A wide variety of upgrades are expanding the lethality (and range) of these systems. Additionally, multi-role missile systems (such as Starstreak, pg 6-60) are being fielded.

Domain #7

AD gun systems are not as widely used as in the past. The primary reason for this is the limited effective range of most guns. Although gun range is noted as out to 13 km (KS-19M2 with radar, pg. 6-45), most AD guns are effective at ranges of 4 km or less. A lot of forces upgraded those guns by merging guns and missiles systems in gun-missile systems. Some forces still field new self-propelled AD guns. Substantial upgrades (pg 6-34 to 42) have increased effectiveness and utility of most weapons.

Domain #8

Modern forces proliferate weapons (especially machine guns) for self-defense, especially versus air threats (see pg 6-33). Ground and air responses to air threats include more medium guns, improved AD munitions, and more responsive missiles and FCS.

Domain #9

Developments in target protection and countermeasures include use of CCD technologies and tactics, as described on the next two pages, and in Chapter 9.

Aircraft Survivability and Air Defense Countermeasures

Modern forces focus much attention to protecting aircraft during air operations through a blend of tactical measures and technical capabilities which are collectively known as ***suppression of enemy air defense (SEAD)***. Separate SEAD aircraft and IW assets are engaged in locating AD assets, jamming AD C2 and RISTA assets, and attacking systems in the AD network. Often SEAD aircraft will accompany FW and helicopters in carefully coordinated air missions. In addition, modern tactical aircraft and supporting aircraft can be equipped with aircraft survivability equipment (ASE) to countermeasure incoming AD missiles.

The OPFOR, like most forces in the world today, have developed technologies and tactics to counter ASE and SEAD. The first priority for AD effort is always force survivability. The OPFOR knows that SEAD usually facilitates other aircraft conducting missions; thus air protection measures are addressed in all units and at all levels. These include a network of air warning receivers to sound air alerts down to battalion level and below.

The most common and challenging air threat is from helicopters, because of their proliferation, their ability to use concealed approaches, and their ability to directly engage AD assets early in the air operation. Helicopters will use terrain and cover to mask their approach with terrain flight modes (low level, contour, or nap-of-the-earth - NOE). The OPFOR conducts an intelligence preparation of the battlefield (IPB) early on to determine routes and assign OPs, sensors and on-call AD weapons to cover areas which offer concealment. Air defense priorities are engaging all aerial targets primarily, and countering SEAD secondarily.

Selected Air Defense Tactics Used to Counter Air Attacks and SEAD Operations

Considerations		Examples
Protection Countermeasures	and	Use concealment, mixing with civilian sites and traffic Use cover (dug-in positions, hardened facilities, urban structures) Disperse assets and use autonomous capabilities Relocate frequently Use protection envelope of friendly forces Deception operations for convoys, crossings, etc.
Tactics		AD conduct bounding overwatch during movement. Air defense ambush with passive mode (EO, radars turn just at launch) Direct attacks against AWACS, SEAD aircraft, airfields, and FARPs Engage SEAD/ASE aircraft from an aspect outside of the jamming arc Conduct beyond borders operations against air capabilities.

RISTA	Use intelligence preparation of the battlefield - approach routes, etc Passive radar and EO modes. Use IADS links for TA data. Emissions control measures Utilize civilians and insurgent links. Use lots of OPs linked to AD units, including forward-based SOF, etc. Employ non-AD sensors and units available to feed reports to IADS.
Command and Control	Mobile, redundant, concealed systems Comms OPSEC measures
Weapons	Engage aircraft, air-to-surface missiles, and ARMs beyond their range Prepare all weapons to respond to aircraft. All units conduct air watches with weapons at ready at all times

Airborne SEAD and SIGINT operations and technologies include radar acquisition systems, radar jamming assets, and anti-radiation missiles which can find and destroy radars, compel AD units to acquire more robust even longer range radar systems, and to more carefully manage radar assets. The OPFOR will use equipment and tactics to degrade SEAD effectiveness, deceive it, and attack SEAD directly. Some of those responses are listed below.

Selected Air Defense Technologies Used to Counter SEAD Operations

Technologies	Examples
Command and Control	IADS, directional comms, SATCOM, retransmission systems, etc. IADS links to artillery, recon, maneuver units, SOF, etc. Digital comms with reduced response time. Mobile, redundant, easily concealed systems
Radars	Low-frequency long-wave early warning radars (50-100 km setback) Low Probability of Intercept (LPI) radars (frequency, power control) Multiple-mode, multiple frequency, frequency-agile radars Phased array radars and guidance modes that negate jamming Counter stealth radars and passive sensors integrated for fast response Aerial radars on helicopters, UAVs, mobile airships, with retrans links Mobile radar systems for frequent moves, or operation on the move
Other Sensors	Sensors using passive modes (EO, IR, acoustic, other bands) Mobile goniometer based fire control sets with GPS and digital comms Remote sensors, unattended ground sensors, linked to AD nets. Remote IR and EO cameras (Sirene, ADAD), and on UAVs/airships
Weapons	SEAD-resistant missile guidance modes (semi-active radar homing, active radar homing, track-via-missile, laser beam rider, etc.) Home-on-jam missiles attack AWACS, SEAD, ASE (Aspide, SA-5) AD missiles can destroy ARMs and HARMs (Pantsir, SA-15b) Responsive autonomous or battery AD weapon systems (SA-11, 2S6) Passive guidance, e.g., IR-homing or EO FCS (Mistral, GDF-003)
Countermeasures	Encryption and secure comms modes Decoys: corner reflectors, multi-spectral, bridge mock-ups, etc, Electronic Warfare: SIGINT/ELINT, GPS/fuze jammers, deception

Most units operating in flight paths are subject to air attack and use active measures to respond to air threats. Dismounted infantry units will have AD OPs and will engage aircraft as required. Any AD weapon can alert its ACV and the IADS net of spotted aircraft. Of course the delays from transmitting reports through these links should be considering figuring response time (15 sec Tiers 1 and 2, 30 or lower for each message link from observer to AD weapon).

To counter the helicopter threat, a wide variety of tactical and combat support vehicles have MANPADs/MGs with AA sights to engage aircraft. Two of the greatest advantages for helicopters are weapons stand-off and ability to use terrain cover on approach. Many ground force and AD weapons can match the stand-off and inflict damage to force aircraft to disengage. When flying NOE (20-25 ft from the ground), a helicopter rotor is still 40 ft high. A helicopter terrain masking cannot easily engage targets or evade missiles, but can be targeted by ground weapons. Nearly all SAMs, small arms, and direct-fire crew weapons (ATGMs, ATGLs, AGLs, etc.) can engage it. ASE includes IR decoys which can be foiled by improved IR missile seekers, and RF jammers with dead zones (and limited effects against modern radars).

Engagement Factors and Data for Air Defense Simulations

No simulation can predict or reflect reality; but a well-designed air defense simulation can be robust enough and detailed enough to represent reality. Air defense engagements offer a difficult challenge for realistic portrayal in training simulations. A simulation might be expected to depict robust and responsive RISTA assets executing the acquisition stages (detection,

classification, recognition, and identification) with early warning and target acquisition/ battlefield surveillance radars, C2 processing (report posting on battle management nets, analysis, tracking, target assignment, and shooter assignment), target engagement (TA radar, location and tracking), missile launches, probability of hit (Ph) data, and probability of kill (Pk) by type of kill calculation. Degrading factors can be factored into calculations: e.g., target type, evasive tactics, battlefield environment constraints, AD systems limitations, and AD counter-tactics. In the real world, RISTA capabilities are affected by a variety of factors, which can affect capabilities calculations by system, by class of system, and in various ways. Here are key ones.

Selected Factors Which Affect Air Defense Functionalities

Technologies	Factors	Data Entry
Sensors for Acquisition, EW, And Fire Control	System range	km
	Target tracking range	km
	Night range (EO sensors)	km
	Range to target	km
	Radar down time	min
	Radar search sector (horizontal/vertical from mid-line)	degrees
	Radar altitude	km/m/ft
	Curvature of earth range limiter (based on sensor and target altitudes)	max km
	Terrain feature effects on line of sight (LOS) (limiter which interrupts LOS)	km
	Aircraft altitude	km/m/ft
	SEAD/aircraft ASE effects (sector of scan)	km x km
	Counter-SEAD capabilities (0 % degradation)	0 %
Command and Control (C2)	Report time (x number of links)	min
	Report-processing time (x links)	min
	Authorization to fire	Yes/No
	IFF time	sec
	Target assignment time	sec
Weapons	Missile/gun effective range	Km
	Number of missiles/rounds per target Missile/gun minimum altitude Weapon reaction time	# x Ph
	Area of munition warhead effects (range and altitude) Aircraft ASE against missile seeker (degrader x Ph) Munition ASE CCM capability (0 % degradation)	m, or band sec m or Ph %
	Ph against target types (RW, FW, ASM, UAV, TBM) Pk-Mobility, Firepower, Comms, Catastrophic, etc	% type/name type/name Ph
	Munition approach/impact aspect vs target (if needed)	
Target Effects	Target flight altitude, speed, range, etc Target countermeasures and counter-tactics	m, km, etc. Ph factors

Many AD data adjustment factors are expressed in range or altitude, which can be used by the simulation to match AD system to target. Some of the factors (or degraders, such as LOS or ASE) can then adjust the capabilities. For time-based capabilities, degraders (such as report time) are critical considerations that can affect the likelihood of AD engagement within the time span of aircraft approach, while the aircraft is still outside of range for ordnance delivery.

Capabilities of AD weapons to engage, hit, and degrade aircraft physical viability and effectiveness is expressed in various data. These include range, altitude, time (noted above), and probabilities of hit and kill. Once target and shooter are within geospatial and time windows, with authorization to fire, the key data are probabilities of hit and kill.

Probability of hit can be affected by many factors (as noted in the table above). Sources vary widely in Ph data for the same systems. Often a range is listed, such as 40%-96%, without clear explanation of calculation criteria and with many detection variables rolled in the figures. Russian sources often state their figures as "single shot kill probability," combining hit and kill in one figure (Ph x Pk). The Ph figures noted in the WEG for missile systems are averages based on probabilities at all aspects,

within operational ranges and altitudes, and against aircraft in noted classes. Different fixed-wing (FW) and rotary-wing (RW) aircraft will have different radar cross-sections, IR heat detection levels, and different Ph levels. Other aeronautical targets such as UAVs, cruise missiles, air-to-surface missiles, and theater ballistic missiles will have different Ph figures by type, system, and aspect. The simulations should use the Ph in the WEG as a single figure for the technical capability. Degraders such as factors noted in the above table could then be applied for use in the simulation. Often AD units will launch multiple missiles at a target. Two missiles will have greater Ph, possibly 2 x one Ph.

Developments in missile seekers, guidance, and gun ammunition technologies are greatly improving probabilities of hit for AD weapons. One of the most deadly AD missiles to threaten modern aircraft are anti-radiation missiles that home-in on an aircraft's ASE or SEAD radar jammer. Another modern AD missile capability is active radar homing missiles, which cannot be easily counter-measured. Both missile types have a higher P-hit. The Starstreak MANPADS system offers another new step in missile precision and countermeasure resistance with laser beam-rider guidance. Starstreak has a very high Ph against less maneuverable aircraft, especially helicopters conducting terrain flying such as NOE. Some modern AD guns now have rounds with proximity fuses, for higher Ph. Others rounds have an AHEAD- type fire control system (a laser range-finder-based computer sets electronic time fuzed rounds, for precision air bursts).

Probability of kill (given a hit) can require even greater variety of figures based on type, system, and aspect, and by munition type or specific munition. Because those Pk figures require laboratory- produced data based on precisely determined conditions, they will not be noted in this publication. However, a few concepts can be noted. A missile with a proximity fuze and large warhead will have a large lethal radius and a high probability of kill given a hit or detonation. For small missiles, partial kills have a greater probability than total (catastrophic) kills.

Dramatic improvements in AD weapon lethality are raising Pk figures. Increased use of HMX explosive has raised Pks. Frangible gun rounds fly like KE rounds, permitting better range and precision than HE rounds. But they shatter inside of the target, offering high explosive Pk figures similar to HE rounds. Some missiles (e.g., Pantsir and SA-18S) have frangible rods in their warheads. Others have multiple sabot penetrators and HE effects (3 x "darts" in Starstreak).

Air Defense Systems: Key Technology Trends

Aircraft upgrades and proliferation of other aerodynamic threats (cruise and ballistic missiles, air-delivered munitions, UAVs, etc.) have increased the aerial threat to military forces worldwide. Thus forces expanded their emphasis on all systems engagement of aerial threats or counters to those threats. Forces worldwide are fielding new air defense (AD) systems and upgrading legacy systems.

System Category	Technology Trend	Reference Vol/Page	System Example	Ref Page
Short-Range Air Defense (SHORAD) Systems	Missiles engage <1-20 km range, and 0-10,000 meters altitude	6-36	Pantsir-S1	6-65
	Radars integrated with passive electro-optical/thermal fire control	6-5	Crotale-NG	6-66
	High-velocity missiles engage aircraft, munitions, UAVs, and missiles	6-26	2S6M1	6-64
	Drop-in overhead turrets and remote weapons for AD vehicle systems	6-33	Strelets/Igla launcher Zu-	6-60
	Guns and missiles integrated into gun-missile systems	6-34	23-2M1	6-50
	Many missiles, most guns defeat all countermeasures	6-10	Mistral 2	6-63
	New or upgrade robust shoulder-fired SAMs throughout the battlefield	6-26	SA-24/Igla-Super	6-60
Medium-Range Air Defense (MRAD) Systems	Missiles engage 1-45 km range, and 0-25,000 m altitude	6-72	Buk-M1-2	--
	Tracked or wheeled with increased mobility and responsiveness	6-72	Pechora-2M	6-28
	Some systems mix MRAD and SHORAD missiles for high surge rate	6-72	Spyder-MR	--
	New autonomous launchers melded in old units to add more FC radars	6-72	SA-6b with Buk-M1	6-43

Long-Range Air Defense (LRAD) Systems	Missiles engage 5-400 km range, and 0-50,000+ m altitude	6-80	SA-21/Triumf	6-19
	Vertical launch and increased velocity against ballistic missiles	6-80	SA-21b/Samoderzhets	6-13
	Anti-radiation/radar-homing missiles defeat SEAD/AWACS/JSTARS	6-80	FT-2000	6-14
	Launcher can add canisters of 1-120 km “small missiles” for surges	6-80	SA-20b/Favorit	6-11
C4ISR	Phased array/low probability of intercept (LPI) radars and more range	6-4	96L6E	6-80
	Radars mounted on RISTA/weapons to operate and rotate on the move	6-15	Sborka-M1-2	6-15
	Other RISTA sensors, e.g., forward observers, UGS, passive IR, IW	6-5	Orion	6-21
	Integrated air defense Systems (IADS) across echelons and branches	6-3	Giraffe AMB	6-16
	IADS, FOs, and radars for responsive AD even in high-jam areas Autonomous	6-5, -9	SA-10/20	6-83
	unit and systems capability in a jamming environment	6-5	2S6M1	6-64
	AD complexes to counter SEAD and stealth systems	6-20	Nebo-SVU	6-85
Multi-role Systems	Multi-role (AD/AT) missiles, gun, vehicles, for AD and AT, etc.	6-32	Starstreak	6-61
	IW and other Infowar add to RISTA and deceive/deny aircraft C4ISR	6-20	Orion	6-21
Other Systems for AD Use	All-arms AD weapons/munitions damage or defeat low-flying aircraft	6-27	12.7-mm/.50-cal MG	6-36
	Anti-helicopter mines or mines which can be used in the role	6-24	Helkir	6-31
	Airships in acquisition, jamming, or obstacle fields against helicopters	6-23	Helikite w/Speed-A	6-23
	Concealment or deception measures limit aircraft effectiveness	6-10	Barracuda RAPCAM	9-4,7

Air Defense and Other Technology Counters to Unmanned Aerial Vehicles (UAVs)

UAVs are proliferating worldwide. These aircraft are used in various configurations and sizes and for an increasing variety of missions. Their size ranges from bomber size to palm-size micro-aerial vehicles. Missions include attack (attack UAVs and UCAVs), reconnaissance, fire support roles, C2, INFOWAR, etc. Responses generally fit within the categories: C3D (pg. 9-1), information warfare (IW), and direct attack. Military tactical and technical responses can vary with the configurations and missions, and require an all- arms approach (see TC 7-100-2, Ch 11).

Forces will use C3D to counter a wide range of threats, including UAVs; but the proliferation of these aircraft throughout the area will require increased emphasis on C3D discipline. Measures include more use of IR/absorbent and vehicle conformant camouflage, screens for dismounted positions, and use of deformers, deception, and signature modification. Greater availability of responsive smoke and digging equipment will assist in rapid concealment.

INFOWAR assets can be used against UAVs. Intercept assets may be able to detect signals for UAV control and intercept the image display for their own RISTA. The US and Iran have demonstrated abilities to counter and crash UAVs. Even low-cost jam assets can jam UAV controls and GPS in critical areas at critical times, to neutralize/crash them or prompt auto-return to launch point. But jamming has its own vulnerabilities. Jammers generate a signature subject to detection and destruction, and must limit use time. Intermittent brief jamming can confuse and neutralize many UAVs, and challenge enemy counter- jamming capabilities.

The most likely and most widely available IW counter is the global navigation satellite system (GNSS) jammer. These can be

miniaturized with low-power, significant range, and wide area effects. Stationary jammers can be detected and destroyed by direct attack but mobile jammers can fit on ground vehicles. They also can be mounted on UAVs flying prescribed routes with visual markers or on airships. They can also be linked with AD as a lure for air ambush. Although GPS jammers also jam their own forces, defenders and most adversary forces are generally less reliant on GPS precision than modern offensive- minded forces.

Most forces will prefer to destroy UAVs upon detection using direct action. Early detection is a critical factor. This task requires use of air watches and RISTA assets to surveil all approaches. Thus we see a trend in the proliferation of new, more flexible sensors for use on ground and vehicle mounts. They include aerial sensors, e.g., airships with radars and thermal/EO sensors (pg 6-18). They also include acoustic systems: sound-ranging sets, unattended ground sensors, and vehicle/tripod acoustic microphone counter-measure sets. Remote camera arrays offer 24/7 monitoring of large areas. Scores of lightweight remote weapon stations or EO sensor pods fit on vehicles or stands with 30-50+ magnification and fast slew. These can be linked to integrated AD nets, e.g., IADS (pgs 6-3 to 4), to cue other sensors and weapons, or to send warnings to possible units along the UAV flight path, using the attack alert systems and azimuth plotting board (pg 6-56). Lightweight, portable, and more responsive radars now fit ground and vehicle mounts for sector searches that include scanning the horizon for aircraft. Larger UAVs with signatures similar to FW aircraft and flying at higher altitudes will be treated like those targets. New stealthy designs in UAVs and unmanned combat aerial vehicles (UCAVs) will challenge conventional air defense radars. Thus, more forces will adopt recent IADS RISTA nets specifically designed to counter stealth aircraft (and their supporting radars).

The enemy will attack UAVs and support assets (i.e. launcher, ground station, and link assets) on encounter. Weapons for attack vary with UAV size. Conventional aircraft sized UAVs can be acquired and engaged by the same assets as their manned counterparts. Tactical UAVs generally feature smaller visual, thermal, and radar signatures. Reduced UAV thermal signature at night can challenge observation by systems other than air defense, and air defense systems without radars. However, most can be detected by modern radars and acoustics, some using high-resolution thermal sights. At range, missiles and rounds with proximity or AHEAD type fuzes (pg 6-39) can be used against these aircraft. More calibers of AD rounds will use these fuzes. Tactical UAVs which fly below 3,500 m altitude may be engaged by modern man-portable SAMs and guns. Vulnerability varies with design and flight profile. If a tactical UAV flies below 300 m altitude, it is vulnerable to nearly all weapons, including shoulder weapons. Rotary-wing UAVs are more likely to fly at a low altitude because of their low-speed control. Anti-helicopter mines can be command-detonated or sensor-fuzed to destroy low-flying UAVs.

UAVs which may present the greatest challenge to air defense are small UAVs of less than 25 kg (pg 4-3) -- mini-UAVs (MUAVs) and micro-aerial vehicles (MAVs). Battery power eliminates their acoustic and thermal signatures. Unless radars or other specialized AD sensors are used, there will not be timely detection to use most of the weapons in the UAV flight path. For MUAVs, small size almost eliminates radar signature beyond a few km. If they use a camouflage pattern and fly above 300 m, they are very difficult to see in daytime. However, due to limited camera range and wind patterns above tree lines, many will fly within 300 m of the ground. Machineguns can be somewhat effective. Rifle fire against them will be more difficult (“big sky – little bullet”). It is difficult to gauge range without ground level background as a gauge; therefore, a laser rangefinder is essential for aiming. A preferred weapon, found in some infantry units, is a shotgun with duck hunter loads. Automatic grenade launchers with precision optics and air-bursting munitions (Vol 1, pg 2-24) offer a counter to MUAVs. They have displayed AGLs fitted with bore-sighted FARA-1 man-portable radars (Vol 1, pg. 4-29) for near instantaneous cuing.

In the Near Term, as these MUAVs proliferate, forces will seek additional counters. A possible development will be proximity-fuzed grenades for 20-40 mm grenade launchers. About a dozen or so producers have developed shoulder-mount grenade launchers for these munitions, with a range of 500 - 1,000 m. Such a weapon with precision optics and a proximity-fuzed or ABM grenades would enable squads or weapons teams to respond quickly. Vehicle mount light remote weapon pods with multiple cameras for 360° monitor displays and rapid slew are likely.

Micro-aerial vehicles are less widely fielded. They vary from palm-size to hand-launched weighing 5 kg, with 0.67 m wingspan (see pg. 4-3). Many have small batteries short range (<5 km), close camera view (<300 m), and low altitude (often <300 m). With instability and high potential for crashing, many must be treated as disposable. Most are daytime only, but limited night capability is available. Good C3D practices such as camouflage and smoke can challenge them. Jammers can defeat them. Weapons in the above paragraph can defeat them, especially the larger MAVs. It is likely that forces will seek other weapon counters specifically against MAVs. But detection and rapid destruction will be a challenge. Most will detect targets before they are destroyed. Because MAVs are used by adversary low-level units or site security units, a target force must have assets and alert nets to quickly warn of their presence, and be ready to respond. Indeed, a weapon response may alert the adversary and accomplish the MAV’s mission.

Air Defense Trends in Countering Low Observable (LO) and Stealth Aerial Systems

One of the greatest threats to AD is LO systems. For decades, aircraft used terrain flying (low altitude) flight profiles for stealth missions against AD. Modern forces also use LO and ***stealth*** (very low observable - VLO) aircraft in the early phase of air operations to neutralize or degrade target air defense capabilities and engage high value targets. Increasingly, stealthy unmanned aerial vehicles (UAVs) and unmanned combat aerial vehicles (UCAVs) are used to engage deep targets in cases where manned aircraft would not be employed. Increasing numbers of modern aircraft and UAVs employ stealth design principles by reducing or nearly eliminating their radar signatures. Thus, AD forces are finding new ways to detect, acquire, and

engage them.

LO systems are designed or given technology upgrades to counter use of electronic signals, visual or thermal signature, noise, or change in those factors with stealthy modes of operation (refueling, etc) to avoid detection. Designs can reduce their radar cross section (RCS) in the head-on aspect against specific radar frequencies, but with some vulnerability for detection in other frequencies, and at other aspects. Most UAVs are inherently LO or stealthy. Aerial systems reduce their signal-to-noise ratio (SNR), hide in the radar clutter to reach their mission area, execute the mission, and escape AD response. Stealthy systems are costly designs especially for those roles. But even the stealthiest aircraft are not invisible all of the time or in all frequencies. AD must exploit their vulnerabilities by improving the SNR, improving acquisition means, and engaging more quickly upon acquisition.

Counter-stealth or counter-LO (CLO) systems and tactics have been in use since the 1980s. Some evolved from efforts to counter helicopters using terrain flying modes. Goals are improved responsiveness to counter limited warning time, better precision against protection countermeasures, use of integrated systems to improve responsiveness, expand links to neighboring units, better utilizing HUMINT capabilities, and reduce time out of action to reduce vulnerability. Methods include using overlapping AD assets to cover all approaches, using air observers to cover air avenues of approach, and integrating active and passive sensors directly with weapons to increase effectiveness. These and identification-friend-foe (IFF) systems are used to support autonomy and enable AD engagement by subunits and individual systems, even when the AD nets and IADS are degraded by SEAD and other methods. Counter-SEAD measures by AD units reduce the effects of SEAD, to maintain warning and data transmission systems. Digitization and GNSS map display in battle management centers are used at brigade, and all the way down to the AD vehicle or gun when possible. These provide faster planning and report updates for autonomous units. Blimps can be used in area defense (see pg 6-23). Space and airborne reconnaissance platforms supplement ground-based AD. Aircraft are tasked to intercept stealth systems long before they engage targets. Since most air stealth missions are conducted at night, improved night sensors (thermal sights, etc.) aid in AD counter-stealth effort.



Stealthy aircraft with high-speed anti-radiation missiles (HARMs) could attack AD units from stand-off range if AD lacks counters to HARMs. Some LRAD and MRAD units are increasing weapon loads on the TELs or adding launcher- loader vehicles to engage both aircraft and the precision ordnance which they carry. Increased missile loads can be added to LRAD systems like the Russian SA-20b (pg 6-86), SA-21, and recent South Korean KM-SAM system.



Most AD units use ***monostatic*** radars, which transmit and receive their own signal. The Russians have fielded a variety of complexes, which can transmit results in real time to battle management centers in LRAD radar units and IADS. Radars may operate in ***bistatic radar*** complexes, with one sending, and others receiving to operate passively and view targets from different aspects and detect stealth systems. There are also ***multistatic radars***, with multiple radars and frequencies in complexes, overlaying and comparing results. The need for multiple overlapping radar frequencies has led to new Russian radars of various frequencies in MRAD and LRAD units. Modern LRAD radars are often phased array systems (e.g., 30N6E2 for the SA-

20b/Favorit) with 360° coverage, employing various search modes. They can be integrated, transmit results in real time to map displays, and are difficult to jam. Many AD radars common (centimeter) H-J bands; but others use less detectable or vulnerable bands. With real-time integration and analytic fusion, battle management centers can detect and track stealth systems. These complexes can be costly for most forces, unless costs are mitigated by updating and digitally integrating older radars. A number of countries offer similar radars for MRAD and LRAD systems, complexes, and IADS.



The complexes can also include early warning (EW) radars which operate in lower frequency bands (A-C), updated with robust multiple target tracking and display, and secure responsive digital data links to integrate their results with IADS. Assets also include long-range passive electronic intelligence (ELINT) systems, to support the IADS with low probability of suppression. They scan wide areas over a wide band of frequencies including communications, guidance, and radar bandwidths (such as Russia's Vega 85V6-A/Orion 3-D complex with 400+ km range, 0.2-18 GHz frequency range, and 100-target handling capacity). The 4-vehicle complex has telescoping antennae on 6x6 off- road truck chassis to detect and track ground, sea, and air targets. Another example is Avtobaza, which is fielded and exported, reportedly sold to Iran and Syria. Other countries also produce/export ELINT systems (pg 6-21).



Russian and other AD forces have developed *"counter-very low observable"* (CVLO) radar complexes, with meter-wave radars specially designed to find stealth aircraft. The Russian Nebo series from 1986 has seen several upgrades. The 1L13-1/Nebo-SV two-dimensional system was replaced by 55Zh6-1 and 1L13-3 automated 3-D versions. The 1L119/Nebo SVU 3-D active phased array system (pg 6-82) appeared in 2001, and links to modern systems, e.g., SA-20b. A new system is Nebo-M mobile radar complex (pg 6-87), with frequency bands ranging from B through X band. Russia is now fielding this system. Nebo variants have been exported; and CVLO radars have been developed by other forces.

Aerial forces are expanding stealth capabilities with longer stand-off for aircraft (and missiles) and smaller UAVs, and UCAVs and UAVs with stealthy designs. Even in an era of reduced budgets, this sequence of improved aerial systems and AD counters will continue to drive the requirement for AD upgrades in acquisition, C2, weapons, and tactics.

Electronic Intelligence (ELINT) Support to Air Defense

ELINT (or Electronic Support, e.g., ES) systems have been in AD forces for decades. They include specialized systems to specifically detect aircraft electronic emissions. General use ELINT systems to detect air, ground, and naval emitters can also be effective with AD forces.

These sensors offer key benefits, including: long ranges and the ability to operate passively and continuously (for days at a time). Thus, they are well suited as early warning assets particularly against aerial systems using radios, radars, or jammers. They can cue the IADS and use triangulation to locate approaching aircraft. Most systems use multiple stations and a control post, but an individual station could be data-linked with radars or other IADS sensors for location. ELINT systems are ineffective against stealth aircraft when the aircraft are not emitting.

Specialized systems include the Czech Ramona (aka KRTP-81 or -81M). The system was first seen in 1979 and deployed in at least 3 countries. It is complicated, with 3 or more stations with 12 hours to emplace, and locates targets by triangulation from the separate stations. The system is difficult to operate, but can track up to 20 targets emitting in a band of 1-8 GHZ. The Tamara (KRTP-84) followed in 1987 and is mounted on a rapid deploying 8x8 truck chassis. With a band of 820 MHz-18 GHz, the Tamara can track 72 targets to a maximum range of 450 km.

Modern systems include the Czech tailored Vera-E and Borap, Chinese DLW002 and YLC-20, and Russian Valeria and Avtobaza (Vol 1, pg 10-12). Below systems are in AD and EW.

Recent Developments in Very Short Range Air Defense (VSHORAD) Systems

VSHORAD systems include a wide variety of technologies defined by mission (AD) and range (to 8 km). These systems are proliferated throughout the battlefield and are used for area defense, site defense, and as multi-role systems for use against a

wide variety of targets on the battlefield. They are used by modern regular forces and irregular forces with limited budgets, limited training, and limited mobility assets.

The most widely proliferated VSHORAD threats are weapons throughout the force in the All-Arms Defense. These weapons are primarily used against low-flying aircraft (helicopters, UAVs, etc) which venture into their area and into range of those weapons. These include infantry small arms, vehicle guns, grenade launchers, and missiles. The single most prolific and dangerous category among these weapons is machineguns. Medium (12.7-mm) and heavy (14.5-mm) MGs permit dismounted personnel and any vehicle, boat, or RV to provide protection and/or attack those targets. These can also be used against the growing UAV threat.

All-arms weapons include new multi-role weapons and munitions for use in ground forces, and which can engage aerial targets. Antitank guided missiles (ATGMs) have always been able to engage low- flying aircraft (most of which must fly at slow speeds). However, some ATGMs fly at higher speeds (such as AT-9) for superior intercept. The AT-9 and some others feature an anti-helicopter missile, with proximity fuze and increased lethal radius warhead. The following section also notes other adaptive weapons for the mission. Tactical units can use selected mines, including anti-helicopter mines (pgs 6-29 to 31), to support AD activities.

The most widely fielded VSHORAD weapons for lower-tier forces are AD guns, including MGs, and medium cannons to 57 mm. There are even heavy AD cannons (76-100+ mm, see pg 6-45). With improved fire control (e.g., radars) and improved munitions, some of these remain a viable threat to aircraft flying at 0-6,000 m. Forces are upgrading some ground mounted guns by fitting them on vehicles with modern fire control (6-32, 50). They are also fielding multi-role systems (AD/AT) and infantry fire support vehicles with improved AD guns.

More modern forces have generally chosen a different route. They mounted robust AD capable guns on ground force IFVs and APCs, but equipped AD forces primarily with missiles. The most widely proliferated missiles in any force are man-portable SAMs (MANPADS). These are missiles launched from disposable canisters attached to hand-held gripstocks. They are used not only with dismounted soldiers, but also mechanized units, in missile launcher vehicles, on helicopters, ships, and boats. Some mount MANPADS on support vehicles, e.g., motorcycles, ATVs, light strike vehicles, and even on AD guns (pgs 6- 41 and 49). MANPADS have seen upgrades in fire control (EO/thermal and auto-trackers), in warheads (proximity fuzing, larger Frag-HE fills with HMX explosive, KE frangible, etc.), and in missile motor design (high velocity speeds and improved maneuverability). Most MANPADS use IR homing with seekers cooled by an attached battery coolant unit (BCU), with modern upgrades such as two-color IR with improved detectors and needle shockwave dampers for cooler seekers, better clutter rejection for improved lock- on and countermeasure rejection and a probability of hit of up to 85% (90% versus helicopters). Recent guidance modes include SACLOS laser beam rider (LBR on Starstreak) and semi-active laser (SAL) homing to defeat countermeasures with a P-hit of 95% or more. The Lightweight Multi-role Missile variant of Starstreak is due out soon and is offered on a Camcopter UAV combat variant (pg 4-12).

Adaptive Weapons for Air Defense in Close Terrain

Military forces worldwide generally recognize the need to counter aerial threats throughout the battlefield. Fixed-wing threats used to drive the requirements for air defense systems but since the Vietnam War era most countries have increased capabilities throughout the force to counter rotary-wing aircraft. These weapons may not destroy the aircraft but their damage can disrupt the aircraft mission and take them out of action for subsequent missions.

The OPFOR will employ conventional AD weapons against helicopters when available. In some environments however, many AD weapons are less effective, such as in dense terrain or urban areas. In dense terrain helicopters may be spotted at <500m, with concealment or sudden appearance requiring fast reaction, minimum range, altitude, or which limits use of most surface-to-air missiles (SAMs). Helicopter countermeasure systems may degrade SAM performance.

Tactical forces may employ teams and assets in addition to specified air defense assets to counter the helicopter threat, in addition to ground threats, in the area.

--*Tactical security elements* are special-designed units which operate in the OPFOR rear area and use weapons such as machineguns to protect rear area assets from ground and air attack.

--*Air defense observers*. Units will assign AD observers for moving and stationary units. At least one observer team (1-3 people) per platoon is assigned the role of AD observation. Most tactical units are linked into the tactical warning net with an alarm system which can warn of ground and air attacks. The team may be assigned a machinegun or other weapon for the role.

--*Air defense teams*. Infantry forces in close terrain and in dispersed operations may send out teams (2-3 men) against helicopters. These teams can also move with other units for tactical and security missions. A team has to travel fast and light and engage quickly thus the maximum weapon weight recommendation is 20 lbs (9.1 kg). The AD team should employ a weapons mix against air and ground threats. The most common AD weapon is a 7.62 or 12.7-mm MG. An AD team may encounter numerous targets. Systems need ammunition for 2-5 encounters per mission. Equipment needed includes a radio, night vision equipment, and laser rangefinders. These teams can use light vehicles but might be better served with motorcycles

or ATVs.

--Combat support and combat service support vehicles with machineguns, medium guns, or automatic grenade launchers will generally not initiate engagements with aircraft, rather have weapons for defense. They may destroy or damage aircraft, force aircraft to break off engagements, and deny aircraft the option for low-altitude flight over wide areas.

--Combat vehicle weapons. Desert Storm demonstrated the capability of helicopters against fighting vehicles. Therefore, AFVs are increasingly addressing that threat with improved weapon systems. Training experience has shown tank main guns with sabot rounds to be a significant threat to rotary- winged aircraft. High-angle-of-fire turrets and air defense sights for LAFV medium guns and machineguns are being fielded and upgraded to address aerial threats. Frangible rounds offer KE-type accuracy and HE- like lethal effects against aircraft. Vehicle guns with programmable-fuze ammunition (such as BMP-3M and T-80UK) can approach the lethality of precision AD systems such as Skyguard. Antitank guided missiles, especially gun-launched (WEG Vol 1 pp 6-41 to 6-45), are a threat to slow-moving or hovering aircraft.

--Anti-helicopter mines or directional mines (such as Claymore or Russian MON series) (See WEG Vol 2, pp. 6-29) can be used. Conventional mines can be adapted with acoustic or multi-sensor units (such as Ajax) to create anti-helicopter mines. RW aircraft obstacle systems can include wire obstacles at LZs and airship nets (armed or unarmed).

Here are a few adaptive weapons for use against aircraft.

System Type	Example
ATGM Launcher	- Short-range systems like Eryx and man-portable ATGMs like Gill, AT-13, AT-7 - Portable systems like European HOT, Russian Kornet, AT-5B
Machineguns	- SQD: Russian 7.62-mm PKM - CO: 12.7-mm w/API, sabot, and frangible
Sniper/Marksman rifle	- 7.62-mm SVD, or .338, with API rounds
Under-barrel grenade launcher	- 40-mm GP-30 HE grenade
Rifle grenades	- BE FN Bullet-thru AV (Anti-vehicle), 3 per rifle
Lightweight grenade launcher	- M79 40-mm grenade launcher
Automatic grenade launcher	- CH 35-mm W-87 w/HEDP, 30-mm AGS-17 (HE) Singapore CIS 40GL, HEDP or airburst munitions
Antitank grenade launcher	- Any ATGLs, esp with longer-range DP or HE grenades - Carl Gustaf M3, w/HEDP grenade, LRF and night sight - German PZF3-T600 or -IT600 with HE and DP grenades
Recoilless rifle	- Yugoslavian M79, US/Swedish M40/M40A1
Antitank disposable launcher	- German Armbrust, Russian RPO-A
Mini-UAVs/Micro-Aerial Vehicles	- With or without warheads, to attack/harass RW aircraft
Air-to-surface rocket launcher	- "C-5K" Iraqi or Chechen launcher with S-5 57-mm rockets
Semi-active laser homing	- Recent ATGLs and ASRs with SAL-H homing munitions

--Improvised rocket launchers. Man-portable air-to-surface rockets of less than 100 mm (Vol 1 pp 14-7) can be launched at low-flying helicopters. Rockets include Russian S-5 series, French 68-mm SNEB, and others. Most improvised launchers lack sights with enough precision. However, some fabricators use fairly standard designs and have employed sights from the Russian RPG-7V ATGL. These sights are adequate for use out to a range of 500 m. To avoid the current problem of high amounts of ash discharge some fabricators added plexiglass shields. With these improvements, launchers for these high velocity rockets with very flat trajectories are a viable threat to helicopters and are claimed to have downed at least one in Iraq.

Air defense teams using man-portable air defense systems (MANPADS) are not adaptive responses but MANPADS can be employed in an adaptive manner. Because of its vulnerability to detection and priority as a target, an AD team needs to be equipped to address multiple targets - air and ground. The Starstreak MANPADS system offers a unique flexibility. It was optimized against helicopters but it can also be employed against FW aircraft, light armored vehicles, and selected other priority targets, such as snipers in bunkers or buildings. Thus a team equipped with Starstreak and other multi-use weapons (e.g., ATGLs, AGLs, machineguns, etc) can be used for a wide array for security, ambush or attack missions. The MANPADS can be linked to MG or cannon fire control, or mounted on reconnaissance vehicles.

Anti-helicopter Mines for Use in Air Defense

The modern attack helicopter, with increasing agility and weapons payload, is able to bring enormous firepower to bear on enemy forces. To counter this threat, some forces employ air defense mines to assist to support air defense ambushes. The intent is less to destroy helicopters, than to: (1) force low-flying helicopters to rise or change course, (2) alert air defenders to trigger the ambush, and (3) distract pilots while engaging them with ground weapons. Some ground-based mines, such as Mon-100 and Mon-200 directional fragmentation mines can be pointed upward for use against helicopters.

Additionally a type of mine—the anti-helicopter mine—was recently developed. By borrowing technologies from side-attack and wide-area landmines, anti-helicopter mines may make use of acoustic fuzing to locate and target potential low-flying targets at significant distances. Their multiple-fragment warheads are more than capable of destroying light-skinned, non-armored targets and damaging any helicopters at closer ranges.

A simple anti-helicopter mine can be assembled from an acoustic sensor, a triggering IR sensor, and a large directional fragmentation mine. More advanced mines use a fairly sophisticated data processing system to track the helicopter, aim the ground launch platform, and fire the kill mechanism toward the target. As the helicopter nears the mines, the acoustic sensor activates or cues an IR or MMW sensor. This second sensor initiates the mine when the helicopter enters the lethal zone of the mine. A typical large fragmentation warhead is sufficient to damage soft targets such as light armored vehicles

and aircraft. Alternate warhead designs include high-explosive warheads and single or multiple explosively-formed penetrators.

This data was developed for and incorporated in the Engineer Chapter of Volume 1; see also pg 8-5. OPFOR forces would be expected to deploy mines in Air Defense units to support air ambushes. Therefore, pertinent data was duplicated here to assist the Air Defense planner.

Anti-helicopter Mines

Country of Manufacture	Number of User Countries	Emplacement Method	Armor Penetration (mm)/ Kill Mechanism	Effective Range (meter) Maximum /Minimum	Detectability/ Composition	Target Velocity (m/s)	Fuze Type/	Warhead Type/Total Weight (kg)	
Bulgaria	1	manual	10 @ 100 m	max 200	visual		combined acoustic & Doppler SHF	Total weight: 35 kg	in p
Austria	1	manual	6 @ 50 m 2 @ 150 m		visual		dual acoustic & IR	Total weight: 43 kg	in p
Russia	0	manual		detection 1,000 max 200	visual	100	dual acoustic & IR	Total weight: 12 kg	dev
UK	0	manual remote		200/50	visual		dual acoustic & IR	multiple EFP	dev

Air Defense/Antitank (ADAT) Vehicles

The battlefield has always held a requirement to fight dispersed and to be able to engage a variety of threats. In the era of large conventional forces, requirements could be met efficiently and inexpensively by task organizing units to meet any fighting requirement. Most weapon systems can be employed against multiple targets. Any machinegun can be employed against aircraft, as well as unarmored and some light armored vehicles. Most forces will include weapons in tactical vehicles to address various threats. But technologies and budgets now permit tactical forces to use systems which can be effective in both air defense and anti-armor missions.

In the Infantry chapter (pages 3-55 to 57), we discussed *infantry ADAT vehicles*. By the 1960s, infantry fire support vehicles were distributed within infantry and dispersed throughout the battlefield. The vehicles had some limited ADAT capability, but their primary role was to carry dismount teams with weapons corresponding to the particular subunit support mission. More capable and responsive vehicles for infantry ADAT, AD, and AT units are available.

Technological changes, force reductions, and increased emphasis on rapid deployment equipment (which may have to fight dispersed) have led to development of more capable *ADAT vehicles*. Improvements in fire control systems and weapons stabilization are crossing over from the antitank arena into air defense. Reverse technologies from air defense systems are also

available for antitank and anti- armor roles. The ADAT vehicle has multi-mission capability.

Among the modern specialized systems advertised with this dual capability is the Canadian Air Defense/Antitank System (ADATS). The system features a high-velocity missile launcher on a tracked chassis. It offers responsiveness, high lethality, and lethal SHORAD capability for use in specialized roles or at the division/brigade level.

The German Rheinmetall SkyRanger Advanced Maneuver Support System is advertised as a multi- mission vehicle. With a 35-mm revolver cannon on a Piranha IV wheeled APC chassis; it can defeat aircraft (and vehicles other than tanks) out to a 4,000-m range. Rounds include electronically-fuzed AHEAD (Advanced Hit Efficiency and Destruction, electronically fuzed) rounds against aircraft, some vehicles, and selected ground targets. The highly mobile unit also includes a Bolide SAM launcher vehicle and a radar vehicle on the same chassis.

The Starstreak ADAT application was discussed earlier. Armored Starstreak is the missile launcher vehicle which could be used for multiple roles, including AD and anti-armor use. Now there is another Starstreak application, the Thales Thor remote weapon system. The light-weight (0.5 mt) RWS features a turret with four launchers, modern responsive day/night fire control system, and remote laptop displays and controls. The launchers will accommodate Starstreak and other MANPADS, such as Mistral and Stinger. It also launches ATGMs such as HELLFIRE, TOW, Ingwe (and probably Mokopa), and Spike-LR.

The Multi-purpose Combat Vehicle (MPCV) is a French and German system with an RWS missile launcher mounted atop a VBR combat support vehicle. The launcher in AD configuration holds 4 x IR- homing Advanced Short-Range Air Defense (ASRAD) MANPADS missiles. In the AT configuration it can launch 4 x MILAN-ER ATGMs. The system includes a CCD camera, laser range-finder, and 3rd general thermal sight. The missiles cannot be mixed.

Some ADAT vehicles were designed from the beginning to fulfill the multi-role requirement. Most were modified from existing systems with replacement subsystems or added capabilities. Add-ons, e.g., Strelets remotely operated MANPADS launcher, or the Israeli RWS with the Spike ATGM launcher enable vehicles to perform multiple missions at less cost than special-built designs, but comparable capability. Thus, the BTR-80 APC features a higher angle-of-fire gun to address aircraft and other higher-angle targets. Ukrainian KMDB developed twin 23-mm cannon to replace turrets or fit atop existing turrets and engage fast-moving targets which cannot be engaged by other vehicle guns. The 23-mm round is also affective against light armored vehicles, materiel, and personnel such as snipers firing from high angles.

A Russian developer offers a replacement turret for the PT-76B amphibious tank (and other AFVs). The PT-76E turret uses a 57 mm stabilized auto-cannon from S-60, with modern FCS (Vol 1, pg 6-52). The 57-mm KE round defeats almost all light armored vehicles at 2,000 m, and accurate fires to 3,000+ m. The upgrade converts the tank into an effective AD/anti-armor system with mobility superior to almost all other vehicles and at a fairly low cost.

Most ATGMs can be employed against helicopters. The faster ATGMs, such as gun-launch missiles and those from the Russian 9P149/Shturm-S ATGM launcher vehicle (Vol 1, pg 6-63) are more effective in intercepting a fast-flying helicopter. The 9P149 now features an Ataka missile AD variant with a proximity fuze and frangible rod designed for use against helicopters. Spike-ER, with fiber-optic guidance and IIR- homing option, is advertised as an effective missile for use against tanks and helicopters. Vehicle remote weapon stations include launchers for this missile with range out to 8+ km. Modern RF threat warning systems can warn of attacks from aircraft and ground vehicles, and differentiate the threats. Some of those systems designate direction of threat approach, such as the azimuth warning system 1L15-1.

The ADAT requirement has also driven improvements in ammunition and sensors. Modern Russian tanks can remotely fire their AAMGs using special air defense sights. The Russian FARA-1E radar can be attached to the NSV 12.7-mm MG as a fire control radar against ground and aerial targets. Long range AD sensors such as 3rd gen FLIR on the MPCV offer night range comparable to day sight range. Improvements in AD gun ammunition are discussed on pages 6-35 (MGs) and 6-37 to 38 (medium cannon).

Many air defense systems mount guns and missiles which can easily engage and destroy light armored vehicles. The Russian 2S6M1, Pantsir-S1, and Sosna-R drop-in turret all feature 30-mm twin- tube auto-cannons and high-velocity missiles with kinetic energy effects. The manufacturers claim that these can be effective against aircraft and light armored vehicles. Similarly, the SA-11/SA-11 FO/SA-7 systems are claimed to be effective against ground targets. The 690 or 715 kg missiles (even with only Frag-HE warheads) can destroy any vehicle. But with the cost of SAMs, ADAT systems mostly use guns and ATGMs against ground vehicles.

Current trends indicate that recent technology improvements offer a greater variety of ADAT vehicles. Technologies include gimbaled and gyro-stabilized RWS and OWS, better recoil compensation systems, auto-trackers and stabilized fire control, computer-based integration, radars, EO, acoustics, laser systems, and GPS-based digital C2. Breakthroughs in ammunition and vehicle drive stabilization offer more responsive precision. In the near term, these capabilities become prevalent, so that forces will increasingly be organized economically to fight dispersed, with the ability to engage air and land force threats with equal deadly effect.

Short-Range Air Defense: Gun and Gun/Missile System Technology Trends

The primary role of air defense continues to be defensive, to deny any adversary the opportunity to use OPFOR air space. A fundamental tenet in that role is to provide area-wide protection. That protection is accomplished with three methods: maintain sufficient inventory, achieve high system mobility, and engage all units to achieve an effective air defense. Methods include use of passive counter- air protective measures and use of lethal counter-air weapons. The focus for many force and weapons designers in recent years has been on missile systems, because of their range and precision against modern aircraft. Gun range limits them to the Very Short-Range Air Defense (VSHORAD) role, but that role is increasingly critical today.

- Many countries have significant inventories of air defense guns and are modernizing their inventory of guns. Reasons for this activity are the following:
- Large inventories, offer wide dispersion for area and point protection of assets.
- Guns rarely lose their operability over time. Even older guns can be used.
- Guns are very difficult to put out of action. A vehicle can be killed, and personnel can be killed. But the weapon can usually be brought back into action quickly.
- They are generally less costly to produce, train on, and use than missile systems.
- They can respond to air threats more quickly than missile launchers.
- There is no “dead zone”, compared to missile systems. Guns can engage targets down to 0 meters altitude and at a few hundred feet minimum range.
- They are nearly immune to countermeasures.
- They are multi-target systems that can engage a variety of aerial targets (including most likely air threats – helicopters and unmanned aerial vehicles), and a variety of ground threats (including infantry and light armored vehicles).
- They can engage small aerial targets (mini-UAVs, rockets, etc.) which missiles cannot engage.
- The active market in add-on subsystems supports improvements in gun mobility, survivability, fire control, weapon function, ammunition handling, and C2.
- New types of ammunition increase range, precision, and lethal effects.

New gun systems are being produced but the greatest activity is in the area of upgrading existing gun systems. To examine modernization activities in AD guns, we will look at them from the aspect of three primary factors: mobility, survivability, and lethality.

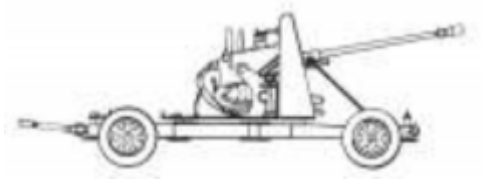


The most numerous guns used for air defense are not specifically AD guns. These are small arms and general weapons in tactical and supporting units which can engage aerial targets which fly within range. Weapons used in these units to engage aerial targets include grenade and rocket launchers, ATGM launchers, combat shotguns, tiltable mines, and IEDs.

The most numerous gun systems which are effective for air defense are machineguns in 7.62 mm to 14.5mm. These weapons are used for targets of opportunity, especially aerial targets. These can be ground-mounted (shoulder- fired, tripod, or bipod), can be fitted onto a pintle for vehicle mount, or can be integrated into a vehicle fire control system (turret or remote weapon station (RWS) mount, coaxial with a main gun, or fired from a firing port. Most tactical vehicles use machineguns as the vehicle main gun.

Even AD unit missiles and medium guns also use common MGs in supporting units and on combat unit support vehicles

Mobility



The guns, missile systems, and gun/missile systems in AD units are generally towed, porteed, or vehicle mounted. Most towed guns have limitations in mobility. They cannot be towed cross-country and in amphibious crossings as easily as with self-propelled anti-aircraft guns (SPAAGs). There are a few towed guns, like the Russian 37mm M1939 which can be quickly halted, mounted, and fired during a road march. A few developers have marketed towable gun complexes which permit them to be manned and operated during the march (such as the Oerlikon 25mm Diana). These ventures have not found market success because they are still less mobile and responsive than SPAAGs, and are almost as expensive as SPAAGs.

A new kind of ground mount is the remote-operated modular gun system. An example is the Skyshield 35 35-mm AA gun unit (2 guns, radar, and generator), for use in the Skyguard air defense system. An entire gun unit can be carried on a flatbed truck, hoisted to the ground, and brought into operation in a few minutes. These guns can locate on uneven ground and orient to level with their servo drive, using computer-adjusted fires. Operators can be up to 500 m away.

Some tow systems can be porteed, then dismounted upon arriving at an AD site. Vehicles can operate in locations beyond towed guns. The BTR-ZD in airborne AD units (pg 6-50) transitioned from tow to portee carry. Although portee improves gun mobility, the penalty is that emplacement time may be even greater than normal transition from a towed mount. Thus, after an initial displacement from an airborne LZ, the BTR-ZDs are more likely to mount their ZU-23 AA gun onboard, using a simple method of fitting the gun on top of the hull.

Hull mount is one basic way of converting a vehicle into a SPAAG. Another common mount is in the bed of a “gun truck”. An early example was BTR-152 truck-based APC SPAAG variants (Vol 1, pg 3-21), e.g., a 14.5-mm ZPU-2 in the bay. Many insurgent forces and Third-World military forces “technicals” are pick-up and utility trucks with AD guns. Some developers offer trucks with medium guns on flatbed trailers, in highly integrated mobile gun systems. These gun trucks can provide general fire support against all air and ground threats.


M42 Duster

Self-propelled anti-aircraft guns (SPAAGs) have been in use well before World War II.

Most early SP systems use AA guns in shielded open turrets, so that crews can easily feed ammunition and slew the guns. Later SPAAGs with auto-cannons, auto-loaders, and integrated wide-aspect FCS, can be responsive and precise without the need for large gun crews and open turrets. To handle the recoil of medium caliber guns (20-75mm), SPAAG chassis are generally heavier

than on commercial vehicles. Best-suited chassis for handling gun weight and providing a stable mount for precision fires are tracked, especially modified tank chassis. However, those chassis may be costly, and are less mobile on roads while travelling with wheeled units. A good rule is for the SPAAG to use the same chassis, or more mobile chassis, as the units supported. Thus, SPAAG often use existing chassis (especially APC/IFV or combat support vehicles) also used by tactical units. For instance, the Russian Pantsir gun/missile system (pg 6-64) initially was fitted on a truck chassis; but early sales favored the turret (Pantsir-S1-0) on a BMP-3 IFV chassis. Considerations for some forces include cross-country capability and swim capability, to assure that units can bring their AD systems with them wherever they go. A few new SPAAGs have been offered on the world market; but sales have been slow. Current trends favor using modular AD turrets or RWS which can be fitted to a variety of existing chassis. Other forces are adding gun, FCS, and ammo subsystem upgrades and vehicle conversions to the AA role.

Survivability



Factors for survivability of AD guns combat are similar to other AD systems and the force in general (see pgs 6-8 to 6-12). Forces are upgrading them to improve survivability. Improved mobility and lethality aid survivability. Use of CCD (including MMW/IR netting) and the low profile inherent in many towed guns still challenge modern air and ground threats.

Two other factors which help counter modern air threats and SEAD are autonomy and integration. Modern guns are increasingly equipped to function effectively as a battery, platoon, or single gun. Thus they can be assigned to tactical units as support. They may have effective links to the AD network, or to direct links with their own forward observers (FOs) or use assigned unit air watches. Attack alerts and azimuth warning receivers like 1L15-1 (pg 6-56) are dispersed to tactical unit CPs and AD guns, to alert them to approaching targets with direction. At the same time that autonomy is improved, AD units have increased

integration. Widespread use of comms and improvements such as digital systems, encryption, frequency agility, SATCOM, and redundancy can assure the integrity of C2 for IADS (pg 6-2), AD units, and links to nearby tactical and supporting units. Vehicles like Sborka (pg 6-15) and Giraffe AMB (pg 6-16) link to IADS and adjacent units to assure that gun crews are aware of air activities in their sector.

Lethality

The most dramatic upgrades in AD gun capabilities are in the area of lethality. As with other tactical weapons, lethality can be addressed in terms of its components: gun, mount, sensors and fire control, C2, and ammunition. Modernization continues in all of the components. Conventional wisdom for AD guns is that success means putting more rounds onto the target. Therefore, most gun design improvements focus on longer range, better gun stabilization (and reduced recoil and barrel-whip) for better accuracy, reduced weight for shorter response, and increasing rate-of-fire while decreasing overheating – for more rounds per salvo.

Machineguns. The most proliferated guns used for AD are small-caliber (5.45-14.5 mm), because of the inventory of machineguns in all forces. Because MG size and lower cost separate them from medium-caliber guns, they should be treated separately. The inventory for MGs is so large because they can be ground-mounted and easily added to light vehicles with a pintle mount. All MGs can be used against aerial as well as ground targets.



Machineguns are increasingly available for use on unarmored or lightly armored combat support vehicles, including tactical utility vehicles, motorcycles, and all-terrain vehicles. Vehicle mounts include pintle mounts, remote weapon stations, overhead weapon stations, and turrets. Using economical laptop computer FCS, servo-motors and stabilization, MG add-ons are increasingly being used for vehicle main weapons or as secondary weapons to supplement main weapon fires and provide general and AD security. For more information on MG applications, see the section at Vol 1, *Auxiliary Weapons for Infantry Vehicles*.

A general rule for guns is that AD range can be calculated at 100 times the mm bullet size, in meters. Of course range actually varies by the components noted above, especially ammunition. But under that rule of thumb, a 7.62-mm MG has a 1,000-m AA range, and a 12.7-mm MG ranges about 1,300 meters. Those estimates are pretty close (see Vol 1, pgs 2-16 and 17). Vehicle-mounted with a good FCS, ranges can extend somewhat farther. Better range and penetration usually favors 12.7mm mm over 7.62 mm. The 14.5 mm round is larger than 12.7 mm, with a marginal edge in penetration and range. But superior round capacity, precision, recoil, ease of fit, and rate of fire favor 12.7 mm for use by dismounts and light vehicles.



The 14.5 MGs are widely fielded on APCs, such as BTR-80 (Vol 1, pg 6- 34). But Russian forces consider it to be obsolescent (Tier 4) for AD guns. Thus they have generally replaced ZPU guns (pg 6-45, on towed mounts of 1, 2, or 4 guns) with 23-mm cannons. Nevertheless, these guns endure and can still be found in more than 45 countries. Improvements available include fire control radars (like SON-9), turret mounts, improved command and radio links, such as an azimuth warning receiver and handheld encrypted radios.

Machineguns in AD units or specifically noted as AD MGs tend to be better equipped to deal with air threats, with features like improved recoil damping, stabilization, twin barrels for higher rate-of-fire, and better fire control. Another modern trend is to chain-drive guns. With chain drive comes more efficient and compact guns, multiple barrels, less recoil, and better precision at range. Air defense MGs often use quick-change barrels and superior air cooling for successive 10-15 round bursts and increased practical rate of fire (100 rounds per minute up to 250-300). Like other MGs, many AA MGs are remote- operated with electronic triggers. Due to their shorter range, MGs will require low technology support, including air watches, forward observers, and links (to nearby units for warning, to AD command nets, and to air warning nets).



Fire control system improvements have caught up with gun and mount technologies. Gun mounted or stabilized remoted day/night ballistic computer sights with EO and LRF are available. The FARA-1E MMW radar (Vol 1 pg 4-29) can be mounted and bore-sighted for immediate fire control. Binocular LRF such as the Sophie-LR or –MF offer thermal day/night use with other functions. For responsive C2, hand-held radios and the 1L15-1 azimuth warner give alerts and azimuth. In vehicle mounts with good telescopic EO sights, effective gun AA range is extended up to 2,000 m. Russian AD sights offer a high-angle view for the AD role. Lead- angle sights and auto-trackers are available.



An emerging trend among small-caliber AD guns is the Gatling-type multi-barrel gun. The weapon was modernized in the US 20-mm towed M168 Vulcan cannon and was employed in the 1950s. The M163 AD vehicle was an M113 with the Vulcan cannon. Other countries, including Russia, have fielded Gatling-type guns in 12.7, 20, 25, and 30 mm. The US Dillon Aero M134 fires 7.62-mm ammunition. There are inherent advantages in these guns. The multi-barrel design permits larger salvos against a fleeting enemy before overheating. The flanged barrels reinforce each other to eliminate barrel-whip. They can use chain-drive for maximum recoil dampening with precision fires. Recoil is still significant but it can be damped to a constant amount which permits accurate aiming. The design also reduces halts due to jammed rounds. But Gatling guns have significant limitations. Recoil and system weight can overwhelm light vehicles (and require stopping). The huge ammo requirement can strain logistic assets. Cost per kill is greater. Thus, Gatlings have seen limited use as light vehicle main guns or in vehicle auxiliary AD weapon station upgrades. The greatest limitation for small-caliber Gatlings is insufficient range against aircraft weapons. In the future, if ranges for small- caliber ammunition improve with the guns, higher carry capacity with smaller rounds may make 12.7-mm Gatling-type guns a preferred replacement for MGs (versus medium guns).

Ammunition developments are the single greatest factor for improving air defense. Improved ammunition is increasing range, precision, and lethality for all air defense guns. Although small-caliber guns have less variety of rounds than medium/large guns, there are new types. Improved armor-piercing incendiary tracer rounds can extend useable range for MGs. Chinese and Russian 12.7-mm duplex rounds (e.g., Russian 1SLT) have two separate projectiles, doubling the pattern of projectiles in any salvo fired. These rounds are especially useful against close-in small targets, like UAVs. Several countries make 12.7-mm sabot rounds like the US Olin M903 SLAP round, with greater precision and penetration at maximum range. Frangible rounds are made in calibers 7.62, and 12.7 mm and .50-cal. They fly like KE rounds, and can be ballistically matched to KE rounds (unlike HE), yet are more lethal at the target than KE (like explosive HE rounds). The most lethal mix may be KE and frangible. One problem associated with having more than one type of ammunition on hand is being able to switch between or among them against fleeting targets. With some MGs using box feed, the mounts permit two boxes, left and right, thus an ammunition switch can be very fast.

Medium AD Guns. In order to increase lethality, the best course of action is to go up in gun size to medium guns. As we noted in the range rule, a 12.7-mm MG ranges about 1,300 meters. But a 30- mm gun can range 3,000 m and a 57-mm gun ranges 5,700 m. Emphasis in modern AD guns is on medium calibers (20-75 mm). There are still some larger caliber guns in 76, 85, 100, and 122 mm; but upgrades are limited to adding radars, radios, and azimuth warners (KS-19M2, pg 6-42). Within medium AA guns, calibers are creeping up to better range aerial threats.



Medium-caliber guns (cannons) have seen the greatest variety of upgrades. Medium guns suffer from many of the same problems of MGs like barrel whip, overheating, and recoil. In the 1950s and 60s, most AD cannons were of 20, 23, 37, 40, and 57 mm. Most are still in use today and are recoil/gas-operated. Many are twin guns like the Russian 23-mm ZU-23 and Chinese 37-mm Type 65. Later, 25, 30, and 35 mm auto-cannons have grown in usage. Many use chain-drive. Modern guns like the Russian 30-mm 2A38 and Swiss 35-mm GDF-003 can fire at rates up to 2,400 rds/min (for 2A38), with 25-round bursts. But limited salvo size and practical rate-of-fire still limit fires to avoid over-heating.

The modern gun size that has received the latest technology is 35-mm. With lightweight designs (some less than 100 kg), these guns can be fitted on ground chassis like the GDF-003 (pg 6-43) and vehicle- mounted in modern turrets like the South African LCT35 for IFV or SPAAG. The best AA gun examples are in the 35-mm and 40-mm guns (made by manufactures like Bofors, Oerlikon, and LIW). These modern weapons can range to 4 km accurately, and exploit new round technologies. For instance, the Swedish Skyshield-35 gun uses a compact 35/1000 revolver cannon (with single barrel, rotating cylinders, and linkless rounds in a conveyor feed system). The gun weighs half the weight of the GDF-series 35-mm guns.

A new AD gun technology is the RMK-30 30x173 mm recoilless auto-cannon from Rheinmetall, fielded on the Spanish Pizarro and Austrian Ulan IFVs. The combustible case rounds produce gas blowback, expended out of the cannon rear to <2 feet. Rate of fire for the 100 kg gun varies from 300- 800 rds/min. Fitted in a RWS, the gun can mount on nearly all light tactical vehicles. It fires sabot and frangible rounds, and AHEAD-type programmable air-burst rounds to 3,000 m effective range. The gun could replace MGs in light AD and combat vehicles.



Some countries use Gatling-type cannons for AD. The US M163 SPAAG with 20-mm Vulcan gun was followed by the Blazer with a 25-mm Gatling gun on a Bradley chassis, and the LAV AD with Blazer gun on the USMC LAV chassis. A French program fitted the gun on a French chassis with radar FCS. The Chinese M1990 30-mm towed gun features a 4-barrel Gatling system. Nevertheless, because of reasons noted on the page above, Gatling AD guns are not widely fielded. Also, as they increase in caliber, recoil and the ammunition storage burden increase dramatically. Better gun precision and range more than offset the advantages of high-volume fire with Gatlings.

The AD gun mount is a critical consideration in gun system, as noted in the discussion of mobility (pg 6-35). For ground systems, we do not see an auxiliary power unit, like the APUs such as on the GHN- 45 artillery cannon, and on the Russian 2A45M AT gun. But some modern guns have lift hooks for rapid mount/dismount. Motor gun drive, such as on the Chinese Type 79, permits faster slew to target, for more precise fires and more salvoes against fleeting targets.



Some SPAAGs have stabilized guns for AA fire on the move. Stabilization kits are available and are fairly inexpensive. Turrets for IFVs and several RWS are easily accurate enough for AA use, and can be fitted on a variety of vehicles. For vehicle mounts,

cannon recoil has led some forces to use tank chassis to absorb the load and assure accuracy. The Polish Loara SPAAG features twin 35-mm guns on the PT-91 (T-72 upgrade) chassis. Light turrets such as the Russian Sosna turret (either 30-mm guns or gun/missile system) can fit on IFV/APC chassis of supported units, which means that they offer amphibious or airborne chassis. The German RMK-30/Wiesel can be used with airmobile units. The Bofors TriAD turret fits on IFVs such as the Swedish CV90 and the Piranha APC. With the radar, superior EO, and quick response 40-mm L70 gun, the SPAAG fires programmable 3P HE rounds for lethal fires.

A few new SPAAGs have been developed. The Rheinmetall SkyRanger is actually a multi-role system, and is discussed on pg 6-29. Recent truck-mounted SPAAGs include the South African Zumlac, with a mine-protected SAMIL (4x4) truck, and a ZU-23 gun on the rear bed.



China offers its FAV light strike vehicle with the ZU-23 on the rear and extendable spades. Oerlikon and Skoda proposed a SPAAG with a Tatra T815 8x8 truck, and a Skyshield 35 gun mounted on the rear. A disadvantage with large truck-mounted SPAAGs is that they can be distinguished from other vehicles, making them high-priority targets for destruction. Note that most of the systems mate existing guns and vehicles rather than costly special-design systems.

Improvements in fire control include day/night all-weather EO computer-based sights and monitors with digital transmission capability. Many older AD guns have added target acquisition radars such as AA guns noted at pgs 6-43 to 52. With added onboard computers, radars (and EO TV/thermal sights with auto-tracker for day/night passive operation) and older guns like the ZU-23 (pg 6-49) can be converted into a responsive autonomous weapon like the ZU-23M or ZU-23M1. Vehicles can integrate a FCS from disparate fire control elements (CCD TV day sight, thermal night sight, ballistic computer, voice radio nets, and forward observers, digital C2 nets in the IADS and other AA and tactical nets, auto-tracker, dual-mode radar, AD net azimuth warning system, laser rangefinder, laser radar, RF detectors, digital displays from remote cameras, robots, UGS, acoustic sensors, UAVs etc). Many of these can also be linked to laptop monitors or FCS displays for ground AA gun systems or transmitted to the unit net or IADS.

The greatest changes for AD guns are in new ammo for longer range and better precision. These rounds for medium guns generally make the previous requirement for higher rates of fire irrelevant to air defense lethality. Air defense guns generally have rounds such as HEI, API-T, and SAPHEI-T. More recent guns use sabot (APFSDS-T) rounds, frangible rounds, and proximity-fuzed HE rounds. These rounds enable many systems, which could not reach beyond 2,000 m without losing velocity and their probability of hit to reach out to 3,000+ m accurately. Most of the older guns can also use these rounds, as well. The Russians offer a 30-mm “CC” round (with 28 sub-projectiles) for use on aircraft guns. It could be a good anti-UAV AD round.



Proximity fuzing permits guns to reach farther and higher and offsets the inaccuracies of HE rounds compared to KE rounds. One proximity-fuzed round is more accurate (because a near miss still detonates the round for a “hit”) than ten rounds of HEI. Salvo size and cost per kill are lower with proximity rounds, making existing or older gun systems effective and lethal in the air defense role. However, proximity-fuzed rounds can be counter measured or decoyed when fired in obstructed areas. Environmental clutter such as vehicles and power lines can predetonate the rounds. Swedish Bofors developed the 3P HE round in 40-mm and 57-mm with a 6-way programmable fuze, which can avoid pre- detonation. One of the fuze modes is gated proximity, which desensitizes the round until near-impact time. Even when engaging helicopters flying nap-of-the earth at low altitude, effects of electronic jammers and clutter are negated. The 40-mm round produces a cloud of 2650 fragments. This is a very affordable option as fewer rounds are needed and more costly rounds are selected only for specific targets.

Another round for medium guns is the Swiss Oerlikon AHEAD (Advanced Hit Efficiency And Destruction) round (and similar

technology rounds), for use in 30 mm, 35 mm, 40 mm, and 57 mm guns. The rounds, also known as Air Burst Munition (ABM), can range 4000 m, using their electronically-programmed time fuze to dispense a wall of tungsten sub-projectiles at an aerial target 10-40 m away. A 40 mm gun round dispenses 152 sub-projectiles. From a 35-mm gun, 24 AHEAD rounds (1-2 sec) usually assure a kill against a fleeting aircraft. The round can be used against even small targets, like mini- and micro-UAVs, artillery rounds, and rockets, or for top/direct attack against ground vehicles, dismounted troops, and materiel targets. Russian Aynet tank round and BMP-3M HEF round are also programmable, for AD and against ground targets like AT assets.

One of the most lethal AD calibers continues to be 57 mm, in the Russian 57-mm S-60 (pg 6-43 and their variants), and Swedish 57-mm naval guns. The rounds are large enough to deliver substantial bursts out to 6000 m. A variety of upgrades are offered for the guns, and proximity and AHEAD rounds are available for effective fires out to the maximum range.

Improvements in ammunition-handling are keeping pace with the weapons systems. Selected gun systems have multiple ammunition feed systems for the different types of rounds. Cased-telescoped gun systems (and their CT ammunition, round in the photo right) are a recent development - which may supplant existing designs. Cased rounds shorten round length, permitting smaller gun breaches that better fit inside of vehicle turrets and weapon stations. The rounds enable autoloaders to hold more ammo in smaller spaces and more easily manipulate rounds in loading trays. Faster loading and more rounds decrease jams and ammo outages at critical moments.

Gun/Missile Systems. Another lethality trend which has reinvigorated SHORAD is widespread fielding of, or conversion to, gun/missile systems. Most SHORAD systems are being converted to having both guns and missiles. Thus the guns, with their links to the AD net and improved FCS, can also serve as platforms for missiles. The guns and missiles can protect each other to provide lethality beyond effective range for most guns, no dead spots for the missiles, and effective lethality despite aircraft countermeasure systems.

A significant amount of SHORAD modernization activity includes gun/missile systems. We have noted some new SPAAGs have been marketed without missile capability. Nevertheless, most new AD gun systems actually fielded are gun/missile systems, such as BRAM, in the photo on pg 6-40. A few systems feature robust SAMs. The Russian 2S6M1 (pg 6-63) was followed by the Pantsir (pg 6-64), with 18-km high-velocity missiles and 30-mm twin auto-cannons. The Ukrainian Donets mounts a ZSU-23-4 turret (with four 23-mm AA guns) on a tank chassis. Also mounted on the turret is an SA-13 missile launcher. China’s Type 95 pairs 25-mm guns and QW-2 MANPADS. TY-90 has a 12.7-mm MG and six robust SAMs.

The Russians now offer modular turrets for the robust gun/missile systems. Pantsir-S1-0 turret can be fitted to a wide variety of chassis. They can use IFV/APC chassis, are almost visually indistinguishable from them, and are compatible with the mobility and maintainability of supported units. With existing chassis and indigenous installation, fielding costs are lower.

Another turret, the Sosna-R, uses a twin 30-mm AA gun and Sosna-R 8-km laser beam-rider missile. The turret is lighter and less costly than Pantsir, and fits many combat vehicles. Its range, precision, and responsiveness can challenge aerial systems well beyond gun range.

Several ground-based gun/missile complexes include robust missile systems. Among the best is Skyguard (pgs 6-43 and 6-72), which feeds compatible digital fire control and radar to both guns and missiles. The Chinese PL-11 system is similar. Many countries will co-locate guns and missiles for mutual fires and support. Germany employs a “team” which includes Roland SAMs and Gepard SPAAGs. Similarly, the French army mixes Roland and AMX-13.



Most gun/missile systems use the less costly low-technology approach of pairing guns and man- portable SAMs (aka: MANPADS). Vehicles such as the US Avenger, LAV- AD, and Blazer use Stinger SAMs. China likes this upgrade approach. The recent FAV light strike AD vehicle mounts a ZU-23 gun and twin MANPADS launcher. Russian variants of MT-LB include the MT-LB6MB3 IFSV/APC with 23-mm GSh-23L twin cannon, 30-mm AGL, and 7.62-mm MG. But the MT-LB6MB5 IFSV has a 2A38 twin 30-mm AD gun, MGs, AGL, and SA-18 SAM launchers. The Polish Sopel tracked system mounts a turreted twin 23-mm gun and twin Grom MANPADS launcher. GMW developed a twin Stinger launcher for mounting on the Gepard AA gun. A French-marketed variant of the Blazer turret features a 25-mm Gatling-type gun and four Mistral MANPADS missiles. The turret also has a radar FCS and it can be fitted on LAVs such as M113.

The widely fielded ZSU-23-4 SPAAG (6-7,000) is the subject of various upgrade packages (pg 6-52).



Several include adding MANPADS, integrated into the fire control system. The Russian ZSU-23M5 mounts one or two Strelets MANPADS modules (each with two SA-18 missiles). The Polish Biala fits four Grom MANPADS launchers onto the turret. A Ukrainian upgrade includes a swing-up launcher with six SA-18 missiles. Other modernizations include GPS navigation, a new radar for some, ballistic computer and TV FCS with thermal sights, digital communications, NBC protection, side skirts, and smoke grenade launchers. An Iranian version includes an auto-tracker and laser warning system.

Towed gun systems can also be fitted with missile launchers. The widely fielded Russian ZU-23 offers an –M1 upgrade (pg 6-49) with a Strelets two-SAM module, also integrated into gun FCS. The FCS in ZU-23M and ZU-23M1 has TV and thermal sights, LRF, IR auto-tracker, and a ballistic computer. Strelets module (with SA-18 SAMs) can be fitted to many AA systems.

Included in the market for AD guns are turrets, remote weapon stations, and subsystem upgrades for infantry vehicles which enable them to reach similar capabilities as specialized AD guns and gun/missile systems. Developments in this area for infantry vehicles are discussed in Vol 1, pgs 3-12 to 14, and 3-55 to 57. Infantry fire support vehicles in maneuver battalions and below offer mobile and responsive AD and AT support (Vol 1, pages 3-52 to 54). For more discussion of AD guns, see ***Air Defense/Antitank (ADAT) Vehicles,*** in this chapter at pg 6-32.

Manportable Air Defense Systems (MANPADS) and Trends

In units with dismounted teams or squads, the most effective air defense asset is the MANPADS launcher. This system requires moderate training to reach proficiency and offers high probabilities of hit and kill. Although its cost is greater than most small arms, it offers an asymmetric possibility of causing enemy damage compared to cost and it retains its effectiveness over time. With infrared (IR) homing guidance (pg 6-55), a MANPADS permits the user to engage its target and quickly displace to avoid a lethal response. These systems also offer insurgents and others an asset to down costly military and civilian aircraft targets.

Basic components of legacy MANPADS include the following: gripstock with attached sight, inserted battery coolant unit (BCU), launch tube (canistered) with sling and missile, and possible protective pads. Missile components are the warhead with seeker, missile body with propulsion motor and guidance fins, and an eject motor for soft launch. A 2-3 man team usually includes operator, assistant with support equipment and spare missiles, and perhaps a loader/transporter. Support assets can provide warning of aircraft approach. Once a target is in sight, the launcher signals lock-on with visual/audio cues. A trigger squeeze launches the missile. MANPADS seekers detect engine heat, so they offer longer range at target side and rear aspects.

Aircraft have added many changes and countermeasures to defeat MANPADS. They include IR flare dispensers, low detection designs, and evasive tactics (e.g., terrain flying modes, use of terrain defilade, and night missions). MANPADS have also added improvements since their inception (1960s). Gripstocks added optical or electro-optical sights to augment post-and-blade sights. Support assets include radio links to forward observers, AD nets, azimuth plotting boards which provide alerts and flight path warning, even helmet-mounted RF receivers to give operators warning and direction (pg 6-56). Manportable surveillance radars (e.g., Fara-1E, Vol 1, pg 4-29) can mount nearby, or link with RF display units (e.g., Chinese QW-1A).

The greatest improvements are in the missile designs. Missile motors and eject motors now use faster low-smoke propellants. These and improved steering systems mean reduced warning time, higher speeds, and higher G-force turns to challenge aircraft evasion capability. Seekers shifted to improved detector arrays for 2-color vs earlier 1-color IR. Microcircuits and superior filter algorithms offer higher contrast and less background clutter. Some added spikes to reduce lens heating, and mirrors to widen field of view. These mean higher hit probability (Ph) and greater IR flare rejection. Ground target discrimination allows MANPADS to fly lower (0-10 m) against helicopters flying in nap-of-the-earth mode. Warheads have greatly improved in lethality, with HMX replacing RDX, fuel detonation fuzing, and proximity fuzes to increase Ph. Warheads are growing, from earlier HE ones at <1 kg, to Frag-HE/frangible rod designs to 3 kg.

Given the number of older MANPADS around the world, especially those based on the Russian SA-7a, industries offer refurbishing and upgrades for older systems. Although systems, when stored well, can last for decades, the BCUs may need replacement. New ones are available. In addition, the Russian firm LOMO offers a replacement 9E46M 2-color IR seeker to replace the older 1-color seeker (pg 6-56). With that seeker, SA-7 missile and foreign copies can approach the higher Ph (including flare rejection) of more modern systems. Other parts, e.g., eject motors and sights can be replaced or upgraded. Variants have added changes. The Chinese incorporated many changes to fielded systems. Others then modified those designs.

Some producers countered aircraft CM and improved effectiveness of their MANPADS with new guidance modes. British

designers developed Blowpipe system in the early 1970s. But its RF command line-of-sight (CLOS) guidance proved difficult to keep on target. The Javelin RF semi-automatic CLOS (SACLOS) system appeared in the mid-80s. It requires only that the crosshairs stay on target. These systems are unaffected by IR flares and have good head-on range, but are subject to RF jamming. In 1976 Sweden fielded the laser beam-rider (LBR) RBS-70 SACLOS system. RBS-90 offered improved fire control and support. British Starstreak (pg 6-60) also adopted LBR guidance. Now British Shorts offers a Javelin upgrade to LBR with the Starburst system. LBR SACLOS systems cannot be jammed or decoyed. But, all SACLOS systems are challenged to stay fixed on evading aircraft. Starstreak II added an auto-tracker to maintain lock until impact. SACLOS launchers also cannot move until impact. Starstreak's answer is high velocity and long range, to kill aircraft beyond their range. Later seekers were fielded with IR/ultraviolet (UV) homing, and with semi-active laser-homing (SAL-H) guidance.

As new MANPADS have emerged with new features, weight for some has crept up considerably. Several have grown beyond weight limit for truly manportable systems. A more accurate term for these is "portable". It means that several are not generally shoulder-launched, rather are launched from vehicles or pedestal ground launchers. RBS-70 and 90, and Mistral fit on these launchers. Other makers also offer pedestal launchers for true MANPADS, for convenient use by MANPADS teams. The Russian Djigit (pg 6-

58) is a pivoting twin launcher with separate triggers and a convenient EO sight system. Pedestal launchers can also mount on vehicles, such as on truck beds, for easy mobile conversions. Also modular launch pods, e.g., Mistral Albi system and Russian Strelets offer multiple launchers with superior FCS. MANPADS can be mounted on helicopters, guns and vehicles, and exploiting their superior FCS and links.

Selected MANPADS Systems

Name	Export Country	Weight (kg)	Range (km)	Altitude (km)	Whd (kg) Prx Fz (P)	Guidance	Remarks
Red Eye	US	13.1	.2-5.5	.05-2.7	Frag 2	1-C IR-H	Obsolete
Blowpipe	UK	20.7	.6-3	.01-2	Frag 2.2 P	RF CLOS	Low hit probability
Javelin	UK	24.3	.3-5.5	.01-3	Frag 2.7 P	RF SACLOS	Blowpipe upgrade
Starburst	UK	20.9	.3-5.5	0-3	Frag 2.7 P	LBR SACLOS	Javelin upgrade
RBS-70	SW	86.5	.2-7	0-4	Frag .9 P	LBR SACLOS	Mk 2 and RBS-90
HN-5/5B	CH	15	.8-4.4	.05-2.5	HE .6	1-C IR-H	SA-7 variant
FN-6	CH	17	.5-5.5	.015-3.8	INA	2-C IR/UV-H	Mistral variant
QW-1	CH	16.5	.5-5	.03-4	Frag .57	2-C IR-H	SA-7b variant
QW-2	CH	18.4	.5-6	.01-4	Frag 1.4	2-C IR-H	SA-14/16 variant
QW-3	CH	29.7	.8-8	.004-5	HE rod	IR SAL-H	Fielding INA
Sakr Eye	EG	18	.8-4.4	.05-2.4	Frag	1-C IR-H	SA-7 variant
Anza Mk I	PK	15	1.2-4.2	.05-2.5	Frag .37	2-C IR-H	HN-5 variant
Anza Mk II	PK	16.5	.5-5	.03-4	Frag .55	2-C IR-H	QW-1 variant
Anza Mk III	PK	18	.5-7	.01-3.5	Frag 1.4	2-C IR-H	QW-2 variant
Misagh-1	IR	16.9	.5-5	.3-4	Frag 1.4	2-C IR-H	QW-1 variant

Developments continue. New thermal night sights are offered. One particularly active area for MANPADS is in support assets. Passive support systems include acoustic detection systems, unattended ground sensors, and remote passive IR camera systems. Radars and links to IADS can link directly with MANPADS or indirectly through the transport/fire support vehicles.

Recent Developments in Medium-Range Air Defense (MRAD) Systems

In the past, the US and Russia dominated military markets in medium-range SAM systems. Most well-fielded MRAD systems are Russian systems, or license-produced copies or variants of those systems. Most still have some effectiveness for AD, especially with upgrade programs. But new systems and new producers are expanding options for their MRAD choices.

For military forces in most countries, with substantial portions of their territory lacking strategic targets or vulnerabilities, MRAD SAMs (aka: MSAMs) are more practical AD systems than the more expensive and restricted mobility long-range SAM systems. Requirements for these systems include ranges from <1 km to 20-50 km, and altitudes of 5 m to 6-50 km. Many MRAD SAMs

operate within these range limits, which are less than LRAD SAMs, but offer high-altitude protection against flight profiles of most fixed-wing aircraft and many missiles.

The most proliferated MRAD SAMs are former Warsaw Pact, e.g., SA-2, SA-3, SA-3b, SA-6/SA-6b, SA-11, Buk-M1-2, or US HAWK and I-HAWK. These include towed semi-mobile and vehicle-mounted mobile systems. Most legacy systems have seen many upgrades. In recent years the pace of upgrades increased with availability of digital data systems, computer integration, imaging fire control systems, and radar improvements. Improved supporting target acquisition and fire control radars are adding improvements in overall systems capabilities. Several towed systems are now mounted on vehicle chassis. Missile improvements include missile motor/range upgrades, new warhead designs, and improved missile guidance modes. Many MRAD systems are upgraded to meet recent AD challenges (e.g., stealth, SEAD, cruise missiles, low-flying helicopters, air-launched munitions, UAVs, and ballistic missiles).

The widely fielded Russian SA-6/Kub system has seen many upgrades, including improved missiles (Kub-M1 and Kub-M3), and unit changes. In the Soviet era, it was being obsolesced by SA-11/Buk systems. Most SA-6 units were upgraded and converted to SA-6b (pg 6-76). SA-11 units also saw upgrades. Dissolution of the USSR left Russia with fewer modern units and many older Kub units. New upgrade packages were fielded, and offered to export customers. Meanwhile, delays and cost issues with the forecasted SA-17 led them to a deep modernization to Buks with Buk-M1-2 (see pg 6-78). An economical and clever change was to add launcher-loaders to batteries, to supplement TELAR missile loads and increase launch rates. New Russian MRAD designs, such as Vityaz, are in development. The trend for increased missile loads on Russians LRADs will further delay domestic fielding of MRAD systems. The SA- 17 is not well fielded; but Russia is upgrading and exporting AD, and modernization options.

Other countries have entered the development arena for indigenous MRAD systems. A number of air-to-air missiles have been adapted for ground mounts as medium-range SAMs. Others are indigenous developments, which offer export capabilities and flexible adaptation to meet specific customer needs. See some of the many variant examples with the Aspide 2000 missile (next page). Other systems have been developed by Sweden (RBS 23/BAMSE) Israel (Spyder-MR), and South Korea. Israel is also developing Arrow as an anti-theater ballistic missile (ATBM) system. India and several other countries have foreign system acquisition/upgrade programs, as well as indigenous development programs underway. European countries (SAMP-T), Norway (NASAMS, with the AMRAAM missile), and Turkey are currently in MRADS development programs. China is offering its KS-1A system. European firms are adapting the IRIS-T AAM for ground launchers.

Recent Developments in Long-Range and High-Altitude Air Defense Systems

The worldwide trend in modernization of long-range AD (LRAD) and high-altitude continues, even in times of shrinking military budgets. The trend is driven by expanding strategic threats of aerodynamic systems (e.g., ballistic and cruise missiles, UAVs, and stealth aircraft), and deadly munitions (e.g., weapons of mass destruction and effects, and precision weapons).

Challenges of rising costs and constricted budgets affect the modernization patterns. Most countries continue to focus most of their air defense modernization programs on upgrading and reconfiguring existing systems. There are upgrade missiles, C2 and fire control assets for Russian SA-5 and other older SAM systems (pgs 6-73, 6-80, etc.). A few other countries are developing new systems, including anti-ballistic missile (ABM) systems.

The non-US strategic systems which have received most world attention in recent years are the Russian SA-10, SA-12, and SA-20 series missile systems. S-300P (SA-10/-20) series have seen a lot of changes, and a confusing mix of names and designators. To clarify those nomenclatures, the table appears below. Export and Russian forces systems in each series may have same capabilities; but in some cases, due to the lengthy export contract negotiation process, export systems may be upgraded by time of shipment. Upgrades succeed only when radars and fire control match missiles with range and altitude coverage to use their capabilities.

In recent years we have heard much about the new Russian 4th-generation missile system, **S- 400/Triumf**. Due to developmental delays and budget issues, the program was delayed. The delays expedited Russian efforts to modernize SA-10 and SA-12 systems, and to incorporate comparable missile/support capabilities into them. Thus **SA-10d** and **SA-10e** upgrades were further modernized and re-designated **SA-20a** and **SA-20b**. An upgraded SA-12 is fielded and designated **SA-23**. The S-400/Triumf is now fielded, and designated **SA-21a**. SA-20b and S-400 systems can launch two different sizes of missiles (see SA-20b at pg 6-86, and SA-21 at pg 6-87). The large missiles offer superior performance for ballistic missile defense (BMD), and for long-range defeat of AWACS, RISTA, stealth, and SEAD targets. With the changes in SA-20 and SA-21 programs, many sources have confused those systems and their details.

Changes in strategic systems may impact fielding of medium-range air defense systems (MRADs). As the 9M96-series small missiles improve, they will form the majority of missiles on S-300/400 launchers, to service most aerial targets. Some countries may choose not to acquire MRADs (e.g., Buk-M1-2), rather upgrade strategic systems like SA-10/20a to SA-20b capability. But ground forces also want long-range AD. Most MRADSs range only to 50 km, yet lack surge capacity of the SA-20b and later long-range systems (up to 16 SAMs, pg 6-81). SA-12/23 units currently have limited surge capacity. Users can now add canisters of small missiles to existing LRADS TELs for increased surge capacity, without the need to add new expensive MRADs.

Russia intends to upgrade strategic SAM systems and upgrade all S-300 and S-400 systems into an integrated network.

Priorities are for every battery to be able to counter ballistic missiles, surges, and high-value systems (stealth, AWACS, and SEAD). China is upgrading its SA-10/SA-20 systems and to compete with Russian systems. Many forces are adding new long-range EW and TA radars and other sensors, and upgrading older systems to extend range and digitally integrate them into IADS. These include ELINT, other passive sensors, and responsive, jam-resistant, secure C3 networks to destroy UCAVs and stealth aircraft.

S-300P Series Strategic Air Defense Systems Comparison*

NATO DESIGNATOR	SA-10b GRUMBLE	SA-10c GRUMBLE	SA-20a (SA-10d) GARGOYLE	SA-20b (SA-10e) GARGOYLE
LAUNCHERS	5P85SU cmd TEL** 5P85DU slaveTEL** 5P85 trailer lchr w/KrAZ-260V	5P85SU cmd TEL** 5P85DU slaveTEL** 5P85T trlr lchr w/KrAZ-260V	5P85SE cmd TEL** 5P85TE trlr lchr w/KrAZ-260V	5P85SE2 cmd TEL** 5P85TE2 Trailer w/KrAZ-260V
MISSILES Range (km) Altitude (km)	5V55R 7-75 0-25 blast radius Also 5V55V (nuc option) 5V55KD (upgrade variant of 5V55K)	5V55RUD 5-90 0-27 blast radius Also 5V55V nuc 5V55PM anti- radiation (ARM) 48N6E (upgrade option)	48N6/ 48N6E export 5-150 0-27 blast radius Also 5V55V nuc 5V55PM anti-radiation (ARM) 48N6E2 (upgrade option)	48N6M /48N6E2 export 5-200 0-27 blast radius ***"Small missile" (4 per canister) 9M96 /9M96E 9M96M /*9M96E2 5-40 5-40 5-120 5-120 0-35 0-35 0-35 0-35 Near term small missiles will range 200 km (upgrade option).
RADARS	64N6/BIG BIRD Bd*	64N6/BIG BIRD D*	64N6E/ BIG BIRD E**	64N6E2/ BIG BIRD E** bde TA radar vehicle 30N6E2/TOMBSTONE Battery FC rdr vehicle 96L6E2 Bn TA radar vehicle 76N6/CLAM SHELL bn option sup NEBO-SVU target track radar (Bn)
	bde TA radar vehicle	(in 83M6 Bd C2 sys)	(in 83M6E1 Bd C2 sys)	
	30N6/FLAP LID-B	30N6/FLAP LID-B	30N6E1/TOMBSTONE	
	Battery FC rdr veh		Battery FC rdr veh	
	76N6/CLAM SHELL	76N6/CLAM SHELL	96L6E Bn TA rdr veh	
	TA on tower trailer	TA on tower trailer	(76N6/CLAM SHELL	
	(36D6/TIN SHIELD	(Optional 96L6E Bn TA	Optional supplement)	
	TA trlr in older units)	radar vehicle)	Option: NEBO-SVU	
OTHER SUPPORT	54K6 CP veh (in the	54K6/Baikal-1 Bde	54K6E CP veh (in the 83M6E Bde C2 system) 1T12-2M survey trk 22T6 loading trk Baikal-1 Bde Intel Ctr 5157 power station MAZ-537 tows rdr twr 48III6y M Repair Base	54K6E2 CP veh (battle management
	83M6 Bde C2 system)	Intel Ctr (in 83M6 Bde		center in 83M6E2 Bde C2 system)
	1T12 survey trk	C2 system)		1T12-2M survey trk
	22T6 loading trk	1T12-2M, 22T6		22T6 loading trk
	Baikal-1 Bde Intel Ctr	5157 power station		Baikal-1 Bde Intel Ctr
	5157 power station	MAZ-537 for rdr twr		5157 power station trailer
	MAZ-537 for rdr twr	48III6y MRepair Base		MAZ-537 tows the radar tower
				48III6y Mobile Repair Base

TA radar = Target Acquisition (surveillance, detection, target tracking, IFF)

FC radar = Fire Control (illumination and guidance, missile tracking, IFF)

Many modern FC radars are dual-mode (capable of TA and FC functions). The 30N6 series radars are dual-mode. System radars and most others are phased-array. They offer SEAD rejection, low detection, and high jam resistance.

* *Fielded systems may adopt radars or missiles of earlier or later versions. Supporting vehicles carry forward, or are upgraded/replaced with new versions. Thus 30N6 on SA-10b and SA-10c is replaced by 30N6E1 on SA-10d. For SA-10b, a76N6 TA radar replaced the36D6 TA radar. An exception to upgradability is the obsolete SA-10a, missile which used radio command guidance, incompatible with later systems. SA-10a units were converted to SA-10b. Missiles with E designators are for use in exported systems, but could be used in domestic Russian launchers.*

Mobile AD radars with counter-stealth ability, e.g., Nebo-SVU, and older EW radars, can be used with SA-10/20. Substantial numbers of air observers will be used. SHORAD systems (including 2 MANPADS/TEL are co-located).

** *The TELs are variants of MAZ-543M. Radar and C2 vehicles are on MAZ-543M or MAZ-7910 chassis. Various other trucks and vans are used for support. Radar tower trailers have supporting units for erection and disassembly.*

*** *Some strategic anti-ballistic missile (ABM) SA-20b units only have 48N6-type "big missiles" and ARMs. In other units, one or more canisters of 4 small missiles will be used. As the smaller (9M96 series) missiles improve in range closer to the big missiles, more launch pods will convert from big missiles to small missiles. Thus the firing units will be able to disperse more widely, with up to four times the target-handling capacity of current firing units.*

**** *In SA-20a and 20b systems, there are no slave versions of the TELs, only command. Many have the trailer launchers operating out of battalion as primarily transport vehicles for resupplying firing units. They can, however, be used as launchers during air surge activities. Firing units which lose trailer-launchers may then add more TELs.*

Volume 3: Naval Systems

Chapter 1: Littoral Systems

This chapter focuses on vessels for use in littoral ("near the shore") operations. Littoral activities include the following:

- "brown water" naval operations in coastal waters (out to as far as 200+ km from shore),
- amphibious landing operations or port entry (opposed and unopposed),
- coastal defense actions (including patrols, engaging enemy, and denying entry)
- operations in inland waterways (rivers, lakes, etc), and
- actions in large marshy or swampy areas.

There is no set distance for “brown water.” Littoral range is highly dependent on specific geography at any point along a coast. Littoral operations can be highly risky. Forces moving in water are often challenged by nature and must move at a slow pace while exposed to enemy observation and fires. Thus littoral forces will employ equipment best suited for well-planned operations with speed, coordination, and combined arms support. Littoral forces will employ a mix of conventional forces, specialized (naval, air, and ground) forces and equipment, and civilian equipment which can be acquired or recruited for the effort. Each type of action may require a different mix of equipment to deal with challenges of terrain, vulnerability, and enemy capabilities.

Coastal water operations can utilize naval vessels that can operate in blue water. Naval battle groups for deep water also operate in littoral waters. Submarines and anti-submarine warfare (ASW) systems conduct missions in littoral waters. But challenges of shallow waters and shoreline threats also require use of smaller fast-attack boats, patrol craft, cutters, etc. Other craft include tug and maintenance boats, amphibious aircraft, and submarines. Many of the surface vessels in Chapter 1 are designed for littoral operations. Newer technologies are contributing to vessel designs for littoral waters. Along coastal areas, naval craft support ground forces by transporting troops and supplies as needed. For patrols in search of enemy and smuggler activities, stealthy high-speed craft are valuable assets. Paramilitary, police, security force, and other authorized agency craft will also operate in these waters. Most vessels in these waters are civilian commercial watercraft (for shoreline maintenance, fishing, and transport) and private pleasure craft. Insurgent forces and smugglers use these craft and may even “hide in plain sight.”

Amphibious landing operations need additional vessels, including landing craft, and shallow water close-in fire support craft to suppress ground targets and provide air defense. Air cushion landing craft (aka landing craft air cushion – LCAC) offer speed and agility to insert assets early in an operation. Other equipment includes unmanned underwater vessels (UUVs) for vessel inspection, reconnaissance, etc. Assets include special purpose forces (SPF), with specialized equipment, such as coastal infiltration submarines, midget submarines, scuba gear, semi-submersible infiltration landing craft, and mother ships for surreptitious launch. Aircraft support missions include anti-ship and anti-landing fires, surveillance, and transport. Inflatable boats (modular, rigid, and rigid-hulled) are widely used.

Most vehicles classified as amphibious are not really designed to operate in sea state 3 or greater. Thus they must be used in fairly calm waters or launched close to shore from landing craft.

Modern Technologies in Littoral Craft Design

There are several modern technologies for vessel design which offer more rapid movement for executing military operations. Some of these are quite costly, or are more suitable for calmer littoral waters, higher mission rates over shorter operating range, or for use in specialized missions.

Hydrofoils are increasingly used in commercial ferries, which can be exploited for military use. Some military patrol craft forces, including U.S. and Russian examples, feature hydrofoils. Discussion of this technology can be found below.

Another modern technology for modern craft is the ***air cavity*** hull design. With a scalloped cross-section, catamaran and trimaran designs mean that much of the hull is above the waterline, for reduced drag and shallower draft. These designs are increasingly being used in the commercial sector for sail craft and for racing boats. They also offer wider hulls for better stability over the waves, and more space to carry wide loads. They are popular for ferries and other roles carrying wide loads, such as vehicles. Capabilities for higher speed, dependable operation (with no need for mechanisms which can fail, e.g., hydrofoils), a stable platform, and shallow draft mean that coastal patrol and attack craft can use this design. A further development of the air cavity design technology is the addition of wave-piercing sponsons with hydra-jet propulsion. Despite higher cost, air cavity vessels are likely for use in littoral and some blue water roles.

Air cushion vessels can operate in coastal areas with irregular shore line and shallows. They are noted below for amphibious landing use, but can also be used as patrol craft, and to provide high speed transport in coastal zones.

Another littoral military technology is ***wing-in-ground effect (WIG)*** *craft*, which use lifting thrust for flight 1- 2 meters above the waves, and propelling thrust for missions at speeds of up to 700 km/hr. A few Russian WIG craft were equipped with

missiles to attack ships, and with large compartments to deliver troops and equipment. Due to military fielding and operational cost issues, most of the large Russian military “Ekranoplans” are no longer in use. However, successful peacetime conversions include the Orlyonok (with

140 ton displacement, speed 220 knots, range 830 nm). It is now used for passenger and cargo transportation, but could be employed for military roles. Commercial developers in various countries offer smaller WIG craft for passenger and cargo transport, and for personal use.

Inland waterways permit use of new technologies designed for commercial and recreational uses. Military requirements for riverine craft include high speed, rapid maneuver, shallow water capability, space for weapon mounts, and more. Airboats can operate in rivers and creeks and in marshy areas with a few inches of water. Ski boats, “cigar boats,” and other high-speed designs offer potential for military applications.

Hydrofoil Craft for Littoral Operations

This technology is increasingly being used for boats and ships in both commercial and military sectors. It is an expensive propulsion upgrade because of the mechanisms required, but the benefits are in open water speed. For ferries and medium range transport, shorter passage time can mean more passages and missions completed. For military applications, speed also decreases exposure time and permits quicker response time to engage targets. When in harbor areas or shallow water, foils are folded for conventional

hull down propulsion. Wave action in high sea state open water will affect craft designed for coastal waters, as is true with any conventional designs.

Military craft using foils are currently limited to craft for littoral operations. However, new hydrofoil designs are being considered for larger blue-water vessels. Military craft have been used by the U.S., Russia, Italy, Philippines, Israel, and others. A Canadian test of the Italian FHE-400 Bras’Dor 200-ton hydrofoil boat for anti-submarine warfare found it to be impressive in coastal waters, but unsuitable for long-term deep-water use under severe weather conditions.

Very Lightweight Craft for Use in Littoral Operations

Inflatable craft can fit in small spaces, with reduced weight for crew carry and transport. They fit stealthy operations with low profile (less visual signature), little metal for minimal radar and thermal signature, and low acoustic signature (low weight for smaller engines, and minimal sound of waves against a hull). They are also very cost effective. Inflation/re-inflation/ preparation times are reduced with compressed gas, pneumatic pumps, and cans of quick sealer.

These craft are popular in the sport industry, and are widely used in commercial roles. Thus there are many new technologies and hundreds of producers, most for non-military markets. Although rubber is still used; its use is far outnumbered by the variety of polyethylene watercraft available. Any of these products could have uses for military forces; however, military applications have some requirements that affect choices. Commercial boats often use bright colors for easy detection, versus military craft that are patterned to be concealable. Military craft are usually more rugged, to withstand wear and handle all men and gear needed on a mission. Military craft may need to support weapons mounts and more powerful engines.

Improved boat technologies have led to confusion in the terms used for the boats. The acronym RIB can mean ***rubber inflatable boat***, ***rigid inflatable boat***, and ***rigid-hulled inflatable boat***. Zodiac and other commercial firms offer boats which can be deflated, easily shipped, then quickly re-inflated and placed into service. Non-rigid boats are well-suited for small teams and for portage off-road between uses. Improvised means for added rigidity include inserted rods, boards, plywood to add decking, and loose seats or packs. Oars are often used for clandestine and short crossings.

Rigid inflatable boats, often favored by military forces, can have rigid seats and decking, for less chance of puncture, better stability in heavier waves, and more carrying capacity. There are dozens of designs for sporting, commercial, and military use. Facilities on or near the water will more likely use these craft than the earlier types. Styrofoam fills add rigidity and prevent sinking.

Many military units now use rigid-hulled boats (RHIB), which can be stacked and quickly placed into service, and can handle bigger engines, more troops and supplies, and heavier seas. Inflatable sections extend freeboard, reduce spray and wave effects, and assure flotation in case of capsizing. A fiberglass hull also permits weapon mounts. Some of the boats use armor plate to protect against 7.62-mm rounds. To avoid confusion of terms, the Zodiac Company now refers to its basic rubber inflatable boats as modular inflatable boats (MIB); but it also offers rigid designs.

Rafts and boats can be towed or rowed, and improvised from random wood, cut from trees, or rigged with drums or bladders. Inflatable rafts assist missions and can be life rafts in emergencies. Craft like

canoes, kayaks, johnboats and bateaus can be expropriated for military use. Another option is folding commercial or assault boats with polypropylene or plywood panels, also used as pontoons.

Chapter 2: Surface Systems

Naval surface vessels vary widely, from aircraft carriers displacing tens of thousands of metric tons to meters-long rubber inflatable boats for littoral use. This chapter covers aircraft carriers and surface combatants. These vessels are designed to conduct overt attacks against naval, air, and/or ground targets or to perform patrol functions. The different types are listed below in order of decreasing tonnage. Of note, distinctions between the types have become blurred in recent years.

- Aircraft carrier: Displacing 18,00-102,000 metric tons, aircraft carriers serve as waterborne military air bases. Lightly-armed, their importance comes from the ability to move large numbers of fighter/attack aircraft around the globe and serve as self-contained bases for the same.
- Battleship: Once the greatest weapon on the seas, battleships could displace as much as 63,000 metric tons – more than some modern-day aircraft carriers. They were armed with heavy guns and used for ship-to-ship and ship-to-shore battles. The last active battleships were decommissioned in 1991.
- Cruiser: Usually displacing 5,000-11,000 metric tons, cruisers were originally fleet scout ships. They have since evolved into anti-air and anti-ship vessels, though some classes can also do shore bombardment. Larger platforms can displace as much as 27,000 metric tons and may be referred to as battle cruisers. These vessels are usually armed with heavy guns and a combination of missiles and/or torpedoes.
- Destroyer: Commonly displacing 4,000-10,000 metric tons, these ships were originally designed for anti-submarine (undersea) warfare. The role of modern destroyers has expanded to include anti-ship and anti-air functions. These vessels are usually armed with missiles, torpedoes, and heavy guns.
- Frigate: Originally used for scout and escort duties, modern frigates commonly displace around 3,000 metric tons and mainly perform anti-air and anti-submarine duties. These vessels are usually armed with a combination of missiles, torpedoes, depth charges, and guns.
- Corvette: Smaller than frigates, corvettes nonetheless perform similar duties. They displace approximately 1,000-1,500 metric tons and are usually armed with a combination of missiles, torpedoes, depth charges, and guns.

This chapter focuses on surface vessels that are capable of blue-water operations. Large patrol craft and smaller littoral vessels are covered in Chapter 1.

Chapter 3: Undersea Systems

Naval undersea vessels vary widely, from ballistic missile submarines displacing several thousand tons to meters-long semi-submersible craft for littoral use. There are several broad categories of undersea vessels, the most commonly known being the traditional submarine. Additional categories include midget submarines, submersibles, semi-submersibles, and unmanned underwater vessels (UUVs).

Most undersea vessels are designed to conduct overt attacks against naval and/or ground targets. Other roles played include coastal infiltration; intelligence, surveillance, and reconnaissance (ISR); mine warfare; research; salvage; search and rescue (SAR); and special purpose forces support functions such as swimmer delivery.

The primary types of “blue-water” submarines are attack submarines and strategic submarines. Attack submarines are designed to target naval vessels – surface, undersea, or both – and are armed with torpedoes and/or anti-ship missiles. These boats are increasingly being armed with ship-to-shore missiles as well. Strategic submarines fall into two main categories based on armament. Ballistic missile submarines, commonly known as “boomers,” are armed with intercontinental ballistic missiles, while guided missile submarines carry cruise missiles.

This chapter focuses primarily on undersea vessels capable of blue-water operations, and is currently limited to submarines. Littoral vessels, such as North Korea’s Semisubmersible Infiltration Landing Craft (SILC), are covered in Chapter 1 of this volume.

Chapter 4: Unconventional and SPF Surface and Undersea Systems

This chapter focuses on vessels for use in littoral ("near the shore") operations. Littoral activities include the following:

- "brown water" naval operations in coastal waters (out to as far as 200+ km from shore),
- amphibious landing operations or port entry (opposed and unopposed),
- coastal defense actions (including patrols, engaging enemy, and denying entry)
- operations in inland waterways (rivers, lakes, etc), and
- actions in large marshy or swampy areas.

There is no set distance for “brown water”. Littoral range is highly dependent on specific geography at any point along a coast. Littoral operations can be highly risky. Forces moving in water are often challenged by nature and must move at a slow pace

while exposed to enemy observation and fires. Thus littoral forces will employ equipment best suited for well-planned operations with speed, coordination, and combined arms support. Littoral forces will employ a mix of conventional forces, specialized (naval, air, and ground) forces and equipment, and civilian equipment which can be acquired or recruited for the effort. Each type of action may require a different mix of equipment to deal with challenges of terrain, vulnerability, and enemy capabilities.

Coastal water operations can utilize naval vessels that can operate in blue water. Naval battle groups for deep water also operate in littoral waters. Submarines and anti-submarine warfare (ASW) systems conduct missions in littoral waters. But challenges of shallow waters and shoreline threats also require use of smaller fast-attack boats, patrol craft, cutters, etc. Other craft include tug and maintenance boats, amphibious aircraft, and submarines (Ch 2). Many of the surface vessels in Chapter 1 are designed for littoral operations. Newer technologies are contributing to vessel designs for littoral waters (see section at pg 3-6). Along coastal areas, naval craft support ground forces by transporting troops and supplies as needed. For patrols in search of enemy and smuggler activities, stealthy high-speed craft are valuable assets. Para-military, police, and security force and other authorized agency craft will also operate in these waters. Most vessels in these waters are civilian commercial watercraft (for shoreline maintenance, fishing, and transport) and private pleasure craft. Insurgent forces and smugglers use these craft and may even “hide in plain sight.”

Amphibious landing operations need additional vessels, including landing craft, and shallow water close-in fire support craft to suppress ground targets and provide air defense. Air cushion landing craft (aka landing craft air cushion – LCAC) offer speed and agility to insert assets early in an operation. Other equipment includes unmanned underwater vessels (UUVs) for vessel inspection, reconnaissance, etc. Assets include special purpose forces (SPF), with specialized equipment, such as coastal infiltration submarines (see Sang-O at pg 2-7), midget submarines, scuba gear, semi-submersible infiltration landing craft (pg 3-10 below), and mother ships for surreptitious launch. Aircraft support missions include anti-ship and anti- landing fires, surveillance, and transport. Inflatable boats (modular, rigid, and rigid-hulled) are widely used.

Most vehicles classified as amphibious are not really designed to operate in sea state 3 or greater.

Thus they must be used in fairly calm waters or launched close to shore from landing craft.

Many countries, however, have a fairly wide variety of vehicles for use in coastal amphibious operations. Some of the largest amphibious forces are in conventional army units that must operate in littoral zones. Thus they must have many vessels, special vehicles, and support assets. Combat vehicles for amphibious operations include selected IFVs and APCs (Vol 1 pg 3-41), light tanks and other heavy armored combat vehicles (HACVs, Vol 1 pgs 6-42 through 58). Chinese forces have added several fighting vehicles with buoyant front compartments for use in high sea states. These include the Type 90 APC, ZBD2000 IFV, and Type 63AM (aka Type 99) light amphibious tank. Highly amphibious combat support vehicles (CSVs) include the U.S. DUKW and the Russian PTS-M. Support equipment includes bladders to attach to vehicles and equipment, and amphibious trailers, such as the Russian PKP (for use on land and water).

Coastal defense forces include conventional units and weapons. Many ATGMs can destroy naval vessels (including NLOS systems, Vol 1 pg 6-75). Specialized weapons include anti-ship missile systems, e.g., Harpy, HY-2/SILKWORM, and supersonic missile BrahMos (Vol 2, pg 5-14). Other specialized systems include aircraft and anti-ship artillery systems (like the Russian Bereg SP cannon system). Torpedoes (such as the high-speed Shkval-E) can be launched from ships or underwater launchers to destroy vessels. Air defense missile systems, e.g., Russian SA-11 and Buk-M1-2 (Vol 2, pg 6-78), can be used as anti-ship missiles. Naval aircraft (e.g., the Russian Ka-27/HELIX) and UAVs can be used for coastal defense forces. Engineers and other support units will emplace obstacle systems underwater and ashore at likely landing areas. Surface and subsurface minefields will target surface vessels and submarines, and slow and channelize movement. Anti-landing mines are laid close to shore and at landing sites. Remote mine and rocket launchers deliver fires and strikes at landing craft and vehicles attempting to breach gaps in obstacle systems. Missile, gun, and rocket weapons will deliver precision strikes. Unmanned surface vessels with remote operated weapons can patrol and attack enemy targets.

Most large military forces conducting large military offensive operations will use ports to bring in forces or support the forces. The OPFOR will focus great effort to deny waterborne early entry and prevent sustained embarkation operations. They will use all available air, land, and naval forces. They will attack the force at critical nodes such as restricted waterways, including straits, channels, canals, harbors, and in port areas, to destroy the force and deny facilities. Mines, torpedoes, submarines, fast-attack craft, SPF, insurgents, and other means will be used.

Crossings in inland waterways are described in Army Field Manual 7-100.2 (Chapter 12). Factors such as gap width, depth, water speed, and threat (whether the crossing is opposed, etc.) affect the choice of equipment used. Coastal patrol, fast-attack, and landing craft can be used in inland waterways. Shallow- draft military riverine craft and commercial boats are widely used.

Airboats can move quickly, even in the shallowest waters. Barges can mount weapons and supplement carrying capacity of vessels. Amphibious vehicles are widely used. Improvised swim assists such as bladders and barrels enable equipment and vehicles to cross water gaps. Hydro-propulsion water-craft and craft with snag protection are widely used. Jet skis (aka wave runners) can be adapted for military use, even mounting weapons and operating rapidly in shallow waters. Seaplanes and aircraft fitted with pontoons can access areas difficult to reach by land.

Engineer assets are used in gap crossings. Reconnaissance assets, e.g., Russian IRM armored reconnaissance vehicles, frogmen with Scuba gear, re-breathers, mini-subs, and underwater propulsion units, shoreline recon units, and underwater maps help prepare a crossing.

Atmospheric diving suits (ADS) are used in all waters for longer-duration underwater work (deep sea diving, ship and harbor repair, surveillance, and engineer work). Civilian divers will also be used. Bridge vehicles can be used for narrow crossings. Pontoons, amphibious transporters and ferries can be used for wider gaps. Boats and amphibious trailers are used.

Pioneer units and others use improvised assets to aid in crossings. Inflatable rafts and improvised aids, such as wooden rafts constructed from nearby timber and structures, will be used to supplement military assets. Boats can be lashed together to substitute for pontoons as improvised bridges. They may even be planked with boards to support vehicles and equipment.

Mechanized amphibious units will include companies and battalions organized and equipped for use in opposed crossings. These units are carefully coordinated with supporting units to use deception, surprise, supporting fires (direct and indirect), and rapid maneuver to cross and to seize the other shore. Assets will include armored amphibious vehicles, fire support vehicles, and other support systems with amphibious capabilities. Aircraft and airborne/air assault assets will be used if available. Water-borne assets will attempt to expand the crossing area and bridge the gap (if needed for support assets to cross). Engineer ferries and transporters can be used once the site is secured. Non-swimming vehicles with high- ford designs and snorkels can be used in many crossings. Some tanks with snorkels can ford in waters to 5 m in depth. Winches on fording vehicles aid in navigating narrow water crossings.

Defense of inland waterways is primarily executed with conventional units. Additional equipment can include crossing assets (above, such as commercial watercraft, and anti-landing mines). The Russian KPDM-4 cassette anti-landing mine system offers 50-m ground launch range, for concealed or defilade launch. The VSM-1 helicopter minelayer can also be used.

Marshy and swampy areas require a mix of boats and vehicles that can move in very shallow waters. Airboats and tracked vehicles designed for very low ground pressures can be useful for rapid movement in these areas. The Ukrainian/Russian MT-LB armored transporter, and the Swedish Bv-206 are far-better suited for these terrains. Wheeled vehicles are poorly suited for this terrain. Even many amphibious tracked vehicles cannot be used in these areas, due to excessive ground pressure. In areas with 1 to 3 feet of water with muddy bottoms and banks, and some obstruction (stumps, brush, etc.), vehicles may find the going very slow. Winches, hoists, and saws are critical assets for pulling out vehicles and clearing obstructions. Engineer road clearing and reconnaissance vehicles (Vol 1, pgs 8-37 thru 41) can help. A wide array of other support and combat support assets can be used in littoral missions, including water crossings and actions in nearby land areas (including ports, coasts, and marshy or sandy areas).

Improvised assets are used by civilians in marshy areas, and will be exploited by military forces. Large numbers of flat-bottom boats, amphibious ATVs (such as Supacat, Vol 1, pg 3-73), and dismounted infantry are needed. So-called “swamp buggies” can be fashioned from trucks and tractors with large wide

wheels for low ground pressure and high ground clearance. They can transport assets, free mired vehicles, and be fashioned into “technicals” for fire support.

Modern Technologies in Littoral Craft Design

There are several modern technologies for vessel design which offer more rapid movement for executing military operations. Some of these are quite costly, or are more suitable for calmer littoral waters, higher mission rates over shorter operating range, or for use in specialized missions.



Hydrofoil Craft for Littoral Operations

Hydrofoils are increasingly used in commercial ferries, which can be exploited for military use. Some military patrol craft forces, including U.S. and Russian examples, feature hydrofoils. Discussion of this technology can be found on page 3-7.

Another modern technology for modern craft is the ***air cavity*** hull design. With a scalloped cross- section, catamaran and trimaran designs mean that much of the hull is above the waterline, for reduced drag and shallower draft. These designs are increasingly being used in the commercial sector for sail craft and for racing boats. They also offer wider hulls for better

stability over the waves, and more space to carry wide loads. They are popular for ferries and other roles carrying wide loads, such as vehicles. Capabilities for higher speed, dependable operation (with no need for mechanisms which can fail, e.g., hydrofoils), a stable platform, and shallow draft mean that coastal patrol and attack craft can use this design. The Chinese C-14/China Cat catamaran missile boat has proven to be an effective design (pg 3-8). Transport craft include the Russian Linda, at 25 tons, with a passenger load of 70, and speed of 31 knots, successfully operating in shallow waters.

A further development of the air cavity design technology is the Chinese HOUBEI-Class/Type 022 catamaran missile fast attack craft. Derived from Australian ferries, these 220-metric ton vessels feature two wave-piercing sponsons with hydra-jet propulsion. Thus they can be armed with an impressive weapons array while operating at speeds up to 36 knots even in deep water. Despite higher cost, air cavity vessels are likely for use in littoral and some blue water roles.

Air cushion vessels can operate in coastal areas with irregular shore line and shallows. They are noted below for amphibious landing use, but can also be used as patrol craft (Russian Sivuch, pg 1-12 and ZUBR at 3-9), and to provide high speed transport in coastal zones.

Another littoral military technology is ***wing-in-ground effect (WIG)*** *craft*, which use lifting thrust for flight 1-2 meters above the waves, and propelling thrust for missions at speeds of up to 700 km/hr. A few Russian WIG craft such as the Caspian Sea Monster were equipped with missiles to attack ships, and with large compartments to deliver troops and equipment. Due to military fielding and operational cost issues, most of the large Russian military “Ekranoplans” are no longer in use. However, successful peacetime conversions include the Orlyonok (with 140 ton displacement, speed 220 knots, range 830 nm). It is now used for passenger and cargo transportation, but could be employed for military roles. Commercial developers in various countries offer smaller WIG craft for passenger and cargo transport, and for personal use.



Inland waterways permit use of new technologies designed for commercial and recreational uses. Military requirements for riverine craft include high speed, rapid maneuver, shallow water capability, space for weapon mounts, and more. Airboats can operate in rivers and creeks and in marshy areas with a few inches of water. Ski boats, “cigar boats” and other high-speed designs offer potential for military applications. These technologies will be described in later updates.

This technology is increasingly being used for boats and ships in both commercial and military sectors. It is an expensive propulsion upgrade because of the mechanisms required, but the benefits are in open water speed. For ferries and medium range transport, shorter passage time can mean more passages and missions completed. For military applications, speed also decreases exposure time and permits quicker response time to engage targets. When in harbor areas or shallow water, foils are folded for conventional hull down propulsion. Wave action in high sea state open water will affect craft designed for coastal waters, as is true with any conventional designs.



Military craft using foils are currently limited to craft for littoral operations. However, new hydrofoil designs are being considered for larger blue-water vessels. Military craft have been used by the U.S., Russia, Italy, Philippines, Israel, and others. A Canadian test of the Italian FHE-400 Bras’Dor 200-ton hydrofoil boat for anti-submarine warfare found it to be impressive in

coastal waters, but unsuitable for long-term deep-water use under severe weather conditions.



One of the early commercial hydrofoil craft was the Italian Supramar design licensed to the Rodriquez shipyard as the PT-20. This craft is highly successful and used around the world. The 72-passenger ferry displaces 32 tons, for a speed of 35 knots. Military conversions such as the Philippine patrol craft noted at right continue to operate.

The Italian SPARVIERO Class includes seven fast-attack craft, first delivered in 1974. With 62.5 tons of displacement, speed is 50 knots foil-borne, 8 foils folded. Range is 2,225 km. The boat has a 76 mm OTO-Melara cannon and two Otomat anti-ship missile launchers.

Russian ANTARES-Class patrol boats from the 1970s and 80s are among several designs currently in operation. They displace 220 tons, with a max speed of 65 knots, and can operate in 3-meter waves. Hull-borne, it can operate in sea state 7. Range is 410 nm. Weapons include a 76-mm gun, a 30-mm 6- barrel Gatling-type gun, and two torpedo tubes. Other Russian hydrofoil vessels include SOKOL-Class ships of 465 tons.

Very Lightweight Craft for Use in Littoral Operations



Inflatable craft can fit in small spaces, with reduced weight for crew carry and transport. They fit stealthy operations with low profile (less visual signature), little metal for minimal radar and thermal signature, and low acoustic signature (low weight for smaller engines, and minimal sound of waves against a hull). They are also very cost effective. Inflation/re-inflation/ preparation times are reduced with compressed gas, pneumatic pumps, and cans of quick sealer.

These craft are popular in the sport industry, and are widely used in commercial roles. Thus there are many new technologies and hundreds of producers, most for non-military markets. Although rubber is still used; its use is far outnumbered by the variety of polyethylene watercraft available. Any of these products could have uses for military forces; however, military applications have some requirements that affect choices. Commercial boats often use bright colors for easy detection, versus military craft that are patterned to be concealable. Military craft are usually more rugged, to withstand wear and handle all men and gear needed on a mission. Military craft may need to support weapons mounts and more powerful engines.

Improved boat technologies have led to confusion in the terms used for the boats. The acronym RIB can mean ***rubber inflatable boat***, ***rigid inflatable boat***, and ***rigid-hulled inflatable boat***. Zodiac and other commercial firms offer boats which can be deflated, easily shipped, then quickly re-inflated and placed into service. Non-rigid boats are well-suited for small teams and for portage off-road between uses. Improvised means for added rigidity include inserted rods, boards, plywood to add decking, and loose seats or packs. Oars are often used for clandestine and short crossings.


Swimming truck

Rigid inflatable boats, often favored by military forces, can have rigid seats and decking, for less chance of puncture, better stability in heavier waves, and more carrying capacity. There are dozens of designs for sporting, commercial, and military use.

Facilities on or near the water will more likely use these craft than the earlier types. Styrofoam fills add rigidity and prevent sinking.

Many military units now use rigid-hulled inflatable boats (RHIB), which can be stacked and quickly placed into service, and can handle bigger engines, more troops and supplies, and heavier seas. Inflatable

sections extend freeboard, reduce spray and wave effects, and assure flotation in case of capsizing. A fiberglass hull also permits weapon mounts. Some of the boats use armor plate to protect against 7.62-mm rounds. To avoid confusion of terms, the Zodiac Company now refers to its basic rubber inflatable boats as modular inflatable boats (MIB); but it also offers rigid designs.

Rafts and boats can be towed or rowed, and improvised from random wood, cut from trees, or rigged with drums or bladders. Inflatable rafts assist missions and can be life rafts in emergencies. Craft like canoes, kayaks, johnboats and bateaus can be expropriated for military use. Another option is folding commercial or assault boats with polypropylene or plywood panels, also used as pontoons.

Infantry Weapons

→Handguns

SIG Sauer M18 American 9mm Semi-Automatic Pistol







Tiers:



Variants:

- **M17:** The P320 is known as the M17 (Full-Size) and M18 (Carry) in U.S. Military service.

System

Alternate Designation(s): P320; M18
Primary Function / Type: Pistol
Manufacturer: SIG Sauer, Inc., Newington, New Hampshire, U.S.
Action: Short recoil-operated
Muzzle Velocity: m/s360
Feed System: 17 or 21-round box magazine
Safety: Ambidextrous thumb safety
Chamber Indicator: Loaded chamber indicator
Slide Sub-Assembly: Improved slide sub-assembly to capture small components when disassembled
Trigger: Improved trigger "mud flap" to prevent foreign debris from entering the pistol action

Dimensions

Length: mm183
Barrel Length: mm98
Width: mm35.5
Height: mm140
Weight: grams737

Ammunition

Type: Rifle

Caliber: mm9

Cartridge: 9x19mm Parabellum

Basic Load: Pistols chambered in 9mm can feature a 17-round magazine in standard with optional 21-round extended magazines available.

Note: As part of the MHS procurement a new source for ammunition was solicited. The two types to be procured are the XM1152 and XM1153 now the M1152 and M1153. Olin Corporation (Winchester Brand) has received that award for approximately 1.2 Million rounds of ammunition. The ammunition mentioned here In the infobox is Winchester Civilian issue.

Sights

Type: Iron Sights

Note: Slide cut out to facilitate the addition of a reflex sight. (This is the slide from the RX Series)

Notes:

The SIG Sauer M17 and M18 are handguns used by the United States Armed Forces. On January 19, 2017, the United States Army announced that a customized version of the SIG Sauer P320 had won the Army's XM17 Modular Handgun System competition. The full-sized model will be known as the M17 and the smaller-sized carry model will be known as the M18. When the requirements were formulated for a new handgun for the U.S. Army, one of the tenets of the proposal was that an existing model handgun was desired to fulfill the requirements laid out in the Modular Handgun System Request for Proposal, known as the XM17 Procurement. SIG Sauer submitted a P320 with a number of modifications and submitted them for the XM17 Modular Handgun System competition. SIG Sauer wins the award On January 19, 2017, the United States Army announced that the SIG Sauer P320 MHS variant had won the military's Modular Handgun System trials. The P320 is known as the M17 (Full-Size) and M18 (Carry) in U.S. Military service. Though the pistol will remain chambered in 9 x 19mm Parabellum rather than a larger caliber, the contract allows the Army and other services to procure SIG Sauer’s proposed XM1152 Full Metal Jacket and XM1153 Special Purpose ammunition. The ammunition chosen to go with the pistol is a "Winchester jacketed hollow point" round; similar in appearance to the Winchester PDX1 round but with some differences to the design of the hollow point petals. The M17 has better accuracy and ergonomics and tighter dispersion than the M9 and will be fielded more widely, being issued down to squad and fireteam leaders. Special forces dual-arm all of its members with a pistol and rifle. Junior leaders in regular infantry units who were previously excluded from carrying sidearms will be given more choices and options in close quarters battle situations under a new policy. All Army units are planned to have the M9 replaced with the M17 within a decade. U.S. military services adopt the M17 and M18 In May 2017, the Army announced that the first unit that will receive the M17 would be the 101st Airborne Division by the end of the year. At the same time, the rest of the U.S. Armed Forces revealed they also intend to acquire the handgun, making it the standard sidearm for the entire U.S. military. The services plan to procure up to 421,000 weapons in total; 195,000 for the Army, 130,000 for the Air Force, 61,000 for the Navy (M18 compact version only), and 35,000 for the Marines. The United States Marine Corps is replacing its M9, M9A1, M45A1, and M007 handguns with the SIG Sauer M18 handguns. The M9 and M9A1 were produced by Beretta while the M45A1 was made by Colt and the M007, which was only recently accepted as a variant, is made by Glock. Although it has been announced that the US Coast Guard is also adopting the M17/18 handgun there are no purchase numbers as yet.

Beretta 92FS Italian 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **90Two:** The 90two is a 9mm/.40 variant of the 92-series with a redesigned, thicker slide and frame to accommodate an accessory rail, fully dovetailed front sight and .40 S&W pressures. Other features added include a captive recoil spring, internal recoil buffer, user changeable monogrips and 17-round magazines.
- **92A1 / 96A1:** (2010–present) The 92A1 and 96A1 were introduced in 2010, based on elements from the 92FS and 90two.
- **Centennial:** (2015) The 92 FS Centennial limited edition (500 units) commemorates adoption by the Italian Military of Beretta's earliest semiautomatic pistol, the Model 1915. This Centennial 92 is notable for its frame-mounted manual safety and single-action-only mechanism. The Beretta medallion in each wood grip panel displays the anniversary dates in Roman numerals, which are also engraved on either side of the steel slide. The pistol is packaged in a custom M2A1 ammunition can bearing the Centennial logo.
- **M9A1:** (2006–present) The M9A1 was adopted by the USMC in 2006. It adds a 1-slot Picatinny rail, more aggressive front and backstrap checkering and a beveled magazine well for easier reloading of the weapon. M9A1 pistols are sold with physical vapor deposition (PVD) coated magazines developed to better withstand the conditions in the sandy environments in Iraq and Afghanistan.
- **M9A3:** (2015–present) The M9A3 (the M9A2 concept never went into production) was released in 2015, as a potential upgrade for the US military, in response to the Modular Handgun System trials. The main updates to the M9A3 were a 3-slot Picatinny rail, thinner vertical grip, removable wrap-around grips that can be swapped between Vertec-style and 'old' M9 style, fully removable sights and a universal slide, which makes the gun convertible from decocker-safety to decocker-only mode. The tip of the barrel is pre-threaded to facilitate addition of a suppressor. Additionally, the M9A3 comes with 17-round sand-resistant magazines in a beveled shape for easier reloading.
- **Wilson Combat 92G Brigadier Tactical:** (2014 to present) Made in collaboration with Wilson Combat, these pistols differ from the standard Brigadier in that they have a military standard 1913 picatinny rail, all steel controls (as opposed to the polymer coated steel), decock only feature (G-model), 4.7" target crowned barrel, fluted steel guiderod, thin profile G-10 grips, rounded trigger guard, the lighter hammer spring used in the "D" model, Elite II hammer, and their own unique serial number with a "WC" prefix among other features.
- **Elite LTT - Langdon Tactical:** The Elite LTT was introduced by Beretta in 2018, in conjunction with firearms trainer Ernest Langdon. The LTT uses the Vertec slide with front cocking serrations on a modified M9A1 frame, and wears Langdon Tactical G10 grips. The pistol comes equipped with G-Model decocker, dovetailed front sight, steel trigger and guide rod, improved springs, and a 4.7 inch stainless barrel with target crown, just to name a few of the more prominent features.
- **93R machine pistol:** The Beretta 93R is a significantly redesigned 92 to provide the option of firing in three-round bursts. It also has a longer ported barrel, heavier slide, fitting for a shoulder stock, a folding forward grip, and an extended magazine. Unlike other Berettas in the 90 series it is single-action only, does not have a decocker, and very few are around today.

System

Alternate Designation(s): 92FS
Primary Function / Type: Pistol
Manufacturer: Fabbrica d'Armi Pietro Beretta

Muzzle Velocity: m/s381

Effective Firing Range: m50

Feed System: Detachable box magazine: *10, 15, 17, 18, 20, 30, 32 rounds (92, 98 series) *10, 11, 12, 13, 15 rounds (96 series) *10, 13 rounds (Compact L) *8 rounds (Compact Type M)

Design: The Beretta 92's open slide design ensures smooth feeding and ejection of ammunition and allows easy clearing of obstructions. The hard-chromed barrel bore reduces barrel wear and protects it from corrosion. The falling locking block design provides good accuracy and operability with suppressors due to the in-line travel of the barrel. This is in contrast to the complex travel of Browning designed barrels. The magazine release button is reversible with simple field tools. Reversing the magazine release makes left-handed operation much easier. Increasingly, it has become popular to reduce handgun weight and cost as well as increase corrosion resistance by using polymers. Starting around the year 2000, Beretta began replacing some parts with polymer and polymer coated metal. Polymer parts include the recoil spring guide rod (which is now also fluted), magazine floor plate, magazine follower and the mainspring cap/lanyard loop. Polymer coated metal parts include the left side safety lever, trigger, and magazine release button.

Magazines: To keep in line with the introduction of laws in some locations restricting magazines that hold more than 10 rounds, Beretta now manufactures magazines that hold fewer than the factory standard 15 rounds. These magazines have heavier crimping (deeper indentations in the side) to reduce the available space while still keeping the same external dimensions and ensuring that these magazines can be used on existing firearms. Beretta also produces 15 round "Sand Resistant" magazines to resolve issues encountered with contractor made magazines, and 17 round magazines included with the A1 models. Both magazines function in earlier 92 series and M9 model pistols. Italian magazine manufacturer Mec-Gar now produces magazines in blue and nickel finishes with an 18-round capacity, which fit flush in the magazine well on the 92 series. Mec-Gar also produces an extended 20-round blued magazine that protrudes below the frame by 3⁄4 inch (19 mm). These magazines provide users in unrestricted states with a larger capacity magazine.

Dimensions

Length: *217 millimetres (8.5 in) *211 millimetres (8.3 in) (Vertec) *197 millimetres (7.8 in) (Compact/Centurion)

Barrel Length: *125 millimetres (4.9 in) *119 millimetres (4.7 in) (Vertec/Elites/Border Marshal/Combo) *109 millimetres (4.3 in) (Compact/Centurion)

Weight: *950 grams (34 oz) (92) *970 grams (34 oz) (92S/SB/F/G) *920 grams (32 oz) (92D) *900 grams (32 oz) (Compact/Vertec)

Ammunition

Type: Rifle

Caliber: mm9

Cartridge: *9×19mm Parabellum (92 series) *.40 S&W (96 series) *9×21mm IMI (98 series) *7.65mm Luger (98 series)

Basic Load: See Magazine

Sights

Type: Iron Sights

Notes:

92FS: The World’s Most Trusted Military and Police Pistol The Beretta 92FS has been setting the standards for best military, police and tactical pistol for over a quarter century. The reason is that it was designed--and has kept evolving--to be and remain the most accurate, durable and reliable semiauto handgun on the market. Easy to use, absolutely safe and delivering impressive firepower, it remains the sidearm of the US military and of allied forces the world over, as well as of countless police and law-enforcement agencies. The 92FS is a double/single-action semi auto pistol that employs an open-slide, short-recoil delayed locking-block system, which yields a faster cycle time and delivers exceptional accuracy and reliability. In particular, the open-slide design practically eliminates “stove-piping” and helps flawless cycling and feeding even after thousands and thousands of rounds. Regardless of the wonderful reputation it may have, the true test for a tactical pistol’s worth is at the shooting range. The 92FS consistently bests the US military requirement of a 10-shot group of 3” or less at 50 meters (just short of 55 yards). While this type of match-grade accuracy is impressive, it is no magic. At Beretta, we know that absolutely precise tolerances keep performance consistent shot after shot—which not only gives the 92FS its extraordinary accuracy, but

it makes all factory parts interchangeable within the same model. Couple this to the ability to reliably feed every variety of commercial ammunition, and it is easy to understand why the 92FS remains the best pistol in its class. This pistol offers a variety of tactical features that make it equally safe, easy to use and dependable in the holster of military personnel as well as for home or personal defense. Its reversible magazine release lets you use either hand for tactical magazine changes, while its ambidextrous safety-decocker makes it flexible for right- or left-handed persons or for shooters trying out different gripping or shooting styles. Its Bruniton finish is highly resistant to sweat and corrosion, and after shooting, a tool-free disassembly latch makes it a snap to take the pistol apart for cleaning. These and countless other useful features make the 92FS the choice of military and police professionals all over the world, as well as individuals wanting the absolute best for sport or self-protection.

Steyr M Austrian 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **Steyr M9:** It is a version, chambered in 9x19 mm Parabellum cartridges. Steyr M40. It is a version, chambered in .40 S&W cartridges. Steyr M357. It is a version, chambered in .357 SIG cartridges. At some point this chambering was discontinued and the Steyr M357 pistol is no longer produced. Steyr S9 is a compact version, chambered in 9x19 mm ammunition. This version was introduced and discontinued alongside the Steyr M. Production of this pistol ceased in 2004. Steyr S40 is a compact version, chambered in .40 S&W ammunition. This version was introduced and discontinued alongside the Steyr M. Production of this pistol ceased in 2004. Steyr M9-A1 is an improved and slightly redesigned version, chambered in 9x19 mm Parabellum cartridges. It was introduced in 2004 and replaced in production the previous Steyr M9. It has a slightly redesigned grip and frame. This weapon has a Picatinny-type accessory rail instead of the proprietary rail. This pistol is also available with or without manual safety. Steyr M40-A1 is an improved and slightly redesigned version, chambered in .40 S&W cartridges. It was introduced in 2004 and replaced in production the previous Steyr M40. This weapon has a Picatinny-type accessory rail instead of the proprietary rail. This pistol is also available with or without manual safety. Steyr S9-A1 is a compact version. It is chambered in 9x19 mm Parabellum ammunition. Steyr S40-A1 is a compact version. It is chambered in .40 S&W ammunition. Steyr C9-A1 it is a compact pistol with a shorter barrel and slide, but with magazine capacity of a full-size model. It is chambered in 9x19 mm Parabellum ammunition. Steyr C40-A1 it is a compact pistol with a shorter barrel and slide, but with magazine capacity of a full-size model. It is chambered in .40 S&W ammunition. Steyr L9-A1 is a full-size pistol with a long slide. It is chambered in 9x19 mm Parabellum cartridge. This version was introduced in 2013. Steyr L40-A1 is a full-size pistol with a long slide. It is chambered in .40 S&W cartridge. This version was introduced in 2013.
- **Steyr M40:** It is a version, chambered in .40 S&W cartridges.
- **Steyr M357:** It is a version, chambered in .357 SIG cartridges. At some point this chambering was discontinued and the Steyr M357 pistol is no longer produced.
- **Steyr S9:** Steyr S9 is a compact version, chambered in 9x19 mm ammunition. This version was introduced and discontinued alongside the Steyr M. Production of this pistol ceased in 2004.
- **Steyr S40:** Steyr S40 is a compact version, chambered in .40 S&W ammunition. This version was introduced and discontinued alongside the Steyr M. Production of this pistol ceased in 2004.
- **Steyr M9-A1:** Steyr M9-A1 is an improved and slightly redesigned version, chambered in 9x19 mm Parabellum cartridges. It was introduced in 2004 and replaced in production the previous Steyr M9. It has a slightly redesigned grip and frame. This weapon has a Picatinny-type accessory rail instead of the proprietary rail. This pistol is also available with or without manual safety.
- **Steyr M40-A1:** Steyr M40-A1 is an improved and slightly redesigned version, chambered in .40 S&W cartridges. It was introduced in 2004 and replaced in production the previous Steyr M40. This weapon has a Picatinny-type accessory rail instead of the proprietary rail. This pistol is also available with or without manual safety.
- **Steyr S9-A1:** Steyr S9-A1 is a compact version. It is chambered in 9x19 mm Parabellum ammunition.
- **Steyr S40-A1:** Steyr S40-A1 is a compact version. It is chambered in .40 S&W ammunition.
- **Steyr C9-A1:** Steyr C9-A1 it is a compact pistol with a shorter barrel and slide, but with magazine capacity of a full-size model. It is chambered in 9x19 mm Parabellum ammunition.
- **Steyr C40-A1:** Steyr C40-A1 it is a compact pistol with a shorter barrel and slide, but with magazine capacity of a full-size model. It is chambered in .40 S&W ammunition.
- **Steyr L9-A1:** Steyr L9-A1 is a full-size pistol with a long slide. It is chambered in 9x19 mm Parabellum cartridge. This version was introduced in 2013.
- **Steyr L40-A1:** Steyr L40-A1 is a full-size pistol with a long slide. It is chambered in .40 S&W cartridge. This version was introduced in 2013.

System

Alternate Designation: Steyr M

Manufacturer: Steyr Mannlicher

In Service: 1999-present

Length: 180 mm

Barrel Length: 101 mm

Height: INA

Weight: 780 g

Effective Firing Range: 50 m

Feed System: 15-round box magazine;15+2 round box mag. available (M9-A1) 12-round box magazine (M40, M357) 10-round box magazine (S9, S40)

Ammunition

Type: Rifle

Caliber: 9×19mm Parabellum (L9-A1, M9, S9, M9-A1, S9-A1) 9x21mm (M9, S9, S9-A1—Italian market only) .40 S&W (L40-A1, M40, S40, M40-A1, S40-A1) .357 SIG (M357, M357-A1)

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Notes:

The Steyr M is a series of semi-automatic pistols developed by Steyr Mannlicher GmbH & Co KG of Austria for police services and the civilian shooting market. Design work on the new pistol began in the early 1990s and the final product known as the M9 (adapted to fire the 9×19mm Parabellum cartridge) was officially unveiled in the spring of 1999. The M40 version chambered in .40 S&W was developed before the M9, followed later by the M357 (chambered in .357 SIG) and two smaller variants of the M9 and M40 designated the S9 and S40 respectively. These pistols were developed primarily for concealed carry and have a shortened barrel, slide, smaller frame and a reduced magazine capacity. In 2013 the Steyr M (Medium) and S (Small) form factors were complemented by the L (Large) sized series and the C (Compact) sized series both available in 9×19mm Parabellum and .40 S&W chamberings as the L9-A1, L40-A1, C9-A1 and C40-A1. The Steyr M series of pistols employs the mechanically locked Browning short recoil method of operation with a linkless, vertically dropping barrel.[1][2] The cold-hammer-forged conventional rifled barrel is locked to the slide by means of a single rectangular lug around the barrel chamber that recesses into the ejection port in the slide. When fired, the recoil impulse from the ignited cartridge drives the barrel and slide back, locked together until the bullet leaves the barrel and pressures drop to a safe level. A locking block integrated into the frame then engages a lug at the base of the chamber and drives the barrel downward, separating it from the slide and terminating any further rearward movement while the slide continues back in a straight line. Design Details The Steyr M series uses a very high grip profile which holds the barrel axis close to the shooter's hand and makes the Steyr M more comfortable to shoot by reducing muzzle rise and allowing for faster aim recovery in rapid shooting sequence. Hammerless and striker-fired, the Steyr M features a double action only (DAO) pre-set trigger mechanism marketed as a "Reset Action" trigger. When the trigger is in the forward position, the firing pin spring remains lightly compressed (pre-cocked by the forward motion of the slide as it returns to battery). Pulling the trigger all the way to the back will compress the firing pin spring completely, draw the firing pin fully to the rear and position the trigger bar to release the firing pin and fire a round. The trigger travel is 4 mm (0.16 in) with a pull weight of 25 N (5.6 lbf). The pistol has a multi-stage safety system consisting of two automatic internal safeties, two external trigger safeties and a manual lock safety. The first external trigger safety acts as the primary fail-safe. A small, spring-loaded inner trigger is housed in a wide, outer trigger and cannot be actuated unless the inset trigger is depressed first. This keeps the trigger from being pulled by an inadvertent off-angle trigger pull. This trigger safety also activates and when released—deactivates the two internal safeties: the firing pin and drop safety. The firing pin safety is contained in the pistol's slide and blocks the longitudinal movement of the striker. The second trigger safety is an optional, manually operated plastic bar located inside the trigger guard and projecting out from the base of the pistol's frame when activated, revealing a small white dot. This indicates that the pistol is currently incapable of being fired. It is used as an additional safety that disables the trigger with the firing pin spring cocked (after reloading the pistol). This safety is engaged by simultaneously pushing in two buttons on both sides of the frame and then deactivated by simply lifting the trigger finger and pushing the bar up and into the pistol's frame, thus allowing the trigger to be pulled back and the weapon fired. These safeties enable safe handling of the

pistol with a round present in the chamber (the so-called "cocked and locked" condition) and allow for rapid deployment and immediate firing; this arrangement however does not permit the firing mechanism to be re-cocked in case of a misfire after the trigger has been pulled. Product Evolution Steyr Mannlicher has updated its basic design several times throughout its production history. Second-generation models In 2004, an improved version of the pistol replaced the original Steyr M in production. The new 'second generation' Steyr M-A1 and S-A1 pistols received several improvements. The grip of the pistol has been redesigned with some textured surfaces as was the magazine well (uses the same magazines), ergonomics have been slightly altered to improve grip, the manual safety button is now optional (not in models sold in the United States, all US imports lack the manual safety) and the lower forward portion of the frame now consists of a STANAG 2324 Picatinny rail for mounting accessories. Later 'second generation' models also have a modified extractor for easier ejecting of casings. Third-generation models In 2010, Steyr Mannlicher US began reimporting Steyr M-A1 and S-A1 pistols. The newly imported 'third generation' Steyr M and S have a revised slide and grip imprinted with the Steyr Arms logo. Post 2009 'third generation' models have a roll pin in the slide just under the rear sight element, feature an improved trigger and 17-round magazines with a +2 baseplate are available for the 9×19mm Parabellum M9-A1, C9-A1 and S9-A1 models. These new 15+2 magazines, designed to compete with the classic Glock 17 rounds magazines, are fully compatible and interchangeable no matter what generation or serie the gun belongs to. In 2010 the C (Compact) sized C-A1 series was introduced in 9×19mm Parabellum and .40 S&W chamberings as the C9-A1 and C40-A1. This C (Compact) form factor mainly pairs the S (Sub-Compact/Small) barrel lengths to the M (Medium) form factor grip. For Italy only the C9-A1 is offered in the 9×21mm chambering. In 2013 the Steyr M (Medium), Steyr C (Compact) and S (Sub-Compact/Small) form factors were complemented by the L (Large) sized L-A1 series available in 9×19mm Parabellum that uses 17-round +2 base plate magazines as the L9-A and .40 S&W chamberings 1 that uses 12-round magazines as the L40-A1. The L-A1 series feature additional serrations on the front sides of the longer slide and 115 mm (4.5 in) barrel length puts it more in line with full-size service pistols offered by other manufacturers. Fourth-generation models In 2019 Steyr introduced the A2 MF series in 9×19mm Parabellum in three form factors: the Large size L9-A2 MF, Medium M9-A2 MF and Compact C9-A2 MF. The "MF" in the designations stands for Modular Frame. The 'fourth generation' A2 MF series have a (serialized) removable chassis/trigger pack, making them not backwards compatible to previous series. The revised grip frame features a full length STANAG 2324 Picatinny rail, more aggressive surface texturing, a lengthened beaver tail and is adjustable to user preferences with different sized back-straps and side grip inlay panels. The conspicuous finger support protrusion on the upper half of the grip is omitted and the grip has a flared magazine well. The magazines were modified and feature orange followers. The ejector was modified to counteract erratic spent cartridge case ejection. Dimensional the A2 MF series are somewhat longer and wider than the preceding A1 series.

Glock 17 Austrian 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **Note:** Following the introduction of the Glock 17, numerous variants and versions have been offered. Variants that differ in caliber, frame, and slide length are identified by different model numbers with the exception of the Glock 17L. Glock pistols are made in five form factors, all modeled after the original full-sized Glock 17. "Standard" models are designed as full-sized duty firearms with a large magazine capacity. "Compact" models are slightly smaller with reduced magazine capacity and lighter weight while maintaining a usable grip length. "Subcompact" models are designed for easier carry and being lighter and shorter, are intended to be used with two fingers on the grip below the trigger guard and lack an accessory rail like the larger, after generation two, Glock models. The .45 ACP and 10mm Auto models have bigger, wider slides and are slightly larger than the smaller-chambered pistols and are available in the subcompact models Glock 29 (10 mm) and Glock 30 (.45 ACP). Glock produces five models of single-stack "Slimline" subcompact pistols, the Glock 36 in .45 ACP, the Glock 42 in .380 ACP, and the Glock 43, 43x, and 48 in 9×19mm. The 43x and the 48 have longer grips that allow for a full three-finger hold and a 10-round capacity. "Competition" versions have longer barrels and slides, adjustable sights, an extended slide and magazine release. Beginning in 2007, Glock introduced several "Short Frame" models designated by the suffix "SF". The short frame was originally designed to compete in the now cancelled U.S. military Joint Combat Pistol trials for a new .45 ACP pistol to replace the M9 pistol. Glock's entry featured an optional ambidextrous magazine release and MIL-STD-1913 rail along with a reduction in the size of the backstrap. The Glock 21SF is currently available in three versions: one with a Picatinny rail and ambidextrous magazine release and two with a Universal Glock rail available with or without the ambidextrous magazine release. Current 10mm and .45 ACP Glock magazines are manufactured with ambidextrous magazine release cutouts. As of January 2009, the Glock 20, 21, 29, and 30 were offered in short-framed variations. These models incorporate a 2.5 mm (0.098 in) reduction in trigger reach, and full-sized models feature a 4 mm (0.16 in) reduction in heel depth, which corresponds to an overall reduction in length for those models.
- **Glock 17:** Glock 17,a baseline model, chambered for 9x19 mm rounds. Magazine holds 17 rounds.
- **Glock 17L:** Glock 17L is a target model, intended for competitions. It is chambered for 9x19 mm ammunition. It has a longer barrel and adjustable sight.
- **Glock 18:** Glock 18, a fully-automatic pistol, chambered for 9x19 mm round. It is one of a few automatic pistols, that are currently produced. It fires in full-auto and semi-auto modes. A fire mode selector is mounted on the left side. It can be fitted with a 33-round magazine and a folding stock.
- **Glock 19:** Glock 19, is a more compact version of the baseline Glock 17. It was introduced in 1988. This pistol is chambered for 9x19 mm ammunition. Magazine holds 15 rounds.
- **Glock 20:** Glock 20, chambered for 10x25 mm (10 mm Auto) ammunition. Magazine holds 15 rounds.
- **Glock 21:** Glock 21, chambered for 11.43x23 mm (.45 ACP) ammunition. Magazine holds 13 rounds.
- **Glock 22:** Glock 22, chambered for 10x22 mm (.40 S&W) ammunition. Magazine holds 15 rounds.
- **Glock 23:** Glock 23, chambered for 10x22 mm (.40 S&W) ammunition. Magazine holds 13 rounds.
- **Glock 24:** Glock 24 is a target model with a longer barrel, chambered for 10x22 mm (.40 S&W) ammunition. This pistol has adjustable sigh. Magazine holds 15 rounds.
- **Glock 25:** Glock 25, chambered for 9x17 mm (.380 ACP) ammunition. Magazine holds 15 rounds.
- **Glock 26:** Glock 26, chambered for 9x19 mm ammunition. Magazine holds 10 rounds. This pistol has a sighting range of 25 meters.
- **Glock 27:** Glock 27, chambered for 10x22 mm (.40 S&W) ammunition. Magazine holds 9 rounds.
- **Glock 28:** Glock 28, chambered for 9x17 mm (.380 ACP) ammunition. Magazine holds 10 rounds.
- **Glock 29:** Glock 29, chambered for 10x25 mm (10 mm Auto) ammunition. Magazine holds 10 rounds.
- **Glock 30:** Glock 30, chambered for 11.43x23 mm (.45 ACP) ammunition. Magazine holds 10 rounds.
- **Glock 31:** Glock 31, chambered for 9x22 mm (.357 SIG) ammunition. Magazine holds 15 rounds.

- **Glock 32:** Glock 32, chambered for 9x22 mm (.357 SIG) ammunition. Magazine holds 13 rounds.
- **Glock 33:** Glock 33, chambered for 9x22 mm (.357 SIG) ammunition. Magazine holds 9 rounds.
- **Glock 34:** Glock 34, chambered for 9x19 mm ammunition. Magazine holds 17 rounds.
- **Glock 35:** Glock 35, chambered for 10x22 mm (.40 S&W) ammunition. Magazine holds 15 rounds.
- **Glock 36:** Glock 36, chambered for 11.43x23 mm (.45 ACP) ammunition. A single-stack magazine holds 6 rounds.
- **Glock 37:** Glock 37, chambered for 11.43x19 mm (.45 GAP) ammunition. Magazine holds 10 rounds.
- **Glock 38:** Glock 38, chambered for 11.43x19 mm (.45 GAP) ammunition. Magazine holds 8 rounds
- **Glock 39:** Glock 39, chambered for 11.43x19 mm (.45 GAP) ammunition. Magazine holds 6 rounds.
- **Glock 41:** Glock 41, chambered for 11.43x23 mm (.45 ACP) ammunition. Magazine holds 13 rounds.
- **Glock 42:** Glock 42, chambered for 9x17 mm (.380 ACP) ammunition. A single-stack magazine holds 6 rounds

System

Alternate Designation: Glock 17

Manufacturer: Glock Ges.m.b.H.

Action: Short recoil, locked breech, tilting barrel (straight blowback for Glock 25 and 28)

Rate of Fire: Glock 18 1,100–1,200 RPM (rounds per minute)

Muzzle Velocity: 375 m/s (1,230 ft/s) (Glock 17, 17C, 18, 18C)

Effective Firing Range: 50 m (55 yd) (Glock 17, 17C, 18, 18C)

Feed System: 6, 10, 13, 15, 17, 19, 31, or 33 round detachable box magazine, or 50 round detachable drum magazine

Dimensions / Charachteristics

Length: 204 mm

Barrel Length: 114 mm

Weight, Unloaded: 710 g

Weight, Loaded: 910 g

Ammunition

Type: Rifle

Caliber: 9mm

Cartridge: 9x19 mm Parabellum

Magazine: 17 rounds

Sights

Note: The Glock 17 has a fixed polymer combat-type sighting arrangement that consists of a ramped front sight and a notched rear sight with white contrast elements painted on for increased acquisition speed – a white dot on the front post and a rectangular border on the rear notch. The rear sight can be adjusted for windage (on certain models due to the windage sights not coming as factory default), as it has a degree of lateral movement in the dovetail it is mounted in. Three other factory rear sight configurations are available in addition to the standard 6.5 mm (0.26 in) height sight: a lower impact 6.1 mm (0.24 in) sight, and two higher impact versions – 6.9 mm (0.27 in) and 7.3 mm (0.29 in).

Notes:

GLOCK 17 Gen4 Semi-Auto Pistol Reliability and simplicity have made GLOCK® semi-automatic pistols a favored sidearm for law enforcement, military, and civilian use all over the world. The GLOCK 17 is a full-size service pistol, shooting the 9x19mm pistol cartridge (9mm Parabellum), a standard military round that's easy to find ammo for anywhere. The Gen4 Semi-Auto Pistol utilizes a dual recoil spring assembly that substantially increases service life of the pistol, and helps take the snap out of recoil, reducing muzzle flip for faster follow up shots. A modular back strap allows shooters to instantly customize the grip to an individual shooter's hand size, or to cold weather gloves. Rough grip texturing on the Gen4's polymer frame provides a sure

hold on the pistol when hands are wet or sweaty, and the enlarged magazine catch is reversible, accommodating left- or right-handed shooters. An integral accessory rail in front of the trigger guard allows for the attachment of a plethora of aftermarket tactical flashlights or laser sights. The dovetailed rear sight is drift adjustable and has a white outline around its notch; the fixed front blade has a white dot. Sight acquisition is quick in any light. The GLOCK 17 Gen4 Semi-Auto Pistol is an ultra-reliable handgun that is easy to learn how to operate and maintain, making it an ideal choice for self-defense, whether it be for field carry or at home. The model 17 Gen4 comes with three standard 17-round magazines or three 10-round magazines that comply with various city or state restrictions on magazine capacity. The Glock 17 is a 9 mm short recoil–operated, locked-breech semi-automatic pistol that uses a modified Browning cam-lock system adapted from the Hi-Power pistol. The firearm's locking mechanism uses a linkless, vertically tilting barrel with a rectangular breech that locks into the ejection port cut-out in the slide. During the recoil stroke, the barrel moves rearward initially locked together with the slide about 3 mm (0.12 in) until the bullet leaves the barrel and chamber pressure drops to a safe level. A ramped lug extension at the base of the barrel then interacts with a tapered locking block integrated into the frame, forcing the barrel down and unlocking it from the slide. This camming action terminates the barrel's movement while the slide continues back under recoil, extracting and ejecting the spent cartridge casing. The slide's uninterrupted rearward movement and counter-recoil cycle are characteristic of the Browning system. Glock pistols incorporate a number of features intended to enhance reliability in adverse conditions, such as utilizing advanced metal coatings, "stub" slide guides instead of true frame rails, and an unusual cocking mechanism wherein the trigger is partially responsible for cocking the striker. By relying partially on force from the shooter's trigger finger to cock the striker, a Glock effectively reduces the load on the recoil spring as the slide moves forward into battery, whereas almost all other striker-fired pistols on the market rely fully on the recoil spring to cock the striker. This design gives the recoil spring fewer tasks as the action cycles, helping to ensure that sufficient energy is available to strip a new round from the magazine and achieve full battery even when the breech, chamber, and/or magazine are heavily fouled. For these and other reasons, Glock pistols are commonly considered to be some of the most reliable striker-fired, semi-automatic handguns available, with some independent testing even showing a Glock taking a lead over a Sig Sauer P320 in a wet/dry reliability test, even though the latter was selected as the winner of the U.S. Army's MHS competition.

SIG Sauer P228 (M11) German 9mm Semi-Automatic Pistol





Tiers:



Variants:

- **P226 Navy:** U.S. Navy SEAL teams started using the SIG P226 in the 1980s, after German Kampfschwimmer tested them successfully. The first Naval Special Warfare inspired P226 pistols to be offered to the public were the NSW Commemoratives, issued in early 2004. The SIG P226-9-NAVY is a version of the SIG P226 produced that features a stainless steel slide engraved with an anchor to designate them as Naval Special Warfare pistols. SIGARMS raised $100,000 for the Special Operations Warrior Foundation through the sale of these NSW serialized pistols. The pistol with the serial number NSW0001 was sold during a live auction on the US-wide syndicated Laura Ingraham radio show for an additional $25,000. Later produced commercial versions added a universal rail for accessory attachments while retaining the anchor of previous models, but do not have the SIGLITE Night Sights.
- **P226 E2:** Introduced at the 2010 SHOT Show, the P226 E2 at the time was a significant update to the P226 line. 'E2' (pronounced 'E-squared'), or otherwise known as "Enhanced Ergonomics", is SIG Sauer's attempt to make the large frame gun more ergonomic for persons with small and medium-sized hands. A reduced grip size and reduced reach trigger bring the trigger face back more than 13 mm (0.5 in), thus potentially allowing better trigger manipulation and control for a greater number of shooters. Other standard features include the Short Reset Trigger, aggressive grip finish texture, and a new wrap-around, one-piece grip panel configuration. The gun was discontinued from the P226 model lineup at the end of 2010 but the E2-style grip system has been adopted on and carried over to other P226 variants.
- **P229:** The P229 is a compact firearm often used for duty or concealed carry purposes. The standard version features a DA/SA trigger. The pistol has also been made available in a DAK (Double Action Kellermann) model, which is a DAO system with two trigger reset points, and a lighter, smoother pull than that of traditional DAO handguns. Most of the above-mentioned factory variants of the P226 are also available for the P229, including the Equinox option, Elite lineup, as well as a SAS GEN 2 model. The P229 differs from its cousin the P226 in several respects, and was originally introduced to supplement and then replace the P228 by adding the .357 SIG and .40 S&W as available chamberings. The P229 was the first production handgun introduced that could chamber the .357 SIG round. The P226 and P228 were originally manufactured using a stamped-steel slide on an aluminum alloy frame. The P229 consists of a CNC-milled stainless steel slide, typically colored black with a Nitron finish. The P229's milled steel slide was introduced to handle the higher slide velocities created by the .357 SIG and .40 S&W loads, which the stamped slide of the P228 could not handle without the use of a much stiffer recoil spring. This would have made manual slide-retraction much more difficult and the use of a milled stainless slide (coupled with the new milling and stainless production capabilities found in the U.S. factory) with a standard weight recoil spring made more sense. A standard weight recoil spring for the P229 is 71 N (16 lbf). A spring weight of 89 N (20 lbf) or higher would have been required if a stamped slide was used for the .40 S&W or .357 SIG chamberings. The SAAMI maximum chamber pressures of 9mm, 9mm +P, .40 S&W, and .357 SIG are as follows: 240 MPa (35,000 psi); 265 MPa (38,500 psi); 240 MPa (35,000 psi); and 280 MPa (40,000 psi). The slide on the P226 was redesigned in a similar fashion, and civilian sales of the P228 were discontinued in early 2005 due to declining sales and the advent of the P229 in 9mm. The P226 and P229 are both available with optional accessory rails and optional forged stainless steel frames. The P229 can be chambered in .22 LR, 9mm, .40 S&W or .357 SIG. Changing between .40 S&W and .357 SIG is as simple as switching out the barrel; both calibers use the same magazine. Conversion barrels also allow a P229 or P226 to change between a .40 S&W/.357 SIG to a 9mm caliber. The 9mm model (both railed and non-railed) can be converted to .22 LR, but in the past its receivers were not designed to provide the space needed for handling the larger rounds of .357 SIG and .40 S&W. As SIG Sauer has slowly begun adopting the E2-style grip system across the P229 model range in 2011—a move similar to what is also happening to the larger P226—they have also begun using the .357 SIG/.40 S&W spec frame dimensions for their factory 9mm P229s, presumably to streamline the number of variations in parts needed to be kept in inventory. Although the manufacturer has announced that older-configuration magazines will continue to operate in the new receiver configuration, SIG Sauer has nonetheless revised new P229 9mm factory magazines to a design that is specific to the resized magazine well of

the newly reconfigured receiver/frame. As a consequence, the newer magazines are not back-compatible, due to their larger width.

System

Alternate Designation(s): SIG P228; M11

Primary Function / Type: Pistol

Manufacturer: SIG Sauer

Caliber: mm9

Action: mechanically locked, recoil operated (DA/SA or DAO)

Feed System: 9×19: 10-round, 13-round, or 15-round box magazine

Dimensions

Length: mm180

Barrel Length: mm99

Width: mm38

Height: mm137

Weight: kg0.825

Ammunition

Type: Rifle

Caliber: mm9

Cartridge: 9×19mm Parabellum (P228 & P229)

Basic Load: INA

Sights

Type: Iron Sights

Notes:

A compact version of the P226, the P228, is in use with various law enforcement agencies and also with the US military, where it is designated as the M11. The P228 has a shorter slide and barrel than the P226. Unlike the P226, the P228 is available only in 9×19mm Parabellum with a 13-round magazine, but can also use P226 15- or 20-round magazines. Aftermarket magazines extend the capacity of the P228 to 15 rounds. From a distance, the P228 can be differentiated from the P226 by comparing the trigger guards (the P228's is curved, while the P226's is slightly hooked) and the barrel and slide lengths (the P228's barrel 99 mm (3.9 in), thus having a corresponding shorter slide). Also in a side-by-side comparison the P228 would appear slightly shorter (15 mm (0.59 in) shorter) than the P226. The larger capacity P226 magazine can also be employed in the P228 although it extends from the base of the grip. Civilian sales of the P228 were discontinued with the introduction of 9mm chambering in the P229 but were recently reintroduced in limited quantities to civilians with an accessory rail and hooked trigger guard, designated the P228R. The P229 is nearly identical to the P228, however its slide is made from milled stainless steel (versus the P228's folded carbon steel slide) and is available in 9mm, .40 S&W, and .357 SIG. In the summer of 2012, SIG Sauer announced they were releasing the M11A1, which is essentially the milled-slide P229 chambered in 9mm with P228-labeled grips, a short reset trigger, SIGLITE tritium night sights, Mec-Gar 15-round magazines, and a military style smart tag and serial number. Later in 2012, Air Force M11b versions of the P228 were released for civilian sale. The M11 is to be replaced in the Army and Air Force through the Modular Handgun System program.[13] On January 19, 2017, it was announced that the SIG Sauer P320 Compact (M18) had been selected to replace the M11 as the U.S's service pistol. One factor in winning the Modular Handgun System competition was the ability to employ 9mm Parabellum, .357 Sig or .40 S&W cartridges within the same basic frame.

Browning Hi-Power Mark I American 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **Note:** Genuine Browning Hi-Power P-35s are still manufactured by FN Herstal of Belgium and Portugal and under licence by Fabricaciones Militares (FM) of Argentina. The Hi-Power remains one of the most influential pistols in the history of small arms. It has inspired a number of clone manufacturers (including Charles Daly of the Philippines & the US, FEG of Hungary, Arcus of Bulgaria, IMI of Israel, and others). Many modern pistols borrow features from it, such as the staggered column high-capacity magazine, and the Browning linkless cam locking system (which on modern pistols is often simplified so that the barrel locks into the ejection port, meaning the barrel and slide do not have to be machined for locking lugs). Until recently, FEG made an almost exact clone in 9mm and .40 S&W, but the company now manufactures a version with modifications to the barrel, linkage, and slide stop that are incompatible with genuine Hi-Powers. Arcus has also superseded its Arcus 94 Hi-Power clone with the Arcus 98DA, a model that draws heavily from the Hi-Power but is capable of double-action operation.
- **P35:** The original P35, as noted earlier, featured an internal extractor. During World War II, it was manufactured by Inglis of Canada for Allied use, and by FN in occupied Belgium for German use. The P35s made under Nazi occupation were designated as the Pistole 640b. Most Canadian P35s were manufactured with a parkerized finish, while most P35s manufactured in occupied Belgium had a blued finish. In 1962 the internal extractor was replaced with a more durable and reliable external extractor alongside other modifications, including a 2-piece barrel and modifications to the locking system for improved durability. Later barrels and frames are not interchangeable with earlier ones.
- **L9A1,:** The L9A1, was the British designation for the military version of the post-1962 Hi-Power, and is marked 'Pistol Automatic L9A1' on the left side of the slide. It started to replace Inglis variants in British service from the late 1960s, and the two types remained in service together until the Inglis variants were finally retired in the late 1980s. It is still in service with the UK military forces, although now fitted with the more ergonomic Mk2 ambidextrous safety and grips. The L9A1 was also widely used by other Commonwealth armed forces. The Hi-Power was the pistol issued to the British Special Air Service throughout the Cold War era. It was phased out in 2013 and replaced with the Glock 17.
- **Mark I:** The Mark I is among the best-known models of the P35 developed over the last 50 years. P35s were first imported into the US in 1954 – the US civilian market P35s had the 'Browning Arms Company' stamp on the left side of the slide (to meet the import requirement for US sales under ATF Section 478.112). These P35s lack the provision of the lanyard ring – the left side pistol grip for a Mark I is fully covered unlike those produced for military and law enforcement use. A wide variety of options and features are available on the P35 models. Recently, Hi-Power pistols have become available in the .40 S&W and .357 SIG loadings. The use of these calibres in guns designed and built for 9×19mm Parabellum has created cases of broken or warped frames. Only Hi-Powers specifically built for these rounds should be used to fire them. The pistols manufactured for these two rounds are easily identified by examining the left side of the slide – a groove is machined into the side of the heavier slide to allow clearance for the slide release. Genuine FN-produced P35s (either FN (Europe/international) or Browning (USA) for the civilian market will have a 245-prefix serial number. Some Hi-Power variants (Type 65, Type 73) incorporate production changes e.g. spur hammers (commonly seen for 1971–present civilian market P35s) and/or 2-piece barrels (1965–present). The 'Type 73' variant (with an elongated barrel bushing) of the Mark I was produced into the late 1980s (to 1987) by FM Argentina when Mark II production commenced in the early-mid-1980s (Belgium).
- **The Pistol, Browning FN 9mm, HP No. 2 MK.1/1 Canadian Lightweight Pattern:** The Pistol, Browning FN 9mm, HP No. 2 MK.1/1 Canadian Lightweight Pattern was a series of experimental aluminum/aluminum alloy framed Browning Hi-Power pistols by the Canadian Inglis Company that reduced the weight by as much as 25% (8.5 oz lighter to 25.5 oz).[21] Two scalloped cuts were made on both sides of the steel slide as well as in front of the rear sight. The reception to this was positive and so six prototype frames were machined from solid aluminum and two send to each of the Canadian, American, and British governments for testing. The Canadian and English governments concluded that sand and dirt caught between the steel slide and aluminum frame substantially increased wear. The steel locking block also

wore the holes in its aluminum frame. After testing Inglis cast 29 frames and assembled 21 pistols and tested them which was met with various problems. The lightweight program was ended in Canada in 1951. In 1952, a US Major General Kessels requested one and took it with him in the Korean War.

- **The Mark I Lightweight:** The Mark I Lightweight is a very rare variant of the Mark I made with a lightweight alloy frame originally intended for paratroop use. According to Massad Ayoob, these were introduced commercially in the 1950s but never caught on. The Lightweights are marked only with Fabrique Nationale's rollmarks, not Browning's.
- **Mark II:** Mark II is an upgraded model of the original Hi-Power introduced in the early '80s. Some of the upgrades were ambidextrous thumb safeties, nylon grips, 3-dot sights, and a throated barrel.
- **Mark III:** Mark III was another advancement over the Mark II released in 1988, which featured a firing pin safety and a black epoxy finish. The main distinguishing (visual) feature of the Mark III is the absence of the water drain hole below the muzzle on the forward face of the slide.
- **The Capitan:** The Capitan is a Mark III variant that features adjustable tangent rear sights and a "ring hammer" like the early model HP35, checkered walnut grips, and a blued finish. It was reintroduced in 1993 and is still in production (c.2004)
- **The Practical:** The Practical is a Mark III variant that features a matte-blued slide and contrasting silver-chromed frame. In addition, this model has wraparound Pachmayr rubber grips and a "ring hammer". The Practical has fixed or adjustable sights, and is available in either 9 mm or .40 S&W. Magazines for all Practical models sport Pachmayr base pads; magazines feature a cartridge capacity of 13 rounds in 9 mm and a cartridge capacity of 10 rounds in .40 S&W.
- **HP-SFS:** The HP-SFS (Safe-Fast-Shooting) is a current variation on the Hi-Power Mark III with a modified firing mechanism. After the weapon is loaded, the hammer is pushed forward, which automatically activates the safety catch. When the shooter is prepared to fire, the safety is pressed down with the thumb, releasing the hammer to spring backwards into the usual, single-action position. A similar system is available for modifying Colt M1911A1s. Magazines are interchangeable with the Mark III and others.
- **The BDA and BDAO:** The BDA and BDAO models were first produced in the 1980s by FN. The BDA model is double-action, and the BDAO model is "double-action only," both versions differing from the usual single-action operation of the P35. These designs have also been marketed as the FN HP-DA and Browning BDA. The DA and DAO models retain many features of the P35, and both are available in full-sized and compact versions. The performance of these models is consistent with FN's high standards. These models resemble the P35, but the most distinguishing feature is the extended SIG-Sauer style trigger guard. Many parts are interchangeable with the P35, but the magazines (although similar) are not. The compact versions also utilise shorter magazines.
- **Browning BDM:** The Browning BDM Model is sometimes erroneously attributed as a special model of the Hi-Power family of pistols. This is a unique pistol design only bearing an external similarity to the Hi-Power. The BDM was produced during the 1990s in North America by Browning Arms Company, and not by FN. The Browning BDM (Browning Double Mode) pistol incorporates many features of the BDA model. It can be switched from double-action/single-action mode to "revolver" mode (Double-Action Only) by the flip of a slide-mounted switch (this requires the use of a flathead screwdriver or a coin, as the switch doesn't have a tang).
- **The Rosario, FM90 and FM95:** The Rosario, FM90 and FM95 models are manufactured by FM. The Rosario is an almost exact copy of the Mark II intended for Argentine and Latin American sales. The FM90 was an export model based on the Mark II, but with a "Colt style" slide without the characteristic bevelled front end, first made in 1990.[25] Rubberized pistol grips (similar to the Pachmayr grips used for P35s) with finger grooves were used in place of the traditional slabside wood grips. The FM95 was the current export model (until 2002) based on the Mark III, also with the "Colt style" slide. The last models, until 2010, are the M02 AR (modernised version of the M95, with a new single-action system by Fabrique nationale) and the M03 AR (not dated 2003, as it would seem, actually a .40 S&W version of M02 AR) with their Detective versions
- **Pistol Auto 9mm 1A:** Pistol Auto 9mm 1A is manufactured in India by the Ordnance Factories Board at Rifle Factory Ishapore. It is a licensed copy of the Canadian Inglis 9mm pistol with a matte black finish and black plastic grips.
- **The Detective:** The Detective is a short-slide HP produced by FM. The Detective slide group was also available without the frame, and is interchangeable with other FM and FN Hi-Power P35s. The pistol and slide group have not been available for North American sales since the late 2000s, but can be found in resale outlets.
- **The Arcus 94:** The Arcus 94 is a single-action semi-automatic pistol manufactured by Arcus of Bulgaria as an unlicensed clone. There is a compact version, the Arcus 94C. It has been succeeded in production by the double-action Arcus 98DA.
- **MA-5 Mk I:** The MA-5 Mk I is a variant of the Hi-Power adopted by the Tatmadaw before they eventually adopted the MA-6 (P226 clone) and the MA-5 Mk II (Glock clone).

System

Alternate Designation: Browning Hi-Power Mark I

Type: 9mm Semi-Automatic Pistol

Manufacturer: Fabrique Nationale (FN) John Inglis & Co. Browning Arms

Magazine: 13 cartridges

Mode of Fire: Single action

Muzzle Velocity: 350 m/s

Safeties: Half-cock notch, manual thumb safety, firing pin block, and magazine disconnect

Trigger Pull: 7.5 lb

Effective Firing Range: 50 m

Dispersion (firing 10 shots with rest): at 15 metres: 95 mm (height 50 mm, width 45 mm); at 30 metres: 200 mm (height 105 mm, width 95 mm); at 50 metres: 320 mm (height 170 mm, width 150 mm)

Dimensions

Length: 197 mm

Barrel Length: 118 mm

Height: 127.5 mm

Width, with Stock: 36mm

Width, without Stock: 25.5mm

Weight, Empty: 0.9 kg

Weight, Loaded Magazine: 1.060 kg

Ammunition

Type: Rifle

Caliber: 9mm

Cartridge: 9×19mm Parabellum

Magazine: 13 cartridges

Notes:

The Mark I is among the best-known models of the P35 developed over the last 50 years. P35s were first imported into the US in 1954 – the US civilian market P35s had the 'Browning Arms Company' stamp on the left side of the slide (to meet the import requirement for US sales under ATF Section 478.112). These P35s lack the provision of the lanyard ring – the left side pistol grip for a Mark I is fully covered unlike those produced for military and law enforcement use. A wide variety of options and features are available on the P35 models. Recently, Hi-Power pistols have become available in the .40 S&W and .357 SIG loadings. The use of these calibres in guns designed and built for 9×19mm Parabellum has created cases of broken or warped frames. Only Hi-Powers specifically built for these rounds should be used to fire them. The pistols manufactured for these two rounds are easily identified by examining the left side of the slide – a groove is machined into the side of the heavier slide to allow clearance for the slide release. Genuine FN-produced P35s (either FN (Europe/international) or Browning (USA) for the civilian market will have a 245-prefix serial number. Some Hi-Power variants (Type 65, Type 73) incorporate production changes e.g. spur hammers (commonly seen for 1971–present civilian market P35s) and/or 2-piece barrels (1965–present). The 'Type 73' variant (with an elongated barrel bushing) of the Mark I was produced into the late 1980s (to 1987) by FM Argentina when Mark II production commenced in the early-mid-1980s (Belgium). The Browning Hi Power is a single-action, semi-automatic handgun available in the 9mm and .40 S&W calibers. It was based on a design by American firearms inventor John Browning, and completed by Dieudonné Saive at Fabrique Nationale (FN) of Herstal, Belgium. Browning died in 1926, several years before the design was finalized. The Hi-Power is one of the most widely used military pistols in history, having been used by the armed forces of over 50 countries. After 82 years of continuous production, the Hi-Power was discontinued in 2017 by Browning Arms, but it remained in production in some countries, under license. The Hi Power name alludes to the 13-round magazine capacity, almost twice that of contemporary designs such as the Luger or Colt M1911. The pistol is often referred to as an HP (for "Hi-Power" or "High-Power"), GP (for the French term, "Grande Puissance"), BAP (Browning Automatic Pistol), or BHP (Browning High-Power). The terms P-35 and HP-35 are also used, based on the introduction of the pistol in 1935. Several sources indicate that the official name was initially "High Power", while it was manufactured in Belgium by Fabrique Nationale prior to the German occupation in World War II. Production of the weapon then moved to a John Inglis and Company plant in Canada; at

some date afterwards, the name was changed to "Hi Power". (Some sources indicate that the name change was not until the 1950s.) Production returned to Belgium after the war, in 1944 or 1945. Nonetheless, the term Hi Power has been the most commonly used in articles over the past decades, regardless of the year of manufacture. Versions of the handgun continued to be made at the FN factory in Belgium under Wehrmacht control, with the designation "9mm Pistole 640(b)". The Browning Hi-Power has undergone continuous refinement by FN since its introduction. The pistols were originally made in two models: an "Ordinary Model" with fixed sights and an "Adjustable Rear Sight Model" with a tangent-type rear sight and a slotted grip for attaching a wooden shoulder stock. The adjustable sights are still available on commercial versions of the Hi-Power, although the shoulder stock mounts were discontinued during World War II. In 1962, the design was modified to replace the internal extractor with an external extractor, improving reliability. Standard Hi-Powers are based on a single-action design. Unlike modern double-action semi-automatic pistols, the Hi-Power's trigger is not connected to the hammer. If a double-action pistol is carried with the hammer down with a round in the chamber and a loaded magazine installed, the shooter may fire the pistol either by simply squeezing the trigger or by pulling the hammer back to the cocked position and then squeezing the trigger. In contrast, a single-action pistol can only be fired with the hammer in the cocked position; this is generally done when a loaded magazine is inserted and the slide cycled by hand. In common with the M1911, the Hi-Power is therefore typically carried with the hammer cocked, a round in the chamber and the safety catch on (a carry mode often called cocked and locked in the United States or "made ready" in the UK, or sometimes called condition one). The Hi-Power, like many other Browning designs, operates on the short-recoil principle, where the barrel and slide initially recoil together until the barrel is unlocked from the slide by a cam arrangement. Unlike Browning's earlier Colt M1911 pistol, the barrel is not moved vertically by a toggling link, but instead by a hardened bar which crosses the frame under the barrel and contacts a slot under the chamber, at the rearmost part of the barrel. The barrel and slide recoil together for a short distance but, as the slot engages the bar, the chamber and the rear of the barrel are drawn downward and stopped. The downward movement of the barrel disengages it from the slide, which continues rearward, extracting the spent case from the chamber and ejecting it while also re-cocking the hammer. After the slide reaches the limit of its travel, the recoil spring brings it forward again, stripping a new round from the magazine and pushing it into the chamber. This also pushes the chamber and barrel forward. The cam slot and bar move the chamber upward and the locking lugs on the barrel re-engage those in the slide.

Heckler and Koch P8 German 9mm Pistol



Tiers:



System

Alternate Designation: P8
Manufacturer: Heckler and Koch
In Service: INA
Caliber: mm9
Operating Principle: Recoil-operated with modified Browning locking system
Magazine Capacity: 15 rounds
Sights: 3-dot

Dimensions

Length: approx. 195 mm
Width: approx. 38.5 mm
Height: approx. 135.0 mm
Barrel Length: approx. 108 mm
Sight Radius: approx. 158.0 mm
Weight: approx. 770 g

Ammunition

Type: Rifle
Caliber: mm9mm
Cartridge: 9 mm x 19

Notes:

The P8 is a modified version of the USP deployed by the German Bundeswehr. It differs by a specific safety and decocking as well as a preferred land and grooves rifling instead of the polygonal profile.

Bersa Thunder 380 ACP Argentinian 380 ACP Combat Pistol



Tiers:



Variants:

- **Thunder Concealed Carry (CC):** Concealed Carry: 8-round single-stack magazine
- **Thunder 380 Plus:** Plus: 15-round double-stack magazine

System

Alternate Designation: Bersa Thunder 380 ACP
Type: Semi-Automatic
Manufacturer: Bersa, S.A.
In Service: 1995-Present
Length: 168 mm
Barrel Length: 90 mm
Weight: 560 g
Action: Blowback
Feed System: 7, 8, 9, or 10-round single-stack magazine
Muzzle Velocity: 1050 ft/s
Finish: Black
Frame: Alloy
Slide: Steel
Front Sight: Dovetailed
Rear Sight: Notched bar dovetailed, adjustable
Grip: Olive Rubber, Wrap around

Ammunition

Type: Rifle
Caliber: .380
Cartridge: .380 ACP (9×17mm Browning Short)
Basic Load: 7, 8, 9, or 10-round single-stack magazine

Notes:

A modern take on the Bersa classic design, the Bersa Thunder 380 Combat brings a new look to the Bersa lineup. Combining outstanding features from existing models along with new ideas, the Thunder 380 Combat brings you the ultimate 380 carry pistol. Enhancements include a redesigned slide, providing for a lower profile, a more rounded trigger guard and smaller beaver tail for ease of carrying, drawing and holstering. Larger slide serrations and combat sights for a more rugged look, as well as ergonomically designed olive rubber wrap around grips with finger grooves. All of this brings Bersa enthusiasts, as well as new shooters, a brand new take on one of the most popular .380 pistols in recent memory.

BGM-71A TOW American Anti-Tank Guided Missile (ATGM)





Tiers:



Variants:

- **BGM-71B:** It has improved range to 3 750 m. This missile flies faster and has a longer wire. Otherwise it is similar to the basic BGM-71A.
- **ITOW (Improved TOW), or BGM-71C:** It was adopted by the US Army in 1976. This missile has improved shape-charged warhead. It also has an extensible probe that triggers detonation of the warhead and provides optimum detonation distance. The probe is extended after the launch. This missile penetrates 630 mm of steel armor.
- **TOW 2:** is an upgraded version of the TOW. It entered service with the US Army in 1983. This weapon system is composed of new BGM-71D missile, new reusable launcher, missile guidance set, and sight system. The launcher is lighter. It is compatible with all previous TOW missiles. It has thermal optics and can be used at night. The new missile has a larger warhead (5.9 kg) with extensible probe, as well as improved guidance. Over 77 000 BGM-71D anti-tank guided missiles were produced.
- **TOW 2A or BGM-71E:** It appeared in 1987. It has a tandem warhead and is intended to defeat tanks with Explosive Reactive Armor (ERA). It penetrates 900 mm of steel armor behind ERA. Newer missiles, starting from the TOW 2A are produced both in wireless and wire-guided forms. The wireless missiles require no special alterations to the launcher. Over 34 000 of the BGM-71E missiles have been delivered. In 2003 these missiles were used by US Marines in Iraq, destroying several Iraqi T-72 tanks.
- **TOW 2B or BGM-71F:** is a top-attack missile. It appeared in 1987. This missile explodes above a tank to penetrate its thin top armor. In concept it is similar to a Swedish RBS 56 BILL. It has a maximum range of 4 200 m. Its warhead weights 6.14 kg. This missile lacks extensible probe. These anti-tank missiles are produced in wireless and wire-guided forms. First unit was equipped with these missiles in 1992. In 2003 these missiles, alongside with the TOW 2As were used by US Marines in Iraq, destroying several Iraqi T-72 tanks. The conflict marked the first operational firing of the TOW 2B missiles. However during combat in Afghanistan the TOW 2B was found to be less effective than the older TOW 2A.
- **TOW 2N:** TOW 2N was an improved anti-tank system, that used missile with wireless data link. It appeared in 1989. However this weapon was not adopted by the US military.
- **BGM-71G:** BGM-71G is a top-attack missile with different warhead. It also lacks extensible probe.
- **BGM-71H:** BGM-71H is a bunker-busting missile. It is used against buildings or fortified structures. This missile has a range of 3 750 m. This missile is produced in wireless and wire-guided forms
- **TOW 2B Aero:** an extended-range version with a maximum range of 4.5 km. Previously this weapon was known as TOW 2B (ER). This missile is produced in wireless and wire-guided forms.
- **Toophan:** Toophan is an Iranian reverse-engineered version of the TOW.

System

Alternative Designation: BGM-71 TOW

Date of Introduction: 1970

Proliferation: The U.S. BGM-71 TOW (tube-launched, optically tracked, wire-guided) weapon is the most widely distributed anti-tank guided missile in the world. It is fired from tripods, ground combat vehicles and helicopters. Total: +700,000 Argentina Army [18] (TOW 2A) Bahrain Air Force [N/A] (TOW) Botswana Army [N/A] (TOW) Cameroon Army [24] (TOW) Colombia Army [18] (TOW) Denmark Army [41] (TOW) Egypt Army [700] (TOW 2) Finland Army [2] (TOW 2) Germany Army [N/A] (TOW) Greece Army [N/A] (TOW) Iran Army [N/A] (TOW, Toophan) Israel Army [300] (TOW 2A/2B) Italy Army [N/A] (I-TOW) Jordan Army [330] (TOW/TOW 2A) Kenya Air Force [N/A] (TOW) Kuwait Army [N/A] (TOW/TOW 2) Lebanon Army [12]

(TOW) Luxembourg Army [N/A] (TOW) Morocco Army [150] (TOW) Oman Army [18] (TOW/TOW 2A) Pakistan Army [N/A] (TOW) Portugal Army [95] (TOW) Saudi Arabia Army [N/A] (ITOW/TOW 2A) South Korea Army [N/A] (TOW 2A) Spain Army [200] (TOW) Marines [24] (TOW 2) Switzerland Army [110] (TOW 2) Taiwan Army [1,060] (TOW) Thailand Army [N/A] (TOW) Marines [N/A] (TOW) Tunisia Army [N/A] (TOW) Turkey Army [365] (TOW) United Arab Emirates Army [25] (TOW) USA Army [N/A] (TOW 2A/2B/Bunker Buster) Marine Corps [1,083] (TOW 2A/2B) Yemen Army [12] (TOW)

Manufacturer: Hughes Aircraft Company

Type: Anti-Tank Guided Missile (ATGM)

Family: BGM-71 Series

In Service: 1970-Present

Crew: Three soldiers, including commander, gunner and assistance gunner.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Note: See ATGM System

Automotive

Man Portable: Yes

Communications

Primary: INA

ATGM System

↳*Launcher*

Name: BGM-71 TOW

Type: ATGM

Configuration: factory-sealed tube contains a cylindrical missile body w/pop-out cruciform wings indexed 45 deg off line from cruciform rudders; 2 rocket exhausts at mid-body; 2 guidance wire spools in tail

Container Length: m1.28

Container Diameter: mm218

Note: It is not a fire-and-forget type weapon. It requires the shooter to keep the target in the line of sight until the missile impacts.

↳*Missile*

Name: BGM-71A/B TOW

Type: ATGM

Missile Length: m1.16

Missile Diamter: m0.15

Fin Span: m0.46

Missile Weight: kg18.9

Warhead Type: HEAT

Warhead Weight: kg2.63

Maximum Range: km3

Armor Penetration: mm430

Guidance System: Wire-Guided

Speed: m/s300

Propulsion: 2 x Hercules solid-fuel rocket motors; first motor has short burn to allow TOW to clear tube; second motor sustains TOW flight until impact; TOW 2 motor provides 30 percent greater impulse than the basic TOW

Fire Control

Name: INA

Computerized FCS: Analog

Guidance System: Semi-automatic command to line-of-sight (SACLOS) wire guidance

Direct Fire: Yes

Optical Sensor: Yes

Infrared: automatic tracking of xenon or thermal beacon in tail

Night Sight: Texas Instruments AN/TAS-4 thermal

Thermal: INA

Proximity: INA

Notes:

The BGM-71 TOW ("Tube-launched, Optically tracked, Wire-guided") is an American anti-tank missile. TOW replaced much smaller missiles like the SS.10 and ENTAC, offering roughly twice the effective range, a more powerful warhead, and a greatly improved semi-automatic guidance system that could also be equipped with infrared cameras for night time use. The U.S. BGM-71 TOW (tube-launched, optically tracked, wire-guided) weapon is the most widely distributed anti-tank guided missile in the world. It is fired from tripods, ground combat vehicles and helicopters. First produced in 1970, TOW is one of the most widely used anti-tank guided missiles. It can be found in a wide variety of manually carried and vehicle-mounted forms, as well as widespread use on helicopters. Originally designed by Hughes Aircraft in the 1960s, the weapon is currently produced by Raytheon.

SIG Sauer M17 American 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **M18:** The P320 is known as the M17 (Full-Size) and M18 (Carry) in U.S. Military service.

System

Alternate Designation(s): P320; M17
Primary Function / Type: Pistol
Manufacturer: SIG Sauer, Inc., Newington, New Hampshire, U.S.
Action: Short recoil-operated
Muzzle Velocity: m/s360
Feed System: 17 or 21-round box magazine
Safety: Ambidextrous thumb safety
Chamber Indicator: Loaded chamber indicator
Slide Sub-Assembly: Improved slide sub-assembly to capture small components when disassembled
Trigger: Improved trigger "mud flap" to prevent foreign debris from entering the pistol action

Dimensions

Length: mm203
Barrel Length: mm120
Width: mm35.5
Height: mm140
Weight: grams834

Ammunition

Type: Rifle
Caliber: mm9
Cartridge: 9x19mm Parabellum
Basic Load: Pistols chambered in 9mm can feature a 17-round magazine in standard with optional 21-round extended

magazines available.

Note: As part of the MHS procurement a new source for ammunition was solicited. The two types to be procured are the XM1152 and XM1153 now the M1152 and M1153. Olin Corporation (Winchester Brand) has received that award for approximately 1.2 Million rounds of ammunition. The ammunition mentioned here In the infobox is Winchester Civilian issue.

Sights

Type: Iron Sights

Note: Slide cut out to facilitate the addition of a reflex sight. (This is the slide from the RX Series)

Notes:

The SIG Sauer M17 and M18 are handguns used by the United States Armed Forces. On January 19, 2017, the United States Army announced that a customized version of the SIG Sauer P320 had won the Army's XM17 Modular Handgun System competition. The full-sized model will be known as the M17 and the smaller-sized carry model will be known as the M18. When the requirements were formulated for a new handgun for the U.S. Army, one of the tenets of the proposal was that an existing model handgun was desired to fulfill the requirements laid out in the Modular Handgun System Request for Proposal, known as the XM17 Procurement. SIG Sauer submitted a P320 with a number of modifications and submitted them for the XM17 Modular Handgun System competition. SIG Sauer wins the award On January 19, 2017, the United States Army announced that the SIG Sauer P320 MHS variant had won the military's Modular Handgun System trials. The P320 is known as the M17 (Full-Size) and M18 (Carry) in U.S. Military service. Though the pistol will remain chambered in 9 x 19mm Parabellum rather than a larger caliber, the contract allows the Army and other services to procure SIG Sauer’s proposed XM1152 Full Metal Jacket and XM1153 Special Purpose ammunition. The ammunition chosen to go with the pistol is a "Winchester jacketed hollow point" round; similar in appearance to the Winchester PDX1 round but with some differences to the design of the hollow point petals. The M17 has better accuracy and ergonomics and tighter dispersion than the M9 and will be fielded more widely, being issued down to squad and fireteam leaders. Special forces dual-arm all of its members with a pistol and rifle. Junior leaders in regular infantry units who were previously excluded from carrying sidearms will be given more choices and options in close quarters battle situations under a new policy. All Army units are planned to have the M9 replaced with the M17 within a decade. U.S. military services adopt the M17 and M18 In May 2017, the Army announced that the first unit that will receive the M17 would be the 101st Airborne Division by the end of the year. At the same time, the rest of the U.S. Armed Forces revealed they also intend to acquire the handgun, making it the standard sidearm for the entire U.S. military. The services plan to procure up to 421,000 weapons in total; 195,000 for the Army, 130,000 for the Air Force, 61,000 for the Navy (M18 compact version only), and 35,000 for the Marines. The United States Marine Corps is replacing its M9, M9A1, M45A1, and M007 handguns with the SIG Sauer M18 handguns. The M9 and M9A1 were produced by Beretta while the M45A1 was made by Colt and the M007, which was only recently accepted as a variant, is made by Glock. Although it has been announced that the US Coast Guard is also adopting the M17/18 handgun there are no purchase numbers as yet.

CZ-75 Czechoslovakian 9mm Semi-Automatic Pistol



Tiers:



Variants:

- **75 Steel Full Size:** CZ 75 The original CZ 75, easily identified by the heavily stepped slide and short slide rails CZ 75 Late version, easily identified by longer slide rails and shorter slide-step CZ 75 B Second-generation CZ 75, upgraded with an internal firing pin safety, squared and serrated trigger guard, and ring hammer CZ 75 BD A variant of the now-common CZ 75 B (B standing for firing pin block) with a decocker replacing the traditional manual safety. (D stands for decocker.) This variant is quickly becoming the most common of the CZ 75B models, due to the additional safety the decocker safety provides. CZ 75 BD Police Variant of the CZ 75 BD equipped with loaded chamber indicator, reversible magazine catch, lanyard ring, checkered front and back strap of the grip and serrated trigger as standard. Most Police models have "Police" stamped on the slide. A smaller amount exclude "Police" but have front slide serrations. CZ 75 B Stainless Stainless steel version of the CZ 75 B. Available in a high gloss and matte stainless finish. Also available in the new/limited edition (sand blasted finish with sides of the slide and frame decoratively ground). All stainless models feature ambidextrous safeties. CZ 75 B Omega (2009-2015) A version of the CZ 75 B with a factory-reworked trigger group, the "Omega" system, introduced with the P-07. It is available chambered for 9 mm or .40 S&W. It has a manual safety that is not ambidextrous. CZ 75 B Omega Convertible (2016-) An updated version of the previous CZ 75 B Omega. It comes with a decocker that can be easily swapped to a manual safety, with the included kit. The decocker or the safety are ambidextrous. It also has the hammer and the sights updated. CZ 75 B SA (cancelled 2018) A CZ 75 which has a single-action trigger mechanism and a drop-free magazine. It is available chambered for 9 mm or .40 S&W. CZ 75 B DAO (cancelled) A CZ 75 that has a longer and heavier, constant trigger pull (double-action only). Chambered for 9mm and .40 S&W. Featuring no external safety or decocker as well as a bobbed hammer.
- **75 Compact:** CZ 75 Compact A standard CZ 75 with a slightly shortened grip and 3.9-inch barrel. There is a version available chambered for the .40 S&W. CZ 75 D PČR Compact Very compact – similar to the P-01 in size, with an aluminum alloy frame also but lacks an M3 rail frame and features a smaller muzzle point and snag free sights. A popular choice for a carry weapon, known for its inherent accuracy and weight distribution. CZ 75 SemiCompact Combines the frame, grip and capacity of the full size CZ 75 with the shortened (by 20mm) barrel and slide of the CZ 75 Compact. CZ P-01 A CZ 75 Compact variant intended for law enforcement use, with an aluminum alloy frame, decocker and under-barrel accessory rail. It is the new weapon of choice for the Czech National Police since 2001. It received NATO certification after undergoing extensive testing. Its NATO Stock Number (NSN) is 1005-16-000-8619. CZ P-01 Omega Convertible A version of the CZ P-01 with the new Omega trigger system. It comes with a decocker that can be easily swapped to a manual safety, with the included kit. The decocker or the safety are ambidextrous. It also has the hammer and the sights updated. CZ P-06 Same as the P-01 but in .40 S&W CZ 40-B/Colt Z-40 Collaboration between Colt/CZ. 1911 style frame made by Colt to use a CZ style slide chambered in .40 S&W. Was the basis of design for the RAMI 2075 series. CZ 40-P After the CZ-40B/Colt Z-40 project fell apart CZ used the left over slides and fit them to P-01 frames and sold as the CZ 40-P in .40 S&W. A small amount of CZ 40-P guns still have the CZ 40-B roll marks.
- **Sub Compact:** CZ 2075 RAMI A subcompact version of the CZ 75 intended for concealed carry. Features a 3-inch

barrel, aluminum frame and low-profile sights. Available in 9×19mm or .40 S&W, with standard magazine capacities of 10 (9×19mm) and 8 (.40 S&W) rounds, respectively. An optional 14-round magazine is available for the 9 mm version. CZ 2075 RAMI BD Same as the 2075 RAMI but includes a decocker and tritium sights CZ 2075 RAMI P Polymer framed version

- **Competition:** CZ 75 SP-01/SP-01 Tactical Similar to the P-01 with accessory rail, but with all-steel construction and utilizing the full-size frame and slide as well as incorporating extended-capacity 18-round magazines. It is available with an ambidextrous manual safety (SP-01) or with an ambidextrous decocker (SP-01 Tactical). The CZ 75 (SP-01) was designed for multiple purposes including but not limited to: a military/law enforcement duty sidearm, sidearm for counter-terrorism forces, and field/target shooting.[6] Used in the 2005 IPSC World Shoot XIV by World Champions Adam Tyc and Angus Hobdell (1st and 3rd place respectively in the production division). CZ 75 SP-01 Shadow New generation of CZ 75 SP-01 pistol especially adapted according to suggestions as proposed by users from communities worldwide, with an additional input from the Team CZ shooters Angus Hobdell and Adam Tyc. Based on the SP-01, it has no firing pin block resulting in improved trigger travel. It also features a slightly reshaped grip and safety, a “weaker” recoil spring for easier loading, and fiber optic front sight and tactical “Novak style” rear sight. CZ 75 Shadow 2 In 2016, with the cooperation of the elite IPSC shooters of the Česká zbrojovka team, an improved version of the Shadow was released, called the Shadow 2. It included a longer barrel, a reshaped, lighter-weight slide, more aggressive slide serrations, improved grip ergonomics, aggressive grip checkering, and a smaller fiber optic in the front sight. CZ 75 SP-01 Phantom The CZ 75 Phantom has a polymer frame, is 33% lighter than steel frame models, with accessory rail and a forged steel slide with a weight saving scalloped profile. Two Interchangeable grip rear strap inserts are included with the Phantom to accommodate users with different sized hands. The pistol is further outfitted with a decocking lever. Czech Army Paratroopers of the 4th Rapid Deployment Brigade are fully equipped with this pistol from January 2012. CZ 75 Standard IPSC A CZ 75 variant designed specifically for IPSC competition with extended grip, single-action trigger, heavy-duty free-falling magazines, and an enlarged magazine well. CZ 75 Tactical Sports Replacing the ST IPSC was the tactical sports model, which featured minor improvements over its very similar predecessor. Available in 9×19mm (20 rounds) or .40 S&W (17 rounds). CZ 75 Champion A competition version designed for Open Division IPSC competition, with three port compensator, adjustable trigger, extended magazine release, ambidextrous safeties, fully adjustable sights and two-tone finish, with blued slide and satin nickel frame. CZ 75 TS Czechmate A competition variant based on the Tactical Sports model, equipped with a compensator and electronic red-dot sight on a frame mount. Designed especially for IPSC Open Division (and replacing the older Champion model), the Czechmate presents a turnkey solution for the sport, offering a complete competitive package including additional magazines and spare parts. CZ 75 Kadet/Kadet 2 A .22 LR caliber slide/ barrel assembly and magazine kit to fit onto most standard CZ 75B frames (except the Tactical Sport and SP-01 Phantom). The Kadet also used to be sold as a complete pistol (slide assembly and frame), but is now only sold as a slide assembly to be mounted on existing frames. The 2nd generation conversion kit currently being sold is called the "Kadet 2", and includes a dedicated .22 slide stop that locks the slide back on an empty magazine. Night sights are optional.
- **Polymer:** CZ P-07 Duty The CZ P-07 Duty is a compact, polymer-framed CZ 75 variant notable for having a redesigned trigger mechanism. The redesign has reduced the number of parts as well as improved the trigger pull. The exterior restyling was greatly influenced by the SPHINX 3000 design (itself being an enhanced Swiss CZ 75 clone). Chambered in 9mm Luger and .40 S&W, the CZ P-07 DUTY also includes the ability to change the manual safety to a decocking lever and vice versa through an exchange of parts. Introduced in 2009. CZ P-09 Duty Full-size version of the P-07, boasting 19 round capacity in 9mm. Introduced in 2013. CZ P-09 Kadet A .22 LR caliber slide/barrel assembly and magazine kit to fit onto standard CZ P-09 frames, similar to the CZ 75 Kadet/Kadet 2. The Kadet is sold as a complete pistol (slide assembly with frame) or a standalone slide assembly to be mounted on existing frames, and can be used as a training gun for the standard P-09. The frame is made from mechanically and thermally stable polymer reinforced with glass fibre, equipped with an underside MIL-STD-1913 rail for accessories. The slide has two pairs of cocking grooves for comfortable handling, and adjustable iron sights. The gun has easy-to-change manual safety and decocking controls, with three interchangeable grip backstraps in small, medium and large sizes.
- **85:** CZ 85 An updated version of the CZ 75 that is also ambidextrous CZ 85B A CZ 85 with a firing pin block CZ 85BD A CZ 85 B with a decocking lever, instead of a safety CZ 85 Compact A limited production compact CZ 85 with under-barrel accessory rail and chambered in .40 S&W. Identical to the current CZ 75 compact in .40 S&W. CZ 85 Combat adds an adjustable rear sight, extended magazine release, drop-free magazine and overtravel adjustment on the trigger. Lacks a firing pin safety so that firing pins can be replaced without special fitting.
- **97 (.45 ACP):** CZ 97B .45 ACP version of the CZ 75 B CZ 97 BD .45 ACP version of the CZ 75 BD
- **CZ 75 Automatic:** A selective-fire variant introduced in 1992 intended for law enforcement and military use. One distinguishing characteristic of earlier models is its longer compensated barrel although later models may have a standard barrel. An extra magazine can be attached to the front to act as a makeshift fore grip.

System

Alternate Designation: CZ 75

Manufacturer: Česká zbrojovka

In Service: 1976-present

Length: 206.3 mm (8.12 in)

Barrel Length: 120 mm (4.7 in)

Width: 32.6 mm (1.28 in)

Height: 138 mm (5.4 in)

Weight: 1.12 kg (2.5 lb)

Rate of Fire: semi-automatic CZ 75 Automatic: 1,000 RPM

Effective Firing Range: 25 m (for 9 mm CZ-75 family and CZ-75 automatic)

Feed System: detachable box magazine, 12–26 rds depending on version and caliber

Sights: Front blade, rear square notch

Ammunition

Type: Rifle

Caliber: 9mm

Cartridge: 9×19mm Parabellum 9×21mm

Basic Load: INA

Notes:

The CZ 75 is a semi-automatic pistol made by Czech firearm manufacturer ČZUB. First introduced in 1975, it is one of the original "wonder nines" and features a staggered-column magazine, all-steel construction, and a hammer forged barrel. It is widely distributed throughout the world and is the most common handgun in the Czech Republic. The CZ 75 is a short recoil operated, locked breech pistol. It uses the Browning linkless cam locking system similar to that used in the Browning Hi-Power pistol, where the barrel and slide are locked together on firing, using locking lugs milled into the barrel mating with recesses in the roof of the slide. An enclosed cam track integral with the barrel is actuated by the slide release lever's transverse pin. After the first few millimeters of the recoil stroke, the barrel is cammed downwards at the rear, enabling the slide to continue the recoil stroke and eject the spent cartridge. Most models have the capability of being fired in both single and double-action modes, and feature a frame-mounted manual safety. Some recent models have a decocking lever that doubles as a manual safety. Starting in the early 1990s, all CZ 75s have been made with firing pin blocks, designated by the letter B (as in CZ 75B). The CZ 75 was one of the first high-capacity 9mm pistols with a manual safety similar to that of the Browning Hi-Power. This allows the CZ 75 to be carried with the hammer cocked with safety applied and a round chambered, ready for use simply by switching the safety off, a configuration known as condition 1. It is somewhat unusual for double-action pistols to have this "cocked and locked" type of safety; most such as the Walther P38 and the Beretta 92F have a combination safety/decocking lever (as do some later versions of the CZ 75). The trade-off of this configuration is that to uncock the hammer for a double-action first shot, the hammer must be dropped manually by pulling the trigger while lowering the hammer with the firer's thumb under control. Once lowered in this manner, a double-action first shot can be achieved in a similar manner to other double-action pistols without actuating any controls. Subsequent shots will be single-action unless the hammer is again manually lowered. All non-double-action only CZ-75 variants feature a "half-cock" notch. This is not a safety position, but rather an operator aid to provide a safe place to manually decock the pistol. All of the "decocker" models decock to this position, and the manual advises not to attempt to place the hammer further on any model. Unlike most other semi-auto pistols, the slide rides inside the frame rails, similar to the SIG P210, rather than outside. This provides a tight slide-to-frame fit and a very efficient barrel lock-up, both of which contribute to its accuracy. On current models, frames are cast and slides are machined from forgings, though forged frames have been used in very early production models. The six-groove barrel has traditional land-and-groove rifling with a higher-than-standard rate of twist (1 in 9.7).

Browning Hi-Power Mark III American 9mm Semi-Automatic Pistol





Tiers:



Variants:

- **Note:** Genuine Browning Hi-Power P-35s are still manufactured by FN Herstal of Belgium and Portugal and under licence by Fabricaciones Militares (FM) of Argentina. The Hi-Power remains one of the most influential pistols in the history of small arms. It has inspired a number of clone manufacturers (including Charles Daly of the Philippines & the US, FEG of Hungary, Arcus of Bulgaria, IMI of Israel, and others). Many modern pistols borrow features from it, such as the staggered column high-capacity magazine, and the Browning linkless cam locking system (which on modern pistols is often simplified so that the barrel locks into the ejection port, meaning the barrel and slide do not have to be machined for locking lugs). Until recently, FEG made an almost exact clone in 9mm and .40 S&W, but the company now manufactures a version with modifications to the barrel, linkage, and slide stop that are incompatible with genuine Hi-Powers. Arcus has also superseded its Arcus 94 Hi-Power clone with the Arcus 98DA, a model that draws heavily from the Hi-Power but is capable of double-action operation.
- **P35:** The original P35, as noted earlier, featured an internal extractor. During World War II, it was manufactured by Inglis of Canada for Allied use, and by FN in occupied Belgium for German use. The P35s made under Nazi occupation were designated as the Pistole 640b. Most Canadian P35s were manufactured with a parkerized finish, while most P35s manufactured in occupied Belgium had a blued finish. In 1962 the internal extractor was replaced with a more durable and reliable external extractor alongside other modifications, including a 2-piece barrel and modifications to the locking system for improved durability. Later barrels and frames are not interchangeable with earlier ones.
- **L9A1,:** The L9A1, was the British designation for the military version of the post-1962 Hi-Power, and is marked 'Pistol Automatic L9A1' on the left side of the slide. It started to replace Inglis variants in British service from the late 1960s, and the two types remained in service together until the Inglis variants were finally retired in the late 1980s. It is still in service with the UK military forces, although now fitted with the more ergonomic Mk2 ambidextrous safety and grips. The L9A1 was also widely used by other Commonwealth armed forces. The Hi-Power was the pistol issued to the British Special Air Service throughout the Cold War era. It was phased out in 2013 and replaced with the Glock 17.
- **Mark I:** The Mark I is among the best-known models of the P35 developed over the last 50 years. P35s were first imported into the US in 1954 – the US civilian market P35s had the 'Browning Arms Company' stamp on the left side of the slide (to meet the import requirement for US sales under ATF Section 478.112). These P35s lack the provision of the lanyard ring – the left side pistol grip for a Mark I is fully covered unlike those produced for military and law enforcement use. A wide variety of options and features are available on the P35 models. Recently, Hi-Power pistols have become available in the .40 S&W and .357 SIG loadings. The use of these calibres in guns designed and built for 9×19mm Parabellum has created cases of broken or warped frames. Only Hi-Powers specifically built for these rounds should be used to fire them. The pistols manufactured for these two rounds are easily identified by examining the left side of the slide – a groove is machined into the side of the heavier slide to allow clearance for the slide release. Genuine FN-produced P35s (either FN (Europe/international) or Browning (USA) for the civilian market will have a 245-prefix serial number. Some Hi-Power variants (Type 65, Type 73) incorporate production changes e.g. spur hammers (commonly seen for 1971–present civilian market P35s) and/or 2-piece barrels (1965–present). The 'Type 73' variant (with an elongated barrel bushing) of the Mark I was produced into the late 1980s (to 1987) by FM Argentina when Mark II production commenced in the early-mid-1980s (Belgium).
- **The Pistol, Browning FN 9mm, HP No. 2 MK.1/1 Canadian Lightweight Pattern:** The Pistol, Browning FN 9mm, HP No. 2 MK.1/1 Canadian Lightweight Pattern was a series of experimental aluminum/aluminum alloy framed Browning Hi-Power pistols by the Canadian Inglis Company that reduced the weight by as much as 25% (8.5 oz lighter to 25.5 oz).[21] Two scalloped cuts were made on both sides of the steel slide as well as in front of the rear sight. The reception to this was positive and so six prototype frames were machined from solid aluminum and two send to each of the Canadian, American, and British governments for testing. The Canadian and English governments concluded that sand and dirt caught between the steel slide and aluminum frame substantially increased wear. The steel locking block also

wore the holes in its aluminum frame. After testing Inglis cast 29 frames and assembled 21 pistols and tested them which was met with various problems. The lightweight program was ended in Canada in 1951. In 1952, a US Major General Kessels requested one and took it with him in the Korean War.

- **The Mark I Lightweight:** The Mark I Lightweight is a very rare variant of the Mark I made with a lightweight alloy frame originally intended for paratroop use. According to Massad Ayoob, these were introduced commercially in the 1950s but never caught on. The Lightweights are marked only with Fabrique Nationale's rollmarks, not Browning's.
- **Mark II:** Mark II is an upgraded model of the original Hi-Power introduced in the early '80s. Some of the upgrades were ambidextrous thumb safeties, nylon grips, 3-dot sights, and a throated barrel.
- **Mark III:** Mark III was another advancement over the Mark II released in 1988, which featured a firing pin safety and a black epoxy finish. The main distinguishing (visual) feature of the Mark III is the absence of the water drain hole below the muzzle on the forward face of the slide.
- **The Capitan:** The Capitan is a Mark III variant that features adjustable tangent rear sights and a "ring hammer" like the early model HP35, checkered walnut grips, and a blued finish. It was reintroduced in 1993 and is still in production (c.2004)
- **The Practical:** The Practical is a Mark III variant that features a matte-blued slide and contrasting silver-chromed frame. In addition, this model has wraparound Pachmayr rubber grips and a "ring hammer". The Practical has fixed or adjustable sights, and is available in either 9 mm or .40 S&W. Magazines for all Practical models sport Pachmayr base pads; magazines feature a cartridge capacity of 13 rounds in 9 mm and a cartridge capacity of 10 rounds in .40 S&W.
- **HP-SFS:** The HP-SFS (Safe-Fast-Shooting) is a current variation on the Hi-Power Mark III with a modified firing mechanism. After the weapon is loaded, the hammer is pushed forward, which automatically activates the safety catch. When the shooter is prepared to fire, the safety is pressed down with the thumb, releasing the hammer to spring backwards into the usual, single-action position. A similar system is available for modifying Colt M1911A1s. Magazines are interchangeable with the Mark III and others.
- **The BDA and BDAO:** The BDA and BDAO models were first produced in the 1980s by FN. The BDA model is double-action, and the BDAO model is "double-action only," both versions differing from the usual single-action operation of the P35. These designs have also been marketed as the FN HP-DA and Browning BDA. The DA and DAO models retain many features of the P35, and both are available in full-sized and compact versions. The performance of these models is consistent with FN's high standards. These models resemble the P35, but the most distinguishing feature is the extended SIG-Sauer style trigger guard. Many parts are interchangeable with the P35, but the magazines (although similar) are not. The compact versions also utilise shorter magazines.
- **Browning BDM:** The Browning BDM Model is sometimes erroneously attributed as a special model of the Hi-Power family of pistols. This is a unique pistol design only bearing an external similarity to the Hi-Power. The BDM was produced during the 1990s in North America by Browning Arms Company, and not by FN. The Browning BDM (Browning Double Mode) pistol incorporates many features of the BDA model. It can be switched from double-action/single-action mode to "revolver" mode (Double-Action Only) by the flip of a slide-mounted switch (this requires the use of a flathead screwdriver or a coin, as the switch doesn't have a tang).
- **The Rosario, FM90 and FM95:** The Rosario, FM90 and FM95 models are manufactured by FM. The Rosario is an almost exact copy of the Mark II intended for Argentine and Latin American sales. The FM90 was an export model based on the Mark II, but with a "Colt style" slide without the characteristic bevelled front end, first made in 1990.[25] Rubberized pistol grips (similar to the Pachmayr grips used for P35s) with finger grooves were used in place of the traditional slabside wood grips. The FM95 was the current export model (until 2002) based on the Mark III, also with the "Colt style" slide. The last models, until 2010, are the M02 AR (modernised version of the M95, with a new single-action system by Fabrique nationale) and the M03 AR (not dated 2003, as it would seem, actually a .40 S&W version of M02 AR) with their Detective versions
- **Pistol Auto 9mm 1A:** Pistol Auto 9mm 1A is manufactured in India by the Ordnance Factories Board at Rifle Factory Ishapore. It is a licensed copy of the Canadian Inglis 9mm pistol with a matte black finish and black plastic grips.
- **The Detective:** The Detective is a short-slide HP produced by FM. The Detective slide group was also available without the frame, and is interchangeable with other FM and FN Hi-Power P35s. The pistol and slide group have not been available for North American sales since the late 2000s, but can be found in resale outlets.
- **The Arcus 94:** The Arcus 94 is a single-action semi-automatic pistol manufactured by Arcus of Bulgaria as an unlicensed clone. There is a compact version, the Arcus 94C. It has been succeeded in production by the double-action Arcus 98DA.
- **MA-5 Mk I:** The MA-5 Mk I is a variant of the Hi-Power adopted by the Tatmadaw before they eventually adopted the MA-6 (P226 clone) and the MA-5 Mk II (Glock clone).

System

Alternate Designation: Browning Hi-Power Mark III

Type: 9mm Semi-Automatic Pistol

Manufacturer: Fabrique Nationale (FN) John Inglis & Co. Browning Arms

In Service: 1988-Present

Magazine: 13 cartridges

Mode of Fire: Single action

Muzzle Velocity: 350 m/s

Safeties: Half-cock notch, manual thumb safety, firing pin block, and magazine disconnect

Trigger Pull: 7.5 lb

Effective Firing Range: 50 m

Dispersion (firing 10 shots with rest): at 15 metres: 95 mm (height 50 mm, width 45 mm); at 30 metres: 200 mm (height 105 mm, width 95 mm); at 50 metres: 320 mm (height 170 mm, width 150 mm)

Dimensions

Length: 197 mm

Barrel Length: 118 mm

Height: 127.5 mm

Width, with Stock: 36mm

Width, without Stock: 25.5mm

Weight, Empty: 0.9 kg

Weight, Loaded Magazine: 1.060 kg

Ammunition

Type: Rifle

Caliber: 9mm

Cartridge: 9×19mm Parabellum

Magazine: 13 cartridges

Notes:

The Mark III was another advancement over the Mark II released in 1988, which featured a firing pin safety and a black epoxy finish. The main distinguishing (visual) feature of the Mark III is the absence of the water drain hole below the muzzle on the forward face of the slide. The classic John Browning design in an all-business matte black, steel slide with epoxy finish, composite grip panels. Proven. This is something that sets the Browning Hi Power apart. Like it's big brother, the 1911 pistol (also designed by John Moses Browning) the Hi Power has been used for over three-quarters of a century in real world conditions. And it has done it with an exceptional record of success. As the original high capacity 9mm pistol, the Browning Hi Power set the standard for all others. On the mark. The Mark III has a great feature set: a receiver of machined steel with a black epoxy finish, a 4 5/8" barrel, high profile fixed sights. The design is superlative with it's locked breech design, single-action trigger, ambidextrous thumb safety and composite grip panels. Extra magazine included. The Browning Hi Power is a single-action, semi-automatic handgun available in the 9mm and .40 S&W calibers. It was based on a design by American firearms inventor John Browning, and completed by Dieudonné Saive at Fabrique Nationale (FN) of Herstal, Belgium. Browning died in 1926, several years before the design was finalized. The Hi-Power is one of the most widely used military pistols in history, having been used by the armed forces of over 50 countries. After 82 years of continuous production, the Hi-Power was discontinued in 2017 by Browning Arms, but it remained in production in some countries, under license. The Hi Power name alludes to the 13-round magazine capacity, almost twice that of contemporary designs such as the Luger or Colt M1911. The pistol is often referred to as an HP (for "Hi-Power" or "High-Power"), GP (for the French term, "Grande Puissance"), BAP (Browning Automatic Pistol), or BHP (Browning High-Power). The terms P-35 and HP-35 are also used, based on the introduction of the pistol in 1935. Several sources indicate that the official name was initially "High Power", while it was manufactured in Belgium by Fabrique Nationale prior to the German occupation in World War II. Production of the weapon then moved to a John Inglis and Company plant in Canada; at some date afterwards, the name was changed to "Hi Power". (Some sources indicate that the name change was not until the 1950s.) Production returned to Belgium after the war, in 1944 or 1945. Nonetheless,

the term Hi Power has been the most commonly used in articles over the past decades, regardless of the year of manufacture. Versions of the handgun continued to be made at the FN factory in Belgium under Wehrmacht control, with the designation "9mm Pistole 640(b)". The Browning Hi-Power has undergone continuous refinement by FN since its introduction. The pistols were originally made in two models: an "Ordinary Model" with fixed sights and an "Adjustable Rear Sight Model" with a tangent-type rear sight and a slotted grip for attaching a wooden shoulder stock. The adjustable sights are still available on commercial versions of the Hi-Power, although the shoulder stock mounts were discontinued during World War II. In 1962, the design was modified to replace the internal extractor with an external extractor, improving reliability. Standard Hi-Powers are based on a single-action design. Unlike modern double-action semi-automatic pistols, the Hi-Power's trigger is not connected to the hammer. If a double-action pistol is carried with the hammer down with a round in the chamber and a loaded magazine installed, the shooter may fire the pistol either by simply squeezing the trigger or by pulling the hammer back to the cocked position and then squeezing the trigger. In contrast, a single-action pistol can only be fired with the hammer in the cocked position; this is generally done when a loaded magazine is inserted and the slide cycled by hand. In common with the M1911, the Hi-Power is therefore typically carried with the hammer cocked, a round in the chamber and the safety catch on (a carry mode often called cocked and locked in the United States or "made ready" in the UK, or sometimes called condition one). The Hi-Power, like many other Browning designs, operates on the short-recoil principle, where the barrel and slide initially recoil together until the barrel is unlocked from the slide by a cam arrangement. Unlike Browning's earlier Colt M1911 pistol, the barrel is not moved vertically by a toggling link, but instead by a hardened bar which crosses the frame under the barrel and contacts a slot under the chamber, at the rearmost part of the barrel. The barrel and slide recoil together for a short distance but, as the slot engages the bar, the chamber and the rear of the barrel are drawn downward and stopped. The downward movement of the barrel disengages it from the slide, which continues rearward, extracting the spent case from the chamber and ejecting it while also re-cocking the hammer. After the slide reaches the limit of its travel, the recoil spring brings it forward again, stripping a new round from the magazine and pushing it into the chamber. This also pushes the chamber and barrel forward. The cam slot and bar move the chamber upward and the locking lugs on the barrel re-engage those in the slide.

→Shotguns

Franchi SPAS-15 Italian 12-Gauge Shotgun







Tiers:



System

Alternate Designation(s): Franchi SPAS-15
Primary Function / Type: Shotgun
Manufacturer: Franchi
Action: Pump-action/gas-actuated, rotating bolt
Rate of Fire: Semi-automatic
Effective Firing Range: m40
Feed System: 3, 6 or 8-round detachable box magazine
Sights: INA

Dimensions

Length, Stock Extended: mm1,000
Length, Stock Folded: mm750
Barrel Length: mm450
Weight: kg3.9

Ammunition

Cartridge: 12-gauge

Notes:

The Franchi SPAS-15 is a dual-mode 12 gauge combat shotgun manufactured by the Italian company Luigi Franchi S.P.A. The weapon is based on the SPAS-12, and has similar pump-action/semi-automatic firing modes. In semi-automatic mode a gas piston drives a bolt carrier and rotating bolt. In pump-action mode the same components are driven by sliding the fore-end backwards. Pump-action mode is required to reliably fire low-pressure (less lethal) ammunition such as tear gas rounds or less-lethal bean bags. Switching between firing modes is done by pressing a button above the foregrip, and sliding the foregrip slightly forwards or backwards. The barrel is chrome lined and features screw-in choke tubes. Unlike its predecessor, the SPAS-15 is fed by a detachable box magazine. The gun features either a fixed black wooden stock, or a side folding metal stock. Both had the same pistol grip safety. Amongst Italian troops the weapon is known by the nickname "La Chiave dell'Incursore" (the key of the commando) because it is used to blast the locks of closed doors. In 1994, the United States banned the importation of the SPAS-15 with close to 180 shotguns imported, but later abolished the relevant regulations. In Canada, the SPAS-15 is classified as a Prohibited Weapon and cannot be legally owned or imported except under very limited circumstances. In Italy the SPAS-15 is not subject to any kind of restriction for sale, purchase or possession, and despite no longer being in production it is still fairly common on the civilian market.

Atchisson (AA-12) American 12-Gauge Assault Shotgun







Tiers:



System

Alternate Designation(s): AA-12
Primary Function / Type: Shotgun
Manufacturer: Maxwell Atchisson
Action: API blowback
Rate of Fire: 300 rounds per minute
Muzzle Velocity: m/s350
Effective Firing Range: 100 m (12 gauge slug)
Maximum Firing Range: 200 m (FRAG-12 ammunition)
Feed System: 8 rounds in box magazine, 20 or 32 rounds in drum magazines
Sights: Iron sight, 2× zoom optical scope

Dimensions

Length: 991 mm (Atchisson Assault Shotgun, 1972) 966 mm (AA-12, 2006)
Barrel Length: mm457
Weight: 5.2 kg less magazine. 7.3 kg with loaded 32-round drum (original version)

Ammunition

Type: Shotgun
Cartridge: 12 Gauge
Note: The AA-12 can use different types of 2 3/4-inch, 12-gauge ammunition such as buckshot, slugs, or less-lethal rubber

stun batons.

Notes:

The Auto Assault-12 (AA-12), originally designed and known as the Atchisson Assault Shotgun, is a shotgun developed in 1972 by Maxwell Atchisson. The most prominent feature is reduced recoil. The current 2005 version has been developed over 18 years since the patent was sold to Military Police Systems, Inc. The original design was the basis of several later weapons, including the USAS-12 combat shotgun. The weapon operates in fully automatic only. However, the relatively low cyclic rate of 300 rounds per minute allows the operator to fire one round at a time with brief trigger pulls. It is fed from either an 8-shell box magazine, or a 20- or 32-shell drum magazine. In 1987, Max Atchisson sold the rights of the AA-12 to Jerry Baber of Military Police Systems, Inc., Piney Flats, Tennessee. MPS in turn developed the successor simply known as Auto Assault-12, which was redesigned over a period of 18 years with 188 changes and improvements to the original blueprint, modifications included changing the AA-12 from blowback- to gas-operated with a locked breech. "When the bolt flies back after firing to cycle another round, around 80% of what would normally be felt as recoil is absorbed by a proprietary gas system. A recoil spring grabs another 10%, leaving the final recoil a remarkable 10% of the normal recoil for a 12-gauge round—so you can point the AA-12 at a target and unload the full magazine without significant loss of accuracy". MPS also teamed up with Action Manufacturing Company, and Special Cartridge Company to combine the gun with FRAG-12 High-Explosive ammunition into a multifunction weapon system. The weapon was lightened to 4.76 kg (10.5 lb) and shortened to 966 mm (38.0 in) but retained the same barrel length. The CQB model has a 13-inch barrel, and is half a pound lighter than the regular model. Uncommon in other automatic shotguns, the AA-12 fires from an open bolt, a feature more commonly found in submachine guns, as well as heavy and squad-level machine guns. It uses 8-round box, 20-round drum, or 32-round drum magazines, as opposed to the original 5-round box magazine. Due to the abundant use of stainless steel and the designed clearance for fouling, MPS has stated that the weapon requires little to no cleaning or lubrication.The designer states that cleaning is required after 10,000 rounds.

Remington 870 American Pump-Action 12 Gauge Shotgun





Tiers:



Variants:

- **Express:** Matte blue/black bead-blasted with hardwood, laminated hardwood or synthetic stocks and chambered for 2 3/4" and 3" 12 or 20 gauge shotshells. All Expresses have been chambered in 3" in 12 and 20 gauge, but markings have varied.
- **Marine:** Nickel-plated with synthetic stocks.
- **Mark 1:** adopted by the United States Marine Corps in the late 1960s and saw service into the 21st century. The Model 870 Mark 1 has a 21-inch (53 cm) barrel with an extended magazine increasing total capacity to 8 rounds, and was fitted with an adapter allowing use of the standard M7 bayonet for the M16 rifle.
- **MCS (Modular Combat Shotgun):** A new modular version of the M870 which can be quickly modified with different barrels, magazine tubes, and stocks for different purposes, such as urban combat and door breaching.
- **Police:** Chambered in 12 gauge only with a 3" magnum chamber. Blued or Parkerized steel finish. These models feature a stronger sear spring, carrier latch spring, and a forged steel extractor (as opposed to the MIM extractor found on Express models). Receivers are stamped "Remington 870 Police Magnum" as of 2014. They are equipped with Police-specific walnut or synthetic stocks which are fitted with sling mounts. Walnut stocks lack checkering as found on the Express/Wingmaster models. 870P models come with matching walnut or synthetic forends that are shortened to prevent interference with most vehicle-mounted rack systems. The shortened forend also allows quick visual inspection of the magazine regardless of what position the forend is in, whereas the lengthened sport-type forend on other models partially blocks the loading port when pulled to the rear. Police models are available with 18" or 20" barrels, with or without rifle sights, and have a standard capacity of four rounds. They can be ordered with a two or three round extended magazine tube from the factory, bringing total capacity to 6+1 (18" barrel) or 7+1 (20" barrel). All police barrels come with an Improved Cylinder choke unless special ordered.
- **Super Mag:** Chambered for 3½" 12 gauge shotshells.
- **Wingmaster:** Blued steel with high gloss or satin walnut stocks. They have been offered in Skeet, Trap, and field configurations. Originally the basic Wingmaster was chambered for 2 3/4" rounds and came with a fixed choke, and the 3" chambered versions were designated Magnum models. Models built after 1986 offer the RemChoke Interchangeable choke tube system, and the 12 and 20 gauge versions are chambered in 3" for either 2 3/4" or 3" shells. Prior to the introduction of the "Police" model 870, altered Wingmasters were popular among law enforcement.
- **Tac-14:** Black oxide receiver finish, with a synthetic stock. The Tac-14 is meant to be extremely short, but retains the reliability and stopping power of previous models. It is chambered in 12 gauge, with a 14" barrel and a capacity of 4+1.
- **Tac-14 DM:** Similar to the regular Tac-14, varying only in the fact that it uses an external box magazine rather than the internal tube magazine in other models. This allows for the size of the Tac-14, but a capacity of 6+1.
- **870 DM:** Matte Blue receiver finish with a synthetic stock. Differs from other 870 models with an external box magazine, similarly to the Tac-14 DM, allowing a capacity of 6+1.
- **200th Anniversary Edition:** To celebrate the 200th Anniversary of Remington, two models were designed. One was a Wingmaster with some styling in the wood and a golden emblem on the bottom of the stock. The second was a limited edition Wingmaster that stopped production after 2016, with the same styling, but extended across the entirety of the stock and pump, and also extends to the receiver and barrel, with a golden ring on the end of the barrel. The emblem on the bottom is also a richer gold, possibly real gold, and there is a golden ribbon under the shell ejection reading

"1816 Bicentennial 2016" along with a golden trigger, and a golden symbol of a hunter with a firearm in hand walking.

System

Alternate Designation: Remington Model 870

Type: Pump-Action Shotgun

Manufacturer: Remington

In Service: 1950-Present

Action: Pump-Action

Feed System: 4+1, 5+1, 6+1, or 7+1 round internal tube magazine, or an external 6+1 box magazine

Sights: Bead, twin bead, adjustable open sights, or ghost ring (all iron sights). Also cantilever and receiver-mounts for scopes.

Dimensions

Length: 946 mm-1,280 mm

Barrel Length: 360 mm - (760 mm

Weight: 3.2 kg

Ammunition

Type: Shotfun Shell

Caliber: 12 gauge

Availabale Cartridges: 12 gauge, 16 gauge, 20 gauge, 28 gauge, or .410 bore

Notes:

This All-American pump gun brings hunters the best of all worlds. Beneath no-nonsense, ready-for-work exterior of the Model 870 Express Trap lies the same quality, precision, and dependability that you'll find in our legendary Model 870 Wingmaster®, but at a much more affordable price. Like all Model 870 shotguns, this workhorse features a receiver milled from a solid billet of steel for maximum strength and reliability. The silky-smooth twin action bars prevent binding and twisting so that you'll always have the chance to get off a second shot. Express style non-reflective black matte metalwork and a no-frills hardwood stock and fore-end. Its solid, dependable action makes it America’s favorite, and our continual upgrades make it the most advanced, well-rounded family of pump shotguns around. Along with continually evolving designs, this shotgun’s superiority is a matter of rugged dependability, great pointing characteristics and versatility. In fact, the Model 870™ has been the standard for slide-action performance for more than 60 years.

Armsel Striker (Protecta Bulldog) South African 12-Gauge Shotgun





Tiers:



Variants:

- **Armsel Striker:** this is Hilton Walker's first design.
- **Armsel Protecta:** An improved version of the Armsel Striker. Readying the weapon for firing was simplified and the weapon's reliability was improved.
- **Armsel Protecta Bulldog:** An extremely shortened, stockless version of the Armsel Protecta. It is intended for building entry and vehicular duties
- **Sentinel Arms Striker-12:** A fully licensed and improved copy of the Armsel Striker for the American market made by Sentinel Arms Co. It was available with an 18-inch barrel and a 7-inch stockless version.
- **Cobray/SWD Streetsweeper:** A lower-end clone of the Armsel Striker, having a limited parts commonality to the original weapons system.
- **Cobray/SWD Ladies Home Companion:** A reduced caliber version of the Streetsweeper. The triggergroup is attached to a .410 bore or .45/70 Government drum and barrel.

System

Alternate Designation(s): The Armsel Striker also known as the Sentinel Arms Co Striker-12, Protecta and Protecta Bulldog is a 12-gauge shotgun with a revolving cylinder that was designed for riot control and combat.

Primary Function / Type: 12-Gauge Shotgun

Date of Introduction: 1993

Manufacturer: INA

Action: Rotating cylinder

Feed System: 12-round revolving cylinder, 7-round cylinder on compact models.

Sights: Removable optical sights on Armsel Striker and Protecta. Such sights are holographic, red dot and various others. Iron sights are on all variants.

Dimensions

Length: 792 mm (31.18 inch) 508 mm (20 inch) (stock folded) (with 12 in barrel)

Barrel Length: 191 mm (7.5 in) 305 mm (12 in) 356 mm (14 in) 470 mm (18.5 in)

Weight, Empty: kg4.2

Weight, Loaded: kg4.4

Ammunition

Cartridge: 12 gauge

Basic Load: 12-round revolving cylinder, 7-round cylinder on compact models.

Notes:

The Armsel Striker also known as the Sentinel Arms Co Striker-12, Protecta and Protecta Bulldog is a 12-gauge shotgun with a revolving cylinder that was designed for riot control and combat. The Armsel Striker was designed by an ex-Rhodesian national, Hilton R. Walker, in 1981. Walker subsequently emigrated to South Africa, bringing with him the design for the Striker shotgun. His shotgun became a success, and was exported to various parts of the world. Even though it was successful, the shotgun still had its flaws. The rotary cylinder-type magazine was bulky, had a long reload time, and the basic action was not without certain flaws. Walker redesigned his weapon in 1989, removing the cylinder rotation mechanism, and adding an auto cartridge ejection system. The new shotgun was named the Protecta. A copy of the Striker was made by the US gunmaker Cobray and marketed as the SWD Street Sweeper from 1989 through 1993. The weapon's action is similar to that of a revolver, using a rotating cylinder. Since the Striker uses a conventional double action only trigger and a very large and heavy cylinder (compared to handguns), Walker added a pre-wound clock-work spring to revolve the magazine which proved to make loading the weapon slow, in exchange for a shorter and lighter trigger pull. The design was changed into having a cocking lever on the right side of the barrel. The first designs were criticized as having a slow and cumbersome firing mechanism. The shells had to be individually loaded and then the drum wound by a clockwork mechanism. Shell ejection was by an ejector rod along the right hand side of the barrel. The last version has the clockwork winding mechanism removed, the ejector rod has been replaced by an automatic ejection system and in the rod's place is a cocking lever that winds the drum automatically. The Striker design has a twelve-round magazine capacity and short overall length. Compact variants have 7 rounds. The Striker and Streetsweeper were declared destructive devices under the National Firearms Act with no sporting purpose by Treasury Secretary Lloyd Bentsen in 1994 and their transfer and ownership is regulated by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF).

Heckler and Koch FABARM FP6 German Pump-Action Shotgun







Tiers:



Variants:

- **Standard FP6 (H&K 40621HS):** featuring a 20" Tribore barrel, black protective finish, perforated heatshield, small front blade sight, fixed synthetic buttstock, and a rounded forend.
- **Carbon fiber finish model (H&K 40621CF):** featuring a 20" Tribore barrel, no heatshield, receiver-mount Picatinny rail, small front blade sight, fixed synthetic buttstock, and a rounded forend.
- **Folding stock and pistol gripped model with a 20" Tribore barrel, no heatshield, receiver-mount Picatinny rail, and a large flip-up blade sight.:**
- **Tactical short-barreled model, the FP6 Entry (H&K 40621T):** featuring a 14" barrel, matte finish, perforated heatshield, receiver-mount Picatinny rail, large flip-up blade sight, fixed synthetic buttstock, and a contoured forend. This variant has a 33.75" overall length and is regulated by the National Firearms Act as a Title II firearm in the United States.

System

Alternate Designation(s): Heckler & Koch Fabarm FP6
Primary Function / Type: Pump-Action Combat Shotgun
Manufacturer: Heckler & Koch FABARM
Action: Pump-Action
Effective Firing Range: m30
Feed System: 5+1 rounds or 7+1 rounds, internal tube magazine
Sights: Night

Dimensions

Length: cm105
Barrel Length: cm51

Weight: pounds6.36

Ammunition

Cartridge: 12 gauge 2¾ & 3 inch shells

Basic Load: 5+1 rounds or 7+1 rounds, internal tube magazine

Accessories

Note: All FP6 shotguns are sold with a choke adjustment wrench, owners manual and a hard plastic vacu-formed impact case. Additional accessories available from H&K include an assortment of chokes, muzzle brakes/compensators, magazine tube extensions, pistol grips and folding stocks. There is an adapter available for the receiver of the FP6 to allow use of Remington 870 stocks such as BlackHawk and Knoxx stocks.

Notes:

The Heckler & Koch Fabarm FP6 is a pump-action combat shotgun that was manufactured by the Italian firearms company Fabbrica Bresciana Armi S.p.A. (FABARM) and sold by Heckler & Koch. It was intended for civilian and law enforcement use. Upon severing business association with Benelli in 1998, Heckler & Koch replaced their entire line of shotguns with those manufactured by FABARM. The line featured hunting and sport shotguns in over-and-under, side-by-side, semi-automatic autoloaders and pump shotguns including youth models. For military, law enforcement and home defense use, H&K released four variants of the FP6 model. The machined receiver is manufactured from lightweight Ergal 55 alloy and is drilled and tapped for scope mounting. Three of the four variants were sold with an attached Picatinny rail for mounting optics or accessories and the bottom forward edge of the forend is also drilled to accept an accessory rail. With the exception of the short-barreled model, FABARM shotguns are sold with their Tribore barrel which is a deep-drilled, machined barrel with three separate internal bore profiles. Beginning at the chamber and forcing cone, the bore is enlarged to .7401" to soften recoil while the second profile is in the middle of the barrel gradually choking down to .7244" to emulate a cylinder bore profile to increase velocity. The final bore is the FABARM choke system which consists of standard choking followed by a cylinder profile at the muzzle which serves to improve shot patterns and distribution. The muzzle is threaded to accept one of five different chokes or a muzzle brake/compensator. Some models were sold with a ventilated barrel shroud. Features of the weapon include a chrome-plated trigger, slide release, and shell carrier. There is also an oversized triangular push-button safety. The trigger group is held in the receiver by two pins which makes removal for cleaning and maintenance very easy. Some models have a flip-up frontsight (which serves as a low-profile sight when closed) while others have a small blade sight. Other models were issued with ghost-ring sights. The forend and buttstock are synthetic black polymer with the latter having a synthetic rubber recoil pad mounted on the end. One model was issued instead with a heavy wire gauge folding stock and pistol grip. Models were available with either a black anodized protective finish, matte finish, or were finished in carbon fiber. The forend is connected to dual action bars which cycle the bolt when pulled back towards the receiver. As it travels to the rear, the shell latch is pushed out of the way by a camming surface on the action bar allowing a cartridge to drop into the carrier while the remaining shells in the magazine tube are held by the cartridge retaining latch. As the forend is returned, the action bars bring the bolt forward while the carrier aligns the shell before seating it into the chamber. After the shell is fully seated, the action bars continue forward forcing the locking bolt into a recess which is on top of the barrel extension causing the action to lock into battery. Upon firing the weapon, the slide unhooking lever releases and the action is allowed to cycle, extracting and ejecting the spent shell while cocking the hammer and releasing the next round from the magazine.

Benelli M4 Super 90 (M1014) Italian 12-Gauge Semi-Automatic Shotgun







Tiers:



System

Alternate Designation(s): Benelli M4 Super 90 (M1014)

Primary Function / Type: Semi-Automatic Shotgun

Manufacturer: Benelli Armi SPA

Action: Gas-operated, rotating bolt

Effective Firing Range: m50

Feed System: 5+1 (civilian) or 7+1 (Military, LE) internal tube (Using 2.75 shells) magazine

Sights: Ghost ring sight, Picatinny rail for sights

COllapsible Buttstock: The buttstock is collapsible on the M4 Model (designated 11707) and on the M1014.Collapsing the buttstock shortens the weapon by almost 8 inches, allowing easier storage and transportation; furthermore, it permits better maneuverability around tight corners and over obstacles. The M4 is also available with both pistol grip and semi-pistol grip fixed stocks, with these also being available for the M1014. The M4 is no longer sold today with the skeleton fixed stock (model M11707) to civilians. Benelli only sells the M4 with a fixed pistol grip style tactical stock in the United States. However, the collapsible butt stock can be purchased by civilians in Canada.

Dimensions

Length: mm885

Barrel Length: mm470

Weight: kg3.82

Ammunition

Caliber: 12 Gauge

Basic Load: 5+1 (civilian) or 7+1 (Military, LE) internal tube (Using 2.75 shells) magazine

Notes:

This is probably one of the most respected foreign shotguns in Russia. Italy’s Benelli M-4 Super 90 is famed not only for its ergonomics and reliability, but also for its beauty. It’s been adopted by the U.S. military and law enforcement units. It received an adjustable stock and Picatinny rails that allows operatives to install various tactical gear to increase operational mobility. The guns are loved by U.S. marines and have become a popular weapon on the civilian arms market in Russia. Yet the gun is pretty expensive compared to Russian weapons of this type - sanctions as well as customs duty have increased the cost of the M-4 to nearly $3,000, which is a pretty hefty price tag, especially when you can bag a Saiga-12 for around $400. The M4 was the first gas-operated shotgun produced by Benelli. Its function is designed around an entirely new method called the "auto regulating gas operated" (ARGO) system. The short-stroke design uses two stainless-steel self-cleaning pistons located just ahead of the chamber to function opposite the rotating bolt, thereby eliminating the need for the complex mechanisms found on other gas-actuated automatics. The ARGO incorporates only four parts: two symmetrical shrouds containing two small steel gas pistons. Additionally, the weapon is self-regulating for use with cartridges of varying length and power levels. It can fire 2.75 (70 mm) and 3-inch (76 mm) shells of differing power-levels without any operator adjustments and in any combination. Low-power rounds, such as less-lethal rubber pellets, must be cycled manually. The sights are military-style ghost ring and are adjustable in the field using only a cartridge rim. The MIL-STD-1913 Picatinny sight rail on top allows use of both conventional and night-vision sights, while retaining use of the original sights. he modular basis of the shotgun means many of its features can be reconfigured as needed. It allows a user to quickly exchange the various assembly groups (barrel, buttstock, forearm, etc.) without the use of tools. Preliminary testing of the M4 suggests a high level of reliability. It can reliably function for at least 25,000 rounds without replacement of any major parts.[2][3] The steel components of the weapon feature a matte black phosphated corrosion resistant finish while the aluminum parts are matte hard-anodized. These finishes reduce the weapon's visibility during night operations. The weapon requires little maintenance and operates in all climates and weather conditions

Saiga-12 Russian 12-Gauge Shotgun





Tiers:



Variants:

- **Note:** The Saiga shotgun is also available in 20-gauge and .410 calibers known as the Saiga-20 and Saiga-410, respectively. A bullpup configuration called Kushnapup is also available for all Saiga calibers. The Saiga semi-automatic rifle family are a sport version of the AK-series rifles, and are marketed for hunting and civilian use. They are sometimes referred to as "Saiga Sporters". *Saiga-12 *Saiga-12S *Saiga-12K *Saiga-12S EXP-01 *Saiga-12K-030 *Saiga-12K-040 Taktika

System

Alternate Designation(s): Saiga-12
Primary Function / Type: Shotgun
Manufacturer: Kalashnikov Concern (formerly known as Izhmash)
Caliber: 12-gauge, 20-gauge, .410
Action: Gas-operated, rotating bolt
Feed System: 2, 5, 8, and 10-round detachable box magazine, 12, 20 or 30-round detachable drum
Sights: Iron Sights

Dimensions

Length: 1,145 mm (45.1 in) (Saiga-12) 1,060 mm (41.7 in) stock extended / 820 mm (32.3 in) stock folded (Saiga-12S) 910 mm (35.8 in) stock extended / 670 mm (26.4 in) stock folded (Saiga-12K, Saiga-12S EXP-01)
Barrel Length: 580 mm (22.8 in) (Saiga-12, Saiga-12S) 430 mm (16.9 in) (Saiga-12K, Saiga-12S EXP-01)
Height: mm190
Weight: 3.6 kg (7.9 lb) (Saiga-12, Saiga-12S) 3.5 kg (7.7 lb) (Saiga-12K, Saiga-12S EXP-01)

Ammunition

Type: 12-gauge

Caliber: 12-gauge, 20-gauge, .410

Basic Load: 2, 5, 8, and 10-round detachable box magazine, 12, 20 or 30-round detachable drum

Notes:

The Saiga-12 (/'saɪgə/) is a 12-gauge shotgun available in a wide range of configurations, patterned after the Kalashnikov series of rifles and named for the Saiga antelope. Like the Kalashnikov rifle variants, it is a rotating bolt, gas-operated gun that feeds from a box magazine. All Saiga-12 configurations are recognizable as Kalashnikov-pattern guns by the large lever-safety on the right side of the receiver, the optic mounting rail on the left side of the receiver and the large top-mounted dust cover held in place by the rear of the recoil spring assembly. The Saiga-12 is manufactured by the arms division of Izhmash, in Russia. It was previously imported into the US by European American Armories, although their agreement expired in 2005 and Izhmash then began exporting through the Russian-American Armory Company. The current export import partner is Wolf Performance Arms. Izhmash also manufactures Saiga 20s and Saiga 410s in 20-gauge and .410 bore, as well as the Saiga semi-automatic hunting rifles in a number of centerfire calibers. Russian armed forces use a combat shotgun variant called the KSK (Karabin Spetsialniy Kalahnikov, "Kalashnikov Special Carbine"), with the 12-gauge size expressed in its metric equivalent of 18.5 mm. The picatinny rail layout is similar to the civilian 030 version. Modifications to the basic Kalashnikov pattern The Saiga-12 incorporates several features absent on the AK-47 and similar firearms. Since shotgun shells are nearly twice as wide as 7.62×39mm cartridge, the extraction port in the side of the dust cover had to be increased in size. However, since the bolt had to remain the same length to fit inside the AK-47 sized receiver, the rear section of the bolt is covered by a sliding metal flap that rides on the recoil spring. This allows the gun to be sealed against dirt when the bolt is forward, but the compression of the recoil spring during firing moves the flap rearward to clear the extracted shells. For the likely reason of simplifying production of Izhmash's other Kalashnikov-pattern guns, the Saiga-12 extractor does not rotate, but instead delegates the bolt-locking function to a caliber-neutral lug directly behind the bolt-face. The Saiga-12 incorporates an adjustable two-position gas system, with "standard" and "magnum" settings for firing 2-3/4" and 3"-length shells respectively. This is because firing 3" shells with high power loads such as slugs and buckshot generates so much force that the receiver will be damaged if the full power of the gas system is employed without some sort of recoil buffer. The problem is that making the gun durable with such high power loads would make it more likely to experience a cycle failure with the less powerful 2-3/4" shells and likely not to cycle at all when used with low-powered less lethal ammunition. This would essentially render it a straight-pull mechanism. The Saiga-12 is manufactured in several different configurations ranging from more traditional-looking hunting models to military-style models utilizing AK or SVD hardware. All these versions are available for purchase by civilians in Russia. Civilian barrel lengths are 430 mm and 580 mm (17 and 23 inches). The 580-mm version comes with a traditional rifle stock or with an AK-style separate pistol grip and folding stock (version S for "skladnaya", "folding"). The 430-mm version (K for "korotkaya", "short") has an AK-style pistol grip and folding stock. The civilian version of the 12K for the Russian domestic market features a specially-designed safety, preventing operation with stock folded (due to Russian gun laws, it is illegal to own a firearm with a barrel length of less than 500 mm and capable of firing while being less than 800 mm long). "Taktika" versions with 580-mm or 430-mm barrels feature various AK, SVD or original "Legion" furniture (handguards, folding and non-folding stocks) and AK-style open sights with high post and tangent rear. Optional screw-in chokes are available. A standard AK rail for optics may be mounted on the left side of the receiver. Two, five, seven, eight and twelve round box magazines are available, as well as ten, twelve, and twenty round aftermarket drums. All magazines may be interchanged with all 12 gauge models (sometimes minor fitting may be necessary), although factory-original magazines from Russia only exist in 5-, 7- and 8-round box configurations. Prior to importation to the US, all Saiga shotguns are configured with a traditional fixed "hunting-style" rifle stock and 5-round magazine. Factory 8-round box magazines are not imported in the US (though they are legal for import in other countries), making them quite rare on the civilian market. Recently, a newly configured version of the Saiga 12 was introduced. Called the Saiga Taktika mod 040, it features an extended magazine well, last round bolt hold open (recently produced very rarely and replaced with manual bolt hold), hinged dust cover with Picatinny rail for mounting optics, picatinny rail gas block, and a newly designed 8-round magazine (not interchangeable with other Saiga-12 models). This design seems to address deficiencies that the Saiga 12 had in function. The traditional AK "rock and lock" magazine system and the difficulties associated with magazine has been replaced by a vertical insertion system that allow the magazine to be inserted with only one hand. The hinged dustcover with picatinny rail makes mounting optics simpler, and is closer to the bore axis, making sighting of optics easier. The gas-block rail system allows for the addition of combat lights and vertical fore grips. The last round bolt hold open gives the user instant feedback that the firearm is empty and allows for a quicker magazine change. In late September 2014 the IZ109T was released in the USA. This model featured a shortened barrel with a permanently attached brake. The barrel length was 18 inches (460 mm) including the brake. The IZ109T also had military style features including a rear pistol grip and 6 position stock. Various modifications were made to the trigger group, bolt, and bolt carrier that allowed loaded magazine insertion without locking the bolt back. The IZ109T also featured a fully parkerized military finish.

Bandayevsky RB-12 Russian 12-Gauge Shotgun







Tiers:



System

Alternate Designation(s): Bandayevsky RB-12
Primary Function / Type: Shotgun
Manufacturer: INA
Action: Slide action, moving barrel with fixed bolt
Barrels: 1
Feed System: 6 round detachable box magazine
Sights: Iron

Dimensions

Length, Total: mm825
Length, Stock Folded: mm610
Barrel Length: mm525
Weight: kg3

Ammunition

Cartridge: 12-Gauge
Basic Load: 6 round detachable box magazine

Notes:

The Bandayevsky RB-12 (Cyrillic: Ружьё Бандаевского РБ-12 – Ruzh'yo Bandayevskogo RB-12) is a shotgun of Russian origin. The weapon is a slide-action (pumped forward) shotgun and comes with a folding stock.The gun is designed by Aleksandr

Bandayevsky, chief designer and president of JSC Uralmashproekt. The RB-12 was an attempt by Aleksandr Bandayevsky, CEO of JSC Uralmashproekt, to create a tactical shotgun for home defense, police or security use, and requested production for the weapon to begin. Unfortunately for him, the RB-12 was very unsuccessful in its attempt to do so, and its failure is mainly attributed to complicated internals, poor reliability, being very problematic to use and just being a very unorthodox concept for a firearm in general; this caused it to disappear from the market shortly after its introduction. Because of its commercial failure, only 50 RB-12s were actually produced before Bandavyevsky's subordinates convinced him to halt all production of the weapon. Today, the RB-12 is a prized collector's item due to its rarity, but holds little practical value mainly due to the reasons that caused its failure in the market. The RB-12 employs a stationary breech and a movable barrel, and unlike most shotguns, the action is cycled forward, then rearward to chamber a new round. While this action does help to reduce the length of the weapon, it makes operating the RB-12 all the more problematic. The RB-12 uses proprietary 6-round detachable box magazines. The weapon's receiver is made of skeletonized steel, and fitted with removable wooden side panels. The RB-12 features no manual safety; the only safety present on the weapon is the grip safety. The weapon has an unusual feature where the trigger is locked up when the stock is folded; this is because mandated Russian firearm laws prohibit civilian use of firearms deemed "too short in length". Another unusual feature with the weapon is that the stock is unfolded automatically when the weapon is charged. The weapon has a carrying handle quite similar to the ones seen on AR-15-pattern rifles, with the rear of the carrying handle having iron sights.

Kel-Tec KSG American 12-Gauge Pump-Action Shotgun



Tiers:



System

Alternate Designation(s): Kel-Tec KSG

Primary Function / Type: Bullpup 12-gauge pump-action shotgun

Manufacturer: Kel-Tec CNC Industries Inc.

Caliber: 12-Gauge

Action: Pump-Action

Feed System: 7+7+1 (2¾") dual internal tube

Sights: Iron sights are not standard

Note: The initial release of the KSG had a mixed reception with some having flawless experiences and others having various issues ranging from the selector switch breaking to double feeding. Kel-Tec quickly released a second generation addressing these issues while also offering to upgrade 1st generation KSGs with the second generation improvements for free. Other improvements to the KSG on the 2nd generation include a trigger reset, small shell tube peep holes, and a fix of the action release to be easier to use and ambidextrous.

Dimensions

Length: cm66

Barrel Length: cm47

Height: cm18

Weight: kg3.1

Ammunition

Cartrdige: 12 gauge (3" shells)

Notes:

The Kel-Tec KSG is a bullpup 12-gauge pump-action shotgun designed by Kel-Tec. It has two tube magazines which the user of the gun can switch between manually. Each tube holds a total of seven 2.75-inch (70 mm) 12-gauge shotshells or six 3-inch (76 mm) shotshells. Kel-Tec has also introduced a larger variant, called the KSG25, which holds 24+1 rounds to the originals 14+1 rounds. Barrel locking is achieved by a swinging wedge, located inside the top of the bolt, which engages the barrel extension. The sliding forend is connected to the bolt by dual operating bars. The ammunition feed is from two independent tubular magazines, located below the barrel. The user is required to manually select a magazine by switching a three-position lever, located behind the pistol grip. The middle position of the switch blocks the feed from both magazines and allows the user to chamber a single round manually. Switching the lever to one side brings the respective magazine into the feed cycle. Once one

magazine is depleted, the user manually switches to the second magazine by pushing the magazine selection lever toward it, or the user can load each magazine with a different type of load, and use the selector to choose the desired load when required. For example, one magazine can be loaded with buckshot, the second with slugs. The selector can be used to switch between the two types (although this will require the user to either fire the round already chambered, or to eject it unfired in order to chamber the new type, unless the chamber is already empty). Rounds are loaded into the magazines through a large loading/ejection port, located at the bottom of the gun in the stock, behind the pistol grip. Empty shells are ejected down through the same port. A manual safety is available in the form of the cross-bolt button, located above the grip, making the gun fully ambidextrous in use. Sighting equipment (iron sights and/or red dot sights) can be installed using the standard Picatinny rail located above the barrel. A second Picatinny rail is provided at the bottom of the sliding forend, permitting installation of other accessories.

→Rifles

→→Assault Rifles

QBZ-95 Chinese 5.8mm Bullpup-Style Assault Rifle





Tiers:



Variants:

- **QBZ-95 (Rifle):** 463mm barrel length
- **QBZ-95B (Carbine):** 300m point target, 500m area target 369mm barrel length Weight: 2.9kg
- **QBB-95 LSW (Light Support Weapon):** 600 m point target, 800 m area target 600mm barrel length Weight: 3.9kg
- **QBZ-97 (5.56 mm Assault Rifle):** 490mm barrel length
- **QBZ-97A (5.56 mm Assault Rifle):** 490mm barrel length
- **QBZ-97B (5.56 mm Carbine):** 300m point target, 500m area target
- **QBB-97 LSW (5.56 mm Light Support Weapon):** 600 m point target, 800 m area target
- **QBZ-95-1 (Rifle):**
- **QBZ-95B-1 (Carbine):** 300m point target, 500m area target
- **QBB-95-1 LSW (Light Support Weapon):** 600m point target, 800m area target

System

Alternative Designation : INA
Cailber/Length : 5.8x42mm
Action: Short-stroke piston, rotating bolt
Fire Mode : 30-round detachable box magazine; 80-round detachable drum for LSW.
Number of Weapons Produced: 3,000,000
Range, Point Target: m400
Range, Area Target: 600-800m area target
Magazine(s) Available: 30-round detachable box magazine; 80-round detachable drum

↳***Dimensions***

Length : mm745
Length, Barrel : mm463
Weight: kg3.25

Ammunition

Note: The design of the QBZ-95 is completely new with little resemblance to any of the previous Chinese designs. Thanks to the low recoil impulse of the small caliber ammunition and a recoil buffer system, the rifle is claimed to be more controllable in automatic fire. The aim was to develop an assault rifle based around the 5.8×42mm round, with specifications of being accurate and reliable.

↳***QBZ-95:***

Cartridge: 5.8×42mm DBP87
Muzzle Velocity : m/s930
Range, Effective : m400 (point target); 500 (area target)

↳***QBB-95:***

Cartridge: 5.8x42mm
Muzzle Velocity: m/s970
Range, Effective: INA
Rate of Fire: rpm650

↳***QBZ-95B:***

Cartridge: 5.8x42mm
Muzzle Velocity: m/s790
Range, Effective: INA
Rate of Fire: rpm800

Sights

Type: Hooded post front sight and aperture rear sight, optional Y/MA 95-002 telescopic sigh
Note: Soldiers can mount optical sights for their rifles, due to a dovetail rail built into the carrying handle. The gun comes with YMA95 and YMA95-1 scopes.

Notes:

The QBZ-95 (Chinese: 95□□□□□; pinyin: 95 Shì Zìdòng Bùqiāng; literally: 'Type 95 Automatic Rifle') is a bullpup-style assault rifle designed and manufactured by Norinco for the People's Liberation Army, the armed forces of the People's Republic of China, People's Armed Police (para-military police), and other Chinese law enforcement agencies. This weapon uses the 5.8×42mm DBP87, an intermediate cartridge of Chinese origin. The QBZ-95 consists of a system of firearms using a common design. This family includes a carbine variant, a standard rifle, and a light support weapon. The QBZ-95 was first observed outside China on 1 July 1997, when the United Kingdom transferred the sovereignty of Hong Kong to the People's Republic of China. It is a modern weapon system in a bullpup configuration, where the weapon's action and magazine are located behind the grip and trigger assembly. The weapon was designed to replace the standard-issue Type 81 assault rifle. The QBZ-95 had replaced the Type 81 in frontline units by 2006, and is gradually replacing it in second-line units and the People's Armed Police. The rifle uses polymer materials in its construction, fires a 5.8×42mm small-caliber, high-velocity bullet (in a class with the NATO

standard 5.56×45mm SS109 and the Russian 5.45×39mm), and employs a bullpup configuration similar to the British SA80, French FAMAS, Austrian Steyr AUG, South African Vektor CR-21, Israeli Tavor or the Singaporean SAR-21. Duo Yingxian mentioned that his staff was given 2 and a half years when he was recruited to serve as the project head to develop the QBZ-95 in 1992, alongside two years of field tests. An improved version called the QBZ-95-1 was first seen undergoing trials in early 2010. The first formal public display of the improved version was with the Hong Kong Garrison, the first unit to receive the original QBZ-95, in a military parade in July 2012. Some improvements were ergonomic, with the safety switch moved to above the pistol grip and the right-sided ejection port moved forward with ejection of cartridges at an angle to allow left-handed firing. Unlike previous DBP87 and DBP85 5.8×42mm rounds, it fires better quality DBP10 ammunition with a non-corrosive primer, clean-burning propellant, and copper-coated steel casing with a copper-alloy-jacketed hardened steel-cored bullet. The QBZ-95-1 has a longer, heavier barrel and redesigned muzzle brake, a diamond-shaped cross-section on the handguard to disperse heat, a stronger buttstock and a redesigned trigger guard. The carrying handle was lowered to better position optics on the quick-releasable modified dovetail rail, and a pair of short rails at the sight's base allows for tactical accessories to be mounted. Some Chinese special forces are seen equipped with customized QBZ-95-1 rifle variants. Though there have been hints of the 97 variants being involved in some foreign conflicts, little has been reported about its overall combat effectiveness. It has been at least shown in televised tests, however, that the weapon can continue to function after being immersed in water, as well as other harsh environmental conditions. What is also known is that the weapon operates using a short-stroke gas operated rotating-bolt system, similar to most modern military rifles. The selector switch on the rifle has four settings. The selector settings are as follows: "0" for safe, "1" for "semi-automatic", "2" for fully automatic, and on selected models, "3" for three round burst setting. The Chinese Army says it has tested its 5.8×42mm cartridge extensively against NATO's 5.56×45mm and its counterpart, the 5.45×39mm from Russia. The PLA claims their cartridge outperforms both with a flatter trajectory, and a higher retention of velocity and energy downrange. It also has a penetration superior to the 5.56×45mm NATO.

M16A4 American 5.56mm Assault Rifle







Tiers:



Variants:

- **M16:** This was the first M16 variant adopted operationally, originally by the U.S. Air Force. It was equipped with triangular handguards, butt stocks without a compartment for the storage of a cleaning kit, a three-pronged flash suppressor, full auto, and no forward assist. Bolt carriers were originally chrome plated and slick-sided, lacking forward assist notches. Later, the chrome plated carriers were dropped in favor of Army issued notched and parkerized carriers though the interior portion of the bolt carrier is still chrome-lined. The Air Force continued to operate these weapons until around 2001, at which time the Air Force converted all of its M16s to the M16A2 configuration. The M16 was also adopted by the British SAS, who used it during the Falklands War.
- **XM16E1 and M16A1 (Colt Model 603):** The U.S. Army XM16E1 was essentially the same weapon as the M16 with the addition of a forward assist and corresponding notches in the bolt carrier. The M16A1 was the finalized production model in 1967 and was produced until 1982. To address issues raised by the XM16E1's testing cycle, a closed, bird-cage flash suppressor replaced the XM16E1's three-pronged flash suppressor which caught on twigs and leaves. Various other changes were made after numerous problems in the field. Cleaning kits were developed and issued while barrels with chrome-plated chambers and later fully lined bores were introduced.
- **M16A2:** The development of the M16A2 rifle was originally requested by the United States Marine Corps as a result of combat experience in Vietnam with the XM16E1 and M16A1. It was officially adopted by the Department of Defense as the "US Rifle, 5.56mm, M16A2" in 1982. The Marines were the first branch of the U.S. Armed Forces to adopt it, in the early/mid-1980s, with the United States Army following suit in the late 1980s. Modifications to the M16A2 were extensive. In addition to the new rifling, the barrel was made with a greater thickness in front of the front sight post, to resist bending in the field and to allow a longer period of sustained fire without overheating. The rest of the barrel was maintained at the original thickness to enable the M203 grenade launcher to be attached. A new adjustable rear sight was added, allowing the rear sight to be dialed in for specific range settings between 300 and 800 meters to take full advantage of the ballistic characteristics of the new SS109 rounds and to allow windage adjustments without the need of a tool or cartridge. The weapon's reliability allowed it to be widely used around the Marine Corps' special operations divisions as well. The flash suppressor was again modified, this time to be closed on the bottom so it would not kick up

dirt or snow when being fired from the prone position, and acting as a recoil compensator.

- **M16A3:** The M16A3 is a modified version of the M16A2 adopted in small numbers by the U.S. Navy SEAL, Seabee, and Security units. It features the M16A1 trigger group providing "safe", "semi-automatic" and "fully automatic" modes instead of the A2's "safe", "semi-automatic", and "burst" modes. Otherwise it is externally identical to the M16A2.
- **The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals.:** The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals. Colt also produces M16A4 models for international purchases: R0901 / NSN 1005-01-383-2872 (Safe/Semi/Auto) R0905 (Safe/Semi/Burst)

System

Alternate Designation(s): M16A4

Primary Function / Type: Assault Rifle

Manufacturer: Colt's Manufacturing Company Daewoo Precision Industries FN Herstal Bushmaster H&R Firearms General Motors Hydramatic Division Elisco U.S. Ordnance

Action: Gas-operated, rotating bolt (direct impingement)

Rate of Fire: 700–950 rounds/min cyclic sustained 45–60 rounds/min semi-automatic

Muzzle Velocity: m/s960

Effective Firing Range: 550 m (601 yd) (point target) 800 m (875 yd) (area target)

Maximum Firing Range: m3,600

Feed System: STANAG magazine 20-round detachable box magazine: 0.211 lb (96 g) empty / 0.738 lb (335 g) full 30-round detachable box magazine: 0.257 lb (117 g) empty / 1.06 lb (480 g) full) Beta C-Mag 100-round double-lobed drum: 2.20 lb (1,000 g) empty / 4.81 lb (2,180 g) full)

Burst: 90 rounds per minute

Magazine: 30 rounds

Sights: Iron sights or various optics

Dimensions

Length: mm1,000

Barrel Length: mm508

Weight, Loaded: kg2.89

Weight, Unloaded: kg3.40

Ammunition

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56×45mm NATO (M193)

Notes:

The FN® M16A4 is an M16A2 with a removable handle and full-length quad picatinny rail. The M16A2 weapon system was developed at the request of the United States Marine Corps to improve on the M16A1 and went into large scale production by 1987. Improvements included a thicker barrel in front of the front sight, modified flash suppressor (closed on bottom), new polymer buttstock (lighter and stronger, faster barrel twist (from 1:12 to 1:7), and spent case deflector for left-hand users. The M16A4 is chambered to fire the 5.56x45mm (.223) NATO cartridge. It is a select-fire rifle having semi-automatic and three-round burst fire capabilities. Cartridges are magazine-fed, and firing is achieved via a direct impingement gas operating system. The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals. The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals.

EF88 Austeyr (F90) Australian 5.56mm Assault Rifle







Tiers:



System

Alternate Designation: EF88 Austeyr; F90
Manufacturer: Thales Australia
In Service: 2012-Present
Modes: Single shot or semi-automatic
Action: select-fire
Trigger Type: SA
Cyclic Rate of Fire: 850 rounds/min
Muzzle Velocity: 970 m/s
Maximum Firing Range: 300 metres
Effective Firing Range: 2,700 metres
Magazine: 30-round box magazine
Sights: Ancillary attachments for the EF88 rifle include enhanced day sights, image intensifiers, thermal imaging sights.

Dimensions

Length: mm802
Barrel Length: mm508
Weight: kg3.39

Ammunition

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56x45 NATO

Notes:

The Australian Defence Force's new EF88 Austeyr rifle is set to improve close combat and general combat capability due to its superior accuracy and lethality, improved ergonomics, balance and increased mounting options for ancillary devices. The EF88 began entering service in mid-2016 and is replacing the F88 Austeyr. Ancillary attachments for the EF88 rifle include enhanced day sights, image intensifiers, thermal imaging sights, forward grips (with bipod), forward grips (basic), weapon stabilisers, visual illumination devices, one o'clock offset rails, and laser-aiming illumination and ranging devices. The EF88 rifle can be quickly reconfigured to meet specific mission roles by utilising these weapon ancillaries. F90 assault rifle, also known as EF88 (Enhanced F88) is an evolution of the F88 assault rifle, which was adopted by Australian and New Zealand armed forces during late 1980s. The original F88 rifle is a licensed copy of the Austrian Steyr AUG rifle, and it was produced in Australia at Australian Defense Industries factory in Lithgow. Today this same factory is operated by the Thales Australia, which developed EF88 / F90 rifle as a next weapon for Australian army, as well as for export. While internally and externally the F90 is still close to Steyr AUG, it has many distinctive upgrades and changes, developed by Thales to fulfill current and near-future requirements of Australian armed forces. The Thales F90 rifles were first displayed to the public in mid-2012, and initial production is scheduled for 2013. The resulting weapon is said to be much more reliable and comfortable than original F88 / Steyr AUG rifle. It is also noticeably lighter: standard F90 with 50 cm / 20” barrel is about 0.5 kg / 1.1 lbs lighter than standard F88 rifle; with new 40mm underbarrel grenade launcher installed, resulting weapon is more than 1.6 kg / 3.5 lbs lighter than F88 rifle equipped with M203PI grenade launcher. F90 / EF88 assault rifle is gas operated, selectively fired weapon of bullpup layout. It uses polymer housing with improved shape of buttstock (including the new buttpad and added comb for better cheek-weld). Gas operated, short-stroke, rotary bolt action is similar to that of original Steyr AUG, but the gas block is modified. Aluminum alloy receiver is also modified to improve reliability and reduce weight. Ejection ports and ejection covers also modified to ensure reliable extraction under all conditions. Unlike all previous versions of the Steyr AUG, the F90 has non-removable barrels, cold-hammer forged and externally fluted. Standard F90 rifles are offered with 50 cm / 20” barrels; other versions include carbines with 40 cm / 16” barrel and CQB variants with 36 cm / 14.1” barrel. Other clearly visible changes include extended Mil-Std (Picatinny) rail at the top; bottom rail has replaced original folding forward grip of the Steyr AUG / F88. Third accessory rail is mounted on the right side of the weapon. Trigger guard is redesigned to accept new, specially designed 40mm Underbarrel Grenade Launcher. This lightweight add-on weapon can be quickly attached directly to the bottom rail of the host rifle, and then easily removed when not required. Less visible changes include addition of the bolt hold-open device to facilitate faster reloads. F90 will feed from the same proprietary translucent magazines, made from polymer as the original Steyr AUG / F88 rifles, although optional STANAG-compatible version is said to be available in the near future. Basic sighting is provided by Trijicon ACOG optical sights with 1.5X or 3.5X magnification, although sights can be easily changed, thanks to MilStd mounts.

CAR 817 Emirati 7.62mm Assault Rifle



Tiers:



Variants:

- **CAR 817:** CAR 817 DMR is a designated marksman rifle with a longer barrel and modified buttstock.

Main Weapon System

↳*System*

Name: Caracal Assault Rifle 817
Alternative Designation: CAR 817
Country: United Arab Emirates
Manufactuer: Caracal International company
Caliber: mm7.62
Length, Stock Extended: mm884
Length, Stock Retracted: mm802
Barrel Length: mm406
Weight, Without Magazine: kg3.3
Muzzle Velocity: m/s750
Cyclic Rate of Fire: rds/min650-750
Practical Rate of Fire: rds/min30-90
Magazine Capacity: 10, 20, 25 rounds
Range of Effective Fire: m600
Sight: Iron

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62x51 mm

Notes:

The Caracal Assault Rifle 817, or CAR 817 was developed in the United Arab Emirates by a Caracal International company. This weapon is intended for elite military and law enforcement units. It is a gas operated, selective fire weapon. The CAR 817 is a version of the CAR 816, but chambered for a more powerful 7.62x51 mm ammunition. The CAR 817 is heavier, but is more accurate and has a longer range. The CAR 817 is similar in concept to the German Heckler & Koch HK417 battle rifle. Internally it resembles Stoner-designed weapons, such as the M16, but all working parts were enlarged to suit the larger 7.62x51 mm ammunition. The CAR 817 is available with 3 barrel lengths. There is an automatic rifle with a 406 mm (16") barrel, carbine with a 386 mm (14.5") barrel, and compact assault rifle with a 317 mm (12.5") barrel. Special forces, often prefer more compact rifles, that are chambered for powerful 7.62x51 mm ammunition with greater penetrative power. The CAR 817 has an adjustable gas valve, which controls the gas system. There are three positions of the gas valve. First position is for normal operation. Second position is for operation when the system is fouled, for adverse conditions or when low impulse ammunition is used. The third position is used when the weapon is equipped with a sound suppressor. A fire mode selector is located above the pistol grip and is conveniently operated by the shooter's thumb. It has three positions for "safe", "semi-auto" and "full-auto". There is a semi-automatic only version of this weapon, intended for law enforcement forces. This weapon is fed from 10-, 20- or 25-round magazines. The CAR 817 has a telescopic buttstock, which can be adjusted for length. It has 6 positions. A similar buttstock is used on the Barrett REC7. This battle rifle has a full-length Picatinny-type scope rail. It comes as standard with detachable flip-up iron sights. However this weapon is mainly intended to be used with various optics. Range of effective fire is around 600 meters. The CAR 817 has greater range and accuracy than the CAR 816 assault rifle, though at a cost of increased weight, lower rate of fire and lower ammunition capacity (both in magazine and carriage). Due to its long range the CAR 817 can be even used for designated marksman role. There are additional accessory rails over the foregrip for various add-on equipment, such as laser pointers, tactical flashlights, vertical grips, bipods and so on. The CAR 816 can mount a sound suppressor and 40 mm underbarrel grenade launcher.

Heckler and Koch G36 German 5.56mm Assault Rifle





Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE)::** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics.

Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch G36

Primary Function / Type: Assault Rifle

Date of Introduction: 1997

Manufacturer: Heckler & Koch Santa Bárbara Sistemas Military Industries Corporation

Proliferation: Widely Proliferated

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36 magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

The G36 is a 5.56×45mm assault rifle, designed in the early 1990s by Heckler & Koch in Germany as a replacement for the heavier 7.62mm G3 battle rifle. It was accepted into service with the Bundeswehr in 1997, replacing the G3. The G36 is gas-operated and feeds from a 30-round detachable box magazine or 100-round C-Mag drum magazine. The G36 is a selective-fire 5.56 mm assault rifle, firing from a closed rotary bolt. The G36 has a conventional layout and a modular component design. Common to all variants of the G36 family are: the receiver and buttstock assembly, bolt carrier group with bolt and the return mechanism and guide rod. The receiver contains the barrel, carry handle with integrated sights, trigger group with pistol grip, handguard and magazine socket. The G36 employs a free-floating barrel (the barrel does not contact the handguard). The barrel is fastened to the receiver with a special nut, which can be removed with a wrench. The barrel is produced using a cold hammer forging process and features a chrome-lined bore with 6 right-hand grooves and a 1 in 178 mm (1:7 in) rifling twist rate. The barrel assembly consists of the gas block, a collar with a bayonet lug that is also used to launch rifle grenades and a slotted flash suppressor. The weapon can be stripped and re-assembled without tools through a system of cross-pins similar to that used on earlier HK designs. For cleaning purposes, the G36 dismantles into the following groups: receiver housing, return mechanism, bolt carrier group and trigger group.

Heckler and Koch M27 German 5.56mm Assault Rifle







Tiers:



Variants:

- **HK416C:** The ultra-compact variant, with "C" for Compact. The HK416C has a 228 mm (9.0 in) barrel and is expected to produce muzzle velocities of approximately 730 m/s (2,395 ft/s).
- **M27 Infantry Automatic Rifle::** A squad automatic weapon variant developed from the D16.5RS adopted in 2011 by the United States Marine Corps. In 2018 the USMC decided to adopt the M27 IAR as their standard battle rifle.
- **HK416A5:** Improved carbine entered in the Individual Carbine competition.[28] The competition was cancelled without a weapon chosen.
- **HK416A7:** Variant designed for the German KSK and KSM. Most significant change is a selector which now rotates 90 degrees rather than 180 degrees as on the M16 series.
- **HK417:** larger caliber variant chambered for 7.62×51mm NATO
- **Civilian version:** Civilian variants of the HK416 and HK417 introduced in 2007 were known as MR223 and MR308 (as they remain known in Europe). Both are semi-automatic rifles with several "sporterized" features. At the 2009 SHOT Show, these two firearms were introduced to the U.S. civilian market renamed respectively MR556 and MR762. There is another variant of the MR556 called the MR556A1, which is an improved version of the former. It was created with input from American special forces units. The MR556A1 lets the upper receiver attach to any M16/M4/AR-15 family lower receiver, as the receiver take-down pins are in the same standard location. The original concept for the MR556 did not allow for this, as the take-down pins were located in a "non-standard" location. The MR223 maintains the "non-standard" location of the pins, disallowing attachment of the upper receiver to the lower receivers of any other M16/M4/AR-15 family of rifles. As of 2012, the MR556A1 upper receiver group fits standard AR-15 lower receivers without modification, and functions reliably with standard STANAG magazines. HK-USA sells a variant under the MR556A1 Competition Model nomenclature; it comes with a 14.5" free-float Modular Rail System (MRS), 16.5" barrel, OSS compensator and Magpul CTR buttstock. The firearm's precision is specified as 1 MOA by Heckler & Koch. In Europe, the MR223A3 variant is sold with the same cosmetic and ergonomical improvements of the HK416A5. The French importer of Heckler & Koch in France, RUAG Defence, have announced that they are going to sell two civilian versions of the HK416F, named the MR223 F-S (14.5″ Standard version) and MR223 F-C (11″ Short version).

System

Alternate Designation(s): Heckler & Koch M27
Primary Function / Type: Assault Rifle
Manufacturer: Heckler & Koch

Action: Gas-operated short-stroke piston, rotating bolt

Rate of Fire: Sustained: 36 rpm Cyclic: 700 to 900 rpm

Muzzle Velcoity: m/s730

Effective Firing Range: 600 m (point target) 800 m (area target)

Maximum Firing Range: m3,601

Feed System: 30-round STANAG magazine

Sights: 3.5x Squad Day Optic, flip-up rear rotary diopter sight and front post

Sights Note: Advanced Combat Optical Gunsight (abbreviated ACOG) is a series of telescopic sights manufactured by Trijicon. The ACOG was originally designed to be used on the M16 rifle and M4 carbine, but Trijicon has also developed ACOG accessories for other firearms. Models provide fixed power magnification levels from 1.5× to 6×.ACOG reticles are illuminated at night by an internal phosphor. Some versions have an additional daytime reticle illumination via a passive external fiber optic light pipe or are LED-illuminated using a battery. The first ACOG model, known as the TA01, was released in 1987.

Dimensions

Length: 36.9 to 33 in (940 to 840 mm) w/ adjustable stock

Barrel Length: mm420

Width: mm79

Height: 240 mm

Weight: 7.9 lb (3.6 kg) empty 9.8 lb (4.4 kg) loaded weight with sling

Ammuntiion

Type: Rifle

Caliber: 5.56

Cartridge: 5.56×45mm NATO

Notes:

The M27 Infantry Automatic Rifle (IAR) is a lightweight, magazine-fed 5.56mm, select-fire weapon based on the HK416 rifle designed and manufactured by the German company Heckler & Koch. It is used by the United States Marine Corps and is intended to enhance an automatic rifleman's maneuverability. The U.S. Marine Corps initially planned to purchase 6,500 M27s to replace a portion of the M249 light machine guns employed by automatic riflemen within Infantry and Light Armored Reconnaissance Battalions. Approximately 8,000–10,000 M249s will remain in service with the Marine Corps to be used at the discretion of company commanders. The United States Army does not plan to purchase the IAR. In December 2017, the Marine Corps revealed a decision to equip every Marine in an infantry squad with the M27. After the Marine Corps Operational Test and Evaluation Activity conducted further testing at MCAGCC Twentynine Palms, Fort McCoy and Camp Shelby (for dust, cold-weather, and hot-weather conditions, respectively), limited fielding of 458 IARs began to four infantry battalions (one per each Marine Expeditionary Force, one reserve) and one light armored reconnaissance battalion, all of which deployed to Afghanistan in 2011. n May 2011, Marine General James Amos approved the conclusion of the Limited User Evaluation (LUE), and ordered the replacement of the M249 LMG by the M27. Fielding of the approximately 6,500 M27 units was expected to be completed in the summer of 2013, at a cost of $13 million. Each M27 gunner was to be equipped with around twenty-two 30-round magazines of the type currently in use with the M16 and M4 carbine approximating the combat load of an M249 SAW gunner; although the M27 gunner would not be expected to carry all 22 magazines. The individual combat load would be determined at the unit level and was expected to vary by unit, based on results of evaluations conducted by the four infantry battalions and one light armored reconnaissance battalion that participated in the Limited User Evaluation. Though program officials were aware that switching from the belt-fed M249 would result in a loss of suppressive fire capability, Charles Clark III, of the Marine Corps' Combat Development and Integration Office, cited the substantially increased accuracy of the M27 as a significant factor in the decision to replace the M249. In early 2017, Commandant of the Marine Corps General Robert Neller said he wanted to equip every "0311" rifleman with an M27 IAR. Because of that, the Marine Corps issued a request in early 2017 for 11,000 M27 IARs from H&K. While talking about the Corps' request, Chris Woodburn, deputy of the Maneuver Branch, Fires and Maneuver

Integration at Marine Corps Combat Development Command, said "The new order will replace all M4s in every infantry squad with an M27, except for the squad leader." He also stated that the change includes infantry training battalions. The timeline for funding was planned for fiscal years 2019 and 2020, with the Corps acquiring some of the rifles in fiscal year 2018. As of August 2017, officials have stated that "riflemen are the top priority," but that the M27 "will be in the hands of combat engineers and light armored reconnaissance battalion scouts next." The Corps later issued a pre-solicitation notice for the M27. "The new pre-solicitation notice of 50,184 [M27s]," said Woodburn, "is [meant] to up the production capacity that H&K must be able to meet as the sole-source provider [of the M27], should the Marines decide to order more in the future." At SHOT Show 2018, the Marine Corps announced that the deal with H&K to produce 11,000 M27s for the Marine Corps had been finalized and that the M27 IAR would be adopted as the standard issue service rifle of the Marine Corps infantry, replacing the M4A1.

Heckler and Koch G36V German 5.56mm Assault Rifle



Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE)::** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics. Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch G36V

Primary Function / Type: Assault Rifle

Manufacturer: Heckler & Koch Santa Bárbara Sistemas Military Industries Corporation

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Note: G36V (V—Variante "variant"): Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36 magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

G36V (V—Variante "variant"): Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia. G36 Standard Model. The G36 is a 5.56×45mm assault rifle, designed in the early 1990s by Heckler & Koch in Germany as a replacement for the heavier 7.62mm G3 battle rifle. It was accepted into service with the Bundeswehr in 1997, replacing the G3. The G36 is gas-operated and feeds from a 30-round detachable box magazine or 100-round C-Mag drum magazine. The G36 is a selective-fire 5.56 mm assault rifle, firing from a closed rotary bolt. The G36 has a conventional layout and a modular component design. Common to all variants of the G36 family are: the receiver and buttstock assembly, bolt carrier group with bolt and the return mechanism and guide rod. The receiver contains the barrel, carry handle with integrated sights, trigger group with pistol grip, handguard and magazine socket. The G36 employs a free-floating barrel (the barrel does not contact the handguard). The barrel is fastened to the receiver with a special nut, which can be removed with a wrench. The barrel is produced using a cold hammer forging process and features a chrome-lined bore with 6 right-hand grooves and a 1 in 178 mm (1:7 in) rifling twist rate. The barrel assembly consists of the gas block, a collar with a bayonet lug that is also used to launch rifle grenades and a slotted flash suppressor. The weapon can be stripped and re-assembled without tools through a system of cross-pins similar to that used on earlier HK designs. For cleaning purposes, the G36 dismantles into the following groups: receiver housing, return mechanism, bolt carrier group and trigger group.

M16A2 American 5.56mm Assault Rifle





Tiers:



Variants:

- **M16:** This was the first M16 variant adopted operationally, originally by the U.S. Air Force. It was equipped with triangular handguards, butt stocks without a compartment for the storage of a cleaning kit, a three-pronged flash suppressor, full auto, and no forward assist. Bolt carriers were originally chrome plated and slick-sided, lacking forward assist notches. Later, the chrome plated carriers were dropped in favor of Army issued notched and parkerized carriers though the interior portion of the bolt carrier is still chrome-lined. The Air Force continued to operate these weapons until around 2001, at which time the Air Force converted all of its M16s to the M16A2 configuration. The M16 was also adopted by the British SAS, who used it during the Falklands War.
- **XM16E1 and M16A1 (Colt Model 603):** The U.S. Army XM16E1 was essentially the same weapon as the M16 with the addition of a forward assist and corresponding notches in the bolt carrier. The M16A1 was the finalized production model in 1967 and was produced until 1982. To address issues raised by the XM16E1's testing cycle, a closed, bird-cage flash suppressor replaced the XM16E1's three-pronged flash suppressor which caught on twigs and leaves. Various other changes were made after numerous problems in the field. Cleaning kits were developed and issued while barrels with chrome-plated chambers and later fully lined bores were introduced.
- **M16A2:** The development of the M16A2 rifle was originally requested by the United States Marine Corps as a result of combat experience in Vietnam with the XM16E1 and M16A1. It was officially adopted by the Department of Defense as the "US Rifle, 5.56mm, M16A2" in 1982. The Marines were the first branch of the U.S. Armed Forces to adopt it, in the early/mid-1980s, with the United States Army following suit in the late 1980s. Modifications to the M16A2 were extensive. In addition to the new rifling, the barrel was made with a greater thickness in front of the front sight post, to resist bending in the field and to allow a longer period of sustained fire without overheating. The rest of the barrel was maintained at the original thickness to enable the M203 grenade launcher to be attached. A new adjustable rear sight was added, allowing the rear sight to be dialed in for specific range settings between 300 and 800 meters to take full advantage of the ballistic characteristics of the new SS109 rounds and to allow windage adjustments without the need of a tool or cartridge. The weapon's reliability allowed it to be widely used around the Marine Corps' special operations divisions as well. The flash suppressor was again modified, this time to be closed on the bottom so it would not kick up dirt or snow when being fired from the prone position, and acting as a recoil compensator.
- **M16A3:** The M16A3 is a modified version of the M16A2 adopted in small numbers by the U.S. Navy SEAL, Seabee, and Security units. It features the M16A1 trigger group providing "safe", "semi-automatic" and "fully automatic" modes instead of the A2's "safe", "semi-automatic", and "burst" modes. Otherwise it is externally identical to the M16A2.
- **The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular**

Weapon System) in U.S. Army field manuals.: The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals. Colt also produces M16A4 models for international purchases: R0901 / NSN 1005-01-383-2872 (Safe/Semi/Auto) R0905 (Safe/Semi/Burst)

System

Alternate Designation(s): M16A2

Primary Function / Type: Assault Rifle

Manufacturer: Colt's Manufacturing Company Daewoo Precision Industries FN Herstal Bushmaster H&R Firearms General Motors Hydramatic Division Elisco U.S. Ordnance

Action: Gas-operated, rotating bolt (direct impingement)

Rate of Fire: 700–950 rounds/min cyclic sustained 45–60 rounds/min semi-automatic

Muzzle Velocity: m/s960

Effective Firing Range: 550 m (601 yd) (point target) 800 m (875 yd) (area target)

Maximum Firing Range: m3,600

Feed System: STANAG magazine 20-round detachable box magazine: 0.211 lb (96 g) empty / 0.738 lb (335 g) full 30-round detachable box magazine: 0.257 lb (117 g) empty / 1.06 lb (480 g) full) Beta C-Mag 100-round double-lobed drum: 2.20 lb (1,000 g) empty / 4.81 lb (2,180 g) full)

Burst: 90 rounds per minute

Magazine: 30 rounds

Sights: Iron sights or various optics

Dimensions

Length: mm1,000

Barrel Length: mm508

Weight, Loaded: kg2.89

Weight, Unloaded: kg3.40

Ammunition

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56×45mm NATO (M193)

Notes:

The development of the M16A2 rifle was originally requested by the United States Marine Corps as a result of combat experience in Vietnam with the XM16E1 and M16A1. It was officially adopted by the Department of Defense as the "US Rifle, 5.56mm, M16A2" in 1982. The Marines were the first branch of the U.S. Armed Forces to adopt it, in the early/mid-1980s, with the United States Army following suit in the late 1980s. Modifications to the M16A2 were extensive. In addition to the new rifling, the barrel was made with a greater thickness in front of the front sight post, to resist bending in the field and to allow a longer period of sustained fire without overheating. The rest of the barrel was maintained at the original thickness to enable the M203 grenade launcher to be attached. A new adjustable rear sight was added, allowing the rear sight to be dialed in for specific range settings between 300 and 800 meters to take full advantage of the ballistic characteristics of the new SS109 rounds and to allow windage adjustments without the need of a tool or cartridge. The weapon's reliability allowed it to be

widely used around the Marine Corps' special operations divisions as well. The flash suppressor was again modified, this time to be closed on the bottom so it would not kick up dirt or snow when being fired from the prone position, and acting as a recoil compensator. The front grip was modified from the original triangular shape to a round one, which better fit smaller hands and could be fitted to older models of the M16. The new handguards were also symmetrical so armories need not separate left- and right-hand spares. The handguard retention ring was tapered to make it easier to install and uninstall the handguards. A notch for the middle finger was added to the pistol grip, as well as more texture to enhance the grip. The buttstock was lengthened by 5⁄8 in (15.9 mm). The new buttstock became ten times stronger than the original due to advances in polymer technology since the early 1960s. Original M16 stocks were made from fiberglass-impregnated resin; the newer stocks were engineered from DuPont Zytel glass-filled thermoset polymers. The new stock included a fully textured polymer buttplate for better grip on the shoulder, and retained a panel for accessing a small compartment inside the stock, often used for storing a basic cleaning kit. The heavier bullet reduces muzzle velocity from 3,200 feet per second (980 m/s), to about 3,050 feet per second (930 m/s). The A2 uses a faster 1:7 twist rifling to allow use of a trajectory-matched tracer round. A spent case deflector was incorporated into the upper receiver immediately behind the ejection port to prevent cases from striking left-handed users. The action was also modified, replacing the fully automatic setting with a three-round burst setting. When using a fully automatic weapon, inexperienced troops often hold down the trigger and "spray" when under fire. The U.S. Army concluded that three-shot groups provide an optimum combination of ammunition conservation, accuracy, and firepower. The USMC has retired the M16A2 in favor of the newer M16A4; a few M16A2s remain in service with the U.S. Army Reserve and National Guard, Air Force, Navy and Coast Guard.

AK-63 (AMM) Hungarian 7.62mm Assault Rifle



Tiers:



Variants:

- **AK-63F:** The basic fixed-stock copy of the Soviet AKM.
- **AK-63D (AMMS in Hungarian service):** An AKMS copy with an under-folding steel stock.
- **AK-63MF:** Modernised AK-63D with telescopic stock and MIL-STD-1913 Picatinny rail.
- **SA-85M:** A semi-automatic-only version intended for civilian sales in the United States; imported by Kassnar in both pre- and post-ban versions.
- **SA-2000S:** Clinton ban-era AK with single stack magazine. Exclusively for the US market.
- **AK-63MF:** 7700 pieces of the AK-63 have been modernised in the Hungarian Armed Forces and received the designation AK-63MF.

Main Weapon System

↳*System*

Name: FEG AK-63 / AMM
Type: 7.62mm General Purpose Machine Gun
Manufacturer: Fegyver- és Gépgyár
In Service: 1977-Present
Proliferation: +1 Million. 11 Countries
Max Rate of Fire: rds/min600
Weight: kg3.6
Length (Total): mm880
Length (Barrel): mm415
Width: INA
Height: INA
Action: Gas-operated, rotating bolt
Effective Firing Range: m500
Feed system: 10, 20, 30, 40-round box magazines, 75 or 100-round drum magazine
Sights: Iron Sights

↳***Ammunition***

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×39mm NATO
Muzzle Velocity: m/s701
Basic Load: ea200

Notes:

he AK-63 (also known in Hungarian military service as the AMM) is a Hungarian variant of the AKM assault rifle manufactured by the Fegyver- és Gépgyár (FÉG) state arms plant in Hungary. It is currently used by the Hungarian Ground Forces as its standard infantry weapon, and by most other branches of the Hungarian Defence Forces. In Hungarian service, the AK-63 replaced the AMD-65, which is nearly identical but features a modified heat shield and a vertical forward hand grip under the barrel. Although the AMD-65 had been the Hungarian service rifle since 1965, it was more expensive to build, and the forward grips had a reputation for being easily damaged in the field. In the late-1970s, the Hungarian Defense Ministry requested that FÉG manufacture a cheaper rifle based on the more traditional Soviet AKM design. By the end of 1977, the AK-63 was adopted by the Hungarian People's Army (beginning with the Ground Forces). In 1978, FÉG added a folding stock AKMS version of the AK-63 to their catalogue; thereafter, the fixed-stock AK-63 became known as the AK-63F (Wooden Stock) and the folding-stock version was designated AK-63D (Descent). In Hungarian service, the AK-63 F and D are designated as the AMM and AMMS, respectively. The AK-63 F and D (AMM and AMMS) are both nearly identical externally to the USSR-manufactured AKM and AKMS. The main difference is that the AK-63 series retains the distinctive-looking straight pistol grip of the AKM-63. The forward hand grip of the AK-63 also lacks the palm swells which characterize the Soviet AKM (and most AKM copies made in many other countries). It's also missing the stepped lightening cut on the bolt carrier and retains the relief ports on the gas tube. The wood on the AK-63, like that of the AKM-63, has a bright, laminated blond finish. During the Cold War and afterwards, the AK-63 series was widely exported to a number of nations in Eastern Europe, the Middle East, Africa, and South America. Iraq under Saddam Hussein was the first major export customer to receive the AK-63, which it began importing in large numbers in 1979 to equip its armed forces. These rifles made their combat debut in the hands of Iraqi soldiers during the Iran–Iraq War in 1980–1988. During the war, the Iranian Revolutionary Guards and many of the local militias which participated in the fighting were also armed with AK-63s; these were most likely acquired by capturing them from the Iraqis (since Iran mostly purchased AKs from China and North Korea, and received some Soviet weapons from Libya and Syria). The AK-63 was used by Iraqi forces again during the Gulf War in 1990–91, and later turned up in Kurdish and Shi'ite hands during the insurrections in Iraq throughout the 1990s. The AK-63 was also exported to the Sandinista government in Nicaragua, which used them to fight the Contras in the 1980s. Significant numbers of AK-63s were also sent to the FMLN in nearby El Salvador starting in late 1984 or 1985. One estimate suggested that about 11,000 AK-63 rifles may have been sent to the region over a five-year period. Since the end of the Cold War, the AK-63 has also turned up regularly in the hands of militants in Somalia and Zambia, and was also purchased by Croatian forces for use during the Croatian War of Independence. Photographic evidence shows that the AK-63 is one the primary rifles in use by the Kurdish YPG/YPJ and PKK forces in Syria and Iraq. In 1985, a semi-automatic version of the AK-63 was exported to the United States for civilian consumption. Imported by Kassnar (of Harrisburg, PA), which sold it as the SA-85M, it was only available in its "pre-ban" form for a few years before the 1989 assault weapons importation ban. Since only about 7,000 pre-ban SA-85Ms were imported prior to 1989, it is now considered a collector's item amongst firearms enthusiasts and commands high prices (often $1,500 or higher). The post-ban version of the SA-85M, featuring a thumbhole stock, was discontinued after only a few years of importation. However, in recent years, several companies in the United States have built clones of these rifles from Hungarian parts kits on American-made receivers.

AKS-74U Russian 5.45mm Automatic Assault Rifle



Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed

from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.

- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74U

In Service: 1977-Present

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression. In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped. The

AKS-74U bridges the tactical deployment gap between a submachine gun and an assault rifle. It was intended for use mainly with special forces, airborne infantry, rear-echelon support units, helicopter and armored vehicle crews. It has been augmented and replaced by various submachine guns, and the less compact AK-105 carbine in Russian military service. It is commonly used by law enforcement; for example, each urban police foot patrol is issued at least one. The rifle's compact dimensions, compared with the AKS-74, were achieved by using a short 206.5 mm (8.1 in) barrel (this forced designers to simultaneously reduce the gas piston operating rod to an appropriate length). Due to the shortening of the operating mechanism the cyclic rate of fire rose slightly to around 700-735 rounds per minute. In order to effectively stabilize projectiles, the barrel's twist rate was increased from 200 mm (1:7.87 in) to 160 mm (1:6.3 in) to adapt the AKS-74U for muzzle velocities of 720 m/s (2,362 ft/s) and higher. A new gas block was installed at the muzzle end of the barrel with a muzzle booster, which features an internal expansion chamber inside the cylindrical section of the booster while the conical end acts as a nozzle to increase net pressure inside the gas chamber by supplying an increased amount of propellant gasses from the barrel. The chrome-lined muzzle booster also burns any remaining propellant, which would normally reduce muzzle blast. However, due to the extremely short barrel and conical end of the booster, the muzzle blast is nevertheless extremely large and visible. The muzzle device locks into the gas block with a spring-loaded detent pin and features two parallel notches cut into the edge of the flash hider cone, used for unscrewing it using the cleaning rod. Unlike most Kalashnikov variants there is no provision to store the cleaning rod under the barrel. The front sight was integrated into the gas block/forward sling loop. The sight height above the bore axis is also approximately 3 mm (0.1 in) higher than the AK-74, due to the combined front sight/gas block, rear sight configuration. The AKS-74U has a different rear sight composed of a U-shaped flip sight on the top cover instead of the standard sliding notch tangent rear sight. This rear sight has two settings: "П" standing for постоянная (constant) corresponding to a 350 m (383 yd) "point-blank range" battle zero setting and "4-5" (used for firing at distances between 400–500 m (437–547 yd)). The rear sight is housed in a semi-shrouded protective enclosure that is riveted to the receiver's spring-loaded top cover. This top cover hinges from a barrel trunnion (hinging where the rear sight on a normal AK74 is located), pivoting forward when opened, which also works to unlock the gas tube cover. Both the gas tube and handguard are also of a new type and are wider and shorter than the analogous parts in the AKS-74. For the AKS-74s combined with the 7N6 or 7N10 service cartridges the 350 m battle zero setting limits the apparent "bullet rise" within approximately −5 to +42 cm (−2.0 to 16.5 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier. The AKS-74U is significantly more maneuverable in tight quarters than the AKS-74; however, the significant decline in muzzle velocity to 735 m/s (2,411 ft/s) resulted in a 100 m (109 yd) reduction in effective range to 400 m (437 yd) (the effective hitting distance for a "running"-type silhouette target was reduced from 625 m (684 yd) to 360 m (394 yd)). The AKS-74U cannot mount a bayonet or standard under-barrel grenade launcher. However, a suppressed 30 mm BS-1 grenade launcher was developed specifically for that platform that fires a high-explosive dual purpose (HEDP) grenade. The grenades for the BS-1 are launched by special blank cartridges that are inserted into the grenade launcher via a detachable magazine. The majority of AKS-74U carbines were manufactured at the Tula Arms Factory rather than Izhmash. There were some accessories produced for the AKS-74U including a plastic thigh holster and (shorter than standard) 20-round AK-74 type magazines. The rifle utilizes a proprietary 25 mm wide sling that differs from the standard 35 mm AK sling also in construction. The AKS-74U also exists in a version featuring modernized synthetic furniture made from a black, glass-filled polyamide. The AKS-74U was also used as the basis for several other unique weapons, including the bullpup OTs-14 Groza specialist carbine which is now in limited service in the Russian military, and the Gepard series of multi-caliber submachine guns (none of which evolved past prototype stage). In the United States, the AKS-74U is called a "Krinkov". The origin of this term is uncertain. A hypothesis was circulating that the name came from the mujahideen who supposedly had captured a high-ranking Soviet officer armed with an AKS-74U, and that they had named it after him. However, investigation by Patrick Sweeney could not confirm this hypothesis, for no Soviet officer with a resembling name was captured in Afghanistan. US journalist C. J. Chivers reported that the gun was nicknamed "the Osama" in jihadist circles, after Osama bin Laden was photographed next to an AKS-74U.[9] Research by The Firearm Blog published in 2016 suggests that the name "Krinkov" is actually a Pashtun invention that came to the United States with accounts of the Mujahideen.[54] The AKS-74U is approximately 3 oz (85 g) lighter than the NATO equivalent XM177, and 10.2 in (260 mm) shorter with the stock folded. Due to the fact that the AKS-74U is moderately concealable with its stock folded and capable of easily defeating IIIa soft body armor, it continues to be able to perform the role of a modern Personal Defense Weapon, despite being designed in the 1970s.

AKM Russian 7.62mm Automatic Assault Rifle





Tiers:



Variants:

- **AKMS:** which was equipped with an under-folding metal shoulder stock in place of the fixed wooden stock. The metal stock of the AKMS is somewhat different from the folding stock of the previous AKS-47 model as it has a modified locking mechanism, which locks both support arms of the AKMS stock instead of just one (left arm) as in the AKS-47 folding model. It is also made of riveted steel pressings, instead of the milled versions of most AKS-47s, and is more inline like the fixed stock AKM. Due to the stamped receiver, it also has a reinforcement plate beneath the pistol grip spot welded in place to prevent damage to the receiver if the gun is dropped on its pistol grip as well as better absorb the recoil with the stock folded. The AKM was produced in the following versions: AKMP, AKML and AKMLP, whereas the AKMS led to the following models – AKMSP, AKMSN and AKMSNP. It is designed especially for use by paratroopers–as the folding stock permits more space for other equipment when jumping from a plane and then landing.
- **AKMP:** The AKMP rifle uses subdued Radium-illuminated aiming points integrated into the front and rear sight. These sights enable targets to be engaged in low-light conditions, e.g. when the battlefield is illuminated with flares, fires or muzzle flashes or when the target is visible as a shadow against an illuminated background. The sliding notch on the sight arm is then moved to the “S” setting (which corresponds to the “3” setting in the AKM). The sight itself is guided on the sliding scale and has a socket, which contains a tritium gas-filled capsule directly beneath the day-time notch. The tritium front post installs into the front sight base using a detent and spring.
- **AKML:** The AKML comes equipped with a side-rail used to attach a night vision device. The mount comprises a flat plate riveted to the left wall of the receiver housing and a support bracket fixed to the mounting base with screws. To shield the light-sensitive photo detector plate of the night vision sight, the weapon uses a slotted flash suppressor, which replaces the standard recoil compensator. The AKML can also be deployed in the prone position with a detachable barrel-mounted bipod that helps stabilise the weapon and reduces operator fatigue during prolonged periods of observation. The bipod is supplied as an accessory and is carried in a holster attached to the duty belt.
- **AKMN:** The AKMN comes equipped with a side-rail used to attach a night vision device. The model designated AKMN-1 can thus mount the multi-model night vision scope 1PN51 and the AKMN2 the multi-model night vision scope 1PN58.
- **AKMLP:** The AKMLP is a version of the AKML with tritium sights (as in the AKMP).
- **AKMSP:** The AKMSP rifle is based on the folding stock AKMS variant but fitted with tritium night sights, as in the AKMP.
- **AKMSN:** The AKMSN model is derived from the AKMS and features an accessory rail used to mount a night vision sensor as seen on the AKML and additionally a flash hider and bipod. The left arm of the AKMSN’s folding stock is bent outwards in order to avoid the sight mount bracket during folding and the sling loop was moved further to the rear. Similarly to the AKMN-1, the AKMSN-1 can mount the multi-model night vision scope 1PN51[34] and the AKMSN2 the multi-model night vision scope 1PN58.

System

Alternative Designations: AK, Kalashnikov
Variant of: Russian 7.62x39mm Assault Rifle AK47
Feed: 30-round curved box magazine
Fire Mode: Selective, automatic or semi-automatic
Operation: Gas

Rate of Fire (Cyclic): rds/min600

Rate of Fire (Practical Automatic): rds/min100

Rate of Fire (Practical Semiautomatic): rds/min40

Action: Gas operated, rotating bolt

Muzzle Velocity: m/s715

Effective Firing Range: m350

Feed System: 10-, 20-, or 30-round detachable box magazines. Also compatible with 40-round box magazines and 75-round drum magazines from the RPK

Dimensions

Length: AKM, AKML: 880 mm (34.6 in) AKMS, AKMSN: 920 mm (36.2 in) stock extended / 655 mm (25.8 in) stock folded

Barrel Length: mm415

Weight: AKM: 3.3 kg (7.28 lb) AKMS: 3.5 kg (7.7 lb) 30-rnd magazine: 0.33 kg (0.73 lb) 6H4 bayonet: 0.32 kg (0.71 lb)

Ammunition

Name:

Type:

Caliber: mm7.62

Cartridge: 7.62×39mm

Basic Load: 12 magazines for 360 rounds 9.83 kg

Note: The weapon uses the same ammunition as the AK-47: the 7.62×39mm M43 intermediate rifle cartridge. The AKM mechanism's design principles and procedures for loading and firing are practically identical to those of the AK-47, the only difference being the trigger assembly (during the return stage of the bolt carrier on fully automatic mode) as a result of incorporating the rate reducer device.

Sights

Type: Fore, pillar; Rear, U-notch

Magnification: None

Night Sights Available: Yes

Note: Rear sight notch on sliding tangent, front post 100–1,000 m sight adjustments Sight radius: 378 mm (14.9 in).

Notes:

The AKM is a 7.62×39mm assault rifle designed by Mikhail Kalashnikov. It is a common modernised variant of the AK-47 rifle developed in the 1940s. Introduced into service with the Soviet Army in 1959, the AKM is the prevalent variant of the entire AK series of firearms and it has found widespread use with most member states of the former Warsaw Pact and its African and Asian allies as well as being widely exported and produced in many other countries. The production of these rifles was carried out at both the Tula Arms Plant and Izhmash. It was officially replaced in Soviet frontline service by the AK-74 in the late 1970s, but remains in use worldwide. The AKM is an assault rifle chambered in 7.62×39mm Soviet intermediate cartridge. It is a selective fire, gas operated with a rotating bolt, firing in either semi-automatic or fully automatic, and has a cyclic rate of fire of around 600–650 rounds per minute (RPM). The gas operated action has a massive bolt carrier with a permanently attached long stroke gas piston. The gas chamber is located above the barrel. The bolt carrier rides on the two rails, formed on the side of the receiver, with a significant space between the moving and stationary parts. Despite being replaced in the late 1970s by the AK-74, the AKM is still in service in some Russian Army reserve and second-line units and several east European countries.The GRAU officially designated the AKM as the 6P1 assault rifle. Compared with the AK-47, the AKM features detail improvements and enhancements that optimised the rifle for mass production; some parts and assemblies were conceived using simplified manufacturing methods. Notably, the AK-47's milled steel receiver was replaced by a U-shaped steel stamping. As a result of

these modifications, the AKM’s weight was reduced by ≈ 1 kg (2.2 lb), the accuracy during automatic fire was increased and several reliability issues were addressed. The AK-47's chrome-lined barrel was retained, a common feature of Soviet weapons which resists wear and corrosion, particularly under harsh field conditions and near-universal Eastern Bloc use of corrosively primed ammunition. The AKM’s receiver is stamped from a smooth 1.0 mm (0.04 in) sheet of steel, compared with the AK-47 where the receiver was machined from heavier gauge steel. A rear stock trunnion and forward barrel trunnion are fastened to the U-shaped receiver using rivets. The receiver housing also features a rigid tubular cross-section support that adds structural strength. Guide rails that assist the bolt carrier’s movement which also incorporates the ejector are installed inside the receiver through spot welding. As a weight-saving measure, the stamped receiver cover is of thinner gauge metal than that of the AK-47. In order to maintain strength and durability it employs both longitudinal and latitudinal reinforcing ribs.

AKS-74 Russian 5.45mm Automatic Assault Rifle



Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal

military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.

- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.
- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74
In Service: 1983-Present
Action: Gas-operated, rotating bolt
Fire Mode : Selective, automatic or semi-automatic
Rate of Fire, Cyclic : rd/min600.0
Rate of Fire, Practical : rd/min100, auto
Rate of Fire, Practical : rd/min40, semiauto
Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)
Muzzle Velocity: 880-900
Effective Firing Range, Point Target: m500
Effective Firing Range, Area Target: m500
Maximum Firing Range: m5,150
Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)
Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)
Width: mm70
Height: mm195
Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437

yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

The AK-74 (Russian: Автомат Калашникова образца 1974 года or "Kalashnikov automatic rifle model 1974") is an assault rifle developed in the early 1970s by Russian weapons designer Mikhail Kalashnikov to replace the earlier AKM (itself a refined version of the AK-47). It uses a smaller 5.45×39mm cartridge, replacing the 7.62×39mm chambering of earlier Kalashnikov-

pattern weapons. The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("B"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

AK-12 Russian 5.45mm Assault Rifle









Tiers:



Variants:

- **AK-12K:** Short barreled version
- **AK-15:** The AK-15 is a variant of the AK-12 chambered in 7.62×39mm cartridge. Both the AK-12 and AK-15 have been developed by the Kalashnikov Group under the "Ratnik" program and have been accepted into Russian military service. The rifle has a combat weight of 4.16 kg (9.17 lb), a full length of 1,066 mm (42.0 in), a barrel length of 415 mm (16.3 in), a cyclic rate of fire of 700 rounds per minute (RPM), a muzzle velocity of 715 m/s, a maximum firing range of 800 m (870 yd) metres and a standard magazine capacity of 30 rounds.[41] It is also compatible using magazines from the AKM, AK-103, and RPK. The only difference between the AK-12 and the AK-15 is their calibre.
- **AK-15K:** During the ARMY-2017, Kalashnikov Concern displayed prototypes of the AK-15K, which is a short-barreled variant of the AK-15.

System

Alternate Designation(s): AK-200
Primary Function / Type: Soldiers' personal weapon
Date of Introduction: NLT July 2018
Manufacturer: Kalashnikov Concern
Proliferation: Armenia, Qatar
Bore Diameter / Caliber / Length or Cartridge: 5.45x39mm
Action: Gas operated, long stroke gas piston, rotating bolt
Cooling Method: Air
Maximum Effective Range for Point Target: m600
Maximum Effective Range for Area Target: INA
Maximum Range: m800
Muzzle Velocity: m/s900

Cyclic Rate of Fire: rpm700

Sustained Rate of Fire: INA

Semi-automatic Rate of Fire: NA

Magazine Capacity (ies): 30, 60, 96 round detachable magazines

Rail System Capable: Yes

Sights Available from Manufacturer: Iron

Capable of Attaching other Weapons (Grenade launcher, bayonet, etc.): Bayonet and grenade launcher can be attached

Bi-pod Capable: No

Dimensions

Length: mm945

Barrel Length: mm415

Weight Without a Magazine: kg3.3

Weight With a Loaded Magazine (Indicate number of rounds): kg4.16

Ammunition

↳5N7: First variant introduced in 1974. Semi-Armor-Piercing Full-Metal-Jacketed (SAP-FMJ) bullet with a mild steel penetrator. There is an air-space between the inside of the metal jacket's tip and the lead core wrapped around the penetrator, making it technically a Jacketed Hollow Point round.

↳7N6: High penetration round introduced in 1987. Can penetrate 6mm of steel plating at 300m. Can be identified by the ring of red lacquer sealing the case mouth.

↳7N10: Improved penetration round introduced in 1992 as the standard service round. Can penetrate 16mm of steel plating at 300m. Can be identified by the ring of violet/purple lacquer sealing the case mouth.

↳7N22: Armour-Piercing round. Can be identified by ring of red lacquer sealing the case mouth and a black tip.

↳7N24: Super armor piercing ammunition. Has a penetrator made of tungsten carbide.

↳7T3: Tracer ammunition burns out to 800m.

↳7T3M: Tracer ammunition burns out to 850m.

↳7H3: Training Blank cartridge with a frangible bullet made of hollow white plastic. Requires blank adapter to fire safely.

↳7H3M: Training Blank cartridge with a frangible bullet made of hollow white plastic. Requires blank adapter to fire safely.

7Sch3: “High Pressure” Proofing Cartridge. A high-pressure cartridge with a yellow-painted bullet used to proof gun barrels.

↳7Sch4: “Increased Pressure” Proofing Cartridge. A high-pressure cartridge with a black-painted bullet used to proof gun actions.

↳7Kh4: Training Dummy. Fixed bullet, no primer in the pocket, contains no propellant, and has a fluted and pierced cartridge case.

↳7U1: US Subsonic ammunition.

Sights

↳*Iron Sights*

Type: Iron sights consist of a shrouded front post, mounted on the gas block, and an adjustable rear aperture sight, installed on the removable base using an upper Picatinny rail. The rear sight has a windage adjustment knob on the right and range scale marked from 1 to 8 (100 to 800 meters in 100-meter increments).

Adjustable: Yes

↳*Optics (Option #1)*

Type: VOMZ Pilad P1x42 reflex sight

Characteristics: FOV – unlimited, Window size – 34x26mm, Dot size – 3.5 MOA, Adjustment click – 1 MOA, Brightness adjustment – manual, Power – 1 CR2032, Operating time – 70 hours, Operating temperature +40 to -40 Centigrade, Size – 82x38x58 mm (3.22×1.49×2.28 inches), Weight – 160g (5.64 oz), Dust and water resistant NVG compatible, Mounting – Picatinny or Weaver rail

↳*Optics (Option #2)*

Type: Dedal DK-9 red dot sight

Characteristics: Power – AA, Weight – 300g, 7 step brightness adjustment, 2 step NVG mode, Dot size – 2 MOA, Operating time – 10000 hours, .338 LM recoil rated, Nitrogen purged, IP-67 waterproof, Size 116x60x75cm

Notes:

The AK-12 is a Russian assault rifle chambered in 5.45×39mm. It is designed and manufactured by Kalashnikov Concern (formerly Izhmash) and is currently the latest of the Russian AK-Pattern series of assault rifles. Kalashnikov Concern also offers the rifle in 7.62×39mm cartridge, designated as the AK-15. A short-barreled variants of the AK-12 and AK-15 have been announced, respectively the AK-12K and AK-15K. The AK-12 project began in 2011 by the IZHMASH factory which became part of the Kalashnikov Concern as a private venture, in an attempt to participate in the "Ratnik" trials which were held by the Russian Army. It was further developed by Kalashnikov Concern, and throughout its development and evaluation stage it has received multiple modifications to meet the Russian military's standard and to address the Russian Army's concerns regarding the cost and issues in fully automatic fire of the earlier prototype models. It went through several revisions in order to improve upon the "range of defects" that were discovered on the earlier prototype models that were derived from the AK-200. These were later abandoned in favour for the proven and improved AK-400, which became the finalised model of the AK-12. The final production model of the AK-12 is based on the well-proven AK-400 prototype. The rifle is chambered in 5.45×39mm and due to the Russian military requirements, Kalashnikov Concern also offers the rifle in 7.62×39mm cartridge, designated as the AK-15. Short-barreled versions of the AK-12 and AK-15 are also being worked on, designated as the AK-12K and AK-15K. With the final production model, it addresses the Russian Army's concerns regarding the issues in fully automatic fire and the cost of the earlier prototype models and is also expected to be much cheaper to build. It also incorporates many of the same improvements developed for the earlier prototype models of the AK-12 but also improves the strength and resilience of some of the components of the rifle. The final production model of the AK-12 has retained the traditional Kalashnikov gas-operated long-stroke piston system with a rotating bolt. The rifle features an integrated Picatinny rail on the top of the redesigned, detachable top cover for mounting various optics/scopes, the lower part of the handguard is also equipped with a Picatinny rail for various

tactical accessories such as vertical grips, flashlights and lasers sights. The rifle has backup iron sights, consisting of a shrouded front post that is mounted on the gas block and an adjustable rear aperture sight that is installed on the removable base using the upper Picatinny rail. The rifle features an ergonomic pistol grip, a retractable side-folding shoulder stock which is adjustable for length of pull, a handguard with ventilation holes and an advanced muzzle brake. The rifle can also be fitted with a quick detachable sound suppressor and a bayonet. To further increase the combat effectiveness of the rifle, it can be equipped with a 40 mm GP-25/GP-34 single-shot underbarrel grenade launcher. The design of the final production model of the AK-12 shares more in common with the existing AK-74M than its earlier prototype models, but will not be a retrofit to existing assault rifles. Several improvements were made to the AK-12's receiver, such as an improved and far more rigid top cover interface and a new free-floating barrel. The final production model of the AK-12 reportedly outperforms the existing AK-74 by at least the margin requested by the Russian government. The final production model of the AK-12 has a cyclic rate of fire of 700 rounds per minute (RPM), which is 50–100 rounds per minute faster than the older Kalashnikov assault rifles and the cancelled prototypes of the AK-12.[36] The three-round hyper burst feature from the earlier prototype models was replaced by a two-round burst feature in the final production model as well.

M16A1 American 5.56mm Assault Rifle



Tiers:



Variants:

- **M16:** This was the first M16 variant adopted operationally, originally by the U.S. Air Force. It was equipped with triangular handguards, butt stocks without a compartment for the storage of a cleaning kit, a three-pronged flash suppressor, full auto, and no forward assist. Bolt carriers were originally chrome plated and slick-sided, lacking forward assist notches. Later, the chrome plated carriers were dropped in favor of Army issued notched and parkerized carriers though the interior portion of the bolt carrier is still chrome-lined. The Air Force continued to operate these weapons until around 2001, at which time the Air Force converted all of its M16s to the M16A2 configuration. The M16 was also adopted by the British SAS, who used it during the Falklands War.
- **XM16E1 and M16A1 (Colt Model 603):** The U.S. Army XM16E1 was essentially the same weapon as the M16 with the addition of a forward assist and corresponding notches in the bolt carrier. The M16A1 was the finalized production model in 1967 and was produced until 1982. To address issues raised by the XM16E1's testing cycle, a closed, bird-cage flash suppressor replaced the XM16E1's three-pronged flash suppressor which caught on twigs and leaves. Various other changes were made after numerous problems in the field. Cleaning kits were developed and issued while barrels with chrome-plated chambers and later fully lined bores were introduced.
- **M16A2:** The development of the M16A2 rifle was originally requested by the United States Marine Corps as a result of combat experience in Vietnam with the XM16E1 and M16A1. It was officially adopted by the Department of Defense as the "US Rifle, 5.56mm, M16A2" in 1982. The Marines were the first branch of the U.S. Armed Forces to adopt it, in the early/mid-1980s, with the United States Army following suit in the late 1980s. Modifications to the M16A2 were extensive. In addition to the new rifling, the barrel was made with a greater thickness in front of the front sight post, to resist bending in the field and to allow a longer period of sustained fire without overheating. The rest of the barrel was maintained at the original thickness to enable the M203 grenade launcher to be attached. A new adjustable rear sight was added, allowing the rear sight to be dialed in for specific range settings between 300 and 800 meters to take full advantage of the ballistic characteristics of the new SS109 rounds and to allow windage adjustments without the need of a tool or cartridge. The weapon's reliability allowed it to be widely used around the Marine Corps' special operations divisions as well. The flash suppressor was again modified, this time to be closed on the bottom so it would not kick up dirt or snow when being fired from the prone position, and acting as a recoil compensator.
- **M16A3:** The M16A3 is a modified version of the M16A2 adopted in small numbers by the U.S. Navy SEAL, Seabee, and Security units. It features the M16A1 trigger group providing "safe", "semi-automatic" and "fully automatic" modes instead of the A2's "safe", "semi-automatic", and "burst" modes. Otherwise it is externally identical to the M16A2.
- **The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals.:** The M16A4 is the fourth generation of the M16 series. It is equipped with a removable carrying handle and a full length quad Picatinny rail for mounting optics and other ancillary devices. The FN M16A4, using safe/semi/burst selective fire, became standard issue for the U.S. Marine Corps. Military issue rifles are also equipped with a Knight's Armament Company M5 RAS hand guard, allowing vertical grips, lasers, tactical lights, and other accessories to be attached, coining the designation M16A4 MWS (or Modular Weapon System) in U.S. Army field manuals. Colt also produces M16A4 models for international purchases: R0901 / NSN 1005-01-383-2872 (Safe/Semi/Auto) R0905 (Safe/Semi/Burst)

System

Alternate Designation(s): M16A1

Primary Function / Type: Assault Rifle

Manufacturer: Colt's Manufacturing Company Daewoo Precision Industries FN Herstal Bushmaster H&R Firearms General Motors Hydramatic Division Elisco U.S. Ordnance

Action: Gas-operated, rotating bolt (direct impingement)

Rate of Fire: 700–950 rounds/min cyclic sustained 45–60 rounds/min semi-automatic

Muzzle Velocity: m/s960

Effective Firing Range: 550 m (601 yd) (point target) 800 m (875 yd) (area target)

Maximum Firing Range: m3,600

Feed System: STANAG magazine 20-round detachable box magazine: 0.211 lb (96 g) empty / 0.738 lb (335 g) full 30-round detachable box magazine: 0.257 lb (117 g) empty / 1.06 lb (480 g) full) Beta C-Mag 100-round double-lobed drum: 2.20 lb (1,000 g) empty / 4.81 lb (2,180 g) full)

Sights: Iron sights or various optics

Dimensions

Length: mm1,003

Barrel Length: mm508

Weight, Loaded: kg2.89

Weight, Unloaded: kg3.40

Ammunition

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56×45mm NATO (M193)

Notes:

The M16 rifle, officially designated Rifle, Caliber 5.56 mm, M16, is a family of military rifles adapted from the ArmaLite AR-15 rifle for the United States military. The original M16 rifle was a 5.56mm automatic rifle with a 20-round magazine. In 1964, the M16 entered US military service and the following year was deployed for jungle warfare operations during the Vietnam War. In 1969, the M16A1 replaced the M14 rifle to become the US military's standard service rifle. This was the first M16 variant adopted operationally, originally by the U.S. Air Force. It was equipped with triangular handguards, buttstocks without a compartment for the storage of a cleaning kit, a three-pronged flash suppressor, full auto, and no forward assist. Bolt carriers were originally chrome plated and slick-sided, lacking forward assist notches. Later, the chrome-plated carriers were dropped in favor of Army issued notched and parkerized carriers through the interior portion of the bolt carrier is still chrome-lined. The Air Force continued to operate these weapons until around 2001, at which time the Air Force converted all of its M16s to the M16A2 configuration. The M16 was also adopted by the British SAS, who used it during the Falklands War.

RPK-74 Russian 5.45mm Assault Rifle







Tiers:



Variants:

- **RPK:** The RPK is the standard light machine gun/squad automatic model and is chambered in 7.62×39mm. It was adopted by the former Soviet Union and was issued mainly to motorized units. It was later adopted by several military agencies around the world.
- **RPKS:** The RPKS ("S" — Skladnoy (Russian: складной) means "folding" [stock]) is a variant of the RPK with a side-folding wooden stock was intended primarily for the air assault infantry. Changes to the design of the RPKS are limited only to the shoulder stock mounting, at the rear of the receiver. It uses a trunnion riveted to both receiver walls that has a socket and tang, allowing the stock to hinge on a pivot pin. The trunnion has a cut-out on the right side which is designed to engage the stock catch and lock it in place when folded. The wooden stock is mounted in a pivoting hull, which contains a catch that secures the buttstock in the extended position. The rear sling loop was moved from the left side of the stock body to the right side of the stock frame.
- **RPKS-74:** The RPK-74M (Modefitsyrovannyj "Modernized") is an updated variant of the RPK-74 developed during the mid-'70s. In line with the AK-74M assault rifle variant, the RPK-74M lower handguard, gas tube cover, pistol grip, and new synthetic stock are made from a black, glass-filled polyamide. The stock is shaped like the RPK-74 fixed stock, but also side-folds like the RPKS-74. Each AK-74M is fitted with a side-rail bracket for mounting optics. Updated magazines were produced by Molot with horizontal ribs going up the sides of the magazines. An export variant chambered in 5.56×45mm NATO was also introduced, designated as the RPK-201. Also for export is the RPKM (A.K.A. RPK-203) chambered in 7.62×39mm; it uses the same polymer furniture as the RPK-74M variant

Tank Commander's Weapon System

↳*System*

Name: RPK-74 (AK-47) 5.45mm Machine Gun
Type: mm5.45
Manufacturer: Vyatskiye Polyany Machine-Building Plant
In Service: 1974-Present
Max Rate of Fire: rds/min600
Weight (RPK): kg4.7

Weight (RPKS): kg5.1

Length: mm1,060

Barrel Length: mm590

Action: Gas operated, rotating bolt; closed bolt

Effective Firing Range (with sight adjustments): m100-1,000

Maximum Firing Range: m3,150

Feed system: 30-, 45-round box magazine, 100-round plastic drum magazine, belt ammunition (with side mounted belt feed device)

Sights: Iron sights: semi-shrouded front post and rear sliding tangent with an adjustable notch Sight radius: 555 mm (21.9 in)

↳*Ammunition*

Type: Rifle

Caliber: mm5.45

Cartridge: 5.45×39mm M74

Muzzle Velocity: m/s960

Basic Load: ea2,000

Notes:

The RPK-74 was introduced in 1974 together with the AK-74 assault rifle and chambered for the new 5.45×39mm intermediate cartridge. It was derived from the AK-74 rifle, with modifications that mirror those made to the AKM to create the RPK. The RPK-74 also uses a longer and heavier chrome-plated barrel, which has a new gas block with a gas channel at a 90° angle to the bore axis, and a ring for the cleaning rod. It is also equipped with a folding bipod and a different front sight tower. The muzzle is threaded for a flash suppressor or blank-firing device. The rear stock trunnion was strengthened and the magazine well was reinforced with steel inserts. Additionally, the RPK-74 has a modified return mechanism compared to the AK-74, which uses a new type of metal spring guide rod and recoil spring. The rear sight assembly, forward handguard and receiver dust cover were all retained from the RPK. The RPK-74 feeds from a 45-round steel or polymer box magazine, interchangeable with magazines from the AK-74, and is designed to be charged from stripper clips. Drum magazines similar to those used on the previous RPK models were tested during its development phase, but were discontinued in favor of the 45-round box magazine. However, recently the production of a 97-round drum has started. This drum was designed to be used with the AK-107 but can also be used in any 5.45×39mm weapon with compatible magazines, such as the RPK-74 and RPK-74M. They were also testing with experimental conventional drums, a prototype 100-round belt fed drum magazine was also created. It attaches into the regular magazine well, but the cartridges are stored on a 100-round belt inside a box. A feed system removes them from the belt and puts them in a position where they can be loaded through the regular magazine well. This system is actuated by a lever from the magazine that clips around the charging handle. It is unknown if this ever went into service. It has a cyclic rate of fire of 650 rounds per minute (RPM). Standard equipment includes: eight magazines, six stripper clips (15 rounds per clip), a speedloader guide, cleaning rod, cleaning kit, sling, oil bottle and two magazine pouches. Some variants do not come with the cleaning kit option. It is in widespread use by member states of the former Soviet Union, as well as Bulgaria.

CAR 816 Emirati 5.56mm Assault Rifle







Tiers:



Variants:

- **Note:** The weapon is available with three barrel lengths; a compact assault rifle with a 267 mm (10.5"), carbine with a 368 mm (14.5") barrel and assault rifle with a 406 mm (16") barrel.[4] The standard issue of the rifle supplied to the UAE armed forces bears an engraving honoring Colonel Sultan Mohammed Ali al-Kitbi.

Main Weapon System

↳System

Name: Caracal Assault Rifle 816
Alternative Designation: CAR 816
Date of Introduction: 2016
Country: United Arab Emirates
Manufactuer: Caracal International company
Caliber: mm5.56
Length, Stock Extended: mm922
Length, Stock Retracted: mm838
Barrel Length: mm406
Weight, Without Magazine: kg3.4
Muzzle Velocity: m/s850
Cyclic Rate of Fire: rds/min750-950
Practical Rate of Fire: rds/min40-100
Magazine Capacity: 30 Rounds

Range of Effective Fire: m500

Sight: Iron

↳***Ammunition***

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56x45 mm

Notes:

The CAR 816, also called Caracal Sultan or simply Sultan, is a 5.56×45mm NATO, gas-operated, magazine-fed assault rifle that is produced by Caracal International in Abu Dhabi, United Arab Emirates. The rifle is also called Sultan in memory of the Emirati Colonel Sultan Mohammed Ali al-Kitbi who was killed in action in Saudi-led intervention in Yemen. The Caracal CAR 816 shares lineage to the Heckler & Koch HK416. The principal firearms engineers for the CAR 816 were Robert Hirt and Chris Sirois. Hirt was instrumental in the development of the HK416. Following his time with H&K, Hirt was recruited by SIG Sauer to work with then SIG engineer Chris Sirois on an improved version of the HK416: the SIG Sauer SIG516. Hirt and Siriois were then recruited by Caracal to develop a rifle that was superior to both the HK416 and SIG516. From this, the CAR 816 was created. The CAR 816 is the primary infantry assault rifle of the United Arab Emirates Armed Forces.

AK-74 Russian 5.45mm Automatic Assault Rifle



Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed

from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.

- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AK, Kalashnikov

In Service: 1974-Present

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

The AK-74 (Russian: Автомат Калашникова образца 1974 года or "Kalashnikov automatic rifle model 1974") is an assault rifle developed in the early 1970s by Russian weapons designer Mikhail Kalashnikov to replace the earlier AKM (itself a refined version of the AK-47). It uses a smaller 5.45×39mm cartridge, replacing the 7.62×39mm chambering of earlier Kalashnikov-pattern weapons. The rifle first saw service with Soviet forces in the 1979 Afghanistan conflict.[8] The head of the Afghan bureau of the Pakistani Inter-Services Intelligence claimed that the CIA paid $5,000 for the first AK-74 captured by the Mujahideen during the Soviet–Afghan War. Today, the rifle is used by most countries of the former Soviet Union. Licensed copies were produced in Bulgaria (AK-74, AKS-74 and AKS-74U), and the former East Germany (MPi-AK-74N, MPi-AKS-74N, MPi-AKS-74NK). The AK-74 was designed by A. D. Kryakushin's group under the design supervision of Mikhail Kalashnikov and is an adaptation of the 7.62×39mm AKM assault rifle and features several important design improvements.These improvements were primarily the result of converting the rifle to the intermediate-caliber high velocity 5.45×39mm cartridge. In fact, some early models are reported to have been converted AKMs, re-barreled to 5.45×39mm.Compared with the preceding AKM the AK-74 has better effective range, firing accuracy (a main development goal), and reliability. The AK-74 and AKM share an

approximate 50% parts commonality (interchangeable most often are pins, springs and screws). The rifle's operation during firing and reloading is identical to that of the AKM. After ignition of the cartridge primer and propellant, rapidly expanding propellant gases are diverted into the gas cylinder above the barrel through a vent near the muzzle. The build-up of gases inside the gas cylinder drives the long-stroke piston and bolt carrier rearward and a cam guide machined into the underside of the bolt carrier along with an ejector spur on the bolt carrier rail guide, rotates the bolt approximately 35° and unlocks it from the barrel extension via a camming pin on the bolt. The moving assembly has about 5.5 mm (0.2 in) of free travel which creates a delay between the initial recoil impulse of the piston and the bolt unlocking sequence, allowing gas pressures to drop to a safe level before the seal between the chamber and the bolt is broken. Like previous Kalashnikov-pattern rifles, the AK-74 does not have a gas valve; excess gases are ventilated through a series of radial ports in the gas cylinder. Since the Kalashnikov operating system offers no primary extraction upon bolt rotation, the 5.45×39mm AK-74 bolt has a larger extractor claw than the 7.62×39mm AKM for increased extraction reliability. Other minor modifications were made to the bolt and carrier assembly. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("B"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

Heckler and Koch G36A2 German 5.56mm Assault Rifle







Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE)::** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics.

Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch G36A2

Primary Function / Type: Assault Rifle

Manufacturer: Heckler & Koch Santa Bárbara Sistemas Military Industries Corporation

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36

magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

G36A2: This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.

AK-15 Russian 5.45mm Assault Rifle





Tiers:



Variants:

- **AK-12K:** Short barreled version
- **AK-15:** The AK-15 is a variant of the AK-12 chambered in 7.62×39mm cartridge. Both the AK-12 and AK-15 have been developed by the Kalashnikov Group under the "Ratnik" program and have been accepted into Russian military service. The rifle has a combat weight of 4.16 kg (9.17 lb), a full length of 1,066 mm (42.0 in), a barrel length of 415 mm (16.3 in), a cyclic rate of fire of 700 rounds per minute (RPM), a muzzle velocity of 715 m/s, a maximum firing range of 800 m (870 yd) metres and a standard magazine capacity of 30 rounds.[41] It is also compatible using magazines from the AKM, AK-103, and RPK. The only difference between the AK-12 and the AK-15 is their calibre.
- **AK-15K:** During the ARMY-2017, Kalashnikov Concern displayed prototypes of the AK-15K, which is a short-barreled variant of the AK-15.

System

Alternate Designation(s): AK-15
Primary Function / Type: Soldiers' personal weapon
Date of Introduction: NLT July 2018
Manufacturer: Kalashnikov Concern
Proliferation: Armenia, Qatar
Bore Diameter / Caliber / Length or Cartridge: 5.45x39mm
Action: Gas operated, long stroke gas piston, rotating bolt
Cooling Method: Air
Muzzle Velocity: m/s715
Cyclic Rate of Fire: rpm700
Semi-automatic Rate of Fire: NA
Magazine Capacity (ies): 30 round detachable magazines
Rail System Capable: Yes
Sights Available from Manufacturer: Iron
Capable of Attaching other Weapons (Grenade launcher, bayonet, etc.): Bayonet and grenade launcher can be attached
Bi-pod Capable: No
Cyclic Rate of Fire: 40 - 100 rpm

Range of Effective Fire: m500

Dimensions

Length: mm1,066

Barrel Length: mm415

Weight, Empty: kg3.74

Weight, Loaded: kg4.1

Ammunition

↳5N7: First variant introduced in 1974. Semi-Armor-Piercing Full-Metal-Jacketed (SAP-FMJ) bullet with a mild steel penetrator. There is an air-space between the inside of the metal jacket's tip and the lead core wrapped around the penetrator, making it technically a Jacketed Hollow Point round.

↳7N6: High penetration round introduced in 1987. Can penetrate 6mm of steel plating at 300m. Can be identified by the ring of red lacquer sealing the case mouth.

↳7N10: Improved penetration round introduced in 1992 as the standard service round. Can penetrate 16mm of steel plating at 300m. Can be identified by the ring of violet/purple lacquer sealing the case mouth.

↳7N22: Armour-Piercing round. Can be identified by ring of red lacquer sealing the case mouth and a black tip.

↳7N24: Super armor piercing ammunition. Has a penetrator made of tungsten carbide.

↳7T3: Tracer ammunition burns out to 800m.

↳7T3M: Tracer ammunition burns out to 850m.

↳7H3: Training Blank cartridge with a frangible bullet made of hollow white plastic. Requires blank adapter to fire safely.

↳7H3M: Training Blank cartridge with a frangible bullet made of hollow white plastic. Requires blank adapter to fire safely.

↳7Sch3: “High Pressure” Proofing Cartridge. A high-pressure cartridge with a yellow-painted bullet used to proof gun barrels.

↳7Sch4: “Increased Pressure” Proofing Cartridge. A high-pressure cartridge with a black-painted bullet used to proof gun actions.

↳7Kh4: Training Dummy. Fixed bullet, no primer in the pocket, contains no propellant, and has a fluted and pierced cartridge case.

↳7U1: US Subsonic ammunition.

Sights

↳*Iron Sights*

Type: Iron sights consist of a shrouded front post, mounted on the gas block, and an adjustable rear aperture sight, installed on the removable base using an upper Picatinny rail. The rear sight has a windage adjustment knob on the right and range scale marked from 1 to 8 (100 to 800 meters in 100-meter increments).

Adjustable: Yes

↳*Optics (Option #1)*

Type: VOMZ Pilad P1x42 reflex sight

Characteristics: FOV – unlimited, Window size – 34x26mm, Dot size – 3.5 MOA, Adjustment click – 1 MOA, Brightness adjustment – manual, Power – 1 CR2032, Operating time – 70 hours, Operating temperature +40 to -40 Centigrade, Size – 82x38x58 mm (3.22×1.49×2.28 inches), Weight – 160g (5.64 oz), Dust and water resistant NVG compatible, Mounting – Picatinny or Weaver rail

↳*Optics (Option #2)*

Type: Dedal DK-9 red dot sight

Characteristics: Power – AA, Weight – 300g, 7 step brightness adjustment, 2 step NVG mode, Dot size – 2 MOA, Operating time – 10000 hours, .338 LM recoil rated, Nitrogen purged, IP-67 waterproof, Size 116x60x75cm

Notes:

The AK-15 is a new Russian assault rifle. It was developed under the Ratnik future infantrymen programme. This weapon was first publicly revealed in 2016. The AK-15 is mainly aimed at elite units of the Russian military and law enforcement forces, as well as possible export customers. It is planned that the AK-15 will replace in production an AK-103 assault rifle. The AK-15 is essentially a version of the AK-12, chambered for a 7.62x39 mm ammunition. This ammunition has superior penetration and stopping power comparing with the Soviet 5.45x39 mm ammunition, or standard NATO 5.56x45 mm ammunition. The 7.62x39 mm ammunition is still used by the Russian military and law enforcement forces and is widely used around the world. Some operators prefer this caliber. There were also plans to chamber the AK-15 for a standard NATO 7.62x51 mm ammunition. Also the new weapon is better balanced and has improved ergonomics. The AK-15 is a gas operated, selective fire weapon. Internally it follows the lines of the traditional Kalashnikov design. Several changes were made to the gas tube, foregrip, magazine well. It looks like this weapon has got a new barrel. It is expected to be simple, rugged and reliable weapon as its predecessors. However it is not a cutting-edge weapon in any way. The AK-15 has a cyclic rate of fire of 700 rounds per minute, which is 50 rounds faster than that of the AK-74M. A combined safety / fire mode selector lever is similar to that used on the AK-74 and earlier Kalashnikov assault rifles. It has three positions for "safe", "semi-automatic", and "fully-automatic". However it uncomfortable to use and is not ambidextrous. Early prototypes of the AK-12 assault rifle had a new ambidextrous safety / fire mode selector switch, that could be operated by a thumb. However for some reason on later prototypes this arrangement was dropped in favor to traditional simple, reliable, but awkward fire mode selector. This weapon is fed from 30-round capacity magazines. It is compatible with the standard 30-round magazines, of AK-103 and AKM, as well as 40-round box and 75-round drum magazines of the RPK light machine gun. This assault rifle has a telescopic buttstock, which resembles that of the US M4 carbine. The buttstock can be adjusted for length. A new pistol grip is ergonomically-shaped. This Russian assault rifle comes as standard with simple iron sights. It also has a full-length Picatinny-type scope rail and can mount various scopes, red dot sights and night vision sights. Range of effective fire is around 500 meters. Maximum range is 800 meters. Even though the AK-15 has improved accuracy over the AKM and AK-103, it is not as accurate as the latest Western assault rifles. The AK-15 has an accessory rail on the foregrip and can mount vertical foregrip, tactical flashlight, laser pointer or other accessories. The assault rifle can also mount a knife-bayonet, silencer or GP-25/GP-34 40 mm underbarrel grenade launcher. The AK-15 was revealed alongside some other Russian weapons, developed by Kalashnikov Concer, such as a new compact assault rifle, that is a proposed replacement for the AKS-74U and RPK-16 light machine gun, a proposed replacement for the RPK-74 light machine gun.

AK-47 Russian 7.62mm Assault Rifle







Tiers:



Variants:

- **AKS:** Folding stock AK-47.
- **AKM:** Improved AK-47, sights, magazine, and stock.
- **AKMS:** Folding stock variant of AKM.

System

Alternative Designations: AK, Kalashnikov
Feed: 30-round curved box magazine
Action: Gas-operated, rotating bolt
Fire Mode: Selective, automatic or semi-automatic
Rate of Fire (Cyclic): rds/min600
Rate of Fire (Practical Automatic): rds/min100
Rate of Fire (Practical Semiautomatic): rds/min40
Efective Firing Range: m350
Feed System: 30-round detachable box magazine There are also 5- 10-, 20- and 40-round box and 75- and 100-round drum magazines available.

Dimensions

Length: mm870
Barrel Length: Overall length: 415 mm (16.3 in)[8] Rifled bore length: 369 mm (14.5 in)
Loaded Weight (with magazine): kg3.8
Empty Weight (w/o magazine): kg4.3

Ammunition

↳*57N2315*

Type: Rifle

Caliber: mm7.62

Cartdige: 7.62×39mm

↳*T-45*

Type: Rifle

Caliber: mm7.62

Cartrdige: 7.62×39mm

↳*57N231P*

Type: Rifle

Caliber: mm7.62

Cartdige: 7.62×39mm

Sights

Type: Fore, pillar; Rear, U-notch

Magnification: None

Night Sights Available: Yes

Note: The AK-47 uses a notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 800 m (109 to 875 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) on the 7.62×39mm AK-47 rear tangent sight element corresponds to a 300 m (328 yd) zero. These settings mirror the Mosin–Nagant and SKS rifles, which the AK-47 replaced. For the AK-47 combined with service cartridges, the 300 m battle zero setting limits the apparent "bullet rise" within approximately −5 to +31 cm (−2.0 to 12.2 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier. Some AK-type rifles have a front sight with a flip-up luminous dot that is calibrated at 50 m (55 yd), for improved night fighting

Magazine

Note: he standard magazine capacity is 30 rounds. There are also 10, 20, and 40-round box magazines, as well as 75-round drum magazines. The AK-47's standard 30-round magazines have a pronounced curve that allows them to smoothly feed ammunition into the chamber. Their heavy steel construction combined with "feed-lips" (the surfaces at the top of the magazine that control the angle at which the cartridge enters the chamber) machined from a single steel billet makes them highly resistant to damage. These magazines are so strong that "Soldiers have been known to use their mags as hammers, and even bottle openers". This contributes to the AK-47 magazine being more reliable, but makes it heavier than U.S. and NATO magazines.

Notes:

The AK-47, officially known as the Avtomat Kalashnikova (Russian: Автома́т Кала́шникова, tr. Avtomát Kaláshnikova, lit. 'Kalashnikov's automatic device'; also known as the Kalashnikov and AK), is a gas-operated, 7.62×39mm assault rifle, developed in the Soviet Union by Mikhail Kalashnikov. It is the originating firearm of the Kalashnikov rifle (or "AK") family. 47 refers to the year it was finished. Design work on the AK-47 began in 1945. In 1946, the AK-47 was presented for official

military trials, and in 1948, the fixed-stock version was introduced into active service with selected units of the Soviet Army. An early development of the design was the AKS (S—Skladnoy or "folding"), which was equipped with an under folding metal shoulder stock. In early 1949, the AK-47 was officially accepted by the Soviet Armed Forces and used by the majority of the member states of the Warsaw Pact. Even after seven decades, the model and its variants remain the most popular and widely used assault rifles in the world because of its reliability under harsh conditions, low production costs compared to contemporary Western weapons, availability in virtually every geographic region, and ease of use. The AK-47 has been manufactured in many countries and has seen service with armed forces as well as irregular forces and insurgencies worldwide, and was the basis for developing many other types of individual, crew-served and specialised firearms. As of 2004, "Of the estimated 500 million firearms worldwide, approximately 100 million belong to the Kalashnikov family, three-quarters of which are AK-47s". The AK-47 was designed to be a simple, reliable fully automatic rifle that could be manufactured quickly and cheaply, using mass production methods that were state of the art in the Soviet Union during the late 1940s.[40] The AK-47 uses a long stroke gas system that is generally associated with great reliability in adverse conditions.[28][41][42] The large gas piston, generous clearances between moving parts, and tapered cartridge case design allow the gun to endure large amounts of foreign matter and fouling without failing to cycle.

Heckler and Koch HK416 German 5.56mm Assault Rifle







Tiers:



Variants:

- **HK416C:** The ultra-compact variant, with "C" for Compact. The HK416C has a 228 mm (9.0 in) barrel and is expected to produce muzzle velocities of approximately 730 m/s (2,395 ft/s).
- **M27 Infantry Automatic Rifle::** A squad automatic weapon variant developed from the D16.5RS adopted in 2011 by the United States Marine Corps. In 2018 the USMC decided to adopt the M27 IAR as their standard battle rifle.
- **HK416A5:** Improved carbine entered in the Individual Carbine competition.[28] The competition was cancelled without a weapon chosen.
- **HK416A7:** Variant designed for the German KSK and KSM. Most significant change is a selector which now rotates 90 degrees rather than 180 degrees as on the M16 series.
- **HK417:** larger caliber variant chambered for 7.62×51mm NATO
- **Civilian version:** Civilian variants of the HK416 and HK417 introduced in 2007 were known as MR223 and MR308 (as they remain known in Europe). Both are semi-automatic rifles with several "sporterized" features. At the 2009 SHOT Show, these two firearms were introduced to the U.S. civilian market renamed respectively MR556 and MR762. There is another variant of the MR556 called the MR556A1, which is an improved version of the former. It was created with input from American special forces units. The MR556A1 lets the upper receiver attach to any M16/M4/AR-15 family lower receiver, as the receiver take-down pins are in the same standard location. The original concept for the MR556 did not allow for this, as the take-down pins were located in a "non-standard" location. The MR223 maintains the "non-standard" location of the pins, disallowing attachment of the upper receiver to the lower receivers of any other M16/M4/AR-15 family of rifles. As of 2012, the MR556A1 upper receiver group fits standard AR-15 lower receivers without modification, and functions reliably with standard STANAG magazines. HK-USA sells a variant under the MR556A1 Competition Model nomenclature; it comes with a 14.5" free-float Modular Rail System (MRS), 16.5" barrel, OSS compensator and Magpul CTR buttstock. The firearm's precision is specified as 1 MOA by Heckler & Koch. In Europe, the MR223A3 variant is sold with the same cosmetic and ergonomical improvements of the HK416A5. The French importer of Heckler & Koch in France, RUAG Defence, have announced that they are going to sell two civilian versions of the HK416F, named the MR223 F-S (14.5″ Standard version) and MR223 F-C (11″ Short version).

System

Alternate Designation(s): Heckler & Koch HK416
Primary Function / Type: Assault Rifle
Manufacturer: Heckler & Koch

Action: Gas-operated short-stroke piston, rotating bolt

Rate of Fire: 700-900 rounds/min HK416A5: 850 rounds/min

Muzzle Velcoity: m/s730

Effective Firing Range: A5 11": 300 metres (330 yd) A5 14.5": 500 metres (550 yd) A5 16.5": 600 metres (660 yd) A5 20": 800 metres (870 yd)

Feed System: 10, 20, 30-round detachable STANAG magazine, 100-round detachable Beta C-Mag

Sights: Picatinny rail-mounted front and rear iron sights, optional removable gas block-mounted flip-up front sight post

Dimensions

Length: 690–1,037 mm (27.2–40.8 in) (stock extended)

Barrel Length: HK416C: 9 in (230 mm) HK416D: 10.5–20 in (270–510 mm) HK416F: 11–20 in (280–510 mm) M27 IAR: 16.5 in (420 mm)

Width: mm78

Height: 236–240 mm

Weight: 2.950–3.850 kg

Ammuntiion

Type: Rifle

Caliber: 5.56

Cartridge: 5.56×45mm NATO

Notes:

The Heckler & Koch HK416 is a rifle designed and manufactured by the German company Heckler & Koch. Although its design is based on the AR-15 class of weapons, specifically the Colt M4 carbine family issued to the U.S. military, it uses a proprietary short-stroke gas piston system derived from the ArmaLite AR-18 (the same system was also used in Heckler & Koch's earlier G36 family of rifles). It is the standard assault rifle of the Norwegian Armed Forces, selected by the French Armed Forces to replace the FAMAS, and was the weapon used by SEAL Team Six to kill Osama Bin Laden in 2011. The HK416 uses a HK-proprietary short-stroke gas piston system that derives from the HK G36, forgoing the concentric to bore gas piston system standard in AR-15 rifles.[8][9] The HK G36 gas system was in turn partially derived from the AR-18 assault rifle designed in 1963. The HK system uses a short-stroke piston driving an operating rod to force the bolt carrier to the rear. This design prevents combustion gases from entering the weapon's interior—a shortcoming with direct impingement systems. The reduction in heat and fouling of the bolt carrier group increases the reliability of the weapon and extends the interval between stoppages. During factory tests the HK416 fired 10,000 rounds in full-auto without malfunctioning.[The HK416 is equipped with a proprietary accessory rail forearm with MIL-STD-1913 rails on all four sides. This lets most current accessories for M4/M16-type weapons fit the HK416. The HK416 rail forearm can be installed and removed without tools by using the bolt locking lug as the screwdriver. The rail forearm is "free-floating" and does not contact the barrel, improving accuracy. The HK416 has an adjustable multi-position telescopic butt stock, offering six different lengths of pull. The shoulder pad can be either convex or concave and the stock features a storage space for maintenance accessories, spare electrical batteries or other small kit items. It can also be switched out for other variations like Magpul stocks. The trigger pull is 34 N (7.6 lbf). The empty weight of a HK416 box magazine is 250 g (8.8 oz). The HK416's barrel is cold hammer-forged with a 20,000-round service life and features a 6 grooves 178 mm (7 in) right-hand twist. The cold hammer-forging process provides a stronger barrel for greater safety in case of an obstructed bore or for extended firing sessions. Modifications for an over-the-beach (OTB) capability such as drainage holes in the bolt carrier and buffer system are available to let the HK416 fire safely after being submerged in water.

AK-74M Russian 5.45mm Automatic Assault Rifle







Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas

tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.

- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.
- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74M

In Service: 1991-Present

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock

extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that

has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

AK-74M In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation. AK-74M universal upgrade kit An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("B"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

→→Battle Rifles

G3 Heckler and Koch German 7.62mm Battle Rifle







Tiers:



Variants:

- **G3:** Original model based on the CETME Model 58. It had a wooden stock and handguard.
- **G3A1:** G3 with a single-position, collapsible stock. This design was chosen after earlier experimentation with an MP-40 style ventrally-folding metal stock; excessive recoil caused it to be dropped from consideration.
- **G2A2:** G3 with new rotating drum rear sight.
- **G3A3:** The most well known version. Drum sights, a fixed plastic buttstock, and a plastic handguard that does not contact the barrel. The handguard came in a slim, ventilated version and a wide version. The latter allows for the attachment of a bipod. G3A3A1: This is a version of the G3A3 with an ambidextrous trigger group and brass deflector. This is an official German Army designation, not an HK factory one.
- **G3A4:** The G3A4 uses drum sights and a single position, collapsible stock. Entered service in 1974 for frontline infantry units.
- **G3A4A1:** Smallest of the line, it is a Karabiner, or carbine version of the G3. It uses an HK33 handguard, features drum sights, a retractable stock, and a 315 mm (12.4 in) barrel (reduced in length to the base of the front sight post), that is too short for use with a bayonet or rifle grenades
- **G3KA4A1:** Variant of the G3KA4 with an ambidextrous trigger group and brass deflector. This is an official German Army designation, not an HK factory one.
- **Models made under license:** The G3 rifle is or was produced under license in the following countries: Brazil, France, Mexico, Turkey, Portugal, Sweden, Norway, Greece, Pakistan, Myanmar and Iran. G3P3: Model number for Pakistani-made version of G3A3. G3P4: Model number for Pakistani-made version of G3A4. G3A5: HK assigned model number for the HK-made Danish version of the G3A3. It differs in that it has a silent bolt-closure device. In Danish service it is known as the Gv M/66. The Gv M/66 was originally intended for use with optics as a designated marksman rifle, while the rest of the squad were issued M1 Garands. G3A6: HK assigned model number for the Iranian-made version of the G3A3. It differs in having a dark-green handguard, stock, and trigger pack. G3A7: HK assigned model number for the Turkish-made version of the G3A3. G3A7A1: HK assigned model number for the Turkish-made version of the G3A4. HSG1: HK assigned model number for the Luxembourg-made version of the G3A3. BA63: Model number for Myanmar-made version of original G3 (with wooden stock, handguard and flip sight)

System

Alternative Designations: None

Action: Roller-delayed blowback

Effective Firing Range: 200–400 metres (219–437 yd) sight adjustments 600 metres (656 yd) with Fero Z24 telescopic sight

Maximum Firing Range: m3,700

Rate of Fire: 500–600 rds/min

Muzzle Velocity: 800 m/s (2,625 ft/s)

Feed System: 20-, 30-, or 40-round detachable box, and 50-round and 100-round drum magazine

Dimensions

Length: 1,025 mm (40.4 in)(G3A3) 1,025 mm (40.4 in) stock extended / 840 mm (33.1 in) stock collapsed (G3A4) 1,025 mm (40.4 in) (G3SG/1) 895 mm (35.2 in) stock extended / 711 mm (28.0 in) stock collapsed (G3K)

Barrel Length: 450 mm (17.7 in) 315 mm (12.4 in) (G3K)

Width: mm45

Height: mm220

Weight: 4.1 kg (9.04 lb) (G3A3) 4.7 kg (10 lb) (G3A4) 5.54 kg (12.2 lb) with optic (G3SG/1) 4.1 kg (9.0 lb) (G3K)

Ammunition

Description: 7.62×51mm NATO; the G3 will fire all known types of 7.62x51mm NATO ammunition from standard ball to tracer, AP or other types.

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: 800 m/s (2,625 ft/s) 747 m/s (2,451 ft/s) (G3KA4)

Basic Load: INA

Sights

Sights: Rear, rotary diopter; front, hooded post

Night Sights Available: There are numerous telescopic and night sights that have been manufactured for use on the G3, by various user nations.

Notes:

The G3 (Gewehr 3) is a 7.62×51mm NATO, select-fire battle rifle developed in the 1950s by the German armament manufacturer Heckler & Koch (H&K) in collaboration with the Spanish state-owned design and development agency CETME (Centro de Estudios Técnicos de Materiales Especiales). G3A3: The most well known version. Drum sights, a fixed plastic buttstock, and a plastic handguard that does not contact the barrel. The handguard came in a slim, ventilated version and a wide version. The latter allows for the attachment of a bipod. The G3A3 (A4) is a selective-fire automatic weapon that employs a roller-delayed blowback operating system. The two-piece bolt assembly consists of a breech (bolt head) and bolt carrier. The bolt is held in battery by two sliding cylindrical rollers that engage locking recesses in the barrel extension. The breech is opened when both rollers are compressed inward against camming surfaces driven by the rearward pressure of the expanding gases upon the bolt head. As the rollers move inward, recoil energy is transferred to the locking piece and bolt carrier which begin to withdraw while the bolt head slowly moves rearward in relation to the bolt carrier. As the bolt carrier clears the rollers, pressure in the bore drops to a safe level, the bolt head is caught by the bolt carrier and moves to the rear as one unit, continuing the operating cycle. The bolt features an anti-bounce mechanism that prevents the bolt from bouncing off the barrel's breech surface. The "bolt head locking lever" is a spring-loaded claw mounted on the bolt carrier that grabs the bolt head as the bolt carrier group goes into battery. The lever essentially ratchets into place with friction, providing enough resistance to being re-opened that the bolt carrier does not rebound. The spring-powered claw extractor is also contained inside the bolt while the lever ejector is located inside the trigger housing (actuated by the recoiling bolt). The rifle is hammer fired and has a trigger mechanism with a 3-position fire selector switch that is also the manual safety toggle that secures the

weapon from accidentally discharging (fire selector in the "E" or "1" position – single fire mode ("Einzelfeuer"), "F" or "20" – automatic fire ("Feuerstoß"), "S" or "0" – weapon is safe ("Sicher"), trigger disabled mechanically). The weapon can be fitted with an optional 4-position safety/fire selector group illustrated with pictograms with an ambidextrous selector lever. The additional, fourth selector setting enables a 3-round burst mode of fire. The rifle has a relatively high trigger pull of 50–55 N (11.2–12.4 lbf) due to a drop safety requirement. An interchangeable set-trigger pack assembly featuring a trigger stop and less trigger pull is available for the G3SG/1 and other sniping orientated variants. The firearm is equipped with a relatively low iron sight line that consist of a rotary rear drum and hooded front post. The rear sight is mechanically adjustable for both windage and elevation with the help of tools. This deliberately prevents non-armorers to (re)zero the iron sight line. The rotary drum features an open V-notch (numbered 1) for rapid target acquisition, close range, low light and impaired visibility use and three apertures (numbered 2, 3 and 4) used for: 200–400 metres (219–437 yd) in 100 metres (109 yd) increments for more precise aiming. The 1 V-notch and 2 or 200 metres (219 yd) aperture settings have an identical point of aim. The V-notch and apertures are calibrated for US M80 / German DM111 series or other equivalent 9.5 grams (147 gr) 7.62×51mm NATO ball ammunition. The receiver housing has recesses that work with STANAG claw mounts/HK clamp adapters used to mount day or night aiming optics. The rifled barrel (contains 4 right-hand grooves with a 305 mm twist rate) terminates with a slotted flash suppressor which can also be used to attach a bayonet or serve as an adapter for launching rifle grenades. From the G3A3 the barrel was free floated from the stock and had polygonal rifling. The barrel chamber is fluted, which assists in the initial extraction of a spent cartridge casing (since the breech is opened under very high barrel in internal cartridge case pressure). The G3A3 (A4) uses either steel (260 g) or aluminium (140 g) 20-round double-stacked straight box magazines, or a 50-round drum magazine. H&K developed a prototype plastic disposable magazine in the early 1960s, but it was not adopted as aluminum magazines were just as light and proved more durable, as well as easier to produce. Standard accessories supplied with the rifle include: a detachable bipod (not included with rifles that have a perforated plastic handguard), sling, cleaning kit and a speed-loading device. Several types of bayonet are available for the G3, but with few exceptions they require an adapter to be inserted into the end of the cocking tube. The most common type features a 63⁄4 inch spear-point blade nearly identical with the M7 bayonet, but with a different grip because of its mounting above the barrel. The weapon can also mount a 40 mm HK79 under-barrel grenade launcher, blank firing adapter a straight blowback bolt (called a "PT" bolt, lacks rollers) used for firing 7.62×51mm ammunition with plastic bullets, a conversion kit used for training with .22 Long Rifle ammunition and a sound suppressor (that uses standard ammunition). The G3 is a modular weapon system. Its butt-stock, fore-stock and pistol-grip/fire-control assembly may be changed at will in a variety of configurations (listed below). Simple push-pins hold the components in place and removing them will allow the user to remove and replace parts rapidly. The G3 served as a basis for many other weapons, among them: the PSG1 and MSG90 precision rifles, the HK11 and HK21 family of light machine guns, a semi-automatic version known as the HK41, a "sporterized" model called the SR9 (designed for the civilian market in countries where the HK91 would not qualify, primarily the US after the 1989 importation restrictions) and the MC51 carbine.

FN FAL French 7.62mm Automatic Battle Rifle







Tiers:



Variants:

- **LAR 50.41 & 50.42 (FAL HBAR & FALO):** Also known as FALO as an abbreviation from the French Fusil Automatique Lourd; Heavy barrel for sustained fire with a 30-round magazine as a squad automatic weapon; Known in Canada as the C2A1, it was their primary squad automatic weapon until it was phased out during the 1980s in favor of the C9, which has better accuracy and higher ammunition capacity than the C2; Known to the Australian Army as the L2A1, it was replaced by the FN Minimi. The L2A1 or 'heavy barrel' FAL was used by several Commonwealth nations and was found to frequently experience a failure to feed after firing two rounds from a full magazine when in automatic mode. The 50.41 is fitted with a synthetic buttstock, while the 50.42's buttstock is made from wood.
- **FAL 50.61 (FAL FS):** Folding-stock, standard 533 mm (21.0 in) barrel length.
- **FAL 50.62 (FAL PARA):** Folding-stock, shorter 458 mm (18.03 inch) barrel, paratrooper version and folding charging handle.
- **FAL 50.63 (FAL PARA 2):** Folding-stock, shorter 436 mm (17.16 inch) barrel, paratrooper version, folding charging handle. This shorter version was requested by Belgian paratroopers. The upper receiver was not cut for a carry handle, the charging handle on the 50.63 was a folding model similar to the L1A1 rifles, which allowed the folded-stock rifle to fit through the doorway of their C-119 Flying Boxcar when worn horizontally across the chest.
- **FAL 50.64 (FAL PARA 3):** Folding-stock, standard 533 mm (21.0 in) barrel length, 'Hiduminium' aluminium alloy lower receiver.
- **FN Universal Carbine (1947):** An early FAL prototype chambered for the 7.92×33mm Kurz round. The 7.92mm Kurz round was used as a placeholder for the future mid-range cartridges being developed by Britain and the United States at the time.
- **FAL .280 Experimental Automatic Carbine, Long Model (1951):** A FAL variant chambered for the experimental .280 British [7.2×43mm] round. It was designed for a competition at Aberdeen Proving Grounds, Aberdeen, Maryland. Although the EM-2 "bullpup" did well, American observers protested that the small-bore .280-caliber round lacked the power and range of a medium-bore .30-caliber round. British observers in return claimed the experimental American .30-caliber T65 round [7.62×51mm] was too powerful to control in automatic fire. Britain was forced to abandon the promising .280 round and adopt the American-designed .30-caliber T65 as the 7.62×51mm NATO cartridge. The EM-2 couldn't be rechambered for the longer and more powerful cartridge and the Americans didn't yet have a working service rifle of their own. Britain and Canada adopted the Belgian 7.62mm FN FAL instead as the L1 Self-Loading Rifle (SLR).
- **FAL .280 Experimental Automatic Carbine, Short Model (1951):** A bullpup-frame version of the FAL chambered in .280 British designed to compete with the British EM-1 and EM-2 bullpup rifles. It also was demonstrated at the Aberdeen Proving Grounds tests, but was never put into full production.
- **Sturmgewehr 58:** The Sturmgewehr 58 (StG 58) is a selective fire (semi-automatic and fully automatic) battle rifle. The first 20,000 were manufactured by Fabrique Nationale d'Armes de Guerre-Herstal Belgique, but later the StG58 was

manufactured under licence by Steyr-Daimler-Puch (now Steyr Mannlicher), and was formerly the standard rifle of the Österreichisches Bundesheer (Austrian Federal Army). It is essentially a user-customized version of the FAL and is still in use, mainly as a drill weapon in the Austrian forces. It was selected in a 1958 competition, beating the Spanish CETME and American AR-10.

- **Olin/Winchester FAL:** A semi-automatic, twin-barrel variant chambered in the 5.56mm Duplex round during Project SALVO. This weapon was designed by Stefan Kenneth Janson who previously designed the EM-2 rifle.
- **Armtech L1A1 SAS:** Dutch company Armtech built the L1A1 SAS, an assault-carbine variant of the L1A1 with a barrel length of 290 mm (11.4 inches). This was similar to short-barreled L1A1 carbines used by the ANZAC forces in Vietnam.
- **DSA FAL (DSA-58):** American company DSA (David Selveggio Arms) manufactures a copy of the FAL called the DSA-58 that is made with the same Steyr-Daimler-Puch production line equipment as the StG-58. It comes with a 406 mm (16 in), 457 mm (18 in) or 533 mm (21 in) barrel, an aluminum-alloy lower receiver, and improved Glass-filled Nylon furniture. Civilian models are semi-automatic, but military and Law Enforcement clients can procure select-fire models that have a fully automatic cyclic rate of 750 rounds/minute. The DSA-58 can use any metric-measurement FAL magazines, which come in 5, 10, 20 or 30-round capacities.
- **DSA-58 OSW (Operational Specialist Weapon):** is an assault carbine version of the paratrooper model of the FAL. It has a side-folding Enhanced PARA polymer stock, shorter 279 mm (11 inch) or 330 mm (13 inch) barrel and an optional full-auto setting.
- **DSA-58 CTC (Compact Tactical Carbine):** is a carbine version of the FAL. It has a side-folding Enhanced PARA polymer stock, shorter 413 mm (16.25 inch) barrel and an optional full-auto setting. Overall Length: 927 mm (36.5 inches) Weight: 3.74 kg (8.25 lbs).

System

Alternative Designations: None

Manufacturer: FN Herstal Fabricaciones Militares IMBEL

Produced: 1953–present (Production by FN stopped in 1988)

Action: Gas-operated, tilting breechblock

Rate of Fire: 650–700 rds/min

Muzzle Velocity: FAL 50.00, FAL 50.61, FAL 50.64, FAL 50.41: 840 m/s (2,755.9 ft/s) FAL 50.63: 810 m/s (2,657.5 ft/s)

Effective Firing Range: FAL 50.00, FAL 50.41: 600 m FAL 50.61, FAL 50.62, FAL 50.63, FAL 50.64: 300 m

Feed System: 20- or 30-round detachable box magazine. 50-round drum magazines are also available

Dimensions

Weight: FAL 50.00: 4.25 kg (9.4 lb) FAL 50.61: 4.45 kg (9.8 lb) FAL 50.62: 4.3 kg (9.5 lb) FAL 50.63: 3.75 kg (8.3 lb) FAL 50.64: 3.9 kg (8.6 lb) FAL 50.41: 5.1 kg (11 lb) FAL 50.42: 6 kg (13 lb)

Length: FAL 50.00 (fixed stock): 1,090 mm (43 in) FAL 50.61 (stock extended): 1,095 mm (43.1 in) FAL 50.61 (stock folded): 845 mm (33.3 in) FAL 50.62 (stock extended): 1,020 mm (40.2 in) FAL 50.62 (stock folded): 770 mm (30.3 in) FAL 50.63 (stock extended): 998 mm (39.3 in) FAL 50.63 (stock folded): 748 mm (29.4 in) FAL 50.41 (fixed stock): 1,125 mm (44.3 in)

Barrel Length: FAL 50.00: 533 mm (21.0 in) FAL 50.61: 533 mm (21.0 in) FAL 50.62: 458 mm (18.0 in) FAL 50.63: 436 mm (17.2 in) FAL 50.41: 533 mm (21.0 in)

Ammunition

Type: Rifle

Description: 7.62x51mm NATO; ball, tracer, armor piercing. All known variants

Caliber: mm7.62

Cartridge: 7.62x51 NATO .280 British[

Sights

Sights: Aperture rear sight, post front sight;

Sight radius: FAL 50.00, FAL 50.41: 553 mm (21.8 in) FAL 50.61, FAL 50.63: 549 mm (21.6 in)

Night Sights Available: Various telescopic and night visions sights are available for mounting on the FN FAL series of rifles.

Notes:

The FAL (French: Fusil Automatique Léger, English: Light Automatic Rifle) is a battle rifle designed by Belgian small arms designer Dieudonné Saive and manufactured by FN Herstal. During the Cold War the FAL was adopted by many countries of the North Atlantic Treaty Organization (NATO), with the notable exception of the United States. It is one of the most widely used rifles in history, having been used by more than 90 countries.[4] Because of its prevalence and widespread usage among the militaries of many NATO and first world countries during the Cold War, it was given the title "The right arm of the Free World". It is chambered for the 7.62×51mm NATO cartridge (although originally designed for the .280 British intermediate cartridge). The British Commonwealth variant of the FAL was redesigned from FN's metrical FAL into British imperial units and was produced under licence as the L1A1 Self-Loading Rifle. The FAL operates by means of a gas-operated action very similar to that of the Russian SVT-40. The gas system is driven by a short-stroke, spring-loaded piston housed above the barrel, and the locking mechanism is what is known as a tilting breechblock. To lock, it drops down into a solid shoulder of metal in the heavy receiver much like the bolts of the Russian SKS carbine and French MAS-49 series of semi-automatic rifles. The gas system is fitted with a gas regulator behind the front sight base, allowing adjustment of the gas system in response to environmental conditions. The piston system can be bypassed completely, using the gas plug, to allow for the firing of rifle grenades and manual operation. The FAL's magazine capacity ranges from five to 30 rounds, with most magazines holding 20 rounds. In fixed stock versions of the FAL, the recoil spring is housed in the stock, while in folding-stock versions it is housed in the receiver cover, necessitating a slightly different receiver cover, recoil spring, and bolt carrier, and a modified lower receiver for the stock. FAL rifles have also been manufactured in both light and heavy-barrel configurations, with the heavy barrel intended for automatic fire as a section or squad light support weapon. Most heavy barrel FALs are equipped with bipods, although some light barrel models were equipped with bipods, such as the Austrian StG58 and the German G1, and a bipod was later made available as an accessory. Among other 7.62×51mm NATO battle rifles at the time, the FN FAL had relatively light recoil, due to the user-adjustable gas system being able to be tuned via a regulator in fore-end of the rifle, which allowed for excess gas which would simply increase recoil to bleed off. The regulator is an adjustable gas port opening that adjusts the rifle to function reliably with various propellant and projectile specific pressure behavior, making the FAL not ammunition specific. In fully automatic mode, however, the shooter receives considerable abuse from recoil, and the weapon climbs off-target quickly, making automatic fire only of marginal effectiveness. Many military forces using the FAL eventually eliminated full-automatic firearms training in the light-barrel FAL.

Heckler and Koch HK417 German 7.62mm Battle Rifle







Tiers:



Variants:

- **HK417 12″ 'Assaulter':** carbine with 304.8 mm (12 in) standard barrel
- **HK417 16″ 'Recce':** "Recon" rifle with 406.4 mm (16 in) standard or accurized barrel
- **HK417 20″ 'Sniper':** "full size" rifle with 508.0 mm (20 in) accurized barrel
- **HK417 A2:** The HK417 A2 is the improved version. The design of the receiver, barrel interface, gas port and the bore axis alignment of the rifle have been further optimised to increase its accuracy and reliability. The German Army uses the HK417 A2 - 13″ with the designation G27. As of 2013, the HK417 A2 models chambered for 7.62×51mm NATO available to the military and law enforcement market are: HK417 A2 - 13″: carbine with 330.2 mm (13 in) barrel HK417 A2 - 16.5″: rifle with 419.1 mm (16.5 in) barrel HK417 A2 - 20″: "full size" rifle with 508.0 mm (20 in) barrel Accurized barrels provide 0.3 mil (1 moa) accuracy (with match grade ammunition). A barrel can be changed in under two minutes with simple tools. All HK417 barrels are cold hammer forged and chrome-lined and use a conventional lands and grooves bore profile with a twist rate of 1 turn in 279.4 mm (11.00 in). They are designed to function reliably with bullet weights ranging from 9.3 to 11.34 g (144 to 175 gr) and are threaded for a flash hider or sound suppressor.
- **G28:** The civilian MR308 was used to develop the G28, a designated marksman rifle for the German Bundeswehr (Federal Army) deployment to the War in Afghanistan. The semi-automatic G28 is chambered for 7.62×51mm NATO and has a factory warrantied accuracy of 45 mm dispersion at 100 meters (0.45 mil or 1.5 moa) when fired with 10 rounds using OTM/HPBT/Sierra Match King ammunition. The G28 features STANAG 4694 NATO Accessory Rails that are backwards-compatible with the STANAG 2324/MIL-STD-1913 Picatinny rails. The upper receiver is made from steel instead of HK's aluminium alloy. Approximately 75% of the parts are interchangeable with the HK417. There are two different versions of the G28: G28 E2 (Standard) with a Schmidt & Bender 3–20×50 PM II (modified to Bundeswehr requirements) and the G28 E3 (Patrol) with Schmidt & Bender 1–8×24 PM II. By October 2017, Heckler & Koch had renamed the G28 as the HK241, though G28 remains its Bundeswehr designation.
- **M110A1:** In April 2016 Heckler & Koch confirmed that a lighter version of the G28 had won the United States Army's Compact Semi-Automatic Sniper System contract to replace the M110 Semi-Automatic Sniper System. It is designated

as the M110A1 and uses an aluminum upper receiver instead of steel to meet weight requirements, weighing 8.4 lb (3.8 kg) unloaded and reaching some 15 lb (6.8 kg) loaded and with accessories; the M110A1 features a Geissele M-LOK rail handguard, Schmidt & Bender 3–20×50 PM II Ultra Short telescopic sight, Geissele optic mount, OSS SRM6 suppressor, 6-9 Harris bipod and mount, and a collapsible stock with adjustable comb. In May 2018, the U.S. Marine Corps will begin receiving the CSASS, also to replace the M110.

- **MR308:** The MR308 is a civilian variant of the HK417, introduced in 2007 alongside the MR223, a civilian HK416. It is a semi-automatic rifle with several "sporterized" features. At the 2009 SHOT Show, the two rifles were introduced to the American civilian market as the MR762 and MR556, respectively. Since then both were replaced by the improved MR762A1 and MR556A1.

System

Alternate Designation(s): Heckler & Koch HK417; HK417

Primary Function / Type: Battle Rifle

Date of Introduction: 2006

Manufacturer: Heckler & Koch

Proliferation: Widely Proliferated. Over 25 countries

Action: Gas-operated short-stroke piston, rotating bolt

Muzzle Velocity: 709 m/s (2,330 ft/s) (12 in) 742 m/s (2,430 ft/s) (13 in) 750 m/s (2,500 ft/s) (16 in) 775 m/s (2,540 ft/s) (16.5 in) 789 m/s (2,590 ft/s) (20 in) 817 m/s (2,680 ft/s) (A2 20″)

Rate of Fire: rds/min600

Effective Firing Range: A2 13″: 400 m (437.4 yd) A2 16.5″: 600 m (656.2 yd) A2 20″: 800 m (874.9 yd) G28: 600 m (656.2 yd)

Feed System: 10- or 20-round detachable box magazine

Sights: Iron or optical sights (Picatinny rail) G28 E2: Schmidt & Bender 3–20×50 PM II G28 E3: Schmidt & Bender 1–8×24 PM II

Dimensions

Length: Assaulter: 885 mm (34.8 in) stock extended/805 mm (31.7 in) stock collapsed Recce: 985 mm (38.8 in) stock extended/905 mm (35.6 in) stock collapsed Sniper: 1,085 mm (42.7 in) stock extended/1,005 mm (39.6 in) stock collapsed G28: 1,082 mm (42.6 in) stock extended/965 mm (38.0 in) stock collapsed A2 13″: 904 mm (35.6 in) stock extended/824 mm (32.4 in) stock collapsed A2 16.5″: 994 mm (39.1 in) stock extended/914 mm (36.0 in) stock collapsed A2 20″: 1,082 mm (42.6 in) stock extended/1,002 mm (39.4 in) stock collapsed.

Barrel Length: Assaulter: 305 mm (12.0 in) Recce: 406 mm (16.0 in) Sniper: 508 mm (20.0 in) G28: 419 mm (16.5 in) A2 13″: 330 mm (13.0 in) A2 16.5″: 419 mm (16.5 in) A2 20″: 508 mm (20.0 in)

Width: mm78

Height: HK417: 213 mm (8.4 in) G28 E2: 340 mm (13.4 in) G28 E3: 280 mm (11.0 in)

Weight: Assaulter: 3.87 kg (8.5 lb) Recce: 4.05 kg (8.9 lb) Sniper: 4.23 kg (9.3 lb) G28 E2: 5.8 kg (13 lb) G28 E3: 5.15 kg (11.4 lb) A2 13″: 4.22 kg (9.3 lb) A2 16.5″: 4.4 kg (9.7 lb) A2 20″: 4.74 kg (10.4 lb)

Ammunition

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Notes:

The Heckler & Koch HK417 is a battle rifle, designed and manufactured by Heckler & Koch in Germany. It is the larger caliber

version of the HK416 and chambered for the 7.62×51mm NATO rifle cartridge. It is a gas-operated, selective-fire rifle with a rotating bolt. The HK417 is intended for use in roles where the penetrative power, stopping power, and range of the 7.62×51mm cartridge are required. It has been adopted for service by a number of armed forces, special forces, and police organizations. The HK417 is similar in internal design to the HK416, although the receiver and working parts are enlarged to suit the larger 7.62×51mm cartridge. The bolt is a seven-lug rotating type, which sits in a bolt carrier and operates in a forged alloy receiver resembling those of the Stoner-designed AR-10, AR-15, and M16 rifles. Like the HK416, the HK417 is gas-operated with a short-stroke piston design similar to that of the Heckler & Koch G36. The short-stroke piston is more reliable than the original direct impingement operation of the AR-15 design because, unlike these weapons, it does not vent propellant gases directly into the receiver, which deposits carbon fouling onto the bolt mechanism as well as heating it up. The early HK417 prototype used 20-round magazines from the Heckler & Koch G3 rifle family, which did not feature a bolt hold-open device. Later prototypes, however, switched to a polymer magazine with bolt hold-open. The magazine resembles an enlarged version of the G36's transparent magazine, except without the pins for holding more than one magazine together.

→→Carbine Rifles

AK-74M Russian 5.45mm Automatic Carbine Rifle



Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7

in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.

- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74M

In Service: 1991-Present

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed

shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

AK-74M In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel

hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation. AK-74M universal upgrade kit An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("B"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

AKS-74U Russian 5.45mm Automatic Carbine Rifle





Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed

from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.

- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74U

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many

magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression. In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped. The AKS-74U bridges the tactical deployment gap between a submachine gun and an assault rifle. It was intended for use mainly with special forces, airborne infantry, rear-echelon support units, helicopter and armored vehicle crews. It has been augmented and replaced by various submachine guns, and the less compact AK-105 carbine in Russian military service. It is commonly

used by law enforcement; for example, each urban police foot patrol is issued at least one. The rifle's compact dimensions, compared with the AKS-74, were achieved by using a short 206.5 mm (8.1 in) barrel (this forced designers to simultaneously reduce the gas piston operating rod to an appropriate length). Due to the shortening of the operating mechanism the cyclic rate of fire rose slightly to around 700-735 rounds per minute. In order to effectively stabilize projectiles, the barrel's twist rate was increased from 200 mm (1:7.87 in) to 160 mm (1:6.3 in) to adapt the AKS-74U for muzzle velocities of 720 m/s (2,362 ft/s) and higher. A new gas block was installed at the muzzle end of the barrel with a muzzle booster, which features an internal expansion chamber inside the cylindrical section of the booster while the conical end acts as a nozzle to increase net pressure inside the gas chamber by supplying an increased amount of propellant gasses from the barrel. The chrome-lined muzzle booster also burns any remaining propellant, which would normally reduce muzzle blast. However, due to the extremely short barrel and conical end of the booster, the muzzle blast is nevertheless extremely large and visible. The muzzle device locks into the gas block with a spring-loaded detent pin and features two parallel notches cut into the edge of the flash hider cone, used for unscrewing it using the cleaning rod. Unlike most Kalashnikov variants there is no provision to store the cleaning rod under the barrel. The front sight was integrated into the gas block/forward sling loop. The sight height above the bore axis is also approximately 3 mm (0.1 in) higher than the AK-74, due to the combined front sight/gas block, rear sight configuration. The AKS-74U has a different rear sight composed of a U-shaped flip sight on the top cover instead of the standard sliding notch tangent rear sight. This rear sight has two settings: "П" standing for постоянная (constant) corresponding to a 350 m (383 yd) "point-blank range" battle zero setting and "4-5" (used for firing at distances between 400–500 m (437–547 yd)). The rear sight is housed in a semi-shrouded protective enclosure that is riveted to the receiver's spring-loaded top cover. This top cover hinges from a barrel trunnion (hinging where the rear sight on a normal AK74 is located), pivoting forward when opened, which also works to unlock the gas tube cover. Both the gas tube and handguard are also of a new type and are wider and shorter than the analogous parts in the AKS-74. For the AKS-74s combined with the 7N6 or 7N10 service cartridges the 350 m battle zero setting limits the apparent "bullet rise" within approximately −5 to +42 cm (−2.0 to 16.5 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier. The AKS-74U is significantly more maneuverable in tight quarters than the AKS-74; however, the significant decline in muzzle velocity to 735 m/s (2,411 ft/s) resulted in a 100 m (109 yd) reduction in effective range to 400 m (437 yd) (the effective hitting distance for a "running"-type silhouette target was reduced from 625 m (684 yd) to 360 m (394 yd)). The AKS-74U cannot mount a bayonet or standard under-barrel grenade launcher. However, a suppressed 30 mm BS-1 grenade launcher was developed specifically for that platform that fires a high-explosive dual purpose (HEDP) grenade. The grenades for the BS-1 are launched by special blank cartridges that are inserted into the grenade launcher via a detachable magazine. The majority of AKS-74U carbines were manufactured at the Tula Arms Factory rather than Izhmash. There were some accessories produced for the AKS-74U including a plastic thigh holster and (shorter than standard) 20-round AK-74 type magazines. The rifle utilizes a proprietary 25 mm wide sling that differs from the standard 35 mm AK sling also in construction. The AKS-74U also exists in a version featuring modernized synthetic furniture made from a black, glass-filled polyamide. The AKS-74U was also used as the basis for several other unique weapons, including the bullpup OTs-14 Groza specialist carbine which is now in limited service in the Russian military, and the Gepard series of multi-caliber submachine guns (none of which evolved past prototype stage). In the United States, the AKS-74U is called a "Krinkov". The origin of this term is uncertain. A hypothesis was circulating that the name came from the mujahideen who supposedly had captured a high-ranking Soviet officer armed with an AKS-74U, and that they had named it after him. However, investigation by Patrick Sweeney could not confirm this hypothesis, for no Soviet officer with a resembling name was captured in Afghanistan. US journalist C. J. Chivers reported that the gun was nicknamed "the Osama" in jihadist circles, after Osama bin Laden was photographed next to an AKS-74U.[9] Research by The Firearm Blog published in 2016 suggests that the name "Krinkov" is actually a Pashtun invention that came to the United States with accounts of the Mujahideen.[54] The AKS-74U is approximately 3 oz (85 g) lighter than the NATO equivalent XM177, and 10.2 in (260 mm) shorter with the stock folded. Due to the fact that the AKS-74U is moderately concealable with its stock folded and capable of easily defeating IIIa soft body armor, it continues to be able to perform the role of a modern Personal Defense Weapon, despite being designed in the 1970s.

Heckler and Koch G36K German 5.56mm Carbine Rifle







Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE):** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics.

Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch G36K

Primary Function / Type: Assault Rifle

Proliferation: Widely Proliferated

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36

magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

G36K (K—kurz "short"): carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).

M4 Carbine American 5.56mm Assault Rifle







Tiers:



Variants:

- **Note:** Except for the first delivery order, all U.S. military-issue M4 and M4A1 carbines possess a flat-top NATO M1913-specification (Picatinny) rail on top of the receiver for attachment of optical sights and other aiming devices—Trijicon TA01 and TA31 Advanced Combat Optical Gunsights (ACOG), EOTech 550 series holographic sights, and Aimpoint M68 Close Combat Optic (M68 CCO) being the favorite choices—and a detachable rail-mounted carrying handle. Standards are the Colt Model 920 (M4) and 921 (M4A1). Variants of the carbine built by different manufacturers are also in service with many other foreign special forces units, such as the Australian Special Air Service Regiment (SASR). While the SASR uses weapons of essentially the same pattern built by Colt for export (Colt uses different models to separate weapons for the U.S. military and those for commercial/export purposes), the British SAS uses a variant on the basic theme, the Colt Canada (formerly Diemaco) C8SFW.
- **XM177:** The XM177 was used in the military since 1965 until 1994 when it was replaced by the M4. The weapon, however, was at its prototype stage, and it was used as a testing weapon to see how it can be used in combat. The Colt 607 was its first model based on the XM16E1. However, it was referred to as the CAR-15 SMG. In 1966, Colt introduced the XM177, which was an improved variant of the CAR-15 Carbine. The Colt 609 was used by the US Army, the US Navy Seals, and the MACV-SOG, referred as the XM177E1. The USAF however used the Colt 610, which is referred to as the GAU-5A, which became known as the GUU-5P. The XM177E1 does have problems with weapon jamming, however it does have positive reviews, and some soldiers preferred the XM177 over the M16. Mainly because it was shorter, lighter, and easier to handle. In 1967, Colt adopted the Colt 629, which is known as the XM177E2. The XM177E2 has some improvements over the M16A1, and Is prone to jamming less than the older variants. The weapon quickly became a favorite of the MACV-SOG. In 1970, Colt stopped making the Colt Commando series, and in 1983, Colt start making a variant of the XM177E2 with some M16A2 features. The XM177E2 prototype was completely finished in 1993, and it became the M4.
- **M4 MWS (Modular Weapon System):** Colt Model 925 carbines were tested and fitted with the Knight's Armament Corporation (KAC) M4 RAS under the designation M4E2, but this designation appears to have been scrapped in favor of

mounting this system to existing carbines without changing the designation. The U.S. Army Field Manual specifies for the Army that adding the Rail Adapter System (RAS) turns the weapon into the M4 MWS or Modular Weapon System.

- **M4A1:** The M4A1 carbine is a fully automatic variant of the basic M4 carbine intended for special operations use. The M4A1 was introduced in May 1991 with improvements. and was in service in 1994. The M4A1 has a "S-1-F" (safe/semi-automatic/fully automatic) trigger group, while the M4 has a "S-1-3" (safe/semi-automatic/3-round burst) trigger group. The M4A1 is used by almost all U.S special operation units including, but not limited to, Marine Force Recon, Army Rangers, Army Special Forces, Navy SEALs, United States Air Force Pararescue and Air Force Combat Control Teams. It has a maximum effective range of about 500 to 600 meters (550–660 yd). The fully automatic trigger gives a more consistent trigger pull, which leads to better accuracy. According to Mark A. Westrom, owner of ArmaLite, Inc., automatic fire is better for clearing rooms than burst fire. In the last few years, M4A1 carbines have been refitted or received straight from the factory with barrels with a thicker profile under the handguard. This is for a variety of reasons such as heat dissipation during full-auto, and accuracy as a byproduct of barrel weight. These heavier barrel weapons are also fitted with a heavier buffer known as the H2. Out of three sliding weights inside the buffer, the H2 possesses two tungsten weights and one steel weight, versus the standard H buffer, which uses one tungsten weight and two steel weights. These weapons, known by Colt as the Model 921HB (for Heavy Barrel), have also been designated M4A1, and as far as the government is concerned the M4A1 represents both the 921 and 921HB. Conversion of M4s to the M4A1 began in 2014, the start of all U.S. Army forces being equipped with the automatic variant. Though in service with special forces, combat in Afghanistan showed the need for providing automatic suppression fires during fire and movement for regular soldiers. The 101st Airborne Division began fielding new-built M4A1s in 2012, and the U.S. 1st Infantry Division became the first unit to convert their M4s to M4A1-standard in May 2014. Upgrades included a heavier barrel to better dissipate heat from sustained automatic firing, which also helps the rifles use the M855A1 EPR that has higher proof pressures and puts more strain on barrels. The full-auto trigger group has a more consistent trigger pull, whereas the burst group's pull varies on where the fire control group is set, resulting in more predictable and better accuracy on semi-automatic fire. Another addition is an ambidextrous selector lever for easier use with left-handed shooters. The M4-M4A1 conversion only increases weapon weight from 7.46 lb (3.38 kg) to 7.74 lb (3.51 kg), counting a back-up iron sight, forward pistol grip, empty magazine, and sling. Each carbine upgrade costs $240 per rifle, for a total cost of $120 million for half a million conversions. Three hundred conversions can be done per day to equip a brigade combat team per week, with all M4A1 conversions to be completed by 2019.
- **Mark 18 CQBR:** The Mk 18 Close Quarters Battle Receiver is an M4A1 with a 10.3-inch barrel upper receiver. Current contractors for the Mark 18 are Colt and Lewis Machine & Tool (LMT) NSN 1005-01-527-2288.
- **Enhanced M4:** For the Individual Carbine competition, Colt submitted their Enhanced M4 design, also known as the Colt Advanced Piston Carbine (APC). The weapon has a suppression-ready fluted barrel, which is lighter and cools better than previous M4 barrels. It is claimed to have "markedly better" accuracy. To improve reliability, Colt used an articulating link piston (ALP), which "reduces the inherent stress in the piston stroke by allowing for deflection and thermal expansion". In traditional gas piston operating systems, the force of the piston striking the bolt carrier can push the bolt carrier downwards and into the wall of the buffer tube, leading to accelerated wear and even chipped metal. This is known as carrier tilt. The ALP allows the operating rod to wiggle to correct for the downward pressure on the bolt and transfers the force straight backwards in line with the bore and buffer assembly, eliminating the carrier tilt. This relieves stress on parts and helps to increase accuracy. The Individual Carbine competition was canceled before a winning weapon was chosen.
- **M4 Commando:** The modern Model 933 has a "flattop" receiver, with a removable carrying handle and a MIL-STD-1913 Picatinny rail, with semi-automatic and automatic fire. The Model 935 Commando has the features of the Model 933, but has three-round burst fire instead of automatic. Though originally called the M16A2 Commando, Colt markets them as the M4 Commando around 1995.
- **Armwest LLC M4:** In 2014, American firearms designer Jim Sullivan provided a video interview regarding his contributions to the M16/M4 family of rifles when working for Armalite. A noted critic of the M4, he illustrates the deficiencies found in the rifle in its current configuration. In the video, he demonstrates his "Arm West LLC modified M4", with enhancements he believes necessary to rectify the issues with the weapon. Proprietary issues aside, the weapon is said to borrow features in his prior development, the Ultimax. Sullivan has stated (without exact details as to how) the weapon can fire from the closed bolt in semi-automatic and switch to open bolt when firing in fully automatic, improving accuracy. The weight of the cyclic components of the gun has been doubled (while retaining the weapon's weight at less than 8 pounds). Compared to the standard M4, which in automatic fires 750-950 rounds a minute, the rate of fire of the Arm West M4 is heavily reduced both to save ammunition and reduce barrel wear. The reduced rate also renders the weapon more controllable and accurate in automatic firing.

System

Alternate Designation(s): M4

Primary Function / Type: Assault Rifle

Date of Introduction: 1994

Manufacturer: Colt's Manufacturing Company, US Colt Canada in Ontario, Canada Lewis Machine and Tool Company in

Milan, Illinois, US Bushmaster Firearms International, US U.S. Ordnance, US Remington Arms Company, US Daniel Defense in Black Creek, Georgia, US Lithgow Small Arms Factory, Australia Forjas Taurus São Leopoldo, RS, Brazil FN Herstal, Belgium. SME Ordnance, Malaysia Sarsilmaz, Turkey Caracal International, United Arab Emirates

Proliferation: Widely Proliferated

Action: Gas-operated, rotating bolt, Stoner expanding gas

Rate of Fire: 700–950 round/min cyclic

Muzzle Velocity: m/s910

Effective Firing Range: 500 m (550 yd)

Feed System: 30-round box magazine or other STANAG magazines. Magazines with different capacities also available.

Sights: Iron sights or various optics

Dimensions

Length: mm838

Length, Stock Collapsed: mm757

Barrel Length: mm370

Weight, Empty: kg2.5

Ammunition

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56x45 mm

Notes:

The M4 carbine is a shorter and lighter variant of the M16A2 assault rifle. The M4 is a 5.56×45mm NATO, air-cooled, gas-operated,[a] magazine-fed carbine. It has a 14.5 in (370 mm) barrel and a telescoping stock. The M4 carbine is extensively used by the United States Armed Forces and is largely replacing the M16 rifle in United States Army and United States Marine Corps combat units as the primary infantry weapon and service rifle. The M4 is also capable of mounting the M203 and M320 grenade launchers. The distinctive step in its barrel is for mounting the M203 with the standard hardware. The M4 has semi-automatic and three-round burst firing modes (like the M16A2 and M16A4), while the M4A1 has semi-automatic and fully automatic firing modes (like the M16A1 and M16A3). The M4 and its variants fire 5.56×45mm NATO (and .223 Remington) ammunition, and are gas-operated, magazine-fed, selective fire firearms with either a multi-position telescoping stock or a fixed A2 or LE tactical stock. The M4 is a shorter and lighter variant of the M16A2 rifle, with 80% parts commonality. The M4 is similar to much earlier compact M16 versions, such as the 1960s-era XM177 family. Some of those visual similarities are obvious in both weapons. As with many carbines, the M4 is handy and more convenient to carry than a full-length rifle. The price is slightly inferior ballistic performance compared to the full-size M16, with its 5.5" (14 cm) longer barrel. This becomes most apparent at ranges of 200 yards (180 m) and beyond. While the M4's maneuverability makes it a candidate for non-infantry troops (vehicle crews, clerks and staff officers), it also makes it ideal for close quarters battle (CQB). The M4, along with the M16A4, have mostly replaced the M16A2 in the Army and Marines. The U.S. Air Force, for example, has transitioned completely to the M4 for Security Forces squadrons, while other armed personnel retain the M16A2. The US Navy uses M4A1s for Special Operations and vehicle crews. Some features of the M4 and M4A1 compared to a full-length M16-series rifle include: *Compact size *Shortened barrel 14.5 in (370 mm), which includes the shorter carbine gas system. *Telescoping buttstock However, there have been some criticisms of the carbine, such as lower muzzle velocities and louder report due to the shorter barrel, additional stress on parts because of the shorter gas system, and a tendency to overheat faster than the M16A2. Army upgrades The M4 product improvement program (PIP) is the effort by the U.S. Army to modernize its inventory of M4 service rifles. Phase I consists of converting and replacing regular M4s with the M4A1 version. This variant of the rifle is fully automatic and has a heavier barrel, and is given ambidextrous fire controls. Phase II of the PIP explored developing a new bolt carrier. 11 designs were submitted. The competition was scheduled to conclude in summer 2013, but ended in April 2012. Over six months of testing revealed that the current bolt carrier assembly outperformed the competing designs, especially in the areas of reliability, durability, and high-temp and low-temp tests. Phase II also includes a competition for a free-floating forward rail assembly. The Army may award contracts to up to three finalists in early 2013, with the selection of a final winner in early 2014. If the Army determines that the winning rail system should be procured, delivery of new rail is anticipated by the summer

of 2014. In March 2015, the Army launched a market survey to see what the small-arms industry could offer to further enhance the M4A1 to an "M4A1+" standard. Several upgrade options include an extended forward rail that will allow for a free-floated barrel for improved accuracy with a low-profile gas block that would do away with the traditional triangular fixed front sight, removable front and rear flip-up back-up iron sights, a coyote tan or "neutral color" rail for reduced visual detection, a more effective flash suppressor/muzzle brake, an improved charging handle, and a new single-stage trigger module. In June 2016, the M4A1+ was canceled after reviewing the offerings and determining that there were no major upgrades currently offered.

AKS-74 Russian 5.45mm Automatic Carbine Rifle





Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.
- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed

from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.

- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AKS-74

Date of Introduction: 1983

Proliferation : ALL AK-74 variants are In approximately 21 different nations, primarily in Eastern Europe, and in Asia. Over 5 Million AK-74 variants produced.

In Service: 1983-Present

Action: Gas-operated, rotating bolt

Fire Mode : Selective, automatic or semi-automatic

Rate of Fire, Cyclic : rd/min600.0

Rate of Fire, Practical : rd/min100, auto

Rate of Fire, Practical : rd/min40, semiauto

Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)

Muzzle Velocity: 880-900

Effective Firing Range, Point Target: m500

Effective Firing Range, Area Target: m500

Maximum Firing Range: m5,150

Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)

Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)

Width: mm70

Height: mm195

Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437 yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed

shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

The AK-74 (Russian: Автомат Калашникова образца 1974 года or "Kalashnikov automatic rifle model 1974") is an assault rifle developed in the early 1970s by Russian weapons designer Mikhail Kalashnikov to replace the earlier AKM (itself a refined version of the AK-47). It uses a smaller 5.45×39mm cartridge, replacing the 7.62×39mm chambering of earlier Kalashnikov-pattern weapons. The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the

receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("Б"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

SKS Russian 7.62mm Semi-Automatic Carbine Rifle







Tiers:



Variants:

- **Karabiner-S:** East German Manufacture
- **Chinese Type 56:** Copy
- **North Korea Type 63:** Copy
- **Yugoslavian M59/66:** Copy, w/permanent grenade launcher

System

Alternative Designations: Simonov Semiautomatic Carbine
Date of Introduction: 1946
Proliferation: Widespread
Action: Short stroke gas piston, tilting bolt, self-loading
Fire Mode: Semi-Automatic
Rate of Fire: rds/min35-40
Muzzle Velocity: m/s735
Effective Firing Range: m400
Feed System: 10 round stripper clip,internal box magazine.

Dimensions

Length Overall: mm1,020
Barrel Length: 450 mm (17.7 in) 315 mm (12.4 in) (G3K)
Weight Empty: kg3.85

Ammunition

↳*M1943 (57N231S)*

Type: Ball, steel core
Caliber/Length: 7.62x39 mm
Effective Range: m350

Maximum Range: m800
Armor Penetration: 6 mm mild steel plate at 300 m Steel helmet at 1,000 m Flak vest at 60 m
Muzzle Velocity: m/s718

↳***M1943 (T-45 or 57N231P)***

Type: Ball-Tracer
Caliber/Length: 7.62x39 mm
Effective Range: m350
Maximum Range: m800
Trace: m800
Muzzle Velocity: m/s718

Sights

Sights: Tangent leaf, graduated from 100 to 1,000 meters
Night Sights Available: Night sights are available for the SKS
Note: Hooded post front sight, tangent notch rear sight graduated from 100 to 1,000 meters.

Notes:

The SKS is the predecessor to the Russian AK-47. This assault rifle is considered very reliable and it can still be found in large numbers throughout the world. It is the primary weapon for the People's Republic of China's "People's Militia".

Heckler and Koch G36C German 5.56mm Carbine Rifle







Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE)::** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics.

Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch G36C

Primary Function / Type: Carbine Rifle

Manufacturer: Heckler & Koch Santa Bárbara Sistemas Military Industries Corporation

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36

magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

G36C (C="Compact", commonly mistaken for "Commando", a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.

AK-74 Russian 5.45mm Automatic Carbine Rifle



Tiers:



Variants:

- **AKS-74:** The AKS-74 ("S"—Russian: складной; Skladnoy, or "folding"), is a variant of the AK-74 equipped with a side-folding metal shoulder stock, designed primarily for use with air assault infantry and developed alongside the basic AK-74. Unlike the AKMS's somewhat fragile underfolding stock (modeled after the MP 40 submachine gun stock), the AKS-74 stock is fabricated from stamped sheet metal struts, machine pressed into a "U" shape and assembled by punch fit and welding. The stock has a triangular shape; it lacks the folding shoulder pad found on the AKMS stock and is folded to the left side of the receiver. The hinged stock is securely locked in its extended position by a spring-loaded button catch located at the rear of the receiver. When folded, the stock is held closed by a spring-loaded capture hook situated on the left side at the front of the receiver housing. A rear-mounted sling swivel is also provided on the right side at the beginning of the stock frame. It retains the pistol grip reinforcement plate the AKMS used, though due to the less complex rear trunnion, only has one riveting hole in place of the three on the AKMS.
- **AK-74M:** In 1991 the Izhmash factory in the city of Izhevsk began full-scale production of a modernized variant of the AK-74—the AK-74M (M—Russian: Модернизированный; Modernizirovanniy or "modernized") assault rifle that offers more versatility compared with its predecessor. Apart from several minor improvements, such as a lightened bolt and carrier assembly to reduce the impulse of the gas piston and bolt carrier during firing, the rifle features a new glass-filled polyamide stock that retains the shape of the original AK-74 fixed laminated wood stock, but side-folds to the left like the skeletonized AKS-74 buttstock. As a result, pistol grip reinforcement plates that were once exclusively used on the folding stock variants are standard on all AK-74Ms. Additionally the AK-74M features an improved muzzle device with extended collar and threads to reduce play and a machine cut beneath to allow easier cleaning rod removal, a reinforced smooth dust cover and a redesigned guide rod return spring retainer that allows firing the GP-25, GP-30 and GP-34 underslung grenade launchers without having to use the previously necessary additional receiver cover fastener. To reduce production costs, barrel hardware, such as the front sight base and gas block, are dimple pressed on to the barrel instead of pinned on (commercial semi-auto variants are still pinned on to maintain user serviceability). Other economic changes include omission of lightening cuts on the front sight block and gas piston as well as a stamped gas tube release lever, replacing the milled one. The bullet guide and bolt guide were also separated, with the bolt guide becoming a simple bump held in place on the left side of the receiver with an additional rivet (it's often called a "bump rivet" because of this) making it easier to replace in case of wear. Each AK-74M is fitted with a side-rail bracket for mounting optics that is a simplified version of the 74N mount with less machining cuts. The AK-74M would have been adopted by the Soviet Union as the standard service rifle, and has been accepted as the new service rifle of the Russian Federation.
- **AK-74M universal upgrade kit:** An AK-74M universal upgrade kit consisting of a new safety, dust cover and furniture featuring improved ergonomics and rails to attach accessories like aiming optics, optoelectronic sights, laser sights, weapon lights and vertical fore grips and a new muzzle device had its official debut on May 9, 2015 in Moscow as part of the 2015 Moscow Victory Day Parade. The Kalashnikov Concern has further developed three sets of additional

equipment for the modernization of 5.45×39mm and 7.62×39mm chambered AK-pattern assault rifles for normal military units, reconnaissance units, and special forces units.[46] The Kalashnikov Concern announced it has a contract with the Russian Ministry of Defence to deliver upgrade kits for their AK-74M assault rifles.

- **AKS-74U:** In 1973, a design competition (codenamed "Modern"—Модерн) was started for the adoption of a fully automatic carbine. This was no doubt inspired by observing the US experience in Vietnam with the XM177. The Soviet planners also drew from the unsolicited design AO-46 built in 1969 by Peter Andreevich Tkachev, which weighed only 1.9 kg. The TTT specifications required a weight no greater than 2.2 kg (4.9 lb), a length of 75 cm (29.5 in)/45 cm (17.7 in) with the stock unfolded/folded, and an effective firing range of 500 m (547 yd). The competition was joined by designs of M.T. Kalashnikov (PP1), I.Y. Stechkin (TKB-0116), S.G. Simonov (AG-043), A.S. Konstantinov (AEK-958), and Yevgeny Dragunov (who called his model "MA"). Kalashnikov also presented an additional design (A1-75) which differed from PP1 by having a modified muzzle for flash and noise suppression.[49] In 1977, the GRAU decided to adopt Kalashnikov's model, which was largely a shortened AKS-74, because its performance was no worse than the competition, and promised significant production cost savings by utilizing existing equipment for the AK-74 line. A final round of large scale testing with Kalashnikov's model was performed by airborne divisions in the Transcaucasian Military District in March 1977. The AKS-74U ("U"—Russian: укороченный; Ukorochenniy, or "shortened") was officially adopted in 1979, and given the official, but seldom used GRAU designation 6P26. In 1993 production stopped.
- **AK-101 variant of the AK-74M. :** 5.56x45-mm (NATO) variant of the AK-74M.
- **AK-102 short-barrel (314-mm) variant of the AK-74M. :** 5.56x45-mm (NATO) short-barrel (314-mm) variant of the AK-74M.
- **AK-103:** 7.62x39-mm variant of the AK-74M.
- **AK-104:** 7.62x39-mm short- barrel (314-mm) variant of the AK-74M.
- **AK-105:** 5.45x39-mm short- barrel (314-mm) variant of the AK-74M.

System

Alternative Designation : AK, Kalashnikov
In Service: 1974-Present
Action: Gas-operated, rotating bolt
Fire Mode : Selective, automatic or semi-automatic
Rate of Fire, Cyclic : rd/min600.0
Rate of Fire, Practical : rd/min100, auto
Rate of Fire, Practical : rd/min40, semiauto
Feed System: 30-rd detachable box magazine (40-rd used by RPK- 74 LMG is interchangeable)
Muzzle Velocity: 880-900
Effective Firing Range, Point Target: m500
Effective Firing Range, Area Target: m500
Maximum Firing Range: m5,150
Feed System: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Dimensions*

Length, Overall: AK-74: 943 mm (37.1 in) AKS-74 (stock extended): 943 mm (37.1 in) AKS-74 (stock folded): 690 mm (27.2 in) AKS-74U (stock extended): 735 mm (28.9 in) AKS-74U (stock folded): 490 mm (19.3 in) AK-74M (stock extended): 943 mm (37.1 in) AK-74M (stock folded): 700 mm (27.6 in)
Length, Barrel: AK-74, AKS-74, AK-74M: 415 mm (16.3 in) AKS-74U: 206.5 mm (8.1 in)
Width: mm70
Height: mm195
Weight: AK-74: 3.07 kg (6.8 lb) AKS-74: 2.97 kg (6.5 lb) AKS-74U: 2.7 kg (6.0 lb) AK-74M: 3.4 kg (7.5 lb) without magazine 30-round magazine: 0.23 kg (0.51 lb) 6H5 bayonet: 0.32 kg (0.71 lb)

Ammunition

Cartridge: 5.45×39mm

Magazine: 30-round or 45-round RPK-74 detachable box magazine or 60-round casket magazine

↳*Ammunition (Option 1)*

Name: 7N6

Type: Ball

Caliber: mm5.45

Armor Penetration : mm6 mm mild steel at 300 m, flak vest at 80 m

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

↳*Ammunition (Option 2)*

Name: 7N10 (Enhanced Penetration)

Type: Armor piercing

Caliber: mm5.45

Armor Penetration : mm16 mild steel at 300 m; 5 armor plate at 150 m Flak vest 200 m

Muzzle Velocity : m/s880.0

Range, Effective : m 500.0

Range, Maximum : m800.0

↳*Ammunition (Option 3)*

Name: 7T3M

Type: Tracer

Caliber: mm5.45

Armor Penetration : mmINA

Muzzle Velocity : m/s880.0

Range, Effective : m500.0

Range, Maximum : m800.0

Trace: m850.0

Sights

↳*Iron Sights*

Note: The AK-74 uses an adjustable notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,000 m (109 to 1,094 yd). The front sight is a post adjustable for elevation in the field. Horizontal adjustment requires a special drift tool and is done by the armory before issue or if the need arises by an armorer after issue. The sight line elements are approximately 48.5 mm (1.9 in) over the bore axis. The "point-blank range" battle zero setting "П" standing for постоянная (constant) the 5.45×39mm AK-74 rear tangent sight element corresponds to a 400 m (437

yd) zero, compared with the 300 m (328 yd) zero for 7.62×39mm AKs. For the AK-74 combined with the 7N6 or 7N10 service cartridges the 400 m battle zero setting point-blank range limits the apparent "bullet rise" within approximately −5 to +38 cm (−2.0 to 15.0 in) under the line of sight. At the corresponding 440 m (481 yd) maximum point-blank range the bullet will have dropped to approximately −21 cm (−8.3 in) relative to the line of sight. Soldiers are instructed to fire at any target within this range by simply placing the sights on the center of mass (the belt buckle, according to Russian and former Soviet doctrine) of the enemy target. Any errors in range estimation are tactically irrelevant, as a well-aimed shot will hit the torso of the enemy soldier.

↳*Optical SIghts*

Note: While most Russian and CIS armed forces use the AK-74 in its basic configuration with iron sights, many magnified and non-magnified optical sights are available for designated marksmen and other special purpose troops in their respective militaries. For the 5.45×39mm AK-74, the East German Zeiss ZFK 4×25, 1P29, Belorussian BelOMO PO 3.5×21P, PO 4×24P and the 1P78 Kashtan dedicated side rail mounted optical sights were developed. These optical sights are primarily designed for rapid target acquisition and first round hits out to 400 m, but by various means these optical sights also offer bullet drop compensation (BDC) (sometimes referred to as ballistic elevation) for aiming at more distant targets. The BDC feature compensates for the effect of gravity on the bullet at given distances (referred to as "bullet drop") in flat fire scenarios. The feature must be tuned for the particular ballistic trajectory of a particular combination of gun and cartridge at a predefined muzzle velocity and air density. Since the usage of standardized ammunition is an important prerequisite to match the BDC feature to the external ballistic behaviour of the employed projectiles, these military optical sights are intended to assist with field shooting at varying medium to longer ranges rather than precise long range shots. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms. It was copied from and hence similar to the British SUIT (Sight Unit Infantry, Trilux). When mounted the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74/AN-94, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at various ranges and is zeroed for both windage and elevation at 400 m (437 yd). On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming.

New Features

Note: The AK-74 was equipped with a new buttstock, handguard (which retained the AKM-type finger swells) and gas cylinder. The stock has a shoulder pad different from that on the AKM, which is rubber and serrated for improved seating against the shooter. In addition, there are lightening cuts on each side of the buttstock. The buttstock, lower handguard and upper heatguard were first manufactured from laminated wood, this later changed to a synthetic, plum or dark brown colored fiberglass. The AK-74 gas tube has a spring washer attached to its rear end designed to retain the gas tube more securely. The lower handguard is fitted with a leaf spring that reduces play in the rifle's lateral axis by keeping the wood tensioned between the receiver and the handguard retainer. The receiver remains nearly identical to that of the AKM; it is a U-shaped 1 mm (0.04 in) thick sheet steel pressing supported extensively by pins and rivets. The internal guide rails on which the bolt carrier travels are stamped and spot welded to the inside of the receiver housing. Minor changes were made to the front barrel and rear stock trunnions as well as the magazine well. All external metal surfaces are coated with a glossy black enamel paint.

Accessories

Note: Accessories supplied with the rifle include a 6H4 or 6H5 type bayonet, a quick-loading device, three spare magazines, four 15-round stripper clips, maintenance kit, cleaning rod and sling. The bayonet is installed by slipping the muzzle ring around the flash hider and latching the handle down on the bayonet lug under the front sight base. The 6H5 AK-74 bayonet introduced in 1983 represents a further refinement of the 6H4 AKM bayonet. It introduced a radical blade cross-section, that has a flat milled on one side near the edge and a corresponding flat milled on the opposite side near the false edge. The blade has a new spear point and an improved one-piece molded plastic grip making it a more effective fighting knife. It also has saw-teeth on the false edge and the usual hole for use as a wire-cutter.

Notes:

The AK-74 (Russian: Автомат Калашникова образца 1974 года or "Kalashnikov automatic rifle model 1974") is an assault rifle developed in the early 1970s by Russian weapons designer Mikhail Kalashnikov to replace the earlier AKM (itself a refined version of the AK-47). It uses a smaller 5.45×39mm cartridge, replacing the 7.62×39mm chambering of earlier Kalashnikov-

pattern weapons. The rifle first saw service with Soviet forces in the 1979 Afghanistan conflict.[8] The head of the Afghan bureau of the Pakistani Inter-Services Intelligence claimed that the CIA paid $5,000 for the first AK-74 captured by the Mujahideen during the Soviet–Afghan War. Today, the rifle is used by most countries of the former Soviet Union. Licensed copies were produced in Bulgaria (AK-74, AKS-74 and AKS-74U), and the former East Germany (MPi-AK-74N, MPi-AKS-74N, MPi-AKS-74NK). The AK-74 was designed by A. D. Kryakushin's group under the design supervision of Mikhail Kalashnikov and is an adaptation of the 7.62×39mm AKM assault rifle and features several important design improvements.These improvements were primarily the result of converting the rifle to the intermediate-caliber high velocity 5.45×39mm cartridge. In fact, some early models are reported to have been converted AKMs, re-barreled to 5.45×39mm.Compared with the preceding AKM the AK-74 has better effective range, firing accuracy (a main development goal), and reliability. The AK-74 and AKM share an approximate 50% parts commonality (interchangeable most often are pins, springs and screws). The rifle's operation during firing and reloading is identical to that of the AKM. After ignition of the cartridge primer and propellant, rapidly expanding propellant gases are diverted into the gas cylinder above the barrel through a vent near the muzzle. The build-up of gases inside the gas cylinder drives the long-stroke piston and bolt carrier rearward and a cam guide machined into the underside of the bolt carrier along with an ejector spur on the bolt carrier rail guide, rotates the bolt approximately 35° and unlocks it from the barrel extension via a camming pin on the bolt. The moving assembly has about 5.5 mm (0.2 in) of free travel which creates a delay between the initial recoil impulse of the piston and the bolt unlocking sequence, allowing gas pressures to drop to a safe level before the seal between the chamber and the bolt is broken. Like previous Kalashnikov-pattern rifles, the AK-74 does not have a gas valve; excess gases are ventilated through a series of radial ports in the gas cylinder. Since the Kalashnikov operating system offers no primary extraction upon bolt rotation, the 5.45×39mm AK-74 bolt has a larger extractor claw than the 7.62×39mm AKM for increased extraction reliability. Other minor modifications were made to the bolt and carrier assembly. Specialized variants The AK-74 is also available in several "night-fighting" configurations, equipped with a side-rail used to mount sights. These variants, the AK-74N, AKS-74N and AKS-74UN can be used in conjunction with NSPU and NSPU-3 (1PN51) night sights, as well as optical sights such as the USP-1 (1P29). The variants designated AK-74N2 and AKS-74N2 can use the multi-model night vision sight NSPUM (1PN58).[56] The AKS-74UB ("B"—Russian: бесшумный; Besshumniy or "silent") is a sound-suppressed variant of the AKS-74U adapted for use with the PBS-4 suppressor (used in combination with subsonic 5.45×39mm Russian ammunition). Very little is known about this model.

→→Sniper Rifles

Remington MSR American 7.62mm Sniper Rifle



Tiers:



System

Alternate Designation: Remington MSR; Modular Sniper Rifle
Caliber: .338; .300; 7.62mm
Manufacturer: Remington Arms
Total Built: 5,150 planned
Length: 36 in (91 cm) (stock folded) 46 in (120 cm) (stock extended)
Barrel Length: 20 in (51 cm)
Weight: 13 lb (5.9 kg) (base rifle) 17 lb (7.7 kg) (complete)
Cartridge: .338 Lapua Magnum; .338 Norma Magnum; .300 Winchester Magnum; 7.62×51mm NATO
Action: Bolt-action
Muzzle Velocity: 1,002 m/s (3,290 ft/s) (.338LM) 938 m/s (3,080 ft/s) (.300WM) 890 m/s (2,900 ft/s) (.338NM) 841 m/s (2,760 ft/s) (7.62 NATO)
Effective Firing Range: 1,500 m (1,640 yd) (varies on cartridge)
Feed System: Detachable box magazine: 5 or 10 rounds (.338 Norma/Lapua, 7.62 NATO) 7 rounds (.300 Win Mag)
Sights: Schmidt & Bender 5–25×56 PMII Leupold & Stevens Mark 4

Notes:

The Modular Sniper Rifle, or MSR, is a bolt-action sniper rifle developed and produced by Remington Arms for the United States Army. It was introduced in 2009, and was designed to meet specific United States Army and USSOCOM Precision Sniper Rifle requirements. The MSR won the PSR competition, and is called the Remington Mk 21 Precision Sniper Rifle in U.S. military service. On 7 March 2013, MSR was declared the winner of the Precision Sniper Rifle competition. Remington announced that the MSR had won on March 8, and it was publicly confirmed on March 9. This was followed by a $79.7 million contract for 5,150 rifles with suppressors, along with 4,696,800 rounds of ammunition to be supplied over the next ten years. The contract was awarded on 12 September 2013. Remington Defense produces the sniper rifles and utilizes two other companies for other system components, with Barnes Bullets for ammunition and Advanced Armament Corporation for muzzle brakes and suppressors; all three companies are subsidiaries of Freedom Group Incorporated. In 2015, the U.S. Army was considering the PSR to replace both the .300 Winchester Magnum M2010 Enhanced Sniper Rifle and the .50 BMG M107 Long Range Sniper Rifle for regular snipers, although no decision has been made. The U.S. Marine Corps was also considering the Mk 21 to replace their M40A5 sniper rifle, but is unlikely to adopt the Mk 21 due to the higher cost of the system, particularly the ammunition, as compared to the 7.62mm NATO M40A5. The Remington MSR is a manually operated bolt-action weapon with a rotary locking bolt. To facilitate caliber change, the bolt is equipped with removable bolt heads, with bolt faces matched for appropriate

calibers. Bolt heads have three radial locking lugs. The MSR rifle is built upon an aluminum alloy "chassis", which hosts a compact receiver, adjustable trigger unit, pistol grip, and fully adjustable side-folding buttstock. The quick-change barrels are free-floated inside the tubular handguard which is provided with a number of user-installable Picatinny type accessory rails. The top of the receiver also is fitted with monolithic Picatinny rail used to install sighting equipment (telescope sights or night vision sights). Additional equipment includes detachable folding bipod, and a quick-detachable suppressor which installs over the specially designed muzzle brake. The model that won the PSR competition is a modified version of the original MSR. It can be chambered in 7.62×51mm NATO, .300 Winchester Magnum, and .338 Lapua Magnum. It is reported to have 0.7 MOA average accuracy at 1,000 m (1,094 yd) with both Barnes and ATK 300 gr (19.4 g) .338 Lapua Magnum ammunition. Changes to the PSR version include: *Reinforced AAC muzzle brake for Titan QD suppressor *Chromoly steel .338 barrel with 1:9.5 twist, 5R rifling, and Melonite (ferritic nitrocarburized) finish *One piece handguard with 20 MOA top rail *Barrel nut accessible without removing the handguard *X-treme trigger *Light weight, removable buttstock with throw lever adjustments instead of ratcheting adjustments On 14 August 2014, the Army announced it was seeking sources to produce .338 Lapua armor-piercing (AP) ammunition for use in the Mk 21 PSR to effectively engage targets out to 1,500 m (1,640 yd). The main objective is for the rifle to defeat level IV body armor at 400 meters, whether suppressed or unsuppressed, in temperature ranges of −65 to 160 °F (−54 to 71 °C). Other minimum requirements include a projectile velocity of 1,340 ft/s (410 m/s) or more at 1,250 m (1,367 yd), 1,000 ft·lb (1,356 J) of kinetic energy at 1,500 m (1,640 yd), and the ability to defeat both 3⁄8 in (9.5 mm) of rolled homogeneous armor (RHA) and 1⁄2 in (12.7 mm) of cast iron at 800 m (875 yd).

Barrett M82 (M107) American Semi-Automatic Sniper Rifle





Tiers:

1 2 **3** 4

Variants:

- **M107-A1:** Product improvement of the M82A1A. Improvements include: reduction in weight by 5 pounds; cylindrical titanium muzzle brake; titanium barrel key/recoil buffer system in order to operate with a Barrett suppressor; functional modifications to increase durability and ease of operation. Barrett introduced this variant in 2013
- **M107:** The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.

System

Alternate Designation: Barrett M82; M107
Date of Introduction: 1984
Proliferation : Widespread (45+ nations)
Manufacturer: Barrett Firearms Manufacturing
Cost: $8,900
Operation : Recoil
Fire Mode : Semi-automatic only
Feed System: 10-rd detachable box magazine
Rate of Fire : rd/min20.0
Muzzle Velocity: m/s853
Effective Firing Range: m1,800

↳*Dimensions*

Length, Barrel : m736.0
Length, Overall : m1448.0
Weight, Empty without Magazine: kg14.75

Ammunition

↳*Ammunition (Option 1)*

Name: Raufoss Grade A (match)(DODIC A606) (USMC)

Type: Standard operating round

Caliber/Length : mm12.7x99 (.50 cal)

Muzzle Velocity : m/s854.0

Range, Maximum, with Scope : m1800.0

↳*Ammunition (Option 2)*

Name: MP NM140 (Nammo) MK211 Mod 0

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 45 degrees at 1,000 m

Fragmentation: 20 fragments after hitting 2 mm steel

Incendiary Effect: Ignition of JP4 and JP8

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 3)*

Name: AP-S NM173 (Nammo)

Type: Armor piercing

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 30 at 1,500 m

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 4)*

Name: M903 (Olin)

Type: Saboted Light Armor Penetrator (SLAP) (actual bullet is tungsten .30 inch penetrator wrapped in a .50-cal plastic sabot)

Bullet: 12.7- mm x 99-m (.50 cal)

Armor Penetration : mm19 mm (.75 in) at 1,500 m

Muzzle Velocity : m/s1014.0

Range, with Scope : m1500.0

Accuracy : m/sINA

↳*Ammunition (Option 5)*

Name: M8

Type: Armor piercing incendiary

Armor Penetration: mm20 mm at 100 m

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Muzzle Velocity : m/s881.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 25 cm at 550 m

↳*Ammunition (Option 6)*

Name: M20

Type: API-T

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration: mm20 mm at 100 m

Muzzle Velocity : m/s887.0

Trace: m91 to 1,463

Accuracy: less than 25 cm at 550 m

↳*Ammunition All*

Combat Load: rds30, typical

Type: Ball, AP, AP-I, API-T, Tracer, SLAP, MP

Sights

↳*Night Sight*

Available: Yes

Available: Yes.

Magnification: 10x42

↳*Sights #1*

Name: Unertl

Type: Optical (matches trajectory of .50-cal Raufoss Grade A)

Magnification: 10x

↳*Sights #2*

Name: Swarovski

Type: Optical (with ranging reticle)

Magnification: 10x42

↳*Sights #3*

Name: Barrett Optical Ranging System (BORS)

Type: Ballistic Computer. This add-on device couples to the telescope, in place of the rear scope ring. It can then adjust

for range, air temperature, round used, and other factors.

Notes: A commonly associated scope is the Leupold Mark 4; but it can also work with other scopes.

Notes:

The Barrett M82, standardized by the U.S. military as the M107, is a recoil-operated, semi-automatic anti-materiel sniper system developed by the American Barrett Firearms Manufacturing company. Despite its designation as an anti-materiel rifle, it is used by some armed forces as an anti-personnel system. The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.[1][2] The weapon is found in three variants, the original M82A1 (and A3), the bullpup M82A2 and Barrett M107A1 with muzzle brake designed to accept suppressor and made out of titanium instead of steel. The M82A2 is no longer manufactured, though the XM500 can be seen as its successor. Barrett Firearms Manufacturing was founded by Ronnie Barrett for the sole purpose of building semi-automatic rifles chambered for the powerful 12.7×99mm NATO (.50 BMG) ammunition, originally developed for and used in M2 Browning machine guns. The weapon was first sold to the Swedish Army in 1989. In 1990, the United States armed forces purchased the M82A1 during operations Desert Shield and Desert Storm in Kuwait and Iraq. About 125 rifles were initially bought by the United States Marine Corps, and orders from the Army and Air Force soon followed. The M82A1 is known by the US military as the SASR—"Special Applications Scoped Rifle", and it was and still is used as an anti-materiel rifle and explosive ordnance disposal tool. In 2006, Barrett completed development of the XM500, which has a bullpup configuration similar to the M82A2. Barrett M82 rifles were bought by various military and police forces from at least 30 countries, such as Belgium, Chile, Denmark, Finland, France, Germany, Greece, Indonesia, Italy, Jamaica, Mexico, the Netherlands, and others. The Barrett M82A1 rifle was used in 2002 as a platform for the experimental OSW (Objective Sniper Weapon) prototype. This weapon was fitted with a shorter barrel, and fired 25mm high-explosive shells developed for the 25×59 mm OCSW (Objective Crew Served Weapon) automatic grenade launcher. The experimental OSW showed an increased effectiveness against various targets, but the recoil was beyond human limitations. This weapon, also known as the Barrett "Payload Rifle", has now been designated the XM109. The M82 is a short-recoil semi-automatic firearm. When the gun is fired, the barrel initially recoils for a short distance (about 1 in (25 mm)), while being securely locked by the rotating bolt. After the short travel, the lower part of accelerator arm, held by receiver upper part, is already hinged in bolt carrier and the middle portion strikes it back to the barrel by a rod place in bolt carrier, transferring part of the recoil energy of the barrel to the bolt to achieve reliable cycling and unlock it from barrel. The bolt is unlocked by turning in the curved cam track in the bolt carrier. Then, the barrel is stopped by the combined effect of the accelerator, buffer spring and the muzzle brake and the bolt continues back, to extract and eject a spent case.[clarification needed] On its return stroke, the bolt strips the fresh cartridge from the box magazine and feeds it into the chamber and finally locks itself to the barrel. The striker is also cocked on the return stroke of the bolt. The gun is fed from a large, detachable box magazine holding up to 10 rounds, although a rare 12-round magazine was developed for use during Operation Desert Storm in 1991. The receiver is made from two parts (upper and lower), stamped from sheet steel and connected by cross-pins. The heavy barrel is fluted to improve heat dissipation and save weight, and fitted with a large and effective reactive muzzle brake. On the earlier models, the muzzle brakes had a round cross-section; later M82 rifles are equipped with two-chamber brakes of rectangular cross-section. M82A1 rifles are fitted with scope mount and folding backup iron sights, should the glass scope break. The U.S. military M82 rifles are often equipped with Leupold Mark 4 telescopic sights. The M82A1M (USMC M82A3) rifles have long Picatinny accessory rails mounted and US Optics telescopic sights. Every M82 rifle is equipped with a folding carrying handle and a folding bipod (both are detachable on the M82A3). The M82A3 is also fitted with a detachable rear monopod under the butt. The buttpad is fitted with a soft recoil pad to further decrease the felt recoil. M82A1 and M82A3 rifles could be mounted on the M3 or M122 infantry tripods (originally intended for machine guns) or on vehicles using the special Barrett soft-mount. The M82A1 can be fitted with a carry sling, but according to those who carried it in the field, the M82 is too uncomfortable to be carried on a sling due to its excessive length and weight. It is usually carried in a special carry soft or hard case.

SR98 Australian 7.62mm Sniper Rifle







Tiers:



Variants:

- **PM (Precision Marksman):** The rifle from which the Arctic Warfare family was developed. In this original form, it entered service in the UK in the mid-1980s, and designated as the L96A1 (chambered for 7.62×51mm NATO).
- **AW (Arctic Warfare):** The basic 'improved' version of the L96A1. The name stems from special features designed to enable operation in extremely cold climates. Adopted as the following (All versions mentioned are chambered for the 7.62×51mm NATO cartridge and uses a 10-round detachable magazine): L118A1: The British military service version. Psg 90: The Swedish military service version. Psg is short for Prickskyttegevär ("Sniper Rifle"). SR98: The Australian military service version. It is the standard issue sniper rifle for the Australian Army and is also used by various law enforcement agencies. This variant features threaded barrel (for a suppressor), an integrated adjustable bipod, a free floating barrel and a folding stock with adjustable butt pad, cheek pad, and a rear mono pod.
- **AWF (Arctic Warfare Folding):** The AWF is a variant of the AW with side-folding polymer stock. L118A2: The British military service version. Psg 90B: The Swedish military service version.
- **AWP (Arctic Warfare Police):** The AWP is a version intended for use by law enforcement as opposed to military, with AWP standing for Arctic Warfare Police. The most notable feature is that the distinctive frame is black instead of light green. It also has a shorter 24 in (610 mm) barrel than the AW model. The AWP is normally chambered for 7.62×51mm NATO/.308 Winchester or .243 Winchester ammunition, though it can be chambered for other cartridges. The AWP is distinct from the Accuracy International AW AE, which also has a black finish but is a cheaper non-military version of the AW series.
- **AWS (Arctic Warfare Suppressed):** The AWS is specifically designed for use with subsonic ammunition which, depending on the target, gives an effective maximum range of around 300 metres (330 yd). Its noise levels are similar to those generated by .22 LR match ammunition. The weapon is fitted with a special .308 Winchester/7.62×51mm NATO 406 mm (16 in) long barrel which has a twist rate of 229 mm (1 in 9 in) and an integral suppressor. The AWS barrel/suppressor combination has a total length of 711 mm (28 in), which keeps the weapon's overall length within normal limits. The user can remove the barrel/suppressor combination and replace it with a standard AW or AWP barrel

in about three minutes. As with all such systems, the sight will need re-zeroing after a barrel change.

- **AWC (Arctic Warfare Covert):** The Covert system is essentially an AWS with a folding stock with a 305 mm (12 in) long barrel/suppressor combination with a 203 mm (1 in 8 in) twist rate. It is supplied in a small suitcase which houses the rifle with the stock folded and the barrel/suppressor combination detached. The polymer suitcase is lined with closed-cell foam featuring cut-outs for the stock/action/optics/bipod combination, the bolt, the suppressor, a magazine and a box of ammunition. While the Covert system's compacted size is considerably smaller than that of any conventional system, its special barrel and integral suppressor keep the weapon's overall length within normal limits when deployed.
- **AWM (Arctic Warfare Magnum):** The AWM is a variant of the AW sniper rifle that is chambered for either the .300 Winchester Magnum or the .338 Lapua Magnum. It has a longer bolt compared to the AW, in order to accommodate for the larger and more powerful magnum cartridges. It's fed through a 5-round detachable magazine. The AWM that is chambered for the .338 Lapua Magnum cartridge has been adopted since its first introduction in the British army and in the Dutch army in 1996.
- **AWM-F (Arctic Warfare Magnum Folding Stock):** The AWM-F was the first AW variant featuring a folding stock and has been adopted since its first introduction in the German Army in 1998, and by other several armies: (See the Arctic Warfare Magnum to see the full list.) The G22 (Gewehr 22 or Scharfschützengewehr 22) by German Army, it features a folding stock and is chambered for the .300 Winchester Magnum round (designated 7.62×67mm). The Dutch army also adopted the AWM-F that is chambered for the .338 Lapua Magnum.
- **AW50 (Arctic Warfare .50 calibre):** The AW50 was introduced in 2000 by the British and Australian armed forces and is an AW rifle re-engineered and chambered for .50 BMG (12.7×99mm NATO). The German Army adopted the AW50 and designated it as the G24 (Gewehr 24 or Scharfschützengewehr 24).
- **AW50F (Arctic Warfare .50 calibre Folding Stock):** The AW50F is a variant of the AW50 adopted by the Australian military. It differs from the standard AW50 in that it is fitted with a folding stock (hence the F) and Maddco barrel.
- **AE (Accuracy Enforcement):** The Accuracy International AE was introduced in 2001 as a cheaper, somewhat simplified, less robust version of the L96/AW series intended for law enforcement, in place of the more expensive AWP or AW models intended for military use. The AE bolt-action differs from the larger, more angular AW design. The round AE receiver is lighter than in the AW models. The action of the AE is not permanently bonded with epoxy material to the aluminium chassis and can be removed. Unlike the AW models, the AE can not be ordered in a left-handed configuration. The AE is chambered in 7.62×51mm NATO cartridge and its barrel is 610 mm (24 in) long.
- **AE Mk III:** In 2009, the AE was updated to the AE Mk III. The AE Mk III sniper rifle system uses AICS 5- and 10-round magazines, has a removable trigger group, and a screw-adjustable cheekpiece. An optional 508 mm (20.0 in) barrel with muzzle brake or tactical suppressor mounting facilities and a folding chassis are available. Accuracy International has discontinued the AE sniper rifles. In 2014, Accuracy International introduced the AT308 or the AT (Accuracy Tactical) sniper rifle, which is a more modern variant of the AE (Accuracy Enforcement) sniper rifle, and will be offered to law enforcement and civilian clients worldwide.
- **AT (Accuracy Tactical):** The AT (Accuracy Tactical) model was introduced in 2014 as a cheaper alternative to the more expensive AX series which are intended for military use. The AT on the other hand is intended for law enforcement and civilian use. Like the AX series the AT continues the legacy of the Arctic Warfare sniper rifle and is also an improvement of the AE (Accuracy Enforcement) sniper rifle. The AT is chambered in 7.62×51mm NATO/.308 Winchester. It is a manual operated, bolt action sniper rifle. It features a rotary bolt with six locking lugs, arranged into three pairs at the bolt head, a polymer stock with aluminium alloy chassis, and a solid, flat-bottomed receiver made of steel, the AI (Accuracy International) muzzle brake (optional), a detachable suppressor, a 20-, 24- inch plain or threaded barrel, and a 26-inch threaded barrel only, a 10-round detachable magazine, an integral Picatinny (Mil-Std 1913) rail above the receiver for mounting various optics/scopes and an additional accessory rails can be easily bolted to the forend of the rifle for mounting various accessories, a standard stock that is made from a polymer and features fully adjustable comb and buttpad, side-folding stock that folds to the left is available, a two-stage trigger that is adjustable for trigger weight between 1.5 and 2 kg.

System

Alternate Designation: SR98
Type: Sniper Rifle
Manufacturer: Accuracy International
In Service: 1990s-Present
Action: Bolt-action
Muzzle Velocity: 850 m/s
Maximum Firing Range: 3,943 m

Effective Firing Range: 800 m

Feed System: 10-round double stack detachable box magazine (.308) 5-round single stack detachable box magazine (.300, .338)

Sights: detachable aperture type iron sights day or night optics

Dimensions

Length: 1,180 mm

Barrel Length: 660 mm

Weight: 6.5 kg

Ammunition

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Available Cartridge: 7.62×51mm NATO (.308 Winchester) .300 Winchester Magnum .338 Lapua Magnum

Notes:

The SR98 Australian 7.62mm Sniper Rifle is the Australian version of the Accuracy International Arctic Warfare rifle is a bolt-action sniper rifle. The Accuracy International Arctic Warfare rifle is a bolt-action sniper rifle designed and manufactured by the British company Accuracy International. It has proved popular as a civilian, police, and military rifle since its introduction in the 1980s. The rifles have some features that improve performance in very cold conditions (which gave the rifle its name) without impairing operation in less extreme conditions. Arctic Warfare rifles are generally fitted with a Schmidt & Bender PM II telescopic sight with fixed or variable magnification. Variable telescopic sights can be used if the operator wants more flexibility to shoot at varying ranges, or when a wide field of view is required. Accuracy International actively promotes fitting the German-made Schmidt & Bender MILITARY MK II product line as sighting components on their rifles, which is rare for a rifle manufacturer. The German and Russian forces preferred a telescopic sight made by Zeiss[4] over Accuracy International's recommendation. The AW system is almost unique in being a purpose-designed military sniper rifle, rather than an accurised version of an existing general-purpose rifle. The modular design of the AW system allows for flexibility, serviceability and repairability under field and combat conditions. Major components, such as the barrel and the bolt, can be switched between rifles, or replaced in the field by their operator with the help of some tools. The chambering can also be switched by the operator as long as the barrels, bolts and feeding mechanism can handle the shape and size of the cartridges. Rather than a traditional wooden or polymer rifle stock, the AW is based on an aluminium chassis which extends the entire length of the stock. This chassis system is marketed as the Accuracy International Chassis System (AICS) and can be used for all Accuracy International rifles. All other components, including the receiver, are bolted directly to this chassis. Two hollow polymer "half thumb-hole stock panels", usually coloured green, dark earth or black, are in turn bolted to each other through the chassis, creating a rugged yet, for its sturdiness, comparatively light weapon. The Accuracy International receiver is bolted with four screws and permanently bonded with epoxy material to the aluminium chassis, and was designed for ruggedness, simplicity and ease of operation. To this end, the heavy-walled, flat-bottomed, flat-sided receiver is a stressed part, machined in-house by AI from a solid piece of forged carbon steel. AW rifles are supplied in two action lengths—standard AW (short) and long SM (magnum). The six bolt lugs, arranged in two rows of three, engage a heat-treated steel locking ring insert pinned inside the front bridge of the action. The ring can be removed and replaced to refresh headspace control on older actions. The AW system cast steel bolt has a 0.75-inch (19.05 mm) diameter combined with gas relief holes in a 0.785 in (19.9 mm) diameter bolt body and front action bridge allowing high-pressure gases a channel of escape in the event of a cartridge-case head failure. Against penetrating water or dirt the bolt has milled slots, which also prevent freezing or similar disturbances. Unlike conventional bolt-action rifles, the bolt handle is bent to the rear, which eases the repeating procedure for the operator and reduces the contour of the weapon. The action cocks on opening with a short, 60 degree bolt throw and has a non-rotating (fixed) external extractor and an internal ejector. Firing pin travel is 0.26 in (6.6 mm) to keep lock times to a minimum. Finally, an 11 mm (0.43 in) integral dovetail rail located above the receiver is designed to accommodate different types of optical or electro-optical sights. As an option, a MIL-STD-1913 rail (Picatinny rail) can be permanently pinned, bonded and bolted to the action, providing a standard interface for many optical systems.

OSV-96 Russian 12.7mm Semi-Automatic Sniper Rifle





Tiers:



Variants:

- **V-94 (B-94 «Волга»):** rototype was developed by the KBP (Instrument Design Bureau) in the early 1990s[2]. V-94 was first revealed to the public in 1994. Initial muzzle energy is estimated to be 18860 J, while firing API ammunition (885 gr).
- **OSV-96:** Developed in 1996-2000, entered service in March 2000. Design utilizes a number of improvements, such as a redesigned stock, muzzle brake, and carrying handle.

System

Alternative Designations: KSVK
Manufacturer: KBP Instrument Design Bureau
Produced: 1990s-Present
Operation: Semi-automatic, gas operated, rotating bolt.
Action: Direct impingement gas-operated, rotating bolt
Rate of Fire: Semi-Automatic
Muzzle Velocity: 870–910 m/s
Effective Firing Range: m2,000
Feed System: 5-round detachable box magazine

Dimensions

Empty Weight (w/o magazine or optical sight) (kg): kg12.9
Overall Length: mm1,746
Barrel Length: mm1,000

Weight, without Scope: kg12.9

Ammunition

Typical Combat Load: 30 est.

↳*Ammunition (Option 1)*

Name: 7N34 Sniper

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

↳*Ammunition (Option 2)*

Name: BZ (API)

Type: Rifle

Caliber: 12.7

Cartridge: 12.7×108mm

Sights

Type: Optical: POS 13x60 or night vision scope mounted on integral Picatinny rail.

Magnification: 13x

Night Sights Available: Yes

Note: various mounting sniper sights and back-up iron sights

Notes:

OSV-96 (Russian: ОСВ-96) is a Russian heavy semi-automatic sniper rifle chambered for the 12.7×108mm. The rifle is capable of engaging infantry at a distance of up to 1800 meters and can combat material targets at ranges up to 2500 meters. As an effective anti-sniper weapon, OSV-96 keeps the shooter outside of the effective range of conventional calibers providing a distinct advantage over lower caliber rifles. Specialized high-accuracy 12.7×108mm 7N34 59.0 gram FMJ and AP sniper cartridges have been developed for Russian .50-caliber sniper rifles such as this rifle. Large caliber machine gun cartridges can also be used for firing, but with limited accuracy. The OSV-96 folds in half in between the barrel/chamber and receiver compartments to shorten its length for ease of transportation. The rifle features a free-floating barrel in combination with a large muzzle brake to greatly decrease its recoil. The OSV-96 12.7mm sniper rifle began its life during early 1990s as V-94. Designed and developed at famous KBP (Instrument Design Bureau) in Tula. During following years rifle incorporated several improvements, and was eventually redesignated as OSV-96. It is offered for export and local buyers, and is in use by Russian Army and Internal Affairs Ministry (MVD) special units. The OSV-96 is a gas operated, rotating bolt semiautomatic rifle. The bolt locks directly to the barrel extension, so it is possible to made a hinge between the barrel and receiver. When not in use, the OSV-96 could be "folded" around this hinge to save the space, since the rifle is quite long. This feature also allows for quick transformation from folded into battle-ready position. To 'fold up' the rifle user must lock the bolt back by cocking it and engaging the bolt catch, then release large barrel lock on the left side of the receiver. The long barrel is free-floated, and fitted with long combination muzzle brake – flash hider. The integral folding bipods are mounted on the special console, attached to the base of the barrel, next to the hinge point. The polymer buttstock is fitted with rubber recoil pad. OSV-96 is usually fitted with some sort of telescope or nightvision sight, but also carries a set of back-up iron sights. The exact accuracy data of the OSV-96 is not yet published, but, apparently, it is enough for intended work as a anti-materiel rifle or mid-range counter-sniper rifle.

SV-98M Russian 7.62mm Bolt-Action Sniper Rifle



Tiers:



Variants:

- **Upgraded SV-98:** n 2013 an upgraded SV-98 variant was developed by Izhmash featuring an adjustable aluminum skeleton type stock. Izhmash expects the upgraded variant to be more economical to produce and offer improved maintainability and accuracy of fire. It has been tested by Izhmash since 2013. The upgraded sniper rifle features an aluminum alloy receiver providing enhanced performance and lower cost of production. The adjustable stock is ambidextrous. The buttstock length is adjustable and the position of the butt plate and comb adjusts by length and height. It also features a bipod in the forearm and a leg in the buttstock; adjustment of each leg is independent. In travel position the bipod is folded into the forearm, and the rear leg – into the buttstock, and, thus, do not enlarge the overall dimensions of the weapon. The upgraded SV-98 is can also be equipped with a tactical suppressor to reduce the sound blast, blowback and flash when it is being fired. It also features a Picatinny rail on top of the receiver to mount Russian-made and foreign-made optics. It comes with a standard 1P69 optical sight with a 3–10× variable magnification and is equipped with an open sight. The rifle safety catch locks the trigger, inerts the sear and prevents the rotary bolt from turning (unlocking).
- **SV-98M:** The SV-98M is the post 2017 Kalashnikov Concern production variant and is based on the 2013 upgraded SV-98 variant. It has a lightweight skeleton stock made of aluminium alloys, a Picatinny rail for optical scopes on the top of its upper receiver, a folding stock, and an integrated bipod. It is chambered for the 7N1 or 7N14 7.62×54mmR sniper cartridges and has a magazine capacity of 10 rounds. The sniper rifle has a combat weight of 7.8 kg, a length of 1,200 mm (including a barrel of 650 mm), and an effective firing range of 1,000 m. It can be equipped with a suppressor instead of the organic muzzle brake to reduce the sound blast, blowback and flash when it is being fired. The SV-98M is primarily intended for the snipers of the Russian Ground Forces. According to a source in the local defence industry, the military has ordered a small batch of SV-98M sniper rifles for operational test and evaluation.
- **SV-338, SV-338M, SV-338 M1:** Based on the Record full bore sport shooting rifle series Izhmash also developed the SV-338, SV-338M, and SV-338 M1 sniper rifles chambered for the .338 Lapua Magnum (8.6×70mm or 8.58×70mm) cartridge. These rifles feature scaled-up magnum bolt actions but are similar to the SV-98.

System

Alternative Designation : SV-98M
Date of Introduction: 2017
Action: Bolt
Feed System: 10 round detachable magazine
Operation : Russian and Armenia (current information)
Muzzle Velocity: m/s820
Effective Firing Range, Iron Sight: m600
Effective Firing Range, Optical Sight: m1,000
Feed System: 10-round detachable magazine

↳*Dimensions*

Length : mm1200.0
Length, Barrel : mm650 mm (25.59 in) (4 grooves, right-hand twist)
Length, with suppressor : m1375.0
Combat Weight: kg1.8

Ammunition

Notes: This rifle is capable of firing standard issue ball ammo in either caliber, but the trained DSMs or Snipers that the rifle will be issued to will also have access to target quality ammunition in order to take advantage of the superb, intrinsic accuracy offered by this sniper system.

↳*Ammunition (Option 1)*

Name: 7.62x54R 7N1 standard sniper
Type: ball
Cailber/Length : mm7.62
Muzzle Velocity : m/s820.0
Range, Effective : m1000, optical sights
Range, Effective : m600, iron sights
Note: Additional Ammo includes 7N1 or 7N14

Sights

Notes: Trigger is fully adjustable for weight of pull. This rifle is capable of firing standard issue ball ammo in either caliber, but the trained DSMs or Snipers that the rifle will be issued to will also have access to target quality ammunition in order to take advantage of the superb, intrinsic accuracy offered by this sniper system.
Type: Telescopic sight and iron sights

Notes:

The SV-98M is the post 2017 Kalashnikov Concern production variant and is based on the 2013 upgraded SV-98 variant. It has a lightweight skeleton stock made of aluminium alloys, a Picatinny rail for optical scopes on the top of its upper receiver, a folding stock, and an integrated bipod. It is chambered for the 7N1 or 7N14 7.62×54mmR sniper cartridges and has a magazine capacity of 10 rounds. The sniper rifle has a combat weight of 7.8 kg, a length of 1,200 mm (including a barrel of 650 mm), and an effective firing range of 1,000 m. It can be equipped with a suppressor instead of the organic muzzle brake to reduce the sound blast, blowback and flash when it is being fired. The SV-98M is primarily intended for the snipers of the Russian Ground Forces. According to a source in the local defence industry, the military has ordered a small batch of SV-98M sniper rifles for operational test and evaluation.[

KSVK Russian 12.7mm Sniper Rifle





Tiers:

1 2 3 4

Variants:

- **SVN-98:** INA
- **KSVK:** (КСВК)
- **ASVK:** ASVK (АСВК, army Kovrov large-caliber sniper rifle) – adopted by Ministry of Defence of the Russian Federation under designation 6S8 "KORD" sniper complex (6С8 «Корд») in June 2013 and used by the Syrian Arab Army during the Syrian Civil War.[
- **ASVK-M Kord-M:** INA

System

Alternative Designation : 6S8 Kord
Manufactuer: Degtyarev plant
Operation: Bolt action, bull pup design
Muzzle Velocity : m/s770-860
Range, Maximum Effective : m1000, iron sights
Range, Maximum Effective, Optical Sight : m1500
Rate of Fire : rd/min10
Feed System: 5-rd detachable box magazine

↳*Dimensions*

Length, Barrel : mm1000.0
Length, Overall : mm1420.0
Weight: 12 kg w/o scope

Ammuntion

Type: Sniper, API, API-T

Caliber: mm12.7

Cartridge: 12.7×108mm

Combat Load: rds30 (est), typical

Magazine Capacity: rds5

Sights

Note: Iron sights, rails for mounting various sniper sights

Notes:

The KSVK (Russian: Крупнокалиберная Снайперская Винтовка Ковровская (Krupnokalibernaya Snayperskaya Vintovka Kovrovskaya); English: Large-Caliber Kovrov Sniper Rifle) or Degtyarev sniper rifle is a 12.7mm anti-materiel sniper rifle developed in Russia for the purpose of counter sniping and penetrating thick walls, as well as light armored vehicles. The KSVK anti-material (or large caliber sniper) rifle was developed in the late 1990s by Degtyarev plant, based in Kovrov, Russia. It is based on the SVN-98 12.7mm experimental rifle. The KSVK is a bullpup-configured, bolt-action, magazine-fed rifle. It is equipped with a muzzle device which acts as a muzzle brake and a sound damper. The KSVK is equipped with standard Russian side-mounted scope rail (dovetail), and can be fitted with variety of day and night scopes. Open iron sights are installed for backup or emergency purposes.

Barret XM500 American Semi-Automatic Sniper Rifle







Tiers:



Variants:

- **M107-A1:** Product improvement of the M82A1A. Improvements include: reduction in weight by 5 pounds; cylindrical titanium muzzle brake; titanium barrel key/recoil buffer system in order to operate with a Barrett suppressor; functional modifications to increase durability and ease of operation. Barrett introduced this variant in 2013
- **M107:** The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.

System

Alternate Designation: XM500
Type: Sniper Rifle
Manufacturer: Barrett Firearms Manufacturing
Action: Gas-operated, rotating bolt
Fire Mode : Semi-automatic only
Feed System: 10-round detachable box magazine
Rate of Fire : rd/min20.0
Muzzle Velocity: m/s853
Effective Firing Range: m1,800

↳*Dimensions*

Length, Overall : mm1200
Weight, Empty without Magazine: kg12

Ammunition

↳*Ammunition (Option 1)*

Name: Raufoss Grade A (match)(DODIC A606) (USMC)
Type: Standard operating round
Caliber/Length : mm12.7x99 (.50 cal)
Muzzle Velocity : m/s854.0
Range, Maximum, with Scope : m1800.0

↳*Ammunition (Option 2)*

Name: MP NM140 (Nammo) MK211 Mod 0
Caliber/Length : mm12.7-mm x 99-m (.50 cal)
Armor Penetration : mm11 mm at 45 degrees at 1,000 m
Fragmentation: 20 fragments after hitting 2 mm steel
Incendiary Effect: Ignition of JP4 and JP8
Muzzle Velocity : m/s915.0
Range, Maximum, with Scope : m1800.0
Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 3)*

Name: AP-S NM173 (Nammo)
Type: Armor piercing
Caliber/Length : mm12.7-mm x 99-m (.50 cal)
Armor Penetration : mm11 mm at 30 at 1,500 m
Muzzle Velocity : m/s915.0
Range, Maximum, with Scope : m1800.0
Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 4)*

Name: M903 (Olin)
Type: Saboted Light Armor Penetrator (SLAP) (actual bullet is tungsten .30 inch penetrator wrapped in a .50-cal plastic sabot)
Bullet: 12.7- mm x 99-m (.50 cal)
Armor Penetration : mm19 mm (.75 in) at 1,500 m

Muzzle Velocity : m/s1014.0

Range, with Scope : m1500.0

Accuracy : m/sINA

↳*Ammunition (Option 5)*

Name: M8

Type: Armor piercing incendiary

Armor Penetration: mm20 mm at 100 m

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Muzzle Velocity : m/s881.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 25 cm at 550 m

↳*Ammunition (Option 6)*

Name: M20

Type: API-T

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration: mm20 mm at 100 m

Muzzle Velocity : m/s887.0

Trace: m91 to 1,463

Accuracy: less than 25 cm at 550 m

↳*Ammunition All*

Combat Load: rds30, typical

Type: Ball, AP, AP-I, API-T, Tracer, SLAP, MP

Sights

↳*Night Sight*

Available: Yes

Available: Yes.

Magnification: 10x42

↳*Sights #1*

Name: Unertl

Type: Optical (matches trajectory of .50-cal Raufoss Grade A)

Magnification: 10x

Sights #2

Name: Swarovski

Type: Optical (with ranging reticle)

Magnification: 10x42

↳*Sights #3*

Name: Barrett Optical Ranging System (BORS)

Type: Ballistic Computer. This add-on device couples to the telescope, in place of the rear scope ring. It can then adjust for range, air temperature, round used, and other factors.

Notes: A commonly associated scope is the Leupold Mark 4; but it can also work with other scopes.

Notes:

The Barrett XM500 is a gas-operated, semi-automatic sniper rifle/anti-materiel rifle currently in development by the Barrett Firearms Company. It is fed by a 10-round detachable box magazine situated behind the trigger in bullpup configuration. Based on the design of the Barrett M82/M107 .50-caliber sniper rifle, it is intended to be a lighter, more compact alternative to the M82. Since the XM500 has a stationary barrel (instead of the recoiling-barrel design of the M82), it will likely have somewhat better accuracy.[1] As with its predecessor, it comes with a removable, adjustable bipod mounted under the barrel, and a top-mounted Picatinny rail for attachment of a scope or other accessory. XM500 rifle is the most recent creation of famous American Barrett Firearms co. This rifle, first shown in 2006, is intended to provide lighter and more compact alternative to popular Barrett M82 "Light fifty" rifle,which is widely used by military and law enforcement forces around the world.The new weapon will provide better accuracy (because of stationary,non-recoiling barrel) and same range as Light Fifty, while being lighter and significantly shorter, thanks to its bullpup layout. According to available information, this rifle is developed primarily for US Armed forces, and is still in development / prototype stage. Barrett XM500 long range sniper / anti-material rifle is a gas operated,semiautomatic rifle. Gas chamber and piston are located above the barrel. Barrelis locked using rotary bolt. Stock is of bullpup layout and made of metal, with rubber buttplate. Rifle is fitted with detachable lightweight bipods, adjustable for height. There are no open sights as of now, but rifle is fitted with integral Picatinny rail on the top of the receiver, so any type of sights can be installed using appropriate mounting interfaces.

↳

Blaser R93 Tactical German 7.62mm Sniper Rifle






Tiers:



Variants:

- **R93 Tactical (1st gen) (1993-1997):** Synthetic body model. Also available under the designations R93 UIT made for UIT competitions (later ISSF) and R93 CISM made for CISM competitions. Detachable staggered feed double stack 10-round box magazine. Chassis and barrel compatible with the regular R93. UIT and CISM versions came with diopter sights.
- **R93 Tactical LRS2 (1997-2005):** Detachable box magazine, Single Stack (5-round). The 2nd gen is a ruggeriezed[clarification needed] version, also known as Long Range Supporter 2 (LRS-2). New magazine design. Some of the different calibers may require different magazines. LRS stands for Long Range Sporter, but the model is sometimes also referred to as LRT for Long Range Tactical.
- **R93 Tactical LRS2 .338LM:** Large chassis version to facilitate .338 Lapua Magnum.
- **Blaser R93 Tactical 2 (2005-):** Large chassis version, available in .223 Rem, .308 Win, .300 WinMag, .338LM.
- **R93 Duo Mod. Hamed:** Double barreled side by side rifle made to order for Hamed bin Zayed Al Nahyan.
- **R93 Handgun Hunting System:** An ultra short R93 with a 36 cm barrel and only a pistol grip (no buttstock).

System

Alternate Designation: Blaser R93 Tactical
Type: 7.62mm Sniper Rifle
Total Built: Total Built: 200,000+
Manufacturer: Blaser
In Service: 1993-Present
Action: Straight-pull bolt action
Feed System: 5-round detachable box magazine (4 for .300 Win), Original LRT 10-rounds
Sights: detachable aperture-type iron sights or day or night optics
Effective Range: 800 m

Dimensions

Length: 1.12 m
Barrel Length: 25" (.223 Rem, .308 Win, .300 Win Mag) 26.3" (.338 Lapua)
Weight: .223 Rem., .308 Win., .300 Win Mag 5.4 kg (12 lb) (empty) .338 Lapua Mag. 5.8 kg (13 lb) (empty)

Ammunition

Type: Rifle
Caliber: 7.62mm
Cartridge: 7.62×51mm NATO
Other Caliber Options: 7.62×51mm NATO, .300 Winchester Magnum, .338 Lapua Magnum, 6.5×55mm

Notes:

The Blaser R93 Tactical is a German sniper rifle, based on the Blaser R93 design. It has as variants the Blaser LRS 2 and Tactical 2. It is used by German and Dutch police forces as well as the Australian military and special police units. The rifles were manufactured by the German firearms manufacturer Blaser. The LRT (Long Range Tactical), LRS 2 (Long Range Sporter 2) and Tactical 2 rifles are straight-pull bolt-action take down sniper rifles. The straight-pull action design was introduced in the Blaser R93 hunting rifle line. These actions allows for faster follow-up shots compared to traditional turn bolt actions. The rifles are designed to fire small groups (sub 0.07 mrad (7 mm at 100 m; 0.25 moa) with factory match ammunition. The LRS 2 version, comes chambered in .223 Remington, 6mm Norma BR, 6.5×55mm, .308 Winchester and .300 Winchester Magnum. An uncommon part of its design is that it is a straight-pull bolt-action rather than a turn-bolt, which allows for much faster follow-up shots. The 14-lug radial collet ensures the centering of the cartridge when fed into the chamber assisting in its accuracy. Barrel changes by an experienced person can take place in under 60 seconds. The Tactical 1 (very low production) or 2 version is available in .223 Remington, .308 Winchester, .300 Winchester Magnum and .338 Lapua Magnum and has a larger frame, action and barrel to accommodate the use of the .338 Lapua Magnum chambering. The sight is mounted directly to the barrel as normal, however, the design allows the barrel and sight to be removed from the body of the rifle by undoing the two hex screws with a hex key accessed from under the body. This allows the rifle to be carried in a more compact fashion and can be reassembled easily in less than 30 seconds. The safety catch is mounted on the rear of the bolt and reveals a large red dot when pushed forward and up to the "fire" position. One feature of the bolt is that when unloaded and no magazine inserted, the safety has to be pushed forward slightly in order to pull the bolt back. The 5 round magazines in .308 calibre sit flush with the underside of the body when inserted.

M24 American 7.62mm Sniper Weapon System (SWS)







Tiers:



Variants:

- **XM24A1:** An experimental variant re-chambered for the .300 Winchester Magnum (7.62×67mm) round. It was not adopted by the US Army due to concerns that operatives in the field would not be able to acquire the special ammo. Also, the available .300 Winchester Magnum ammo that was procured sometimes misfired due to incompletely-burned propellant in the longer cartridge.
- **M24A2:** Remington has developed an improved version of the M24 rifle, known as the M24A2. The A2 model features a detachable 5-round magazine, top-mounted and adjustable side-mounted Picatinny rails (advertised by Remington as "MARS", or Modular Accessory Rail System), barrel modifications designed to accommodate a sound suppressor, and an improved H-S Precision PST-026 stock with adjustable cheek height and length of pull. Existing M24s can also be converted into M24A2s, which replaces the stock and adds the new detachable magazine feed. The conversion requires a re-barreling of the weapon so it can take the OPS silencer.
- **M24A3:** Remington developed the M24A3 SWS, a variant of the M24 chambered for the .338 Lapua Magnum round (8.58×70mm) and feeding from a 5-round detachable box magazine. It comes tapped for the Leupold Mk 4 M1LR/T 8.5–25×50mm Variable Power day scope. It can also use detachable front and rear Back-Up Iron Sights in an emergency (BUIS units are standard accessories that can be fitted to the Picatinny Rail that runs on the top of the receiver and along the barrel).
- **U.S. Army 2009 solicitation for an M24 reconfiguration:** The U.S. Army put out a solicitation in May 2009 for reconfiguring M24 Sniper Weapon Systems currently available in Army inventory consisting of a: *Rebarreling/rechambering the SWS's barrel optimized to accommodate Mk 248 (DODIC A191) .300 Winchester Magnum ammunition. *Replacement of existing weaver rails with a MIL-STD-1913 rail capable of accommodating both a day optic and in-line forward mounted, AN/PVS-26 (NSN 5855-01-538-8121) image intensified (I2) night vision device. *Reconfiguring the stock with a stock that incorporates a detachable box magazine, adjustable comb and length of pull. *Addition of a detachable sound suppressor as well as any necessary barrel modifications required for a sound suppressor interface. *Replacement of the existing day optic sight (DOS) and rings with an Army specified variable power day optic and compatible rings. The US government purchased MK 248 MOD 1 .300 Winchester Magnum match-grade ammunition in 2009 for use in .300 Winchester Magnum sniper rifles like the U.S. Navy Mk.13 MOD 5 rifle or reconfigured M24 SWSs. This ammunition was developed as a .300 Winchester Magnum Match Product Improvement (PIP) and uses the 14.26 g (220 gr) Sierra MatchKing Hollow Point Boat Tail (HPBT) very-low-drag bullet fired at a nominal muzzle velocity of 869 m/s (2,850 ft/s) ± 15.2 m/s (50 ft/s). According to the U.S. Navy this ammunition should increase the maximum effective range of .300 Winchester Magnum sniper rifle systems to 1,370 m (1,500 yd), decrease wind deflection on bullets in flight and use a reduced muzzle flash propellant that remains temperature stable across an operational temperature range of −32 °C to 74 °C (−25 °F to 165 °F). According to JBM Ballistics, using the G7 ballistic coefficient provided by Bryan Litz, the Mk 248 MOD 1 .300 Winchester Magnum cartridge, when fired at its nominal muzzle velocity of 869 m/s (2,850 ft/s), should have approximately 1,286 m (1,406 yd) supersonic range under

International Standard Atmosphere conditions at sea level (air density ρ = 1.225 kg/m3).

- **2010 M24E1 Enhanced Sniper Rifle reconfiguration competition:** In September 2010 the United States Army's Joint Munitions and Lethality Contracting Center awarded Remington a Firm Fixed Price Indefinite Delivery/Indefinite Quantity contract (W15QKN-10-R-0403) for the upgrade of up to 3,600 M24 Sniper Weapon Systems currently fielded to the Army pending type classification as the M24E1 Enhanced Sniper Rifle (ESR). Later the Enhanced Sniper Rifle was classified as the XM2010. The major configuration change for this system is the conversion from 7.62×51mm NATO to dimensionally larger .300 Winchester Magnum ammunition exploiting the M24's "long action" bolt to provide additional precision and range.
- **IDF modernized M24:** In 2019 the Israel Defense Forces started to upgrade the M24 and replace the stock and receiver of the old M24 rifles with a modern stock with AR15/M16 pistol grip, adjustable stock, magazine feeding and Picatinny rails around the barrel.

System

Alternate Designation: M24

Type: Sniper Weapon System (SWS)

Caliber: 7.62mm

Length: 1,092 mm

Barrel Length: 610 mm

Weight: 5.4 kg (11.88 lbs) empty, w/. sling, without scope (M24) 7.3 kg (16 lbs) max weight with day optical sight, sling swivels, carrying strap, fully loaded magazine

Action: Bolt-action

Rate of Fire: 20 rpm

Muzzle Velocity: 790 m/s

Maximum Firing Range: INA

Effective Firing Range: 800 m

Feed System: 5-round internal magazine

Sights: Telescopic; detachable backup iron sights

Ammunition

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Basic Load: INA

Notes:

The M24 Sniper Weapon System (SWS) is the military and police version of the Remington Model 700 rifle, M24 being the model name assigned by the United States Army after adoption as their standard sniper rifle in 1988. The M24 is referred to as a "weapon system" because it consists of not only a rifle, but also a detachable telescopic sight and other accessories. The M24 SWS has the "long action" bolt version of the Remington 700 receiver but is chambered for the 7.62×51mm NATO "short action" cartridge that has an overall length of 2.750 inches (69.85 mm). The "long action" allows the rifle to be re-configured for dimensionally larger cartridges up to 3.340 inches (84.84 mm) in overall length. The M24 originally came tapped for the Leupold Ultra M3A 10×42mm fixed-power scope, which came with a circle-shaped mil-dot glass-etched reticle. This was later replaced in 1998 by the Leupold Mk 4 LR/T M1 10×40mm fixed-power scope with an elongated-shaped mil-dot wire reticle.[5] The first number is the scope's magnification and the second number in millimeters (40mm) is the diameter of the objective lens. A fixed power scope has only one magnification (e.g., 10×) and a variable power scope can be adjusted to focus between a range of magnifications (e.g., 3–9× is adjustable from a minimum power of 3× to a maximum power of 9×). The rifle itself comes with a detachable Harris 9–13" 1A2-LM or Harris 9–13" 1A2-L bipod unit. The M24 SWS was to be replaced with the M110 Semi-Automatic Sniper System, a contract awarded to Knight's Armament Company. However, the Army still continued to

acquire M24s from Remington until February 2010 and upgraded to the A2 and M24E1 standard in many cases, continuing to serve. The Army chose to upgrade all its M24 rifles in the arsenals to the M2010 Enhanced Sniper Rifle, with the final M24 being converted in April 2014.

SV-98 Russian 7.62mm Bolt-Action Sniper Rifle







Tiers:



Variants:

- **Upgraded SV-98:** n 2013 an upgraded SV-98 variant was developed by Izhmash featuring an adjustable aluminum skeleton type stock. Izhmash expects the upgraded variant to be more economical to produce and offer improved maintainability and accuracy of fire. It has been tested by Izhmash since 2013. The upgraded sniper rifle features an aluminum alloy receiver providing enhanced performance and lower cost of production. The adjustable stock is ambidextrous. The buttstock length is adjustable and the position of the butt plate and comb adjusts by length and height. It also features a bipod in the forearm and a leg in the buttstock; adjustment of each leg is independent. In travel position the bipod is folded into the forearm, and the rear leg – into the buttstock, and, thus, do not enlarge the overall dimensions of the weapon. The upgraded SV-98 is can also be equipped with a tactical suppressor to reduce the sound blast, blowback and flash when it is being fired. It also features a Picatinny rail on top of the receiver to mount Russian-made and foreign-made optics. It comes with a standard 1P69 optical sight with a 3–10× variable magnification and is equipped with an open sight. The rifle safety catch locks the trigger, inerts the sear and prevents the rotary bolt from turning (unlocking).
- **SV-98M:** The SV-98M is the post 2017 Kalashnikov Concern production variant and is based on the 2013 upgraded SV-98 variant. It has a lightweight skeleton stock made of aluminium alloys, a Picatinny rail for optical scopes on the top of its upper receiver, a folding stock, and an integrated bipod. It is chambered for the 7N1 or 7N14 7.62×54mmR sniper cartridges and has a magazine capacity of 10 rounds. The sniper rifle has a combat weight of 7.8 kg, a length of 1,200 mm (including a barrel of 650 mm), and an effective firing range of 1,000 m. It can be equipped with a suppressor instead of the organic muzzle brake to reduce the sound blast, blowback and flash when it is being fired. The SV-98M is primarily intended for the snipers of the Russian Ground Forces. According to a source in the local defence industry, the military has ordered a small batch of SV-98M sniper rifles for operational test and evaluation.
- **SV-338, SV-338M, SV-338 M1:** Based on the Record full bore sport shooting rifle series Izhmash also developed the SV-338, SV-338M, and SV-338 M1 sniper rifles chambered for the .338 Lapua Magnum (8.6×70mm or 8.58×70mm) cartridge. These rifles feature scaled-up magnum bolt actions but are similar to the SV-98.

System

Alternative Designation : INA
Date of Introduction: 2003
Action: Bolt
Feed System: 10 round detachable magazine

Operation : Russian and Armenia (current information)

Muzzle Velocity: m/s820

Effective Firing Range, Iron Sight: m600

Effective Firing Range, Optical Sight: m1,000

Feed System: 10-round detachable magazine

↳*Dimensions*

Length : mm1200.0

Length, Barrel : mm650 mm (25.59 in) (4 grooves, right-hand twist)

Length, with suppressor : m1375.0

Weight without Suppressor and Sight: kg5.8

Weight with Suppressor and Sight: kg7.8

Ammunition

Notes: This rifle is capable of firing standard issue ball ammo in either caliber, but the trained DSMs or Snipers that the rifle will be issued to will also have access to target quality ammunition in order to take advantage of the superb, intrinsic accuracy offered by this sniper system.

↳*Ammunition (Option 1)*

Name: 7.62x54R 7N1 standard sniper

Type: ball

Cailber/Length : mm7.62

Muzzle Velocity : m/s820.0

Range, Effective : m1000, optical sights

Range, Effective : m600, iron sights

Sights

Notes: Trigger is fully adjustable for weight of pull. This rifle is capable of firing standard issue ball ammo in either caliber, but the trained DSMs or Snipers that the rifle will be issued to will also have access to target quality ammunition in order to take advantage of the superb, intrinsic accuracy offered by this sniper system.

Type: Telescopic sight and iron sights

Notes:

The SV-98 (Snaiperskaya Vintovka Model 1998) is a Russian bolt-action sniper rifle designed by Vladimir Stronskiy. In 2003 special operations troops were armed with the 7.62 mm 6S11 sniper system comprising the SV-98 sniper rifle (index 6V10) and 7N14 sniper enhanced penetration round. The rifle has been used in combat during operations in Chechnya. The SV-98 sniper rifle is based on the Record 300 m (328 yd) full bore sport shooting rifle series also made by Izhmash. Izhmash also produces Record target rifles chambered in .308 Winchester, 7.62×54mmR and .338 Lapua Magnum which are similar to the SV-98. According to the manufacturer the SV-98 sniper rifle is designed to engage various targets at a range up to 1,000 m (1,100 yd). The heart of the SV-98 is a cold-hammer forged receiver and a cold-hammer forged free-floating heavy barrel which can be chrome lined to order. The manually operated bolt action has a rotating bolt with three symmetrically-spaced frontal lugs. The barrel has 4 grooves right-hand rifling and a 320 mm (1 in 12.6 in) twist rate and features a threaded muzzle which can accept the standard provided conical birdcage-pattern muzzle brake or a specially designed 23db (A) suppressor that requires the use of subsonic ammunition. The rifle was developed to fire 7.62×54mmR 7N1 standard sniper, 7N14 enhanced penetration sniper

or "Extra" match grade sports cartridges. The SV-98 is equipped with iron sights (shrouded front and an up to 600 m (656 yd) in 100 m (109 yd) increments adjustable tangent-type rear sight) and a Picatinny rail on top of the receiver that can be used to mount Russian and foreign made telescopic sights and other aiming optics with an appropriate rail interface system. According to several internet sources, a standard telescopic sight used on this rifle is the PKS-07 7× fixed-magnification scope. The manufacturer however states the Russian made 1P69 3-10×42 variable magnification telescopic sight with a sighting range of up to 1,000 m (1,094 yd) is used as standard day light optical sight. The 1PN113 3.7× fixed magnification night sight is used as the standard low light optical sight. The ambidextrous laminated plywood stock features an adjustable butt plate that can be regulated for length of pull, height and pitch and has a height and length adjustable cheek comb. A fiber glass reinforced polymer stock was also offered. A front attachment point is situated at the foreend for mounting an integral folding bipod and the stock is prepared for mounting an integral rear monopod. The length of both bipod legs is independently adjustable and the rear monopod folds into the stock. A carrying handle can be attached to the stock in order to prevent the operator from grasping the rifle by its aiming optics during quick position changes or on the march. The trigger mechanism displays an adjustable trigger pull of 1.0 to 1.5 kgf (2.2 to 3.3 lbf). The safety lever is located behind the bolt handle and the safety locks the trigger, immobilizes the sear and prevents the rotary bolt from turning. The staggered (or double) column detachable box magazine is made out of glass fiber reinforced nylon with metal inserts and holds 10 rounds. To reduce recoil, jump, flash and sound signature, the SV-98 can be supplied with a TGP-V tactical suppressor. An anti-mirage strap can be fixed between the front and rear sights. Internet sources report differing information regarding the attainable accuracy of fire, though the quality of the ammunition used is often mentioned as a very important factor in obtaining good accuracy.

SVD-63 Russian 7.62mm Russian Automatic Sniper Rifle







Tiers:



Variants:

- **SVD-S:** Folding stock, 15-rd magazine.
- **SVU:** Bullpup (trigger forward of magazine).
- **OTs-03AS sight. :** SVU w/PSO-1 sight.
- **6V1:** SVD with PSO-1 sight.
- **6V1-N3 night sight. :** SVD with NSPU-3 night sight.

System

Alternative Designation : SVD, Dragunov
Date of Introduction: 1963
Fire Mode : Semi-automatic only
Operation : Gas
Rate of Fire : rd/min30.0
Action: Gas-operated, rotating bolt
Muzzle Velocity: m/sa830
Effective Firing Range: m800
Feed System: 10-rd detachable box magazine (15-rd available for the SVD-S)

↳*Dimensions*

Length : 1,225 mm (48.2 in) (SVD)
Barrel Length: mm620
Weight: 4.30 kg (9.48 lb) (with scope and unloaded magazine)

Ammunition

Note: The rifle features mechanically adjustable backup iron sights with a sliding tangent rear sight (the iron sight line can be adjusted from 100 to 1,200 m (109 to 1,312 yd) in 100 m (109 yd) increments). The iron sights can be used with or without the standard issue optical sight in place. This is possible because the scope mount does not block the area between the front and rear sights. The Dragunov is issued with a quick-detachable PSO-1 optical sight.The PSO-1 sight (at a total length of 375 mm with a lens cover and sun shade, 4× magnification and 6° field of view) mounts to a proprietary side mount Warsaw Pact rail that does not block the view of the iron sight line. The PSO-1 sight includes a variety of features, such as a bullet drop compensation (BDC) elevation adjustment knob and an illuminated rangefinder grid that can be used up to 1,000 m (1,094 yd), a reticle that enables target acquisition in low light conditions as well as an infrared charging screen that is used as a passive detection system. The current version of the sight is the PSO-1M2. This telescopic sight is different from the original PSO-1 only in that it lacks the now obsolete Infra-Red detector. The PSO-1 sight enables area targets to be engaged at ranges upwards of 1,300 m (1,422 yd); effective ranges in combat situations have been stated at between 600 to 1,300 m (656 to 1,422 yd), depending on the nature of the target (point or area target) quality of ammunition and skill of the shooter.

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Ball, standard steel- core

Cailber/Length : mm7.62x54 (rimmed)

Armor Penetration : mmSteel plate: 6 at 520 m, Flak vest: Yes at 110 m

Muzzle Velocity : m/s828.0

Range, Effective : m600.0

Range, Effective : m300 (sight INA), night

↳*Ammunition (Option 2)*

Name: Sniper (7N1)

Type: Steel core

Cailber/Length : mm7.62x54R (rimmed)

Armor Penetration : mmINA

Muzzle Velocity : m/s823.0

Range, Effective w/o scope : m800.0

Range, Effective w/o scope : m1000.0

↳*Ammunition (Option 3)*

Name: 7N13

Type: Enhanced penetration (steel core)

Cailber/Length : mm7.62x54R (rimmed)

Armor Penetration : mmSteel Plate: 6 at 660 m, Flak Vest: 800 m

Muzzle Velocity : m/s828.0

Range, Effective w/o scope : m800.0

Range, Effective w/o scope : m1000.0

Ammunition (Option 4)

Name: 7B2-3

Type: AP-I

Cailber/Length : mm7.62x54R (rimmed)

Muzzle Velocity : m/s808.0

Armor Penetration : mm10-mm armor plate at 200 m

Range, Effective w/o scope : m800.0

Range, Effective w/o scope : m1000.0

↳*Ammunition (Option 5)*

Name: 7T2m

Type: Tracer

Cailber/Length : mm7.62x54R-(rimmed)

Muzzle Velocity : m/s798.0

Range, Effective w/o scope : m800.0

Range, Effective w/o scope : m1000.0

Trace: m1200.0

Time of Trace : sec3.0

Sights

Name: PSO-1

Type: Infrared detection capability for night firing

Field of View : deg6.0

Magnification: 4x

Sighting Range: m1300.0

Note: PSO-1 telescopic sight, 1PN51/1PN58 night vision sights and iron sights with an adjustable rear notch sight

↳*Night Sights*

Available: Yes

Notes: NSPU-3. The NSPU-3 increases accuracy to 1,000 m at night or during poor visibility.

Notes:

The Dragunov sniper rifle (formal Russian: Сна́йперская Винто́вка систе́мы Драгуно́ва образца́ 1963 года, Snáyperskaya Vintóvka sistém'y Dragunóva obraz'tsá 1963 goda (SVD-63), officially "Sniper Rifle, System of Dragunov, Model of the Year 1963") is a semi-automatic sniper/designated marksman rifle chambered in 7.62×54mmR and developed in the Soviet Union. The Dragunov was designed as a squad support weapon since, according to Soviet and Soviet-derived military doctrines, the long-range engagement ability was lost to ordinary troops when submachine guns and assault rifles (which are optimized for close-range and medium-range, rapid-fire combat) were adopted. It was developed in 1957–1963 and selected as the winner of a contest that included three competing groups of designers: led by Sergei Simonov, Aleksandr Konstantinov and Yevgeny Dragunov. Extensive field testing of the rifles conducted in a wide range of environmental conditions resulted in Dragunov's proposal being accepted into service on 3 July 1963. An initial pre-production batch consisting of 200 rifles was assembled for

evaluation purposes, and from 1964 serial production was carried out by Izhmash, later called Kalashnikov Concern. Since then, the Dragunov has become the standard squad support weapon of several countries, including those of the former Warsaw Pact. China, while having produced an unlicensed copy of the SVD through reverse-engineered samples captured from Sino-Vietnamese War as the Type 79 and 85,[11] never officially purchased or was given SVD Dragunov by the Soviets, as the Sino-Soviet split had already occurred when the SVD entered service and relations were strained between the two, halting further military cooperations and aid. Iran also produced a clone as the Nakhjir 3 (as a direct copy of the Chinese Type 79).

→→Anti-Material Rifles (AMR)

AW50F British 12.7mm Anti-Material Rifle



Tiers:



Variants:

- **AW50:** The AW50 is intended to engage a variety of targets, including radar installations, light vehicles (including light armoured vehicles), field fortifications, boats and ammunition dumps. The standard ammunition combines a penetrator, high explosive and incendiary effect in a single round.

System

Alternate Designation: AW50F
Type: Anti-Material Rifle
Manufacturer: Accuracy International
In Service: 2000-Present
Action: Bolt-action
Effective Firing Range: 1,500 m
Feed System: Box magazine, 5 rounds
Sights: Mil spec Mk II in 6x, 10x and standard iron sights.

Dimensions

Length: 1,420 mm, 1,170 mm (folded)
Barrel Length: 686 mm
Weight: Weighing 15 kilograms, the AW50F rifle is approximately four times the weight of a typical assault rifle.

Ammunition

Type: Rifle
Caliber: 12.7mm
Cartridge: 12.7×99mm NATO, multi-purpose Raufoss Mk 211 cartridge and other rounds.
Note: The NM140 .50 calibre ammunition is also heavy.

Notes:

The AW50F is a folding stock variant which fires the multi-purpose Raufoss Mk 211 cartridge and other rounds. Most of the rifles are made in the United Kingdom; the barrels are sourced from three different manufacturers: Lothar Walther, Border and Maddco. The weapon's stock folds for portability. It has a fully adjustable bipod and buttstock heel rest. Four sling loops allow shoulder and hand carrying of the rifle. Weighing 15 kilograms, the AW50F rifle is approximately four times the weight of a typical assault rifle. The NM140 .50 calibre ammunition is also heavy. The weight of the weapon, combined with a muzzle brake on the front end and a hydraulic buffer system in the butt, gives the AW50F a relatively low recoil and enhances accuracy. The AW50 is a .50 BMG anti-materiel rifle designed by Accuracy International. It is a re-engineered version of the Accuracy International Arctic Warfare L96 sniper rifle (the standard issue sniper rifle in the British forces). The AW50 is intended to engage a variety of targets, including radar installations, light vehicles (including light armoured vehicles), field fortifications, boats and ammunition dumps. The standard ammunition combines a penetrator, high explosive and incendiary effect in a single round. The weight of the weapon (15 kg), combined with a muzzle brake and a hydraulic buffer system in the butt, gives the AW50F relatively low recoil and enhances accuracy. The MIL STD 1913 sight rail can hold a variety of equipment; the normal sight for the AW50 is the Schmidt & Bender 3-12x50 PM II with Al Mil Dot reticle, 0.2 mrad clicks and elevation to 1500 m and laser protection. Night vision device sights such as the Simrad KN series or Hensoldt NSV 80 can also be fitted.

AW50 British 12.7mm Anti-Material Rifle







Tiers:



Variants:

- **AW50F:** The AW50F is a folding stock variant which fires the multi-purpose Raufoss Mk 211 cartridge and other rounds. Most of the rifles are made in the United Kingdom; the barrels are sourced from three different manufacturers: Lothar Walther, Border and Maddco. The weapon's stock folds for portability. It has a fully adjustable bipod and buttstock heel rest. Four sling loops allow shoulder and hand carrying of the rifle.

System

Alternate Designation: AW50

Date of Introduction: 2000

Type: Anti-Material Rifle

Proliferation: Australia: AW50F. Germany: Designated G24. Ireland: Used by ARW marksmen. New Zealand: Used by New Zealand Army Malaysia: Used by Royal Malaysian Navy PASKAL Malta Portugal: AW50 is used by Portuguese Army and GNR (Republican National Guard). Singapore: AW50 Slovakia: AW50F Used by 5th Special Operations Regiment South Korea: Used by UDT/SEAL. Thailand: Used by Royal Thai Navy and Royal Thai Navy SEALS. United Kingdom Used in limited quantities by EOD units and UKSF Czech Republic Used by Police of the Czech Republic

Manufacturer: Accuracy International

In Service: 2000-Present

Action: Bolt-action

Effective Firing Range: 1,500 m

Feed System: Box magazine, 5 rounds

Sights: Mil spec Mk II in 6x, 10x and standard iron sights.

Dimensions

Length: 1,420 mm, 1,170 mm (folded)

Barrel Length: 686 mm

Weight: 15 kg w/ bipod

Ammunition

Type: Rifle

Caliber: 12.7mm

Cartridge: 12.7×99mm NATO

Notes:

The AW50 is a .50 BMG anti-materiel rifle designed by Accuracy International. It is a re-engineered version of the Accuracy International Arctic Warfare L96 sniper rifle (the standard issue sniper rifle in the British forces). The AW50 is intended to engage a variety of targets, including radar installations, light vehicles (including light armoured vehicles), field fortifications, boats and ammunition dumps. The standard ammunition combines a penetrator, high explosive and incendiary effect in a single round. The weight of the weapon (15 kg), combined with a muzzle brake and a hydraulic buffer system in the butt, gives the AW50F relatively low recoil and enhances accuracy. The MIL STD 1913 sight rail can hold a variety of equipment; the normal sight for the AW50 is the Schmidt & Bender 3-12x50 PM II with Al Mil Dot reticle, 0.2 mrad clicks and elevation to 1500 m and laser protection. Night vision device sights such as the Simrad KN series or Hensoldt NSV 80 can also be fitted.

Barrett M82 (M107) American Semi-Automatic Anti-Material Rifle







Tiers:



Variants:

- **M107-A1:** Product improvement of the M82A1A. Improvements include: reduction in weight by 5 pounds; cylindrical titanium muzzle brake; titanium barrel key/recoil buffer system in order to operate with a Barrett suppressor; functional modifications to increase durability and ease of operation. Barrett introduced this variant in 2013
- **M107:** The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.

System

Alternate Designation: Barrett M82; M107
Manufacturer: Barrett Firearms Manufacturing
Cost: $8,900
Operation : Recoil
Fire Mode : Semi-automatic only
Feed System: 10-rd detachable box magazine
Rate of Fire : rd/min20.0
Muzzle Velocity: m/s853
Effective Firing Range: m1,830

↳*Dimensions*

Length, Barrel : m736.0
Length, Overall : m1448.0
Weight, Empty without Magazine: kg14.75

Ammunition

↳*Ammunition (Option 1)*

Name: Raufoss Grade A (match)(DODIC A606) (USMC)

Type: Standard operating round

Caliber/Length : mm12.7x99 (.50 cal)

Muzzle Velocity : m/s854.0

Range, Maximum, with Scope : m1800.0

↳*Ammunition (Option 2)*

Name: MP NM140 (Nammo) MK211 Mod 0

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 45 degrees at 1,000 m

Fragmentation: 20 fragments after hitting 2 mm steel

Incendiary Effect: Ignition of JP4 and JP8

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 3)*

Name: AP-S NM173 (Nammo)

Type: Armor piercing

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 30 at 1,500 m

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 4)*

Name: M903 (Olin)

Type: Saboted Light Armor Penetrator (SLAP) (actual bullet is tungsten .30 inch penetrator wrapped in a .50-cal plastic sabot)

Bullet: 12.7- mm x 99-m (.50 cal)

Armor Penetration : mm19 mm (.75 in) at 1,500 m

Muzzle Velocity : m/s1014.0

Range, with Scope : m1500.0

Accuracy : m/sINA

↳*Ammunition (Option 5)*

Name: M8

Type: Armor piercing incendiary

Armor Penetration: mm20 mm at 100 m

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Muzzle Velocity : m/s881.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 25 cm at 550 m

↳*Ammunition (Option 6)*

Name: M20

Type: API-T

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration: mm20 mm at 100 m

Muzzle Velocity : m/s887.0

Trace: m91 to 1,463

Accuracy: less than 25 cm at 550 m

↳*Ammunition All*

Combat Load: rds30, typical

Type: Ball, AP, AP-I, API-T, Tracer, SLAP, MP

Sights

↳*Night Sight*

Available: Yes

Available: Yes.

Magnification: 10x42

↳*Sights #1*

Name: Unertl

Type: Optical (matches trajectory of .50-cal Raufoss Grade A)

Magnification: 10x

↳*Sights #2*

Name: Swarovski

Type: Optical (with ranging reticle)

Magnification: 10x42

↳***Sights #3***

Name: Barrett Optical Ranging System (BORS)
Type: Ballistic Computer. This add-on device couples to the telescope, in place of the rear scope ring. It can then adjust for range, air temperature, round used, and other factors.
Notes: A commonly associated scope is the Leupold Mark 4; but it can also work with other scopes.

Notes:

The Barrett M82, standardized by the U.S. military as the M107, is a recoil-operated, semi-automatic anti-materiel sniper system developed by the American Barrett Firearms Manufacturing company. Despite its designation as an anti-materiel rifle, it is used by some armed forces as an anti-personnel system. The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.[1][2] The weapon is found in three variants, the original M82A1 (and A3), the bullpup M82A2 and Barrett M107A1 with muzzle brake designed to accept suppressor and made out of titanium instead of steel. The M82A2 is no longer manufactured, though the XM500 can be seen as its successor. Barrett Firearms Manufacturing was founded by Ronnie Barrett for the sole purpose of building semi-automatic rifles chambered for the powerful 12.7×99mm NATO (.50 BMG) ammunition, originally developed for and used in M2 Browning machine guns. The weapon was first sold to the Swedish Army in 1989. In 1990, the United States armed forces purchased the M82A1 during operations Desert Shield and Desert Storm in Kuwait and Iraq. About 125 rifles were initially bought by the United States Marine Corps, and orders from the Army and Air Force soon followed. The M82A1 is known by the US military as the SASR—"Special Applications Scoped Rifle", and it was and still is used as an anti-materiel rifle and explosive ordnance disposal tool. In 2006, Barrett completed development of the XM500, which has a bullpup configuration similar to the M82A2. Barrett M82 rifles were bought by various military and police forces from at least 30 countries, such as Belgium, Chile, Denmark, Finland, France, Germany, Greece, Indonesia, Italy, Jamaica, Mexico, the Netherlands, and others. The Barrett M82A1 rifle was used in 2002 as a platform for the experimental OSW (Objective Sniper Weapon) prototype. This weapon was fitted with a shorter barrel, and fired 25mm high-explosive shells developed for the 25×59 mm OCSW (Objective Crew Served Weapon) automatic grenade launcher. The experimental OSW showed an increased effectiveness against various targets, but the recoil was beyond human limitations. This weapon, also known as the Barrett "Payload Rifle", has now been designated the XM109. The M82 is a short-recoil semi-automatic firearm. When the gun is fired, the barrel initially recoils for a short distance (about 1 in (25 mm)), while being securely locked by the rotating bolt. After the short travel, the lower part of accelerator arm, held by receiver upper part, is already hinged in bolt carrier and the middle portion strikes it back to the barrel by a rod place in bolt carrier, transferring part of the recoil energy of the barrel to the bolt to achieve reliable cycling and unlock it from barrel. The bolt is unlocked by turning in the curved cam track in the bolt carrier. Then, the barrel is stopped by the combined effect of the accelerator, buffer spring and the muzzle brake and the bolt continues back, to extract and eject a spent case.[clarification needed] On its return stroke, the bolt strips the fresh cartridge from the box magazine and feeds it into the chamber and finally locks itself to the barrel. The striker is also cocked on the return stroke of the bolt. The gun is fed from a large, detachable box magazine holding up to 10 rounds, although a rare 12-round magazine was developed for use during Operation Desert Storm in 1991. The receiver is made from two parts (upper and lower), stamped from sheet steel and connected by cross-pins. The heavy barrel is fluted to improve heat dissipation and save weight, and fitted with a large and effective reactive muzzle brake. On the earlier models, the muzzle brakes had a round cross-section; later M82 rifles are equipped with two-chamber brakes of rectangular cross-section. M82A1 rifles are fitted with scope mount and folding backup iron sights, should the glass scope break. The U.S. military M82 rifles are often equipped with Leupold Mark 4 telescopic sights. The M82A1M (USMC M82A3) rifles have long Picatinny accessory rails mounted and US Optics telescopic sights. Every M82 rifle is equipped with a folding carrying handle and a folding bipod (both are detachable on the M82A3). The M82A3 is also fitted with a detachable rear monopod under the butt. The buttpad is fitted with a soft recoil pad to further decrease the felt recoil. M82A1 and M82A3 rifles could be mounted on the M3 or M122 infantry tripods (originally intended for machine guns) or on vehicles using the special Barrett soft-mount. The M82A1 can be fitted with a carry sling, but according to those who carried it in the field, the M82 is too uncomfortable to be carried on a sling due to its excessive length and weight. It is usually carried in a special carry soft or hard case.

AX50 British 12.7mm Anti-Material Rifle



Tiers:



Variants:

- **AXMC:** AXMC multi calibre sniper rifle that can be chambered either in .338 Lapua Magnum, 300 Winchester Magnum or 7.62×51mm NATO/.308 Winchester when it is reconfigured by changing the 22 mm (0.87 in) diameter bolt, magazine/insert, and barrel.
- **AX308:** AX308 non-multi calibre sniper rifle chambered in 7.62×51mm NATO/.308 Winchester using a 20 mm (0.79 in) diameter bolt.
- **AX50:** AX50 non-multi calibre anti-materiel rifle chambered in 12.7×99mm NATO/.50 BMG using a 30 mm (1.18 in) diameter bolt.

AX50 Anti-Material Rifle

↳*System*

Name: AX50
Type: Anti-Material Rifle
Manufacturer: Accuracy International
In Service: 2010-Present
Length: 1,370 mm (53.9 in) 1,115 mm (43.9 in) folded
Barrel Length: 685.8 mm (27.0 in)
Width: 125 mm (4.92 in)
Height: 190 mm (7.48 in)
Weight: 12.5 kg (27.6 lb) (no scope/no rails, empty mag)
Action: Bolt-action
Muzzle Velocity: 900 m/s (2,953 ft/s)

Effective Firing Range: 2,500 m (2,734 yd)

Feed System: 5-round detachable box magazine

Sights: Standard: S&B 5-25×56 PM II telescopic sight

↳*Ammunition Gun Weapon System #3*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: INA

Notes:

The AX50 is a sniper rifle developed by British firearms manufacturer Accuracy International. Devised as an upgrade, it is the latest iteration of the AW50 rifle and is built to withstand sustained, heavy usage. Inheriting all the attributes of its predecessor, it allows the operator a high level of accuracy and performance in the harshest of conditions. The AX50 is a variant of the AX series of sniper rifles that entered production in 2010. Fabricated by Accuracy International to meet the modern demands of military and police units alike and was designed with long range precision accuracy in mind for a more accurate anti-materiel weapon. According to Accuracy International the development of the series was partly influenced by the Precision Sniper Rifle (PSR) U.S. Special Operations Command solicitation. An undertaking by the U.S. military for a new and improved Precision long range rifle. Although the contract was lost to Remington's Modular Sniper Rifle. The AX50 is a bolt-action, .50 BMG sniper/anti-material rifle weighing 12.5 kg (27.6 lb), and is 1,370 mm (53.9 in) in overall length with a 685.8 mm (27.0 in) free floated barrel that can be changed in less than 10 minutes. The rifle itself is built on an aluminum chassis, and has a stock which can be folded to the left to shorten the overall length of the rifle when needed, and features a two-stage trigger with a 3.3 to 4.4 lbs. adjustible pull. The receiver and bolt featuring a 60° bolt throw are made of steel. The AX50 comes with an integrated Piccatinny rail as well as a "Firing pin cocking indicator" safety allowing the user to ascertain whether a cartridge is chambered. Accuracy International actively promotes fitting the Schmidt & Bender PM II / MILITARY MK II product line as sighting components on their sniper rifles and sells these telescopic sights as accessories, which is rare for a rifle manufacturer.

Barret XM500 American 12.7mm Semi-Automatic Anti-Material Rifle



Tiers:



Variants:

- **M107-A1:** Product improvement of the M82A1A. Improvements include: reduction in weight by 5 pounds; cylindrical titanium muzzle brake; titanium barrel key/recoil buffer system in order to operate with a Barrett suppressor; functional modifications to increase durability and ease of operation. Barrett introduced this variant in 2013
- **M107:** The M107 variant is also called the Light Fifty for its .50 BMG (12.7×99mm NATO) chambering and significantly lighter weight compared to previous applications and the 15% heavier base M82 model.

System

Alternate Designation: XM500
Date of Introduction: 2006
Type: Anti-Material Rifle
Proliferation : Widespread (45+ nations)
Manufacturer: Barrett Firearms Manufacturing
Action: Gas-operated, rotating bolt
Fire Mode : Semi-automatic only
Feed System: 10-round detachable box magazine
Rate of Fire : rd/min20.0
Muzzle Velocity: m/s853
Effective Firing Range: m1,800

↳*Dimensions*

Length, Overall : mm1200

Weight, Empty without Magazine: kg12

Ammunition

↳*Ammunition (Option 1)*

Name: Raufoss Grade A (match)(DODIC A606) (USMC)

Type: Standard operating round

Caliber/Length : mm12.7x99 (.50 cal)

Muzzle Velocity : m/s854.0

Range, Maximum, with Scope : m1800.0

↳*Ammunition (Option 2)*

Name: MP NM140 (Nammo) MK211 Mod 0

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 45 degrees at 1,000 m

Fragmentation: 20 fragments after hitting 2 mm steel

Incendiary Effect: Ignition of JP4 and JP8

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 3)*

Name: AP-S NM173 (Nammo)

Type: Armor piercing

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration : mm11 mm at 30 at 1,500 m

Muzzle Velocity : m/s915.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 15 cm at 550 m

↳*Ammunition (Option 4)*

Name: M903 (Olin)

Type: Saboted Light Armor Penetrator (SLAP) (actual bullet is tungsten .30 inch penetrator wrapped in a .50-cal plastic sabot)

Bullet: 12.7- mm x 99-m (.50 cal)

Armor Penetration : mm19 mm (.75 in) at 1,500 m

Muzzle Velocity : m/s1014.0

Range, with Scope : m1500.0

Accuracy : m/sINA

↳*Ammunition (Option 5)*

Name: M8

Type: Armor piercing incendiary

Armor Penetration: mm20 mm at 100 m

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Muzzle Velocity : m/s881.0

Range, Maximum, with Scope : m1800.0

Accuracy: less than 25 cm at 550 m

↳*Ammunition (Option 6)*

Name: M20

Type: API-T

Caliber/Length : mm12.7-mm x 99-m (.50 cal)

Armor Penetration: mm20 mm at 100 m

Muzzle Velocity : m/s887.0

Trace: m91 to 1,463

Accuracy: less than 25 cm at 550 m

↳*Ammunition All*

Combat Load: rds30, typical

Type: Ball, AP, AP-I, API-T, Tracer, SLAP, MP

Sights

↳*Night Sight*

Available: Yes

Available: Yes.

Magnification: 10x42

↳*Sights #1*

Name: Unertl

Type: Optical (matches trajectory of .50-cal Raufoss Grade A)

Magnification: 10x

↳*Sights #2*

Name: Swarovski

Type: Optical (with ranging reticle)

Magnification: 10x42

↳*Sights #3*

Name: Barrett Optical Ranging System (BORS)

Type: Ballistic Computer. This add-on device couples to the telescope, in place of the rear scope ring. It can then adjust for range, air temperature, round used, and other factors.

Notes: A commonly associated scope is the Leupold Mark 4; but it can also work with other scopes.

Notes:

The Barrett XM500 is a gas-operated, semi-automatic sniper rifle/anti-materiel rifle currently in development by the Barrett Firearms Company. It is fed by a 10-round detachable box magazine situated behind the trigger in bullpup configuration. Based on the design of the Barrett M82/M107 .50-caliber sniper rifle, it is intended to be a lighter, more compact alternative to the M82. Since the XM500 has a stationary barrel (instead of the recoiling-barrel design of the M82), it will likely have somewhat better accuracy. As with its predecessor, it comes with a removable, adjustable bipod mounted under the barrel, and a top-mounted Picatinny rail for attachment of a scope or other accessory. XM500 rifle is the most recent creation of famous American Barrett Firearms co. This rifle, first shown in 2006, is intended to provide lighter and more compact alternative to popular Barrett M82 "Light fifty" rifle,which is widely used by military and law enforcement forces around the world.The new weapon will provide better accuracy (because of stationary,non-recoiling barrel) and same range as Light Fifty, while being lighter and significantly shorter, thanks to its bullpup layout. According to available information, this rifle is developed primarily for US Armed forces, and is still in development / prototype stage. Barrett XM500 long range sniper / anti-material rifle is a gas operated,semiautomatic rifle. Gas chamber and piston are located above the barrel. Barrelis locked using rotary bolt. Stock is of bullpup layout and made of metal, with rubber buttplate. Rifle is fitted with detachable lightweight bipods, adjustable for height. There are no open sights as of now, but rifle is fitted with integral Picatinny rail on the top of the receiver, so any type of sights can be installed using appropriate mounting interfaces.

OSV-96 Russian 12.7mm Semi-Automatic Anti-Material Rifle







Tiers:



Variants:

- **V-94 (B-94 «Волга»):** rototype was developed by the KBP (Instrument Design Bureau) in the early 1990s[2]. V-94 was first revealed to the public in 1994. Initial muzzle energy is estimated to be 18860 J, while firing API ammunition (885 gr).
- **OSV-96:** Developed in 1996-2000, entered service in March 2000. Design utilizes a number of improvements, such as a redesigned stock, muzzle brake, and carrying handle.

System

Alternative Designations: KSVK
Manufacturer: KBP Instrument Design Bureau
Produced: 1990s-Present
Operation: Semi-automatic, gas operated, rotating bolt.
Action: Direct impingement gas-operated, rotating bolt
Rate of Fire: Semi-Automatic
Muzzle Velocity: 870–910 m/s
Effective Firing Range: m2,000

Feed System: 5-round detachable box magazine

Dimensions

Empty Weight (w/o magazine or optical sight) (kg): kg12.9

Overall Length: mm1,746

Barrel Length: mm1,000

Weight, without Scope: kg12.9

Ammunition

Typical Combat Load: 30 est.

↳*Ammunition (Option 1)*

Name: 7N34 Sniper

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

↳*Ammunition (Option 2)*

Name: BZ (API)

Type: Rifle

Caliber: 12.7

Cartridge: 12.7×108mm

Sights

Type: Optical: POS 13x60 or night vision scope mounted on integral Picatinny rail.

Magnification: 13x

Night Sights Available: Yes

Note: various mounting sniper sights and back-up iron sights

Notes:

OSV-96 (Russian: OCB-96) is a Russian heavy semi-automatic sniper rifle chambered for the 12.7×108mm. The rifle is capable of engaging infantry at a distance of up to 1800 meters and can combat material targets at ranges up to 2500 meters. As an effective anti-sniper weapon, OSV-96 keeps the shooter outside of the effective range of conventional calibers providing a distinct advantage over lower caliber rifles. Specialized high-accuracy 12.7×108mm 7N34 59.0 gram FMJ and AP sniper cartridges have been developed for Russian .50-caliber sniper rifles such as this rifle. Large caliber machine gun cartridges can also be used for firing, but with limited accuracy. The OSV-96 folds in half in between the barrel/chamber and receiver compartments to shorten its length for ease of transportation. The rifle features a free-floating barrel in combination with a large muzzle brake to greatly decrease its recoil. The OSV-96 12.7mm sniper rifle began its life during early 1990s as V-94. Designed and developed at famous KBP (Instrument Design Bureau) in Tula. During following years rifle incorporated several improvements, and was eventually redesignated as OSV-96. It is offered for export and local buyers, and is in use by Russian Army and Internal Affairs Ministry (MVD) special units. The OSV-96 is a gas operated, rotating bolt semiautomatic rifle. The bolt locks directly to the barrel extension, so it is possible to made a hinge between the barrel and receiver. When not in use, the OSV-96 could be "folded" around this hinge to save the space, since the rifle is quite long. This feature also allows for quick transformation from folded into battle-ready position. To 'fold up' the rifle user must lock the bolt back by cocking it and engaging the bolt catch, then release large barrel lock on the left side of the receiver. The long barrel is free-floated, and fitted

with long combination muzzle brake – flash hider. The integral folding bipods are mounted on the special console, attached to the base of the barrel, next to the hinge point. The polymer buttstock is fitted with rubber recoil pad. OSV-96 is usually fitted with some sort of telescope or nightvision sight, but also carries a set of back-up iron sights. The exact accuracy data of the OSV-96 is not yet published, but, apparently, it is enough for intended work as a anti-materiel rifle or mid-range counter-sniper rifle.

KSVK Russian 12.7mm Anti-Material Rifle





Tiers:



Variants:

- **SVN-98:** INA
- **KSVK:** (KCBK)
- **ASVK:** ASVK (ACBK, army Kovrov large-caliber sniper rifle) – adopted by Ministry of Defence of the Russian Federation under designation 6S8 "KORD" sniper complex (6C8 «Корд») in June 2013 and used by the Syrian Arab Army during the Syrian Civil War.[
- **ASVK-M Kord-M:** INA

System

Alternative Designation : 6S8 Kord
Manufactuer: Degtyarev plant
Operation: Bolt action, bull pup design
Muzzle Velocity : m/s770-860
Range, Maximum Effective : m1000, iron sights
Range, Maximum Effective, Optical Sight : m1500
Rate of Fire : rd/min10
Feed System: 5-rd detachable box magazine

↳*Dimensions*

Length, Barrel : mm1000.0
Length, Overall : mm1420.0
Weight: 12 kg w/o scope

Ammuntion

Type: Sniper, API, API-T
Caliber: mm12.7
Cartridge: 12.7×108mm
Combat Load: rds30 (est), typical

Magazine Capacity: rds5

Sights

Note: Iron sights, rails for mounting various sniper sights

Notes:

The KSVK (Russian: Крупнокалиберная Снайперская Винтовка Ковровская (Krupnokalibernaya Snayperskaya Vintovka Kovrovskaya); English: Large-Caliber Kovrov Sniper Rifle) or Degtyarev sniper rifle is a 12.7mm anti-materiel sniper rifle developed in Russia for the purpose of counter sniping and penetrating thick walls, as well as light armored vehicles. The KSVK anti-material (or large caliber sniper) rifle was developed in the late 1990s by Degtyarev plant, based in Kovrov, Russia. It is based on the SVN-98 12.7mm experimental rifle. The KSVK is a bullpup-configured, bolt-action, magazine-fed rifle. It is equipped with a muzzle device which acts as a muzzle brake and a sound damper. The KSVK is equipped with standard Russian side-mounted scope rail (dovetail), and can be fitted with variety of day and night scopes. Open iron sights are installed for backup or emergency purposes.

→Submachine Guns (SMG)

Uzi Pro Israeli 9mm Submachine Gun



Tiers:



Variants:

- **Uzi Submachine Gun:** The Uzi Submachine Gun is a standard Uzi with a 10-inch (250 mm) barrel. It has a rate of automatic fire of 600 rounds per minute (rpm) when chambered in 9mm Parabellum; the .45 ACP model's rate of fire is slower at 500 rpm.
- **Mini Uzi:** The Mini Uzi is a smaller version of the regular Uzi, first introduced in 1980. The Mini Uzi is 600 mm (23.62 inches) long or 360 mm (14.17 inches) long with the stock folded. Its barrel length is 197 mm (7.76 inches), its muzzle velocity is 375 m/s (1230 f/s) and its effective range is 100 m. It has a greater automatic rate of fire of 950 rounds per minute due to the shorter bolt. Its weight is approximately 2.7 kg (6.0 lb). The Micro Uzi is an even further scaled down version of the Uzi, introduced in 1986. The Micro Uzi is 486 mm (19.13 in) long, reduced to 282 mm (11.10 in) with the stock folded and its barrel length is 117 mm and has a closed bolt compared to its original counterpart. Its muzzle velocity is 350 m/s (1148 f/s) and its cyclic rate of fire is 1,200 rpm. It weighs slightly over 1.5 kg (3.3 lb).
- **Uzi Pro:** The Uzi Pro, an improved variant of the Micro Uzi, was launched in 2010 by Israel Weapon Industries Ltd. (I.W.I.), formerly the magen ("small arms") division of Israel Military Industries. The Uzi Pro is a blowback-operated, select-fire, closed-bolt submachine gun with a large lower portion, comprising grip and handguard, entirely made of polymer to reduce weight; the grip section was redesigned to allow two-handed operation and facilitate control in full-automatic fire with such a small-sized firearm. The Uzi Pro features four Picatinny rails, two at the sides of the barrel, which can be removed, one below the barrel for the addition of forgrips and one on the top for optics. The under barrel rail is often shown with a specialised foregrip which attaches to the pistol grip to form a hand guard. In addition, the cocking handle has been moved to the left side.[28] The new weapon weighs 2.32 kg and has a length of 529 mm with an extended stock, and 30 cm while collapsed. It has been purchased by the IDF in limited numbers for evaluation and it is yet to be decided whether or not to order additional units for all of its special forces
- **Uzi carbine:** The Uzi carbine is similar in appearance to the Uzi submachine gun. The Uzi carbine is fitted with a 400-mm (16-inch) barrel, to meet the minimum rifle barrel length requirement for civilian sales in the United States. A small number of Uzi carbines were produced with the standard length barrel for special markets. It fires from a closed-bolt position in semi-automatic mode only and uses a floating firing pin as opposed to a fixed firing pin.[23] The FS-style selector switch has two positions (the automatic setting was blocked): "F" for "fire" (semi-auto) and "S" for "safe". Uzi carbines are available in calibers .22LR, 9mm, .41 AE, and .45 ACP. The Uzi carbine has two main variants, the Model A (imported from 1980 to 1983) and the Model B (imported from 1983 until 1989). The Type A was the same as the fully automatic Uzi, while the Type B had a firing pin safety and improved sights and sling swivels. These two variants were imported and distributed by Action Arms. The American firm Group Industries made limited numbers of a copy of the Uzi "B" model semiauto carbine for sale in the US along with copies of the Uzi submachine gun for the U.S. collectors' market. After registering several hundred submachine guns transferable to the general public through a special government regulated process, production was halted due to financial troubles at the company. Company assets (including partially made Uzi submachine guns, parts, and tooling) were purchased by an investment group later to become known as Vector Arms. Vector Arms built and marketed numerous versions of the Uzi carbine and the Mini Uzi. Today, while the civilian manufacture, sale and possession of post 1986 select-fire Uzi and its variants is prohibited in the United States it is still legal to sell templates, tooling and manuals to complete such conversion. These items are typically marketed as being "post-sample" materials for use by federal firearm licensees for manufacturing/distributing select-fire variants of the Uzi to Law Enforcement, Military and Overseas customers.
- **Mini Uzi carbine:** The Mini Uzi carbine is similar in appearance to the Mini Uzi machine pistol. The Mini Uzi carbine is fitted with a 500-mm (19.8-in) barrel, to meet the minimum rifle overall length requirement for civilian sales in the

United States. It fires from a closed-bolt position in semi-automatic mode only.

- **Uzi pistol:** The Uzi pistol is a semi-automatic, closed bolt, and blowback-operated pistol variant. Its muzzle velocity is 345 m/s. It is a Micro Uzi with no shoulder stock or full-automatic firing capability. The intended users of the pistol are various security agencies in need of a high-capacity semi-automatic pistol, or civilian shooters who want a gun with those qualities and the familiarity of the Uzi style. It was introduced in 1984 and produced until 1993.
- **Uzi Pro pistol:** The Uzi Pro pistol is a current version of the Uzi pistol. It has rails on the top and bottom, and there is an optional stabilizing brace. Unlike any other Uzi variant, the Uzi Pro pistol has a side charging handle, rather than a top charging handle, and has a three-stage safety. There are three safeties on the Uzi Pro pistol: a thumb safety, grip safety, and a firing pin block. This model was intended for law enforcement and civilian use, due to the compact size, rails, and a semi-automatic rate of fire. Unlike other Uzi variants, the Uzi Pro pistol is only chambered for 9x19 parabellum.

System

Alternate Designation(s): Uzi

Primary Function / Type: Submachine Gun

Manufacturer: Israel

Action: Blowback, Open Bolt

Rate of Fire: rds/min950

Muzzle Velocity: m/s350

Effective Firing Range: m100

Cyclic Rate of Fire: 1,200 RPM

Feed System: •10-round box magazine (.22 and .41 AE) •12-, 16-, or 22-round box (.45 ACP) •20-, 25-, 32-, 40-, or 50-round box (9x19mm Parabellum)

Note: has a closed bolt compared to its original counterpart.

Dimensions

Length, Total: mm529

Length, stock Folded: mm30

Barrel Length: INA

Weight: kg2.32

Ammunition

↳*Option 1*

Type: Rifle

Caliber: mm9

Cartridge: 9mm Parabellum

Basic Load: See Magazines

Stocks

Note: There are different stocks available for the Uzi proper. There is a wooden stock with a metal buttplate that comes in three similar variations that was used by the IDF. The first version had a flat butt and straight comb and had hollows for a cleaning rod and gun oil bottle. The second had an angled butt and a straight comb and no hollows. The third had an angled butt and curved comb and no hollows; a polymer version is currently available from IMI. The wooden stocks originally had a quick-release base but the ones sold in the United States have a permanent base to be compliant with US gun laws. Choate

made an aftermarket polymer stock with a rubber buttpad that had a flat butt, a straight comb, and a permanent base. In 1956, IMI developed a downward-folding twin-strut metal stock with two swiveling sections that tucks under the rear of the receiver. The Mini Uzi has a forward-folding single-strut metal stock that is actually an inch longer than the Uzi's. Its buttplate can be used as a foregrip when stowed. The Micro Uzi has a similar model.

Magazine

Note: The original box magazines for the 9mm Uzi had a 25-round capacity. Experimental 40- and 50-round extended magazines were tried but were found to be unreliable. A 32-round extended magazine was then tried and was later accepted as standard. The Mini Uzi and Micro Uzi use a shorter 20-round magazine. Available extended magazines include 40-, and 50-round magazines. Other high-capacity aftermarket magazines exist such as the Vector Arms 70-round and Beta Company (Beta C-Mag) 100-round drums. The .45 ACP Uzi used a 16- or 22-round magazine, while the .45 ACP Micro Uzi and Mini Uzi used a 12-round magazine. A conversion kit by Vector Arms allowed the .45-caliber Uzi to use the same 30-round magazines as the M3 "Grease Gun".

Sights

↳*Iron Sights*

Adjustable: Yes

Caliber conversions

Note: The Uzi was available with caliber conversion kits in .22 LR or .41 AE. The operator just has to change the barrel, bolt and magazine. The .22 LR had 20-round magazines; the original IMI kit used a barrel insert while the aftermarket Action Arms kit used a full replacement barrel. The .41 AE also had a 20-round magazine; since it has the same bolt face as the 9×19mm Parabellum, only the barrel and magazine needed to be changed. IMI also manufactured a .45ACP conversion kit both in full auto/open bolt with a 10.2" barrel for the 9mm SMG and a semi only/closed bolt with a 16" barrel for the carbine version. Magazine capacity is limited, with 2 sizes of 16 and 10 rds each.

Notes:

The Uzi Pro, an improved variant of the Micro Uzi, was launched in 2010 by Israel Weapon Industries Ltd. (I.W.I.), formerly the magen ("small arms") division of Israel Military Industries. The Uzi Pro is a blowback-operated, select-fire, closed-bolt submachine gun with a large lower portion, comprising grip and handguard, entirely made of polymer to reduce weight; the grip section was redesigned to allow two-handed operation and facilitate control in full-automatic fire with such a small-sized firearm. The Uzi Pro features four Picatinny rails, two at the sides of the barrel, which can be removed, one below the barrel for the addition of forgrips and one on the top for optics. The under barrel rail is often shown with a specialised foregrip which attaches to the pistol grip to form a hand guard. In addition, the cocking handle has been moved to the left side. The new weapon weighs 2.32 kg and has a length of 529 mm with an extended stock, and 30 cm while collapsed. It has been purchased by the IDF in limited numbers for evaluation and it is yet to be decided whether or not to order additional units for all of its special forces.

Steyr TMP Austrian 9mm Submachine Gun







Tiers:



Variants:

- **SPP:** The Steyr SPP (Special Purpose Pistol) is a semi-automatic variant of the TMP. The TMP's barrel and barrel jacket lengths were increased slightly so there is a greater length of protruding jacket and barrel. The forward tactical pistol grip was also removed. It is large for a pistol and is constructed mainly from Polyamide 66.

System

Alternate Designation: Steyr TMP
Type: 9mm Submachine Gun
Manufacturer: Steyr
In Service: 1992-present
Muzzle Velocity: 370 m/s
Cyclic Rate of Fire: 800 - 900 rpm
Practical Rate of Fire: 30 - 90 rpm
Magazine Capacity: 15, 30 rounds
Sighting Range: INA
Range of Effective Fire: 50 - 100 m
Action: Short recoil, locking rotating barrel, delayed blowback
Feed System: 15-, 20-, or 30-round detachable box magazine

Dimensions

Length: 282
Barrel Length: 130
Length (with folded stock): INA
Weight: 1.3
Height: INA

Ammunition

Type: Rifle

Caliber: 9mm

Cartridge: 9×19mm Parabellum

Basic Load: INA

Notes:

The Steyr TMP (Taktische Maschinenpistole/Tactical Machine Pistol) is a select-fire 9×19mm Parabellum caliber machine pistol manufactured by Steyr Mannlicher of Austria. The magazines come in 15-, 20-, or 30-round detachable box types. A suppressor can also be fitted. In 2001, Steyr sold the design to Brügger & Thomet, who developed it into the Brügger & Thomet MP9.

Micro Uzi Israeli 9mm Submachine Gun







Tiers:



Variants:

- **Uzi Submachine Gun:** The Uzi Submachine Gun is a standard Uzi with a 10-inch (250 mm) barrel. It has a rate of automatic fire of 600 rounds per minute (rpm) when chambered in 9mm Parabellum; the .45 ACP model's rate of fire is slower at 500 rpm.
- **Mini Uzi:** The Mini Uzi is a smaller version of the regular Uzi, first introduced in 1980. The Mini Uzi is 600 mm (23.62 inches) long or 360 mm (14.17 inches) long with the stock folded. Its barrel length is 197 mm (7.76 inches), its muzzle velocity is 375 m/s (1230 f/s) and its effective range is 100 m. It has a greater automatic rate of fire of 950 rounds per minute due to the shorter bolt. Its weight is approximately 2.7 kg (6.0 lb). The Micro Uzi is an even further scaled down version of the Uzi, introduced in 1986. The Micro Uzi is 486 mm (19.13 in) long, reduced to 282 mm (11.10 in) with the stock folded and its barrel length is 117 mm and has a closed bolt compared to its original counterpart. Its muzzle velocity is 350 m/s (1148 f/s) and its cyclic rate of fire is 1,200 rpm. It weighs slightly over 1.5 kg (3.3 lb).
- **Uzi Pro:** The Uzi Pro, an improved variant of the Micro Uzi, was launched in 2010 by Israel Weapon Industries Ltd. (I.W.I.), formerly the magen ("small arms") division of Israel Military Industries. The Uzi Pro is a blowback-operated, select-fire, closed-bolt submachine gun with a large lower portion, comprising grip and handguard, entirely made of polymer to reduce weight; the grip section was redesigned to allow two-handed operation and facilitate control in full-automatic fire with such a small-sized firearm. The Uzi Pro features four Picatinny rails, two at the sides of the barrel, which can be removed, one below the barrel for the addition of forgrips and one on the top for optics. The under barrel rail is often shown with a specialised foregrip which attaches to the pistol grip to form a hand guard. In addition, the cocking handle has been moved to the left side.[28] The new weapon weighs 2.32 kg and has a length of 529 mm with an extended stock, and 30 cm while collapsed. It has been purchased by the IDF in limited numbers for evaluation and it is yet to be decided whether or not to order additional units for all of its special forces
- **Uzi carbine:** The Uzi carbine is similar in appearance to the Uzi submachine gun. The Uzi carbine is fitted with a 400-mm (16-inch) barrel, to meet the minimum rifle barrel length requirement for civilian sales in the United States. A small number of Uzi carbines were produced with the standard length barrel for special markets. It fires from a closed-bolt position in semi-automatic mode only and uses a floating firing pin as opposed to a fixed firing pin.[23] The FS-style selector switch has two positions (the automatic setting was blocked): "F" for "fire" (semi-auto) and "S" for "safe". Uzi carbines are available in calibers .22LR, 9mm, .41 AE, and .45 ACP. The Uzi carbine has two main variants, the Model A (imported from 1980 to 1983) and the Model B (imported from 1983 until 1989). The Type A was the same as the fully automatic Uzi, while the Type B had a firing pin safety and improved sights and sling swivels. These two variants were imported and distributed by Action Arms. The American firm Group Industries made limited numbers of a copy of the Uzi "B" model semiauto carbine for sale in the US along with copies of the Uzi submachine gun for the U.S. collectors' market. After registering several hundred submachine guns transferable to the general public through a special government regulated process, production was halted due to financial troubles at the company. Company assets (including partially made Uzi submachine guns, parts, and tooling) were purchased by an investment group later to

become known as Vector Arms. Vector Arms built and marketed numerous versions of the Uzi carbine and the Mini Uzi. Today, while the civilian manufacture, sale and possession of post 1986 select-fire Uzi and its variants is prohibited in the United States it is still legal to sell templates, tooling and manuals to complete such conversion. These items are typically marketed as being "post-sample" materials for use by federal firearm licensees for manufacturing/distributing select-fire variants of the Uzi to Law Enforcement, Military and Overseas customers.

- **Mini Uzi carbine:** The Mini Uzi carbine is similar in appearance to the Mini Uzi machine pistol. The Mini Uzi carbine is fitted with a 500-mm (19.8-in) barrel, to meet the minimum rifle overall length requirement for civilian sales in the United States. It fires from a closed-bolt position in semi-automatic mode only.
- **Uzi pistol:** The Uzi pistol is a semi-automatic, closed bolt, and blowback-operated pistol variant. Its muzzle velocity is 345 m/s. It is a Micro Uzi with no shoulder stock or full-automatic firing capability. The intended users of the pistol are various security agencies in need of a high-capacity semi-automatic pistol, or civilian shooters who want a gun with those qualities and the familiarity of the Uzi style. It was introduced in 1984 and produced until 1993.
- **Uzi Pro pistol:** The Uzi Pro pistol is a current version of the Uzi pistol. It has rails on the top and bottom, and there is an optional stabilizing brace. Unlike any other Uzi variant, the Uzi Pro pistol has a side charging handle, rather than a top charging handle, and has a three-stage safety. There are three safeties on the Uzi Pro pistol: a thumb safety, grip safety, and a firing pin block. This model was intended for law enforcement and civilian use, due to the compact size, rails, and a semi-automatic rate of fire. Unlike other Uzi variants, the Uzi Pro pistol is only chambered for 9x19 parabellum.

Characteristics

Alternate Designation(s): Uzi

Primary Function / Type: Submachine Gun

Manufacturer: Israel

Action: Blowback, Open Bolt

Rate of Fire: rds/min950

Muzzle Velocity: m/s350

Effective Firing Range: m100

Cyclic Rate of Fire: 1,200 RPM

Feed System: •10-round box magazine (.22 and .41 AE) •12-, 16-, or 22-round box (.45 ACP) •20-, 25-, 32-, 40-, or 50-round box (9x19mm Parabellum)

Note: has a closed bolt compared to its original counterpart.

Dimensions

Length, Total: mm486

Length, stock Folded: mm282

Barrel Length: mm117

Weight: kg1.5

Ammunition

↳*Option 1*

Type: Rifle

Caliber: mm9

Cartridge: 9mm Parabellum

Basic Load: See Magazines

Stocks

Note: There are different stocks available for the Uzi proper. There is a wooden stock with a metal buttplate that comes in three similar variations that was used by the IDF. The first version had a flat butt and straight comb and had hollows for a cleaning rod and gun oil bottle. The second had an angled butt and a straight comb and no hollows. The third had an angled butt and curved comb and no hollows; a polymer version is currently available from IMI. The wooden stocks originally had a quick-release base but the ones sold in the United States have a permanent base to be compliant with US gun laws. Choate made an aftermarket polymer stock with a rubber buttpad that had a flat butt, a straight comb, and a permanent base. In 1956, IMI developed a downward-folding twin-strut metal stock with two swiveling sections that tucks under the rear of the receiver. The Mini Uzi has a forward-folding single-strut metal stock that is actually an inch longer than the Uzi's. Its buttplate can be used as a foregrip when stowed. The Micro Uzi has a similar model.

Magazine

Note: The original box magazines for the 9mm Uzi had a 25-round capacity. Experimental 40- and 50-round extended magazines were tried but were found to be unreliable. A 32-round extended magazine was then tried and was later accepted as standard. The Mini Uzi and Micro Uzi use a shorter 20-round magazine. Available extended magazines include 40-, and 50-round magazines. Other high-capacity aftermarket magazines exist such as the Vector Arms 70-round and Beta Company (Beta C-Mag) 100-round drums. The .45 ACP Uzi used a 16- or 22-round magazine, while the .45 ACP Micro Uzi and Mini Uzi used a 12-round magazine. A conversion kit by Vector Arms allowed the .45-caliber Uzi to use the same 30-round magazines as the M3 "Grease Gun".

Sights

↳*Iron Sights*

Adjustable: Yes

Caliber conversions

Note: The Uzi was available with caliber conversion kits in .22 LR or .41 AE. The operator just has to change the barrel, bolt and magazine. The .22 LR had 20-round magazines; the original IMI kit used a barrel insert while the aftermarket Action Arms kit used a full replacement barrel. The .41 AE also had a 20-round magazine; since it has the same bolt face as the 9×19mm Parabellum, only the barrel and magazine needed to be changed. IMI also manufactured a .45ACP conversion kit both in full auto/open bolt with a 10.2" barrel for the 9mm SMG and a semi only/closed bolt with a 16" barrel for the carbine version. Magazine capacity is limited, with 2 sizes of 16 and 10 rds each.

Notes:

The Micro Uzi is an even further scaled down version of the Uzi, introduced in 1986. The Micro Uzi is 486 mm (19.13 in) long, reduced to 282 mm (11.10 in) with the stock folded and its barrel length is 117 mm and has a closed bolt compared to its original counterpart.[27] Its muzzle velocity is 350 m/s (1148 f/s) and its cyclic rate of fire is 1,200 rpm. It weighs slightly over 1.5 kg (3.3 lb)

Mini Uzi Israeli 9mm Submachine Gun




Tiers:



Variants:

- **Uzi Submachine Gun:** The Uzi Submachine Gun is a standard Uzi with a 10-inch (250 mm) barrel. It has a rate of automatic fire of 600 rounds per minute (rpm) when chambered in 9mm Parabellum; the .45 ACP model's rate of fire is slower at 500 rpm.
- **Mini Uzi:** The Mini Uzi is a smaller version of the regular Uzi, first introduced in 1980. The Mini Uzi is 600 mm (23.62 inches) long or 360 mm (14.17 inches) long with the stock folded. Its barrel length is 197 mm (7.76 inches), its muzzle velocity is 375 m/s (1230 f/s) and its effective range is 100 m. It has a greater automatic rate of fire of 950 rounds per minute due to the shorter bolt. Its weight is approximately 2.7 kg (6.0 lb). The Micro Uzi is an even further scaled down version of the Uzi, introduced in 1986. The Micro Uzi is 486 mm (19.13 in) long, reduced to 282 mm (11.10 in) with the stock folded and its barrel length is 117 mm and has a closed bolt compared to its original counterpart. Its muzzle velocity is 350 m/s (1148 f/s) and its cyclic rate of fire is 1,200 rpm. It weighs slightly over 1.5 kg (3.3 lb).
- **Uzi Pro:** The Uzi Pro, an improved variant of the Micro Uzi, was launched in 2010 by Israel Weapon Industries Ltd. (I.W.I.), formerly the magen ("small arms") division of Israel Military Industries. The Uzi Pro is a blowback-operated, select-fire, closed-bolt submachine gun with a large lower portion, comprising grip and handguard, entirely made of polymer to reduce weight; the grip section was redesigned to allow two-handed operation and facilitate control in full-automatic fire with such a small-sized firearm. The Uzi Pro features four Picatinny rails, two at the sides of the barrel, which can be removed, one below the barrel for the addition of forgrips and one on the top for optics. The under barrel rail is often shown with a specialised foregrip which attaches to the pistol grip to form a hand guard. In addition, the cocking handle has been moved to the left side.[28] The new weapon weighs 2.32 kg and has a length of 529 mm with an extended stock, and 30 cm while collapsed. It has been purchased by the IDF in limited numbers for evaluation and it is yet to be decided whether or not to order additional units for all of its special forces
- **Uzi carbine:** The Uzi carbine is similar in appearance to the Uzi submachine gun. The Uzi carbine is fitted with a 400-mm (16-inch) barrel, to meet the minimum rifle barrel length requirement for civilian sales in the United States. A small number of Uzi carbines were produced with the standard length barrel for special markets. It fires from a closed-bolt position in semi-automatic mode only and uses a floating firing pin as opposed to a fixed firing pin.[23] The FS-style selector switch has two positions (the automatic setting was blocked): "F" for "fire" (semi-auto) and "S" for "safe". Uzi carbines are available in calibers .22LR, 9mm, .41 AE, and .45 ACP. The Uzi carbine has two main variants, the Model A (imported from 1980 to 1983) and the Model B (imported from 1983 until 1989). The Type A was the same as the fully automatic Uzi, while the Type B had a firing pin safety and improved sights and sling swivels. These two variants were imported and distributed by Action Arms. The American firm Group Industries made limited numbers of a copy of the Uzi "B" model semiauto carbine for sale in the US along with copies of the Uzi submachine gun for the U.S. collectors' market. After registering several hundred submachine guns transferable to the general public through a special government regulated process, production was halted due to financial troubles at the company. Company assets (including partially made Uzi submachine guns, parts, and tooling) were purchased by an investment group later to become known as Vector Arms. Vector Arms built and marketed numerous versions of the Uzi carbine and the Mini Uzi. Today, while the civilian manufacture, sale and possession of post 1986 select-fire Uzi and its variants is prohibited in the United States it is still legal to sell templates, tooling and manuals to complete such conversion. These items are typically marketed as being "post-sample" materials for use by federal firearm licensees for manufacturing/distributing select-fire variants of the Uzi to Law Enforcement, Military and Overseas customers.
- **Mini Uzi carbine:** The Mini Uzi carbine is similar in appearance to the Mini Uzi machine pistol. The Mini Uzi carbine is fitted with a 500-mm (19.8-in) barrel, to meet the minimum rifle overall length requirement for civilian sales in the United States. It fires from a closed-bolt position in semi-automatic mode only.
- **Uzi pistol:** The Uzi pistol is a semi-automatic, closed bolt, and blowback-operated pistol variant. Its muzzle velocity is 345 m/s. It is a Micro Uzi with no shoulder stock or full-automatic firing capability. The intended users of the pistol are

various security agencies in need of a high-capacity semi-automatic pistol, or civilian shooters who want a gun with those qualities and the familiarity of the Uzi style. It was introduced in 1984 and produced until 1993.

- **Uzi Pro pistol:** The Uzi Pro pistol is a current version of the Uzi pistol. It has rails on the top and bottom, and there is an optional stabilizing brace. Unlike any other Uzi variant, the Uzi Pro pistol has a side charging handle, rather than a top charging handle, and has a three-stage safety. There are three safeties on the Uzi Pro pistol: a thumb safety, grip safety, and a firing pin block. This model was intended for law enforcement and civilian use, due to the compact size, rails, and a semi-automatic rate of fire. Unlike other Uzi variants, the Uzi Pro pistol is only chambered for 9x19 parabellum.

Characteristics

Alternate Designation(s): Uzi

Primary Function / Type: Submachine Gun

Manufacturer: Israel

Action: Blowback, Open Bolt

Rate of Fire: rds/min950

Muzzle Velocity: m/s375

Effective Firing Range: m100

Feed System: •10-round box magazine (.22 and .41 AE) •12-, 16-, or 22-round box (.45 ACP) •20-, 25-, 32-, 40-, or 50-round box (9x19mm Parabellum)

Dimensions

Length, Total: mm600

Length, stock Folded: mm360

Barrel Length: mm197

Weight: kg2.7

Ammunition

↳*Option 1*

Type: Rifle

Caliber: mm9

Cartridge: 9mm Parabellum

Basic Load: See Magazines

:

Stocks

Note: There are different stocks available for the Uzi proper. There is a wooden stock with a metal buttplate that comes in three similar variations that was used by the IDF. The first version had a flat butt and straight comb and had hollows for a cleaning rod and gun oil bottle. The second had an angled butt and a straight comb and no hollows. The third had an angled butt and curved comb and no hollows; a polymer version is currently available from IMI. The wooden stocks originally had a quick-release base but the ones sold in the United States have a permanent base to be compliant with US gun laws. Choate made an aftermarket polymer stock with a rubber buttpad that had a flat butt, a straight comb, and a permanent base. In 1956, IMI developed a downward-folding twin-strut metal stock with two swiveling sections that tucks under the rear of the receiver. The Mini Uzi has a forward-folding single-strut metal stock that is actually an inch longer than the Uzi's. Its buttplate can be used as a foregrip when stowed. The Micro Uzi has a similar model.

Magazine

Note: The original box magazines for the 9mm Uzi had a 25-round capacity. Experimental 40- and 50-round extended magazines were tried but were found to be unreliable. A 32-round extended magazine was then tried and was later accepted as standard. The Mini Uzi and Micro Uzi use a shorter 20-round magazine. Available extended magazines include 40-, and 50-round magazines. Other high-capacity aftermarket magazines exist such as the Vector Arms 70-round and Beta Company (Beta C-Mag) 100-round drums. The .45 ACP Uzi used a 16- or 22-round magazine, while the .45 ACP Micro Uzi and Mini Uzi used a 12-round magazine. A conversion kit by Vector Arms allowed the .45-caliber Uzi to use the same 30-round magazines as the M3 "Grease Gun".

Sights

↳*Iron Sights*

Adjustable: Yes

Caliber conversions

Note: The Uzi was available with caliber conversion kits in .22 LR or .41 AE. The operator just has to change the barrel, bolt and magazine. The .22 LR had 20-round magazines; the original IMI kit used a barrel insert while the aftermarket Action Arms kit used a full replacement barrel. The .41 AE also had a 20-round magazine; since it has the same bolt face as the 9×19mm Parabellum, only the barrel and magazine needed to be changed. IMI also manufactured a .45ACP conversion kit both in full auto/open bolt with a 10.2" barrel for the 9mm SMG and a semi only/closed bolt with a 16" barrel for the carbine version. Magazine capacity is limited, with 2 sizes of 16 and 10 rds each.

Notes:

The Mini Uzi is a smaller version of the regular Uzi, first introduced in 1980. The Mini Uzi is 600 mm (23.62 inches) long or 360 mm (14.17 inches) long with the stock folded. Its barrel length is 197 mm (7.76 inches), its muzzle velocity is 375 m/s (1230 f/s) and its effective range is 100 m. It has a greater automatic rate of fire of 950 rounds per minute due to the shorter bolt. Its weight is approximately 2.7 kg (6.0 lb).

Uzi Israeli 9mm Submachine Gun







Tiers:



Variants:

- **Mini Uzi:** The Mini Uzi is a smaller version of the regular Uzi, first introduced in 1980. The Mini Uzi is 600 mm (23.62 inches) long or 360 mm (14.17 inches) long with the stock folded. Its barrel length is 197 mm (7.76 inches), its muzzle velocity is 375 m/s (1230 f/s) and its effective range is 100 m. It has a greater automatic rate of fire of 950 rounds per minute due to the shorter bolt. Its weight is approximately 2.7 kg (6.0 lb). The Micro Uzi is an even further scaled down version of the Uzi, introduced in 1986. The Micro Uzi is 486 mm (19.13 in) long, reduced to 282 mm (11.10 in) with the stock folded and its barrel length is 117 mm and has a closed bolt compared to its original counterpart. Its muzzle velocity is 350 m/s (1148 f/s) and its cyclic rate of fire is 1,200 rpm. It weighs slightly over 1.5 kg (3.3 lb).
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System

Alternate Designation(s): Uzi

Primary Function / Type: Submachine Gun

Manufacturer: Israel

Action: Blowback, Open Bolt

Rate of Fire: rds/min600

Muzzle Velocity: m/s400

Effective Firing Range: m200

Feed System: •10-round box magazine (.22 and .41 AE) •12-, 16-, or 22-round box (.45 ACP) •20-, 25-, 32-, 40-, or 50-round box (9x19mm Parabellum)

Dimensions

Length: 445 mm (17.5 in) stockless 470 mm (18.5 in) folding stock collapsed 640 mm (25 in) folding stock extended

Barrel Length: 260 mm

Weight: kg3.5

Ammunition

↳*Option 1*

Type: Rifle

Caliber: mm9

Cartridge: 9mm Parabellum

Basic Load: See Magazines

:

Stocks

Note: There are different stocks available for the Uzi proper. There is a wooden stock with a metal buttplate that comes in three similar variations that was used by the IDF. The first version had a flat butt and straight comb and had hollows for a cleaning rod and gun oil bottle. The second had an angled butt and a straight comb and no hollows. The third had an angled butt and curved comb and no hollows; a polymer version is currently available from IMI. The wooden stocks originally had a

quick-release base but the ones sold in the United States have a permanent base to be compliant with US gun laws. Choate made an aftermarket polymer stock with a rubber buttpad that had a flat butt, a straight comb, and a permanent base. In 1956, IMI developed a downward-folding twin-strut metal stock with two swiveling sections that tucks under the rear of the receiver. The Mini Uzi has a forward-folding single-strut metal stock that is actually an inch longer than the Uzi's. Its buttplate can be used as a foregrip when stowed. The Micro Uzi has a similar model.

Magazine

Note: The original box magazines for the 9mm Uzi had a 25-round capacity. Experimental 40- and 50-round extended magazines were tried but were found to be unreliable. A 32-round extended magazine was then tried and was later accepted as standard. The Mini Uzi and Micro Uzi use a shorter 20-round magazine. Available extended magazines include 40-, and 50-round magazines. Other high-capacity aftermarket magazines exist such as the Vector Arms 70-round and Beta Company (Beta C-Mag) 100-round drums. The .45 ACP Uzi used a 16- or 22-round magazine, while the .45 ACP Micro Uzi and Mini Uzi used a 12-round magazine. A conversion kit by Vector Arms allowed the .45-caliber Uzi to use the same 30-round magazines as the M3 "Grease Gun".

Sights

↳*Iron Sights*

Adjustable: Yes

Caliber conversions

Note: The Uzi was available with caliber conversion kits in .22 LR or .41 AE. The operator just has to change the barrel, bolt and magazine. The .22 LR had 20-round magazines; the original IMI kit used a barrel insert while the aftermarket Action Arms kit used a full replacement barrel. The .41 AE also had a 20-round magazine; since it has the same bolt face as the 9×19mm Parabellum, only the barrel and magazine needed to be changed. IMI also manufactured a .45ACP conversion kit both in full auto/open bolt with a 10.2" barrel for the 9mm SMG and a semi only/closed bolt with a 16" barrel for the carbine version. Magazine capacity is limited, with 2 sizes of 16 and 10 rds each.

Notes:

The Uzi (Hebrew: עוזי, officially cased as UZI) /ˈuːzi/ (About this soundlisten) is a family of Israeli open-bolt, blowback-operated submachine guns. Smaller variants are often considered to be machine pistols. The Uzi was one of the first weapons to use a telescoping bolt design which allows the magazine to be housed in the pistol grip for a shorter weapon. The first Uzi submachine gun was designed by Major Uziel Gal in the late 1940s. The prototype was finished in 1950. First introduced to IDF special forces in 1954, the weapon was placed into general issue two years later. The Uzi has found use as a personal defense weapon by rear-echelon troops, officers, artillery troops and tankers, as well as a frontline weapon by elite light infantry assault forces. The Uzi has been exported to over 90 countries. Over its service lifetime, it has been manufactured by Israel Military Industries, FN Herstal, and other manufacturers. From the 1960s through the 1980s, more Uzi submachine guns were sold to more military, law enforcement and security markets than any other submachine gun ever made. The Uzi uses an open-bolt, blowback-operated design, quite similar to the Jaroslav Holeček-designed Czech ZK 476 (prototype only) and the production Sa 23, Sa 24, Sa 25, and Sa 26 series of submachine guns. The open bolt design exposes the breech end of the barrel, and improves cooling during periods of continuous fire. However, it means that since the bolt is held to the rear when cocked, the receiver is more susceptible to contamination from sand and dirt. It uses a telescoping bolt design, in which the bolt wraps around the breech end of the barrel.This allows the barrel to be moved far back into the receiver and the magazine to be housed in the pistol grip, allowing for a heavier, slower-firing bolt in a shorter, better-balanced weapon. The weapon is constructed primarily from stamped sheet metal, making it less expensive per unit to manufacture than an equivalent design machined from forgings. With relatively few moving parts, the Uzi is easy to strip for maintenance or repair. The magazine is housed within the pistol grip, allowing for intuitive and easy reloading in dark or difficult conditions, under the principle of "hand finds hand". The pistol grip is fitted with a grip safety, making it difficult to fire accidentally. However, the protruding vertical magazine makes the gun awkward to fire when prone. The Uzi features a bayonet lug. The non-reciprocating charging handle on the top of the receiver cover is used to retract the bolt. Variants have a ratchet safety mechanism which will catch the bolt and lock its movement if it is retracted past the magazine, but not far enough to engage the sear. When the handle is fully retracted to the rear, the bolt will cock (catch) on the sear mechanism and the handle and cover are released to spring fully forward under power of a small spring. The cover will remain forward during firing since it does not reciprocate with the bolt. The military and police versions will fire immediately upon chambering a cartridge as the Uzi is an open bolt weapon. There are two external safety mechanisms on the Uzi. The first is the three-position selector lever located at the top of the grip and behind the trigger group. The rear position is "S", or "safe" (S = Sicher or Secure on the MP2), which locks the sear and prevents movement of the bolt. The second external safety mechanism is the grip safety, which is located at the rear of the

grip. It is meant to help prevent accidental discharge if the weapon is dropped or the user loses a firm grip on the weapon during firing. The trigger mechanism is a conventional firearm trigger, but functions only to control the release mechanism for either the bolt (submachine gun) or firing pin holding mechanism (semi-auto) since the Uzi does not incorporate an internal cocking or hammer mechanism. While the open-bolt system is mechanically simpler than a closed-bolt design (e.g. Heckler & Koch MP5), it creates a noticeable delay between when the trigger is pulled and when the gun fires. The magazine release button or lever is located on the lower portion of the pistol grip and is intended to be manipulated by the non-firing hand. The paddle-like button lies flush with the pistol grip in order to help prevent accidental release of the magazine during rigorous or careless handling. When the gun is de-cocked the ejector port closes, preventing entry of dust and dirt. Though the Uzi's stamped-metal receiver is equipped with pressed reinforcement slots to accept accumulated dirt and sand, the weapon can still jam with heavy accumulations of sand in desert combat conditions when not cleaned regularly.[18] The magazine must be removed prior to de-cocking the weapon.

Heckler and Koch MP5 German 9mm Submachine Gun





Tiers:



Variants:

- **HK54:** The original model that was produced in 1964. The 54 designation is from the Heckler & Koch company's old system that indicates that it is a submachine gun/assault carbine (5-) chambered for the 9×19mm cartridge (-4). It had a charcoal-gray phosphated finish rather than the matte-black lacquered finish used on later models and had narrow slotted metal handguards. Its major differences were that it had a longer and heavier bolt carrier than the MP5 and a flip up "ladder"-style rear sight (like the early G3 rifle) rather than the MP5's aperture sight. Its original 15- or 30-round steel magazines were straight rather than curved, had a plastic follower, and were reinforced with ribs (thus their nickname of "waffle"-type magazines).
- **MP5:** A slightly modified version of the HK54 first created in 1966. A matte-black lacquered finish instead of the grayish phosphated finish was introduced for export models in 1977. It originally had the narrow checkered metal "Slimline" handguards in the place of the HK54's narrow slotted metal ones. These were later replaced by the thicker "Tropical" handguards in 1978. The proprietary Heckler & Koch "claw mount" rails for mounting optical and electronic scopes were added around 1973. The improved 15- and 30-round magazines were adopted in 1977; they were curved, had unribbed sides, and had chromed-steel followers.
- **MP5A1:** No buttstock (endplate/receiver cap in place of buttstock), "SEF" trigger group.[
- **MP5A2:** Fixed buttstock, "SEF" trigger group
- **MP5K:** Short (kurz) version created in 1976. It has a shortened 4.5 in (114 mm) barrel, shorter trigger group frame, and a vertical foregrip rather than a handguard. There are no MP5KA2 or MP5KA3 models because it does not come with a fixed or retractable stock

System

Alternate Designation: MP5
Manufacturer: Heckler & Koch
In Service: 1966-Present
Action: Roller-delayed blowback, closed bolt
Rate of Fire: 800 rounds/min (MP5A series) 700 rounds/min (MP5SD series) 900 rounds/min (MP5K series)
Muzzle Velocity: 400 m/s (1,312 ft/s) (MP5A2, MP5A3, MP5A4, MP5A5) 285 m/s (935 ft/s) (MP5SD1, MP5SD2, MP5SD3, MP5SD4, MP5SD5, MP5SD6) 375 m/s (1,230 ft/s) (MP5K, MP5KA1, MP5KA4, MP5KA5, MP5K-PDW)
Effective Firing Range: 200 m (656 ft) (MP5A2, MP5A3, MP5A4, MP5A5) 100 m (328 ft) (MP5K, MP5KA1, MP5KA4, MP5KA5, MP5K-PDW)
Feed System: 15, 30 or 40 round detachable box magazine and 100-round Beta C-Mag drum magazine
Sights: Iron sights. Rear: rotary drum; front: hooded post

Dimensions

Length: Fixed stock: 680 mm (27 in) (MP5A2, MP5A4) 790 mm (31.1 in) (MP5SD2, MP5SD5) 634 mm (25.0 in) (T-94 ZSG)

700 mm (27.6 in) stock extended / 550 mm (21.7 in) stock collapsed (MP5A3, MP5A5) 660 mm (26.0 in) stock extended / 490 mm (19.3 in) stock collapsed 805 mm (31.7 in) stock extended / 670 mm (26.4 in) stock collapsed (MP5SD3, MP5SD6) 603 mm (23.7 in) stock extended / 368 mm (14.5 in) stock folded (MP5K-PDW) Receiver end cap: 550 mm (21.7 in) (MP5SD1, MP5SD4) 325 mm (12.8 in) (MP5K, MP5KA1, MP5KA4, MP5KA5) 349 mm (13.7 in) (MP5K-PDW)

Barrel Length: 225 mm (8.9 in) (MP5A2, MP5A3, MP5A4, MP5A5, MP5/10, MP5/40) 146 mm (5.7 in) (MP5SD1, MP5SD2, MP5SD3, MP5SD4, MP5SD5, MP5SD6) 140 mm (5.5 in) (T-94 ZSG) 115 mm (4.5 in) (MP5K, MP5KA1, MP5KA4, MP5KA5) 148 mm (5.8 in) (MP5K-PDW)

Width: 50 mm (2.0 in) (MP5A2, MP5A3, MP5A4, MP5A5, MP5K, MP5KA1, MP5KA4, MP5KA5, MP5K-PDW) 60 mm (2.4 in) (MP5SD1, MP5SD2, MP5SD3, MP5SD4, MP5SD5, MP5SD6)

Height: 260 mm (10.2 in) (MP5A2, MP5A3, MP5A4, MP5A5, MP5SD1, MP5SD2, MP5SD3, MP5SD4, MP5SD5, MP5SD6, MP5/10, MP5/40) 210 mm (8.3 in) (MP5K, MP5KA1, MP5KA4, MP5KA5, MP5K-PDW)

Weight: 2.54 kg (5.6 lb) (MP5A2, MP5A4) 2.88 kg (6.3 lb) (MP5A3, MP5A5, MP5N) 2.9 kg (6.4 lb) fixed stock / 3.1 kg (6.8 lb) retractable stock (MP5F) 2.7 kg (6.0 lb) fixed stock 2.8 kg (6.2 lb) (MP5SD1, MP5SD4) 3.1 kg (6.8 lb) (MP5SD2, MP5SD5) 3.4 kg (7.5 lb) (MP5SD3, MP5SD6) 2.0 kg (4.4 lb) (MP5K, MP5KA1, MP5KA4, MP5KA5) 2.53 kg (5.6 lb) (MP5K-PDW)

Ammunition

Type: Rifle

Caliber: mm9

Cartridge: 9×19mm Parabellum

Notes:

The MP5 (German: Maschinenpistole 5) is a 9x19mm Parabellum submachine gun, developed in the 1960s by a team of engineers from the German small arms manufacturer Heckler & Koch GmbH (H&K) of Oberndorf am Neckar. There are over 100 variants of the MP5, including some semi-automatic versions. The MP5 is one of the most widely used submachine guns in the world,[8] having been adopted by 40 nations and numerous military, law enforcement, intelligence, and security organizations. It was widely used by SWAT teams in North America, but has largely been supplanted by M16 variants in the 21st century. In 1999, Heckler & Koch developed the Heckler & Koch UMP, the MP5's successor; both are available as of 2019. It however, was not met with the same level of success. The primary version of the MP5 family is the MP5A2, which is a lightweight, air-cooled, selective fire delayed blowback operated 9×19mm Parabellum weapon with a roller-delayed bolt. It fires from a closed bolt (bolt forward) position. The fixed, free floating, cold hammer-forged barrel has 6 right-hand grooves with a 1 in 250 mm (1:10 in) rifling twist rate and is pressed and pinned into the receiver. The first MP5 models used a double-column straight box magazine, but since 1977, slightly curved, steel magazines are used with a 15-round capacity (weighing 0.12 kg) or a 30-round capacity (0.17 kg empty). The adjustable iron sights (closed type) consist of a rotating rear diopter drum and a front post installed in a hooded ring. The rear sight is mechanically adjustable for both windage and elevation with the use of a special tool, being adjusted at the factory for firing at 25 metres (27 yd) with standard 8 grams (123 gr) FMJ 9×19mm NATO ammunition. The rear sight drum provides four apertures of varying diameters used to adjust the diopter system, according to the user's preference and tactical situation. Changing between apertures does not change the point of impact down range. For accurate shooting the user should select the smallest aperture that still allows an equal circle of light between the rear sight aperture and the outside of the front sight hood ring. The MP5 has a hammer firing mechanism. The trigger group is housed inside an interchangeable polymer trigger module (with an integrated pistol grip) and equipped with a three-position fire mode selector that serves as the manual safety toggle. The "S" or Sicher position in white denotes weapon safe, "E" or Einzelfeuer in red represents single fire, and "F" or Feuerstoß (also marked in red) designates continuous fire. The SEF symbols appear on both sides of the plastic trigger group. The selector lever is actuated with the thumb of the shooting hand and is located only on the left side of the original SEF trigger group or on both sides of the ambidextrous trigger groups. The safety/selector is rotated into the various firing settings or safety position by depressing the tail end of the lever. Tactile clicks (stops) are present at each position to provide a positive stop and prevent inadvertent rotation. The "safe" setting disables the trigger by blocking the hammer release with a solid section of the safety axle located inside the trigger housing. The non-reciprocating cocking handle is located above the handguard and protrudes from the cocking handle tube at approximately a 45° angle. This rigid control is attached to a tubular piece within the cocking lever housing called the cocking lever support, which in turn makes contact with the forward extension of the bolt group. It is not however connected to the bolt carrier and therefore cannot be used as a forward assist to fully seat the bolt group. The cocking handle is held in a forward position by a spring detent located in the front end of the cocking lever support which engages in the cocking lever housing. The lever is locked back by pulling it fully to the rear and rotating it slightly clockwise where it can be hooked into an indent in the cocking lever tube.

→Machine Guns

→→Light Machine Guns (LMG)

RPK Russian 7.62mm Light Machine Gun



Tiers:



Variants:

- **RPKS:** The RPKS ("S" — Skladnoy) means "folding" [stock]) is a variant of the RPK with a side-folding wooden stock was intended primarily for the air assault infantry. Changes to the design of the RPKS are limited only to the shoulder stock mounting, at the rear of the receiver. It uses a trunnion riveted to both receiver walls that has a socket and tang, allowing the stock to hinge on a pivot pin. The trunnion has a cut-out on the right side which is designed to engage the stock catch and lock it in place when folded. The wooden stock is mounted in a pivoting hull, which contains a catch that secures the butt-stock in the extended position. The rear sling loop was moved from the left side of the stock body to the right side of the stock frame.
- **Night Version:** The RPK family of light machine guns are also available in a night fighting configuration. These weapons are designated as the RPKN, RPKSN, RPK-74N, and RPKS-74N. They have a side rail mounting on the left side of the receiver that accepts a NSP-3, NSPU, or NSPUM night vision sight. Models designated RPKN-1, RPKSN-1, RPK-74N and RPKS-74N can mount the multi-model night vision scope NSPU-3 (1PN51) while RPKN2, RPKSN2, RPK-74N2 and RPKS-74N2 can mount the multi-model night vision scope NSPUM (1PN58).
- **RPK-74:** Some sources call the RPK-74 a variant of the RPK though the RPK-74 is a 5.45×39mm weapon. Please refer to the RPK-74 WEG sheet for information on this weapon.

System

Alternate Designation(s): NA
Primary Function / Type: Squad Automatic Weapon
Manufacturer: Vyatskiye Polyany Machine-Building Plant
Bore Diameter / Caliber / Length or Cartridge: 7.62 x 39mm
Action: Gas operated, rotating bolt; closed bolt
Cooling Method: Air
Maximum Effective Range for Point Target: m1,000
Maximum Range: m3,150
Muzzle Velocity: m/s745
Sustained Rate of Fire: rpm600
Magazine Capacity (ies): 20-, 30-, 40-round curved magazine, 75-round drum magazine

Rail System Capable: Can be modified to have rails but rails are not standard equipment

Sights Available from Manufacturer: Iron sights

Capable of Attaching other Weapons (Grenade launcher, bayonet, etc.): No

Bi-pod Capable: Yes

Dimensions

Length: mm1,040

Barrel Length: mm590

Weight Without a Magazine: kg4.8

Weight With a Loaded Magazine (Indicate number of rounds): INA

Ammunition

↳*57-N-231*

Type: Steel Core (Ball)

Cartridge Weight: 16.3 g

Bullet Weight: 7.9 g

Muzzle Velocity: 718 m/s

Accuracy at 300m: 75 mm

↳*57-N-231P*

Type: Tracer

Cartridge Weight: 16.1 g

Bullet Weight: 7.57 g

Muzzle Velocity: 718 m/s

Accuracy at 300m: 140 mm

↳*57-T-231PM1*

Type: Tracer

Cartridge Weight: 16.05 g

Bullet Weight: 7.55 g

Muzzle Velocity: 718 m/s

Accuracy at 300m: 140 mm

Sights

↳*Iron Sights*

Sight Picture Offered to Shooter: Iron sights: semi-shrouded front post and rear sliding tangent with an adjustable notch. Sight radius: 555 mm. The rear sight leaf also features a windage adjustment knob, unique to the RPK series of rifles.

Adjustable: Yes

Note: The weapon's rear sight leaf is elevation adjustable, and graduated for ranges of 100 to 1,000 meters in 100 m increments. The rear sight leaf also features a windage adjustment knob unique to the RPK series of rifles.

Accessories

Note: Supplied with the RPK are: spare magazines, a cleaning rod, cleaning kit (stored in a hollowed compartment in the buttstock), a sling, oil bottle, and magazine pouches (a single-pocket pouch for a drum magazine or a 4-pocket pouch for box magazines).

Notes:

The RPK (Ruchnoy Pulemyot Kalashnikova, Russian: РПК Ручной пулемёт Калашникова or "Kalashnikov hand-held machine gun") is a 7.62×39mm light machine gun of Soviet design, developed by Mikhail Kalashnikov in the early 1960s, parallel with the AKM assault rifle. It was created as part of a program designed to standardize the small arms inventory of the Red Army, where it replaced the 7.62×39mm RPD light machine gun. The RPK continues to be used by the armed forces of countries of the former Soviet Union and certain African and Asian nations. The RPK is also manufactured in Bulgaria, Romania and Serbia. The RPK functions identically to the AK-47. It also uses the same 7.62×39mm ammunition. It has a similar design layout to the Kalashnikov series of rifles, with modifications to increase the RPK's effective range and accuracy, enhance its sustained fire capability, and strengthen the receiver. The RPK features a heavier and longer barrel than the AKM. This allows for the weapon to be fired for extended periods without major loss in accuracy due to the barrel heating up. The chrome-lined barrel is permanently fixed to the receiver and cannot be replaced in the field. It is fitted with a new front sight base, and the gas block lacks both a bayonet lug and an under-barrel cleaning rod guide. The barrel also features a folding bipod mounted near the muzzle, and a front sight base with a lug that limits the bipod's rotation around the axis of the barrel. The barrel has a threaded muzzle, enabling the use of muzzle devices such as flash hiders, compensators, and blank-firing adapters. When a muzzle device is not being used, the threads on the muzzle can be covered by a thread protector. The barrel is pinned to the receiver in a modified trunnion, reinforced by ribbing, and is slightly wider than the trunnion used on the standard AKM type rifles. Symmetrical bulges on both sides of the front trunnion ensure a proper fit inside the receiver. The RPK also has a slightly longer receiver, by about 20 mm or less. This was done to decrease the fire rate slightly, but not significantly enough to lower it any less than 600 rounds per minute (RPM). The U-shaped receiver is stamped from a smooth 1.5 mm (0.06 in) sheet of steel compared to the 1.0 mm (0.04 in) sheet metal receiver used on the standard AKM rifles. It uses a modified AKM recoil spring assembly that consists of a rear spring guide rod from the AK and a new forward flat guide rod and coil spring. It features a thick laminated wood foregrip and a fixed laminated wood "club-foot" buttstock similar to the stock used on the RPD, which is designed to allow the user to fire from the prone position more comfortably. It uses a standard AKM pistol grip and can also use standard AKM detachable box magazines, but it is most commonly used with a 40-round box magazine or a 75-round drum magazine. Interchangeability of parts between the RPK and AKM are moderate.

M249 American 5.56mm Light Machine Gun







Tiers:



Variants:

- **M249:** The M249 version of the Minimi was adopted by the US military in 1982; since 1984, production for the US military has been carried out entirely in the US by a local subsidiary, FN Manufacturing LLC in South Carolina. As part of the US military's M249 Product Improvement Program (PIP), the M249 was updated with: a new synthetic stock and modified buffer assembly, a single-position gas regulator, a so-called birdcage type flash hider/compensator from the M16A2, a polymer barrel heat guard, and a folding carry handle. As a result, the weapon’s weight increased to 7.47 kg (16.5 lb). Many of the PIP upgrades were later incorporated by FN for the Minimi. A lightweight variant of the Para with a Picatinny top cover rail adapter is known as the Minimi Special Purpose Weapon (SPW). It had the magazine feed port removed to further reduce weight, and a railed MIL-STD-1913 handguard was used that enables the use of standard tactical accessories. Another variant of the SPW requested by the US Special Operations Forces is the Mk 46 Mod 0 that incorporates a lightweight fluted barrel but lacks the magazine feed system, vehicle mounting lugs and carry handle. A railed forearm ensures modularity and mission-adaptability permitting the use of flashlights, vertical grips, and infrared laser designators. An improved variant known as the Mk 46 Mod 1 with an improved forward rail and lightweight titanium bipod has been adopted by the United States Navy.
- **Minimi 7.62:** The Minimi prototype was originally designed in 7.62×51mm NATO, and later redesigned for the 5.56 mm cartridge. When the USSOCOM issued the requirements for the Mk 48 Mod 0, the original plans for the Minimi were retrieved and used to develop this new model. As a result of favorable reviews of the Mk 48 Mod 0 and increasing demand for a more powerful variant of the Minimi, FN Herstal introduced the Minimi 7.62, available in several different configurations. Apart from the different caliber, the Minimi 7.62 incorporates a non-adjustable, self-regulating gas system and a hydraulic recoil buffer in the buttstock assembly. The Minimi 7.62 also has a different sight setup calibrated for the larger cartridge. The rear sight is adjustable from 100 to 1,000 m by 100 m increments. The sight can also be corrected for windage. A variant of the Minimi 7.62 equipped with a railed Picatinny handguard is the Minimi 7.62 TR.
- **Minimi Mk3:** In November 2013, FN Herstal unveiled the improved Mk3 version of the Minimi light machine gun. The upgrades were based on operational experience and user feedback over the past 10–15 years. It can be converted to fire either 5.56×45mm or 7.62×51mm rounds. The stock is 5-position adjustable that is also adjustable for cheek rest height with a folding shoulder rest and hydraulic buffer. The feed tray has retaining pawls to hold ammunition from the belt in place while loading. The handguard has three forward picatinny rails. A new bipod is 3-position height adjustable and seamlessly integrates into the shape of the handguard when folded back regardless of accessories that may be attached. Others features include a more ergonomic cocking handle and an optional heat shield, enabled by an added on long pin, to protect from barrel heat. Users that already have Minimi machine guns can partially or completely upgrade their existing weapons with the Mk3 features.
- **Production in other countries:** The Minimi is being licence-built in Canada, Australia, Italy, Indonesia, Japan, Sweden, Greece and Switzerland by Colt Canada, Lithgow Arms, Beretta, Pindad, Sumitomo Heavy Industries, Bofors Carl Gustaf,

EAS and Astra Arms S.A. respectively. Copies of the Minimi have been produced for export by Norinco and made by Changfeng Machinery Co., Ltd in China without license, designated as CS/LM8 [zh] in 2011, and chambered in 5.56×45mm NATO. Another clone, known as the XY 5.56, is made by Yunnan Xiyi Industry Company Limited. This was supposed to be mistaken for the CS/LM8 when news of the weapon was made in 2008. Taiwan also produced the Minimi without license, as the T75. In addition, Egypt also produce Minimi under license.

- **F89:** Australia: Designated F89 in Australian service. It is manufactured by Lithgow Arms. Both the Standard and Para versions are used, with the Standard version usually being equipped with a 1.5x sight, and the Para variant usually equipped with a holographic sight, a removable forward grip and a detachable bipod.The 7.62 mm model is known as the Maximi, is also in limited service.

System

Alternate Designation: M249

Manufacturer: FN Herstal FNH USA

In Service: 1984-Present

Action: Gas-operated long-stroke piston, open bolt

Rate of Fire: Sustained rate of fire: 50 RPM Rapid rate of fire: 100 RPM Cyclic rate of fire: 650–850 RPM

Muzzle Velocity: 915 m/s

Effective Firing Range: 700 m (2,300 ft) (point target, 465 mm barrel) 800 m (2,600 ft) (point target, 521 mm barrel) 3,600 m (11,800 ft) (maximum range)

Feed System: M27 linked disintegrating belt, STANAG magazine

Sights: INA

Dimensions

Length: 1,035 mm

Barrel Length: 465 mm

Width: INA

Weight: 7.5 kg (17 lb) empty 10 kg (22 lb) loaded

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Notes:

The M249 light machine gun (LMG), formerly designated the M249 Squad Automatic Weapon (SAW) and formally written as Light Machine Gun, 5.56 mm, M249, is the American adaptation of the Belgian FN Minimi, a light machine gun manufactured by the Belgian company FN Herstal (FN). The M249 is manufactured in the United States by the local subsidiary FN Manufacturing LLC in Columbia, South Carolina and is widely used in the U.S. Armed Forces. The weapon was introduced in 1984 after being judged the most effective of a number of candidate weapons to address the lack of automatic firepower in small units. The M249 provides infantry squads with the high rate of fire of a machine gun combined with accuracy and portability approaching that of a rifle. The M249 is gas operated and air-cooled. It has a quick-change barrel, allowing the gunner to rapidly replace an overheated or jammed barrel. A folding bipod is attached near the front of the gun, though an M192 LGM tripod is available. It can be fed from both linked ammunition and STANAG magazines, like those used in the M16 and M4. This allows the SAW gunner to use rifle magazines as a source of ammunition in case they run out of belts. However, it should only be used in emergencies due to its high malfunction rate. M249s have seen action in every major conflict involving the United States since the U.S. invasion of Panama in 1989. Due to the weight and age of the weapon, the United States Marine Corps is fielding the M27 Infantry Automatic Rifle with plans to partially replace the M249 in Marine Corps service. The M249 is a belt-fed light machine gun. It fires the 5.56×45mm NATO cartridge, usually a combination of one M856 tracer and four M855 ball cartridges

fed from M27 linked belts. Belts are typically held in a hard plastic or soft canvas box attached to the underside of the weapon. It fires from an open bolt and is gas operated. When the trigger is pulled, the bolt and bolt carrier move forward under the power of the recoil spring. A cartridge is stripped from the belt, chambered, and discharged, sending a bullet down the bore. Expanding propellant gases are diverted through a hole in the barrel into a chamber. This pressure moves a piston providing the energy to extract and eject the spent casing as well as advance the belt and compress the recoil spring, thus preparing for subsequent shots. At 1,041 mm (41 in) long and 7.5 kg (17 lb) in weight (10 kg (22 lb) including a 200-round belt and plastic ammo box), the M249 is a cumbersome weapon. The barrel has a rifling twist rate of one turn in 180 mm (7 in). Because firing heats up the bore, the air-cooled barrel is equipped with a mechanism to remove and replace the barrel assembly with a spare. A folding bipod with adjustable legs is attached near the front of the weapon, though there are provisions for hard-mounting to a M192 Lightweight Ground Mount tripod or vehicle mount. The M249 provides accuracy approaching that of a rifle, combined with the sustained volume of fire of a machine gun. Its original gas regulator offered two different gas port sizes, allowing cyclic rates of fire of 725-rounds per minute (r/min) or 1,000 r/min. The latter setting was intended for adverse conditions, such as an excessively dirty firearm or cold weather. The two-position gas regulator was discarded as part of a product improvement program.[10] The sustained rate of fire, the rate at which the gunner can fire continuously without overheating, is listed as 50 r/min. It has a cyclic, or maximum, rate of fire of between 650 and 850 r/min.

Degtyaryov (DP-28) Russian 7.62mm Light Machine Gun







Tiers:



Variants:

- **DPM:** modernized version adopted in 1943–44, with a more robust bipod fastened to the cooling jacket and the recoil spring housed in a tube projecting from the rear of the receiver which necessitated a pistol grip for this model of the weapon (manufactured in China as the Type 53)
- **DA:** DA, for mounting and loading in aircraft (Дегтярёва авиационный, Degtyaryova Aviatsionny; ДА). Also used in tandem mounts known as DA-2. Employed in the early versions of the Tupolev TB-3 bomber and in the Polikarpov R-5 and Polikarpov Po-2 army cooperation aircraft. The DA weighted 7.1 kg empty and 11.5 kg with standard ammunition load. Its rate of fire was 600 rounds per minute. It was built between 1928 and March 1930 with 1,200 units delivered.[15] It was soon superseded by the ShKAS, which had a much higher rate of fire.
- **DT and DTM:** DT and DTM, for mounting and loading in armoured fighting vehicles (Дегтярёва танковый, Degtyaryova Tankovy; ДТ and ДТМ)
- **DTM-4:** DTM-4, (ДТМ-4) quad mounted variant.
- **RP-46:** RP-46 (Ротный пулемет - company machine gun): metallic-belt fed version adopted in 1946 with a heavier barrel to allow prolonged sustained fire. About 500 rounds could be fired continuously before the barrel had to be swapped or allowed to cool down. Also had a user-adjustable gas system, with three holes of varying diameters provided, to cope with varying environmental conditions and residue buildup. Although the empty weight of the RP-46 exceeded that of DP by 2.5 kg, when considered together with a single ammo box of 250 rounds, the RP-46 weighed 10 kg less than the DP together with the same amount of ammunition in DP pans. The RP-46 remained in Soviet service for 15 years before it was replaced (together with the SGM) by the PK machine gun. The RP-46 was later manufactured in China as the Type 58 and in North Korea as the Type 64. The RP-46 could still fire from DP-style magazines by removing its belt-feeding system.

System

:

↳System

Name: Degtyaryov (DP-28) Machine Gun
Type: 7.62mm Light Machine Gun
Manufacturer: Vasily Degtyaryov

Caliber: mm7.62

Length: DP, DPM – 1,270 mm

Barrel Length: DP, DPM – 604 mm (23.8 in) RP-46 – 605 mm (23.8 in)

Weight: 9.12 kg (20.11 lb) (unloaded) 11.5 kg (25 lb) (loaded)

Action: Gas-Operated, flapper locking

Rate of Fire: 550 rpm

Muzzle Velocity: 840 m/s

Effective Firing Range: 800 m

Feed System: 47-round pan 63-round pan (DT & DTM) belt feed (RP-46) 30-round overhead box magazine (PD-36 and DTM-4)

Sights: Adjustable iron sights, front post and rear notch on a scaled tangent

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: m/s7.62×54mmR

Basic Load: 200

Armor Penetration: INA

Notes:

The Degtyaryov machine gun (Russian: Пулемёт Дегтярёва Пехотный Pulemyot Degtyaryova Pekhotny "Degtyaryov's infantry machine gun") or DP-28 is a light machine gun firing the 7.62×54mmR cartridge that was primarily used by the Soviet Union, with service trials starting in 1927 followed by general deployment in 1928. Besides being the standard Soviet infantry light machine gun (LMG) during WWII, with various modifications it was used in aircraft as a flexible defensive weapon, and it equipped almost all Soviet tanks in WWII as either a flexible bow machine gun or a co-axial machine gun controlled by the gunner. It was improved in 1943 producing the DPM, but it was replaced in 1946 with the RP-46 which improved on the basic DP design by converting it to use belt feed. The DP machine gun was supplemented in the 1950s by the more modern RPD machine gun and entirely replaced in Soviet service by the general purpose PK machine gun in the 1960s. The DP-27 was a light machine gun designed for the Soviet Red Army in the 1920s under the leadership of Vasily Degtyarev (1880-1949), the first test model being the DP-26. Two test guns were manufactured and fired 5,000 rounds each from September 27 -29, 1926, during which weaknesses were discovered in the extractor and firing pin mechanisms. After design improvements, two more guns were made and tested in December of 1926, firing 40,000 rounds under adverse conditions, resulting in only .6% stoppages. However, changes to the bolt carrier and the chamber locking mechanism were still required. After this redesign the improved gun, now called the DP-27, was tested by the Red Army at the Kovrov plant on January 17-21 of 1927, passing all tests and being approved for manufacture. A full year of service testing followed, after which the primary requested change was the addition of the large flash suppressor that is now considered one of the recognition features of the design. With further refinements, the DP was to be the primary light machine gun of the Red Army during WWII. As with most other light machine guns of WWII, the DP-27 was designed to fire the same 7.62×54mmR (R indicating Rimmed) ammunition as the main Soviet infantry battle rifle, the Mosin-Nagant, much simplifying ammunition logistics for Soviet infantry units. Of typical Russian design philosophy, the DP-27 was a sturdy and simple gun that was easy and cheap to manufacture, and could be relied upon to perform even in the most adverse conditions; it was capable of withstanding being buried in dirt, mud, or sand and still operating consistently. However it had a low rate of fire when compared to its main wartime rival, the German MG 34/MG 42 series, firing at a rate of 550rpm as compared to the 800-1200rpm of the German light machine guns. The operating mechanism of the DP-27 was gas-operated, using a Kjellmann-Friberg flap locking design to lock the bolt against the chamber until the round had left the barrel, aided by a recoil spring. Ammunition came in the form of a 47-round circular pan magazine that attached to the top of the receiver. It was this disc-shaped, rotating magazine that led Soviet soldiers to call the DP, in typical soldier slang, the "record player". Its main parts were a removable barrel with an integrated flash suppresor and gas cylinder, a receiver with the rear sight, a perforated barrel shroud/guide with the front sight, the bolt and locking flaps, the bolt carrier and gas piston rod, a recoil spring, stock and trigger mechanism group, a bipod for firing from prone positions, and the previously-mentioned pan magazine. In total, the first versions contained only 80 parts, indicating both the simplicity and ease

of manufacture of the design. Early versions had 26 transverse cooling fins machined into the barrel, but it was found that these had little cooling effect and so were deleted in 1938, further easing manufacture. Its main weaknesses besides the somewhat low rate of fire were that the pan magazines were prone to damage while being carried, the bipod mechanism was known to be weak and likely to fail if not handled with care, the recoil spring's location near the barrel led to overheating of the spring causing it to lose proper spring temper and thereby most of its strength as a spring, and the 47-round magazines made sustained fire impossible. Since the German MG-34/MG-42 were continuous belt-fed, they had both a much higher rate of fire as well as a sustained fire capability that the DP series could not match. Further, the pan magazines were difficult and time-consuming to reload.

F89 Australian 5.56mm Light Machine Gun




Tiers:



Variants:

- **M249:** The M249 version of the Minimi was adopted by the US military in 1982; since 1984, production for the US military has been carried out entirely in the US by a local subsidiary, FN Manufacturing LLC in South Carolina. As part of the US military's M249 Product Improvement Program (PIP), the M249 was updated with: a new synthetic stock and modified buffer assembly, a single-position gas regulator, a so-called birdcage type flash hider/compensator from the M16A2, a polymer barrel heat guard, and a folding carry handle. As a result, the weapon’s weight increased to 7.47 kg (16.5 lb). Many of the PIP upgrades were later incorporated by FN for the Minimi. A lightweight variant of the Para with a Picatinny top cover rail adapter is known as the Minimi Special Purpose Weapon (SPW). It had the magazine feed port removed to further reduce weight, and a railed MIL-STD-1913 handguard was used that enables the use of standard tactical accessories. Another variant of the SPW requested by the US Special Operations Forces is the Mk 46 Mod 0 that incorporates a lightweight fluted barrel but lacks the magazine feed system, vehicle mounting lugs and carry handle. A railed forearm ensures modularity and mission-adaptability permitting the use of flashlights, vertical grips, and infrared laser designators. An improved variant known as the Mk 46 Mod 1 with an improved forward rail and lightweight titanium bipod has been adopted by the United States Navy.
- **Minimi 7.62:** The Minimi prototype was originally designed in 7.62×51mm NATO, and later redesigned for the 5.56 mm cartridge. When the USSOCOM issued the requirements for the Mk 48 Mod 0, the original plans for the Minimi were retrieved and used to develop this new model. As a result of favorable reviews of the Mk 48 Mod 0 and increasing demand for a more powerful variant of the Minimi, FN Herstal introduced the Minimi 7.62, available in several different configurations. Apart from the different caliber, the Minimi 7.62 incorporates a non-adjustable, self-regulating gas system and a hydraulic recoil buffer in the buttstock assembly. The Minimi 7.62 also has a different sight setup calibrated for the larger cartridge. The rear sight is adjustable from 100 to 1,000 m by 100 m increments. The sight can also be corrected for windage. A variant of the Minimi 7.62 equipped with a railed Picatinny handguard is the Minimi 7.62 TR.
- **Minimi Mk3:** In November 2013, FN Herstal unveiled the improved Mk3 version of the Minimi light machine gun. The upgrades were based on operational experience and user feedback over the past 10–15 years. It can be converted to fire either 5.56×45mm or 7.62×51mm rounds. The stock is 5-position adjustable that is also adjustable for cheek rest height with a folding shoulder rest and hydraulic buffer. The feed tray has retaining pawls to hold ammunition from the belt in place while loading. The handguard has three forward picatinny rails. A new bipod is 3-position height adjustable and seamlessly integrates into the shape of the handguard when folded back regardless of accessories that may be attached. Others features include a more ergonomic cocking handle and an optional heat shield, enabled by an added on long pin, to protect from barrel heat. Users that already have Minimi machine guns can partially or completely upgrade their existing weapons with the Mk3 features.
- **Production in other countries:** The Minimi is being licence-built in Canada, Australia, Italy, Indonesia, Japan, Sweden, Greece and Switzerland by Colt Canada, Lithgow Arms, Beretta, Pindad, Sumitomo Heavy Industries, Bofors Carl Gustaf, EAS and Astra Arms S.A. respectively. Copies of the Minimi have been produced for export by Norinco and made by Changfeng Machinery Co., Ltd in China without license, designated as CS/LM8 [zh] in 2011, and chambered in 5.56×45mm NATO. Another clone, known as the XY 5.56, is made by Yunnan Xiyi Industry Company Limited. This was supposed to be mistaken for the CS/LM8 when news of the weapon was made in 2008. Taiwan also produced the Minimi without license, as the T75. In addition, Egypt also produce Minimi under license.
- **F89:** Australia: Designated F89 in Australian service. It is manufactured by Lithgow Arms. Both the Standard and Para versions are used, with the Standard version usually being equipped with a 1.5x sight, and the Para variant usually equipped with a holographic sight, a removable forward grip and a detachable bipod.The 7.62 mm model is known as the Maximi, is also in limited service.

System

Alternate Designation: F89

Manufacturer: FN Herstal FNH USA

In Service: INA-Present

Action: Gas-actuated, open bolt

Rate of Fire: Minimi 5.56: 700–1,150 rounds/min Maximi 7.62: 680–800 rounds/min

Muzzle Velocity: Standard model: 925 m/s (3,035 ft/s) Minimi Para: 866 m/s (2,841.2 ft/s)

Effective Firing Range: 300–1,000 m sight adjustments

Feed System: 100 or 200-round belt contained in a 100-round or 200-round soft pouch, or 200-round box or 30-round M16-type STANAG magazine

Sights: Rear aperture, front post

Dimensions

Length: Standard model: 1,040 mm (40.9 in) Minimi Para: 914 mm (36.0 in) stock extended / 766 mm (30.2 in) stock collapsed Vehicle model: 793 mm (31.2 in) no buttstock Minimi 7.62: 1,015 mm (40.0 in) fixed stock Minimi 7.62: 1,000 mm (39.4 in) stock extended / 865 mm (34.1 in) stock collapsed

Barrel Length: Standard model: 465 mm (18.3 in) Minimi Para: 349 mm (13.7 in) Minimi 7.62: 502 mm (19.8 in)

Width: 110 mm (4.3 in) Minimi 7.62: 128 mm (5.0 in)

Weight: Standard model: 7.1 kg (15.7 lb) Minimi Para: 7.44 kg (16.4 lb) Minimi TR: 7.75 kg (17.1 lb) Minimi Para TR: 7.77 kg (17.1 lb) Vehicle model: 5.32 kg (11.7 lb) Minimi 7.62: 8.2 kg (18 lb) Minimi 7.62 Para: 8.4 kg (19 lb) Minimi 7.62 Para TR: 8.6 kg (19 lb) Minimi Mk3: 8 kg (18 lb) Minimi Mk3 7.62: 8.8 kg (19 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Notes:

The F89 Australian 5.56mm Light Machine Gun is a copy of the FM Minimi. Australia: Designated F89 in Australian service. It is manufactured by Lithgow Arms. Both the Standard and Para versions are used, with the Standard version usually being equipped with a 1.5x sight, and the Para variant usually equipped with a holographic sight, a removable forward grip and a detachable bipod. The 7.62 mm model is known as the Maximi, is also in limited service. The FN Minimi (short for French: Mini Mitrailleuse; "mini machine gun") is a Belgian 5.56mm Squad Automatic Weapon, or SAW developed by Fabrique Nationale (FN) in Herstal by Ernest Vervier. First introduced in the late 1970s, it is now in service in more than 75 countries. The weapon is currently manufactured at the FN facility in Herstal and their U.S. subsidiary FN Manufacturing LLC. The Minimi is a SAW that fires from an open bolt. It is an air-cooled weapon that is capable of fully automatic fire only. It can be belt fed or fired from a magazine. The Minimi is configured in several variants: the Standard model as a platoon or squad support weapon, the Para version for paratroopers and the Vehicle model as secondary armament for fighting vehicles. The Minimi has a manually adjustable gas valve with two positions, normal and adverse. The adverse setting increases the cyclic rate of fire from 700–850 rounds per minute to 950–1,150 rounds per minute and is used only in extreme environmental conditions or when heavy fouling is present in the weapon's gas tube. The spring extractor is located inside the bolt, while the tilting lever ejector is contained inside the receiver housing. Spent casings are removed through a port located at the bottom of the right side of the receiver, protected from debris with a spring-loaded dust cover. The Minimi is striker-fired and the bolt carrier functions as the striker mechanism. The Minimi has a push-button type manual safety installed in the trigger housing, above the pistol grip. In the "weapon safe" position, it disables the sear mechanism; pushing the button to the right side exposes a red-colored rim on the left side of the firearm and indicates the weapon is ready to fire. The black polymer pistol grip from the FAL and FNC rifles was initially used, but the Minimi is currently fitted with a modified grip with lateral grooves, installed at a smaller angle to the receiver. The Minimi features a welded receiver made from stamped steel. Both the standard and Para variants are equipped

with a fixed, folding bipod mounted to the gas tube and stowed under the handguard. The bipod can be adjusted in height and each leg has three height settings. The bipod also offers a 15° range of rotation to either side. With the bipod fully extended, the bore axis is elevated to a height of 465 mm (18.3 in). The Minimi can also be fired from the Belgian FN360° tripod or the American M122 mount using an M60 pintle. The vehicle-mounted Minimi is fitted with an electrically powered trigger that enables it to be fired remotely from within an armored fighting vehicle. The standard light machine gun version has a 465 mm (18.3 in) barrel and a skeletonized aluminum stock with a folding wire shoulder strap. The shortened Para model has a 349 mm (13.7 in) barrel and a collapsible metal stock, while the vehicle-mounted model has a 465 mm (18.3 in) barrel but does not have a stock or iron sights. All models can alternatively be fitted with a fixed synthetic stock, the same used on the M249, which contains a hydraulic buffer that contributes to stabilizing the rate of fire and reducing recoil forces.

Heckler and Koch MG4 German 5.56mm Light Machine Gun







Tiers:



Variants:

- **MG4 (HK123):** The Heckler & Koch MG4 (HK123) light machine gun is chambered in 5.56×45mm NATO cartridge and has been adopted by the Bundeswehr.
- **MG4E (HK123E):** An export variant of the MG4 that has been slightly modified and is slightly lighter. The letter "E" in the designation stands for "Export". It has a different gas assembly that reduces the cyclic rate of fire. In 2007, the Spanish Army adopted this variant as their standard light machine gun. The Spanish Military of Defence ordered 1,800–2,000 of these light machine guns.
- **MG4 Vehicle Weapon (HK123 Vehicle Weapon):** A variant of the MG4 configured for use as a vehicle or coaxial machine gun. It lacks a buttstock, rear sight, cartridge case deflector, handguard, and bipod mount. It can be fitted with a remote firing device and safety/fire selector lever. It can also be fitted for dismounted use
- **MG4K (HK123K):** A variant of the MG4 with a shorter barrel.
- **MG4KE (HK123KE):** An export variant of the MG4K.
- **MG5 (HK121):** The Heckler & Koch MG5 (HK121) general-purpose machine gun is chambered in 7.62×51mm NATO cartridge and has been adopted by the Bundeswehr. It is based on the MG4, however there are only few parts that are interchangeable due to the machine guns having different calibers and their size differences.

System

:

↳System

Name: Heckler and Koch MG4 (also known as the HK123)

Type: Light machine gun

Manufacturer: Heckler & Koch

Length: 1,030 mm (40.6 in) stock extended / 830 mm (32.7 in) stock folded (MG4, MG4E) 950 mm (37.4 in) stock extended / 750 mm (29.5 in) stock folded (MG4KE)

Barrel Length: 450 mm (17.7 in) (MG4, MG4E) 370 mm (14.6 in) (MG4KE)

Width: 90 mm (3.5 in)

Height: 250 mm (9.8 in)

Weight: 8.15 kg (17.97 lb) (MG4) 7.90 kg (17.4 lb) (MG4E) 7.70 kg (17.0 lb) (MG4KE)

Action: Gas-operated, rotating bolt

Rate of Fire: 890 (± 60) RPM (MG4) 775 (± 50) RPM (MG4E, MG4K)

Effective Firing Range: Approx. 1,000 m (MG4, MG4E) Approx. 900 m (MG4KE)

Feed System: M27 linked disintegrating belt

Sights: Iron sights; MIL-STD-1913 rail provided for optics, German Army models are equipped with telescopic sights with 3× magnification.

↳***Ammunition***

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56 x 45mm NATO

Basic Load: 1,000 rounds ready to fire, 1,000 rounds in storage

Notes:

The Heckler & Koch MG4 (also known as the HK123) is a belt-fed 5.56 mm light machine gun designed and developed by German firearm manufacturer Heckler & Koch. The weapon was developed in the late 1990s and was first seen publicly in September 2001. It has been selected to replace the 7.62 mm MG3 general-purpose machine gun in the Bundeswehr at the squad support level; it will complement the MG3 in other roles. The MG4 will also be the secondary armament of the new Puma infantry fighting vehicle. Overall, it is designed to be light, provide maximum safety to the user and function reliably under adverse conditions using a wide range of ammunition from different manufacturers, without the need to adjust the gas system. The machine gun was initially known as the MG43 prior to its adoption by the Bundeswehr. The MG4 is an air-cooled, belt-fed gas-operated light machine gun with a positively locked rotary bolt and is somewhat similar in concept to the Belgian Minimi light machine gun. Safety mechanisms on the machine gun includes a manual safety incorporated into the fire mode selector toggle; setting the fire selector lever on the "safe" position blocks the trigger mechanically and locks the bolt in the cocked position. When the bolt is not pulled back completely, accidental firing is prevented by an integral, automatic mechanism that prevents the bolt from traveling forward. In addition, the firing pin cannot reach the cartridge primer until the cartridge has been fully chambered. The machine gun is fed from a disintegrating belt and is carried out in two stages from the top left using an enhanced pawl mechanism. As on the MG42 family of machine guns, the belt is expelled to the right and spent cases are ejected downwards, although sideways ejection to the right is an option. The MG4 has a hammer-forged quick-change barrel that can be safely exchanged when hot without the need for protective gloves; the carrying handle serves as the barrel change grip. The barrel assembly weighs 1.80 kg (3.97 lb). To reduce the overall length of the weapon for transport, the butt stock can be folded to the left side of the receiver. With the buttstock folded the MG4 remains fully operable. A field cleaning kit is housed within the stock. The MG4 takes zero shifts between barrel assemblies into account by making the front sight of the assemblies mechanically adjustable. In its standard form, the MG4 is equipped with closed type iron sights with range settings up to 1,000 m (1,094 yd) in 100 m (109 yd) increments. The folding front sight element is mounted on the barrel assembly and is adjustable mechanically for both windage and elevation. The sight line radius is 602 millimeters (23.7 in). Optical or night sights or laser pointers can be mounted on a length of MIL-STD-1913 Picatinny rail located on the receiver feed tray cover. Bundeswehr models are equipped with telescopic sights with 3× magnification. A folding bipod weighing 0.70 kg (1.54 lb) is provided. Supporting interfaces are integrated into the receiver to allow the MG4 to be mounted on the standard American M122A1 tripod for increased accuracy and stability.

MK 48 (Maximi) Belgian 7.62mm Light Machine Gun



Tiers:



Variants:

- **Mk 48 Mod 0:** This is a 7.62×51mm NATO version of the Mk 46, used by USSOCOM when a heavier cartridge is required.[3] It is officially classified as an LWMG (light weight machine gun) and was developed as a replacement for the Mk 43 Mod 0/1. The M60-based machine guns are a great deal more portable than the heavier M240-based designs used elsewhere in the U.S. military in the infantry medium machine gun role. The M60-based designs have a long history of insufficient reliability, however. Trials conducted through the mid-1990s led the U.S. Army to replace its M60 with M240B GPMGs. The M240B weighs in at ~27.5 lb and is about 49 inches long with the standard barrel. Due to this extra weight and size NAVSPECWAR was reluctant to give up the increased portability of the M60 (~22.5 lb, 37.7 inches OAL with the shortest "Assault Barrel") designs, despite the M240's increased reliability. A request was put in for a new machine gun in 2001, and FN responded with a scaled-up version of the M249 weighing in at ~18.5 lb with an OAL of ~39.5". This new design achieved much better reliability than the M60-based weapons while bettering its light weight and maintaining the same manual of arms as the already in-use M249. USSOCOM was slated to begin receiving deliveries of the new gun in August 2003.
- **Mk 48 Mod 1:** The Mk 48 Mod 1 is an update of the Mk 48 Mod 0. Like the Mod 0, it is essentially an M249 scaled up to fire the 7.62×51mm NATO round. The Mod 1 utilizes a 19.75-inch barrel, weighs in at 18.37 lb unloaded, and has a rate of fire of 500–625 rpm. Major changes include the use of an adjustable buttstock, modified rail interface system, removal of the original hinged heat guard in favor of M249-style ones attached to the barrel, and modified bipod mount.
- **Mk 48 Mod 2 prototype:** At the National Defense Industry Association’s annual Special Operations Forces Industry Conference (SOFIC), which began on May 20 2019, FN has unveiled a prototype of its new Mk 48 Mod 2 machine gun chambered for 6.5mm Creedmoor. It was developed in response to a USSOCOM requirement. American special operations forces are interested in acquiring a lightweight belt-fed "assault" machine gun, which would offer better range than existing weapons.

System

:

↳System

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun
Caliber: 7.62mm
Manufacturer: FN Herstal
In Service: 2003-Present
Length: 1,000 mm
Barrel Length: 502 mm
Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds
Action: Gas-operated, open bolt
Rate of Fire: 710 (± 50) rounds/min
Maximum FIring Range: 3,600 m
Effective Firing Range: 800 m
Feed System: Disintegrating belt (M13 link)
Sights: INA

↳***Ammunition***

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO (STANAG 2310)
Basic Load: 1,200

Notes:

The Mark 48, or Mk 48, or Maximi is a lightweight belt-fed machine gun, firing 7.62×51mm NATO cartridges from a disintegrating belt of ammunition. It is manufactured by Fabrique Nationale Manufacturing, Inc., a division of FN Herstal based in the United States. The Mk 48 has been developed in conjunction with the U.S. Special Operations Command (USSOCOM), which has adopted the weapon and started its fielding process, beginning with special operations units. The Mk 48 Mod 0 is a gas-operated, air-cooled, fully automatic belt-fed machine gun. The design is based on an early 7.62×51mm NATO prototype of the FN Minimi, modified to be a scaled-up version of the 5.56 mm Mk 46 Mod 0. Being heavily based on the Mk 46 Mod 0, the Mk 48 Mod 0 features five MIL-STD-1913 Picatinny rails (one on top of the receiver, one on each side of the forearm/handguard, one under the handguard, and one on top of the barrel), an integral folding bipod, and a tripod-mounting lug. The weapon is fitted with the same fixed, polymer buttstock as the M249, although the metallic, collapsible buttstock from the "Para" model can be found in some models. The carrying handle, which had been removed from the Mk 46, was reintegrated on the Mk 48 to assist the replacement of hot barrels without use of other equipment, such as heat-resistant gloves; the handle can be folded down when not in use. As with the Mk 46, the Mk 48 Mod 0 does not have an M249-type magazine feed port, in order to save weight. The weapon can be fed from a loose belt, separate belt boxes, or clip-on ammunition pouches for 100 rounds. There is a high degree of parts commonality between the Mk48, M249 and Mk46 machine guns, which simplifies maintenance and repair. The use of M1913 "Picatinny" rails allows the fitting of various accessories from the SOPMOD kit, such as the ECOS-N (Enhanced Combat Optical Sight) red dot sight and other sighting or target-designating devices. The Mk 48 can also be fitted with a vertical foregrip for increased controllability during sustained fire. While heavier than the 5.56×45mm NATO M249 due to its larger chambering and heavier barrel, the Mk 48 Mod 0 is still 17% lighter and 8.4% shorter than the M240. The Mk 48 Mod 0 is currently in service with certain USSOCOM units, such as the U.S. Navy SEALs and Army's 75th Ranger Regiment.

FN Minimi Belgian 5.56mm Light Machine Gun





Tiers:



Variants:

- **M249:** The M249 version of the Minimi was adopted by the US military in 1982; since 1984, production for the US military has been carried out entirely in the US by a local subsidiary, FN Manufacturing LLC in South Carolina. As part of the US military's M249 Product Improvement Program (PIP), the M249 was updated with: a new synthetic stock and modified buffer assembly, a single-position gas regulator, a so-called birdcage type flash hider/compensator from the M16A2, a polymer barrel heat guard, and a folding carry handle. As a result, the weapon’s weight increased to 7.47 kg (16.5 lb). Many of the PIP upgrades were later incorporated by FN for the Minimi. A lightweight variant of the Para with a Picatinny top cover rail adapter is known as the Minimi Special Purpose Weapon (SPW). It had the magazine feed port removed to further reduce weight, and a railed MIL-STD-1913 handguard was used that enables the use of standard tactical accessories. Another variant of the SPW requested by the US Special Operations Forces is the Mk 46 Mod 0 that incorporates a lightweight fluted barrel but lacks the magazine feed system, vehicle mounting lugs and carry handle. A railed forearm ensures modularity and mission-adaptability permitting the use of flashlights, vertical grips, and infrared laser designators. An improved variant known as the Mk 46 Mod 1 with an improved forward rail and lightweight titanium bipod has been adopted by the United States Navy.
- **Minimi 7.62:** The Minimi prototype was originally designed in 7.62×51mm NATO, and later redesigned for the 5.56 mm cartridge. When the USSOCOM issued the requirements for the Mk 48 Mod 0, the original plans for the Minimi were retrieved and used to develop this new model. As a result of favorable reviews of the Mk 48 Mod 0 and increasing demand for a more powerful variant of the Minimi, FN Herstal introduced the Minimi 7.62, available in several different configurations. Apart from the different caliber, the Minimi 7.62 incorporates a non-adjustable, self-regulating gas system and a hydraulic recoil buffer in the buttstock assembly. The Minimi 7.62 also has a different sight setup calibrated for the larger cartridge. The rear sight is adjustable from 100 to 1,000 m by 100 m increments. The sight can also be corrected for windage. A variant of the Minimi 7.62 equipped with a railed Picatinny handguard is the Minimi 7.62 TR.
- **Minimi Mk3:** In November 2013, FN Herstal unveiled the improved Mk3 version of the Minimi light machine gun. The upgrades were based on operational experience and user feedback over the past 10–15 years. It can be converted to fire either 5.56×45mm or 7.62×51mm rounds. The stock is 5-position adjustable that is also adjustable for cheek rest height with a folding shoulder rest and hydraulic buffer. The feed tray has retaining pawls to hold ammunition from the belt in place while loading. The handguard has three forward picatinny rails. A new bipod is 3-position height adjustable and seamlessly integrates into the shape of the handguard when folded back regardless of accessories that may be attached. Others features include a more ergonomic cocking handle and an optional heat shield, enabled by an added on long pin, to protect from barrel heat. Users that already have Minimi machine guns can partially or completely upgrade their existing weapons with the Mk3 features.
- **Production in other countries:** The Minimi is being licence-built in Canada, Australia, Italy, Indonesia, Japan, Sweden, Greece and Switzerland by Colt Canada, Lithgow Arms, Beretta, Pindad, Sumitomo Heavy Industries, Bofors Carl Gustaf, EAS and Astra Arms S.A. respectively. Copies of the Minimi have been produced for export by Norinco and made by Changfeng Machinery Co., Ltd in China without license, designated as CS/LM8 [zh] in 2011, and chambered in 5.56×45mm NATO. Another clone, known as the XY 5.56, is made by Yunnan Xiyi Industry Company Limited. This was supposed to be mistaken for the CS/LM8 when news of the weapon was made in 2008. Taiwan also produced the Minimi without license, as the T75. In addition, Egypt also produce Minimi under license.
- **F89:** Australia: Designated F89 in Australian service. It is manufactured by Lithgow Arms. Both the Standard and Para versions are used, with the Standard version usually being equipped with a 1.5x sight, and the Para variant usually equipped with a holographic sight, a removable forward grip and a detachable bipod.The 7.62 mm model is known as the Maximi, is also in limited service.

System

Alternate Designation: FN Minimi

Manufacturer: FN Herstal FNH USA

In Service: 1974-Present

Action: Gas-actuated, open bolt

Rate of Fire: Minimi 5.56: 700–1,150 rounds/min Maximi 7.62: 680–800 rounds/min

Muzzle Velocity: Standard model: 925 m/s (3,035 ft/s) Minimi Para: 866 m/s (2,841.2 ft/s)

Effective Firing Range: 300–1,000 m sight adjustments

Feed System: 100 or 200-round belt contained in a 100-round or 200-round soft pouch, or 200-round box or 30-round M16-type STANAG magazine

Sights: Rear aperture, front post

Dimensions

Length: Standard model: 1,040 mm (40.9 in) Minimi Para: 914 mm (36.0 in) stock extended / 766 mm (30.2 in) stock collapsed Vehicle model: 793 mm (31.2 in) no buttstock Minimi 7.62: 1,015 mm (40.0 in) fixed stock Minimi 7.62: 1,000 mm (39.4 in) stock extended / 865 mm (34.1 in) stock collapsed

Barrel Length: Standard model: 465 mm (18.3 in) Minimi Para: 349 mm (13.7 in) Minimi 7.62: 502 mm (19.8 in)

Width: 110 mm (4.3 in) Minimi 7.62: 128 mm (5.0 in)

Weight: Standard model: 7.1 kg (15.7 lb) Minimi Para: 7.44 kg (16.4 lb) Minimi TR: 7.75 kg (17.1 lb) Minimi Para TR: 7.77 kg (17.1 lb) Vehicle model: 5.32 kg (11.7 lb) Minimi 7.62: 8.2 kg (18 lb) Minimi 7.62 Para: 8.4 kg (19 lb) Minimi 7.62 Para TR: 8.6 kg (19 lb) Minimi Mk3: 8 kg (18 lb) Minimi Mk3 7.62: 8.8 kg (19 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Notes:

The FN Minimi (short for French: Mini Mitrailleuse; "mini machine gun") is a Belgian 5.56mm Squad Automatic Weapon, or SAW developed by Fabrique Nationale (FN) in Herstal by Ernest Vervier. First introduced in the late 1970s, it is now in service in more than 75 countries. The weapon is currently manufactured at the FN facility in Herstal and their U.S. subsidiary FN Manufacturing LLC. The Minimi is a SAW that fires from an open bolt. It is an air-cooled weapon that is capable of fully automatic fire only. It can be belt fed or fired from a magazine. The Minimi is configured in several variants: the Standard model as a platoon or squad support weapon, the Para version for paratroopers and the Vehicle model as secondary armament for fighting vehicles. The Minimi has a manually adjustable gas valve with two positions, normal and adverse. The adverse setting increases the cyclic rate of fire from 700–850 rounds per minute to 950–1,150 rounds per minute and is used only in extreme environmental conditions or when heavy fouling is present in the weapon's gas tube. The spring extractor is located inside the bolt, while the tilting lever ejector is contained inside the receiver housing. Spent casings are removed through a port located at the bottom of the right side of the receiver, protected from debris with a spring-loaded dust cover. The Minimi is striker-fired and the bolt carrier functions as the striker mechanism. The Minimi has a push-button type manual safety installed in the trigger housing, above the pistol grip. In the "weapon safe" position, it disables the sear mechanism; pushing the button to the right side exposes a red-colored rim on the left side of the firearm and indicates the weapon is ready to fire. The black polymer pistol grip from the FAL and FNC rifles was initially used, but the Minimi is currently fitted with a modified grip with lateral grooves, installed at a smaller angle to the receiver. The Minimi features a welded receiver made from stamped steel. Both the standard and Para variants are equipped with a fixed, folding bipod mounted to the gas tube and stowed under the handguard. The bipod can be adjusted in height and each leg has three height settings. The bipod also offers a 15° range of rotation to either side. With the bipod fully extended, the bore axis is elevated to a height of 465 mm (18.3 in). The Minimi can also be fired from the Belgian FN360° tripod or the American M122 mount using an M60 pintle. The vehicle-mounted Minimi is

fitted with an electrically powered trigger that enables it to be fired remotely from within an armored fighting vehicle. The standard light machine gun version has a 465 mm (18.3 in) barrel and a skeletonized aluminum stock with a folding wire shoulder strap. The shortened Para model has a 349 mm (13.7 in) barrel and a collapsible metal stock, while the vehicle-mounted model has a 465 mm (18.3 in) barrel but does not have a stock or iron sights. All models can alternatively be fitted with a fixed synthetic stock, the same used on the M249, which contains a hydraulic buffer that contributes to stabilizing the rate of fire and reducing recoil forces.

RPD Russian 7.62mm Light Machine Gun







Tiers:



Variants:

- **Type 56 & 56-1:** Chinese
- **Type 62 Light MG:** North Korean
- **M52:** Czech

System

Alternative Designation: Degtyarev
Operation: Gas
Fire Mode: Automatic
Mount: Bipod
Feed System: Metallic-link belt, 100-rd drum (containing belt). The Chinese copies may use 200-rd drums.
Quick Change Barrel: No
Rate of Fire (Cyclic): rd/min600
Rate of Fire (Practical): rd/min150

Dimensions

Overall Length: mm1,037
Barrel Length: mm520
Empty Weight (w/o magazine): kg7
Loaded (with magazine): kg13

Ammunition

↳*M1943 (57N231S)*

Caliber/length: 7.62x39-mm

Type: Ball, steel core

Effective Range: m800

Maximum Range: m800

Armor Penetration: 6 mm mild steel plate at 300 m Steel helmet at 1,000 m Flak vest at 60 m

Muzzle Velocity: m/s718

↳*M1943 (T-45 or 57N231P)*

Caliber/length: 7.62x39-mm

Type: Ball-Tracer

Effective Range: m800

Maximum Range: m800

Trace: m800

Muzzle Velocity: m/s718

↳*M1943*

Caliber/length: 7.62x39-mm

Type: API

Armor Penetration: mm8

Muzzle Velocity (m/s): N/A

Sights

↳*Sights*

Type: Leaf sights

Sight Range (m): 900 in 100 meter increments.

Magnification: None

Night Sights Available: Yes

Note: The RPD is equipped with a set of open-type iron sights. These consist of a front post and a notched rear sight mounted on a tangent. Both the front and rear sights on the RPD are adjustable for windage and elevation. The front sight is adjusted up or down for elevation using a tool included in the issued cleaning kit. To adjust the front sight for windage, the smaller of the two wrenches on the multi-tool included in the issued cleaning kit is used to loosen the retaining bolt on the front sight clamp. The front sight can then be adjusted left or right for the correct windage, after which the retaining bolt is reinstalled to lock the sight into place. The rear sight is adjusted for elevation using a slider. The rear sight is marked in 100 meter increments from 100 to 1,000 meters. The rear sight is adjusted for windage using a knob on the left side of the rear sight. Because the front sight of the RPD must be partially disassembled in order to adjust windage, in practice the front sight would have been zeroed for windage and then locked in place. Adjustment for windage in the field would have been accomplished using the knob on the rear sight. A number of RPDs were fitted with a side rail (attached to the left side of the receiver) to accept an NSP-2 night vision sight.

Accessories

Note: Standard accessories issued with the weapon include and sling, extra ammunition drums and belts (with either belt or shoulder pouches for same), oil bottle, cleaning rod (carried in a slot on the left side of the receiver), (stowed in a compartment inside the stock), and drop case. The cleaning kit consists of a rectangular metal clam-shell case that typically contains the following tools and spare parts: pin punch (used for disassembling the bolt), cleaning jag, multi-tool (includes screwdriver, small and large wrenches used for adjusting the front sight and gas system, respectively, and a notch for installing and removing the cleaning jag on the cleaning rod), broken case extractor, front sight adjustment tool, gas tube scraping tool, gas port reamer, spare extractor, spare extractor spring, spare firing pin. There are a number of spring steel "fingers" on the lid of the clam-shell case which press on the contents of the cleaning kit when closed to prevent rattling. One end of the clam-shell case has a notch from which the screwdriver end of the multi-tool can protrude.

Notes:

The RPD is a 7.62mm light machine gun developed in the Soviet Union by Vasily Degtyaryov for the 7.62×39mm M43 intermediate cartridge. It was created as a replacement for the DP machine gun chambered for the 7.62×54mmR round. It is a precursor of most squad automatic weapons. It was succeeded in Soviet service by the RPK. The RPD is an automatic weapon using a gas-operated long-stroke piston system and a locking system recycled from previous Degtyaryov small arms, consisting of a pair of hinged flaps set in recesses on each side of the receiver. The movement of these flaps and the resulting locking and unlocking action is controlled by carefully angled surfaces on the bolt carrier assembly. The weapon fires from an open bolt. The RPD is hammer fired from an open bolt. The hammer forms part of the rear of the bolt carrier (which is connected to the gas piston), which continues moving forward for a short distance after the round is chambered and the bolt locked, the hammer face then striking the rear of the free floating firing pin which passes through the length of the bolt. Locking occurs by means of lateral flaps located along the sides of the bolt, which are forced outwards (by the angled sides of the hammer) into recesses cut into the receiver body, after which firing occurs when the face of the hammer strikes the rear of the firing pin. The mechanism is simple, rugged and reliable. It features a trigger mechanism that is limited to fully automatic fire only. The bolt is equipped with a spring-loaded casing extraction system, and a fixed insert inside the receiver housing which passes between the feed horns of the bolt serves as the ejector. Spent cartridge casings are ejected downward through an opening in the bolt carrier and receiver. The RPD has a manually operated lever-type safety mechanism that secures the weapon against accidental firing by blocking the bolt catch when engaged. Unlike Degtyarov's earlier firearm patents, the RPD's return spring is located inside the butt. Like many other Russian-made firearms, the chamber and bore are chrome-lined, greatly decreasing the risk of corrosion and jamming.[citation needed] The weapon has a non-removable barrel with a three-position gas adjustment valve used to control the performance of the gas system. It is also equipped with a folding integral bipod, wooden shoulder stock, foregrip and pistol grip. The firearm strips down into the following major groups: the receiver and barrel, bolt, bolt carrier, feed tray and feed cover, the recoil mechanism and the trigger group and stock. The RPD fires from an open bolt in full auto only. There is no provision for semi-auto fire, although RPD gunners were trained to fire in short bursts to prolong the life of the non-quick-change barrels. The RPD feeds ammunition from the left side using a metallic, open-link, non-disintegrating belt typically holding 100 rounds of 7.62x39 ammunition. Unlike many other belt-fed automatic weapons, where the rounds must be pulled out the rear of the belt and then pushed forward into the chamber, the RPD uses a simpler "push through" design where the rounds are pushed out the front of the belt and into the chamber. At least three variants of the RPD belt were produced. The Russians and Hungarians both produced 50-round belt segments, while the Chinese produced 25-round belt segments. The Russian RPD belts held the rounds in place using the extractor groove. The Hungarians designed a simpler belt that held the cartridges in place using an "L"-shaped tab at the rear of the belt. The Chinese copied the Hungarian design for their belts, albeit in 25-round lengths instead of 50. RPD belt segments are connected using a round of ammunition that holds the last link of the first belt and the first link of the next belt together. When the last round in a belt segment is fired, that belt segment disconnects and falls away, reducing the chances of the empty belt snagging or becoming entangled. Regardless of the style of belt used, the RPD was typically fed using 100 rounds of linked ammunition. The Russian, Hungarian, and Chinese RPD belts are all interchangeable, and can be linked together without affecting the feeding of the RPD. The combined belt segments are stored in a metal drum that is attached to a mount on the receiver, for a total of 100 rounds. The RPD can also feed belts that are not contained in a drum if, for example, there is a need for more than 100 rounds of linked ammunition at a time. The feed system is operated by a roller connected to the reciprocating bolt carrier assembly. The belt is pulled into the gun during the rearward motion of the bolt carrier. The noteworthy flaw in the drum's design is its unreliability in dirty conditions; it can become clogged with filth and other natural elements.

Heckler and Koch MG36 German 5.56mm Light Machine Gun







Tiers:



Variants:

- **G36V (V—Variante "variant"):** Previously known as the G36E (E—Export), it is the export version of the standard G36. The G36V has all of the characteristics of the standard rifle with the exception of the sight setup and bayonet mount. It is fitted with a x1.5 or x3 sight and lacks the integrated reflector sight; the bayonet mount is a standard NATO type. This version was first produced for Spain and Latvia.
- **MG36 (MG—Maschinengewehr "machine gun"):** Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.
- **G36K (K—kurz "short"):** carbine variant with a shorter barrel (fitted with an open-type flash suppressor) and a shorter forend, which includes a bottom rail that can be used to attach tactical accessories, such as a UTL flashlight from the USP pistol. The carbine's barrel lacks the ability to launch rifle grenades and it will not support a bayonet. The weapon retained the ability to be used with the AG36 grenade launcher. G36Ks in service with German special forces are issued with a 100-round C-Mag drum. There are two variants of the G36K. The first and most commonly known has x3 scope/carry handle attached to the top, while the second is equipped with iron sights and a rail (no scope included).
- **G36KV (formerly G36KE)::** export version of carbine variant G36K, with sights like G36V.
- **G36C (C="Compact", commonly mistaken for "Commando":** a term trademarked by Colt Firearms for the CAR-15): This subcarbine model is a further development of the G36K. It has a shorter barrel than the G36K, and a four-prong open-type flash hider or a birdcage type flash hider. The extremely short barrel forced designers to move the gas block closer to the muzzle end and reduce the length of the gas piston operating rod. The handguard and stock were also shortened and the fixed carry handle (with optics) was replaced with a carrying handle with an integrated MIL-STD-1913 Picatinny rail. The dual optical sight found on the standard G36 and G36K models was replaced with a set of rail-mounted detachable iron sights that consist of a semi-shrouded front post and a flip-up rear sight with two apertures of different diameter. The short handguard has four accessory attachment points, one of which could be used for a vertical grip. The G36C was developed and produced in January 2001.
- **G36A2:** This is an ordnance designation allocated to an upgraded variant of the G36 used by the German Army. The G36A2 is equipped with a quick-detachable Zeiss RSA reflex red dot sight[32] mounted on a Picatinny rail that replaces the original red dot sight of the dual combat sighting system. The G36A2 upgrade kit also consists of the shorter G36C stock (Designed for better handling with use of body armor and load bearing equipment), new handguard made of aluminium (provides better heat resistance during long periods of firing) with an optional 4 Picatinny rails and a vertical foregrip with an integrated switch for operating an Oerlikon Contraves LLM01 laser light module.
- **Sporting models:** Based on the G36, Heckler & Koch also created the semi-automatic SL8 rifle and the straight-pull, bolt-action R8, which are offered to the civilian sport shooting markets. The SL8 is substantially different from the G36, it has a modified receiver and a thumbhole stock with a cheek rest, which is integral with the trigger group. The SL8 has a heavy profile, extended, 510 mm (20.1 in) barrel that does not have a flash hider or bayonet lug. The rifle uses a 10-round single-stack magazine and an extended top rail used to mount a wide variety of Picatinny-standard optics.

Mounted to the rail are a set of iron sights with a hooded foresight and adjustable flip rear aperture. The SL8 can also mount the G36 carry handle and integrated sight assembly, after removing the mechanical iron sights. The SL8 has an unloaded weight of 4.3 kg, overall length of 980–1030 mm and a trigger rated at 20 N (4.5 lbf). In November 2013, Heckler & Koch applied for permission from the German Government to sell a new civilian-legal version of the G36. Called the HK243 in Europe and the HK293 in America, it is more similar to the G36 assault rifle than previous civilian models. The main difference is the bolt is redesigned to not allow a conversion to fully automatic fire. It has quad picatinny rails and accepts STANAG magazines. Four different barrel lengths from 230 mm (9.1 in) to 480 mm (19 in) and four stock models (short fixed, long fixed and two adjustable) will be offered.

System

Alternate Designation(s): Heckler & Koch MG36

Primary Function / Type: Assault Rifle

Date of Introduction: 1997

Manufacturer: Heckler & Koch Santa Bárbara Sistemas Military Industries Corporation

Proliferation: Widely Proliferated

Produced: G36: 1996–present G36K: 1997–present G36C: 2001–present

Number Built: 260,000+

Action: Short-stroke piston, rotating bolt

Rate of Fire: 750 rounds/min cyclic

Muzzle Velocity: G36, G36V, MG36, MG36E: 920 m/s (3,018 ft/s) G36K, G36KV: 850 m/s (2,788.7 ft/s) G36C, G36CV: 722 m/s (2,368.8 ft/s)

Maximum Firing Range: m2,860

Effective Firing Range: G36, G36V, MG36, MG36E: 800 metres (870 yd) G36K, G36KV: 500 metres (550 yd) G36C, G36CV: 200 metres (220 yd)

Feed System: 30-round detachable box magazine or 100-round C-Mag drum magazine

Sights: Reflex sight with 1× magnification, telescopic sight with 3× magnification (export version has a 1.5× magnified sight) and back-up fixed notch sight

Note: MG36 (MG—Maschinengewehr "machine gun"): Squad automatic weapon version of the G36 equipped with a heavier barrel for increased heat and cook-off resistance. The MG36 and MG36E are no longer offered by H&K.

Dimensions

Length: G36, G36V, MG36, MG36E: 999 mm (39.3 in) stock extended / 758 mm (29.8 in) stock folded G36K, G36KV: 860 mm (33.9 in) stock extended / 615 mm (24.2 in) stock folded G36C: 720 mm (28.3 in) stock extended / 500 mm (19.7 in) stock folded

Barrel Length: G36, G36V, MG36, MG36E: 480 mm (18.9 in) G36K, G36KV: 318 mm (12.5 in) G36C: 228 mm (9.0 in)

Width: mm64

Height: G36, G36K, MG36: 320 mm (12.6 in) G36V, G36KV, MG36E: 285 mm (11.2 in) G36C: 278 mm (10.9 in)

Weight: G36: 3.63 kg (8.00 lb) G36V: 3.33 kg (7.3 lb) G36K: 3.30 kg (7.3 lb) G36KV: 3.0 kg (6.6 lb) G36C: 2.82 kg (6.2 lb) MG36: 3.83 kg (8.4 lb) MG36E: 3.50 kg (7.7 lb)

Ammunition

Type: Rifle

Caliber: 5.56mm

Cartridge: 5.56×45mm NATO

Magazine

Note: In the box magazine is room for 30 cartridges staggered (or double-stacked) on top of one another. The magazines are molded with shock resistant plastic, and are translucent allowing the user to see the ammunition. On the sides are studs which allow the magazines to be attached next to each other, this way the operator can reload more easily. An empty G36 magazine weighs 127 grams (4.5 oz) and filled with 30 rounds 483 grams (17.0 oz). STANAG magazines cannot be normally used, but the G36 can use an adapter that will accept the STANAG. Certain types of Beta C-Mags can also be used and are employed with the MG36 support variant.

Sights

Note: The standard German Army versions of the G36 are equipped with a ZF 3×4° dual optical sight that combines a 3× magnified telescopic sight (with the main reticle designed for firing at 200 m and bullet drop compensation markings for: 200, 400, 600 and 800 m crosshairs and a range-finding scale) and an unmagnified reflex sight (calibrated for firing at 100 m) mounted on top of the telescopic sight.[4] The reflex sight is illuminated by ambient light during the day and uses battery powered illumination for use at night. Electric illumination is activated automatically by a built in photo sensor and can be manually activated to boost the brightness of the reticle in daytime low contrast situations. The export versions have a single telescopic sight with a 1.5× magnification and an aiming reticle fixed at 300 m. All rifles are adapted to use the Hensoldt NSA 80 third-generation night sight, which clamps into the G36 carry handle adapter in front of the optical sight housing and mates with the rifle's standard optical sight.[12] The sighting bridge also functions as a carrying handle and features auxiliary open sights molded on top of the handle that consist of a forward blade and rear notch, but these can only be used with the reflex sight removed, as in the G36V. The optical sight system is produced by Hensoldt AG (a subsidiary of Carl Zeiss AG).

Operating mechanism

Note: The G36 uses a short-stroke piston system from which HK later developed the HK-416's impingement system. Unlike direct impingement, this system takes gas trailing the bullet to operate a piston instead of pushing directly on the bolt. The G36's bolt is operated by a cam that guides the bolt carrier by its respective cutout. Then when fully pushed forward 7 radial locking lugs fully enclose the chamber. HK included several design features that are essential in modern military firearms. For example, the bolt locks back after the last round is spent (this can be deactivated), and at the front end of the trigger guard there is a bolt catch button. The cocking handle can be switched from either end, folds in, and unfolds from a spring so the shooter need not unfold it by hand before firing. Another feature of it is that it doubles as the forward assist, which is used in the instance that the spent cartridge is ejected but the next round does not properly feed. In addition, the ejection port has a brass deflector to mitigate the amount of casings that may strike the face of left-handed operators. Instead of a dust cover which has the need to be flipped back up when the gun isn't in use, the bolt acts as the seal from dirt.

Accessories

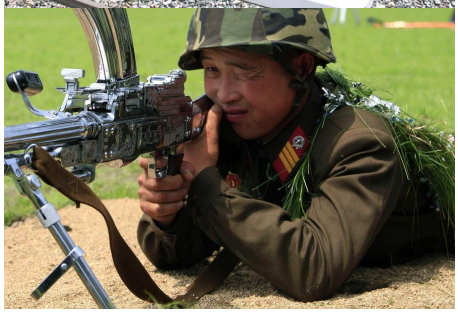
Note: The rifle can be fitted with a 40 mm AG36 (AG—Anbau-Granatwerfer) under-barrel grenade launcher, which is a breech-loaded break-action weapon with a side-tilting barrel. Standard equipment supplied with the G36 includes: spare magazines, a cleaning and maintenance kit, sling, speed-loading device and sometimes modified AKM type II blade bayonets (many of which are left over in Germany from stocks of the former National People's Army).

Notes:

The MG36 (German: Maschinengewehr 36, English; "Machine gun 36") is a squad automatic weapon version of the G36 developed by Heckler and Koch, equipped with a heavier barrel for increased heat and cook-off resistance, and a large 100 round Beta-C dual drum magazine for suppressive capabilities. Like its assault rifle counter-part, the MG36 had an export edition, the MG36E. However, the MG36 and MG36E were discontinued by Heckler and Koch due to the development of the MG4 and MG5 (previously known as the HK MG121) series.[1] Because of this, MG36s are now quite rare. However H&K do offer heavy barrel upper receivers and 100 round Beta-C drum mags for easy conversion of a normal G36 to a de facto MG36 when military contractors request them.

Type 73 North Korean 7.62mm Light Machine Gun







Tiers:



System

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↳ ***System***

Name: Type 73

Type: Light Machine Gun

Caliber: mm7.36

Manufactuer: First Machine Industry Bureau

Length: 1190 mm

Barrel Length: 608 mm

Weight: 10.6 kg

Action: Gas

Rate of Fire: 600–700 rpm

Feed System: Box magazine Belt

Sights: Iron

↳ ***Ammunition***

Type: Type 73

Caliber: mm7.63

Cartridge: 7.62×54mmR

Basic Load: INA

Notes:

The Type 73 is a light machine gun designed and manufactured by North Korea's First Machine Industry Bureau. It is used primarily by the Korean People's Army, and via Iran, has been exported throughout the Middle East. It has a passing resemblance to the Bren light machine gun. The design is heavily based on the 1960s-era Soviet PK machine gun. However, the Type 73 does have certain indigenous modifications, including removable muzzle sleeves and a dual magazine/belt feed system, patterned after the Czechoslovak Vz.52 LMG, allowing the user to fire the weapon from indigenous box magazines or ammunition belts that can used with the PKM. One unusual feature is a special barrel attachment to enable the gun to fire rifle grenades. The weapon's intended combat role is thought to be as a squad automatic weapon. However, it uses a 7.62×54mmR cartridge, not the 7.62×39mm round used by the Type 58 assault rifle, North Korea's standard infantry rifle. This is unusual as most armies' squad automatic weapons use the same ammunition as rifles, so all members of a unit may share ammunition and only one type needs to be supplied. A larger cartridge is a characteristic of a general-purpose machine gun, although such weapons typically are belt fed and do not use a box magazine.

→→Medium Machine Gun (MMG)

Type 57 Chinese 7.62mm Medium Machine Gun



Tiers:



Variants:

- **SG-43, SGM, SGMT, SGMB:** After the end of World War II, the SG-43 was improved and renamed SGM ("M" for modernized); dust covers and a new barrel lock were fitted, and a splined barrel was fitted to improve cooling. A coaxially-mounted stockless electric solenoid-fired variant was developed under the designation SGMT (the "T" standing for Tankovy, or "Tank"). The SG-43M and SGMB are versions modified with dust covers and used mostly on armoured personnel carriers. The SG-43/SGM was widely exported and also licensed for construction in several countries. It was manufactured in the People's Republic of China as the Type 53 (SG-43) and Type 57 (SGM) heavy machine guns. It was also produced in Czechoslovakia (as Vz 43) and Poland (as Wz 43)

System

:

↳***System***

Name: Type 53 (SG43)
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: People's Republic of China
Length: 1,150 mm
Barrel Length: 720 mm
Weight: 13.8 kg (30.42 lb) gun body 41 kg (90.39 lb) on wheeled mount
Action: Gas-operated
Rate of Fire: 500–700 rounds/min
Muzzle Velocity: 800 m/s
Effective Firing Range: 1100 m
Maximum Firing Range: 1,500 meters
Feed System: 200 or 250 round belts
Sights: Iron sights

↳***Ammunition***

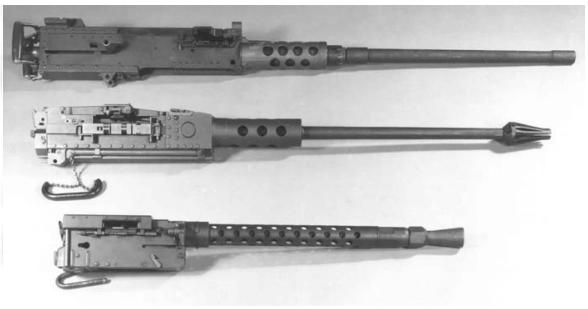
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Basic Load: 1,000 rds

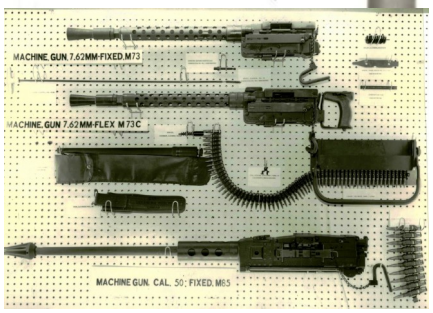
Notes:

The SG-43/SGM was widely exported and also licensed for construction in several countries. It was manufactured in the People's Republic of China as the Type 53 (SG-43) and Type 57 (SGM) heavy machine guns. It was also produced in Czechoslovakia (as Vz 43) and Poland (as Wz 43). The SG-43 Goryunov (Russian: Станковый пулемет системы Горюнова, Stankovyy pulemet sistemi Goryunova, meaning "Mounted machinegun, Goryunov design") was a Soviet medium machine gun that was introduced during the Second World War. It was chambered for the 7.62×54mmR cartridge, and was introduced in 1943 as a replacement for the older M1910 Maxim machine guns. It was mounted on wheeled mounts, tripods and armored vehicles. The SG-43 used a tilting breechblock, moving sideways and locking into the side of the receiver. The feed is not straightforward, as the gun fires the 7.62×54mmR round, and this has to be withdrawn rearwards from the belt before ramming into the breech. The reciprocating motion is achieved by using two claws to pull the round from the belt, and then an arm pushes the round into the cartridge guide ready for the bolt to carry it to the breech. Despite this complication, the SG-43 was remarkably reliable and feed jams were apparently few. The barrel is air-cooled and massively dense, contributing to a fairly high overall weight. The bore is chromium-plated and able to withstand continuous fire for long periods. The barrel can also be easily changed by releasing a simple lock, and the carrying handle allows a hot barrel to be lifted clear without difficulty. The World War II version of the gun had a smooth outline to the barrel, and the cocking handle was under the receiver, with no dust covers to the feed and ejection ports.

M73 Machine Gun American 7.62mm Medium Machine Gun







Tiers:



Variants:

- **M73:** Adopted in 1959
- **M73C:** Flexible infantry variant with sights and pistol grip. Concept development. Never entered service. Used a special tripod, the XM132. It was a standard M2 mount for the .30 cal. Browning M1919A4 with an adapter to fit the M73C.
- **M73A1/M219:** Developed in 1970 as an improved version with simplified ejection mechanism attempting to reduce chronic jamming Redesignated in 1972 as the M219

System

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↳System

Name: M73 Machine Gun
Type: Medium Machine Gun
Caliber: 7.62mm
Quantity: 1 x 7.62mm M73 machine gun
Manufacturer: United States
Length: 1,219.2 mm
Barrel Length: 609.6 mm
Weight: 14.1 kg
Rate of Fire: 500-625 round/min
Action: Recoil-operated/short-recoil operation with gas assist

Muzzle Velocity: 853.44 m/s

Maximum Firing Range: 3,657.6 m

Effective Firing Range: 899.8 m

Feed System: Belt Feed, left or right hand

Sight: INA

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 2,000 Rounds

Notes:

The M73 and M219 are 7.62 mm NATO caliber machine guns designed for tank use. NATO no longer uses them, but they were used on the M48 Patton and M60 Patton MBT series (including the M728 Combat Engineer Vehicle), and on the M551 Sheridan Armored Reconnaissance / Airborne Assault Vehicle (AR/AAV). Designed primarily as a coaxial machine gun by the Rock Island Arsenal and produced by General Electric, the M73 was developed as a replacement for the M1919A4E1, M1919A5, and M37 machine guns that continued to serve in the immediate post–World War II environment. The Machine Gun, 7.62-MM, M73 was officially adopted in 1959. It is an air-cooled, recoil-operated machine gun, but also using cartridge gasses to boost recoil. Though designed as a simplified alternative to the M1919 series, it is of almost identical weight. The weapon is fitted with a quick-change barrel, pull-chain charging assembly, and can be made to feed from the left or the right hand side (though the left-hand feed is more common). An attempt to make the M73 useful as a flexible infantry gun saw the weapon fitted with sights and a pistol grip trigger as the Machine Gun, 7.62-MM, M73C. Equally unpopular, very few of these weapons were produced. Sources claim that it saw limited use in Vietnam. The M73 suffered from numerous malfunctions and was prone to jamming. An improved M73E1 was eventually developed in 1970 with a simplified ejection system, being type classified as the Machine Gun, 7.62-MM, M73A1. In 1972, it was decided that this weapon was sufficiently different from its predecessor and was redesignated Machine Gun, 7.62-MM, M219. These weapons were eventually replaced by the M60E2 and M240 machine gun, and vehicles still in service using the M73 series were refitted with these weapons.

M1919 Browning American 7.62mm Medium Machine Gun







Tiers:



Variants:

- **M1919A1:** The M1919A1 featured a lighter barrel and a bipod. It was distinguished from the "M1919" because it also had sights, which the M1919 did not.
- **M1919A2:** The M1919A2 was another lightweight development specifically for mounted cavalry units, utilizing a shorter 18-inch barrel and a special tripod, though it could be fitted to either the M1917 or M2 tripods. This weapon was designed to allow greater mobility to cavalry units over the existing M1917 machine gun. The M1919A2 was introduced in 1922, and was used for a short period between World War I and World War II after the cavalry had converted from horses to wheeled and tracked vehicles.
- **M1919A3:** The M1919E1, commonly known as the M1919A3, was introduced in 1931 as an improved version of the M1919A2 for the infantry
- **M1919A4:** However, by and large the most common variant of the series was the M1919A4. Production blueprints of the new variant were complete in late 1936, and slow-scale production soon followed. The driving force behind the development of this variant was the suffering reliability of the 18-inch barrel of previous versions, which did not produce enough recoil to cycle the action reliably. The bull barrel was made much thicker and was lengthened to 24 inches like the M1917. Various other small adjustments to the design were made, such as moving the front sight from the barrel jacket to the receiver, which made it easier to mount the gun on vehicles. The design of the barrel jacket was changed to include circular holes instead of long slits of earlier models, and a recoil booster in the muzzle end improved reliability. The recoil buffer assembly was also a new addition to the design between A3 and A4 development, designed to reduce the impact of the bolt hitting the backplate. The M1919A4 was used in both fixed and flexible mounts, by infantry and on vehicles. It was also widely exported after World War II and continues to be used in small numbers around the world. Two variants were developed specifically for vehicular use, the M1919A5, with an extended charging handle, and the M1919A4E1, a sub-variant of the M1919A4 refitted with an extended charging handle developed in the 1950s
- **M1919A6:** During the war it became clear to the US military that the M1918 Browning Automatic Rifle, while portable, was not sufficient as a sustained fire weapon due to its fixed barrel and 20-round magazine. The M1919A4 was faster and cheaper to produce, but did not have the portability of a rifle. Realising that producing an entirely new replacement machine gun would take time, the military decided that a stop-gap solution would be best and adapted an existing design. The M1919A6 was an attempt at such a solution, to parallel the designs of the German MG 34 and MG 42 machine guns, each of which were portable for a squad weapon and were effective at sustained fire. The M1919A6 first saw combat service in the fall of 1943. It had a metal buttstock assembly that clamped to the backplate of the gun, and a front barrel bearing that incorporated both a muzzle booster and a bipod similar to that used on the BAR. A lighter barrel than that of the M1919A4 was fitted, and a carrying handle was attached to the barrel jacket to make it easier to carry. Previous M1919 designs could change the barrel, but it required essentially field stripping the gun to pull the barrel out from the rear - the pistol grip back plate, bolt group and the trigger group all had to be removed before the barrel could be replaced, and this put the gun out of action for minutes, and risked losing and damaging parts in the

field. The M1919A6 muzzle device allowed the gun crew to replace the barrel from the front; an improvement, but still an awkward procedure compared to other machine guns of the day.
- **T66:** The M1919A6 was used by Springfield Armory in the late 1940s and early 1950s as a testbed for an interim general-purpose machine gun. It was rechambered for the experimental T65 series cartridges, culminating in 1951 with the T66 machine gun chambered for the T65E3 cartridge (one of the forerunners to the 7.62mm NATO cartridge). It had a new barrel with a flash-hider attachment, a shorter action, and modified M1 disintegrating belt links to feed the new cartridge. It was deemed still too heavy for field use and was not adopted.
- **.30 AN/M2:** A specific aircraft version of the .30 caliber Model 1919A4 was manufactured by Browning as the .30 AN/M2. It had a thinner barrel and receiver walls to keep down weight. Compared to the M1919A4, the AN/M2 had a substantially higher rate of fire (1,200 to 1,500 rounds per minute). It was used on US aircraft early in World War II, but the lighter .30-caliber weapon was increasingly relegated to training duties as the war progressed. A derivative of this weapon was built by Colt as the civilian market MG40. It was later replaced by the larger caliber — and is not to be confused with — the Browning Machine Gun, Cal. .50, M2, Aircraft, with the smaller-calibre ordance bearing the official designation of "Browning Machine Gun, Cal. .30, M2, Aircraft." The .50 AN/M2 "light barrel" version, used in the majority of fixed and flexible/turreted mounts on U.S. World War II-era aircraft as the war progressed, lacked the massive "cooling collar" of the heavy barrel M2HB version, which is still in service with the ground forces of the U.S. military in the 21st century.

System

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↳*System*

Name: M1919 Browning
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: Buffalo Arms Corporation Rock Island Arsenal Saginaw Steering Gear division of General Motors
Length: 964 mm
Barrel Length: 610 mm
Weight: 14 kg
Action: Recoil-operated/short-recoil operation
Rate of Fire: 400–600 round/min (1200–1500 for AN/M2 variant)
Muzzle Velocity: 850 m/s
Effective Firing Range: 1,500 yd (1,400 m) (maximum effective range)
Feed System: 250-round belt

↳*Ammunition*

Type: Rifle
Caliber: mm7.62mm
Cartridge: .30-06 Springfield (U.S.) 7.62×51mm NATO .303 British 7.92×57mm Mauser 6.5×55mm .22 Long Rifle (Mini) 7.62×54mmR 8×63mm patron m/32 7.65×53mm Argentine 7.5×54mm French
Basic Load: 4,000 rds

Notes:

The M1919 Browning is a .30 caliber medium machine gun that was widely used during the 20th century, especially during World War II, the Korean War, and the Vietnam War. The M1919 saw service as a light infantry, coaxial, mounted, aircraft, and anti-aircraft machine gun by the U.S. and many other countries. Many M1919s were rechambered for the new 7.62×51mm NATO round and remain in service to this day. The M1919 was an air-cooled development of the standard US machine gun of

World War I, the John M. Browning-designed water-cooled M1917. The emergence of general-purpose machine guns in the 1950s pushed the M1919 into secondary roles in many cases, especially after the arrival of the M60 in US Army service. The United States Navy also converted many to 7.62mm NATO, and designated them Mk 21 Mod 0; they were commonly used on river craft in the 1960s and 1970s in Vietnam. Many NATO countries also converted their examples to 7.62, and these remained in service well into the 1990s, as well as up to the present day in some countries. A similar conversion of the M1917 also produced the larger M2 Machine Gun, using the same basic operating principles and layout but firing the much more powerful .50 caliber (12.7mm) ammunition. The M1919 is distinguished by its smaller size and the use of a holed jacket around the barrel used on most versions. The M1919 originally fired the .30 cal M1906 (30-06) ball cartridge, and later the .30 caliber M2 ball cartridge, contained in a woven cloth belt, feeding from left to right. A metal M1 link was later adopted, forming a "disintegrating" belt. Loading was accomplished by inserting the pull tab on the ammunition belt from the left side of the gun - either metal links or metal tab on cloth belts - until the belt-holding pawl at the entrance of the feed way grabbed the belt and held it in place. The cocking handle was then pulled back with the palm of the hand facing up, and then released. This advanced the first round of the belt in front of the bolt for the extractor/ejector on the bolt to grab the first cartridge. The cocking handle was pulled and released a second time. This removed the first cartridge from the belt, advanced the next round into position to be grabbed and moved the first round down into the chamber of the barrel ready for firing. As the bolt went into battery, the extractor grabbed the next round on the belt that was advanced and was resting in the feedway waiting to be loaded. Every time the gun fired a single shot, the gun performed the sequence of extracting and ejecting the spent round as the bolt came rearward, loading the next round to be fired into the barrel, advancing the belt, grabbing the next round in preparation for loading, then chambering it as the bolt came forward again under tension from the spring. If the trigger was held down, the gun would continue to fire in full automatic, repeating the sequence over and over until stopped. The gun's original design was as a water-cooled machine gun (see the M1917 Browning machine gun). When it was decided to try to lighten the gun and make it air-cooled, its design as a closed bolt weapon created a potentially dangerous situation. If the gun was very hot from prolonged firing, the cartridge ready to be fired could be resting in a red-hot barrel, causing the propellant in the cartridge to heat up to the point that it would ignite and fire the cartridge on its own (a cook-off). With each further shot heating the barrel even more, the gun would continue to fire uncontrollably until the ammunition ran out, since depressing the trigger was not what was causing the gun to fire. Gunners were taught to cock the gun with the palm facing up, so that in the event of a cook-off, their thumb would not be dislocated by the charging handle. Gunners were trained to manage the barrel heat by firing in controlled bursts of three to five rounds, to delay heating. Most other machine gun designs were fired in the same way, even though most featured quick-change barrels and an open bolt, two features that make air-cooled machine guns capable of sustained fire, and features that the M1919 design lacked. When the gun was ready to fire, a round would be in the chamber and the bolt and barrel group would be locked together, with the locking block at the rear of the bolt. When the rear of the trigger was pivoted upwards by the operator, the front of the trigger tipped downward, pulling the sear out of engagement with the spring-loaded firing pin, allowing it to move forward and strike the primer of the cartridge. As the assembly of bolt, barrel and barrel extension recoiled to the rear of the gun upon firing, the locking block was drawn out of engagement by a cam in the bottom of the gun's receiver. The recoiling barrel extension struck the "accelerator" assembly, a half-moon shaped spring-loaded piece of metal pivoting from the receiver below the bolt and behind the barrel extension. The tips of the accelerator's two curving fingers engaged the bottom of the bolt and caused it to move rapidly to the rear. The extractor-ejector was a mechanism that pivoted over the front of the bolt, with a claw that gripped the base of the next round in the belt. A camming track in the left side of the receiver caused this to move down as the bolt moved back, lowering the next round down on top of the fired case, pushing it straight down out of the extraction grooves of the bolt face through the ejection port. A spring in the feed tray cover pushed the extractor-ejector down onto the next round, so if the feed tray cover was opened, the extractor-ejector would be pulled upwards if the belt needed to be removed. The belt feed lever was connected to the belt feeding pawl at the front end, had a cam pin at the rear end which ran through a track in the top of the bolt, and a pin in the feed tray cover acted as the pivot between the two ends. The rearward movement of the bolt caused the rear end of the feed lever to pull to the right, causing the feeding pawl at the other end to move left over the belt. The pawl would pull the belt further to the right as the bolt came forward again, also sending the loose M1 link of the previous round to be taken out of the belt to fly out the right side of the receiver. A recoil buffer tube extended from the back of the receiver to make the cycle of the bolt smoother than previous designs, to absorb some of the recoil of the bolt, and formed a place for the pistol grip to be installed. Except for the M1919A6, all other variants had to be mounted on a tripod or other type of mount to be used effectively. The tripod used by infantry allowed traverse and elevation. To aim the gun along its vertical axis, the adjustment screw needed to be operated. This allowed the gun to be pointed upwards or downwards, with free traverse to either side. The gun was aimed using iron sights, a small folding post at the front end of the receiver and a rear aperture sight on a sliding leaf with range graduations from 200 to 1,800 meters in 200 meter increments. When folded down, the aperture formed a notch that could be used to fire the gun immediately without flipping up the leaf. The rear sight also had windage adjustment with a dial on the right side.

SG-43 Goryunov Russian 7.62mm Medium Machine Gun







Tiers:



Variants:

- **SGM:** After the end of World War II, the SG-43 was improved and renamed SGM ("M" for modernized); dust covers and a new barrel lock were fitted, and a splined barrel was fitted to improve cooling.
- **SGMT:** A coaxially-mounted stockless electric solenoid-fired variant was developed under the designation SGMT (the "T" standing for Tankovy, or "Tank").
- **SGMB:** he SG-43M and SGMB are versions modified with dust covers and used mostly on armoured personnel carriers

System

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↳System

Name: SG-43 Goryunov
Type: 7.62mm Medium Machine Gun
Manufacturer: P.M. Goryunov
Length: mm1,150
Barrel Length: mm720
Action: Gas-Operated
Rate of Fire: rds/min500-700
Effective Firing Range: m1100
Maximum firing range: m1,500
Feed System: 200 or 250 round belts
Sights: Iron Sights

Variants: SG-43, SGM, SGMT, SGMB

↳*Ammunition*

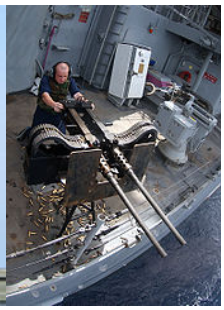
Type: Rifle
Caliber: 7.62mm
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s800
Basic Load: ea1,000

Notes:

The SG-43 Goryunov (Russian: Станковый пулемет системы Горюнова, Stankovyy pulemet sistemi Goryunova, meaning "Mounted machinegun, Goryunov design") was a Soviet medium machine gun that was introduced during the Second World War. It was chambered for the 7.62×54mmR cartridge, and was introduced in 1943 as a replacement for the older M1910 Maxim machine guns. It was mounted on wheeled mounts, tripods and armored vehicles. The SG-43 used a tilting breechblock, moving sideways and locking into the side of the receiver. The feed is not straightforward, as the gun fires the 7.62×54mmR round, and this has to be withdrawn rearwards from the belt before ramming into the breech. The reciprocating motion is achieved by using two claws to pull the round from the belt, and then an arm pushes the round into the cartridge guide ready for the bolt to carry it to the breech. Despite this complication, the SG-43 was remarkably reliable and feed jams were apparently few. The barrel is air-cooled and massively dense, contributing to a fairly high overall weight. The bore is chromium-plated and able to withstand continuous fire for long periods. The barrel can also be easily changed by releasing a simple lock, and the carrying handle allows a hot barrel to be lifted clear without difficulty. The World War II version of the gun had a smooth outline to the barrel, and the cocking handle was under the receiver, with no dust covers to the feed and ejection ports.

→→Heavy Machine Guns (HMG)

M2 Browning American .50 Caliber Heavy Machine Gun


Tiers:



Variants:

- **M2 variants:** The basic M2 was deployed in U.S. service in a number of subvariants, all with separate complete designations as per the US Army system. The basic designation as mentioned in the introduction is Browning Machine Gun, Cal. .50, M2, with others as described below. The development of the M1921 water-cooled machine gun which led to the M2, meant that the initial M2s were, in fact, water-cooled. These weapons were designated Browning Machine Gun, Cal. .50, M2, Water-Cooled, Flexible. There was no fixed water-cooled version. Improved air-cooled heavy barrel versions came in three subtypes. The basic infantry model, Browning Machine Gun, Cal. .50, M2, HB, Flexible, a fixed developed for use on the M6 Heavy Tank designated Browning Machine Gun, Cal. .50, M2, HB, Fixed, and a "turret type" whereby "Flexible" M2s were modified slightly for use in tank turrets. The subvariant designation Browning Machine Gun, Cal. .50, M2, HB, TT was only used for manufacturing, supply, and administration identification and separation from flexible M2s. A number of additional sub variants were developed after the end of World War II. The M2 Heavy Barrel, M48 Turret Type was developed for the commander's cupola on the M48 Patton tank. The cupola mount on the M48A2 and M48A3 was thoroughly disliked by most tankers, as it proved unreliable in service. An externally mounted M2 was later adopted for the commander's position on the M1 Abrams tanks. Three sub variants were also developed for use by the U.S. Navy on a variety of ships and watercraft including the soft mount and fixed type versions. The fixed types fire from a solenoid trigger and come in left or right hand feed variants for use on the Mk 56 Mod 0 dual mount and other mounts. Huaqing Machinery has made a clone of the M2HB known as the CS/LM6, which was released publicly in 2010 in foreign weapons expo conventions. It was made with a picatinny rail on the receiver in order to have quick installation of various optics. The original M2HB tripod and parts can be used on the CS/LM6.
- **M2A1:** When the M2 was first being designed, John Browning faced two design challenges. With the machine tools available at that time, the dimensions that established the location of the bolt face and the depth of the chamber could not be held tightly enough to control the fit of the cartridge in the chamber. The round can be too tight in the chamber and the gun would not shoot, or be too loose in the chamber, resulting in a stoppage or ruptured cartridge. The other dimension that could not be held close enough was when the firing pin would fall. The solution to these problems was adjustable timing and headspace ("headspace" is the distance between the face of the bolt and the base of the cartridge case, fully seated in the chamber); the operator had to screw the barrel into the barrel extension, moving the barrel toward the bolt face to reach the proper headspace with simple gauges to allow the operator to adjust to the proper dimensions. By the late 20th century, the M2 was the only adjustable headspace weapon in the U.S. inventory. With rising reports of injuries from improperly headspaced weapons, the U.S. military held a competition for a quick change barrel conversion kit with fixed timing and headspace in 1997. Three companies offered kits and Saco Defense won the competition. However, funding was lost before the design could be fully evaluated and the program ended. In 2007, the military found money to start a new competition. Saco Defense had since been acquired by General Dynamics, which won the competition. On October 15, 2010, the M2A1 heavy machine gun was type classified by the U.S. Army. Formerly known as the M2E2, the M2A1 incorporates improvements to the design including a quick change barrel (QCB) with removable carrying handle, a new slotted flash suppressor that reduces muzzle flash by 95 percent, fixed headspace and timing, a modified bolt, and a manual trigger block safety. "Timing" is the adjustment of the gun so that firing takes place when the recoiling parts are in the correct position for firing. When a standard M2 had a barrel change, the headspace and timing had to be manually set. Improper adjustment could damage the weapon and cause serious injury to the user. Fixed headspace and timing reduces risk, and the carrying handle allows the barrel to be switched in seconds.
- **FN Browning M.1939:** An important derivative of the M2 Browning is the Mitrailleuse d´Avion Browning - F.N. Calibre

13,2 mm, more commonly known as the FN Browning M.1939. The FN Browning M.1939 was a heavily modified M2 Browning for aircraft use designed by FN Herstal for export. Their aim was to make a light, reliable heavy machine gun with the same damage output as a 20 mm autocannon. To achieve this they raised the firing rate to 1080 rpm and gave it a more powerful cartridge in form of the 13.2x99 mm Hotchkiss. This cartridge was basically a .50 BMG but with a 13.2 mm bullet (.52 in) and more explosive propellant. Besides the new cartridge they designed a new bullet exclusively for this gun. The bullet was of a high explosive type and was designed to take down a small aircraft with a single hit. Tests showed that it was very effective against both cloth and aluminum skinned aircraft. Due to the aforementioned improvements the gun received interest from numerous nations when it entered the export market in 1939. Due to the start of World War 2 and the invasion of Belgium it was exported to only Romania and Sweden. Sweden was able to buy the majority of the weapons along with the blueprints to produce the weapon on their own without paying for a license. In Sweden the weapon received the designation Automatkanon m/39, short Akan m/39, meaning Autocannon m/39 and was later produced by Ericsson as the Akan m/39A. Sweden also gave the blueprints to Finland so they could produce the weapon. Since Finland was already producing 12.7 mm ammunition, the Finnish variant was rechambered to 12.7 mm (.50 bmg). The Finnish variant was designated VKT 12,70 LKk/42 and was produced by the state of Finland

System

:

↳*System*

Name: M2 Browning .50 Caliber Machine Gun

Type: Machine Gun

Weight, Gun: kg83.78

Weight, Gun with Tripod and T&E: kg127.87

Length: mm1,654

Barrel Length: mm1,143

Action: Short recoil-operated

Rate of Fire: rds/min450-600

Effective Firing Range: m1,800

Maximum Effective Firing Range: m7,400

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s890

Basic Load: ea2,000

Notes:

The M2 Machine Gun or Browning .50 Caliber Machine Gun is a heavy machine gun designed toward the end of World War I by John Browning. Its design is similar to Browning's earlier M1919 Browning machine gun, which was chambered for the .30-06 cartridge. The M2 uses the much larger and much more powerful .50 BMG cartridge, which was developed alongside and takes its name from the gun itself (BMG standing for Browning Machine Gun). It has been referred to as "Ma Deuce",[23] in reference to its M2 nomenclature. The design has had many specific designations; the official US military designation for the current infantry type is Browning Machine Gun, Cal. .50, M2, HB, Flexible. It is effective against infantry, unarmored or lightly armored vehicles and boats, light fortifications and low-flying aircraft. The Browning .50 caliber machine gun has been used extensively as a vehicle weapon and for aircraft armament by the United States from the 1930s to the present. It was heavily used during

World War II, the Korean War, the Vietnam War, the Falklands War, the Soviet–Afghan War, the Gulf War, the Iraq War and the War in Afghanistan in the 2000s and 2010s. It is the primary heavy machine gun of NATO countries, and has been used by many other countries as well. The M2 has been in use longer than any other firearm in U.S. inventory except the .45 ACP M1911 pistol, also designed by John Browning. The current M2HB is manufactured in the U.S. by General Dynamics and U.S. Ordnance for use by the U.S. government, and for allies via Foreign Military Sales, as well as by foreign manufacturers such as FN Herstal. The Browning M2 is an air-cooled, belt-fed machine gun. The M2 fires from a closed bolt, operated on the short recoil principle. The M2 fires the .50 BMG cartridge, which offers long range, accuracy and immense stopping power. The closed bolt firing cycle made the M2 usable as a synchronized machine gun on aircraft before and during World War II, as on the early versions of the Curtiss P-40 fighter. The M2 is a scaled-up version of John Browning's M1917 .30 caliber machine gun, even using the same timing gauges. The M2 has varying cyclic rates of fire, depending on the model. The M2HB (heavy barrel) air-cooled ground gun has a cyclical rate of 450–575 rounds per minute. The early M2 water-cooled AA guns had a cyclical rate of around 450–600 rpm. The AN/M2 aircraft gun has a cyclic rate of 750–850 rpm; this increases to 1,200 rpm for AN/M3 aircraft guns. These maximum rates of fire are generally not achieved in use, as sustained fire at that rate will wear out the bore within a few thousand rounds, necessitating replacement. In addition to full automatic, the M2HB can be selected to fire single-shots or at less than 40 rounds per minute, or rapid fire for more than 40 rounds per minute. Slow and rapid firing modes use 5–7 round bursts with different lengths of pause between bursts. The M2 has an effective range of 1,830 metres (2,000 yd) and a maximum effective range of 2,000 metres (2,200 yd) when fired from the M3 tripod. In its ground-portable, crew-served role as the M2HB, the gun itself weighs 84 pounds (38 kg) and the assembled M3 tripod another 44 pounds (20 kg). In this configuration, the V-shaped "butterfly" trigger is located at the very rear of the weapon with a "spade handle" hand-grip on either side of it and the bolt release in the center. The spade handles are gripped and the butterfly trigger is depressed with one or both thumbs. Recently, new rear buffer assemblies have used squeeze triggers mounted to the hand grips, doing away with the butterfly triggers. When the bolt release is locked down by the bolt latch release lock on the buffer tube sleeve, the gun functions in fully automatic mode. Conversely, the bolt release can be unlocked into the up position resulting in single-shot firing (the gunner must press the bolt latch release to send the bolt forward). Unlike virtually all other modern machine guns, it has no safety (although a sliding safety switch has recently been fielded to USMC armorers for installation on their weapons and is standard-issue for the U.S. Army for all M2s). Troops in the field have been known to add an improvised safety measure against accidental firing by slipping an expended shell casing under the butterfly trigger. The upgraded M2A1 has a manual trigger block safety. Because the M2 was designed to operate in many configurations, it can be adapted to feed from the left or right side of the weapon by exchanging the belt-holding pawls, and the front and rear cartridge stops (three-piece set to include link stripper), then reversing the bolt switch. The operator must also convert the top-cover belt feed slide assembly from left to right hand feed as well as the spring and plunger in the feed arm. This will take a well trained individual less than two minutes to perform. The charging assembly may be changed from left to right hand charge. A right hand charging handle spring, lock wire and a little "know-how" are all that are required to accomplish this. The M2 can be battle-ready and easily interchanged if it is preemptively fitted with a retracting slide assembly on both sides of the weapon system. This eliminates the need to have the weapon removed from service to accomplish this task. At some point during World War 2 the Frankford Arsenal developed a squeeze bore version of the M2HB which reduced the bullet size from .50 to .30 caliber.

QJC88 Chinese 12.7mm Heavy Machine Gun



Tiers:



Variants:

- **W85:** The W85 is a late Cold War era heavy machine gun of Chinese origin. The W85 was developed alongside an improved version of the Type 77. The Type 77 heavy machine gun with its rather unconventional design did not perform as well as expected. As an infantry weapon the W85 lost out to the Type 85, the improved version of the Type 77. However, several years later it was adopted under the designation QJC88 as the standard anti-aircraft machine gun for use on all new Chinese armored vehicles.

System

:

↳***System***

Name: QJC88
Type: Heavy Machine Gun
Caliber: 12.7mm
Manufacturer: Norinco
In Service: 1985-Present
Length: 1.5 m
Barrel Length: 1 m
Height: INA
Weight: 18.5 kg plus 15.5 kg mount
Fire Selector: 0-F
Action: Gas operated, open bolt
Rate of Fire: 540 - 600 rpm
Muzzle Velocity: 850 m/s
Maximum Firing Range: INA
Magazine: Belt fed, 50 rounds
Sights: Iron sights, optional optical sights

↳ ***Ammunition***

Type: Rifle
Caliber: mm12.7
Cartridge: 12.7x108mm Soviet
Basic Load: 2,000

Notes:

The vehicle mounted version of the W85 is designated QJC88 in the Chinese army. It is the standard heavy machine gun that is fitted on most armored vehicles for self-defense. As a vehicle mounted weapon it is solenoid fired and fitted in a special cradle for pintle mounting that allows for an elevation of -5 to +65°.

K6 South Korean 12.7mm Heavy Machine Gun







Tiers:

1 2 3 4

System

:
:
:

↳K6 12.7mm Heavy Machine Gun

Name: K6
Type: Heavy Machine Gun
Caliber: 12.7mm
Manufacturer: ST Motiv (Daewoo)
Quantity: 6 x K6 12.7mm Heavy Machine Gun
Role: Fire Support / Suppression / Defense
Length: 1,654 mm
Barrel Length: 1,143 mm
Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)
Action: Short recoil-operated
Rate of Fire: 450–600 rounds/min
Muzzle Velocity: 890 m/s
Maximum Firing Range: 7,400 m
Effective Firing Range: 1,800 m

Feed System: Belt-fed

Sights: Iron Sights

Note #1: The ST Motiv (Daewoo) "K6" Heavy Machine Gun (HMG) is the standard HMG of South Korean fighting forces. It is a locally-produced copy of the storied American M2 Browning Heavy Machine Gun and, therefore, utilizes the same form and function of its widely-used counterpart.

Note #2: The ROTEM K1 Main Battle Tank (MBT) of the South Korean Army makes use of the K6 as a trainable, roof-mounted Anti-Aircraft (AA) machine gun.

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7x99mm

Basic Load: INA

Notes:

The ST Motiv (Daewoo) "K6" Heavy Machine Gun (HMG) is the standard HMG of South Korean fighting forces. It is a locally-produced copy of the storied American M2 Browning Heavy Machine Gun and, therefore, utilizes the same form and function of its widely-used counterpart.

DShK 1938 Russian 12.7mm Heavy Machine Gun







Tiers:



Variants:

- **DShKT:** Tank mounted
- **Chinese Type 54 Heavy Machinegun:** Chinese unlicensed production. Also produced in Pakistan with a Chinese license.
- **Czech M54 Quad Mount:**

System

Alternative Designation: DShKM, Degtyarev, DShK 38
Manufacturer: Tula
In Service: 1946-Present
Action: Gas-operated, flapper locking
Rate of Fire: 600 rounds/min
Muzzle Velocity: m/s850
Effective Firing Range: m2,000
Maximum Firing Range: m2,500
Feed System: 50 round belt

Dimensions

Length: mm1,625
Barrel Length: mm1,070
Weight, Gun Only: kg34
Weight, On Wheeled Mounting: kg157

Ammunition

Type: Ball API (B-32) API-T (BZT-44) HEI

Combat Load: 750

↳*B-32*

Caliber and Length: 12.7x108-mm

Type: Armor Piercing Incendiary

Max Range (ground): m7,850

Effective Range: mAA: 1,000 Ground: 2,000 Armor: 800 Night (w/1PN52-1):1,000

Armor Penetration @ 0o obliquity @ 500/1,000m range (mm): 20/13.2

Muzzle Velocity: m/s860

Sights

↳*NFI*

Type: metallic leaf sights

Sight Range (m): 2,000

Night Sights Available: Yes

↳*Model 1943 Antiaircraft Sights*

Type: Computing AA sight

Night Sights Available: Yes

Note: Many DShKs intended for the close anti-aircraft role were fitted with a simple mechanical sighting system that helped the gunner properly account for "lead" in order to hit fast-moving targets. The system consisted of two circular disks mounted side-by-side in a common framework. On the right, in front of the gunner, was a large "spider" sight that contained a line of small metal rings running from the center to the outer edge. On the left, in front of the loader, was a smaller disk with several parallel metal wires. In some examples, the sight was installed with the loader's sight on the right. To use the sight, the loader/observer would spin his disk so the wires were parallel to the target's direction of travel. A shaft running between the two turned the gunner's sight to the same angle. The gunner would then sight through one of the metal rings based on the estimated range and speed.

Notes:

The DShK 1938 is a Soviet heavy machine gun with a V-shaped "butterfly" trigger, firing the 12.7×108mm cartridge. The weapon was also used as a heavy infantry machine gun, in which case it was frequently deployed with a two-wheeled mounting and a single-sheet armour-plate shield. It took its name from the weapons designers Vasily Degtyaryov, who designed the original weapon, and Georgi Shpagin, who improved the cartridge feed mechanism. It is sometimes nicknamed Dushka (a dear or beloved person) in Russian-speaking countries, from the abbreviation. The requirement for a heavy machine gun appeared in 1929. The first such gun, the Degtyaryov, Krupnokalibernyi (DK, Degtyaryov, large calibre), was built in 1930, and this gun was produced in small quantities from 1933 to 1935. The gun was fed from a drum magazine of thirty rounds, and had a poor rate of fire. Shpagin developed a belt feed mechanism to fit to the DK giving rise, in 1938, to the adoption of the gun as the DShK 1938. This became the standard Soviet heavy machine gun in World War II. Like its U.S. equivalent, the M2 Browning, the DShK 1938 was used in several roles. As an anti-aircraft weapon it was mounted on pintle and tripod mounts, and on a triple mount on the GAZ-AA truck. Late in the war, it was mounted on the cupolas of IS-2 tanks and ISU-152 self-propelled guns. As an infantry heavy support weapon it used a two-wheeled trolley which unfolded into a tripod for anti-aircraft use, similar to the mount developed by Vladimirov for the 1910 Maxim gun. It was also mounted in vehicle turrets, for example, in the T-40 light amphibious tank. In 1946, the DShK 1938/46 or DShKM (M for modernized) version was introduced. In addition to the Soviet Union and Russia, the DShK has been manufactured under license by a number of countries, including the People's Republic of

China (Type 54), Pakistan, and Romania. Currently, it has been mostly replaced in favour of the more modern NSV and Kord designs. Nevertheless, the DShK is still one of the most widely used heavy machine guns. In June 1988, during the conflict in Northern Ireland known as "the Troubles", a British Army Westland Lynx helicopter was hit 15 times by two Provisional IRA DShKs smuggled in from Libya, and forced to crash-land near Cashel Lough Upper, south County Armagh. DShKs were also used in 2004, against British troops in Al-Amarah, Iraq. In the 2012 Syrian civil war, the Syrian government said rebels used the gun mounted on cars. It claimed to have destroyed, on the same day, 40 such cars on a highway in Aleppo and six in Dael. It is often claimed that the DShK could fire US/NATO .50-caliber ammunition, but the M2 Browning could not fire 12.7mm ammunition. This is completely untrue. Neither round is interchangeable, with their case length and head (cartridge base) dimensions completely different and will not chamber or function in the other weapon. The Russian ammunition is 12.7×108mm and the US is 12.7×99mm. The myth began in US weapons intelligence manuals referring to the DShK as being "12.7mm (.51-caliber)" and the assumption made that this was intentional to accommodate interchangeable ammunition.

NSV Russian 12.7mm Heavy Machine Gun







Tiers:



Variants:

- **NSVT:** Tank-mounted version (See NOTES) A tripod-mount (6T7) version is available for infantry use in a ground role. However, the NSVT appears more commonly mounted on the turrets of tanks as an antiaircraft machinegun.
- **Russian NSV/NSVT:** The Russian version can produce the guns for either Russian 12.7x108 or NATO 12.7 x 99 (.50-cal) ammunition.
- **Kord:** A Russian modernized version of the NSV/NSVT. Improvements include reduced weight (50% for hand-carry 6P57), reduced recoil, increased barrel life, improved reliability, improved accuracy, increased burst rate capacity, and improved reliability and maintenance. Reduced weight and recoil permits use with the 6T19 light machinegun bipod. Like the above Russian MGs, the Kord can be produced in either ammunition version. Vehicle version is 6P49. Swivel mount hand-operated versions are 6P58 and 6P59.

System

Alternative Designation : NSVS (when mounted on tripod)
Barrel Life : rds 5000.0
Operation: Gas
Change Time, Barrel : sec 5.0
Feed System: Left or right from metal link belt from 50-rd boxes
Fire Mode : Automatic; short bursts (four to six), long bursts (10 to 15), or continuously
Rate of Fire, Cyclic : rd/min680-800
Rate of Fire, Practical : rd/min100.0
Notes: The HMG in the above picture is of a Finnish NSV.

↳*Dimensions*

Height : mm380, tripod T

Length : m1900, Tripod, 6T7

Length, Overall : m1560.0

Width : mm860, Tripod, 6T7

Weight, Barrel: kg9.2

Weight, Empty: kg25

Weight, Total System: kg43

Weight, Tripod: kg16

↳*Mount*

Elevation : degneg 5 to +75

Traverse : deg360.0

Type: 6T7 (infantry) tripod or 6U6 (w/seat) universal tripod

Ammunition

Cailber/Length : mm12.7x108

Combat Load : rds300 rds

Type: API, API-T, HEI

↳*Ammunition (Option 1)*

Type: API

Armor Penetration : mm20/13.2 at 0 deg obliquity at 500 m

Cailber/Length : mm12.7x108

Muzzle Velocity : m/s860.0

Range, Maximum Effective, Anti-Aircraft: m1000.0

Range, Maximum Effective, Armor : m800.0

Range, Maximum Effective, Ground : m2000.0

Range, Maximum Effective, Night : m1000.0

Range, Maximum, Ground : m7850.0

↳*Munition All*

Name: B-32 (API); BZT-44 (API-T); HEI

Sights

↳*Sights #1*

Name: INA

Type: Metallic sights, (tangent leaf rear and folding front post)

Range : m2000.0

↳*Sights #2*

Name: 10P50 Optical
Type: Day optical sight
Magnification: 3-6x

↳*Sights #3*

Name: 1PN52-1
Type: Night sight
Magnification: 5.3x

↳*Sights #4*

Name: 10P80 (used w/ 6U6 mount)
Type: AA collimating sight (aircraft speed to 300 km/h)

↳*Sights #5*

Name: 10P81 (used w/ 6U6 mount)
Name: K10-T (on NSVT for T- 72/T-80)
Type: Ground target sight
Type: Reflex AA sight

Notes:

The NSV (Russian НСВ Никитина-Соколова-Волкова), also known as the «Utyos» (Project: Lonely Cliff), is a 12.7mm caliber heavy machine gun of Soviet origin, named after the designers, G. I. Nikitin (Г. И. Никитин), Y. S. Sokolov (Ю. М. Соколов) and V. I. Volkov (В. И. Волков). It was designed to replace the DShK machine gun and was adopted by the Soviet Army in 1971. It is no longer being produced in Russia; the manufacturing license for the NSV ended up in Kazakhstan after the break-up of the Soviet Union. The NSV has been manufactured in Bulgaria, India, Poland and Yugoslavia under license. The NSV weighs 25 kg (55 lb), has a rate of fire of 700–800 rounds per minute, and an effective range from 1,500 m (1,600 yd) to 2,000 m (2,200 yd) against airborne and ground targets, respectively. A loaded ammunition belt with 50 rounds weighs 11 kg (24 lb). The Soviet Army began looking for a new heavy machine gun to replace its older SGM and DShK machine guns in the early 1950s. The Soviet Army liked the idea behind the German MG 42; a versatile weapon used on a variety of mounts to perform many different roles. Two Soviet weapon designers were asked to design one weapon each utilizing the same principle. Testing approved Mikhail Kalashnikov's solution; it was found to be more reliable and cheaper to manufacture than the design of Grigory Nikitin and Yuri Sokolov. Kalashnikov's machine gun became the new standard machine gun, and was named PK. Nikitin's and Sokolov's design was however not forgotten. It was developed into the heavy NSV machine gun about 10 years later and selected in 1969 as the successor to the DShK/DShKM machine gun. It was accepted in service by the Soviet Army in 1971. The machine gun was also license-manufactured in Bulgaria, India, Yugoslavia and Poland. The Yugoslavian version of the NSVT is called the M87. Production of the NSV has ended in Russia, and it is currently being replaced by the Kord heavy machine gun. The Russian Army needed a more accurate heavy machine gun, and it has also been increasingly difficult to get hold of spare parts. NSV production was located in Ukraine and in Kazakhstan and was disrupted by the end of the Soviet Union.

KPV-14.5 Russian 14.5mm Heavy Machine Gun







Tiers:



Variants:

- **KPVT:** The version for use in armoured vehicles is called the KPVT (tankoviy, 'tank'). KPVT is used for armoured vehicle installations, boats, movable and stationary mounts and various antiaircraft mounts. It features a shorter receiver and a heavier barrel jacket. The KPVT also uses a 50-round belt instead of the original 40-round belt. KPVTs are the primary armament of the wheeled BTR-60PB/70/80 series armoured personnel carriers and BRDM-2 armoured reconnaissance vehicles. It is intended for fighting against light armoured targets, weapons systems and light shelters at the distances of up to 3000 m, as well as air targets at distances up to 2000 m. The distance at which the bullet retains lethal force is 8 km. The maximum flight range of the bullet is 9 km.

System

:

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)
Type: Heavy Machine Gun (KPV)
Caliber: mm14.5mm
Manufacturer: V.A. Degtyarev Plant
Weight: kg49
Length, Total: mm1.980
Barrel Length: mm1,346
Width: mm162
Height: mm225
Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Notes:

The KPV-14.5 heavy machine gun (KPV is an initialism for Krupnokaliberniy Pulemyot Vladimirova, in Russian as Крупнокалиберный Пулемёт Владимирова, or КПВ) is a Soviet designed 14.5×114mm-caliber heavy machine gun, which first entered service as an infantry weapon (designated PKP) in 1949. In the 1960s, the infantry version was taken out of production because it was too big and heavy. It was later redesigned for anti-aircraft use, because it showed excellent results as an AA gun, with a range of 3,000 meters horizontally and 2,000 meters vertically against low flying planes.[4] It was used in the ZPU series of anti-aircraft guns. Its size and power also made it a useful light anti-armour weapon on the BTR series of vehicles and the BRDM-2 scout car. The development of the machine gun began in 1944. The 14.5×114mm M41 cartridge can be used with High Explosive Incendiary - Tracer (HEI-T) or Armour-Piercing Incendiary (API) bullets, and they have approximately twice the energy of a 12.7 mm (.50 BMG) projectile. The KPV is air-cooled and fitted with barrel with a hard chrome plated bore. It uses a short recoil operation system with gas assistance and a rotary bolt. It can be fed with the 40-round metallic belt from either the left or right side. The barrel can be removed by turning the prominent latch on the forward end of the receiver and pulling on the barrel's carrying handle.

STK 50MG Singapore 12.7mm Heavy Machine Gun





Tiers:



Variants:

- **SRAMS:** 120-mm Super Rapid Advanced Mortar System (SRAMS) with an auto-loader & 6 rounds on vehicle
- **Ammo Carrier:** Accompanies the SRAMS with additional crew member
- **Spider with Spike ATGM:** Anti-tank weapons carrier
- **Light Strike Vehicle Mark II:** The primary role of the LSV MK. II is against armoured threats. It is designed to be helicopter portable and manoeuvrable over cross-country terrain. The vehicle is equipped with enhanced networking capabilities to support the integration with other combat systems during operations.

System

↳*System*

Name: STK 50MG
Type: 12.7mm Heavy Machine Gun
In Service: 1991-Present
Manufacturer: • CIS: 1988–2000 • ST Kinetics: 2000–present
Length: mm1,778
Barrel Length: mm1,143
Width: mm190
Weight: 30 kg (66.14 lb) (complete gun assembly w/o feed chute and tripod adaptor)
Action: Gas-operated, rotating bolt
Caliber: 12.7mm
Barrels: Single barrel (progressive RH parabolic twist, 8 grooves)
Maximum Firing Range: INA
Rate of Fire: 400–600 rounds/min
Muzzle Velocity: m/s890
Feed System: Single sprocket Belt-fed with dual-feed chutes
Sights: Folding leaf sight

Ammunition

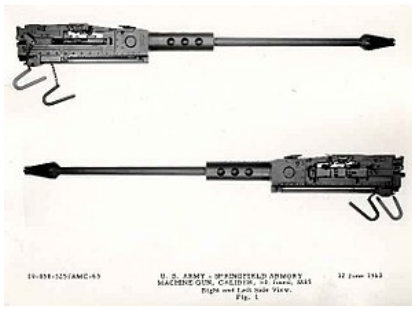
Type: Rifle
Caliber: mm12.7
Cartridge: 12.7×99mm NATO

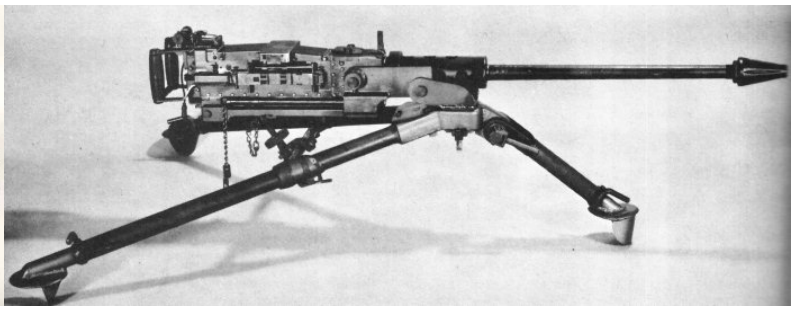
Notes:

The STK 50 MG, formerly known as the CIS 50MG, is a gas-operated, air-cooled, belt-fed heavy machine gun developed and manufactured by Chartered Industries of Singapore (CIS, now ST Kinetics) in the late 1980s, in response to a request by the Singaporean Defence Ministry to replace the 12.7mm Browning M2HB machine guns then in ubiquitous service with the Singapore Armed Forces (SAF). The aim was to have a brand new heavy machine gun design, that fires the same type of .50 cal rounds as the M2HB machine guns and to have the gun parts more readily available in view of easing SAF's chain of logistics and supplies. The CIS engineers learnt from the lesson of the canceled (lack of funding) American "Dover Devil GPHMG" program known as the Special Projects Group at Picatinny Arsenal led by Charles J. Rhoades. Curt Johnson and Phil Baker developed the original concept to create a modular weapon suited for modern tactical doctrines and production techniques. In 1988, CIS introduced the new 12.7mm machine gun which was aptly named as the CIS 50MG, after two years of development and testing phase. As the STK 50 MG is a gas-operated, air-cooled, belt-fed weapon, the gun is operated using dual gas pistons, located in two gas tubes placed on either side of the barrel. The barrel is locked by means of a rotary bolt with multiple radial lugs that engages the barrel extension, eliminating the need for headspace adjustments. The CIS 50MG utilises the same "constant recoil" system used in the Ultimax 100 and it also has a quick-detachable barrel equipped with a carrying handle to facilitate the ease of barrel changing under combat situations or during operational manoeuvres. The one unique feature of the weapon is its dual belt-feed system, the system allows for fast and easy switching of ammunition from standard ball rounds to the Raufoss Mk 211 Armor-Piercing-Incendiary rounds or the Saboted light armor penetrator (SLAP), which are capable of penetrating a rolled homogeneous armour plate with a thickness of 25 mm (0.98 in) from a range of 1 km (0.62 mi). Such systems are more commonly used in modern automatic cannons such as the M242 Bushmaster 25mm cannon and the Mk44 Bushmaster II 30mm cannon, both of which are also in use by the Singapore Army's Bionix AFVs.

↳

M85 American 12.7mm Heavy Machine Gun





Tiers:



Variants:

- **M85:** Basic weapon, designed for mounting inside vehicle cupolas
- **M85C:** Flexible infantry variant with sights and spade grips

System

:

↳*System*

Name: M85 Machine Gun
Type: Heavy Machine Gun
Caliber: 12.7mm
Manufacturer: INA
Length: 1,384.3 mm)
Weight: 29.5 kg
Action: Recoil-operated
Rate of Fire: 400-625 rd/min
Muzzle Velocity: 880.0 m/s
Maximum Firing Range: 6,702.6 m
Effective Firing Range: 1,999.8 m
Feed System: Belt Feed, left or right hand
Sights: INA

↳*Ammunition*

Type: Rifle
Caliber: mm12.7mm
Cartridge: 12.7×99mm NATO (.50 BMG)
Basic Load: Rifle

Notes:

The M85 is a heavy machine gun firing .50 BMG ammunition that was used primarily for turreted applications in armored fighting vehicles. It was intended to replace the venerable M2 machine gun with a smaller and much lighter weapon, suitable for use inside fighting vehicles, as opposed to only on external mounts. It was used on the M60 series of tanks and the LVTP-7 amphibious landing vehicle. Intended as a smaller, lighter, more capable replacement for the venerable M2 Browning machine gun, the M85 was produced by General Electric. The weapon was developed with selectable high and low rates of fire for engagement of both ground and air targets, a feature lacking in the older M2. The M85 was the standard heavy tank machine gun for the M60 series, and was also used on the LVTP-7 amphibious vehicle. It is an air-cooled, recoil operated machine gun, has a short receiver and quick change barrel, and can be configured for left or right hand feeding. The M85 is significantly lighter than the M2, and significantly smaller, a prime consideration for its intended role inside the cramped interiors of armored vehicles. Firing and charging are achieved by pull on one of two color-coded pull chains (black for charging and red for firing), or firing could be initiated by means of a switch activated solenoid on the cupola elevation mechanism. The M85 used the M15 push-through link to feed ammunition as opposed to the M2 or M9 pull-out links used on the M2 and M3 Browning machine guns. This created issues with ammunition supply in use, since despite the same .50 BMG cartridges being used in both machine guns, the ammunition was supplied already packed on links and re-linking was not practical in the field. In service the M85 was found to be unreliable and extremely complex compared to the M2 machine gun. The weapon was not fitted to the M1 Abrams, and was replaced by the M2 machine gun on the improved AAVP-7. An attempt was also made to make a version of the M85 that would replace the M2 in the infantry role was designated the M85C, and features standard spade grips and can be fitted to the M3 heavy tripod. Like the M85 the M85C was extremely unreliable and unpopular and this weapon was not adopted. The M85 was also tested by the United Kingdom under the designations XL17E1 and XL17E2. They were equipped with special purpose barrels and evaluated as ranging machine guns. The weapon was not adopted for use on any British vehicles.

Type 54 Chinese 12.7mm Heavy Machine Gun



Tiers:



Variants:

- **DShKT:** Tank mounted
- **Chinese Type 54 Heavy Machinegun:** Chinese unlicensed production. Also produced in Pakistan with a Chinese license.
- **Czech M54 Quad Mount:**

System

Alternative Designation: Type 54
Manufacturer: INA
Action: Gas-operated, flapper locking
Rate of Fire: 600 rounds/min
Muzzle Velocity: m/s850
Effective Firing Range: m2,000
Maximum Firing Range: m2,500
Feed System: 50 round belt

Dimensions

Length: mm1,625
Barrel Length: mm1,070
Weight, Gun Only: kg34
Weight, On Wheeled Mounting: kg157

Ammunition

Type: Ball API (B-32) API-T (BZT-44) HEI
Combat Load: 750

↳B-32

Caliber and Length: 12.7x108-mm

Type: Armor Piercing Incendiary

Max Range (ground): m7,850

Effective Range: mAA: 1,000 Ground: 2,000 Armor: 800 Night (w/1PN52-1):1,000

Armor Penetration @ 0o obliquity @ 500/1,000m range (mm): 20/13.2

Muzzle Velocity: m/s860

Sights

↳*NFI*

Type: metallic leaf sights

Sight Range (m): 2,000

Night Sights Available: Yes

↳*Model 1943 Antiaircraft Sights*

Type: Computing AA sight

Night Sights Available: Yes

Note: Many DShKs intended for the close anti-aircraft role were fitted with a simple mechanical sighting system that helped the gunner properly account for "lead" in order to hit fast-moving targets. The system consisted of two circular disks mounted side-by-side in a common framework. On the right, in front of the gunner, was a large "spider" sight that contained a line of small metal rings running from the center to the outer edge. On the left, in front of the loader, was a smaller disk with several parallel metal wires. In some examples, the sight was installed with the loader's sight on the right. To use the sight, the loader/observer would spin his disk so the wires were parallel to the target's direction of travel. A shaft running between the two turned the gunner's sight to the same angle. The gunner would then sight through one of the metal rings based on the estimated range and speed.

Notes:

The Type 54 Chinese 12.7mm Heavy Machine Gun is a unlicensed Chinese produced DshK 1938. The DShK 1938 is a Soviet heavy machine gun with a V-shaped "butterfly" trigger, firing the 12.7×108mm cartridge. The weapon was also used as a heavy infantry machine gun, in which case it was frequently deployed with a two-wheeled mounting and a single-sheet armour-plate shield. It took its name from the weapons designers Vasily Degtyaryov, who designed the original weapon, and Georgi Shpagin, who improved the cartridge feed mechanism. It is sometimes nicknamed Dushka (a dear or beloved person) in Russian-speaking countries, from the abbreviation. The requirement for a heavy machine gun appeared in 1929. The first such gun, the Degtyaryov, Krupnokalibernyi (DK, Degtyaryov, large calibre), was built in 1930, and this gun was produced in small quantities from 1933 to 1935. The gun was fed from a drum magazine of thirty rounds, and had a poor rate of fire. Shpagin developed a belt feed mechanism to fit to the DK giving rise, in 1938, to the adoption of the gun as the DShK 1938. This became the standard Soviet heavy machine gun in World War II. Like its U.S. equivalent, the M2 Browning, the DShK 1938 was used in several roles. As an anti-aircraft weapon it was mounted on pintle and tripod mounts, and on a triple mount on the GAZ-AA truck. Late in the war, it was mounted on the cupolas of IS-2 tanks and ISU-152 self-propelled guns. As an infantry heavy support weapon it used a two-wheeled trolley which unfolded into a tripod for anti-aircraft use, similar to the mount developed by Vladimirov for the 1910 Maxim gun. It was also mounted in vehicle turrets, for example, in the T-40 light amphibious tank. In 1946, the DShK 1938/46 or DShKM (M for modernized) version was introduced. In addition to the Soviet Union and Russia, the DShK has been manufactured under license by a number of countries, including the People's Republic of China (Type 54), Pakistan, and Romania. Currently, it has been mostly replaced in favour of the more modern NSV and Kord designs. Nevertheless, the DShK is still one of the most widely used heavy machine guns. In June 1988, during the conflict in Northern Ireland known as "the Troubles", a British Army Westland Lynx helicopter was hit 15 times by two Provisional IRA DShKs smuggled in from Libya, and forced to crash-land near Cashel Lough Upper, south County Armagh. DShKs were also used in 2004, against British troops in Al-Amarah, Iraq. In the 2012 Syrian civil war, the Syrian government said rebels used the gun mounted on cars. It claimed to have destroyed, on the same day, 40 such cars on a highway in Aleppo and six in Dael. It is often claimed that the DShK could fire US/NATO .50-caliber ammunition, but the M2 Browning could not fire 12.7mm ammunition. This is completely untrue. Neither round is interchangeable, with their case length and head (cartridge base) dimensions completely different and will not chamber or function in the other weapon. The Russian ammunition is

12.7×108mm and the US is 12.7×99mm. The myth began in US weapons intelligence manuals referring to the DShK as being "12.7mm (.51-caliber)" and the assumption made that this was intentional to accommodate interchangeable ammunition.

Type 77 Chinese 12.7mm Heavy Machine Gun




Tiers:



Variants:

- **Type 85 heavy machine gun:** Just five years after the Type 77 entered service, it was replaced in production by the updated Type 85 heavy machine gun. An evolution on the Type 77, it used a more conventional muzzle brake and replaced the spade grips and separate cocking handle with horizontal grips and a sliding trigger unit, the entirety of which is moved forward and back to cock the gun. The gun and tripod were also lighter, weighing 24 kg (53 lb) and 17.5 kg (39 lb) respectively. Both weapons can be mounted on vehicles.

System

:

↳*System*

Name: Type 77
Type: Heavy Machine Gun
Manufacturer: Norinco
Length: 2,150 mm
Barrel Length: 1,016 mm
Weight: 28 kg (61.73 lb) (gun only) 28.3 kg (62.39 lb) (tripod)
Action: Gas
Rate of Fire: 650-700 rounds/min
Muzzle Velocity: 825 m/s
Feed System: belt 60 rounds
Sights: Iron/Optical

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: 12.7×108mm
Basic Load: INA

Notes:

The Type 77 heavy machine gun is described as China’s first generation designed 12.7 mm heavy machine gun. During the mid-1970s, China decided to develop a lighter 12.7 mm machine gun to replace the Type 54 (indigenous DShK) that was more suited for mobile anti-aircraft applications. The weapon was adopted in 1977 and mass production commenced in 1980. To save weight the Type 77 used a direct gas impingement operated action, somewhat unusual for a machine gun, resulting in few moving parts and a long and slim, tubular receiver. Overall weight of the gun and tripod comes to about 56 kg (120 lb), less than half that of a mounted Type 54/DShK, though it retains the same locking system and belt feed. The barrel is also thinner as light weight was favored over volume of fire, which causes it to overheat faster, with a prominent "pepperpot" muzzle brake. It has iron sights and a mount for a low-magnification optical sight suitable for engaging ground and air targets. The gun also has a large charging handle below the receiver, shoulder stock, and fires from an open bolt.

Kord 6P50 Russian 12.7mm Heavy Machine Gun







Tiers:

1 2 **3** 4

Variants:

- **6P49:** Baseline variant for vehicle mounting
- **6P50:** Bare infantry version
- **6P50-1 (6P57):** 6T19 Bipod-mounted infantry version. Bipod provides ±15° range of traverse
- **6P50-2 (6P58):** Infantry variant.
- **6P50-3 (6P59):** Infantry version on a 6U16 multipurpose mount. Casing ejection is to the right side
- **6P51:** Co-axial version with left-hand feed system and forward casing ejection

System

:

↳*System*

Name: Kord-12.7 mm
Type: 12.7mm Heavy Machine Gun
Caliber: mm12.7
Manufacturer: V.A. Degtyarev Plant
In Service: 1990s-Present
Variants: 6P50-1, 6P50-2, 6P50-3, 6P49
Length: mm1,980
Weight: kg25.5
Action: Gas-operated, rotating bolt
Rate of Fire: 650–750 rounds/min
Maximum Effective Firing Range: m2,000

Feed System: 50-round linked belt
Sights: Iron sights

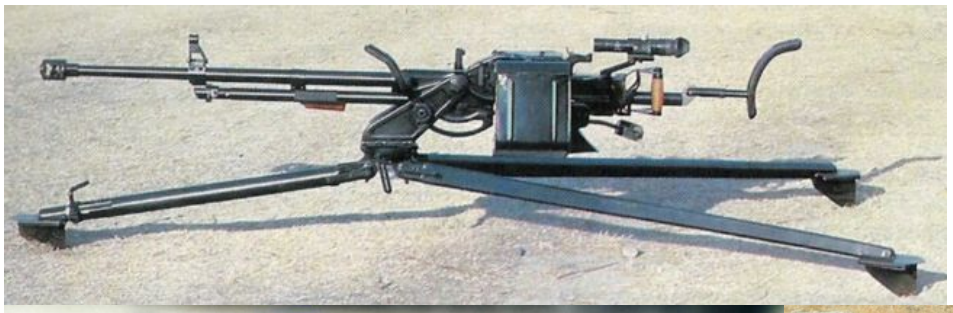
↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartdige: 12.7×108mm
Muzzle Velocity: m/s860
Basic Load: ea450

Notes:

The Kord-12.7 mm heavy machine gun is a Russian design that entered service in 1998 replacing the older NSV machine gun. Externally the weapon resembles the NSV; however, the internal mechanism has been extensively reworked, changing from a horizontally pivoting breech block to a rotating bolt design. Additionally, the gas system has been changed and the muzzle baffle redesigned. These changes give the weapon reduced recoil compared with the NSV, allowing greater accuracy during sustained fire. The catalyst for the development of the weapon was a complete lack of any heavy machine guns in construction at that time in the Russian Federation. Prior to the dissolution of the Soviet Union, the weapon that had functioned as the heavy machine gun was the NSV, or "Utes" or "Utjos" ("утёс", meaning one lonely cliff in Russian, this name was its designation during development) machine gun. The main production centre for the NSV was located in what is now Kazakhstan. The Russian Degtyarev bureau was given the job of producing an updated version of the weapon chambered in the 12.7×108mm cartridge, which could be used for support, mounted on vehicles or in an anti-aircraft capacity. The weapon has also been chambered to handle the .50 BMG cartridge for export sales. The weapon employs new construction, and consequently is significantly lighter than its predecessor. The firing mechanism is very rugged, yet is capable of a greater rate of fire and significantly less recoil. Because a new barrel made of a high-tech alloy minimizes distortion and drop, accuracy has increased tremendously over previous Soviet machine guns. Unlike its predecessor, it may be fired from a bipod — a rather unusual feature for 12.7 mm/.50 caliber heavy machine guns. Its relatively light weight and lesser recoil allows stronger soldiers to move the gun around without assistance.

W85 Chinese 12.7mm Heavy Machine Gun







Tiers:

1 2 3 4

W85 Heavy Machine Gun

↳*System*

Name: W85
Type: Heavy Machine Gun
Caliber: 12.7mm
Manufacturer: Norinco
Proliferation: Widely Proliferated
In Service: 1980s-Present
Length: INA
Weight: 18.5 kg (40.79 lb) (gun only) 17.5 kg (38.58 lb) (tripod)
Action: Gas
Rate of Fire: 550-600 rounds/min
Muzzle Velocity: 850 m/s
Feed System: belt
Sights: Iron/Optical

↳*Ammunition*

Type: Rifle
Caliber: 12.7mm
Cartridge: 12.7×108 mm

Basic Load: INA

Notes:

The W-85 heavy machine gun is a gas-operated heavy machine gun designed in the People's Republic of China. It fires the Soviet-designed 12.7×108mm round. The W85 is not to be confused with the Type 85, another Chinese machine gun of the same caliber but of a different design. The W85 was designed to be as light as possible for infantry use. Its small receiver is of generally rectangular cross-section and it has a thick gas tube below the barrel containing a conventional gas piston. In addition to iron sights it has rails for optics or anti-aircraft sights. It fires 12.7×108mm rounds from belts and is more accurate than the Type 54 heavy machine gun, but the thinner barrel overheats faster. In trials the W85 lost out to the Type 85 as an infantry weapon and was not accepted into PLA service.

QJZ-89 (Type 89) Chinese 12.7mm Heavy Machine Gun





Tiers:



System

:

↳*System*

Name: QJZ-89 (Type 89)
Type: 12.7mm Heavy Machine Gun
Manufacturer: NORINCO
Cartridge: mm12.7x108
Weight, Gun Only: kg17.5
Weight,Tripod: kg8.5
Length, Total: mm2,119
Length, Barrel: mm1,003
Barrels: ea1
Action: Gas/Recoil
Rate of Fire: rds/min450-600
Muzzle Velocity: m/s850
Feed System: Belt
Sights: Iron/Optical

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Muzzle Velocity: m/s850
Basic Load: INA
Max Range: m1,600
Min Range: kmINA

Armor Penetration: Yes

Notes:

The QJZ-89, also known as the Type 89, is a heavy machine gun designed in the People's Republic of China and fires the Soviet-designed 12.7×108mm ammunition. The Chinese military was still searching for a lighter heavy machine gun after the adoption of the Type 85 machine gun. The Type 89 was adopted just two years after the adoption of the Type 85 as an entirely new "lightweight heavy machine gun." The gun and tripod together only weigh 26 kg (57 lb), which is even lighter than the 32 kg (71 lb) Russian Kord machine gun on a bipod mount; although the American XM312 was lighter at 19 kg (42 lb), it never entered service and had a rate of fire too low to effectively engage low-flying aerial targets. It achieves such a low weight through a combination gas/recoil action usually seen on autocannons, where gas unlocks the breech while recoil operates the feed and decreases the peak recoil forces induced on the housing and mount. China has reportedly developed 12.7 mm armor piercing discarding sabot (APDS) ammunition for the QJZ-89, similar to U.S. saboted light armor penetrator rounds, increasing performance against light armored vehicles.

→→General-Purpose Machine Guns (GPMG)

Rheinmetall MG 3 German 7.62mm General-Purpose Machine Gun



Tiers:



Variants:

- **MG1:** Rheinmetall variant of the MG 42, most notably rechambered to fire 7.62×51mm NATO.
- **MG 1A1 (MG 42/58):** As MG 1, but with sights properly calibrated for the new round. Sights refitted to existing MG 1s.
- **MG 1A2 (MG 42/59):** MG 1A1 variant; product improved with longer ejection port, heavy bolt and friction ring buffer.
- **MG 1A3:** MG 1A2 variant; product improvement of all major components.
- **MG 1A4:** MG 1 variant; for fixed mount armor use.
- **MG 1A5:** MG 1A3 variant; MG1A3s converted to MG1A4 standard.
- **MG 2:** Designation for all wartime MG 42s rechambered to 7.62×51mm NATO.
- **MG 3:** MG 1A3 variant; product improved with AA rear sight.
- **MG 3E:** MG 3 variant; reduced weight model (roughly 1.3 kg lighter), entered into late 1970s NATO small arms trials.
- **MG 3A1:** MG 3 variant; for fixed mount armor use.
- **MG 3KWS:** MG 3 variant; developed by Rheinmetall and Tactics Group as a stand in until the HK121 replaces it
- **MG 42/59:** talian variant produced by Beretta, Whitehead Motofides and Franchi, since 1959, Chambered in 7.62×51mm NATO. The bolt weight was increased to 1,200 g (42.33 oz)) for a reduced 800 rounds per minute cyclic rate of fire. Used mainly mounted on vehicles and has largely been phased out by the M249 SAW.
- **Ksp m/94:** Swedish variant chambered with the 7.62×51mm NATO round. Mainly used as secondary armament in Stridsvagn 122.

System

:

↳***System***

Name: Rheinmetall MG 3
Type: mm7.62
Manufacturer: Rheinmetall
Max Rate of Fire: rds/min1,000-1,300
Weight (Gun Only): kg11.5
Weight (Mounted on a Tripod): kg27.5
Length (With Stock): mm1,225
Length (With Stock): mm1,097
Barrel Length: mm565

Action: Recoil-operated, roller locked

Effective Firing Range: 200–1,200 m sight adjustments

Maximum Firing Range (Bipod): m600

Maximum Firing Range (Tripod): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed system: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO cartridge

Muzzle Velocity: m/s820

Basic Load: ea5,000

↳*Sights*

Type: Open tangent iron sights

Note: The open-type iron sighting line has a relatively short 430 millimeters (16.9 in) radius and consists of a "∧-type" height adjustable front sight on a folding post and a leaf rear sight with an open V-notch sliding on a ramp, graduated from 200 to 1,200 meters (219 to 1,312 yd) in 100 meters (109 yd) increments. A flip-up anti-aircraft sight is attached to the receiver top just in front of the normal rear sight element.

↳*Tripod*

Note: In a stationary, heavy machine gun role the MG 3 is mounted on a buffered Feldlafette ("field tripod") that also features storage containers for accessories like the Zielfernrohr 4 × 24 periscope-style telescopic sight. The direct fire only Zielfernrohr 4 × 24 sight like the MG 3 is mounted on the Feldlafette and is graduated from 0 to 1,600 meters (0 to 1,750 yd) in 100 meters (109 yd) increments. The Zielfernrohr 4 × 24 reticle can be illuminated by an external unit. It can also be used with the FERO-Z 51 night sight. A unique feature of the German World War II Feldlafette types that was not carried over to the MG3 Feldlafette was the Tiefenfeuerautomat ("in-depth automatic fire"). If selected, this feature walked the fire in wave like motions up and down the range between predefined ranges. This sweeping of a given range (Tiefenfeuer - "in-depth fire") continued as long as the gun was fired.

Notes:

The MG 3 is a German general-purpose machine gun chambered for the 7.62×51mm NATO cartridge. The weapon's design is derived from the World War II era MG 42 universal machine gun that fired the 7.92×57mm Mauser round. The MG 3 was standardized in the late 1950s and adopted into service with the newly formed Bundeswehr, where it continues to serve to this day as a squad support weapon and a vehicle-mounted machine gun. The weapon and its derivatives have also been acquired by the armed forces of over 30 countries. Production rights to the machine gun were purchased by Italy (MG 42/59), Spain, Pakistan (MG 1A3), Greece, Iran, Sudan and Turkey. The German military instructs sustained fire must be avoided at all costs. In the bipod mounted light machine gun role MG 3 users are trained to fire short bursts of 3 to 5 rounds and strive to optimize their aim between bursts fired in succession. In the tripod mounted medium machine gun role MG 3 users are trained to fire short bursts and bursts of 20 to 30 rounds and strive to optimize their aim between bursts fired in succession.[14] After around 150 rounds of rapid fire, the gun operator will open a side hatch (leading to the barrel) and replace the hot barrel with a new cool(er) one. Non-observance of this technical limitation renders the barrel prematurely unusable. The machine gun crew member responsible for a hot barrel change is issued protective asbestos gloves or a cloth to prevent burns to the hands. The MG 3 is an automatic, air-cooled, belt-fed short recoil-operated firearm. It features a roller locked bolt mechanism that consists

of the bolt head, a pair of rollers, the striker sleeve, bolt body and return spring. The bolt is locked securely by a wedge-shaped striker sleeve, which forces two cylindrical rollers contained in the bolt head outward, and into corresponding recesses in the extension of the breech of the barrel. On firing, both the barrel and barrel extension recoil to the rear. The resulting impact (much like a Newton's cradle) moves the carrier to the rear withdrawing the wedge and both rollers as they are cammed inward and out of their sockets by fixed cams, unlocking the bolt head. The bolt carrier and bolt then continue to the rear together guided by fixed guides while the barrel and barrel extension return to battery. Upon return of the bolt forward, the impact of the rollers against the camming surfaces on the breech carry the rollers from their seats, and, together with the surfaces on the striker sleeve, force the rollers outward, locking the bolt head into the barrel extension and ensuring a complete lock. The bolt also houses a spring-loaded casing extractor and ejector. Ejection is carried out when the ejector strikes the buffer head, sending a push forward through the ejector bar, which hits the ejector pin. This pin pushes the top of the base of the cartridge, which is still held by the extractor at the base, causing the empty casing to rotate and eject downward through the ejection chute. The machine gun has an automatic-only trigger mechanism and a cross-bolt safety in the form of a button that is operated by the shooting hand (in its "safe" position the bolt release is disabled). The weapon fires from an open bolt. The cyclic rate can be altered by installing different bolts and recoil springs. A heavier bolt uses more recoil energy to overcome inertia, thus slowing the action. On MG 3 machine guns, two types of bolts are available, with standard weight (about 650 g (22.93 oz)) for the standard 1,000–1,300 rounds per minute cyclic rate of fire and with extra weight (about 900 g (31.75 oz)) for a slower 800–950 rounds per minute cyclic rate of fire. It must be noted that those bolts also are used along with different return springs. The MG 3 feeds from the left side through a feed block using metal, 50-round continuous-link Patronengurt DM1 ammunition belts (which can be combined by cartridge) or disintegrating-link M13 or DM6 belts. In the light machine gun role, the MG 3 is deployed with a 100-round (or 120-round in case of disintegrating belts) belt fitted inside a synthetic ammunition drum developed by Heckler & Koch that is latched on to the left side of the receiver. The rear wall of the drum is transparent and serves as a visual indicator for the amount of ammunition available. The feed system operates through a feed arm that is housed in the feed cover. Two feed pawls are linked to the front end of the arm by an intermediate link and move in opposite directions, moving the belt in two stages as the bolt moves back and forward during firing. For the light machine gun role the MG3 is equipped with a synthetic polymer stock and a folding bipod. The MG 3 has a quick-change, chrome-lined barrel with four right-hand grooves and a rifling twist rate of 1 in 305 mm (1:12 in) and weighs 1.7 kg (3.7 lb). Alternatively, MG 3 barrels can also have polygonal rifling. The barrel is integrated with the barrel breech. During sustained firing, there is a need for the barrel to be changed and this is how they are swapped: The gun is cocked and the barrel catch on the right of the barrel shroud is swung forward. Then, the breech end of the hot barrel swings out and can be removed by elevating or twisting the gun. A fresh barrel would be inserted through the barrel catch and the muzzle bearing. When the catch is rotated back, the barrel is locked and the machine gun can resume firing. Both the receiver housing and ventilated barrel casing are made from pressed sheet steel. The machine gun crew member responsible for a hot barrel change was issued protective asbestos gloves to prevent getting burned. A muzzle device is mounted at the end of the barrel and it acts as a flash suppressor, muzzle brake and recoil booster. MG 3 machine guns are belt-fed, using non-disintegrating metal DM1 belts, which have links that wrap around the cartridge case and are linked by a coiling wire on each side. DM1 belts are preloaded at ammunition factories in 50-round connectable belt lengths and can be linked to any length necessary. Alternatively the MG3 can also be fed by disintegrating metal M13 link belts (designated DM60 by Germany) used by many NATO member states. M13 links are also used on the Dillon M134D Minigun, M60, FN MAG, HK21 and MG5 machine guns among others. Both belt types are of push-through type and use a metal lip that is arrested in the rim of the cartridges to correctly position and fix the cartridges in place. For field use there are several ammunition containers available. The Gurttrommel (belt drum) contains a 50-round DM1 or DM60 belt. The Gurttrommel is not a true magazine but holds a curled 50-round belt preventing it from snagging, twisting and getting stuck during mobile assaults. The steel DM2 ammunition box contains a 250-round DM1 belt and the smaller plastic DM40004 ammunition box contains a 100-round DM1 belt or a 120-round DM60 belt. The German military tends to use non-disintegrating DM1 belts for general use and disintegrating DM60/M13 belts in vehicle or aircraft fixed MG3 mountings that allow for collecting the ejected link pieces for reuse.

PKM Russian 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **PKM:** Squad machinegun
- **PKT:** Vehicle mounted MG with solenoid electric trigger, remote sight, and a longer heavier barrel. It lacks a stock and, bipod. Some are coaxial to a main gun and use its sights. Others operate separately. They generally do not dismount for ground use.
- **PKS:** Lightweight tripod- mounted infantry weapon
- **PKMS:** Lightweight tripod- mounted variant of the PKS
- **PKB (PKBM):** Pintle-mounted on APCs, SP guns, BRDM, BTRs, has butterfly trigger rather than solenoid, double spade grips, and front and rear sights

System

Alternative Designation : See Variants.
Type: Pintle, coaxial, bipod or tripod (Stepanov)
Feed System: Belt, 100-rd belt carried in a box fastened to the right side of the receiver. 25-rd belts can be joined in several combination lengths (100/200/250)
Crew : ea2.0
Fire Mode : Automatic
Operation: Gas
Rate of Fire : rd/minCyclic: 650; Practical: 250 (PKM); Up to 600 for Pecheneg/PKP
Notes: Picture, above, is of a PKP (Pecheneg).

↳*Dimensions*

Length, Overall : PK: 1,203 mm (47.4 in) PKM: 1,192 mm (46.9 in) PKT: 1,098 mm (43.2 in)
Barrel Length: PK(M): 605 mm (23.8 in) (without muzzle device) PKT: 772 mm (30.4 in)

Weight: PK: 9 kg (19.84 lb) (gun + integral bipod) + 7.7 kg (16.98 lb) (tripod). PKM: 7.5 kg (16.53 lb) (gun + integral bipod) + 4.5 kg (9.92 lb) (tripod). PKTM (tank): 10.5 kg (23.15 lb)

Ammunition

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Ball

Cailber/Length : mm7.62x54 (rimmed)

Muzzle Velocity : m/s825.0

Armor Penetration at 500m: mm6.0

Range, Maximum : m3800.0

Range, Practical, Day : m1000.0

Range, Practical, Night : m300.0

↳*Ammunition (Option 2)*

Name: 7BZ-3

Type: API

Cailber/Length : mm7.62x54 (rimmed)

Armor Penetration : mm10 at 200 range

Muzzle Velocity : m/s808.0

Range, Maximum : m3800.0

Range, Practical, Day : m1000.0

Range, Practical, Night : m300.0

Sights

↳*Iron sights*

Note: The rear sight assembly is riveted onto the receiver cover and consist of a square notched rear tangent iron sight calibrated in 100 m (109 yd) increments from 100 to 1,500 m (109 to 1,640 yd) and includes a "point-blank range" battle zero setting corresponding to a 330 m (361 yd) zero. It is identical in design to the AKM and Mosin–Nagant, except that it is oriented backwards with the notch forward and the hinge behind. The iron sight line has a 663 mm (26.1 in) sight radius. Like the RPD rear sight, the PK rear sight also features full windage adjustment in the form of small dials on either side of the notch. The front sight assembly is mounted near the end of the barrel and consists of a protected open post adjustable for elevation in the field.

↳*Optical sights*

Note: PK machine guns that feature a Warsaw Pact side-rail bracket on the left side of the receiver can mount various aiming optics. The standard Russian side rail mounted optical sight was the 4×26 1P29 Universal sight for small arms, an aiming optic similar to the British SUIT and SUSAT and Canadian C79 optical sights. When mounted, the 1P29 sight is positioned centered above the receiver at a height that allows the use of the iron sights. It weighs 0.8 kg, offers 4× magnification with a field of view of 8° and 35 mm eye relief. The 1P29 is issued with a canvas pouch, a lens cleaning cloth, combination tool, two rubber eyecups, two eyecup clamps and three different bullet drop compensation (BDC) cams for the AK-74, RPK-74 and PK machine gun. The 1P29 is intended for quickly engaging point and area targets at

various ranges. On the right side of the field of view a stadiametric rangefinder is incorporated that can be used to determine the distance from a 1.5 meters (4 ft 11.1 in) tall object from 400 to 1,200 m (437 to 1,312 yd). The reticle is an inverted aiming post in the top half of the field of view and is tritium-illuminated for low-light condition aiming. A later designed similar optical sight suitable for the PK machine gun series is the 4×24 1P77

Notes:

The PK (Russian: Пулемёт Калашникова, transliterated as Pulemyot Kalashnikova, or "Kalashnikov's Machine Gun"), is a 7.62×54mmR general-purpose machine gun designed in the Soviet Union and currently in production in Russia.[16] The original PK machine gun was introduced in 1961 and then the improved PKM in 1969 to replace the SGM and RP-46 machine guns in Soviet service. It remains in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces. The PK has been exported extensively and produced in several other countries under license. The original PK was a development of Kalashnikov's AKM assault rifle and the accompanying RPK light machine gun design that featured stamped receivers. The PK uses the 7.62×54mmR Eastern Bloc standard cartridge that produces significantly more bolt thrust when compared to the Eastern Bloc 7.62×39mm and 5.45×39mm intermediate cartridges. The bolt and carrier design are similar to the AK-47 and other modernized Kalashnikov-pattern weapons, as is the stripping procedure performed to remove those mechanisms from the gun for cleaning. The bolt and bolt carrier are however oriented upside down compared to the AKM, with the piston and gas system being underneath the barrel. Unlike the AKM and RPK the PK machine gun series is an open bolt design, which improves heat management during automatic fire compared to closed bolt designs and helps avoiding the dangerous phenomenon known as "cook-off", wherein the firing chamber becomes so hot that the propellant contained in a chambered round unintentionally ignites, making the weapon fire until the ammunition is exhausted. Open bolt designs typically operate much cooler than closed bolt designs due to the airflow allowed into the chamber, action and barrel during pauses between bursts, making them more suitable for constant full-automatic weapons such as machine guns. General-purpose machine guns like the PK are further normally issued with several quick change barrels that during prolonged intensive use are swapped out allowing one barrel to cool while the machine gun fires with the other. The rimmed 7.62×54mmR cartridges are set in a metal ammunition belt and are held against the shoulder inside non disintegrating looped links, leaving the rim exposed at the rear. The belt is mounted from the right side into the feedway of the PK machine gun. The PK uses a non-reciprocating charging handle on the right side of the receiver to charge the gun. Since the PK uses a rimmed rifle cartridge and closed-link belts used for feeding, a two-stage feed mechanism with a preliminary extraction of a cartridge from a belt link was preferred over a direct ammunition feed design often used for rimmed cartridges. The PK machine gun is equipped with a lever-type feed mechanism, mounted on the feed cover and operated by the feed lever, mounted on the right wall of the receiver and wrapping around the bolt carrier with its feed pawl and roller. The PK feed mechanism pulls the rimmed 7.62×54mmR cartridges out from the back of the ammunition belt and drops the cartridges down into the feed way, allowing the bolt to strip and feed the cartridges into the chamber for firing. The breech is locked by a rotating bolt, with two locking lugs engaging locking recesses in the receiver. The gas piston is hinged to the bolt carrier assembly, and its vertical travel makes it possible to bend the group making machine gun assembly and disassembly for maintenance easier. The protruding rear part of the bolt carrier assembly features spiral shaped cuts, which provide a controlled rotation of the bolt. The mainspring is accommodated in the bolt carrier assembly slide channel. A cartridge extractor with a latch is mounted in the rear part of the bolt carrier assembly. The cocking lever, mounted on the right, is not integral with the bolt carrier and does not reciprocate as the gun fires. The machine gun fires from the rear sear. The gas cylinder is mounted under the barrel and fitted with a gas regulator with three fixed positions. The gas regulator opens corresponding holes to change the amount of expanding propellant gases bled off out of the gas cylinder into the atmosphere, thus varying the amount of energy transferred on to the long-stroke piston. The PK general-purpose machine gun U-shaped receiver is stamped from a smooth 1.5 mm (0.06 in) sheet of steel that is supported extensively by pins and rivets. For additional rigidity and strength the PK receiver features double walls made from 1.5 mm steel plates that are welded together with the U-shaped stamping. The receiver top cover is also stamped from 1.5 mm sheet metal and hinged on the front of the receiver and locked at the back with a spring-loaded latch.

FN MAG French 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **MAG 60.20:** Standard infantry version with pistol grip, fixed buttstock and bipod; Many subvariants including the T3 (L7A1) and T6 (L7A2)
- **MAG 60.30:** Fixed aircraft version, firing from a solenoid trigger; Capable, at least in some subvariants, of left and right hand feeding
- **MAG 60.40:** Coaxial version for armoured fighting vehicles; Many sub variants including the T3 (M240)

Primary Weapon System

Weapon System

↳*System*

Name: FN MAG, 7.62mm General Purpose Machine Gun
Type: mm7.62
Max Rate of Fire: rds/min650-1000
Weight: kg11.8
Length: mm1,263
Barrel Length: mm630
Width: mm118.7
Height: mm263
Effective Firing Range (Bipod): m800
Effective Firing Range (Tripod): m1,800
Maximum Firing Range: m3,500
Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt
Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Type: Rifle
Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea4,000

Maximum Firing Range: m3,500

Notes:

The FN MAG is a Belgian 7.62 mm general-purpose machine gun, designed in the early 1950s at Fabrique Nationale (FN) by Ernest Vervier. It has been used by more than 80 countries and it has been made under licence in several countries, including Argentina, Canada (as the C6 GPMG), Egypt, India and the United Kingdom. The weapon's name is an abbreviation for Mitrailleuse d'Appui Général, meaning "general support machine gun". The MAG is available in three primary versions: the standard, infantry Model 60-20 machine gun, the Model 60-40 coaxial machine gun for armoured fighting vehicles and the Model 60-30 aircraft variant. The MAG Model 60-20 is an automatic, air-cooled, gas-operated machine gun, firing belt-fed 7.62×51mm NATO from an open bolt. The MAG uses ignited powder gases vented through a port in the barrel to propel a gas piston rod connected to the locking assembly (it uses a long-stroke piston system). The barrel breech is locked with a vertically tilting, downward locking lever mechanism that is connected to the bolt carrier through an articulated joint. The locking shoulder and camming surfaces that guide the locking lever are located at the base of the receiver. The MAG uses a series of proven design concepts from other successful firearms, for example the locking mechanism is modeled on that of the Browning M1918 (BAR) automatic rifle, and the feed and trigger mechanisms are from the WWII-era MG 42 universal machine gun. The MAG fires from an open bolt. Both the spring-powered extractor and ejector are contained in the bolt. After firing, spent cartridge casings are removed through an ejection port located at the base of the receiver (a spring-loaded dust cover of the MG42 type covers the ejection port). The machine gun has a striker firing mechanism (the bolt carrier acts as the striker as it contains a channel that houses the firing pin, which protrudes out from the surface of the bolt upon firing), an automatic-only trigger assembly and a manual cross-bolt push-button safety, which is located above the pistol grip. With the safety placed in the safe setting, the sear mechanism is disabled. The safety can only be engaged with the weapon cocked. The weapon feeds from the left side from open-link, metal ammunition belts: either the American disintegrating M13 belt (NATO standard) or the segmented German DM1 belt, whose 50-round sections can be linked through a cartridge. In order to adapt the weapon to feed from one belt type to the other, several components of the feed mechanism need to be reconfigured since the position of the feed tray's cartridge stop and pawl angles in the top cover are different. The MAG features a pawl-type feeding mechanism that continues to move the feed link during both the rearward and forward cycles of the reciprocating bolt carrier, producing a smooth belt flow. The feeding mechanism's three pawls are actuated by a roller connected to the bolt carrier. The feed channel rail, feed link, both feed slides and the feed tray are chrome plated. The top cover body is an anodized aluminum casting. In the infantry assault role, the weapon can be fitted with a sheet metal container that houses a 50-round belt and is attached to the left side of the receiver. The quick-change barrel has a slotted flash suppressor. The barrel's chamber and bore are chromium-lined and the barrel has four right-hand grooves with a 305 mm (1:12 in) rifling twist rate. Also attached to the barrel is the front sight base, carry handle and gas block (equipped with an exhaust-type gas regulator valve with three settings). The barrel assembly weighs 3,050 g (6.72 lb) and of the 630 mm (24.80 in) long barrel a portion of 487.5 mm (19.19 in) is rifled. The MAG takes zero shifts between barrel assemblies into account by making the front sight of the assemblies adjustable with the help of tools. The machine gun is fitted with a folding bipod (attached to the end of the gas cylinder) that can be adjusted for height. For carrying or use as a forearm, the aluminum legs can be folded back and secured in slots under the receiver by hooks and a spring-loaded catch. When firing from the hip, the bipod legs remain extended and the left leg is gripped for support. The bipod can be removed from the gas cylinder by tapping-out a roll pin in the gas cylinder head until it is flush and the bipod can be rotated enough to clear the gas cylinder's retaining lugs. The MAG is also equipped with a fixed wooden stock, pistol grip, carrying handle and iron sights that consist of a forward blade (adjustable mechanically for both windage and elevation) and a folding leaf rear sight with an aperture in the down position for firing distances from 200 to 800 m (219 to 875 yd) in 100 m (109 yd) increments and an open U-notch for ranges from 800 to 1,800 m (875 to 1,969 yd) graduated every 100 m (109 yd). The rear sight is hinged to a base with protective ears that is integral with the receiver's upper forging. The iron sight line has a 848 mm (33.4 in) sight radius. The MAG's receiver is constructed from sheet metal stampings reinforced by steel plates and rivets. The front is reinforced to accept the barrel nut and gas cylinder which are permanently mounted. Guide rails that support the bolt assembly and piston extension during their reciprocating movement are riveted to the side plates. The bolt's guide rails are shaped downward to drive the locking lever into engagement with the locking shoulder, which is also riveted to the side plates. The rear of the receiver has been reinforced and slotted to accept the butt-stock. In the static machine gun role, the weapon is mounted on a tripod that offers a higher degree of accuracy and control than the bipod, for example the FN 360° tripod, which features an elevation adjustment mechanism that enables the weapon's bore axis to be maintained from 300 mm (11.8 in) to 600 mm (23.6 in), has a 30° to +15° elevation change and a 360° traverse range. When used in the anti aircraft role, the machine gun can increase the cyclic rate of fire from 650 up to 1,000 rpm by regulating a user adjustable gas valve.

FN MAG 58 Belgian 7.62mm General-Purpose Machine Gun







Tiers:



System

Alternate Designation: FN MAG 58
Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance
In Service: ?-Present
Caliber: 7.62 mm
Feed: Belt Feed
Effective Range: 800 m
Cyclic Rate of Fire: 750-1,000 Rounds per minute

Dimensions

Length: 1,231 mm
Barrel Length: 679 mm
Weight: 10.9 kg

Ammunition

Type: Rifle
Caliber: 7.72 mm
Cartridge: 7.62×51mm NATO

Notes:

The FN MAG 58 is a Belgian 7.62×51 mm NATO general-purpose machine gun manufactured by Fabrique Nationale (FN) by Ernest Vervier in the early 1950s and put into service in 1958. The firearm's name is an abbreviation for Mitrailleuse d'Appui

Général, meaning “general-purpose machine gun”. The MAG is available in three primary versions: the standard, infantry Model 60-20 machine gun, the Model 60-40 coaxial machine gun for armoured fighting vehicles and the Model 60-30 aircraft variant. The FN MAG 58 was used extensively by the IDF and is now gradually being phased out due to the increased use of the IWI Negev in 5.56×45 and 7.62×51 calibers. It can be used either as an Light Support Weapon (LSW) fired from the bipod, or be fired from a tripod in the extended range role. It can also be mounted on a tripod with a C2 sight and used in the sustained fire role. It is a fully automatic, belt-fed, air-cooled, gas-operated weapon, firing from the open bolt position, and is capable of a sustained high volume of fire. Stoppages can be easily and quickly remedied. The barrel is chromed internally to reduce wear. The ammunition belt is made up of disintegrating links; factory filled and packed in 500-round containers. The belts are normally fitted in the ratio of four ball rounds to one tracer round mix, although all-ball round belts are available. The maximum effective range of the GSMG MAG 58 in the LSW role is 800 metres.

M240 American 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **Note:** The manufacturer's name for the weapon is the MAG 58. The M240 adheres to FN MAG-58 specifications, allowing parts to be interchanged with other standard MAG-58s. This has significant advantages in training, logistics support, tactical versatility, and joint operations. For example, a US unit with attached British troops could supply replacement parts for the L7s, and vice versa.
- **M240, M240E1, and M240C:** The M240 is designed as coaxial machine gun for tanks and 7.62 mm fire power on light armored vehicles. The M240 is part of the secondary armament on the U.S. Army M1 series Abrams tank, M2/M3 series Bradley Fighting Vehicle, and the U.S. Marine Corps LAV-25. The M240E1 is the US Marine Corps version of the original M240 coaxial/pintle-mounted machine gun, that is used on vehicles, like the LAV-25. It can also be fitted with spade grips for flexible use, like the ones from the M240D. The M240C is the right hand variant on the original coaxial (installed alongside the main weapon) M240, it is identical to the M240 except for the ammunition cover and feed tray. It has a right-handed feed for use on the M2/M3 Bradley Fighting Vehicle and LAV as the coaxial machine gun. It is fed from the left on the M1 Abrams and other M1 variant (M1A1, M1A2, M1A2 SEP) tanks. The M240C uses a charging cable instead of a charging handle, has a cut-off pistol grip and has a special paddle assembly that allows the trigger to be actuated by means of a solenoid. Since the machine gun is not meant to be handled during use, the barrel is fully exposed and must be handled with asbestos mittens during barrel changes.
- **M240B:** The M240B (formerly called as the M240E4) is the standard infantry medium machine gun of the U.S. Marine Corps. The US Navy and Coast Guard likewise utilize the weapon system. It is also still used by some Army units. It comes configured for ground combat with a buttstock and bipod, though it can also be mounted on tripod, ground vehicles, aircraft, aboard ships and small boats. It is almost always referred to as an "M240 Bravo" or even just "240" verbally
- **M240D:** The M240D is an upgrade of the M240E1, primarily in the addition of an optical rail on the receiver cover. It has two possible configurations: aircraft and egress (ground). In the aircraft configuration, the M240D has a front and rear sight and a trigger group which accommodates the spade grip device, while the ground configuration involves the installation of an Egress Package or "infantry modification kit", which is designed to provide downed aircrew personnel with increased firepower. The Egress Package contains a buttstock assembly, a buffer assembly, a bipod assembly, and a conventional trigger assembly. The M240D is issued for aircraft configuration. The barrel assembly contains a three position gas plug. The first gas plug position allows the weapon to cycle at 650–750 rounds per minute (RPM), the second gas plug positions allows the weapon to fire at 750–850 rounds per minute (RPM), and the third gas plug position allows the weapon to fire at 850–950 rounds per minute (RPM). The aircraft configured M240D weighs 25.6 lb (11.6 kg) and is 42.3 in (1074.42 mm) long, while the egress configuration weighs 26.2 lb (11.9 kg) and is 49 in (1244.6 mm) long.
- **M240H:** The M240H (formerly designated as the M240E5) is an improvement of the M240D, the M240H features a rail-equipped feed cover, an improved flash suppressor, and has been configured so that it can be more quickly converted

to infantry standard using an Egress Kit. The M240H has an overall length of 41.6 in (1056.6 mm) with a 21.7 in (551.2 mm) barrel and weighs 26.3 pounds (11.9 kg) empty, and has a rate of fire of 550–650 rounds per minute (RPM). The M240H entered service in 2004 on U.S. Army helicopters. It is equipped with dual spade grips and thumb-activated trigger systems, and can be quickly converted for dismounted infantry use via an egress components kit that includes a bipod and conventional pistol grip trigger module.

- **M240N:** The M240N is designed with a front and rear sights, and configured specifically for mounting on water craft. It is similar to the M240G, but lacks the integral bipod. It also uses the hydraulic buffer of the M240B, and features the lower cyclic rate of fire of the M240B which is around 550–650 rounds per minute (RPM).
- **M240G:** The M240G allows for commonality throughout the Marine Corps whether the weapon is used in an infantry, vehicular, or airborne role. The M240G is the ground version of the original M240 or M240E1, 7.62 mm medium class weapon designed as a coaxial/pintle-mounted machine gun for tanks and LAVs. The M240G can be modified for ground use by the installation of an "infantry modification kit" (a flash suppressor, front sight, carrying handle for the barrel, a buttstock, infantry length pistol grip, bipod, and rear sight assembly). The M240G lacks a front heat guard, and as such is a few pounds lighter than the M240B, weighing in at 25.6 pounds (11.6 kg). The rate of fire of the M240G can be controlled by three gas settings. On gas setting one the weapon will fire at 650–750 rounds per minute, on gas setting two the weapon will fire at 750–850 rounds per minute, and on gas setting three the weapon will fire at 850–950 rounds per minute. The size of the gas port increases resulting in greater energy being delivered to the action. Use at high settings induces added stresses on the action and results in a shorter service life of the weapon. It gives the operator an ability to adjust the gas bleed to the action. This also allows the weapon to continue firing when very dirty from sustained use in combat conditions when it may be otherwise rendered inoperable due to an extremely dirty and dry action.
- **M240L:** The M240L (M240 Lima), formerly the M240E6 is the product of the M240B Weight Reduction Program which reduces the weight of the existing M240B by 5.5 pounds (2.5 kg). To achieve 18% weight savings, the M240L incorporates titanium construction and alternative manufacturing methods for fabricating major components. The resulting improvements reduced the soldier's combat load while allowing easier handling and movement of the weapon. The M240L may replace the M240B in U.S. Army service. It was type classified in the fourth quarter of fiscal year 2010. Titanium was used to make the receiver body, front sight post, and carrying handle while maintaining steel operating system components. Manufacture had to be adjusted because titanium takes longer to machine than steel and requires more frequent replacement of tooling bits; more pliable stainless steel rivets were used, and the receiver was coated with boron and chrome carbo-nitride coatings with a ceramic-based top coat to preserve it under extreme operating temperatures. The M240L weighs 22.3 lb (10.1 kg) with a standard-length barrel and standard stock, and weighs 21.8 lb (9.9 kg) with a shorter barrel and collapsible stock. The short barrel is 4 in (100 mm) shorter than a standard M240 barrel, and with the collapsible stock the M240L can be made 7 in (180 mm) shorter. The smaller and lighter variant of the M240L is the M240P, which is still in a testing phase in Afghanistan. The M240P is not used as often as its predecessors. The Army initially bought 4,500 M240Ls, and plans to buy 12,000 total.
- **Barrett 240LW:** The Barrett 240LW (Light Weight) program has its design roots in the original U.S. Army solicitation for a lighter M240 medium machine gun in 2010. The program called for a much lighter version of the M240, while keeping the same familiar open bolt design that the machine gun is world-renowned for. This was formally known as the M240B Weight Reduction Program, or the M240E6. The results of that solicitation ended with the adoption of the M240L by the U.S. Army. By producing the receiver out of titanium, instead of steel, FN delivered a light-weight solution by trimming the weight of the M240B by 5.5 pounds, or an 18 percent weight reduction of the original machine gun, giving it an overall weight of 22.3 pounds. The Lima is in limited service with the U.S. Army.
- **Barrett 240LWS:** The Barrett 240LWS (Light Weight Short) gas operated, belt fed, open bolt, medium machine gun is a shortened variant of the 240LW program. The design concept of this variant is to produce a viable medium machine gun that would serve in a special operations capacity, where a small team of operators could maximize a medium machine gun by having it in a shorter and lighter package than its big brother, the 240LW, or the equivalent M240B. This follows in the footsteps of the Mk 48 and the M60E6 medium machine guns, also designed for the small unit role. The Mk 48 is a variant of the M249 LMG, scaled up to chamber 7.62×51mm NATO; it has come across some issues in its service life; it was never designed to be a general-purpose machine gun, while the M60E6 arguably came too late to make a difference in USMC and US Army general machine gun adoption, being that the M240 design was well standardized within the DoD ranks. Both offerings are more focused on Special Operations in US Service.

System

Alternate Designation: M240
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: FN America U.S. Ordnance Barrett Firearms Manufacturing Colt Canada
In Service: 1977-Present

Length: 1,260 mm

Barrel Length: 630 mm

Width: 120 mm

Height: 260 mm

Weight: 27.6 lb (12.5 kg) (M240B) 25.6 lb (11.6 kg) (M240G) 22.3 lb (10.1 kg) (M240L)

Action: Gas-operated long-stroke piston, open bolt

Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM

Muzzle Velocity: 853 m/s

Maximum Firing Range: 3,725 m

Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)

Feed System: Belt-fed using M13 disintegrating links

Sights: Iron sights: front blade and folding rear leaf with aperture and notch

Ammunition

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Basic load: INA

Notes:

The M240, officially the Machine Gun, 7.62 mm, M240, is the US military designation for the FN MAG[5] (Mitrailleuse A Gaz, 'gas-operated machine gun'; alternatively, Mitrailleuse d'Appui General 'machine gun, support, general'), a family of belt-fed, gas-operated medium machine guns that chamber the 7.62×51mm NATO cartridge. The M240 has been used by the United States Armed Forces since the late 1970s. It is used extensively by infantry, most often in rifle companies, as well as on ground vehicles, watercraft and aircraft. Despite being heavier than some comparable weapons, it is highly regarded for reliability and its standardization among NATO members is a major advantage. All variants are fed from disintegrating belts and are capable of firing most types of 7.62 mm (.30/.308 cal) NATO ammunition. M240 variants can be converted to use non-disintegrating belts. There are significant differences in weight and some features among some versions which restrict interchangeability of parts. The M240s used by the US military are currently manufactured by FN America, the American subsidiary of FN Herstal. The M240B and M240G are usually fired from an integrated bipod, a tripod, or a vehicular mount; regarding tripod use, the U.S. Army primarily uses the M192 Lightweight Ground Mount, while the U.S. Marine Corps uses the M122A1 tripod, a slightly updated M2 tripod. Loading the M240 can be done either with the bolt forward or to the rear. If the bolt is to remain forward, the operator will then load the rounds into the feeding block (feed tray cover closed); or will open the feed tray cover, load the rounds onto the feeding tray, then close the feed tray cover. The charging handle will then be pulled to the rear, which locks the bolt to the rear. The weapon is then placed on safe and the charging handle is then placed back to the forward position (this is spring-loaded on the tank-mounted variation). The weapon is now ready for operation. The weapon fires from the open bolt position, meaning that the bolt is held to the rear and only moves forward as it is firing a round. The firing pin is static and the bolt moves around the firing pin, circumventing any need for a hammer. A sear is used to time the internal mechanisms of the weapon to provide a consistent rate of fire, ensuring proper function and accuracy. However, firing from an open bolt also provides the possibility of an accidental discharge due to a bolt override. This happens when there is enough force for the bolt to jump over the sear and fire without the trigger being pulled. The safety on the weapon cannot stop this from happening. The safest way to protect against this is to leave the bolt forward on the weapon until the operator is ready to fire the weapon; then charge the weapon and fire. Clearing the weapon is performed by ensuring that the bolt is locked to the rear and the weapon is on safe. The top cover is then lifted, the remaining belt (if any) is swept out of the feed tray, the feed tray is lifted to visually inspect the chamber and the face of the bolt. Any links or brass casings are removed. The weapon is now clear. In the extremely unlikely event that a live round is on the bolt face, it is knocked loose with a cleaning rod or another rigid object. If there is a live round lodged in the barrel, the operator must immediately decide if the barrel is hot enough that there is a chance of it cooking off. If there is, he will immediately move his face away from the opening of the weapon; and aiming the gun in a direction that is perceived to take the least amount of damage and/or casualties should the event of a cook-off occur.

He should then wait for the barrel to cool off before attempting to remove it. He can also attempt to extract the round by closing the cover, taking the weapon off of safe, and pulling the trigger. This will likely causing the weapon to fire, so care should be made in ensuring that the weapon is first pointed in a safe direction. The rate of fire may be controlled by three different gas regulator settings. The first setting allows the weapon to cycle at 650–750 rounds per minute, the second setting being 750–850 rounds per minute, and the third setting being 850–950 rounds per minute. These settings are changed by dismounting the barrel, removing the gas regulator collar and turning the gas regulator to allow more or less gas to move through the weapon system. It is generally performed only when necessary to return the gun to operation after fouling has caused sluggish operation and there is no time to properly clean the weapon. The barrels can be exchanged rapidly, thanks to a barrel release button located on the left side of the weapon. The weapon is cleared first and then the button is held down, while the barrel's carrying handle is moved from the right side of the weapon to the center, unlocking it from the receiver. At this point, the button is released and the barrel is then pulled free of the receiver and placed to the side. The new barrel is inserted into the receiver and then the carrying handle is shifted to the right, locking it into place. Headspace is set by counting the clicks as the barrel is locked down and should be between two and seven clicks. During prolonged firing, care must be taken to not allow exposed skin to come in contact with the weapon. The barrels can become hot enough to inflict second-degree burns instantly without becoming visibly different. These hot barrels glow brightly to anyone using any sort of optics sensitive to infrared radiation, such as night vision devices.

Heckler and Koch MG5 German 7.62mm General-Purpose Machine Gun



Tiers:



Variants:

- **MG5:** (Universal)
- **MG5 A2:** (Infantry)
- **MG5 A1:** (Mounted)
- **MG5 S:** (Special Forces)

Heckler & Koch MG5 7.62mm General-Purpose Machine Gun

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↳***System***

Name: Heckler & Koch MG5
Type: General-Purpose Machine Gun
Caliber: mm7.62
Manufacturer: Heckler & Koch
Length: 1,160 mm
Barrel Length: 550 mm
Height: 239 mm
Width: 120 mm
Weight: 11.20 kg
Action: Gas-operated, rotating bolt
Rate of Fire: 640/720/800 rounds/min
Muzzle Velocity: 840 m/s
Maximum Firing Range: 600–1,000 m
Effective Firing Range: 100–1,000 m
Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 1,250 rounds
Armor Penetration: INA

Notes:

The Heckler & Koch MG5 (in the development phase also known as the HK121) is a belt-fed 7.62×51mm NATO general-purpose machine gun manufactured by German firearm manufacturer Heckler & Koch. The MG5 resembles the 5.56×45mm NATO Heckler & Koch MG4 light machine gun, which was adopted into German military service in 2005.

PKTM Russian 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **PKS:** For heavier employment, the PKS ("PK Mounted") is based on the Samozhenkov 6T2 tripod mount. The PK and 6T2 tripod weigh 16.5 kg (36.38 lb).
- **PKM:**
- **PKMN:** The PKMN (ПКМ Ночной: "PKM Night-Vision") is a variant that can mount a night sight for low-visibility operations. The PKMN-1 can thus mount the multi-model NSPU-3 (1PN51) night vision scope while the PKMN-2 can mount the multi-model NSPUM (1PN58) night vision scope. It can also be fitted with the 1PN93 series passive night sights.
- **PKMS:** For heavier employment, the PKMS (ПКМ Станковый: "PKM Mounted") is mounted on the Stepanov 6T5 tripod mount. The PKM and 6T5 tripod weigh 12 kg (26.46 lb). The tripod mount, designed by L. V. Stepanov for the PKM machine gun entered service in 1969 and weighs 4.5 kg (9.92 lb). It is a lighter mount for the PK(M) general-purpose machine gun without affecting the accuracy of fire. Besides, the Stepanov mount has 20 fewer components than the preceding Samozhenkov tripod and is 40% less labour-intensive. The Stepanov mount is based on a principle of multi-functional components: the elevation mechanism frame is also used as a pole for kneeled shooting or anti-aircraft fire; the base sleeve also serves as the axis for attaching rear legs of the tripod: the machine gun attachment is combined with the elevation mechanism frame lock for anti-aircraft fire; the fine elevation adjustment mechanism is integrated with the elevation mechanism axis. The ammunition belt box can be secured to the right rear tripod leg. This enables one crew member to carry and operate the gun in combat without having to unload the gun before repositioning the gun.
- **PKMSN:** The PKMSN (ПКМС Ночной: "PKMS Night-Vision") is similarly to the PKMN a special model of the tripod-mounted variant that can mount night sights for low-visibility operations.
- **PKT:** The PKT (ПК Танковый, "PK Tank") (1968) is a solenoid-fired coaxial version of PK to replace the SGMT Goryunov vehicle-mounted machine gun. Modifications include the removal of the stock, a longer and heavier barrel, a gas regulator and an electric solenoid trigger. The PKT is usually fed from 250-round ammunition boxes. The PKT barrel assembly weighs 3.23 kg (7.1 lb) and can fire up to 500 rounds in rapid fire scenarios before it has to be replaced for another barrel or allowed to cool down to prevent unacceptable wear of the bore.
- **PKMT:** Modernized version of PKT.
- **PKB:** Version on which a set of spade grips replace the stock, for mounting on roofs of vehicles.
- **PKBM:** Modernized version of PKB.
- **PKP Pecheneg:** The PKP Pecheneg (6P41) (2001) is a further development and modification of the PKM. It has a heavy fixed barrel encased in a radial cooling sleeve that uses forced-air cooling, much like the Lewis Gun of World War I.

System

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↳*PKTM 7.62mm General-Purpose Machine Gun*

Name: PKTM

Type: General-Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Degtyaryov plant

Length: mm1098

Width: mm195

Height: mm170

Weight: 10.5 kg

Rate of Fire: 700-800 Rounds per minute

Muzzle Velocity: 850 ms

Maximum Firing Range: 4,000 m

Effective Firing Range: 1,500 m

Belt Capacity: 250 Rounds

Sights: Tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7,62x54R

Basic Load: INA

Notes:

The 7.62mm Kalashnikov modernized PKTM tank machine gun is an automatic weapon designed to engage enemy manpower and fire weapons. The machine gun is designed to equip tanks, armored vehicles, helicopters, armored boats and other war materiel. The PKTM can fire cartridges with conventional, armor-piercing incendiary, tracer and enhanced penetration bullets. Ammunition is fed from a metal belt stowed in a cartridge box.

PKT Russian 7.62mm General-Purpose Machine Gun





Tiers:



Variants:

- **PKS:** For heavier employment, the PKS ("PK Mounted") is based on the Samozhenkov 6T2 tripod mount. The PK and 6T2 tripod weigh 16.5 kg (36.38 lb).
- **PKM:** The PKM (ПК Модернизированный: "Kalashnikov's Machine-gun Modernized"), was adopted into service in 1969. The PKM is a modernized, product-improved version of the PK. The upgrades, primarily aimed at reducing the weight, simplifying production, and facilitating easier operation. The receiver cover became more rigid due to lengthwise ribs.
- **PKMN:** The PKMN (ПКМ Ночной: "PKM Night-Vision") is a variant that can mount a night sight for low-visibility operations. The PKMN-1 can thus mount the multi-model NSPU-3 (1PN51) night vision scope while the PKMN-2 can mount the multi-model NSPUM (1PN58) night vision scope. It can also be fitted with the 1PN93 series passive night sights.
- **PKMS:** For heavier employment, the PKMS (ПКМ Станковый: "PKM Mounted") is mounted on the Stepanov 6T5 tripod mount. The PKM and 6T5 tripod weigh 12 kg (26.46 lb)
- **PKMSN:** The PKMSN (ПКМС Ночной: "PKMS Night-Vision") is similarly to the PKMN a special model of the tripod-mounted variant that can mount night sights for low-visibility operations.
- **PKMT:** Modernized version of PKT
- **PKP Pecheneg:** The PKP Pecheneg (6P41) (2001) is a further development and modification of the PKM. It has a heavy fixed barrel encased in a radial cooling sleeve that uses forced-air cooling, much like the Lewis Gun of World War I.

Main Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: mm7.62mm
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds/min250-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Action: Gas-operated, open bolt
Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: km7.62×54mmR

Muzzle Velocity: m/s855

Muzzle Energy: J3,509

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳*Ammunition (Option 2)*

Name: 7N13 (AP)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s855

Muzzle Energy: J3,436

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳*Ammunition (Option 3)*

Name: 7BZ3 (API)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s834

Muzzle Energy: J3,613

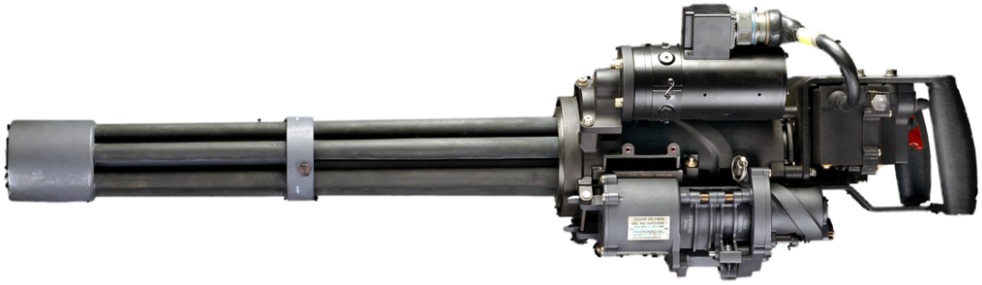
Basic Load: ea2,500

Accuracy of fire at 300 m: mm150

Notes:

The PKT (ПК Танковый, "PK Tank") (1968) is a solenoid-fired coaxial version of PK to replace the SGMT Goryunov vehicle-mounted machine gun. Modifications include the removal of the stock, a longer and heavier barrel, a gas regulator and an electric solenoid trigger. The PKT is usually fed from 250-round ammunition boxes. The PKT barrel assembly weighs 3.23 kg (7.1 lb) and can fire up to 500 rounds in rapid fire scenarios before it has to be replaced for another barrel or allowed to cool down to prevent unacceptable wear of the bore.

M134 Minigun American 7.62mm Six-Barrel Rotary Machine Gun







Tiers:



Variants:

- **XM134/M134:** 7.62×51mm NATO GE "Minigun" 6-barreled machine gun
- **GAU-2A/A:** GAU-2/A variant; unknown differences
- **GAU-2B/A:** GAU-2A/A variant; unknown differences
- **GAU-17/A:** GAU-2B/A variant; optimized for flexible use, uses either an MAU-201/A or MAU-56/A delinking feeder.
- **XM214 Microgun:** Scaled-down variant of the XM134 firing the 5.56×45mm NATO round.
- **XM196:** M134/GAU-2B/A variant; housing modified by addition of an ejection sprocket; for use in the XM53 armament subsystem on the AH-56 helicopter

System

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↳System

: M134 Minigun
Type: six-barrel rotary machine gun with a high, sustained rate of fire (2,000 to 6,000 rounds per minute).
Caliber: 7.63mm
Barrels: 6
Length: 801.6 mm
Barrel Length: 558.8 mm
Weight: 85 lb (39 kg) (41 lb (19 kg) lightweight mod.)
Action: Electrically driven rotary breech
Rate of Fire: Variable, 2,000–6,000 rpm
Muzzle Velocity: 2,800 ft/s (853 m/s)

Maximum Firing Range: 3,280 ft (1,000 m, 1,093 yd)

Feed System: Disintegrating M13 linked belt or linkless feed; dependent on installation [500-5,000-round belt]

Sights: Dependent on installation; no fixed sights

↳*Ammunition Weapon Station #3*

Name: INA

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Basic Load: INA

Notes:

The M134 Minigun is a 7.62×51mm NATO six-barrel rotary machine gun with a high, sustained rate of fire (2,000 to 6,000 rounds per minute). It features a Gatling-style rotating barrel assembly with an external power source, normally an electric motor. The "Mini" in the name is in comparison to larger-caliber designs that use a rotary barrel design, such as General Electric's earlier 20 mm M61 Vulcan, and "gun" for the use of rifle ammunition as opposed to autocannon shells. "Minigun" refers to a specific model of weapon that General Electric originally produced, but the term "minigun" has popularly come to refer to any externally powered rotary gun of rifle caliber. The term is sometimes used loosely to refer to guns of similar rates of fire and configuration, regardless of power source and caliber. The Minigun is used by several branches of the U.S. military. Versions are designated M134 and XM196 by the United States Army, and GAU-2/A and GAU-17/A by the U.S. Air Force and U.S. Navy. The basic minigun is a six-barrel, air-cooled, and electrically driven rotary machine gun. The electric drive rotates the weapon within its housing, with a rotating firing pin assembly and rotary chamber. The minigun multi-barrel design helps prevent overheating, but also serves other functions. Multiple barrels allow for a greater capacity for a high firing rate, since the serial process of firing, extraction, and loading is taking place in all barrels simultaneously. Thus, as one barrel fires, two others are in different stages of shell extraction and another three are being loaded. The minigun is composed of multiple closed-bolt rifle barrels arranged in a circular housing. The barrels are rotated by an external power source, usually electric, pneumatic, or hydraulic. Other rotating-barrel cannons are powered by the gas pressure or recoil energy of fired cartridges. A gas-operated variant, designated XM133, was also developed. While the weapon can feed from linked ammunition, it requires a delinking feeder to strip the links as the rounds are fed into the chambers. The original feeder unit was designated MAU-56/A, but has since been replaced by an improved MAU-201/A unit. The General Electric minigun is used in several branches of the U.S. military, under a number of designations. The basic fixed armament version was given the designation M134 by the United States Army, while the same weapon was designated GAU-2/A (on a fixed mount) and GAU-17/A (flexible mount) by the United States Air Force (USAF) and United States Navy (USN). The USAF minigun variant has three versions, while the US Army weapon appears to have incorporated several improvements without a change in designation. The M134D is an improved version of the M134 designed and manufactured by Dillon Aero, while Garwood Industries manufactures the M134G variant. Available sources show a relation between both M134 and GAU-2/A and M134 and GAU-2B/A. A separate variant, designated XM196, with an added ejection sprocket was developed specifically for the XM53 Armament Subsystem on the Lockheed AH-56 Cheyenne helicopter. Another variant was developed by the USAF specifically for flexible installations, beginning primarily with the Bell UH-1N Twin Huey helicopter, as the GAU-17/A. Produced by General Dynamics, this version has a slotted flash hider. The primary end users of the GAU-17/A have been the USN and the United States Marine Corps (USMC), which mount the gun as defensive armament on a number of helicopters and surface ships. GAU-17/As from helicopters were rushed into service for ships on pintle mountings taken from Mk16 20 mm guns for anti-swarm protection in the Gulf ahead of the 2003 Iraq War - 59 systems were installed in 30 days. The GAU-17/A is designated Mk 44 in the machine gun series and is generally known as the Mk 44 when installed on British warships. The weapon is part of both the A/A49E-11 armament system on the UH-1N; and of the A/A49E-13 armament subsystem on the USAF Sikorsky HH-60H Pave Hawk helicopter. The weapons on these systems feature a selectable fire rate of either 2,000 or 4,000 rpm. There is mention of a possible GAUSE-17 designation (GAU-Shipboard Equipment-17), in reference to the system when mounted on surface ships, though this would not follow the official ASETDS designation system's format.

Heckler and Koch HK21 German 7.62mm General-Purpose Machine Gun



Tiers:



Variants:

- **G8 and G8A1:** The German Army, German Navy and the Federal Police use a variant of the HK11 designated the Gewehr-8 (or G8). It is tapped for telescopic sights and has a quick-change barrel with a bipod that uses either a heavy match-grade bull-barrel or a heavy barrel for automatic fire. It was designed to use G3-type 10- or 20-round box magazines in the designated marksman role, but could also use a special 50-round drum magazine for sustained supporting or suppressing fire. The modified G8A1 adopted the improvements of the HK11A1 series and was only able to feed from magazines and drums.
- **GR-series:** The GR-series were "sanitized" (i.e., having no serial numbers or identifying marks) Heckler & Koch weapons used by special operations forces. They differed from the stock weapons in that they had optical sights, no provisions for iron sights, and came standard in Woodland (-C suffix) or Desert (-S suffix) camouflage. *GR-6 Automatic Rifle (HK13). *GR-9 Light Machinegun (HK23).
- **HK21A1:** In the early 1970s the HK21's design was simplified and the feed mechanism was modified. The machine gun's weight was increased, a carrying handle and a hooked butt stock with improved buffer mechanism were also added. The barrels were internally revised to polygonal rifling. Since then, the HK21 was offered in two main variants: the HK21A1 general-purpose machine gun (with a different belt feed mechanism) and the HK11A1 automatic rifle (optimized for magazine feed only). The HK11A1 proved more successful in export sales and was adopted by the Hellenic Army and several African and Asian armies. Both weapons, as in the original HK21, can be converted to chamber the 5.56×45mm NATO round by replacing the appropriate components.
- **HK21E:** During the 1980s both the HK21A1 and HK11A1 were modernized based on user and testing feedback, resulting in a new modular family of machine guns that share the same receiver, trigger group and interchangeable barrels and feed units, consisting of: *HK11E automatic rifle (magazine fed, chambered in 7.62×51mm NATO) *HK13E automatic rifle (magazine fed, chambered in 5.56×45mm NATO) *HK21E general-purpose machine gun (belt-fed, 7.62×51mm NATO), which is also license-built in Mexico for the armed forces *HK23E light machine gun (belt-fed, 5.56×45mm NATO).
- **HK25:** A heavy machine gun variant of the HK21 chambered in .50 BMG/12.7×99mm NATO was proposed but never went into production.
- **HK51B:** An aftermarket conversion of an HK21 general purpose machinegun into a belt-fed short carbine created by gunsmiths F. J. Vollmer & Company Inc. The barrel is 8.9 inches long, has an overall length of 21 inches, weighs about 11 lbs. unloaded, and has a rate of fire of 950 to 1,000 rounds per minute. Fixed barrel models have a "Tropical" MP5-style handguard with ventilation slots. Quick-change barrel models have a four-position Picatinny Rail handguard (usually used with a vertical foregrip). It feeds from a 100-round HK21 belt box and uses either the American M13 or German DM6 disintegrating link belt. Vollmer only made 30 guns, 2 of which had quick-change barrels.

System

Alternate Designation: HK21
Manufacturer: Heckler & Koch Fábrica de Braço de Prata SEDENA
In Service: 1961-Present
Length: 1,021 mm
Barrel Length: 450 mm

Weight: 7.92 kg

Action: Roller-delayed blow back, closed bolt

Rate of Fire: 900 rounds/min

Muzzle Velocity: 800 m/s

Effective Firing Range: 100–1,200 m

Feed System: M13, DM6, DM1 ammunition belt, 20-round detachable box or 50-round drum magazine (from the G3). An 80-round drum magazine or even a 100-round drum magazine was also available (No longer manufactured).

Sights: Rear rotary diopter drum; hooded front post

Ammunition

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: INA

Notes:

The HK21 is a German 7.62 mm general-purpose machine gun, developed in 1961 by small arms manufacturer Heckler & Koch and based on the G3 battle rifle. The weapon is in use with the armed forces of several Asian, African and Latin American countries. It was also license-manufactured by Fábrica de Braço de Prata in Portugal as the m/968 and in Mexico by SEDENA as the MG21. In the German military (Bundeswehr) and the federal police (Bundespolizei) it is designated "G8". The HK21 is a selective fire roller-delayed blowback-operated firearm with a semi-rigid locking mechanism designed to retard the rearward movement of the bolt. This delay was achieved by artificially increasing the inertia of the bolt by using an angular, interposed transmission system, installed symmetrically to the bore axis, with two cylindrical rollers acting as transmission elements against a movable locking piece which drives the heavy bolt carrier. The two-piece bolt assembly consists of a bolt head, which contains the aforementioned rollers, and a supporting locking piece and bolt carrier. During the "unlocking" sequence, the bolt head receives the recoil impulse from the ignited cartridge and exerts rearward pressure against the rollers, seated in recesses in the barrel extension. The rollers are driven inward against angled ramps of the barrel extension and interact with the wedge-shaped locking piece, projecting it backwards. Thus a chambering dependent (4:1 for 7.62×51mm NATO) or (3:1 for 5.56×51mm NATO) transmission ratio is maintained (as long as the rollers move on the inclined surfaces of the barrel extension and locking piece) of the bolt carrier and locking piece relative to the bolt head; the bolt head carrier travels backwards significantly faster than the bolt head, ensuring a safe drop of pressure within the barrel prior to extraction. Since extraction is carried-out under relatively high pressure, the barrel's chamber received a series of flutes designed to help free the bloated cartridge casing from the chamber wall. Like the G3 and HK33 assault rifle bolts the HK21 bolt features an anti-bounce mechanism that prevents the bolt from bouncing off the barrel's breech surface. The "bolt head locking lever" is a spring-loaded claw mounted on the bolt carrier that grabs the bolt head as the bolt carrier group goes into battery. The lever essentially ratchets into place with friction, providing enough resistance to being re-opened that the bolt carrier does not rebound. The spring-powered claw extractor is also contained inside the bolt while the lever ejector is located inside the trigger housing (actuated by the recoiling bolt).

Zastava M84 Yugoslavian 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **M84:** The M84 is intended for infantry use, and is derived from the Soviet PKM, however the M84 has the flash hider from the original PK.
- **M86:** The M86 is a clone of the PKT, and is designed to mount as a coaxial weapon on M-84 tanks and other combat vehicles. The stock, bipod, and iron sights are omitted from this version,

Main Weapon System

↳*System*

Name: Zastava M84
Type: General-purpose machine
Manufacturer: Zastava Arms
Length: mm1,175
Barrel Length: mm658
Diameter: INA
Action: Gas-operated (rotating bolt)
Rate of Fire: rds/min700-800
Effective Firing Range: m1,000
Feed System: Belt-fed with 100 and 250 round belts
Sights: Adjustable iron sights, optional mount required for optical sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea2,000

Notes:

The Zastava M84 is a general-purpose machine gun manufactured by Zastava Arms. It is a gas-operated, air-cooled, belt-fed and fully automatic shoulder-fired weapon. The M84 is a CLONE OF THE SOVIET PKM, the sole difference being in the stock, which is not hollow like the original and is made out of a different type of wood.

AA-52 French 7.62mm General-Purpose Machine Gun




Tiers:



Variants:

- **NF-1:** The AA-52 originally used the standard 7.5×54mm French cartridge. The general adoption of the 7.62×51mm NATO cartridge reduced the opportunity for export sales, and the gun was adapted for this standard NATO calibre.
- **MAC-58:** The MAC-58 was a version of the AA-52 chambered in .50 BMG. A few prototypes were tested and one retained for preserial production, but it never reached production due to the large quantity of US M2 Browning machine guns already in service with the French armed forces.

System

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↳*System*

Name: AA-52 machine gun
Type: General-purpose machine gun
Manufacturer: Manufacture d'armes de Saint-Étienne (MAS)
Caliber: 7.5mm or 7.62mm
Cartridge: 7.5×54mm French 7.62×51mm NATO
Action: Lever-delayed blowback
Rate of Fire: rds/min900
Muzzle Velocity: m/s830
Maximum Effective Firing Range: m600
Effective Firing Range: m3,200
Feed System: 50-round non-disintegrating belt
Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳*Ammunition*

Type: Rifle

Caliber: 7.5mm or 7.62mm

Cartridge: 7.5×54mm French 7.62×51mm NATO

Notes:

The AA-52 (full designation in French: Arme Automatique Transformable Modèle 1952, "Transformable automatic weapon model 1952") is one of the first French-produced guns of the post–World War II era. It was manufactured by the French government-owned Manufacture d'armes de Saint-Étienne (MAS) company. The AA-52 is still used today as a vehicle-mounted weapon due to large quantities in service, but has been replaced in the helicopter role by the Belgian FN MAG, starting with the EC 725 Caracal of the special operations units and the Air Force search and rescue teams. The AA-52 had been largely phased out for infantry use in favour of the lighter FN Minimi but remains in use. The AA-52 general-purpose machine gun was conceived and developed following the French military's experiences in the First Indochina War during the early 1950s. At that time, the French army was equipped with an assortment of weapons from British and American sources, as well as some German weapons from the Second World War. Effective supply of ammunition and replacement parts was an almost insoluble task and the army decided to adopt a standard machine gun. The result was the AA-52, conceived for ease of production. The construction is of simple welded stamped sheet steel. The AA-52 was partially withdrawn from the service of the French army in 2008. It was replaced in the 2010s by 10,881 FN MAG general-purpose machine guns. The AA-52 is a peculiar weapon among modern machine guns because it uses lever-delayed blowback operation, also seen in the FAMAS rifle, manufactured at the same factory. When firing, the pressure pushing the case head rearward initiates an impulse on a cam that sends the bolt carrier rearward. After a certain distance, a link (in this case the firing pin) pulls the bolt head, hence extracting the spent case. Since there is no primary extraction, the chamber is fluted to allow powder gases to flow back, unsticking the case from the wall chamber as with Heckler & Koch–type roller-delayed blowback weapons. The AA-52 can be used as a light machine gun with a bipod or as a heavy machine gun with a tripod. When used with a tripod for continuous fire, the gun is fitted with a heavier barrel. In the light machine gun configuration, the AA-52 is a relatively light weapon to carry. The AA-52 can be fired from the shoulder but this is slightly awkward because of the position of the handle, however the bipod can be used as a handguard when not in use. The barrel is changed by pressing a latch and rotating it a quarter of a turn. The APX(SOM) telescopic sight used on the MAS-49 and the FR-F1 sniper rifle can be mounted on the AA-52 as well as an infrared night sight.

MG3 German 7.62mm General-Support Machine Gun



Tiers:



Variants:

- **MG 1:** Rheinmetall variant of the MG 42, most notably rechambered to fire 7.62×51mm NATO.
- **MG 1A1 (MG 42/58):** As MG 1, but with sights properly calibrated for the new round. Sights refitted to existing MG 1s.
- **MG 1A2 (MG 42/59):** MG 1A1 variant; product improved with longer ejection port, heavy bolt and friction ring buffer.
- **MG 1A3:** MG 1A2 variant; product improvement of all major components.
- **MG 1A4:** MG 1 variant; for fixed mount armor use.
- **MG 1A5:** MG 1A3 variant; MG1A3s converted to MG1A4 standard.
- **MG 2:** Designation for all wartime MG 42s rechambered to 7.62×51mm NATO.
- **MG 3:** MG 1A3 variant; product improved with AA rear sight.
- **MG 3E:** MG 3 variant; reduced weight model (roughly 1.3 kg lighter), entered into late 1970s NATO small arms trials.
- **MG 3A1:** MG 3 variant; for fixed mount armor use.
- **MG 3KWS:** MG 3 variant; developed by Rheinmetall and Tactics Group as a stand in until the HK121 replaces it.[
- **MG 42/59:** Italian variant produced by Beretta, Whitehead Motofides and Franchi, since 1959, Chambered in 7.62×51mm NATO. The bolt weight was increased to 1,200 g (42.33 oz)) for a reduced 800 rounds per minute cyclic rate of fire. Used mainly mounted on vehicles and has largely been phased out by the M249 SAW.
- **Ksp m/94:** Swedish variant chambered with the 7.62×51mm NATO round. Mainly used as secondary armament in Stridsvagn 122.

System

:

↳ ***System***

Name: MG3
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: Rheinmetall License-built by: Beretta, MKEK, Ellinika Amyntika Systimata, Defense Industries Organization, Military Industry Corporation, Pakistan Ordnance Factories, General Dynamics Santa Bárbara Sistemas
Length: 1,225 mm (48.2 in) 1,097 mm (43.2 in) (without stock)
Barrel Length: 565 mm
Weight: 11.5 kg (25.35 lb) 27.5 kg (61 lb) (mounted on tripod)
Action: Recoil-operated, roller locked
Rate of Fire: 1,000–1,300 rpm
Muzzle Velocity: 820 m/s

Maximum Firing Range: 600 m (1,969 ft) (bipod) 1,200 m (3,937 ft) (tripod mounted) 3,000 m (9,843 ft) (gun carriage) 3,750 m (12,303 ft) (terminal
Effective Firing Range: 200–1,200 m sight adjustments
Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt
Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 1,000 rounds

Notes:

The MG 3 is a German general-purpose machine gun chambered for the 7.62×51mm NATO cartridge. The weapon's design is derived from the World War II era MG 42 universal machine gun that fired the 7.92×57mm Mauser round. The MG 3 was standardized in the late 1950s and adopted into service with the newly formed Bundeswehr, where it continues to serve to this day as a squad support weapon and a vehicle-mounted machine gun. The weapon and its derivatives have also been acquired by the armed forces of over 30 countries. Production rights to the machine gun were purchased by Italy (MG 42/59), Spain, Pakistan (MG 1A3), Greece, Iran, Sudan and Turkey. The German military instructs sustained fire must be avoided at all costs. In the bipod mounted light machine gun role MG 3 users are trained to fire short bursts of 3 to 5 rounds and strive to optimize their aim between bursts fired in succession. In the tripod mounted medium machine gun role MG 3 users are trained to fire short bursts and bursts of 20 to 30 rounds and strive to optimize their aim between bursts fired in succession. After around 150 rounds of rapid fire, the gun operator will open a side hatch (leading to the barrel) and replace the hot barrel with a new cool(er) one. Non-observance of this technical limitation renders the barrel prematurely unusable. The machine gun crew member responsible for a hot barrel change is issued protective asbestos gloves or a cloth to prevent burns to the hands. The MG 3 is an automatic, air-cooled, belt-fed short recoil-operated firearm. It features a roller locked bolt mechanism that consists of the bolt head, a pair of rollers, the striker sleeve, bolt body and return spring. The bolt is locked securely by a wedge-shaped striker sleeve, which forces two cylindrical rollers contained in the bolt head outward, and into corresponding recesses in the extension of the breech of the barrel. On firing, both the barrel and barrel extension recoil to the rear. The resulting impact (much like a Newton's cradle) moves the carrier to the rear withdrawing the wedge and both rollers as they are cammed inward and out of their sockets by fixed cams, unlocking the bolt head. The bolt carrier and bolt then continue to the rear together guided by fixed guides while the barrel and barrel extension return to battery. Upon return of the bolt forward, the impact of the rollers against the camming surfaces on the breech carry the rollers from their seats, and, together with the surfaces on the striker sleeve, force the rollers outward, locking the bolt head into the barrel extension and ensuring a complete lock. The bolt also houses a spring-loaded casing extractor and ejector. Ejection is carried out when the ejector strikes the buffer head, sending a push forward through the ejector bar, which hits the ejector pin. This pin pushes the top of the base of the cartridge, which is still held by the extractor at the base, causing the empty casing to rotate and eject downward through the ejection chute. The machine gun has an automatic-only trigger mechanism and a cross-bolt safety in the form of a button that is operated by the shooting hand (in its "safe" position the bolt release is disabled). The weapon fires from an open bolt. The cyclic rate can be altered by installing different bolts and recoil springs. A heavier bolt uses more recoil energy to overcome inertia, thus slowing the action. On MG 3 machine guns, two types of bolts are available, with standard weight (about 650 g (22.93 oz)) for the standard 1,000–1,300 rounds per minute cyclic rate of fire and with extra weight (about 900 g (31.75 oz)) for a slower 800–950 rounds per minute cyclic rate of fire. Those bolts also are used along with different return springs. The MG 3 feeds from the left side through a feed block using metal, 50-round continuous-link Patronengurt DM1 ammunition belts (which can be combined by cartridge) or disintegrating-link M13 or DM6 belts. In the light machine gun role, the MG 3 is deployed with a 100-round (or 120-round in case of disintegrating belts) belt fitted inside a synthetic ammunition drum developed by Heckler & Koch that is latched on to the left side of the receiver. The rear wall of the drum is transparent and serves as a visual indicator for the amount of ammunition available. The feed system operates through a feed arm that is housed in the feed cover. Two feed pawls are linked to the front end of the arm by an intermediate link and move in opposite directions, moving the belt in two stages as the bolt moves back and forward during firing. For the light machine gun role the MG3 is equipped with a synthetic polymer stock and a folding bipod.

Type 80 Chinese General-Purpose Machine Gun



Tiers:



Variants:

- **Type 86:** Type 86 - A machine gun only used for tanks as a secondary weapon
- **CF06:** An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition. A study on creating the CF06 started with an evaluation from July to December 2006 with a prototype review on February 2007. Production started from April to May 2007 before the CF06 was officially formalized in January 2008. It's equipped with polymer furniture instead of the wooden furniture used in the original Type 80. The barrel life consist of 25,000 rounds, with 12,500 rounds for each one of two barrels supplied
- **BD-14:** BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license.

System

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↳*System*

Name: Type 80
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: Norinco
Length: 1,192 mm
Barrel Length: 658 mm
Weight: 12.6 kg
Action: Gas-operated, open bolt
Rate of Fire: 700–800 round/min
Muzzle Velocity: 840 m/s
Effective Firing Range: 100—1,500 m sight adjustments
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500 rds

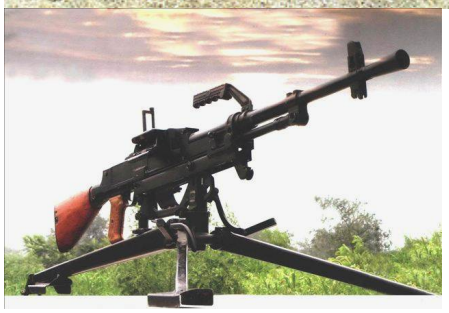
Notes:

he Type 80 (Chinese: 80□□□□□) is a general-purpose machine gun manufactured by Norinco in China, based on the Soviet PKM. The machine gun was certified for design finalisation in 1980 and entered the PLA service in the mid-1980s, specifically in 1983. The Type 80 was intended as a successor to the Chinese independently developed Type 67, doing well in tests conducted in the Chengdu Military Region before it was dropped and instead, opted to keep the Type 67 GPMG in use. Only a few Type 80s were used in the People's Liberation Army Marine Corps and airborne units, and a modified Type 80, named as Type 86, was then accepted by PLA armor units. The development of the GPMG started when Chinese firearms engineers studied PKMs that were captured from Vietnamese forces during the Sino-Vietnamese War. The Type 80 chambers and fires the 7.62×54mmR round. It is a gas-operated, air-cooled, belt-fed, fully automatic firearm. It can fire on both the tripod and the foldable bipod on the gas tube below the barrel. Belts are used from 100-round boxes in the light machine gun configurations, and from 200- or 250-round boxes in tripod-mounted applications. The machine gun uses an open iron sight, but can also be fitted with an optical or night-vision sight.

Type 67 Chinese 7.62mm General-Purpose Machine Gun







Tiers:

1 2 3 **4**

System

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↳*System*

Name: Type 67
Type: General-Purpose Machine Gun
Caliber: 7.62mm
Manufacturer: China North Industries Corporation
Length: 1,650 mm
Barrel Length: 605 mm
Weight: 11 kg
Action: Gas-operated, tilting breechblock
Rate of Fire: 650-700 rounds/min
Effective Firing Range: 800-1000 m
Feed System: 100/250-round belt
Sights: Rear leaf sight, forward post

↳*Ammunition*

Type: Rifle
Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500

Notes:

The Type 67 is a machine gun of Chinese origin. It was designed in the 1960's to replace the local production models of the SG-43 and SGM. Western and East Bloc nations moved to 7.62mm general purpose machine guns on the squad level. The Chinese prefered to use the Type 67 from the bipod and to use the lighter RPD as the squad level machine gun. The Type 67 can be considered a mixture of various proven machine gun designs. The gas regulator is derived from the RPD, the trigger mechanism from the DPM, the feed mechanism from the Maxim, the bolt and piston from the ZB-26 and the barrel change system from the SG-43. The Type 67 is a conventional belt fed weapon that is gas operated and uses a tilting block for locking. In order to allow for a high volume of fire the Type 67 fires from the open bolt position and has a quick change barrel mechanism. A bipos is fitted onto the gas system. Normally a low profile tripod is used. The Type 67 fires the 7.62x54mm Russian round at a cyclic rate of fire of 650 rpm. The thick quick change barrel allows for a large volume of fire. When fitted onto a tripod 250 round belts are used. In the infantry role 50 or 100 round belts most common. Reportedly the maximum effective range is 800 meters on the tripod and 600 meters from the bipod.

M60D American 7.62mm General-Purpose Machine Gun






Tiers:



Variants:

- **M60:** The basic model, type-classified in 1957.
- **M60E1:** An improved variant that did not enter production. The primary difference was the handle fixed to the barrel and the removal of the gas cylinder and bipod from the barrel assembly.
- **M60E2:** Used in vehicles as a coaxial machine gun; electrically fired.
- **M60B:** Used in helicopters in the 1960s and 1970s; unmounted.
- **M60C:** Used in fixed mounts in aircraft in the 1960s and 1970s; electrically fired and hydraulically charged.
- **M60D:** Replaced the M60B; a pintle-mounted variant used especially in armament subsystem for helicopters, but also some other roles.
- **M60E3:** An updated, lightweight variant adopted in the 1980s.
- **M60E4 (Mk 43 Mod 0/1):** An improved variant of the 1990s that looks similar to the M60E3, but has many improvements. It has sub variants of its own, and is also used by the U.S. Navy (as the Mk 43 Mod 0/1). The Mk 43 Mod 1 is a specialized variant with additions such as extra rails for mounting accessories.
- **M60E6:** A lightened and improved variant of the M60E4.

System

:

↳System

Name: M60D
Type: 7.62mm
Caliber: General-Purpose Machine Gun
Manufacturer: Saco Defense U.S. Ordnance
Length: 1,105 mm
Barrel Length: 560 mm
Weight: 10.5 kg

Action: Gas-operated, short-stroke gas piston, open bolt

Rate of Fire: 550–650 RPM

Muzzle Velocity: 853 m/s

Effective Firing Range: 1,100 m

Feed System: Disintegrating belt with M13 Links

Sights: Iron sights

Note: The M60D is a mounted variant of the standard M60. It can be mounted on boats, vehicles and as a pintle-mounted door gun in helicopters. When used in aircraft, it differs from the M60C in that it is not controlled by the pilot—rather, it is mounted in a door and operated by a member of the crew. Like the rest of the M60 family, it is an air-cooled, gas-operated, belt-fed weapon. Unlike other models, however, the M60D normally has spade grips and an aircraft ring-type sight or similar, as well as an improved ammunition feed system. A canvas bag is also affixed to the gun to capture ejected casings and links, preventing them from being sucked into the rotor blades or into an engine intake. The M60D was equipped on the UH-1B Huey (using the M23, XM29, M59, and the Sagami mounts), the CH-47 Chinook (using the M24 and M41 mounts) in both door and ramp locations, the ACH-47A "Guns-A-Go-Go" variant of the Chinook (using the XM32 and XM33 mounts), and on the UH-60 Black Hawk (using the M144 mount). The M60D is also used by the British on Royal Air Force Chinooks. In US service, the M60D has been primarily replaced by the M240H. The M60D is still manufactured by U.S. Ordnance and still used on the SH-60 Seahawk.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 3,000 Rounds Each

Notes:

The M60D is a mounted variant of the standard M60. It can be mounted on boats, vehicles and as a pintle-mounted door gun in helicopters. When used in aircraft, it differs from the M60C in that it is not controlled by the pilot—rather, it is mounted in a door and operated by a member of the crew. Like the rest of the M60 family, it is an air-cooled, gas-operated, belt-fed weapon. Unlike other models, however, the M60D normally has spade grips and an aircraft ring-type sight or similar, as well as an improved ammunition feed system. A canvas bag is also affixed to the gun to capture ejected casings and links, preventing them from being sucked into the rotor blades or into an engine intake. The M60D was equipped on the UH-1B Huey (using the M23, XM29, M59, and the Sagami mounts), the CH-47 Chinook (using the M24 and M41 mounts) in both door and ramp locations, the ACH-47A "Guns-A-Go-Go" variant of the Chinook (using the XM32 and XM33 mounts), and on the UH-60 Black Hawk (using the M144 mount). The M60D is also used by the British on Royal Air Force Chinooks. In US service, the M60D has been primarily replaced by the M240H. The M60D is still manufactured by U.S. Ordnance and still used on the SH-60 Seahawk. The M60 is a belt-fed machine gun that fires the 7.62×51mm NATO cartridge (similar to .308 Winchester), which is commonly used in larger rifles. It is generally used as a crew-served weapon and operated by a team of two or three individuals. The team consists of the gunner, the assistant gunner (AG), and the ammunition bearer. The gun's weight and the amount of ammunition it can consume when fired make it difficult for a single soldier to carry and operate. The gunner carries the weapon and, depending on his strength and stamina, anywhere from 200 to 1,000 rounds of ammunition. The assistant carries a spare barrel and extra ammunition, and reloads and spots targets for the gunner. The ammunition bearer carries additional ammunition and the tripod with associated traversing and elevation mechanism, if issued, and fetches more ammunition as needed during firing. The M60 can be accurately fired at short ranges from the shoulder thanks to its design. This was an initial requirement for the design and a hold-over in concept from the M1918 Browning Automatic Rifle. It may also be fired from the integral bipod, M122 tripod, and some other mounts. M60 ammunition comes in a cloth bandolier containing a cardboard box of 100 pre-linked rounds. The M60 uses the M13 ammunition link, a change from the older M1 link system with which it was not compatible. The cloth bandolier is reinforced to allow it to be hung from the current version of the feed tray. Historically, units in Vietnam used B3A cans from C-rations packs locked into the ammunition box attachment system to roll the ammunition belts over for a straighter and smoother feed to the loading port to enhance reliability of feed. The later models changed the ammunition box attachment point and made this adaptation unnecessary. The M60 has been adopted by various military agencies around the world, it also has been updated and modernized throughout the years to meet modern military requirements.

M60 American 7.62mm General-Purpose Machine Gun





Tiers:



Variants:

- **M60:** The basic model, type-classified in 1957.
- **M60E1:** An improved variant that did not enter production. The primary difference was the handle fixed to the barrel and the removal of the gas cylinder and bipod from the barrel assembly.
- **M60E2:** Used in vehicles as a coaxial machine gun; electrically fired.
- **M60B:** Used in helicopters in the 1960s and 1970s; unmounted.
- **M60C:** Used in fixed mounts in aircraft in the 1960s and 1970s; electrically fired and hydraulically charged.
- **M60D:** Replaced the M60B; a pintle-mounted variant used especially in armament subsystem for helicopters, but also some other roles.
- **M60E3:** An updated, lightweight variant adopted in the 1980s.
- **M60E4 (Mk 43 Mod 0/1):** An improved variant of the 1990s that looks similar to the M60E3, but has many improvements. It has sub variants of its own, and is also used by the U.S. Navy (as the Mk 43 Mod 0/1). The Mk 43 Mod 1 is a specialized variant with additions such as extra rails for mounting accessories.
- **M60E6:** A lightened and improved variant of the M60E4.

M60D 7.62mm General-Purpose Machine Gun

↳*System*

Name: M60
Type: 7.62mm
Caliber: General-Purpose Machine Gun
Manufacturer: Saco Defense U.S. Ordnance
Proliferation: Widely Proliferated
In Service: 1957-Present
Length: 1,105 mm
Barrel Length: 560 mm
Weight: 10.5 kg
Action: Gas-operated, short-stroke gas piston, open bolt
Rate of Fire: 550–650 RPM
Muzzle Velocity: 853 m/s
Effective Firing Range: 1,100 m

Feed System: Disintegrating belt with M13 Links
Sights: Iron sights
Note: The M60D is a mounted variant of the standard M60. It can be mounted on boats, vehicles and as a pintle-mounted door gun in helicopters. When used in aircraft, it differs from the M60C in that it is not controlled by the pilot—rather, it is mounted in a door and operated by a member of the crew. Like the rest of the M60 family, it is an air-cooled, gas-operated, belt-fed weapon. Unlike other models, however, the M60D normally has spade grips and an aircraft ring-type sight or similar, as well as an improved ammunition feed system. A canvas bag is also affixed to the gun to capture ejected casings and links, preventing them from being sucked into the rotor blades or into an engine intake. The M60D was equipped on the UH-1B Huey (using the M23, XM29, M59, and the Sagami mounts), the CH-47 Chinook (using the M24 and M41 mounts) in both door and ramp locations, the ACH-47A "Guns-A-Go-Go" variant of the Chinook (using the XM32 and XM33 mounts), and on the UH-60 Black Hawk (using the M144 mount). The M60D is also used by the British on Royal Air Force Chinooks. In US service, the M60D has been primarily replaced by the M240H. The M60D is still manufactured by U.S. Ordnance and still used on the SH-60 Seahawk.

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 3,000 Rounds Each

Notes:

The initial variant was officially adopted by the U.S. Army in the late 1950s, though at this time it was only intended for the infantry. It was known as the T161 before it was adopted (specifically the T161E3), and was chosen over the competing T52 during testing in the 1950s.They both used a similar feed and were both gas-operated, but the T161 was easier to produce and its different internals performed better. The model that won the competition was the T161E3. The model was type-classified in 1957, and entered production. It saw its first heavy use in the 1960s. The basic design has undergone some smaller changes, and has been produced by different manufacturers. The M60 is a belt-fed machine gun that fires the 7.62×51mm NATO cartridge (similar to .308 Winchester), which is commonly used in larger rifles. It is generally used as a crew-served weapon and operated by a team of two or three individuals. The team consists of the gunner, the assistant gunner (AG), and the ammunition bearer. The gun's weight and the amount of ammunition it can consume when fired make it difficult for a single soldier to carry and operate. The gunner carries the weapon and, depending on his strength and stamina, anywhere from 200 to 1,000 rounds of ammunition. The assistant carries a spare barrel and extra ammunition, and reloads and spots targets for the gunner. The ammunition bearer carries additional ammunition and the tripod with associated traversing and elevation mechanism, if issued, and fetches more ammunition as needed during firing. The M60 can be accurately fired at short ranges from the shoulder thanks to its design. This was an initial requirement for the design and a hold-over in concept from the M1918 Browning Automatic Rifle. It may also be fired from the integral bipod, M122 tripod, and some other mounts. M60 ammunition comes in a cloth bandolier containing a cardboard box of 100 pre-linked rounds. The M60 uses the M13 ammunition link, a change from the older M1 link system with which it was not compatible. The cloth bandolier is reinforced to allow it to be hung from the current version of the feed tray. Historically, units in Vietnam used B3A cans from C-rations packs locked into the ammunition box attachment system to roll the ammunition belts over for a straighter and smoother feed to the loading port to enhance reliability of feed. The later models changed the ammunition box attachment point and made this adaptation unnecessary. The M60 has been adopted by various military agencies around the world, it also has been updated and modernized throughout the years to meet modern military requirements.

PKP Pecheneg Russian 7.62mm General-Purpose Machine Gun







Tiers:



Variants:

- **PKP Pecheneg-N:** The PKP Pecheneg-N is similar to the PKP Pecheneg but features a mounting rail for night vision sights.
- **PKP Pecheneg-SP:** The Pecheneg-SP is an improved variant of the PKP Pecheneg, and its GRAU index is 6P69. It has two main versions; a standard version and a special forces version. Titanium is now used for its construction. It was also reported that it now features a Picatinny rail for mounting the 1P89-3 unified optical sight and other optical sights, a telescopic folding stock and at the request of the Russian military, an additional tactical handle for the convenience when firing. According to the manufacturers, during transportation the gun can be folded, making it 30 mm (3 cm) shorter than the regular Kalashnikov rifle. It uses a shortened barrel and a suppressor for noiseless and flameless fire. Its serial production started in February 2017.
- **Pecheneg Bullpup:** The Pecheneg Bullpup is a bullpup conversion of the PKP Pecheneg developed by the Degtyarev plant

System

↳*System*

Name: PKP Pecheneg 7.62mm General Purpose Machine Gun
Type: General Purpose Machine Gun
Manufacturer: TsNIITochMash
Weight (without Bipod): kg8.2
Weight (with Bipod): kg8.7
Weight (with an Infantry Tripod Mount): kg12.7
Length (Total): mm1,3200
Barrel Length: mm658
Action: Gas Operated

Rate of Fire: rds/min600-800

Effective Firing Range: m1,500

Feed System: Belt feed: 100-, 200-, 250-round

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s900

Basic Load: ea1,000

Notes:

The PKP Pecheneg is a Russian 7.62×54mmR general-purpose machine gun[6]. It is a further development and modification of the PK machine gun. It is said to be more accurate than all its predecessors due to a heavier, non-removable, forced-air-cooled barrel with radial cooling ribs and a handle which eliminates the haze effect from hot gases and keeps the barrel cooler, making the weapon more reliable. A steel jacket encloses the barrel to and runs up to the muzzle similarly to the Lewis machine gun provide forced air cooling. Low pressure created at the front of the jacket during firing draws cool air into the jacket through oval windows at the rear of the jacket. Furthermore, the weapon is capable of having a telescopic sight or other sights mounted on it, which increases its accuracy and effective range. According to the manufacturer the PKP Pecheneg can fire 600 rounds in rapid fire scenarios without damaging the barrel. When conducting a long fire fight, it can fire up to 10,000 rounds of ammunition per hour without degrading the combat characteristics and reducing the life of the barrel. In general, the PKP Pecheneg retained up to 80% parts commonality with the PKM. Constant forced cooling of the barrel reduces dispersion when firing, and also increases the durability of the barrel. The service life of the barrel is estimated at 25,000 to 30,000 rounds. The GRAU index of the PKP Pecheneg is 6P41 or 6P41N (PKP Pecheneg-N) when fitted with a mounting rail for a night vision sight. It is currently in use by Russian Army Spetsnaz and other troops in significant numbers. Even though it was developed mainly for infantry use, it also has been fitted to several light vehicles.

→Flamethrowers

M202 FLASH American 66mm Rocket Launcher Flamethrowers





Tiers:



System

Alternate Designation(s): M202 FLASH (FLame Assault SHoulder)
Primary Function / Type: Flamethrower
Manufacturer: INA
Cartridge: M235 Incendiary TPA
Caliber: mm66
Action: Single shot (each rocket has its own firing pin)
Muzzle Velocity: m/s114
Maximum Firing Range: 820 yd (750 m) (area target) 219 yd (200 m) (point target)
Effective Firing Range: m20
Feed System: 4 Rocket Clip
Sights: Reflex

Dimensions

Length, Extended: mm883
Length, Closed: mm686
Weight, Empty: kg5.22
Weight, Loaded: kg12.07

Notes:

The United States stopped using flamethrowers in 1979, not necessarily because of the horror the weapons inflict, but more because of they were deemed less effective in modern combat. Not long after the United States stopped using flamethrowers, Geneva passed standards on military use of flamethrowers in December 1983, with the Convention on Certain Conventional Weapons. One of the main shifts was that it banned use of the weapons in areas near concentrations of civilians. The M202 FLASH (FLame Assault SHoulder) is an American rocket launcher, designed to replace the World War II–vintage flamethrowers (such as the M1 and the M2) that remained the military's standard incendiary devices well into the 1960s. The XM202 prototype launcher was tested in the Vietnam War, as part of the XM191 system. The M202A1 features four tubes that can load 66 mm incendiary rockets. The M74 rockets are equipped with M235 warheads, containing approximately 1.34 pounds (0.61 kg) of an incendiary agent. The substance, often mistaken for napalm, is in fact TPA (thickened pyrophoric agent). TPA is

triethylaluminum (TEA) thickened with polyisobutylene. TEA, an organometallic compound, is pyrophoric and burns spontaneously at temperatures of 1600 °C (2912 °F) when exposed to air. It burns "white hot" because of the aluminum, much hotter than gasoline or napalm. The light and heat emission is very intense and can produce skin burns from some (close) distance without direct contact with the flame, by thermal radiation alone. The M202 was designed to share its 66mm caliber with the contemporary M72 LAW antitank rocket launcher, to allow it to be used as an antitank launcher. While HEAT rounds were trialled with the XM191 launcher under the designation XM78, no HEAT clips were ever manufactured for the M202. Similarly, a crowd control agent round using CS gas, the XM96, was trialled, but never entered service. The weapon is meant to be fired from the right shoulder, and can be fired from either a standing, crouching, or prone position. It is loaded with a clip which holds a set of four rockets together, which is inserted into the rear of the launcher and can be pushed past the launching position to enable the launcher to be carried while loaded more easily.

RPO-A Shmel Russian 93mm Man-Portable Rocket-Propelled Flamethrower







Tiers:



Variants:

- **Shmel-M/PDM-A Priz:** This is a reusable upgrade system adopted in the Russian Army in 2003 to replace the disposable RPO-A. It Includes a reusable mini- grip-stock launcher, with a reflex sight and pistol grip. Disposable canisters (with munitions) slide on and serve as the launcher tubes. The Shmel-M is more powerful (50 % more blast = 152/155-mm cannon round) and lighter in weight than RPO-A. Range is 800m, 300m direct fire. Specifications are: caliber 90 mm, length 940 mm, weight 8.8 kg for 2. In time other canister fills (e.g., smoke and incendiary) will be available. Standard issue (2 grenades per launcher) is more compact than 2 RPO-A launchers.
- **PF-97:** Chinese licensed copy of RPO-A, with optical sight mounted on some launchers.

System

Alternative Designation: Shmel (Bumblebee). Although “RPO” may be used generically to describe various infantry flame weapons, RPO- A is this specific multi-role flame weapon system.

Components : Container, ejection motor, warhead.

Crew : ea1.0

Quantity, Weapons in a Package: ea2.0

Rate of Fire : rd/min2.0

Reaction Time, Travel to Fire : sec30.0

↳*Dimensions*

Length : Launcher: 920 mm Rocket: 700mm

Weight: kg11

Ammunition

Fire from Inside Building: Yes. It can be fired in enclosures of 60m3 or greater or with a barrier behind the weapon.

↳*Ammunition (Option 1)*

Name: RPO-A

Type: Thermobaric-flammable mixture

Cailber/Length : mm93.0

Burn Temperation : deg C800+

Casualty Area : m250 m2(personnel in the open); 80 m3 (enclosed space)

Lightly armored materiel kill probability at 400 m : 0.7

Weight, Mixture: kg2.1

Notes: The RPO-A is known as the infantryman's pocket artillery because the demolition effect corresponds to 122-mm HE artillery, and 120-mm mortar projectile. It can buckle armor, penetrate rubber seals and enter openings in vehicles, injure or kill personnel, and collapse roofs and doors on bunkers and buildings.

↳*Ammunition (Option 2)*

Name: RPO-D

Type: Smoke-Incendiary Type, Based on red phosphorous.

Smokescreen Depth and Height : mINA

Smokescreen Duration : min3-5

Smokescreen Effective Against: Visual and infrared

Smokescreen Length : m55-90

Smokescreen Time of Formation : min2.0

Weight : kg2.3

↳*Ammunition (Option 3)*

Name: RPO-Z

Type: Incendiary

Weight, Mixture: kg2.5

↳*Ammunition (Option 4)*

Name: Shmel-M

Type: Thermobaric

Accuracy: m .5 m2 at 200 m

Combat Load : rds2 per launcher

Direct Fire : Direct Fire: 200 with iron sight, 850 with optical sight

Indirect Fire: 1000.0

Minimum : 20.0

Muzzle Velocity : m/s125.0

Range : mRange

Range, Effective : m600.0

Sights

Name: OPO-1

Type: Optical calibrated to 600 m

Location: Left, next to grip

Magnification: None

↳***Night Sight***

Available: INA

Notes:

The RPO-A Shmel (Russian: реактивный пехотный огнемёт-А Шмель (РПО-А Шмель), Rocket-propelled Infantry Flamethrower-A Bumblebee) is a man-portable disposable rocket launcher, although it is classified as a flamethrower by its manufacturer KBP. The Shmel is designed, produced and exported by the Russian Federation and previously by the Soviet Union. It entered service with the Soviet Armed Forces at the end of the 1980s as the successor for the RPO Rys. The RPO-A is a single-shot, self-contained tube shaped launcher that operates much like some RPG and LAW rocket launchers, a sealed tube, carried in a man-pack in pairs. The same person can remove the tube, place it in firing position, and launch the weapon without assistance. After launch, the tube is discarded. All models are externally similar. Each weapon contains a single rocket, of which there are three varieties. The basic rocket is the RPO-A, which has a thermobaric warhead and is designed for attacking soft targets under moderate cover. The RPO-Z is the incendiary warhead (Rus. зажигательный / Zazhigatel'nyy, Incendiary) designed to spread fire and ignite targets. There is a smoke-producing warhead (Rus. дымовой / Dymovoy, Smoke) offered, the RPO-D.

TOS-1 Buratino Russian 220mm Heavy Flamethrower System




Tiers:



Variants:

- **TOS-1A Solntsepek:** TOS-1A is the latest variant of the original heavy flamethrower system. It was accepted to service with the Russian Army in 2001. The BM-1 launch vehicle uses longer 220-mm rockets. Also a number of launching tubes was reduced from 30 to 24. New launching tubes are longer in comparison with the previous system. Maximum range of fire was increased to 6 000 m. This heavy flamethrower is supported by a new TZM-T reloading vehicle. It carries two units for 12 rockets each. A crane is mounted between these units. Reloading vehicle also carries 400 liters of fuel for the launch vehicle.
- **TZM-T:** INA

System

Alternative Designation: TOS-1 Buratino

Manufacturer: Omsk Transmash Design Bureau

In Service: 1988-Present

Type: 220mm Heavy Flamethrower System

Family: TOS

Crew: ea3

Chassis: Modified T-72 main battle tank chassis

Displacement Time: minINA

Emplacement Time: minINA

Dimensions

Length: m9.53

Width: m3.37

Height: m3.23

Weight, Combat: tons42

Ground Pressure: kg/mINA

Automotive

Chassis: Modified T-72 main battle tank chassis

Engine Name: V-84-1

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h45

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fuel Capacity: liters1,200

Oil Capacity: liters76

Starter Generator: SG-10-1S that can generate 10 kW of energy as a power generator or 19 kW of energy (26 hp) as an auxiliary starter motor.

Communications

Primary: R-173 short-wave radio

Secondary: R-168 series of digital radio

Launcher

↳*System*

Name: TOS 1 Launcher

Type: Heavy flamethrower system

Number of Tubes: ea30

Rate of Fire: 30 rounds/15 s

Time to Fire all 30 Rockets: seconds7.5

Effective Firing Range: m500–3,500

Full Salvo Flamethrower System Area of Destruction: m200-400

Note: The launcher itself has six tubes in its top row and three rows of eight below it.

↳*Ammunition*

Name: MO-1.01.04

Type: Flamethrower 220mm Rocket

Caliber: mm220

Muzzle Velocity: m/sINA

Rocket Length: m3.3
Rocket Weight: kg173
Maximum Effective Range: km3.5
Basic Load: INA
Warhead Type: Thermobaric warhead (MO.1.01.04.01)
Fuze Type: MRV-U1 impact fuze
Engine: Solid propellant rocket motor (MO.1.01.04.02)
Temperature at Peak of the Explosion: 3,700 °C
Note #1: A thermobaric warhead is a derivative of a fuel air explosive, both of which are known as volumetric explosives.
Note # 2: A further effect of thermobaric weapons is the consumption of oxygen in the target area.

Fire Control

Name: INA
Computerized FCS: Yes, A Modern Fire Control System
Direct Fire: No
Indirect Fire: Yes
Time to Identify a Target and Fire: seconds90
Driver's Periscope: TNPO-168V periscope
Driver's Night Vision: TVNE-4B, an electro-optic binocular, and periscopic heated sight.

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogeneous Armor (RHA)
Turret Armor: mmSteel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogeneous Armor (RHA)
Applique Armor: Available, Turret top and track skirts
Explosive Reactive Armor: Yes, Kontakt-5
Active Protection System: Yes, ZETS11-3 control panel
Mine Clearing: Yes, Roller and plow (optional)
Self-Entrenching Blade: Yes
NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM)
Smoke Equipment: Yes, Grenade launcher 8x; VESS and The TOS-1 can create a smoke screen by injecting fuel into the exhaust and this effect can be employed for no more than 10 minutes, using 10 litres of fuel per minute when in use.
Note: The TOS-1 is based on a T-72 hull, which is understood to carry the same level of protection as the standard T-72 MBT

Notes:

The TOS-1 heavy flamethrower system is intended for direct fire support of advancing infantry and main battle tanks, and moves in their combat orders. It is designed to engage military personnel, fortifications and light armored vehicles. The heavy flamethrower system is generally similar to multiple launch rocket systems, however fires different types of rockets and has shorter firing range. The TOS-1 was developed in the early 1980s and was successfully used by the Soviet Army in Afghanistan and later by the Russian forces in Chechnya. It is nicknamed the 'Buratino'. It seems that the original TOS-1 heavy

flamethrower system was used only for trials and evaluation. It seems that it was never produced in quantity. Also the TOS-1 was never exported. The systems are designed to conduct fire support missions closer to the front line than is typically the case for multiple launch rocket systems such as the BM-21 Grad.

Handflammpatrone DM34 German Single-Shot Disposable Incendiary Weapon







Tiers:



System

Alternate Designation(s): Handflammpatrone DM34; HAFLA-35L

Primary Function / Type: Incendiary Weapon

Manufacturer: Buck KG

Caliber: mm35

Effective Firing Range: 8–90 meters

Incendiary Composition: Red Phosphorus

Packing: HAFLAs per pouch: 51 HALFAs per crate.

Dimensions

Length: mm445

Weight, Total: grams625

Weight of Composition: grams240

Notes:

The Handflammpatrone DM34 Cartridge Launcher model HAFLA-35L ("hand-held flame-cartridge") was a single-shot, disposable incendiary weapon issued to the German Armed Forces from 1976 to 2001. Manufactured by Buck KG. An earlier version HAFLA-35 had been in service from 1965. The weapon consisted of three compressed sections of incendiary red phosphorus contained in a projectile with a time fuse and bursting / scattering charge. The cartridge was held in an aluminium launch tube, externally reinforced with pasteboard. A pivotal handgrip with safety button, a primer and initial propelling charge are at one end of this tube, the other end with the cartridge being sealed with a plastic cover, making a watertight unit. The firing mechanism is locked until the safety button is pressed and the handle unfolded, an act that exposes the trigger and releases a safety mechanism. When the trigger is pulled the primer ignites the initial propelling charge, setting the red phosphorus round in motion. Immediately a second propelling charge at the back of the cartridge accelerates the round out of the tube and also sets fire to a delay fuse. The round would either shatter on hard contact by kinetic energy alone after travelling 8 m spreading

the incendiary content 5 to 8 metres (in this case scattering charge does not explode), or if fired into the air over enemy dispositions, the cartridge would be burst by a scattering charge after 1.3 seconds of flight, the scattering charge being ignited by the timed fuse. (this represents forward travel of 70-80 m). The heat of the bursting charge and friction through the air changes the red phosphorus to white phosphorus which then self ignites as it spreads. When burst in flight the fuel spreads across an area approximately 10 m wide and 15 m long and burns at 1,300 °C. The incendiary charge will burn for two minutes. Also produced by PRB in Belgium as the CALID NR 179 red phosphorus. There was a practice version of the HAFLA . It had the same dimensions and weight as the HAFLA-35L but had an inert filling of lime and a smoke marker to indicate the point of impact.

TOS-1A Solntsepek Russian 220mm Heavy Flamethrower System





Tiers:



Variants:

- **TOS-1 Buratino:** TOS-1, Heavy Flamethrower System) is a Soviet 220mm 30-barrel (original system, Ob.634 or TOS-1M) or 24-barrel (Ob.634B or TOS-1A) multiple rocket launcher and thermobaric weapon mounted on a T-72 tank chassis. TOS-1 was designed for defeating enemy personnel in fortifications, in open country, and in lightly armoured vehicles and transport. First combat tests took place in 1988–1989 in the Panjshir Valley during the Soviet–Afghan War. The TOS-1 was shown for the first time in public in 1999 in Omsk.

System

Alternative Designation: TOS-1A Solntsepek
Manufacturer: Omsk Transmash Design Bureau
In Service: 2011-Present
Type: 220mm Heavy Flamethrower System
Family: TOS
Crew: ea3
Chassis: Modified T-72 main battle tank chassis
Displacement Time: minINA
Emplacement Time: minINA

Dimensions

Length: m7.24
Width: m3.58
Height: m3.07

Weight, Combat: tons44.3

Ground Pressure: kg/mINA

Automotive

Chassis: Modified T-92 main battle tank chassis

Engine Name: V-84M

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h45

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fuel Capacity: liters1,200

Oil Capacity: liters76

Starter Generator: SG-10-1S that can generate 10 kW of energy as a power generator or 19 kW of energy (26 hp) as an auxiliary starter motor.

Communications

Primary: R-173 short-wave radio

Secondary: R-168 series of digital radio

Launcher

↳*System*

Name: TOS 1A Launcher

Type: Heavy flamethrower system

Number of Tubes: ea24

Time to Fire One Singe Rocket: seconds12

Time to Fire Rocket Pair: seconds6

Effective Firing Range: m500–3,500

Suppression Area: 40,000 m2

Note: The launcher itself has six tubes in its top row and three rows of eight below it.

Ammunition (Option 1)

Name: MO-1.01.04M

Type: Flamethrower 220mm Rocket

Caliber: mm220

Muzzle Velocity: INA

Rocket Length: m3.7

Rocket Weight: kg217

Maximum Effective Range: km6

Minimum Effective Range: m600

Basic Load: 24 total 220mm Projectiles

Warhead Type: Thermobaric warhead (MO.1.01.04.01)

Fuze Type: MRV-U1 impact fuze

Engine: Solid propellant rocket motor (MO.1.01.04.02)

Temperature at Peak of the Explosion: 3,700 °C

Note #1: A thermobaric warhead is a derivative of a fuel air explosive, both of which are known as volumetric explosives.

Note # 2: A further effect of thermobaric weapons is the consumption of oxygen in the target area.

↳*Ammunition (Option 2)*

Name: MO.1.01.04M.OP

Type: Incendiary rocket

Caliber: mm220

Muzzle Velocity: INA

Rocket Length: 3.7

Rocket Weight: kg204

Maximum Effective Range: km6

Minimum Effective Range: m600

Basic Load: 24 total 220 mm Projectiles

Warhead Type: Incendiary

Warhead Index Code: MO-1.01.04M.01.02.

Fuze Type: INA

Engine: Solid propellant rocket motor (MO.1.01.04.02)

Fire Control

Name: INA

Computerized FCS: Yes, A Modern Fire Control System

↳

Direct Fire: Yes

Indirect Fire: Yes

Time to Identify a Target and Fire: seconds90

Commander's Day/Night Observation Device: TKN-3A

Driver's Periscope: TNPO-168V periscope

Driver's Night Vision: TVNE-4B, an electro-optic binocular, and periscopic heated sight.

Ballistic Computer: Yes

Laser Rangefinder: Yes

Combined Sight and Rangefinder: 1D14 t

1D14 t Sight/Rangefinder Accuracy: m10

Roll and Pitch Sensing Device: PB2.329.04

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogeneous Armor (RHA)

Turret Armor: mmSteel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogeneous Armor (RHA)

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor: Yes, Kontakt-5

Active Protection System: Yes, ZETS11-3 control panel

Mine Clearing: Yes, Roller and plow (optional)

Self-Entrenching Blade: Yes

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM)

Smoke Equipment: Yes, Grenade launcher 8x; VESS and The TOS-1 can create a smoke screen by injecting fuel into the exhaust and this effect can be employed for no more than 10 minutes, using 10 litres of fuel per minute when in use.

Note: The TOS-1A is based on a T-90 hull, which is understood to carry the same level of protection as the standard T-90 MBT

Notes:

The TOS-1A is Russian-made Heavy flamethrower system which is designed for fire support of infantry and tanks, defeating enemy personnel at unconcealed environment and under the shelter in various kinds of offensive and defensive combat action, and also for incapacitation of light armored transport and vehicles. TOS-1A is used in combat formation of supported forces from unconcealed and concealed positions. The TOS-1A is designed and manufactured by the Russian Defence Company JSC of Uralvagonzavod. The TOS-1A is in service with the Russian armed forces. Heavy flamethrower system TOS-1A is an effective mean of thermobaric and volume-detonating ammunition. It can fire unguided 220mm 30-barrel or 24-barrel incendiary rocket and thermobaric weapon mounted on a tracked main battle tank chassis. High accuracy calculation of firing angle for unguided rockets allocates targets of the impact point on the area in a way that makes it possible to cover a target densely at 6 seconds of full salvo duration at the maximum range of 6,000 m. It allows suppressing enemy active actions for a long time period at considerable areas and 100% destruction of unconcealed enemy personnel at the area of 40,000 square meters. The maximum action effect of unguided missiles in thermobaric equipment could be reached in mountainous area because of blast wave mutual apposition and their multiple reflections from surrounding rocks, causing of ground taluses, stone blockages. High accuracy of salvo fire at the target area is provided by target direct sighting (aiming) of the launcher, automatic aiming at the fire range of up to 6,000 m. Ammunition consists of 72 missiles, 24 of which are based at TOS-1A and 48 at reloader vehicle TZM-T. Chassis of tanks of T-80, T-90 type could be used as the basic chassis.The systems are designed to conduct fire support missions closer to the front line than is typically the case for multiple launch rocket systems such as the BM-21 Grad.

→Grenade Launchers

GP-25 Kostyor (Bonfire) Russian 40mm Under-Barrel Grenade Launcher





Tiers:



Variants:

- **BG-15, GP-25: (see NOTES):**

System

Alternative Designation: BG- 15 Mukha GP-25 Koster, GP- 30 Obuvka

Specifications

Empty Weight (kg): 1.5

Loaded Weight (kg): 1.79

Length (mm): 323

Barrel Length (mm): 205

Rate of Fire (rd/min): 4-5

Operation: N/A

Feed: Muzzle-loaded

Fire Mode: Single-shot

Accuracy @ 400 m (Distance): 6.7

Accuracy @ 400 m (Deflection): 3

Components: Barrel (w/ mounting bracket and sight), trigger assembly

Sights

Type: Front post and rear open U-notched

Location: Left side of mounting bracket

Sighting Range (m): Graduated out to 400

Ammunition

40-mm caseless grenade: Frag-HE (impact) Frag-HE (bounding) Smoke Tear gas

Combat Load: 10 rounds

↳*VOG-25*

Caliber/length: 40x102-mm

Type: Frag-HE with impact fuze

Round Weight (kg): .250

Explosive Weight (kg): .048

Maximum Range (m): 400

Minimum Range (m): 10-40 (arms itself)

Casualty Radius (m): 6; (90% @ 10)

Self-destruct Time (sec): 14–19

Muzzle Velocity (m/s): 76

↳*VOG-25P*

Caliber/length: 40x122-mm

Type: Bounding Frag-HE, explodes .5 to 1.5 m from impact

Round Weight (kg): .278

Explosive Weight (kg): .037

Maximum Range (m): 400

Minimum Range (m): 10-40 (arms itself)

Casualty Radius (m): 6; (90% @ 10)

Self-destruct Time (sec): 14–19

Muzzle Velocity (m/s): 75

↳*GRD-40*

Caliber/length: 40x150-mm

Type: Smoke

Effective Against: Visual and infrared

Weight (g): 260

Smoke Screening Range (m): 50, 100, 200

Smoke Screen Dispersion (m): 1 sec 10x10x10 2 sec 20x20x20 3 sec 25x25x25

Smoke Screen Duration @ wind speed of 3-5 m/s: At least 60 sec

Muzzle Velocity (m/s): 70-75

↳*Gvozd*

Description: (“Nail”) tear gas grenade

Notes:

The GP-25 Kostyor ("Bonfire"), GP-30 Obuvka ("Footwear") and GP-34 are a family of Russian 40 mm under-barrel grenade launchers (Granatomyot Podstvolnyj) for the AK family of assault rifles. They were first seen by the west in 1984 during the Soviet Invasion of Afghanistan. The GP-30 was lightened and the redesigned sighting system was moved to the right. The current Izhmash-made version, the GP-34, has an again redesigned sighting system on the right and features the following advantages: Reliability: It is designed and tested specifically for the Kalashnikov assault rifles, fits such assault rifles directly without any adaptors or forearm dismantling. Improved safety: The design prevents a round from moving within or falling out of the barrel, even if the muzzle is pointed down. The GP-34 features an additional mechanism (firing pin safety lever) to improve safety during loading.

MK 19 American 40mm Grenade Launcher





Tiers:



Variants:

- **Mk 19A:** The Mk 19A is a man-portable crew-served weapon that can fire from a tripod-mounted position or from a vehicle mount, with the latter being the preferred method, as the weapon alone weighs 77.6 pounds (35.2 kg). The primary ammunition for it is the high-explosive dual-purpose M430 grenade. On impact, the grenade can kill anyone within a radius of five meters, and wound them within a radius of 15 meters. It can also punch through 2 inches (5.1 cm) of rolled homogeneous armor with a direct hit (0-degree obliquity), which means it can penetrate most infantry fighting vehicles and armored personnel carriers. It is especially effective when used against enemy infantry formations. The ammunition comes in cans that hold a 32- or 48-grenade belt weighing 42 and 60 pounds (19 and 27 kg), respectively. Due to its low recoil and comparatively light weight, it has been adapted for use on many different platforms, including small attack boats, fast attack vehicles such as the Humvee (HMMWV), AAV and Stryker, military jeeps, and a large variety of naval mounts.

System

:	
:	
:	

↳***Mk 19 Grenade Launcher***

Name: Mk 19 Grenade Launcher
Type: Grenade Launcher
In Service: 1968-Present
Manufacturer: Saco Defense Industries (now a division of General Dynamics Ordnance and Tactical Systems), Combined Service Forces, MKEK
Length: 1,090 mm
Barrel Length: 413 mm
Width: 240.4 mm
Height: 199 mm
Weight: 35.2 kg (empty without accessories)
Action: Blowback (Advanced primer ignition)
Rate of Fire: 360–390 rpm (cyclic) 40 rpm (sustained) 60 rpm (rapid)

Muzzle Velocity: 750–790 feet per second (230–240 m/s) (average)

Effective Firing Range: 1,500 m

Maximum Firing Range: 2,212 m

Feed System: 32- or 48-grenade belt

↳*Ammunition, Weapon Station #2*

Cartridge: 40×53 mm

Caliber: 40mm

Basic Load: INA

Notes:

The Mk 19 grenade launcher (pronounced Mark 19) is an American 40 mm belt-fed automatic grenade launcher that was first developed during the Vietnam War. The first model (Mod 0) in 1966 was determined to be unreliable and unsafe, but a total of six Mod 1 launchers were successfully tested on U.S. Navy riverine patrol craft in the Mekong Delta in 1972. The Navy made further improvements to the weapon, resulting in the Mod 3 in 1976. The Mod 3 was adopted by the U.S. Army in 1983 and remains in service to the present day. The Mk 19 is a belt-fed, blowback-operated, air-cooled, crew-served, fully automatic weapon that is designed not to cook off. It fires 40 mm grenades at a cyclic rate of 325 to 375 rounds per minute, giving a practical rate of fire of 60 rounds per minute (rapid) and 40 rounds per minute (sustained). The weapon operates on the blowback principle, which uses the chamber pressure from each fired round to load and re-cock the weapon. The Mk 19 can launch its grenade at a maximum distance of 2,212 meters (2,419 yd), though its effective range to a point target is about 1,500 meters (1,600 yd), since the large rear leaf sight is only graduated as far. The nearest safe distance to launch the grenade is 310 meters in training and 75 meters in combat. Though the Mk 19 has a flash suppressor, it serves only to save the eyesight of its operator, not concealing the weapon's position. For night operation, a picatinny rail quadrant sight can be added for thermal and night vision optics. The Mk 19A is a man-portable crew-served weapon that can fire from a tripod-mounted position or from a vehicle mount, with the latter being the preferred method, as the weapon alone weighs 77.6 pounds (35.2 kg). The primary ammunition for it is the high-explosive dual-purpose M430 grenade. On impact, the grenade can kill anyone within a radius of five meters, and wound them within a radius of 15 meters. It can also punch through 2 inches (5.1 cm) of rolled homogeneous armor with a direct hit (0-degree obliquity), which means it can penetrate most infantry fighting vehicles and armored personnel carriers. It is especially effective when used against enemy infantry formations. The ammunition comes in cans that hold a 32- or 48-grenade belt weighing 42 and 60 pounds (19 and 27 kg), respectively. Due to its low recoil and comparatively light weight, it has been adapted for use on many different platforms, including small attack boats, fast attack vehicles such as the Humvee (HMMWV), AAV and Stryker, military jeeps, and a large variety of naval mounts. The Mk 19 automatic grenade launcher replaced the earlier Mk 18 hand-cranked multiple grenade launcher. The 40 mm ammunition used (40×53 mm) is not interchangeable with that used in the M203 (40×46 mm). The M203 ammunition develops a lower chamber pressure, and resultant lower muzzle velocity and range, compared to ammunition loaded for the Mk 19. The Mk 19 fires from an open bolt. The rounds are mechanically fed onto the bolt face with the pull of the charging handles. When the trigger is pressed, the bolt closes, and the firing pin is released. The recoil blows back the bolt, feeds a new round onto the bolt face, which pushes the expended casing off the bolt face. Production of the Mk 19 is managed by Saco Defense Industries (now a division of General Dynamics Ordnance and Tactical Systems). In November 2014, General Dynamics entered into an agreement with Advanced Material Engineering Pte Ltd, a subsidiary of Singapore Technologies Kinetics, to manufacture 40 mm high-velocity air burst ammunition for the U.S. military. The 40 mm air burst grenade uses a programmable, time-based fuse that computes and programs the detonation time into it, which counts down once fired to zero to detonate at the intended target point. The airburst ammunition is compatible with the Mk 19, which would give it greater effectiveness and lethality, particularly against concealed and defilade targets. The U.S. Army plans to introduce several new features to the Mk 19 in an upgrade package that could be introduced by late 2017. Initiatives include: increased muzzle velocity through a less resistant barrel; increased cyclic rate from an improved profile for the vertical cam to reduce the force needed to charge the weapon; enhancing reliability with a redesigned round-positioning block to decrease the chance of misfires; increased durability and shortened re-assembly time after maintenance from a new cocking cam and lever; and an updated mechanical sight utilizing up-to-date ammunition ballistic data to aid accuracy.

GP-30 Obuvka (Footwear) Russian 40mm Under-Barrel Grenade Launcher



Tiers:



Variants:

- **BG-15, GP-25: (see NOTES):**

System

Alternative Designation: BG- 15 Mukha; GP-25 Koster, GP- 30 Obuvka

Sights

Type: Front post and rear open U-notched

Location: Left side of mounting bracket

Sighting Range (m): Graduated out to 400

Specifications

Empty Weight (kg): 1.5

Loaded Weight (kg): 1.79

Length (mm): 323

Barrel Length (mm): 205

Rate of Fire (rd/min): 4-5

Operation: N/A

Feed: Muzzle-loaded

Fire Mode: Single-shot

Accuracy @ 400 m (Distance): 6.7

Accuracy @ 400 m (Deflection): 3

Components: Barrel (w/ mounting bracket and sight), trigger assembly

Ammunition

40-mm caseless grenade: Frag-HE (impact) Frag-HE (bounding) Smoke Tear gas

Combat Load: 10 rounds

Note: The grenade launchers fire a series of special 40 mm grenades. Originally, the main grenade was the VOG-15 (7P17) fragmentation grenade. This was superseded by the steel-cased VOG-25 fragmentation grenade. The VOG-25 has a lethal radius of six meters. Rounds for the muzzle-loaded GP-25 consist of a single piece containing both propellant and warhead, unlike the more traditional two piece casing-and-projectile design of the comparable American 40x46mm round used in breech-loaded grenade launchers, such as the M203. A bouncing grenade, the VOG-25P, is also available. On impact, a small charge in the nose of the grenade is detonated; this raises the grenade 0.5 to 1.5 m in the air, before an impact delay fuse detonates it. The VOG-25P also has a lethal radius of six meters. New generation rounds VOG-M and VOG-PM with an increased effectiveness not less than 1.5 times are now serially available. Smoke grenades are also available. The original GRD-40 grenade has been replaced by a series of grenades designed for use at different ranges. These are the GRD-50, GRD-100 and GRD-200 for use at 50, 100 and 200 meters respectively. They are capable of producing a 20 square meter cloud of smoke that lasts for one minute in winds of up to five meters per second. A CS gas grenade called the Gvozd ("Nail") and a baton grenade are also available.

↳*VOG-25*

Caliber/length: 40x102-mm

Type: Frag-HE with impact fuze

Round Weight (kg): .250

Explosive Weight (kg): .048

Maximum Range (m): 400

Minimum Range (m): 10-40 (arms itself)

Casualty Radius (m): 6; (90% @ 10)

Self-destruct Time (sec): 14–19

Muzzle Velocity (m/s): 76

↳*VOG-25P*

Caliber/length: 40x122-mm

Type: Bounding Frag-HE, explodes .5 to 1.5 m from impact

Round Weight (kg): .278

Explosive Weight (kg): .037

Maximum Range (m): 400

Minimum Range (m): 10-40 (arms itself)

Casualty Radius (m): 6; (90% @ 10)

Self-destruct Time (sec): 14–19

Muzzle Velocity (m/s): 75

↳*GRD-40*

Caliber/length: 40x150-mm

Type: Smoke

Effective Against: Visual and infrared

Weight (g): 260

Smoke Screening Range (m): 50, 100, 200

Smoke Screen Dispersion (m): 1 sec 10x10x10 2 sec 20x20x20 3 sec 25x25x25

Smoke Screen Duration @ wind speed of 3-5 m/s: At least 60 sec

Muzzle Velocity (m/s): 70-75

↳***Gvozd***

Description: (“Nail”) tear gas grenade

Notes:

The GP-25 Kostyor ("Bonfire"), GP-30 Obuvka ("Footwear") and GP-34 are a family of Russian 40 mm under-barrel grenade launchers (Granatomyot Podstvolnyj) for the AK family of assault rifles. They were first seen by the west in 1984 during the Soviet Invasion of Afghanistan. The GP-30 was lightened and the redesigned sighting system was moved to the right. The current Izhmash-made version, the GP-34, has an again redesigned sighting system on the right and features the following advantages: *Reliability: It is designed and tested specifically for the Kalashnikov assault rifles, fits such assault rifles directly without any adaptors or forearm dismantling. *Improved safety: The design prevents a round from moving within or falling out of the barrel, even if the muzzle is pointed down. The GP-34 features an additional mechanism (firing pin safety lever) to improve safety during loading. Development of a grenade launcher for the AK-47 assault rifle began in 1966 at the Sporting and Hunting Arms Central Design and Research Bureau. Development continued into the 1970s, and in 1978 it was accepted into service. The GP-30 first entered service in 1989, and is intended for use with the AK-100 series of assault rifles. The GP-34 is designed to be a universal service model that can be fitted to the AKM / AKMS, AK74 / AK74S, AK74M, AK-101, AK-103, and AN-94 Nikonova rifles. he grenade launchers are similar in appearance and fire the same 40 mm caliber ammunition and use the same High-Low System developed by Germany in late World War II to keep recoil forces low without a rocket or other type of recoilless weapon back blast. The GP-30(M) is a stripped-down model grenade launcher, consisting of a very short, 40 mm rifled barrel in front of a basic trigger mechanism with minimal hand grip. On top of the barrel is mounting gear to attach the weapon under the barrel of an AK-series assault rifle, from where it is designed to be fired. A grenade is first muzzle loaded into the barrel, the weapon is aimed, then the self-cocking trigger is pulled to fire the weapon. This fires the percussion cap at the base of the grenade which triggers the nitrocellulose propellant inside the body of the grenade. The hot expanding gas from the propellant is forced through vents in the base of the grenade that move the grenade along the barrel, and at the same time force the driving band to engage with the twelve rifling grooves. The rifling imparts stabilizing spin to the projectile. The barrel has a service life of about 400 rounds.

RPG-7D3 Russia Rocket-Propelled Grenade Launcher



Tiers:



Variants:

- **RPG-250:** Prototype and test base for the RPG-7V.
- **RPG-7V1:** Upgrade w/bipod and improved PGO-7V3 sight. This is the standard production ATGL version since the late 1990s.
- **RPG-7B1N3, -7N, and -7N1:** Night site variant
- **RPG-7D, RPG-7DV1, and RPG- 7D2N3 (night):** Folding variants used by airborne troops. RPG-7D3 is the airborne counterpart to RPG-7V1.
- **Type 69-1, II, III:** Chinese upgrades variants with lighter weight, a wide range of munitions, and 3.0 x longer range sights.

System

Alternative Designation: RPG-7D3

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Crew: 2 RPG-7 is light enough to be carried and fired by one person if needed. With a crew of 2, an assistant grenadier normally deploys left of the gunner to protect him from small arms fire. The full set has two bags: one has two grenades, spare parts, tools and accessories. The other has three more grenades.

Effective Firing Range: m330

Maximum Firing Range: m700

DImensions

Length: 950mm

Weight: 6.3 kg (14 lb) (without a telescopic sight)

Ammunition

Combat Load: 5 rockets

Grenade Components: Warhead, rocket motor, tail assembly

Cartridge: mm85

Caliber: mm40

Note: he RPG-7D3 can fire a variety of warheads for anti-armor (HEAT, PG-Protivotankovaya Granata) or anti-personnel (HE, OG-Oskolochnaya Granata) purposes, usually fitting with an impact (PIBD) and a 4.5 second fuze. Armor penetration is warhead dependent and ranges from 30 to 60 centimetres of RHA; one warhead, the PG-7VR, is a 'tandem charge' device, used to defeat reactive armor with a single shot.

↳*Production Ammunition*

PG-7VL: [c.1977] Improved 93 mm HEAT warhead effective against most vehicles and fortified targets.
PG-7VR: c.1988] Dual 64 mm/105 mm HEAT warhead for defeating modern armored vehicles equipped with reactive armor blocks. The first warhead (64 mm HEAT) detonates the reactive armor block prematurely and the second warhead (105 mm HEAT) passes through the gap to hit the exposed armor underneath.
TBG-7V Tanin: (c.1988] 105 mm Thermobaric warhead for anti-personnel and urban warfare.
OG-7V: [c.1999] 40 mm Fragmentation warhead for anti-personnel warfare. Has no sustainer motor.
PG-7V: [c.1961] Baseline 85 mm HEAT warhead capable of penetrating 260 mm RHA.
PG-7VM: [c.1969] Improved 70 mm HEAT warhead capable of penetrating 300 mm RHA.
PG-7VS: [c.1972] Improved 73 mm HEAT warhead capable of penetrating 400 mm RHA.
PG-7VS1: [c.mid-1970s] Cheaper PG-7VS version capable of penetrating 360 mm RHA
GSh-7VT: [c.2013] Anti-bunker warhead with cylindrical follow-through blast-fragmentation munition followed by explosively formed penetrator.

Sights

Night Sights Available: NSP-3,NSP-2 (IR), NSPU, PGN-1 (II),1PN58 (II), 1PN51, 7V1N3

↳*PGO-7V*

Type: Optical illuminated
Magnification: 2.7x, 13° field of view
Location: Top of launcher/sight-left side
Sighting Range (m): 500

↳*PGO-7V3 (RPG-7V1 sight with longer range)*

↳*UP-7V For RPG-7V1*

Description: a telescopic collimating attachment fits on PGO-7V3 sight and extends sight range for larger munitions

Notes:

RPG-7D3: improved paratrooper model. It is equivalent to the RPG-7V2. It was adopted in 2001 and is a current production model, used the Russian armed forces and possibly some other countries. The RPG-7 has seen such wide and varied service that it is nearly impossible to list all of the conflicts it has fought in. From the Vietnam War to the Gulf War, the RPG-7 is most certainly combat proven. The RPG-7 continues to be produced in countries such as Iraq, Romania, China, and Bulgaria. Even though it will continue to serve in low-budget forces for years in a fire-support role, it is being phased out by most militaries from the anti-armor role due to its limited effectiveness against modern main battle tanks. Perhaps the primary reason RPG-7s are so popular is the low cost—anywhere from $500-2 000 for a launcher and $100-500 per rocket.

AGS-30 Atlant Russian 30mm Automatic Grenade Launcher





Tiers:



Variants:

- **AG-30M:** Vehicle mounted version with electric trigger mechanism.

AGS-30 Atlant

↳*System*

Name: AGS-30 Atlant
Type: Automatic Grenade Launcher
Caliber: mm30
Manufacturer: ZID
In Service: 1995-Present
Length: 1,165 mm
Weight, Unloaded: kg16
Action: Blowback
Rate of Fire: 400 round/min
Muzzle Velocity: m/s185
Effective Firing Range: 2,100 m
Feed System: 29 grenades belt
Sights: Adjustable telescopic sight, day-night sight, mechanical sight, portable radar
Note: Main service grenade launcher in the Russian Armed Forces. Completely replaced complex AGS-17

↳*Ammunition*

Name: VOG-17M
Type: HE
Caliber: mm30
Basic Load: 200 Rounds
Armor Penetration: INA

Available Ammunition Options: VOG-17M (HE) IO-30 (HE) IO-30TP (Practice) VOG-30 (HE) VOG-30D (HE) VUS-30 (Smoke) GPD-30 (HE)

Notes:

The AGS-30 Atlant is a Russian-designed automatic grenade launcher currently in production in the Russian Federation and in service with the Russian armed forces. Designed on the basis of AGS-17, the AGS-30 provides better mobility, longer range and better accuracy during firing. Significantly lighter than its previous version but far more advanced and powerful, the AGS-30 weighs 30 kg loaded, meaning it can be carried by one person. Using a specially designed GPD-30 grenade, recently put into serial production, the AGS-30 can engage targets at 2100m. Recoil is lessened with a much smoother grenade ejection mechanism. An adjustable SAG-30 tripod mount (GRAU index 6P17) is also included. After the dissolution of the USSR, Russia found itself in a difficult position in the First Chechen war. After the success of the AGS-17 in Afghanistan, the KBP Instrument Design Bureau immediately began work on the new grenade launcher. The Russian army needed a weapon that could easily flush militants out of their fortified building hideouts, levelling them in seconds. The new design proved to be reliable and lethal. Another improvement to the weapon is its ability to stay undetectable by the enemy—reduced sound when firing, reduced flash and the lightning speed of the grenade make the AGS-30 very hard to detect. It can be operated from almost everywhere—from attaching it to a window, to mud and grassy surfaces. Officially adopted in 2002.Adopted by the Russian Interior Ministry Troops.

GM-94 Russian 43mm Pump-Action Grenade Launcher





Tiers:



System

Alternative Designation: Some sources state that the GM-94 is the same weapon as Infantry Flamethrower LPO- 97; but KBP, the manufacturer, lists them separately.

Sights

Type: Front post and rear open U-notched, 2 blades

Location: Top of magazine

Sighting Range (m): 300

Specifications

Empty Weight (kg): 4.8

Length (with stock folded) (mm): 540

Length (with stock extended) (mm): 810

Width (mm): 80

Height (mm): 320 with folded stock

Rate of Fire (rd/min): 12 (salvo of 4 in 8seconds, 4 reloads, est)

Operation: Pump action

Feed: Over-barrel magazine

Fire Mode: Semi-automatic

↳*Typical Combat Load*

Description: Single Load 4 (1 in chamber, 3 in magazine)

For dismounts: 16

From vehicles: <48

Ammunition

Type: 43-mm grenade, HE Thermobaric, Non Lethal: Shock effect Smoke Tear gas

↳*VGM-93.100*

Caliber/length: 43-mm

Type: HE thermobaric, with impact fuze. The round has a plastic nose with the explosive fill. It deforms and detonates against hard and soft targets.

Weight (kg): INA

Maximum Range (m): 600

Maximum Sighted Range (m): 300

Casualty Radius (m): 3 With no metal fragments, the round can be used for room-to-room clearance of buildings (3-m lethal radius), with minimum damage to nearby personnel (5-m safe distance). Concussive effect from the blast will debilitate or shock personnel over a wider area than with the Shock Effects grenade noted below.

Armor Penetration (mm): The deforming round permits armor penetration against light armor, such as that found on tactical utility vehicles, trucks, etc. The round can destroy materiel targets.

Muzzle Velocity (m/s): 85+

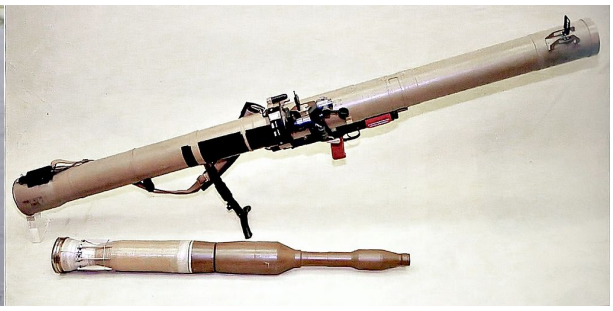
Other Ammunition Types: Non-lethal grenades: Smoke, shock effect, and tear gas.

Description: The Shock Effect grenade is a “flash-bang” non-lethal grenade for temporarily pacifying persons in a target area, aiding discrimination of targets from neutral personnel in the area. Tear gas grenade effectiveness area is 100m2 against personnel in the open or 300 m2 against personnel in enclosed areas.

Notes:

The GM-94 is a pump action grenade launcher developed by the KBP design bureau for use by Russian special and security forces. The GM-94 is a short range weapon, allowing it to be used in close urban environments. With a minimum safe distance of only 10 meters, the GM-94 is well suited to close, room-to-room fighting. Its simple design and operation allows it to operate in dusty and dirty environments and even after being immersed in water. The launcher is capable of firing VGM-93.900[3] high explosive fragmentation, VGM-93.100 thermobaric, VGM-93.300 smoke and VGM-93.200 tear gas canisters, VGM-93.600 rubber slugs and other non-lethal payloads. The VGM-93.100 thermobaric grenade contains around 160 grams of explosive filler. It can penetrate up to 8 mm of mild steel or interior wall, while producing minimal primary fragmentation. In June 2005, GM-94 with thermobaric VGM-93.100 ammunition was adopted by the Russian Ministry of Internal Affairs. In October 2007, the Russian armed forces adopted a new launcher designated LPO-97 developed in the KBP Instrument Design Bureau on the basis of the GM-94 with a thermobaric grenade, in 2008 GM-94 adopted for the branches of the Federal Security Service. Though the launcher was intended for use by Russian security forces, the GM-94 has been spotted as far afield as Kazakhstan and Libya.

RPG-29 (Tripod Mounted) Russian 105mm Anti-tank Grenade Launcher (ATGL)

Tiers:

1 2 **3** 4

Variants:

- **RPG-29 Mounted:** Mounted crew-served launcher variant, designed to replace SPG-9. It can fit on a vehicle with a pintle mount, or be dismounted to a tripod ground mount. The RPG-29 Mounted has a fire control system with an optical sight, laser rangefinder and ballistic data computer for increase range and precision. This increases the effective range of the mounted system to 800 m against a stationary target with a probability of 80%. The system can fire at all targets to maximum range (even moving, with reduced Ph). For Tier 1 and Tier2 COE Hybrid Threat, RPG-29 Mounted is the crew weapon in Weapons Squads and other supporting tactical units.
- **RPG-32/Hashim:** Russian Bazalt and Jordanian KADDB squad launcher (see RPG-29, pg 2-37). They jointly developed a lighter 105 mm shoulder launcher, for infantry squad use. Loaded, it weighs 7 kg, with a length of 1.2 m. It can also launch a variety of smaller 72.5 mm grenades. There is also a vehicle remote weapons station with 7.62-mm MG, Hashim launcher, and thermal sight. An upgrade is due in 2010, to add precision for increased range and 80% P-hit
- **Shoulder launched RPG-29:** Has an optical sight similar to RPG-7V. The RPG-29 could become a standard squad ATGL for maneuver squads; but weight and large size are problems. The launcher, even stripped down for shoulder launch, is almost 2m long considered to be fairly burdomsome and ungainly for use with infantry attempting to move in close quarters or dense cover, and set up quickly to fire.
- **The RPG-29 comes in several versions.:** INA

System

Alternative Designation: Vampir. This is the pintle mount version of the launcher. When tripod-mounted version was first seen, and was known to be a replacement for SPG-9, it was incorrectly dubbed SPG-10. For other versions, see Variants.

Cailber/Length : mm105, tube

Crew : ea2.0

Barrel Life : rds 300.0

Deployment: The pintel permits the launcher to attach to a tripod ground mount or a vehicle mount. The RPG-29 mounted breaks down into 3/4 parts for one soldier carry (launcher, grenade/canister rear section, tripod, and perhaps, sight). It is read to fire within a few seconds with quick connect couplines. A folding bipod on the canister can assist aiming during prone firing. Fire means smoke and noise; but a low profile permits loading and firing while prone. Often it will be used in combined arms ambushes.

Fire from Inside Building: INA

Rate of Fire : rd/min4 to 6

Muzzle Velocity: m/s280

Effective Firing Range, With Tripod and Fire Control Unit: m800

↳*Dimensions*

Length, Firing : m1850, with grenade canister attached

Length, Transport : m1 w/o rear section/canister

Weight: 11.5 kg (without sight, launch tube, sight, and canister); 20 on the tripod

Armament

Displacement Time : minless than 0.25

Emplacement Time : minless than 0.25

Munition

↳*Munition 1*

Armor Penetration : mm CE750+ behind ERA, 950+ conventional

Cailber/Length : mm105.0

Cailber/Length : mm105.0

Muzzle Velocity : m/s280.0

Name: PG-29V (in canister/launch tube extension)

Penetration, Other : mm CE1,500+ concrete and brick, 2000 brick, 3000 earth

Range, Effective : m800.0

Weight : kg6.7

Sights

↳*Sights 1*

Location: Left side

Magnification: 1x/3.5x

Name: Simrad IS2000 or similar EO sight for RPG-29 Mounted

Sighting Range : m800.0

Type: LRF-based FCS with ballistic computer

↳*Sights 2*

Location: Left side

Magnification: 1x/3.5x

Name: KN250F or similar sight for RPG-29 Mounted

Other: A variety can be used. 1st was the heavy 2Ts35 (3kg).

Sighting Range : m600-800 for vehicle targets; 300+ man

Type: 3 gen II clip-on sight designed to work with day sight

Notes:

The RPG-29 "Vampir" is a Soviet reusable rocket-propelled grenade (RPG) launcher. Adopted by the Soviet Army in 1989,[4] it was the last RPG to be adopted by the Soviet military before the fall of the Soviet Union in 1991. The RPG-29 has since been supplemented by other rocket-propelled systems, such as the RPG-30 and RPG-32. The RPG-29 has been implicated in an attack on the British Challenger 2, as well as in attacks on Israeli Merkava tanks in Lebanon, which breached the tanks' armor and in some cases injured or killed members of the crew. The RPG-29 is a shoulder-launched, unguided, tube-style, breech-loading anti-tank rocket system with a range of 500 meters. The light weapon is designed to be carried and used by a single soldier. On the top of the launch tube is a 2.7×1P38 optical sight. When launched, the missile deploys eight fins as the rocket leaves the launcher, stabilizing the rocket during flight, up to a range of 500 meters. Two warheads are available for the weapon: The TBG-29V thermobaric anti-personnel round. The PG-29V anti-tank/anti-bunker round has a tandem-charge HEAT warhead for defeating explosive reactive armor (ERA). This warhead is standardized with that of the PG-7VR round fired by the RPG-7V rocket launcher. The comprises two charges—an initial small charge triggers any reactive armor. If ERA or cage armor is absent, this charge strikes the main armour. Behind the primary charge, a much larger secondary shaped charge bursts at the rear of the initial warhead and projects a thin, high-speed-jet of metal into the armour compromised by the first charge. PG-29V is capable of killing hard targets, including tanks with ERA. The RPG-29 is unusual among Russian anti-tank rocket launchers in that it lacks an initial propellant charge to place the projectile at a safe distance from the operator before the rocket ignites. Instead, the rocket engine starts as soon as the trigger is pulled, and burns out before the projectile leaves the barrel. On the bottom of the tube is a shoulder brace for proper positioning along with a pistol grip trigger mechanism. A 1PN51-2 night sight can be fitted.

RPG-7V2 Russia Rocket-Propelled Grenade Launcher






Tiers:



Variants:

- **RPG-250:** Prototype and test base for the RPG-7V.
- **RPG-7V1:** Upgrade w/bipod and improved PGO-7V3 sight. This is the standard production ATGL version since the late 1990s.
- **RPG-7B1N3, -7N, and -7N1:** Night site variant
- **RPG-7D, RPG-7DV1, and RPG- 7D2N3 (night):** Folding variants used by airborne troops. RPG-7D3 is the airborne counterpart to RPG-7V1.
- **Type 69-1, II, III:** Chinese upgrades variants with lighter weight, a wide range of munitions, and 3.0 x longer range sights.

System

Alternative Designation: N/A

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Crew: 2 RPG-7 is light enough to be carried and fired by one person if needed. With a crew of 2, an assistant grenadier normally deploys left of the gunner to protect him from small arms fire. The full set has two bags: one has two grenades, spare parts, tools and accessories. The other has three more grenades.

Effective Firing Range: m330

Maximum Firing Range: m700

DImensions

Length: 950mm

Weight: 6.3 kg (14 lb) (without a telescopic sight)

Ammunition

Combat Load: 5 rockets

Grenade Components: Warhead, rocket motor, tail assembly

Cartridge: mm85

Caliber: mm40

Note: he RPG-7 can fire a variety of warheads for anti-armor (HEAT, PG-Protivotankovaya Granata) or anti-personnel (HE, OG-Oskolochnaya Granata) purposes, usually fitting with an impact (PIBD) and a 4.5 second fuze. Armor penetration is warhead dependent and ranges from 30 to 60 centimetres of RHA; one warhead, the PG-7VR, is a 'tandem charge' device, used to defeat reactive armor with a single shot.

↳*Production Ammunition*

PG-7VL: [c.1977] Improved 93 mm HEAT warhead effective against most vehicles and fortified targets.

PG-7VR: c.1988] Dual 64 mm/105 mm HEAT warhead for defeating modern armored vehicles equipped with reactive armor blocks. The first warhead (64 mm HEAT) detonates the reactive armor block prematurely and the second warhead (105 mm HEAT) passes through the gap to hit the exposed armor underneath.

TBG-7V Tanin: (c.1988] 105 mm Thermobaric warhead for anti-personnel and urban warfare.

OG-7V: [c.1999] 40 mm Fragmentation warhead for anti-personnel warfare. Has no sustainer motor.

PG-7V: [c.1961] Baseline 85 mm HEAT warhead capable of penetrating 260 mm RHA.

PG-7VM: [c.1969] Improved 70 mm HEAT warhead capable of penetrating 300 mm RHA.

PG-7VS: [c.1972] Improved 73 mm HEAT warhead capable of penetrating 400 mm RHA.

PG-7VS1: [c.mid-1970s] Cheaper PG-7VS version capable of penetrating 360 mm RHA

GSh-7VT: [c.2013] Anti-bunker warhead with cylindrical follow-through blast-fragmentation munition followed by explosively formed penetrator.

Sights

Night Sights Available: NSP-3,NSP-2 (IR), NSPU, PGN-1 (II),1PN58 (II), 1PN51, 7V1N3

↳*PGO-7V*

Type: Optical illuminated

Magnification: 2.7x, 13° field of view

Location: Top of launcher/sight-left side

Sighting Range (m): 500

↳*PGO-7V3 (RPG-7V1 sight with longer range)*

↳*UP-7V For RPG-7V1*

Description: a telescopic collimating attachment fits on PGO-7V3 sight and extends sight range for larger munitions

Notes:

The RPG-7V2 portable anti-tank grenade launcher is designed to counter tanks, self-propelled artillery systems, other armored vehicles (including those protected by ERA), defeat enemy manpower located both in light shelters and urban and rural type structures. The RPG-7V2 is completed with: *PGO-7V3 optical sight; *UP-7V sighting device; *iron sight; *bipod. The grenade launcher fires PG-7V, PG-7VM, PG-7VS, PG-7VL, PG-7VR HEAT rounds, TBG-7V thermobaric round and OG-7V fragmentation round. The grenade launcher is simple and reliable in operation and withstands harsh climatic conditions.

RG-6 Russian Revolving 40mm Grenade Launcher







Tiers:



System

Alternative Designation: 6G30
Action: Double action
Rate of Fire: 2 rounds/sec (rapid fire) 16-18 rounds/min (sustained)
Muzzle Velocity: 76.5 m/s
Maximum Firing Range: 400 m
Feed System: 6-Round, Revolving, Swing Out-Type Cylinder
Sights: folded, ladder-type rear sight

Dimensions

Length: 690 mm (27 in) stock extended / 520 mm (20.5 in) stock folded
Width: 145 mm
Height: 280 mm (11 in) in combat / 200 mm (7.9 in) in travelling
Weight: 6.2 kg

Ammunition

Description: The RG-6 fires the same 40mm caseless grenades listed for the GP 30 under barrel GL.
Caliber: 40mm
Cartidge: 40 mm caseless grenades

Notes:

The RG-6 (GRAU designation 6G30) is a Russian 40 mm, six-shot, revolver-type grenade launcher developed between 1993 and 1994 by Central Design and Research Bureau of Sporting and Hunting Weapons (TsKIB SOO), Tula, Russia. The RG-6 was required to increase the firepower of the infantry during urban combat, seen in small-scale conflicts, such as the Chechen wars. The RG-6 entered limited production by the mid-1990s and is now in use by various elements of Russian Army and special forces such as those in the MVD. RG-6 is designed to fire all standard 40mm "caseless" grenades, available for the general issue GP-25 underbarrel launcher. The design of the RG-6 is, apparently, heavily influenced by the South African Milkor MGL grenade launcher, with some differences. The key difference is RG-6 uses "caseless" rounds, and thus its cylinder is loaded from the front. The "barrel" is, in fact, a smoothbore tube, which served only as a support for front grip and sights. The double-action only trigger unit is also modified from GP-25, with manual safety and several automatic safeties. The cylinder is rotated using a clockwork-type spring, which is manually wound during reloading. For reloading, the front cylinder plate with the "barrel" tube is unlocked from the frame and then rotated sideways, to expose the front of the cylinder. Each chamber in the cylinder is a separate muzzle-loading rifled barrel, similar in design to the GP-25 barrel. The sights are folded for more convenient carry and storage, with a ladder-type rear sight. The buttstock is fitted with a rubber recoil pad, and when it is not in use, it is telescoped into the frame.

Mk 47 (Striker 40) American 40mm Automatic Grenade Launcher





Tiers:



Variants:

- **Mk47 Mod 0:** INA
- **Mk47 Mod 1:** INA

System

Alternate Designation: Mk 47; Striker 40
Manufacturer: General Dynamics - Armament and Technical Products
In Service: 2005-Present
Crew: 1-2

Dimensions

Length: 940 mm
Barrel Length: 610 mm
Width: 255 mm
Height: 205 mm
Weight: 18.0 kg

Armament

↳*System*

Name: Mk 47
Type: Automatic Grenade Launcher
Caliber: 40mm
Action: Short-recoil
Feed System: Belt
Sights: AN/PAS-13 Heavy Thermal Weapon Sight, by Raytheon
FIre Control System: The Lightweight Video Sight produced by Raytheon, the Mk 47’s sophisticated fire control system utilizes the latest in laser rangefinding, I2 night vision and ballistic computer technology.

↳*Ammunition*

Name: MK285 smart grenades that can be programmed to air burst after a set distance.
Type: Grenade
Caliber: 40mm
Cartridge: 40×53mm

Notes:

The Mk 47 or Striker 40 is a 40mm automatic grenade launcher with an integrated fire control system, capable of launching smart programmable 40mm air burst grenades in addition to various unguided rounds. The Mk 47 has the latest sensing, targeting and ballistics technology. The Lightweight Video Sight produced by Raytheon, the Mk 47’s sophisticated fire control system utilizes the latest in laser rangefinding, I2 night vision and ballistic computer technology. In addition to being able to fire all NATO standard high velocity 40mm rounds like the Mk 19 grenade launcher, it can fire MK285 smart grenades that can be programmed to air burst after a set distance. A computerized sight allows the user to set this distance.

STK 40 AGL Singapore 40mm Automatic Grenade Launcher







Tiers:



Variants:

- **M47/STRIKER:** US version. This technology is comparable to that in US OICW and OCSW programs.
- **Singaporean Air Bursting Munition (ABM) System:** The ABMS consists of the Air Bursting Munition, Fire Control System (FCS), and ammunition. The system is a kit which fit a variety of launchers which use NATO standard 40-mm AGL ammunition.

System

Alternative Designation: Unk.

Specifications

Empty Weight (kg): 33
Soft Mount Weight (kg): 52
Metal box Magazine Capacity (rds): CIS-32 rds, US M548-48 rds
Weight (M548) (loaded) (kg): 28
Weight (CIS-32 rds) (kg): 18
Barrel Length (m): .350
Length (m): .966
Length (on soft mount) (m): 1.025
Height (on soft mount) (m): .389
Width (m): .375
Width (on soft mount) (m): .47
Tripod Name: M3

Tripod Weight M3 (kg): 20

Lightweight Tripod Avail: Yes

Mounts: Tripod, vehicle, pedestal, or turret

Rate of Fire (Rapid) (rd/min): 60

Rate of Fire (Sustained) (rd/min): 40

Rate of Fire (Cyclic) (rd/min): 375

Operation: Air cooled, Direct blowback with advanced primer ignition

Feed: Disintegrating metal link belt (M16A2), left to right

Fire Mode: Selective, automatic and semiautomatic, turret mounts (CIS 40/50) can be fired remotely

Loader Type: Manual

Ammunition

HE DP, Self-Destruct: HE-M384/CIS S412 HE

Optional: Buckshot (US)

Typical Combat Load: 32 rds dismounted (1 CIS can), 48 rds dismounted (1 US M548 can), 400 rds in vehicle mount

Other Ammunition Types: HEDP-M430/CIS S411 Dual Purpose, US HE M384/CIS S412, M385/CIS S416A Practice, US Buckshot, other compatible 40mm AGL cartridges

↳***ABM***

↳***S411***

↳***CIS HEDP***

Sights

Standard Sights: Reflex sight

Day Sights Sights: Day optical sights and computerized laser rangefinder optical sights available.

Night Sights Available: AN/PAS-13-type Thermal sight (higher tier units), or US AN/TVS-5-type II Night Vision Sight (6.5x, lower tier units)

Notes:

The STK 40 AGL, formerly the CIS 40 AGL is a 40 mm automatic grenade launcher, developed in the late 1980s and produced by the Singaporean defence firm − Chartered Industries of Singapore (CIS, now ST Kinetics). The launcher is employed primarily by the Singapore Armed Forces and the police and security forces of several other countries. On June 19, 2000, STK announced the release of an upgrade kit, known as the 40mm Automatic Grenade Launcher Air-Bursting System (40mm AGL-ABS). Upgrades consist of the electronic fire control system, the gun computer, the muzzle programming coil as well as the optical sighting system. On December 13, 2010, the Kuwait Defense Ministry released a statement that the CIS 40 AGL was offered for the Kuwaiti military. The STK 40 AGL can be mounted on a M3 tripod, a light weigh tripod, a lock/fire mount, soft mount, ring mount or on a RWS. The STK 40 AGL has a Mark II variant, which includes weight reduction of almost 6 kg; a barrel removal system; improved handling, performance, aesthetics and ergonomics. The components, when disassembled, consist of the operating group, barrel, receiver group, top cover group, trigger group.

QLZ-87 Chinese 35mm Automatic Grenade Launcher (AGL)







Tiers:



Variants:

- **WLZ-87:** Early prototype, found in few units.
- **QLZ-87:** Updated lighter variant of the W-87, adopted for PLA forces. It comes in standard and heavy configurations. The standard version, with a bipod and telescope, weighs 12 kg, and has an anti-armor range of 600m. Range with the Frag-HE grenade is 1,000-1,750 m. The heavy version is more suitable for vehicle pintle mount or dismounted tripod. It is scoped, weighs 20 kg, and ranges to 1,750 m.
- **QLB-06/87B:** Recent lightweight shoulder version (9.1 kg), which also fires HEATMP grenades to 600 m, Frag- HE to 1,000 m, and has a rate of fire of 500 rds/min. The launcher has a 3x day telescope, EO night sight, bipod, and uses 6 or 15 rd grenade drums.

System

Alternative Designation: Unk.

Country of Origin: FRA

Specifications

Empty Weight (kg): 12

Tripod Weight (kg): 8

Mounts: Bipod (attached) or Tripod

Operation: Blowback

Feed: 6, 9-rd box, 12-rd drum, 15-rd drum

Fire Mode: Semi or Automatic

Loader Type: Manual

Effective Range (m): 600

Maximum Range (m): 1500

Rate of Fire (rd/min): 400

Muzzle Velocity (m/s): 170

Ammunition

Typical Combat Load: Crew load of 36 rds., in drums of 6, 9, 12, or 15 rds.

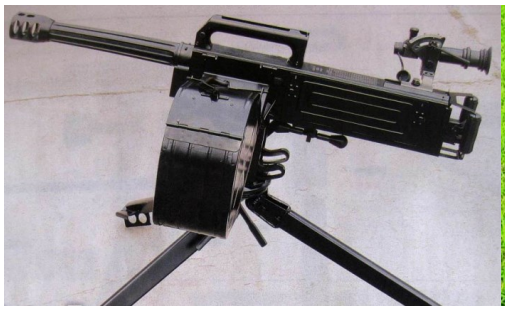
↳***Frag-HE***

↳***HEAT-MP***

Notes:

THE W-87 IS SIGNIFICANT IN THAT IT WEIGHS A LITTLE MORE THAN A MEDIUM 7.62-MM GP MG (PKM 18.5 LBS/U.S. M60 MG 32 LBS). IT IS SMALLER AND LIGHTER THAN THE AGS-17 BUT STILL PROVIDES THE INFANTRYMAN WITH THE ABILITY TO DESTROY LIGHTLY ARMORED VEHICLES AT 2 TO 3 TIMES THE RANGE OF THE MAJORITY OF INFANTRY LIGHT AT SYSTEMS. TEN 35-MM W-87 ROUNDS WEIGH LESS THAN 100 LINKED 7.62 ROUNDS. THE 35-MM ROUNDS ARE PROBABLY MORE EFFECTIVE AGAINST POINT TARGETS AT MEDIUM TO LONG RANGES THAN BALL 7.62-MM. OTHER UNIT MEMBERS CAN CARRY ADDITIONAL AMMUNITION AS NEEDED, AND CAN BREAK DOWN LOAD INTO SMALLER INCREMENTS FOR EASIER CARRY

QLZ-04 Chinese 35mm Automatic Grenade Launcher





Tiers:

1 2 3 4

System

:
:
:

↳*QLZ-04 37mm Automatic Grenade Launcher*

Name: QLZ-04
Type: Automatic Grenade Launcher
Caliber: 35mm
Manufacturer: Norinco
Proliferation: The QLZ-04 is reportedly in Chinese service and has been exported in small quantities. It is likely to supplement or even replace the QLZ-87 as a crew served or vehicle mounted weapon since it is much more capable in that role.
In Service: 1970s-Present
Length: 1026 mm
Barrel Length: 380 mm
Weight: 20 kg
Muzzle Velocity: 190 m/s
Rate of Fire: 350-400 rounds per minute
Effective Firing Range: 1750 m
Feed System: Belt
Sights: Optical sight, backup iron sights

↳*Ammunition*

Type: Grenade
Caliber: mm37mm
Cartridge: HE-FRAG; HE-DP

Basic Load: 30 rounds

Notes:

The QLZ-04 is an automatic grenade launcher of Chinese origin. It was developed in the early 2000's as an alternative to the older QLZ-87 for use as a crew served or vehicle mounted weapon. The same ammunition as the QLZ-87 is used but the belt fed design is better suited at providing support fire. The QLZ-04 is a gas operated weapon and its 'free bolt mechanism' might refer to the use of the blowback principle. The belt feeds from the left and the belt box can be attached to the weapon. The QLZ-04 is tripod or pintle mounted and is fitted with spade grips. Normally an optical sight is used and crude backup iron sights are available in the carrying handle. The QLZ-04 fires 35mm Type 87 grenades from a 30 round belt. The cyclic rate of fire is 350 to 400 rpm and the maximum range is 1.75 km. All types of 35mm rounds can be fired. A drawback is that switching ammunition types requires reloading and no dual purpose ammunition is available.

Milkor Mk-4 UBGL South African 40mm Single-Shot Grenade Launcher







Tiers:



Variants:

- **US-Mk 4 - Milkor 40mm UBGL Mk-4:** INA
- **US-Mk 4S - Milkor 40mm UBGL Mk-4S:** INA

Main Weapon System

Alternate Designation(s): Milkor 40mm UBGL Grenade Launcher
Primary Function / Type: lightweight single-shot, underslung grenade launcher
Manufacturer: Milkor (Pty) Ltd
In Service: 2009-Present
Caliber: mm40
Length: mm240
Barrel Length: INA
Width: mm60
Height: mm90
Weight, Without Sight: kg0.95
Action: Single Shot; Reausable
Rate of Fire: rds/min6
Maximum Effective Range: m250
Minimum Effective Range: m30
Muzzle Velocity: INA
Loading Type: The UBGL is fitted with a steel barrel with constant-pitch rifling and swings to the side for loading and

unloading of standard low-velocity 40mm cartridges.

Trigger Mechansim: A “push-button” trigger mechanism is used in place of an actual trigger in order to differentiate between firing mechanisms of the rifle and the under barrel as the soldier might invariably, under duress, tend to pull the incorrect trigger if presented with two triggers.

Ammunition (Option 1)

Name: M383

Type: High Explosive (HE)

Caliber: mm40

Maximum Effective Firing Range: m200-250

Muzzle Velocity: INA

Casualty Radius: m5

↳*Ammunition (Option 2)*

Name: M430I

Type: High Explosive Dual Purpose(HEDP)

Caliber: mm40

Maximum Effective Firing Range: m200-250

Muzzle Velocity: INA

↳*Ammunition (Option 3)*

Name: M1001

Type: High Velocity Canister Cartridge (HVCC)

Caliber: mm40

Maximum Effective Firing Range: m200

Muzzle Velocity: INA

Sights

↳*Sight #1*

Name: Ladder Sight

Weight: grams155

↳*Sight #2*

Name: Saddle Sight

Weight: grams85

↳*Sight #3*

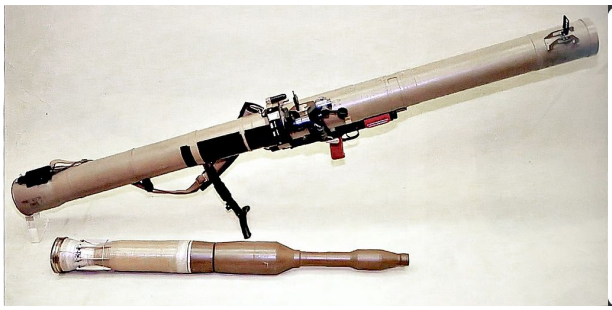
Name: Reflex Sight

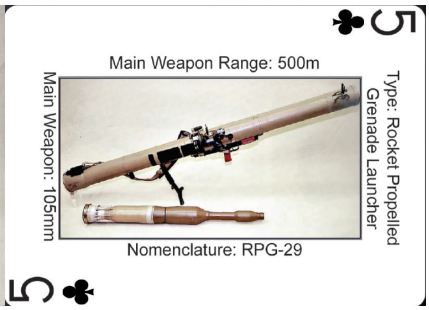
Weight: grams210

Notes:

The Milkor 40mm UBGL grenade launcher is a lightweight single-shot, underslung grenade launcher designed and developed in South Africa by Milkor (Pty) Ltd.[1] It can be attached to most modern assault weapons and rifles using a Picatinny rail system.[2] The UBGL is capable of firing standard 40mm rounds including illumination and observation rounds (max length of 140 mm). Clip-on, clip-off mechanism allows the UBGL to be fitted, with an additional recoil buffer, to any weapon fitted with a Picatinny rail. The UBGL is fitted with a steel barrel with constant-pitch rifling and swings to the side for loading and unloading of standard low-velocity 40mm cartridges. This enables the user to have a 40mm grenade launcher capability together with an assault rifle. The UBGL can also be fired independently from a rifle (handheld) in an emergency.[3][4] It can also be fitted to rifles and shotguns used in policing and is able to fire less lethal and lethal ammunition. The US-Mk 4 has a mass of 1.68 kg (empty), while the new US-Mk 4S weighs 0.750 kg with an aluminium barrel or around 1 kg with a steel barrel. A “push-button” trigger mechanism is used in place of an actual trigger in order to differentiate between firing mechanisms of the rifle and the under barrel as the soldier might invariably, under duress, tend to pull the incorrect trigger if presented with two triggers.[5] The opening mechanism swings to the side in order to enable the user to load ammunition without external interference of the weapon it is mounted to or other complications.

RPG-29 (Vampir) Iranian 105mm Rocket-Propelled Grenade (RPG) Launcher





Tiers:

1 2 3 4

Variants:

- **RPG-29 :** Night sight only shoulder-launch variant
- **RPG-29N:** Night sight only shoulder-launch variant

System

Alternative Designation: Vampir (RPG-29)

Type: Shoulder-launched, unguided, tube-style, breech-loading anti-tank rocket system

Manufacturer: Bazalt, SEDENA

Deployment: The pintle permits the launcher to attach to a tripod ground mount or a vehicle mount. The RPG-29 can be broken down into two parts for one soldier carry (launcher unit front section, and grenade/canister rear section). It can be made ready to fire within a few seconds with quick connect couplings. A folding bipod is provided to assist aiming during prone firing.

Crew : ea2.0

Fire from Inside Building: INA

Displacement Time: less than less than 0.25 min

Emplacement Time: less than less than 0.25 min

↳*Dimensions*

Length, Firing : m1.85 with grenade canister attached

Length, Transport : m1 without rear section/canister

Weapon System

↳*Missile Launcher*

Name: INA

Type: Launch Tube

↳*Missile*

Name: PG-29V (in canister/launch tube extension)

Type: Tandem HEAT (shaped charge)

Cailber: mm105

Cartridge: PG-29V tandem rocket TBG-29V thermobaric rounds

Length, Disassembled for Transportation: m1

Length, Ready to Fire: m1.85

Weight, Unloaded (with optical sight): kg12.1

Weight, Loaded and Ready to Fire: kg18.8

Muzzle Velocity : m/s280.

Armor Penetration : mm CE750+ behind ERA, 950+ conventional

Penetration, Other : mm CE1500+ concrete, 2000 brick, 3000 earth

Effective Firing Range: m500

Effective Firing Range, with with Tripod and Fire Control Unit: m800

Note #1: TBG-29V multipurpose HE thermobaric grenade. Blast effects are the same as the TBG-7V (previous pg.). Effective range (m): 50-2,000 RPG-27, PG-7R grenade for RPG-7V, and RPG-32/Hashim use the same tandem warhead design.

Note #2: Two warheads are available for the weapon: 1. The TBG-29V thermobaric anti-personnel round. 2. he PG-29V anti-tank/anti-bunker round has a tandem-charge HEAT warhead for defeating explosive reactive armor (ERA).

Sights

↳*Sights 1*

Magnification: INA

Name: 1P-38

Sighting Range : m500 for optical sight. Effective range for the iron (post) sight would probably be less.

Type: Day sight: Optical and iron, for RPG-29 shoulder-launch

Weight : kg0.6

↳*Sights 2*

Name: 1PN51, 1PN52 standard RPG-29 or RPG-29N

Type: Night Sight: II sight

Weight : kg2.1

Notes:

Iran imports a large amount of their military equipment and weapons from China, Russia, and America. The RPG-29 is one of the deadliest rocket launchers in use today. The RPG-29 "Vampir" is a Soviet reusable rocket-propelled grenade (RPG) launcher. Adopted by the Soviet Army in 1989, it was the last RPG to be adopted by the Soviet military before the fall of the Soviet Union in 1991. The RPG-29 has since been supplemented by other rocket-propelled systems, such as the RPG-30 and RPG-32. The RPG-29 has been implicated in an attack on the British Challenger 2, as well as in attacks on invading Israeli Merkava tanks in Lebanon, which breached the tanks' armor and in some cases injured or killed members of the crew. The RPG-29 is a shoulder-launched, unguided, tube-style, breech-loading anti-tank rocket system with a range of 500 meters. The light weapon is designed to be carried and used by a single soldier. On the top of the launch tube is a 2.7×1P38 optical sight. When launched, the missile deploys eight fins as the rocket leaves the launcher, stabilizing the rocket during flight, up to a range of 500 meters. Two warheads are available for the weapon: * The TBG-29V thermobaric anti-personnel round. * The PG-29V anti-tank/anti-

bunker round has a tandem-charge HEAT warhead for defeating explosive reactive armor (ERA). This warhead is standardized with that of the PG-7VR round fired by the RPG-7V rocket launcher.[8] The comprises two charges—an initial small charge triggers any reactive armor. If ERA or cage armor is absent, this charge strikes the main armour. Behind the primary charge, a much larger secondary shaped charge bursts at the rear of the initial warhead and projects a thin, high-speed-jet of metal into the armour compromised by the first charge. PG-29V is capable of killing hard targets, including tanks with ERA. The RPG-29 is unusual among Russian anti-tank rocket launchers in that it lacks an initial propellant charge to place the projectile at a safe distance from the operator before the rocket ignites. Instead, the rocket engine starts as soon as the trigger is pulled, and burns out before the projectile leaves the barrel. On the bottom of the tube is a shoulder brace for proper positioning along with a pistol grip trigger mechanism. A 1PN51-2 night sight can be fitted.

SL40 Austrian 40mm Grenade Launcher



Tiers:

1 **2** 3 4

System

Alternate Designation: SL40
Manufacturer: Steyr
In Service: INA-Present
Rifle Integration: SL40 instantly integrates with F90 rifles without tools or parts. Simple integration mechanics minimise weight and maximise mission flexibility.
Stock: Standalone stock allows the SL40 to be employed by team members in a dedicated grenadier or fire support role.
Muzzle Velocity: 76 m/s
Maximum Firing Range: 400 m
Effective Firing Range: 382 yds (350 m) Fire-team sized area target; 164 yds (150 m) Vehicle or weapon point target
Sights: Toughened, quick fit grenade launcher sight with 7 MOA Trijicon holographic sight allows fast and accurate target acquisition without the difficultly or fragility of traditional plastic open sights.

Dimensions

Length: INA
Width: INA
Weight: The SL40 grenade launcher with holographic sight weighs only 1185 grams, making the SL40 one of the lightest grenade launchers available.

Ammunition

Type: Grenade
Caliber: mm40
Note: Lithgow Arms maintains strategic arrangements with munitions manufacturers, and is co-developing airburst smart

munitions compatible with the SL40.

Notes:

The 40x46mm low-velocity SL40 grenade launcher has been in Australian Defence Force service for some time now, serving primarily as a modular under-barrel grenade launcher attached to the 5.56x45mm NATO F90 service rifle within the infantry at the squad or section level. It was first chosen to accompany the F90 family of rifles in 2014, a derivative of the Austrian Steyr GL40 launcher (the SL40 being a derivative of the GL40). The original design competition was between the Steyr GL40 and the Madritsch Weapon Technology ML40AUS, another Austrian armaments company. The Steyr design was selected for integration. The SL40 grenade launcher was developed in parallel with the F90 rifle. Munition compatibility, system integration and ergonomics were nominated as the driving considerations for design. The completed prototypes was tested alongside the F90 as a critical element of the mission system, and successfully passed the same arduous test and evaluation trials as the rifle itself. The pairing of the SL40 grenade launcher and F90 rifle represents one of the most elegant system integrations available on the market. Co-located triggers allow operators to react instantly to emerging threats by dual firing the SL40 and F90 rifle. Complementing this, the SL40 grenade launcher Intuitive Grenade Launcher Sight enables rapid and accurate engagement of targets even while the firer is on the move. At just 1185 grams with sight, the SL40 is lighter than any comparable competition. Despite this low weight the SL40 is still equipped with a robust hammer forged steel barrel.

Type 69 RPG Chinese 85mm Rocket Propelled Grenade Launcher







Tiers:



System

Alternate Designation(s): Type 69 RPG
Type: Rocket Propelled Grenade Launcher
Caliber: mm85
Manufacturer: Norinco
Crew: 1 or 2, depending on situation
Cartridge: 40 mm (1.57") barrel 85mm warhead
Maximum Firing Range: 600 m
Effective Firing Range: 200 m
Feed System: one round per shot
Sights: Iron sights. Infrared and night vision sights possible

Dimensions

Length: 910 mm
Weight: 5.6 kg

Ammunition

RPG Rounds: Although the design of the grenade launcher has not changed significantly since it was introduced in the 1970s, many new types of grenade rounds have been developed over the years to provide enhanced capabilities.
Type 69 high-explosive anti-tank (HEAT):: basic grenade introduced in the PLA during the 1970s with the Type 69. Phased out of PLA service.
Type 69-I hollow charge high-explosive anti-tank:: standard HEAT grenade developed for the PLA in the 1980s. The

hollow warhead was created with improved armour-piercing capabilities.

Type 69-II HEAT:: the same as the Type 69-I HEAT grenade, except that it is improved to defeat modern armoured vehicles that are equipped with anti-tank missile plating.

Type 69-III HEAT:: the same as the Type 69-II, increased range and further improved armour-piercing abilities.

Type 84 HEAT:: made in the 1980s as a lighter warhead with the ability to be fired from long range with claims that the rocket is not affected by side winds. Usable with both Type 69 and 69-I rocket launchers.

Type 69 75mm airburst anti-personnel high-explosive (HE):: created for anti-personnel purposes. This is mostly meant to combat against entrenched forces since the rocket, after gaining impact on the ground, bounces to a height of around 2m then airbursts over the target area, scattering about 800 anti-personnel steel balls over a lethal radius of 15m.

HE/HEAT:: used for anti-armour and anti-personnel combat. Even though it has 1,500 prefabricated fragments which scatter over a 20m radius on detonation, the rocket retains its anti-tank capabilities.

Anti-personnel high-explosive incendiary (HEI):: created for use in certain environments such as jungles and mountains, it has 900 steel balls and 2,000 to 3,000 incendiary pellets that scatter over a 15m radius on detonation.

Tandem-warhead anti-tank grenade:: thought to have been used in the 1990s, it is meant to penetrate vehicles with explosive reaction armour or ERA. Even though it can not defeat most modern vehicles, lighter vehicles such as APCs and AFVs can be destroyed with this rocket.

Illumination grenade:: equipped with a small parachute to suspend it in mid air while being used, its effective range is 600m with the braking ring and 1,500m without it.

Notes:

The Type 69 85mm rocket propelled grenade (RPG), made by Norinco, is a Chinese variant of the Soviet RPG-7. First introduced in 1972, the Type 69 is a common individual anti-tank weapon in service with the PLA. More advanced grenade rounds were developed in the 1980s and 1990s to meet the requirements of modern battlefields. Eventually, the aging Type 69 RPG family was replaced by modern anti-tank weapon systems developed by China such as Type 89 and Type 08. China first obtained the RPG-2 85mm anti-tank RPG in the early 1950s, and began to build Chinese copies in 1956 under the designation Type 56. However, the rapid development of the new generation main battle tanks (MBTs) in the early 1960s posed new threats to the PLA, which was later proven in the 1969 Sino-Soviet border conflict. Because the Type 56 was unable to penetrate the armour of the new generation Soviet tanks such as the T-62, the PLA desperately needed a new individual anti-tank weapon to replace the aging Type 56. Reverse-engineering of the RPG-7 began in the early 1960s, and demonstrations were made to senior PLA officials in 1964. The Chinese copy of the RPG-7, designated Type 69, received its design certificate in 1970. The weapon entered service with the PLA in the mid-1970s, and took part in the 1979 Sino-Vietnam border conflict to provide platoon-level anti-personnel and anti-obstacle fire support. Its performance was highly praised by the troops. As well as being equipped by the PLA, the Type 69 has also been exported in significant numbers to many foreign customers, including the Mujahideen in Afghanistan under the covert co-operations between China and the CIA in the 1980s against the Soviet Union. Status The production of the Type 69 RPG stopped in the mid-1980s when an advanced version, Type 69-I was introduced by Norinco. As the weapon became less effective in modern land battlefield, the Type 69 RPG is being gradually replaced by the PF-89 80mm anti-tank grenade launcher.

AGS-17 Plamya Russian 30mm Automatic Grenade Launcher





Tiers:



Variants:

- **AGS-17A:** remotely controlled aircraft mounted version with electric trigger mechanism.
- **AGS-17D:** remotely controlled vehicle mounted version with electric trigger mechanism.

Main Weapons System

↳*System*

Name: AGS-17 Plamya
Type: 30mm Automatic Grenade Launcher
Manufacturer: Molot plant
Length: mm840
Diameter: INA
Weight: kg31
Action: Blowback
Rate of Fire: 400 round/min
Effective Firing Range: 800 to 1,700 m
Feed System: 29 grenades belt
Sights: Adjustable iron sights, optional mount required for optical sights
Maximum Elevation: deg+75
Minumum Elevation: deg-5
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180
Variants: AG-17A helicopter-mounted version

↳*Ammunition*

Type: Grenade

Caliber: mm30

Cartridge: 30×29mm grenade

Muzzle Velocity: m/s185

Basic Load: ea400

Notes:

The AGS-17 is a heavy infantry support weapon designed to operate from a tripod or mounted on an installation or vehicle. The AGS-17 fires 30 mm grenades in either direct or indirect fire to provide suppressive and lethal fire support against soft skinned or fortified targets. The weapon uses a blowback mechanism to sustain operation. Rounds are fired through a removable (to reduce barrel stress) rifled barrel. The standard metal ammunition drum contains 29 linked rounds. The tripod is equipped with fine levelling gear for indirect fire trajectories.

RPG-7 Russia Rocket-Propelled Grenade Launcher







Tiers:



Variants:

- **RPG-250:** Prototype and test base for the RPG-7V.
- **RPG-7V1:** Upgrade w/bipod and improved PGO-7V3 sight. This is the standard production ATGL version since the late 1990s.
- **RPG-7B1N3, -7N, and -7N1:** Night site variant
- **RPG-7D, RPG-7DV1, and RPG- 7D2N3 (night):** Folding variants used by airborne troops. RPG-7D3 is the airborne counterpart to RPG-7V1.
- **Type 69-1, II, III:** Chinese upgrades variants with lighter weight, a wide range of munitions, and 3.0 x longer range sights.

System

Alternative Designation: N/A

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Crew: 2 RPG-7 is light enough to be carried and fired by one person if needed. With a crew of 2, an assistant grenadier normally deploys left of the gunner to protect him from small arms fire. The full set has two bags: one has two grenades, spare parts, tools and accessories. The other has three more grenades.

Effective Firing Range: m330

Maximum Firing Range: m700

DImensions

Length: 950mm

Weight: 6.3 kg (14 lb) (without a telescopic sight)

Ammunition

Combat Load: 5 rockets

Grenade Components: Warhead, rocket motor, tail assembly

Cartridge: mm85

Caliber: mm40

Note: he RPG-7 can fire a variety of warheads for anti-armor (HEAT, PG-Protivotankovaya Granata) or anti-personnel (HE, OG-Oskolochnaya Granata) purposes, usually fitting with an impact (PIBD) and a 4.5 second fuze. Armor penetration is warhead dependent and ranges from 30 to 60 centimetres of RHA; one warhead, the PG-7VR, is a 'tandem charge' device, used to defeat reactive armor with a single shot.

↳*Production Ammunition*

PG-7VL: [c.1977] Improved 93 mm HEAT warhead effective against most vehicles and fortified targets.

PG-7VR: c.1988] Dual 64 mm/105 mm HEAT warhead for defeating modern armored vehicles equipped with reactive armor blocks. The first warhead (64 mm HEAT) detonates the reactive armor block prematurely and the second warhead (105 mm HEAT) passes through the gap to hit the exposed armor underneath.

TBG-7V Tanin: (c.1988] 105 mm Thermobaric warhead for anti-personnel and urban warfare.

OG-7V: [c.1999] 40 mm Fragmentation warhead for anti-personnel warfare. Has no sustainer motor.

PG-7V: [c.1961] Baseline 85 mm HEAT warhead capable of penetrating 260 mm RHA.

PG-7VM: [c.1969] Improved 70 mm HEAT warhead capable of penetrating 300 mm RHA.

PG-7VS: [c.1972] Improved 73 mm HEAT warhead capable of penetrating 400 mm RHA.

PG-7VS1: [c.mid-1970s] Cheaper PG-7VS version capable of penetrating 360 mm RHA

GSh-7VT: [c.2013] Anti-bunker warhead with cylindrical follow-through blast-fragmentation munition followed by explosively formed penetrator.

Sights

Night Sights Available: NSP-3,NSP-2 (IR), NSPU, PGN-1 (II),1PN58 (II), 1PN51, 7V1N3

↳*PGO-7V*

Type: Optical illuminated

Magnification: 2.7x, 13° field of view

Location: Top of launcher/sight-left side

Sighting Range (m): 500

↳*PGO-7V3 (RPG-7V1 sight with longer range)*

↳*UP-7V For RPG-7V1*

Description: a telescopic collimating attachment fits on PGO-7V3 sight and extends sight range for larger munitions

Notes:

The RPG-7 is a portable, reusable, unguided, shoulder-launched, anti-tank rocket-propelled grenade launcher. Originally the RPG-7 – Hand-held anti-tank grenade launcher) and its predecessor, the RPG-2, were designed by the Soviet Union; it is now manufactured by the Russian company Bazalt. The weapon has the GRAU index (Russian armed forces index) 6G3. Widely produced, the most commonly seen major variations are the RPG-7D (десантник - desantnik - paratrooper) model, which can be broken into two parts for easier carrying; and the lighter Chinese Type 69 RPG. DIO of Iran manufactures RPG-7s with olive green handguards, H&K pistol grips, and a Commando variant. The RPG-7 was first delivered to the Soviet Army in 1961 and deployed at squad level. It replaced the RPG-2, having clearly out-performed the intermediate RPG-4 design during testing. The

current model produced by the Russian Federation is the RPG-7V2, capable of firing standard and dual high explosive anti-tank (HEAT) rounds, high explosive/fragmentation, and thermobaric warheads (see below), with a UP-7V sighting device fitted (used in tandem with the standard 2.7× PGO-7 optical sight) to allow the use of extended range ammunition. The RPG-7D3 is the equivalent paratrooper model. Both the RPG-7V2 and RPG-7D3 were adopted by the Russian Ground Forces in 2001. The launcher is reloadable and based around a steel tube, 40 millimetres in diameter, 95.3 centimetres long, and weighing 7 kilograms. The middle of the tube is wood wrapped to protect the user from heat and the end is flared to assist in blast shielding and recoil reduction.[dubious – discuss] Sighting is usually optical with a back-up iron sight, and passive infra-red and night sights are also available. The launchers designated RPG-7N1 and RPG-7DN1 can thus mount the multi-purpose night vision scope 1PN51 and the launchers designated RPG-7N2 and RPG-7DN2 can mount the multi-purpose night vision scope 1PN58. As with similar weapons, the grenade protrudes from the launch tubes. It is 40–105 millimetres in diameter and weighs between 2.0[5][6][7] and 4.5 kilograms. It is launched by a gunpowder booster charge, giving it an initial speed of 115 metres per second, and creating a cloud of light grey-blue smoke that can give away the position of the shooter.[8] The rocket motor[9] ignites after 10 metres and sustains flight out to 500 metres at a maximum velocity of 295 metres per second. The grenade is stabilized by two sets of fins that deploy in-flight: one large set on the stabilizer pipe to maintain direction and a smaller front set to induce rotation. The grenade can fly up to 1,100 metres; the fuze sets the maximum range, usually 920 metres.

Panzerfaust 3 German 60mm Anti-tank Grenade Launcher (ATGL)







Tiers:



Variants:

- **Panzerfaust 3 (Pzf 3):** Original system with 110-mm HEAT grenade (nose probe for 700 mm penetration). Optical day sight limits range to 300 m moving, 400 stationary.
- **Panzerfaust 3-T:** Upgrade with 3-T tandem HEAT grenade and original day sight. It is effective against targets to 300m stationary, 400m moving. Night sight is optional.
- **Panzerfaust 3-T600:** Tier 2 upgrade adds the IS2000 computer laser day sight with range of out to 600 m for moving targets. It uses the Simrad KN250 series II night sight. Acquisition-to-firing time is 3-4 seconds.
- **Panzerfaust 3-IT600:** Tier 1 capability upgrade adds more recent 3-IT grenade which penetrates 900+ mm armor behind ERA (equals 1,150 mm vs armor without ERA).
- **Panzerfaust 3LTW:** Lightweight launcher weighing less than 10 kg.
- **Panzerfaust 3LR:** Long-range semi-active laser homing (SALH) system requires CO2 laser guidance unit and SAL-H grenade. Range-800 m, armor penetration-700 mm.

System

Alternative Designation: Balliste, Pzf 3-T600
Manufacturer: Dynamit Nobel AG IHI Aerospace – Licensed
Caliber: 60 mm (2.4 in) barrel, 110 mm (4.3 in) warhead
Muzzle Velocity: m/s115
Maximum Firing Range: 920 m (3,020 ft) (automatic self-destructs once beyond the range)

Dimensions

Length: mm950
Weight: * Hollow charge warhead: 12.9 kg (28 lb 7 oz) * Tandem hollow charge warhead: 13.3 kg (29 lb 5 oz) * Bunker-buster warhead: 13.3 kg (29 lb 5 oz) * Unloaded firing unit: 2.3 kg (5 lb 1 oz)

Ammunition

Type: Tandem HEAT Multipur-FRAG (MZ-110) BASTEG Illumination Smoke/IR Smoke Tandem HEAT Multipurpose HESH Tandem HEAT SAL-H (Pzf-3LR)

Grenade Components: Warhead, rocket motor, tail assembly

↳*3-T (Tandem)*

Type: Tandem HEAT (Pzf 3-T and 3-T600)

Caliber: mm110

Effective Range: m600 moving and stationary)

Armor Penetration: mm CE800 behind ERA

Weight: kg4.3

Muzzle Velocity: m/s152

Flight Velocity: m/s220

Time of Flight to 300 m: secINA

↳*BASTEG (Barricade and Street Encounter Grenade)*

Type: Shaped-charge w/stand-off fuze

Caliber: mm110

Range: m11 to 600

Penetration: mm15 armor at 45, 920 sandbag, 256 concrete

Weight: kg4.3

Time of Flight to 300 m: secINA

↳*3-IT (Improved Tandem)*

Type: Tandem HEAT/HESH (Dual-mode) on Pzf 3-IT600 With nose retracted, HESH mode has greater effects against APCs, material targets, etc.

Caliber: mm110

Effective Range: m600 moving and stationary

Armor Penetration: mm CE900+ behind ERA, with nose extended; 1,150 conventional, with nose extended

Weight: kg5.4

Muzzle Velocity: m/s152

Flight Velocity: m/s220

Time of Flight to 300 m: secINA

↳*Other Grenades*

Description: See above. The new 3LWD multipurpose grenade has a shaped charge and HE/anti-armor effects of a high-explosive squash-head (HESH) round.

Sights

Night Sights Available: NSP-3,NSP-2 (IR), NSPU, PGN-1 (II),1PN58 (II), 1PN51, 7V1N3

↳*DynaRange*

Type: Computer laser rangefinder (LRF) sight

Magnification: 1x/3.5

Location: Left side

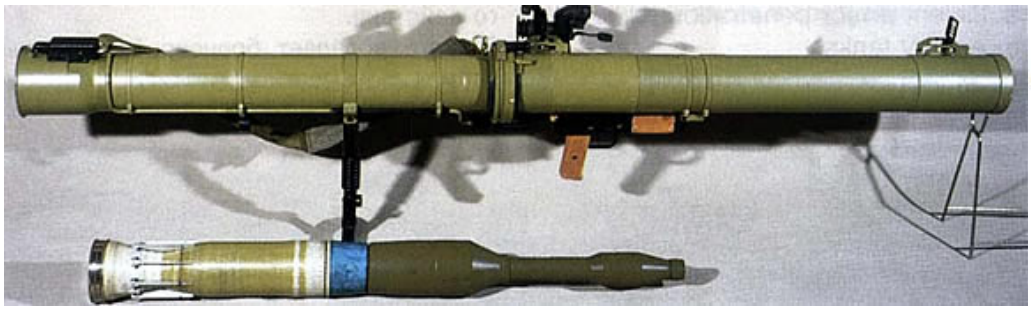
Night Sights Available: Yes, KN-250 series II

Note: Day sight can be used with Simrad GN1 NVG.

Notes:

The Panzerfaust 3 (lit. "armor fist" or "tank fist") is a modern disposable recoilless anti-tank weapon, which was developed between 1978 and 1985 and put into service by the Bundeswehr in 1992. It was first ordered in 1973 to provide West German infantry with an effective weapon against contemporary Soviet armour, thereby replacing West Germany's aging PzF 44 Light Lanze launchers and the heavy Carl Gustaf 84 mm anti-tank recoilless rifle manufactured in Sweden. The Panzerfaust 3 is operated by at least 11 countries and has first seen combat in Afghanistan. The Panzerfaust 3 series of launchers is a compact, lightweight, shoulder-fired, unguided antitank weapon series. It consists of a disposable canister with a 110-mm warhead and reusable firing and sighting device. The DM12 and DM12A1 projectile consists of a shaped-charge warhead and is filled with Octol 7030, while the tandem DM22 warheads are made of PBX octogene (ca. 95% β-HMX) including the propulsion unit. The penetration performance of the Panzerfaust 3 is due to the shaped charge principle and the quick response of the percussion fuze; the effect on the target does not depend on the impact velocity. The Panzerfaust 3 is light enough to be carried and fired by one person. It can be fired from enclosures since it does not have a significant backblast; the rear of the tube, filled with plastic granulate, minimises the blast effect by the so-called recoilless countermass principle. The booster propellant for the projectile in its tube is ignited by a bolt via a spring mechanism. Once ejected from the launcher, the projectile coasts a safe distance and then the rocket motor is ignited, boosting it to its maximum speed, after which it coasts until impact. The gunner carries at least two rounds, while the assistant grenadier carries an additional three rounds. As a safety precaution, the built-in fuse for the warhead is released by a safety mechanism. This arms the warhead after a flight distance of approximately five meters. Once armed, the warhead will detonate on impact, and as a safety when the rocket's propellant runs out. This safeguards against live ammunition staying around and causing hazards to all in the future. The Panzerfaust 3 is distributed in a special package including spare parts and a cleaning kit. The package contains a launcher, ejector and spring, extractor, dummy extractor plug, bolt-head retaining pin, plastic cleaning rod with brass tip, bore and chamber brushes, camel's hair brush and a prismatic bore scope. It takes several minutes to assemble and load the launcher. The ergonomic design of the controls, such as handles, launcher, barrel shape and optical sight, is a predefined standard. All controls are easy to handle in all shooting positions (lying, kneeling or standing). After the weapon is fired, the firing mechanism with the attached optical sight is removed and the barrel thrown away, the firing mechanism is reusable. The effective combat range of Panzerfaust 3 is from 15 to 300 metres against moving targets and from 400 to 600 metres against static ones. An optical sight with line pattern fixed to the reusable firing mechanism enables it to engage moving or static targets. To ensure night combat capability, a night-vision device or residual light amplifier can be set up in front of the optical sight.

RPG-29 (Vampir) Russian 105mm Rocket-Propelled Grenade (RPG) Launcher





Tiers:



Variants:

- **RPG-29 :** Night sight only shoulder-launch variant
- **RPG-29N:** Night sight only shoulder-launch variant

System

Alternative Designation: Vampir (RPG-29)

Type: Shoulder-launched, unguided, tube-style, breech-loading anti-tank rocket system

Manufacturer: Bazalt, SEDENA

Deployment: The pintle permits the launcher to attach to a tripod ground mount or a vehicle mount. The RPG-29 can be broken down into two parts for one soldier carry (launcher unit front section, and grenade/canister rear section). It can be made ready to fire within a few seconds with quick connect couplings. A folding bipod is provided to assist aiming during prone firing.

Crew : ea2.0

Fire from Inside Building: INA

Displacement Time: less than less than 0.25 min

Emplacement Time: less than less than 0.25 min

↳*Dimensions*

Length, Firing : m1.85 with grenade canister attached

Length, Transport : m1 without rear section/canister

Weapon System

↳*Missile Launcher*

Name: INA

Type: Launch Tube

↳*Missile*

Name: PG-29V (in canister/launch tube extension)

Type: Tandem HEAT (shaped charge)

Cailber: mm105

Cartridge: PG-29V tandem rocket TBG-29V thermobaric rounds

Length, Disassembled for Transportation: m1

Length, Ready to Fire: m1.85

Weight, Unloaded (with optical sight): kg12.1

Weight, Loaded and Ready to Fire: kg18.8

Muzzle Velocity : m/s280.

Armor Penetration : mm CE750+ behind ERA, 950+ conventional

Penetration, Other : mm CE1500+ concrete, 2000 brick, 3000 earth

Effective Firing Range: m500

Effective Firing Range, with with Tripod and Fire Control Unit: m800

Note #1: TBG-29V multipurpose HE thermobaric grenade. Blast effects are the same as the TBG-7V (previous pg.). Effective range (m): 50-2,000 RPG-27, PG-7R grenade for RPG-7V, and RPG-32/Hashim use the same tandem warhead design.

Note #2: Two warheads are available for the weapon: 1. The TBG-29V thermobaric anti-personnel round. 2. he PG-29V anti-tank/anti-bunker round has a tandem-charge HEAT warhead for defeating explosive reactive armor (ERA).

Sights

↳*Sights 1*

Magnification: INA

Name: 1P-38

Sighting Range : m500 for optical sight. Effective range for the iron (post) sight would probably be less.

Type: Day sight: Optical and iron, for RPG-29 shoulder-launch

Weight : kg0.6

↳*Sights 2*

Name: 1PN51, 1PN52 standard RPG-29 or RPG-29N

Type: Night Sight: II sight

Weight : kg2.1

Notes:

The RPG-29 is one of the deadliest rocket launchers in use today. The RPG-29 "Vampir" is a Soviet reusable rocket-propelled grenade (RPG) launcher. Adopted by the Soviet Army in 1989, it was the last RPG to be adopted by the Soviet military before the fall of the Soviet Union in 1991. The RPG-29 has since been supplemented by other rocket-propelled systems, such as the RPG-30 and RPG-32. The RPG-29 has been implicated in an attack on the British Challenger 2, as well as in attacks on invading Israeli Merkava tanks in Lebanon, which breached the tanks' armor and in some cases injured or killed members of the crew. The RPG-29 is a shoulder-launched, unguided, tube-style, breech-loading anti-tank rocket system with a range of 500 meters. The light weapon is designed to be carried and used by a single soldier. On the top of the launch tube is a 2.7×1P38 optical sight. When launched, the missile deploys eight fins as the rocket leaves the launcher, stabilizing the rocket during flight, up to a range of 500 meters. Two warheads are available for the weapon: * The TBG-29V thermobaric anti-personnel round. * The PG-29V anti-tank/anti-bunker round has a tandem-charge HEAT warhead for defeating explosive reactive armor (ERA). This

warhead is standardized with that of the PG-7VR round fired by the RPG-7V rocket launcher.[8] The comprises two charges—an initial small charge triggers any reactive armor. If ERA or cage armor is absent, this charge strikes the main armour. Behind the primary charge, a much larger secondary shaped charge bursts at the rear of the initial warhead and projects a thin, high-speed-jet of metal into the armour compromised by the first charge. PG-29V is capable of killing hard targets, including tanks with ERA. The RPG-29 is unusual among Russian anti-tank rocket launchers in that it lacks an initial propellant charge to place the projectile at a safe distance from the operator before the rocket ignites. Instead, the rocket engine starts as soon as the trigger is pulled, and burns out before the projectile leaves the barrel. On the bottom of the tube is a shoulder brace for proper positioning along with a pistol grip trigger mechanism. A 1PN51-2 night sight can be fitted.

RPG-30 Russian Disposable Anti-tank Grenade Launcher (ATGL)






Tiers:

1 2 **3** 4

System

Alternative Designation: Kryuk (Hook)

Manufacturer: State Research and Production Enterprise, Bazalt

Specifications

Crew: 1

Caliber: mm105 main tandem warhead HEAT rocket; Approx. 40mm sub-caliber precursor “decoy” rocket.

Weight: kg12 (projectile)

Firing Position Length: mm1135

Travel Position Length: mm1135

Rate of Fire: rd/minSingle-shot disposable

Ammunition

Type: Tandem-HEAT

Caliber: mm105 (PG-30)

Range (Effective): m300

Penetration (Armor): 900 + behind ERA, 950 + conventional

Penetration (Brick): 3,000

Penetration (Reinforced Concrete): 1,500+

Penetration (Log and Dirt): m3,700

Muzzle Velocity: m/s120

Sights

Type: Raised iron peep site Sighting Range (m): 50, 100, 150, 200

Night Sights Available: No (can be used with NVG found in OPFOR units). Other sights can be adapted, such as the strap-on British Ring Sight, with NVG.

Notes:

The RPG-30 "Kryuk" ("Hook"; Russian: РПГ-30 «Крюк») is a Russian hand-held disposable anti-tank grenade launcher. The RPG-30 was unveiled in 2008 by the State Research and Production Enterprise, Bazalt, as a modern anti-tank grenade launcher designed to address the challenge of reactive armor and active protection systems (APS) on tanks.[1] Active protection systems such as ARENA-E, Drozd and Trophy defeat anti-armor munitions by destroying them before they reach their target. The RPG-30 is an intended response to the introduction of these systems. The RPG-30 cleared its testing program and entered service in 2012–2013 and was immediately put on the Pentagon's list of "asymmetrical threats to the US armed forces." The RPG-30, like the RPG-27, is a man-portable, disposable anti-tank rocket launcher with a single shot capacity. Unlike the RPG-27 however, there is a smaller diameter precursor round in a side tube, in addition to the main round in the main tube. The precursor round is fired shortly before the main round and acts as a decoy, tricking the target's active protection system (APS) into engaging it. The APS is not ready to engage again until 0.2–0.4 seconds later, allowing the main round time to hit the target. The PG-30 is the main round of the RPG-30. The round is a 105 mm tandem shaped charge with a weight of 10.3 kg (22.7 lb) and has a range of 200 meters and a stated penetration capability in excess of 600 mm (24-in) of rolled homogeneous armor (RHA), 1,500 mm of reinforced concrete, 2,000 mm of brick and 3,700 mm of soil.[

→Rocket Launchers

RPG-28 Klyukva (Cranberry) Russian 125mm Handheld Anti-Tank Rocket Launcher





Tiers:



System

Alternative Designation: Klyukva (Cranberry)
Type: Handheld Anti-Tank Rocket Launcher.
Manufacturer: State Research and Production Enterprise, Bazalt
Rate of fire: rd/min1 (single shot, disposable launch tube)
Operation: Manually cocked, then aimed and fired.
Action: ~900-1000 mm:[2] Rolled homogeneous armor after ERA
Effective Firing Range: m300

Dimensions

Length: mm1200 (carry and firing)
Weight (loaded launcher): kg13.5
Weight (rocket alone): kg12

Ammunition

Description: High Explosive, Anti-Tank (HEAT) RPG 125mm, tandem warhead. Capable of penetrating ERA and up to 1000mm of RHA; up to 3000mm of brick/cinder block; 1500+mm of reinforced concrete; 3700mm of logs and dirt (bunker).
Caliber: mm125
Charge: Tandem shaped charge
Penetration: The round has a stated penetration capability in excess of 1000 mm RHA (after ERA) and 3000 mm of brick.

Sights

Type: PGO-7 Optical or iron peep sight. Iron sights are graduated 15, 100, 150, 200, and 300 meters 300m max effective range.

Notes:

The RPG-28 Klyukva ("Cranberry") is a Russian handheld anti-tank rocket launcher. The RPG-28 was unveiled in 2007 at IDEX Abu Dhabi by the State Research and Production Enterprise, Bazalt as a modern anti-tank rocket launcher designed to defeat modern and future tanks with advanced reactive and composite armour as well as fortified infantry. It was offered for export in 2008. Officially adopted by the Russian Government in December 2011. The RPG-28 shares a close resemblance with the RPG-27 in that it is a portable, disposable anti-tank rocket launcher with a single shot capacity. The RPG-28 has a larger diameter round than the RPG-27 which enables the RPG-28 to achieve higher armour penetration performance. The PG-28 round is a 125 mm tandem shaped charge with a weight of 12 kg and a range of 300 meters. The round has a stated penetration capability in excess of 1000 mm RHA (after ERA) and 3000 mm of brick. Loaded weight is 13.5 kg.

RPG-27 Russian 105mm Disposable Anti-Tank Grenade Launcher (ATGL)







Tiers:



Variants:

- **RMG Variant:** The RMG is a smaller, multipurpose variant of the RShG-1 that is optimized for the bunker buster role and defeating light vehicles and infantry in cover. As a result, its penetration performance against tank armor is reduced. The launcher carries a tandem warhead. The precursor high-explosive anti-tank (HEAT) warhead penetrates armor or other obstacles (reinforced concrete, masonry, etc.). The main warhead creates a fine explosive cloud and takes into the interior through the hole, pierced by the precursor charge. Detonation of the main warhead explosive boasts a multiple effects (high-explosive and incendiary). The RMG rocket launcher ('RMG' stands for “Reaktivnaya Mnogotselevaya Granata” or rocket-propelled multi-purpose grenade) was developed by Bazalt in the early 2000s. As is the case with disposable anti-tank rocket launchers and multi-purpose assault weapons, the designation of the new rocket launcher is the designation of its round. The design project was supervised by leading designer S. Kh. Irtuganov. Officially adopted by the Russian Government in December 2011.
- **RSHG-1:** INA

System

Alternative Designation: Tavolga (Meadow Grass)
Cailber/Length : mm105
Crew : ea1
Rate of Fire : rd/minSingle-shot disposable
Penetration: 600 - ~ 750 mm: RHA after ERA 1500 mm: Brick 3700 mm: Earth
Muzzle Velocity: m/s120
Effective Firing Range: m200

↳*Dimensions*

Length, Firing : m1.155
Length, Travel : m1.155

Weight: kg7.6

Munition

↳*Munition 1*

Cailber/Length : mm105

Muzzle Velocity : m/s120

Range, Effective : m200

Type: Tandem-HEAT

Sights

↳*Night Sights*

Available: No

↳*Sights*

Notes: (Can be used with NVG found in Hybrid Threat units). Other sights can be adapted, such as the strap-on British Ring Sight, with NVG.

Type: Raised iron peep sight

Notes:

The RPG-27 is a Soviet disposable rocket launcher. The RPG-27 shares a close resemblance with the previous RPG-26 in that it is a man-portable, disposable anti-tank rocket launcher with a single shot capacity. The RPG-27 has a larger diameter round than the RPG-26 which enables the RPG-27 to achieve higher armor penetration performance. The RPG-27 fin stabilized round is a 105 mm tandem-charge HEAT warhead with a range of 200 meters. The round has a stated penetration capability in excess of 600 mm of RHA (after ERA) and 1500 mm of brick or concrete and 3700 mm of earth. The RShG-1 is very similar in operation to the RPG-27 but carries a thermobaric warhead with a lethal radius of 10 meters and a larger range of 600 meters. Officially adopted by the Russian Government in December 2011.

RPO-A Shmel Russian 93mm Man-Portable Disposable Rocket Launcher







Tiers:



Variants:

- **Shmel-M/PDM-A Priz:** This is a reusable upgrade system adopted in the Russian Army in 2003 to replace the disposable RPO-A. It Includes a reusable mini- grip-stock launcher, with a reflex sight and pistol grip. Disposable canisters (with munitions) slide on and serve as the launcher tubes. The Shmel-M is more powerful (50 % more blast = 152/155-mm cannon round) and lighter in weight than RPO-A. Range is 800m, 300m direct fire. Specifications are: caliber 90 mm, length 940 mm, weight 8.8 kg for 2. In time other canister fills (e.g., smoke and incendiary) will be available. Standard issue (2 grenades per launcher) is more compact than 2 RPO-A launchers.
- **PF-97:** Chinese licensed copy of RPO-A, with optical sight mounted on some launchers.

System

Alternative Designation: Shmel (Bumblebee). Although “RPO” may be used generically to describe various infantry flame weapons, RPO- A is this specific multi-role flame weapon system.

Components : Container, ejection motor, warhead.

Crew : ea1.0

Quantity, Weapons in a Package: ea2.0

Rate of Fire : rd/min2.0

Reaction Time, Travel to Fire : sec30.0

↳*Dimensions*

Length : Launcher: 920 mm Rocket: 700mm

Weight: kg11

Ammunition

Fire from Inside Building: Yes. It can be fired in enclosures of 60m3 or greater or with a barrier behind the weapon.

↳*Ammunition (Option 1)*

Name: RPO-A

Type: Thermobaric-flammable mixture

Cailber/Length : mm93.0

Burn Temperation : deg C800+

Casualty Area : m250 m2(personnel in the open); 80 m3 (enclosed space)

Lightly armored materiel kill probability at 400 m : 0.7

Weight, Mixture: kg2.1

Notes: The RPO-A is known as the infantryman's pocket artillery because the demolition effect corresponds to 122-mm HE artillery, and 120-mm mortar projectile. It can buckle armor, penetrate rubber seals and enter openings in vehicles, injure or kill personnel, and collapse roofs and doors on bunkers and buildings.

↳*Ammunition (Option 2)*

Name: RPO-D

Type: Smoke-Incendiary Type, Based on red phosphorous.

Smokescreen Depth and Height : mINA

Smokescreen Duration : min3-5

Smokescreen Effective Against: Visual and infrared

Smokescreen Length : m55-90

Smokescreen Time of Formation : min2.0

Weight : kg2.3

↳*Ammunition (Option 3)*

Name: RPO-Z

Type: Incendiary

Weight, Mixture: kg2.5

↳*Ammunition (Option 4)*

Name: Shmel-M

Type: Thermobaric

Accuracy: m .5 m2 at 200 m

Combat Load : rds2 per launcher

Direct Fire : Direct Fire: 200 with iron sight, 850 with optical sight

Indirect Fire: 1000.0

Minimum : 20.0

Muzzle Velocity : m/s125.0

Range : mRange

Range, Effective : m600.0

Sights

Name: OPO-1

Type: Optical calibrated to 600 m

Location: Left, next to grip

Magnification: None

↳***Night Sight***

Available: INA

Notes:

The RPO-A Shmel (Russian: реактивный пехотный огнемёт-А Шмель (РПО-А Шмель), Rocket-propelled Infantry Flamethrower-A Bumblebee) is a man-portable disposable rocket launcher, although it is classified as a flamethrower by its manufacturer KBP. The Shmel is designed, produced and exported by the Russian Federation and previously by the Soviet Union. It entered service with the Soviet Armed Forces at the end of the 1980s as the successor for the RPO Rys. The RPO-A is a single-shot, self-contained tube shaped launcher that operates much like some RPG and LAW rocket launchers, a sealed tube, carried in a man-pack in pairs. The same person can remove the tube, place it in firing position, and launch the weapon without assistance. After launch, the tube is discarded. All models are externally similar. Each weapon contains a single rocket, of which there are three varieties. The basic rocket is the RPO-A, which has a thermobaric warhead and is designed for attacking soft targets under moderate cover. The RPO-Z is the incendiary warhead (Rus. зажигательный / Zazhigatel'nyy, Incendiary) designed to spread fire and ignite targets. There is a smoke-producing warhead (Rus. дымовой / Dymovoy, Smoke) offered, the RPO-D.

RPG-18 Russian Anti-Tank Rocket Launcher







Tiers:

1 2 3 4

System

Alternative Designation: RPG-18
Type: Disposable Light Anti-Tank Rocket Launcher
Crew: ea1
Displacement Time: INA
Emplacement Time: INA
Prime Mover Required: No
Man Portable: Yes
Reloadable: No
Penetration: 300 mm: RHA 500 mm: Reinforced concrete 1000 mm: Brickwork
Muzzle Velocity: 115 m/s
Effective Firing Range: 200 m

Dimensions

Length: 705 mm (unarmed) 1,050 mm (ready to fire)
Width: INA
Weight, Combat: kg1.4 kg (projectile) 2.6 kg (loaded)

Rocket

Name: PG-18

Type: HEAT

Caliber: 64 mm

Notes:

The RPG-18 Mukha (Russian: Myxa, romanized: Fly) is a Soviet short-range, disposable light anti-tank rocket launcher. The RPG-18 is very similar to the US M72-series LAW anti-tank rocket launcher. The RPG-18 has been succeeded by the RPG-22, a very similar design with a larger warhead. The RPG-18 fires a 64 mm PG-18 HEAT warhead mounted on a small rocket capable of engaging targets within 200 meters. The warhead self-destructs 6 seconds after launch, placing definite limits on range even if a sight was used that was effective with targets beyond 200 meters. The RPG-18 itself can penetrate up to 375 mm of conventional armor. However, performance is significantly diminished when the RPG-18 is employed against targets protected by HEAT-resistant ERA or composite armor. Unlike better known weapons, the RPG-18 requires only one operator because it is not reloadable. Assistant grenadiers are used to help reload the RPG-2, RPG-7 and RPG-16 systems.

Type 70-1 Chinese 62mm Rocket Launcher





Tiers:



Variants:

- **FHJ-84:** A twin-barrel incendiary rocket launcher, which used the same 62mm caliber and reloading mechanism. Mainly used to fire smoke and incendiary rockets as a supplement to short-range flamethrowers.

System

Alternate Designation: Type 70
Type: Rocket Launcher
Caliber: mm62
Manufacturer:
Crew: 1
Recoil: Recoilless
Maximum Effective Range: 200m
Maximum Range: 800m

Dimensions

Length: 1.2m
Weight: 2.03kg

Ammunition

Type: HEAT, Airburst anti-personnel
Shell Weight: 1.18kg

Basic Load: 1 per soldier

Armor Penetration: 345mm

Notes:

This is a light antitank weapon intended for one-man use against light and medium armor. It is comprised of a two-part launch tube of fiberglass, with a simple pistol grip and sight. The rear of the launcher is removed for loading; the round is placed inside and the rear section replaced around the rocket. The rocket is very light, and the Chinese use the Type 70-1 more as a bunker buster or antipersonnel weapon than an antiarmor weapon. The Type 70-1 used a two-piece tube design. The front tube is the launch tube (which could be used multiple times). The rear tube was a single use component (which carries a single rocket). The whole weapon system weighed 3.28kg. Both tubes were connected and locked by a rotary latch and all made of plastic impregnated fiberglass. Close to the screw coupling, there was an aluminum reinforcement in the inner tube. The ammunition tube was encased with a bakelite cover and rubber sealing ring on both sides. A copper terminal jumper was set the inner side of the rear sealing cover forming a rudimentary safety–when the rear cover was still on the tube, it worked as a short circuit.

PF-98 (Type 98) Chinese 120mm Anti-Tank Rocket Launcher





Tiers:

1 **2** 3 4

System

Alternative Designation: PF-98;Type 98; “Queen Bee”

:

:

:

Specifications

Crew: 2, 3 if more rounds are needed

Caliber (launch tube): mm120

Caliber (warhead): mm120

Weight: INA

Length (firing): mmINA

Length (travel): mmINA

Rifling: None

Breech Mechanism Type: Rocket canister is attached to end of launcher, extending the launch tube.

Launcher mount: Shoulder for company launcher, Tripod, shoulder, or pintle for battalion launcher.

Rate of Fire: 4–6 rounds per minute

Fire From Inside Building: No

Maximum range: 800 m (HEAT); 1800 m (HE)

Combat Load: 5 rockets.

Ammunition

Type: Tandem HEAT and Multipurpose

↳*HEAT, with time fuze*

Type: Tandem HEAT (shaped charge)

Caliber: mm120

Range: m800 battalion, 400-500 with company level launcher

Penetration: mm800+

Weight: kg6.4

Time of Flight: sec10

↳***Multipurpose***

Caliber: mm120

Type: Frag-HE-Incendiary (120 steel balls)

Range: m2,000

Penetration: 400 mm KE for steel balls, 25 m lethal radius

Weight: kg7.6

Sights

↳***Y/MK/PF98(Y)-120***

Type: Ballistic computer laser range-finder (LRF) sight for battalion version, and optical telescope for company sight

Notes:

The Type 98 (PF-98) is a 120mm unguided anti-tank rocket system developed by Norinco for the People's Liberation Army as a successor to the Type 65 and Type 78 recoilless guns. It is also known by its nickname, "Queen Bee". The PLA began to search for a successor for the Type 78 in the 1990s. The older, 1950s-era equipment began to show its age. The Type 98 was revealed with a garrison unit in Macao in 1999, while some elite units began to receive the weapon after 2000. The design makes the accurate delivery of a 120 mm multi-purpose high-explosive or high-explosive anti-tank projectile with negligible recoil possible. The weapon can be tripod- or shoulder-fired. The reusable tube launcher is fibreglass-wrapped and weighs under 10 kg. Two variants are available; both are equipped with night vision. The reaction time (from acquiring the target to firing) is about 10 seconds. Starting from 1999, the PLA deployed PF98 to both Company and Battalion units for direct and indirect infantry fire support. The fire-control of the battalion version Type 98 consists of an optical sight with night vision channel (500 m range), a fire-control computer, a laser range-finder and an LED display. The system can automatically find the distance and make the ballistic calculations which are then displayed on the LED screen for the gunner. This reduces the reaction time and makes for increased accuracy. The company version Type 98 is fitted with an x4 telescopic optical sight with a night vision channel (300 m range). A computer calculates the lead of moving targets and put a light spot in the gunner’s optical sight to assist in aiming the device. The tripod of the battalion version allows an elevation of +30° to −6° around 360°. The weapon is manually operated by 1–2 soldiers. The company version has a small fixed tripod to support the launcher when it is used in lower firing position. In late 2018, the lightweight PF-98A was deployed for infantry use on a squad level. The launcher's firing tube, tripod and carrying handle are modified to reduce weight significantly. The HEAT (High Explosive Anti Tank) projectile is armed with a double (tandem) warhead and an electronically timed fuse. The round can pierce the reactive armor of a main battle tank, and has an armour-piercing depth of about 800 mm RHA (under 90 degrees) at a maximum range of 800 m. The multipurpose high explosive round has a warhead with 120 steel balls and incendiary material. This round is capable of piercing 400 mm armor (under 55 degrees). Due to the fragmented nature, it kills the crew inside, or produces fragments to kill other personnel within 25 m of the point of impact. The maximum range is 1,800–2,000 m.

DZJ-08 (Type 08) Chinese 80mm Multi-Purpose Rocket Launcher






Tiers:

1 **2** 3 4

System

Alternate Designation(s): DZJ-08; Type 08

Type: Multi-Purpose Rocket Launcher

Caliber: mm80

Manufacturer: Norinco

Crew: 1 (single-use, disposable)

Rate of Fire: 5-7 rounds per minute

Muzzle Velocity: 172 m/s

Maximum FIring Range: 300 m

Effective Firing Range: 25 m to 200 m

Sights: optical 1×/3× day sight

Dimensions

Length: 971 mm

Launcher Weight: INA

Total Weight: 7.6 kg

Ammunition

Name: INA

Type: Type 08 utilizes countermass to reduce the recoil, noise, muzzle flash, pressure wave and back blast that can cause burns and overpressure as well as creating conspicuous launch signature of the user. Moreover, Type 08's multipurpose ammunition has a relatively small blast radius of 7 meters, which gives the weapon system a minimum range of 25 meters. Thus, a soldier can fire the weapon more safely inside confined spaces.

Caliber: mm80

Cartridge: 80×428 mm

Cartridge Weight: 1.65 kg (3.6 lb)(Standard Multipurpose)

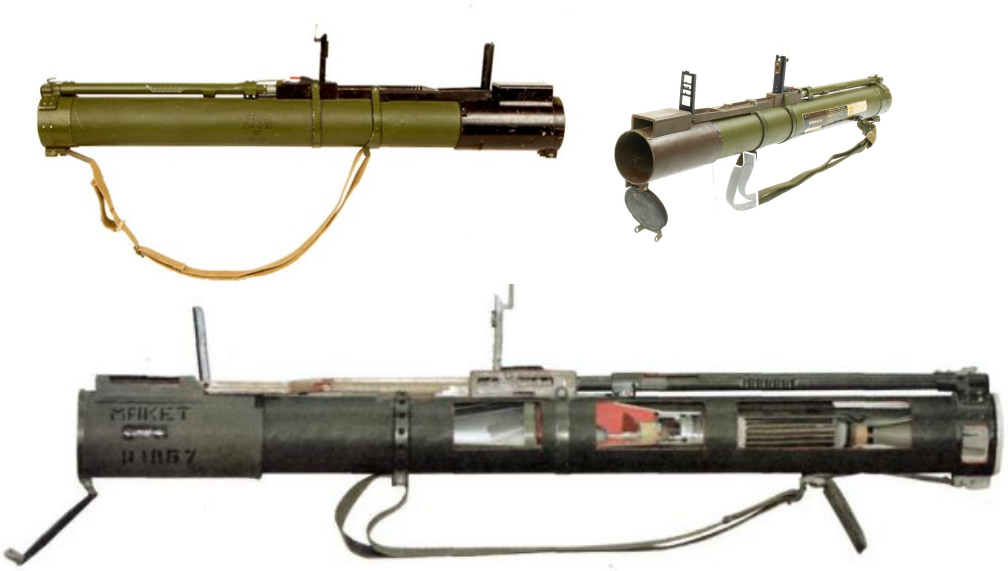
Penetration: The high-explosive ammunition of DZJ-08 is specially designed to penetrate structures. It can penetrates 25 mm of steel armor at 65° angle, or around 30 mm of steel armor at 90° angle. Although it is not effective against heavy

vehicle, lightly armored vehicles, such as armored personnel carriers, can still be penetrated and destroyed by DJZ-08. The biggest improvement of DZJ-08 is the ability to penetrates 500 mm of reinforced concrete, whereas the predecessor PF-89A with its multipurpose round can only penetrate 300mm of reinforced concrete.

Notes:

The DZJ-08 Type 08, 80 millimetre Individual Multipurpose Assault Ammunition System') is a portable, disposable, unguided, shoulder-launched, multipurpose recoilless weapon. The weapon is designed as a multi-role assault weapon aiming to provide anti-armor, anti-fortification, anti-personnel capability. Designed and manufactured by Norinco for People's Liberation Army, Type 08 is the successor to Type 89A multipurpose rocket launcher. The Type 08 has a unique firing mechanism called hermetic balance projection possibly inspired by C.Davis recoilless principle. Compare to the previous system, Type 08 utilizes countermass to reduce the recoil, noise, muzzle flash, pressure wave and back blast that can cause burns and overpressure as well as creating conspicuous launch signature of the user. Moreover, Type 08's multipurpose ammunition has a relatively small blast radius of 7 meters, which gives the weapon system a minimum range of 25 meters. Thus, a soldier can fire the weapon more safely inside confined spaces. The high-explosive ammunition of DZJ-08 is specially designed to penetrate structures. It can penetrates 25 mm of steel armor at 65° angle, or around 30 mm of steel armor at 90° angle. Although it is not effective against heavy vehicle, lightly armored vehicles, such as armored personnel carriers, can still be penetrated and destroyed by DJZ-08. The biggest improvement of DZJ-08 is the ability to penetrates 500 mm of reinforced concrete, whereas the predecessor PF-89A with its multipurpose round can only penetrate 300mm of reinforced concrete. Type 08 is China's first attempt to develop an anti-tank weapon that can be used in confined space and urban warfare. China used Type 89 rocket launcher to replace Type 69 RPG in the 90s, however the problem of back blast became prominent. Since May 2000, Norinco started to design a new generation of weapon that is portable, single-use and can be distributed to each individual soldier of infantry squad like Type 89 yet offers low collateral damage. DZJ-08 weights 7.6kg, is water-proof and features a fordable day sight. The weapon also has folding front-grip and carrying handle. Firing instruction is printed on the left side of the launch tube.

RPG-22 Russian 72.5mm Anti-Tank Rocket Launcher



Tiers:

1 2 **3** 4

System

Alternative Designation: RPG-22
Crew: 1
Shell: HEAT with penetration of 400 mm versus RHA
Muzzle Velocity: m/s133
Maximum Firing Range: m250
Effective Firing Range: m150-200
Fire From Inside Building: No, as back blast is out to 30 m behind the weapon.

Dimensions

Caliber: mm72.5
Weight: kg2.8
Firing Position Length: mm850
Travel Position Length: mm750

Ammunition

Type: HEAT
Caliber: mm72.5
Length: mm618
Weight: kg1.48

Combat Load: INA

Effective Range: m250

Arming Range: INA

Armor Penetration: mm390

Brick Penetration: m1.2

Reinforced Concrete Penetration: m1

Initial Muzzle Velocity: m/s133

Maximum Muzzle Velocity: m/s300

Sights

Type: Iron, calibrated for 50, 150, 200 m

Magnification: None

Location: Top of launcher

Sighting Range: m250

Night Sights Available: No

Notes:

The Soviet RPG-22 Netto is a one-shot disposable anti-tank rocket launcher first deployed in 1985, based on the RPG-18 rocket launcher, but firing a larger 72.5 mm fin stabilised projectile. The weapon fires an unguided projectile, can be prepared to fire in around 10 seconds, and can penetrate 400 mm of armour, 1.2 metres of brick or 1 metre of reinforced concrete. The smoothbore container is made from two fibreglass parts; a main tube containing the rocket, and a telescoping forward extension, which slides over the barrel. In transport mode, both ends of the barrel are closed by plastic covers, which open when the weapon is extended. The firing mechanism is manually cocked by raising the rear sight. Lowering the rear sight de-cocks the weapon if there is no target. On firing, there is a backblast danger area behind the weapon, of at least 15 metres. The solid propellant motor completely burns out while the rocket is still in the barrel tube, accelerating it to about 133 metres per second. The weapon has simple pop-up sights graduated to ranges of 50, 150 and 250 metres. To keep training costs down, a reusable RPG-22 is available that fires a 30 mm subcalibre projectile, weighing 350g, to operational ranges. Handling is identical to that of the full calibre version, with the exception of the discharge noise and backblast. On the evening of 20 September 2000, the MI6 Building in London (the headquarters of the British Secret Intelligence Service) was attacked by unapprehended forces using a RPG-22 anti-tank rocket, causing superficial damage. A weapons cache destined for the Real IRA that was seized in Croatia in August 2000 contained a number of RPG-22s. Prices range from £150 to £220 per weapon. The one used against the MI6 building was Russian-made, while one found at Dungannon came from Bulgaria.

M79 Osa Former Yugoslavian 90mm Anti-Tank Rocket Launcher







Tiers:



Armament

Displacement Time : minless than 0.25

Emplacement Time : minless than 0.25

System

Cailber/Length : mm105, tube

Deployment: The M79 Osa was designed and manufactured by Sloboda Čačak in the former Socialist Federal Republic of Yugoslavia. It has continued production in Serbia, the Republic of Macedonia, and in Croatia as the RL90 M95. A large number of M79 OSA rocket launchers have been supplied to rebels in Syria which have been proven effective in deterring the Syrian Army's armor. Many have mistaken the M79 supplied to the rebels in Syria for the Russian RPG-29 rocket launcher, which is also seeing use. M79 Osa's are also used in Iraq by Islamic State against Iraqi army and JANES has reported their use against US-made M1A1 Abrams tanks.

Crew : ea2.0

Barrel Life : rds 300.0

Fire from Inside Building: INA

Rate of Fire : rd/min6

Maximum Firing Range: m1,960

Effective Firing Range: m350

↳*Dimensions*

Length, Launcher Loaded: m191

Length, Rocket: m0.67

Weight, Loaded: kg11.2

Weight, Launcher: kg6.2

Weight, Rocket: kg3.5

Munition

↳*Munition 1*

Armor Penetration : mm CE750+ behind ERA, 950+ conventional

Cailber/Length : mm105.0

Cailber/Length : mm105.0

Muzzle Velocity : m/s280.0

Name: PG-29V (in canister/launch tube extension)

Penetration, Other : mm CE1,500+ concrete and brick, 2000 brick, 3000 earth

Range, Effective : m800.0

Weight : kg6.7

Sights

↳*Sights 1*

Location: Left side

Magnification: 1x/3.5x

Name: Simrad IS2000 or similar EO sight for RPG-29 Mounted

Sighting Range : m800.0

Type: LRF-based FCS with ballistic computer

↳*Sights 2*

Location: Left side

Magnification: 1x/3.5x

Name: KN250F or similar sight for RPG-29 Mounted

Other: A variety can be used. 1st was the heavy 2Ts35 (3kg).

Sighting Range : m600-800 for vehicle targets; 300+ man

Type: 3 gen II clip-on sight designed to work with day sight

Notes:

The M79 Osa (Serbian: Oca; "wasp") is a Yugoslav-made portable 90 mm anti-tank weapon made of fibre-reinforced plastics. It resembles the French portable anti-tank launcher 89 mm LRAC F1. It consists of the launcher, a CN-6 sighting piece, rocket and carrying case for the rocket. The M79 shoots unguided projectiles in direct sight and is effective against armoured fighting vehicles and fortifications. The M79 Osa is operated by a two-man team, an operator and a loader. The loader inserts the rocket container through the rear of the launcher. The operator then takes aim at the target through the CN-6 sight. The CN-6 sight has 3.5x magnification and a 10 degree field of view. It also features anti-laser filters to protect the operator from blinding battlefield lasers. When the trigger is pressed, the rocket motor is fired electronically. The rocket leaves the launcher at a speed of approximately 250 meters per second. It is accurate enough to be used against armoured vehicles at a range of 350 meters, and can engage larger stationary targets up to 600 meters away. On impact a piezoelectric impact fuse in the rocket triggers the shaped charge warhead, which can penetrate up to 400 millimeters of armour. The fuse is sensitive enough to trigger the warhead at impact angles up to 70 degrees from the vertical. After firing, the spent rocket container is removed from the launcher, and a fresh tube is attached. The M79 Osa was designed and manufactured by Sloboda Čačak in the former Socialist Federal Republic of Yugoslavia. It has continued production in Serbia, North Macedonia, and in Croatia as the RL90 M95. A large number of M79 OSA rocket launchers have been supplied to rebels in Syria which have been proven effective in deterring the Syrian Army's armor. Many have mistaken the M79 supplied to the rebels in Syria for the Russian RPG-29 rocket launcher, which is also seeing use. M79 Osa's are also used in Iraq by Islamic State against Iraqi army and JANES has reported their use against US-made M1A1 Abrams tanks.

Type 98 (PF-98) Chinese 120mm Anti-Tank Rocket




Tiers:



Variants:

- **PF98:** Battalion and company level version.
- **PF98A:** Lightweight version for infantry squad.

System

Alternative Designation: Type 98; PF-98; Queen Bee

Type: Anti-Tank Rocket

Crew: ea1-2

Displacement Time: INA

Emplacement Time: INA

Man Portable: Yes

Launcher: The reusable tube launcher is fibreglass-wrapped and weighs under 10 kg. Two variants are available; both are equipped with night vision. The reaction time (from acquiring the target to firing) is about 10 seconds. Starting from 1999, the PLA deployed PF98 to both Company and Battalion units for direct and indirect infantry fire support. The fire-control of the battalion version Type 98 consists of an optical sight with night vision channel (500 m range), a fire-control computer, a laser range-finder and an LED display. The system can automatically find the distance and make the ballistic calculations which are then displayed on the LED screen for the gunner. This reduces the reaction time and makes for increased accuracy. The company version Type 98 is fitted with an x4 telescopic optical sight with a night vision channel (300 m range). A computer calculates the lead of moving targets and put a light spot in the gunner’s optical sight to assist in aiming the device. The tripod of the battalion version allows an elevation of +30° to −6° around 360°. The weapon is manually operated by 1–2 soldiers. The company version has a small fixed tripod to support the launcher when it is used in lower firing position. In late 2018, the lightweight PF-98A was deployed for infantry use on a squad level. The launcher's firing tube, tripod and carrying handle are modified to reduce weight significantly.

Dimensions

Length: 1191 mm

Width: INA

Height: INA

Weight, Combat: 10 kg

Missile

Name: INA

Type: HEAT

Caliber: 120mm

Warhead: The HEAT (High Explosive Anti Tank) projectile is armed with a double (tandem) warhead and an electronically timed fuse. The round can pierce the reactive armor of a main battle tank, and has an armour-piercing depth of about 800 mm RHA (under 90 degrees) at a maximum range of 800 m.

Maximum Firing Range: 800 m (HEAT) to 1800 m (HE)

Note: The multipurpose high explosive round has a warhead with 120 steel balls and incendiary material. This round is capable of piercing 400 mm armor (under 55 degrees). Due to the fragmented nature, it kills the crew inside, or produces fragments to kill other personnel within 25 m of the point of impact. The maximum range is 1,800–2,000 m.

Fire Control

Name: INA

Computerized FCS: Yes

Optical Sight: Yes, optical / 4× optical

Night Vision: Yes

Night Vision Range: 500 m

Laser Range -Finder: Yes

LED Display: Yes

Notes:

The Type 98 (PF-98) is a 120mm unguided anti-tank rocket system developed by Norinco for the People's Liberation Army as a successor to the Type 65 and Type 78 recoilless guns. It is also known by its nickname, "Queen Bee".

PF-89 (Type 89) Chinese 80mm Anti-Tank Rocket Launcher







Tiers:



Variants:

- **PF-89:** High-explosive
- **PF-89A:** Multipurpose incendiary
- **PF-89B:** High-explosive tandem-charge
- **WPF-89-1:** Thermometric
- **WPF-89-2:** Thermometric tandem-charge

System

Alternate Designation(s): PF-89
Type: Portable, disposable, unguided, shoulder-launched, anti-tank rocket-propelled rocket launcher
Caliber: mm80
Manufacturer: Norinco
Crew: 1 (single-use, disposable)
Action: Single-shot
Rate of Fire: 5-7 rounds per minute
Muzzle Velocity: 147 m/s
Maximum Firing Range: 400 m
Effective Firing Range: 100 m to 250 m
Sights: optical 1x/2.5x (day sight)

Dimensions

Length: 900 mm

Launcher Weight: 1.85kg

Total Weight: 3.7 kg

Ammunition

Name: PF-89

Type: High-explosive

Cartridge: 80mm

Cartridge Weight: 1.84kg

Penetration: 180mm/65°

Velocity: 147 m/s

Notes:

The PF-89 or Type 89 is a portable, disposable, unguided, shoulder-launched, anti-tank rocket-propelled rocket launcher. Developed by Norinco for People's Liberation Army, PF-89 was designed to replace the obsolete Type 69 RPG, providing a man-portable, single-use assault weapon system that could used primarily by infantry squads in order to engage and defeat light armor and bunkers. The design permits accurate delivery of an rocket-propelled 80mm High Explosive Anti-Tank warhead, with negligible recoil. PF-89 entered mass production in 1993, and generally replaced Type 69 RPG in PLA throughout 1990s. Since 2010, the system is being used alongside with the more advanced Type 08 recoilless gun. The PF-89 is a lightweight, self-contained, anti-armor weapon comparable to the Swedish AT4 (U.S. Designation M136). Unlike AT4, PF-89 is a rocket-propelled weapon instead of a recoilless gun which by design is more similar to M72 LAW and RPG-26. The weapon consists of a free-flight, fin-stabilised, rocket-propelled cartridge packed in a one-piece, one-off, fiberglass-wrapped tube. It is man-portable and is fired from the right shoulder only. The launcher is watertight for ease of transportation and storage. The PF-89 has a simple optical sight for aiming, with no night combat capability. The firer must be able to see and identify the target and estimate the range to it. The round of ammunition is self-contained in a disposable launch tube. The system weighs only eight pounds and can be utilized effectively with minimal training. However, the problem of back blast became prominent after Army adopted PF-89. Collateral damage is especially concerning for PLA that utilizes motorized infantry fighting tactics. China developed Type 08 multipurpose recoilless gun with countermass balance mechanism to replace the PF-89.

RPO PDM-A (Shmel-M)Russian 90mm Thermobaric Rocket Launcher



Tiers:



Variants:

- **RPO PDM-A:** The RPO-A Shmel (Russian: реактивный пехотный огнемёт-А Шмель (РПО-А Шмель), Rocket-propelled Infantry Flamethrower-A Bumblebee) is a man-portable disposable rocket launcher, although it is classified as a flamethrower by its manufacturer KBP. The Shmel is designed, produced and exported by the Russian Federation and previously by the Soviet Union. It entered service with the Soviet Armed Forces at the end of the 1980s as the successor for the RPO Rys.
- **MGK Bur:** MGK Bur is a 62 mm version of the RPO-M consisting of two major components: the disposable launch tube and reusable fire control unit. Described as "the most compact grenade launcher in the world," the weapon has an overall length of 742 mm and weighs 5 kg (11 lb). Loaded tubes weigh 3.5 kg (7.7 lb) and can fire thermobaric (blast yield similar to 6 kg (13 lb) of TNT, or a 122 mm artillery rocket) or fragmentation warheads. The fire control unit is the same one used on the RPO-M, weighing 1.5 kg (3.3 lb) and enabling ranges of 25–650 m with the baseline day sight; night and thermal systems are also available. Maximum range is 950 meters, with a firing mechanism service life of at least 500 rounds. It can be fired in confined spaces with a volume of at least 30 cubic meters. As of October 2014, it has been accepted into service and serial production has been started.

System

Alternate Designation(s): RPO-M "Shmel-M"
Primary Function / Type: Thermobaric rocket launcher
Caliber: mm90
Muzzle Velocity: INA
Maximum Range: m1,700
Rang of Effective Fire: m600
Disposable Launching Tube: Yes
Fire Control Unit: Yes
Electronic Trigger: Yes

Dimensions

Length: mm940
Weight: kg8.8
:

Ammunition

Name: INA

Type: 90 mm thermobaric rockets.

Blast Efffect: equivalent to 5.5 kg (12 lb) of TNT, comparable to a 155 mm artillery shell.

Weight: kg8.8

Basic Load: Due to its lighter weight the operator can carry 3 rockets instead of 2.

Sights

Maximum Sighting Range: m800

Note: optical sight and additional rail for an infrared/night vision sight.

Notes:

The RPO PDM-A (Shmel-M) is a next-generation version of the RPO-A Shmel with dramatically increased range and blast yield. It was developed to meet requirement of the Russian MoD as a follow-on to the RPO-A Shmel. However this design has evolved to the point that it is effectively a new weapon rather than improved version of the RPO-A Shmel. Sometimes this weapon is unofficially referred as RPO-M, Shmel-2, RPO-2 or Priz. Though its actual manufacturer's designation is RPO PDM-A (Shmel-M). Letters "PDM" in the designation stand for "Improved Range and Lethality". Unlike the previous RPO-A, this weapon is reloadable. The Shmel-M was introduced into the Russian Army in 2003 or 2004. Officially classified as a "flamethrower", the Shmel-M is technically a rocket launcher similar to RPG-series anti-tank weapons, but it is nonetheless suitable for different missions. It is used by dedicated flamethrower squads. It is being proposed for export customers. This weapon saw action in Syria, and possibly some other countries. This devastating weapon was designed to engage infantry holed-up in buildings, trenches, field fortifications and fortified structures. It is also extremely efficient against soft-skin and lightly armored vehicles, as well as other targets, such as parked aircraft, radar dishes, command posts and so on. This shoulder-launched weapon fires 90 mm thermobaric rockets. These are smaller than 93 mm RPO-A rockets. Yet the newer RPO PDM-A weights less at 8.8 kg, opposed to 11 kg. Furthermore it carries more thermobaric filler (3 kg opposed to 2.1 kg) and has a more modern thermobaric compound. Also the new weapon is more ergonomic. Due to its lighter weight the operator can carry 3 rockets instead of 2. The rocket is factory fitted and sealed in a hermetical tube. On impact the Shmel-M's projectile releases its thermobaric filler in a cloud-like form by a small precursor charge employing a conventional high explosive compound. The thermobaric filler combusts on contact with the air. Detonation generates immense heat and pressure and creates intense incendiary and blast effects over a large area. It is claimed by the manufacturer that the blast of the Shmel-M munition is equivalent in power to 152 mm high explosive artillery shell, or equivalent to 6 kg of TNT. It is substantial for such a small and portable munition. The warhead creates a fireball with a radius of 7 m. Tough the casualty radius could be around 65 meters. This weapon can be used in the areas where fire support is difficult or impossible to provide. The effects of the blast on personnel are generally the same as those of basic high explosives, but with substantially greater trauma associated with blast overpressure; this includes internal hemorrhaging, ruptured internal organs (especially the lungs), and even broken bones, and these effects are especially pronounced and brutal against personnel inside confined areas, such as buildings, trenches or pillboxes. These make the Shmel-M exceptionally effective for clearing-out enemies in closed terrain, without having to risk close quarters combat with an enemy that is likely waiting in ambush. The Shmel-M is also extremely effective against against soft-skin vehicles, such as trucks, and lightly armored vehicles. However heavily armored vehicles, such as tanks, are unlikely to sustain any significant damage, unless their hatches are open. The Shmel-M is a reloadable weapon. Once the rocket is launched, the empty tube is discarded, and reloaded by a new tube with rocket. The previous RPO-A Shmel was a single-use weapon. The new weapon has a simple flip-up sights with a sighting range of 800 m. The sights consist of a fixed front post and a flip-up rear diopter. The sights are adjustable for range from 100 m to 800 m, in increments of 100 m. Though optional optical day or night sights can be equipped for improved accuracy. Though it seems that the Russian Army never ordered these optional sights and use this weapon with basic flip-up sights. The Shmel-M has an effective range of 600 m opposed to 300 m of the older RPO-A. Maximum range also increased to 1 700 m from 1 000 m.

→Anti-Tank Guided Missiles (ATGM)

9K113 Konkurs (AT-5 Spandrel) Russian Anti-Tank Guided Missile (ATGM)







Tiers:

1 2 **3** 4

Variants:

- **9M113M:** INA

System

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↳ ***Anti-Tank Guided Missile (ATGM)***

Name: 9M113 Konkurs (AT-5 Spandrel)
Type: Soviet SACLOS wire-guided anti-tank missile.
Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod
Length, with Gas Generator: mm1,150
Length, Without Gas Generator: mm875
Diameter: mm135
Wingspan: mm468
Weight, Missile: kg14.6
Weight, 9P135 Launching Post: kg22.5
Wahread Type: 9N131 HEAT

Warhead Weight: kg2.7

Detonation Mechanism: Contact

Engine: Solid-fuel rocket

Operarational Range: 70 m - 4 km

Speed: mm/s208

Guidance system: Wire-guided SACLOS

Steering System: Two control surfaces

↳***Models***

9M113 Konkurs: (NATO: AT-5 Spandrel, AT-5A Spandrel A)

9M113M Konkurs-M: (NATO: AT-5B Spandrel B) Tandem warhead – with extended explosive probe. The warhead penetration is 750–800 mm vs RHA. Adopted in 1991. Missile 9M113M 1990. Fagot/Kornet. Tandem (800 mm (behind a layer of ERA)). 4,000 m (3500 m night (passive)). Low price.

Towsan-1, Tosan, Towsan, or M113: Iranian licensed 9M113M Konkurs-M (AT-5B Spandrel B) copy.Introduced in early 2000. Unclear if still in production.Used primarily by paratroopers and armored vehicles.

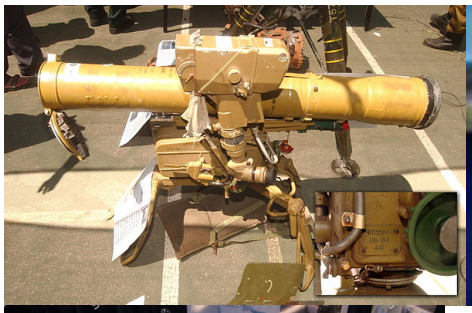
9N131M1: Warhead, upgraded version.

9N131M2-1: Warhead, the newest upgraded version

Notes:

The 95113 Konkurs is the most successful anti-tank weapons ever developed by the Soviet Union. It was developed at the same time as the smaller 9K111 Fagot and features a similar design. The 9K113 uses a larger and longer missile that is much more powerful and has twice the range of the smaller 9M111. The French HOT and US TOW missiles have a roughly similar performance as the 9K113. The 9K113 can be considered the larger brother of the 9K111 system. The missile design and guidance are similar and only the size, range and performance differ. The 9M113 missile is transported in and launched from a container. The missile has a booster charge and sustainer rocket motor. Four small vanes at the front and four large wings in the middle provide stability during launch. The 9M113 is wire guided and features SACLOS guidance. The 9P135 lightweight tripod launcher includes an optical sight system and computing mechanism. The same launcher can be used with the smaller and shorter range 9M111 Konkurs missile. The 9M113 Konkurs was developed by the Tula Machinery Design Bureau (Tula KBP). Development began with the aim of producing the next generation of SACLOS anti-tank missiles, for use in both the man-portable role and the tank destroyer role. The 9M113 Konkurs was developed alongside the 9M111; the missiles use similar technology, differing only in size. The original 9M113 with a single-charge warhead can penetrate 600 mm of rolled homogeneous armor (RHA). The missile entered service in 1974. Iran bought a license for the Konkurs in 1991 and began producing a copy, the Tosan (not to be confused with the Toophan), sometime around 2000. he missile is designed to be fired from vehicles, although it can also be fired from the later models of 9M111 launchers. It is an integral part of the BMP-2, BMD-2 and BRDM-2 vehicles. The missile is stored and carried in a fiberglass container/launch tube. The system uses a gas generator to push the missile out of the launch tube. The gas also exits from the rear of the launch tube in a similar manner to a recoilless rifle. The missile leaves the launch tube at 80 meters per second, and is quickly accelerated to 200 meters per second by its solid fuel motor. This initial high speed reduces the missile's deadzone, since it can be launched directly at the target, rather than in an upward arc. In flight, the missile spins at between five and seven revolutions per second. The launcher tracks the position of an incandescent infrared bulb on the back of the missile relative to the target and transmits appropriate commands to the missile via a thin wire that trails behind the missile. The system has an alarm that activates when it detects jamming from a system like Shtora. The operator can then take manual control, reducing the missile to MCLOS. The SACLOS guidance system has many benefits over MCLOS. The system's accuracy is quoted in some sources as 90%, though its performance is probably comparable to the BGM-71 TOW or later SACLOS versions of the 9K11 Malyutka.

AT-5 Towsan Iranian Anti-Tank Guided Missile (ATGM)





Tiers:

1 **2** 3 4

Variants:

- **9M113M Konkurs-M (NATO: AT-5B Spandrel B):** Tandem warhead - with extended explosive probe. The warhead penetration is 750–800 mm vs RHA.
- **Tosan:** Iranian-built missile

System

Name: AT-5 Towsan, 9M113 Konkurs (AT-5 Spandrel)
Type: Soviet SACLOS wire-guided anti-tank missile.
Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod
Varaints: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1
Crew: ea2-3
Weight (Missile): kg14.6
Weight (9P135 Launching Post): kg22.5
Length: mm1,150
Diameter: mm135
Warhead Weight: kg2.7
Warhead Type: HEAT
Detonation Mechanism: Contract
Engine: Solid-fuel rocket
Wingspan: mm468
Firing Range (Day): m100-4,000

Firing Range (Night): m2,500
Speed: m/s208
Guidance system: Wire-guided SACLOS
Steering system: Two control surfaces
Launch platform: Individual, vehicle
Penetration: 600mm of RHA/ERA
Thermal Imager: Available
Manual command to line of sight (MCLOS).: Yes
Accessories: Thermal sight 1PN65, sight-tracker
Operating Temperature: –50°C to +50°C

Notes:

The AT-5 Towsan is a Iranian Licensed 9m113 Kongurs (AT-5 Spandrel) The 9K113 Konkurs (NATO code AT-5 Spandrel) is Russian-made Semi-automatic command to line of sight (SACLOS) wire-guided anti-tank missile. The missile was designed and developed by the Russian Defense Company KBP (Konstruktorskoe Buro Priborostroeniya). The 9K113 Konkurs is designed to engage moving and stationary armoured targets provided with explosive reactive armour (ERA) protection. The Konkurs system can be carried by tracked or wheeled armoured vehicle. The 9K113 was introduced in the Russian army in 1977. The missile was seen for the first time during a military parade in Moscow, mounted on a BRDM-2 4x4 armoured vehicle.

9K111 Fagot (AT-4 Spigot) Russian SACLOS Wire-Guided Anti-Tank Missile (ATGM)





Tiers:



Variants:

- **9M111 Fagot (NATO: AT-4 Spigot and AT-4A Spigot A):** Entered service in 1970. Maximum range 2,000 m (6,600 ft; 1.2 mi), minimum 70 m (230 ft). Warhead 400 mm versus RHA or 200 mm towards armour inclined at 60°
- **9M111-2 Fagot (NATO: AT-4B Spigot B):** Slightly improved version.
- **9M111M Faktoriya/Faktoria (Trading post) or Fagot-M (NATO: AT-4C Spigot C):** Improved motor, longer guidance wire. Maximum range 2,500 m (8,200 ft; 1.6 mi), minimum 75 m (246 ft). Improved single HEAT warhead; penetration 400 mm versus RHA or 230 mm towards armour inclined at 60 deg (some publications claimed 9M111M to have tandem HEAT warhead).

System

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↳*9K111 Fagot SACLOS Wire-Guided Anti-Tank Missile (ATGM)*

Type: SACLOS Wire-Guided Anti-Tank Missile (ATGM)
Manufacturer: Tula Machinery Design Bureau (Tula KBP)
Launcher Type: 9P135 launching post
Missile Weight: kg12.5
9P135 Launching Post Weight: kg22.5
Length: mm1,100
Diameter: mm120
Action: 400 mm versus RHA or 200 mm towards armour inclined at 60°
Rate of Fire: rds/min3
Muzzle Velocity (At Launch): m/s80
Muzzle Velocity (In Flight): m/s186
Effective Firing Range: m10-2,500
Warhead Type: HEAT
Warhead Weight: kg1.7

Guidance system: SACLOS wire-guided missile

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+20

Minimum Elevation: deg-20

Basic Load: ea4

Notes:

The 9K111 Fagot (Russian: Фагот; "bassoon") is a second-generation tube-launched SACLOS wire-guided anti-tank missile system of the Soviet Union for use from ground or vehicle mounts. The 9K111 Fagot missile system was developed by the Tula KBP Design Bureau for Instrument Building. "9M111" is the GRAU designation of the missile. Its NATO reporting name is AT-4 Spigot.

MILAN 1 French Anti-Tank Guided Missile (ATGM) System





Tiers:



Variants:

- **MILAN 1:** Single, main shaped charge warhead (1972), calibre 103 mm
- **MILAN 2:** Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm
- **MILAN 2T:** Single main shaped charge, with smaller shape charge warhead at end of standoff probe to defeat reactive armour (1993)
- **MILAN 3:** Tandem, shaped charge warheads (1996) and electronic beacon
- **MILAN ER:** Extended range (3,000 m) and improved penetration

System

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↳***MILAN 1 Anti-Tank Guided Missile (ATGM)***

Country: France / Germany
Manufacturer: MBDA, MKEK (under license)
Unit Cost: £7,500 (1984)
Operational Range: m200–2,000
Basic Load: ea10
Armor Penetration: mm350
Missile Length: mm918
Missile Diameter: mm103
Fin Span: mm267
Missile Weight: kg6.73
Total Weight with Launcher: kg24
Warhead Weight: kg2.7
Warhead Type: High Explosive
Guidance System: SACLOS Wire-Guided

Steering System: Jet deflector

Launch Platform: Individual, vehicle

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Notes:

MILAN (French: Missile d'infanterie léger antichar; English: Light anti-tank infantry missile, milan is French for kite) is a European anti-tank guided missile. Design of the MILAN started in 1962, it was ready for trials in 1971, and was accepted for service in 1972. It is a wire guided SACLOS (semi-automatic command to line-of-sight) missile, which means the sight of the launch unit has to be aimed at the target to guide the missile. The MILAN can be equipped with a MIRA or MILIS thermal sight to give it night-firing ability.The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers. MILAN is a product of Euromissile, a Franco-West German missile development program dating back to the 1960s. The system entered service in 1972 as a second generation anti-tank weapon and soon became a standard anti-tank weapon throughout NATO, in use by most of the alliance's individual armies. Consisting of two main components, the launcher and the missile, the MILAN system utilizes a semi-automatic command to line of sight (SACLOS) command guidance system. It tracks the missile either by a tail-mounted infrared lamp or an electronic-flash lamp, depending on the model. Because it is guided by wire by an operator, the missile cannot be affected by radio jamming or flares. However, drawbacks include its short range, the exposure of the operator, problems with overland powerlines, and a vulnerability to infrared jammers such as Shtora that can prevent the automatic tracking of the missile's IR tail light. The MILAN 2 variant, which entered service with the French, German and British armies in 1984, utilizes an improved 115 mm HEAT warhead. The MILAN 3 entered service with the French army in 1995 and features a new-generation localizer that makes the system more difficult to jam electronically

Bumbar (Bumble Bee) Serbian Short Range Anti-Tank / Anti-Bunker Guided Missile





Tiers:



System

Alternative Designation: Bumble Bee

Type: Wire Guided Line of Site (LOS)

Crew: ea2

Displacement Time: INA

Emplacement Time: INA

Prime Mover Required: Not required

Man Portable: Yes

Night Firing Capable: Yes

Maximum Speed: 245 meters per second (18 mps at launch)

Time Required for Launch Sequence: seconds6

Dimensions

Length: m.9

Diameter: mm136

Height: mINA

Weight, Combat: kg18

Weight, Missile: kg10

Weight, Launch Tube: kg2

Weight, Firing Post: kg4

Weight, Tripod: kg2

Factory Induced Superelevation: degrees10

Missile

Caliber: mm120

Secondary Missile Caliber: mm55

Time of Flight to Target at 600m: sec4.6

Warhead Penetration: Over 1000mm RHA behind ERA

Range: m60 to 600

Warhead Type: Tandem, shape charge

Fire Control

Guidance System: SACLOS wire guided

Notes:

Bumbar is an anti-tank / anti bunker weapon from Serbia. The Bumbar is a wire guided, man-portable, short-ranged missile system. The missile has a soft launch capability, which means that the main motor fires after the missile has left the launcher, which allows for the missile to be fired from confined spaces, which is a necessity in urban warfare. During its flight, the rocket is maneuvered by a system of thrust vectoring. The missile is propelled by two main rocket motor exhaust vanes located at mid body. As the missile rotates the launch units send signals commanding the correction by one of the two vanes to move against the missile motors thrust. For example, if the missile has to move to the left, the right thrust vector vane will actuate at the correct time. It is protected against electronic countermeasures through use of CCD matrix sensors, fast image processing computer and robust missile tracer recognition algorithm. Its general design is similar to the French/Canadian Eryx MBDA anti-tank missile. All key components of the Bumbar system are indigenously developed by VTI - Military Technical Institute Belgrade Serbia. Can be vehicle mounted. Primary purpose is to be deployed forward with infantry forces. The weapon can be fired remotely offering protection to the crew. The launcher is reusable. Some sources state that the PH is 90% against moving targets under all conditions up to 600m.

Spike Israeli Anti-tank Guided Missile (ATGM) System






Tiers:



Variants:

- **Spike-SR:** The short range version of the weapon was unveiled in 2012 to give infantrymen a guided missile between the larger Spike-MR and unguided rockets.[9] The missile is 8 kg (17 lb 10 oz) for a 9.8 kg (21 lb 10 oz) disposable munition for use at platoon-level whose minimum range is 50 m (160 ft) and whose maximum range is 1.5 km (0.93 mi). It is equipped with a stiff-necked uncooled electro-optical infrared seeker and advanced tracker, as opposed to the gimballed seeker in the Spike MR/LR/ER versions.[10] The Spike-SR does not require a separate sight, instead utilizing the low-cost thermal camera and guidance electronics strapped to the missile's nose to provide this function through a display integrated into the launcher, showing the target until launch. The warhead can either be a multi-purpose tandem shaped-charge warhead with blast-fragmentation effect[9] or a new Penetration-Blast-Fragmentation (PBF) variant leveraged from the MATADOR's anti-structure warhead to equip maneuvering forces in urban environments to breach enemy cover and structures with a lethal blast effect. In May 2016 Rafael concluded deliveries of Spike-SR to its first export customer, later revealed to be the Singapore Armed Forces to replace the Carl Gustav M2.
- **Spike-MR:** The medium range version (Israeli designation: NT-Gil). The weight of the missile is 14 kg (30 lb 14 oz), its minimum range is 200 m, while its maximum range is 2,500 m (1.6 mi). It is used by infantry and special forces.
- **Spike-LR:** Long range version (Israeli designation: NT-Spike). The weight of the missile is 14 kg (30 lb 14 oz), and the weight of the complete system is less than 45 kg (99 lb 3 oz).[15] Maximum range is 4,000 m (2.5 mi) and it is used by infantry and light combat vehicles. It adds fiber-optic communication to and from the operator during flight. Reported armour penetration capability is more than 700 mm (28 in) of Rolled homogeneous armour (RHA). It is also deployed by Sentry Tech remotely controlled weapons stations along the Gaza border. In early 2014, Rafael revealed they had increased the range of the Spike-LR to 5 km (3.1 mi), enhancing versatility on existing firing platforms and allowing it to be utilized on new ones like light helicopters.
- **Spike-LR II:** A new generation of the original Spike-LR is in full-scale development and scheduled to be operational by the end of 2018. Spike-LR II (Israeli designation: Gil-2, גיל 2) has reduced weight to 12.7 kg (28 lb), increased range of 5.5 km (3.4 mi) at ground level and 10 km (6.2 mi) from helicopters using an RF data-link, warhead options of tandem HEAT with 30% increased armor penetration or a multipurpose blast warhead with selectable impact or penetration detonation fusing, a new seeker that includes an uncooled IR sensor with a smart target tracker with artificial intelligence features, the ability to fire on grid target coordinates using an inertial measurement unit for third party-target allocation, and is compatible with legacy launchers. The missile is designed with a counter-active protection system (CAPS) capability, being able to hit targets at higher impact angles of up to 70 degrees.
- **Spike-ER:** Extended range or extra-long range version of the weapon (Israeli designation: NT-Dandy or NT-D). It has a minimum range of 400 m and a maximum range of 8,000 m (5.0 mi). It has a larger diameter and is heavier than the other systems, and is usually vehicle mounted. It is used by infantry, Light Combat Vehicle (LCVs), and helicopters. The Finnish Navy's Coastal Jaegers and Philippine Navy's Multi-purpose Attack Craft Mk.III also operate this version in the anti-ship role. The weight of the missile is 34 kg (74 lb 15 oz), the launchers are 30 kg (66 lb 2 oz) and 55 kg (121 lb 4

oz) respectively for the vehicle and air-launched versions. Penetration is around 1,000 mm (39 in) of RHA.[

- **Spike-ER II:** In August 2018, Rafael disclosed the development of an enhancement of the missile called the Spike-ER II. It retains the same weight, airframe, surface geometries, and propulsion unit but introduces a two-way RF data-link to increase real-time control to an extended range of 16 km (9.9 mi) from helicopters; it also has an extended fiber optic link to increase range to 10 km (6.2 mi) from land and naval platforms.
- **Spike NLOS:** "Non Line Of Sight" is an ultra long-range version of the weapon (Israeli designation: Tamuz, תמוז), with a claimed maximum range of 25 kilometres (16 miles). It is a significantly larger missile than other Spike variants, with an overall weight of around 70 kg (154 lb 5 oz). It can be launched from the ground or from helicopters. It was developed following lessons learned in the Yom Kippur War, which showed a need for a high-precision guided tactical ground-to-ground battlefield missile. The first variants entered service with the IDF in tandem with the Pereh missile carrier in 1981, though the existence of both was not revealed to the public until 2011. The Spike NLOS uses a fiber optic link similar to other Spike versions, but only out to 8 km, after which it employs a radio data link for command guidance. In 2011 it also became known that in a highly unusual move, the British Army was hastily equipped with the missile, drawn directly from IDF inventory after being exposed to increasing insurgent attacks in Iraq and Afghanistan beginning in 2007 with three variants of the NLOS being procured. A total of 600 missiles was acquired, the breakdown being 200 NLOS MK.2 in 2007, 200 NLOS MK.4 in 2008 (together with the MK.2 these were known as Exactor-1) and 200 NLOS MK.5 (Exactor-2) in 2009.[29] For operational security, the codename of 'Exactor missile' was assigned in British service and it was initially mounted on launchers atop leased M113 APCs. Later on, the missile was fired from a separate trailer launcher instead, ditching the non-standard M113 APCs altogether. In a deal concluded on 6 September 2011, the South Korean government had agreed to purchase an unknown number of Spike NLOS missiles. Rafael is working on expanding the missile's versatility by enhancing the existing EO-IR/CCD seeker with semi-active laser (SAL) capability and different anti-armor, blast-penetration, and high-explosive fragmentation warheads to meet specific applications.
- **Mini-Spike:** On 2 September 2009, at an IDF exhibition held at the 3rd Latrun annual land warfare conference, the Israeli Defense Force unveiled a new member of the Spike family of missiles – the Mini Spike Anti-personnel guided weapon (APGW). Rafael claimed that this latest member of the Spike family of missile costs and weighed only a third of the Spike-LR at 4 kg (8.8 lb), while offering a longer engagement range of 1.3–1.5 km (0.81–0.93 mi) when compared to the Spike-SR. It was to introduce new flight modes to enable precision strikes in urban areas, such as flying through an open windows or attacking an enemy hidden behind defilade or obstacles using non-line-of-sight engagement. Mini Spike would use the same launcher and sight system of the Spike-LR, loading the missile on a special adaptor. By 2016, Mini-Spike development had been discontinued.

System

Alternative Designation : To emphasize missile interchangeability using the launchers, Rafael changed missile names from Gill and Spike to Spike-MR and –LR. Later, Spike ER was fielded.
Alternate Mounts: IFV, APC, jeep, helicopter
Country of Origin: Israel/Europe
Crew : ea2
Primary mount: Tripod mount, sitting, crouching or prone
Rate of Fire: Ready to launch in 30 seconds, reload in 15 seconds
Effective Firing Range: • Spike-SR: 50–1,500 metres (55–1,640 yards) • Spike-MR: 200–2,500 m (220–2,730 yd) • Spike-LR: 200–4,000 m (220–4,370 yd) • Spike-LR II: 200–5,500 m (220–6,010 yd) • Spike-ER: 400–8,000 m (440–8,750 yd) • Spike-ER II: 400–10,000 m (440–10,940 yd) • Spike-NLOS: 600–25,000 m (660–27,340 yd)
Detonation Mechanism: Piezoelectric trigger

↳*Dimensions*

Length: • Spike-MR/LR: 1,200 mm (3 ft 11 in) • Spike-ER: 1,670 mm (5 ft 6 in)
Diameter: • Spike-MR/LR: 130 mm (5.1 in) • Spike-ER: 170 mm (6.7 in)
Height, Firing : mless than 75 (est)
Weight: kgSpike-ER from helicopter: • Missile in canister: 34 kg (74 lb 15 oz) • Launcher: 55 kg (121 lb 4 oz) • Launcher + 4 missiles: 187 kg (412 lb 4 oz) Spike-MR/LR from ground:[2] • Missile round: 14 kg (30 lb 14 oz) • Command & launch unit (CLU): 5 kg (11 lb 0 oz) • Tripod: 2.8 kg (6 lb 3 oz) • Battery: 1 kg (2 lb 3 oz) • Thermal sight: 4 kg (8 lb 13 oz) Spike-SR: • Missile in canister: 9.6 kg (21 lb 3 oz)

Armament

Emplacement Time : minless than 0.5

Launch Method: Disposable launch canister

Launcher Name: Spike Command Launch Unit (CLU), for Spike-MR and –LR

Rate of Launch : rd/min2-3 depending on range

Reaction Time : sec1 to 2

Ready/Stowed Missiles: rds2 for 2-man crew, 4 for 3-man crew

Reload Time : secless than 0.25

Fire Control System

Countermeasures: Smoke and cover (IIR only). -IIR seeker penetrates most smokes. -FOG allows varied controlled flight path. -IIR and CCD can be fuzed in dual mode to counter various CMs. -Spike-MR can launch from enclosed area and buildings -LR FOG can launch from cover, over-fly defilade/obscuration.

Guidance: Either for Spike-LR launcher, only IIR for Spike-MR. (1) IIR-homing Seeker (fire-and-forget, lock-on before launch)-all 3 (2) CCD/IIR fiber-optic guided (LOBL or command)-Spike-LR/ER Command Link: none for IIR- homing (1), Fiber-optic cable for (2) Susceptible To Countermeasures: Smoke and cover (IIR only)

Rangefinder: Not included bu tavailable

↳*Day Sight*

Acquisition Range : km2500 CCD/IIR, Spike-MR, -LR; 4000 CCD/IIR FOG for -LR

Field of View : deg5 IIR, 10 CCD

↳*FCS*

Name: INA

↳*Night Sight*

Acquisition Range : km3000.0

Field of View : degWide and narrow

Type: Thermal sight, 3.5x and 10x (removable for easier carry)

Munition

Notes: HE version of each missile. A multi-role Penetrator Blast - Frag (PBF) missile is offered for Spik-LR and others.

↳*Munition 1*

Armor Penetration : mm CE800 top-attack

Name: Spike-MR (or Gill [“short Spike,” NT-G])

Probability of Hit: PCT95.0

Range, Maximum : m2500.0

Range, Minimum : m200.0

Type: Tandem Shape Charge (HEAT)

Weight : kg13; fills Spke-MR and LR launchers

↳*Munition 2*

Armor Penetration : mm CE800 top attack

Name: Spike-LR (or Spike, NT-S)

Probability of Hit: PCT95.0

Range, Maximum : m400.0

Range, Minimum : m200.0

Type: Tandem Shape Charge (HEAT)

Weight : kg13; will fit on all launchers

↳*Munition 3*

Armor Penetration : mm CE1000+top-attack

Name: Spike-ER (or Spike, Dandy, NT- D)

Probability of Hit: PCT95.0

Range, Maximum : m8000.0

Range, Minimum : m200.0

Type: Tandem Shape Charge (HEAT)

Weight : kg32.0

Notes:

Spike is an Israeli fire-and-forget anti-tank guided missile and anti-personnel missile with a tandem-charge HEAT warhead, currently in its fourth-generation. It was developed and designed by the Israeli company Rafael Advanced Defense Systems. It is available in man-portable, vehicle-launched, and helicopter-launched variants. As well as engaging and destroying targets within the line-of-sight of the launcher ("fire-and-forget"), some variants of the missile are capable of making a top attack profile through a "fire, observe and update" guidance method (essentially lock-on after launch (LOAL)); the operator tracking the target, or switching to another target, optically through the trailing fiber-optic wire (or RF link in the case of the vehicle-mounted, long-range NLOS variant) while the missile is climbing to altitude after launch. This is similar to the lofted trajectory flight profile of the US FGM-148 Javelin. Spike is a fire-and-forget missile with lock-on before launch and automatic self-guidance. The missile is equipped with an imaging infrared seeker. The long and extended range versions of the Spike also have the capability of "Fire, Observe and Update" operating mode (also known as Lock-on after launch (LOAL)). The missile is connected by a fiber-optical wire that is spooled out between the launch position and the missile. With this, the operator can obtain a target if it is not in the line of sight of the operator at launch, switch targets in flight, or compensate for the movement of the target if the missile is not tracking the target for some reason. Hence, the missile can be fired speculatively for a target of opportunity, or to provide observation on the other side of an obstacle. The missile has a soft launch capability – the motor firing after the missile has left the launcher – that allows for the missile to be fired from confined spaces, which is a necessity in urban warfare. The missile uses a tandem warhead consisting of two shaped charges: a precursor warhead to detonate any explosive reactive armor, and a primary warhead to penetrate the underlying armor. Currently, it is replacing aging second generation anti-tank missiles like the MILAN and M47 Dragon in the armies of the user nations. Spike missile is also equipped with heat chasing technology. The Spike system is made up of the launching tripod with its fire control unit and the missile. There is no dedicated thermal sight on the launcher – the missile's imaging seeker is used. Altogether, the long range variant of the system weighs around 26 kg (57 lb). Spike can be operated from the launcher by infantry, or from mounts that can be fitted to vehicles such as fast attack vehicles, armoured personnel carriers or utility vehicles. Vehicles that are not normally fitted with anti-tank weapons can therefore be given anti-tank capability. Spike has been tested as a weapon system for the SAGEM Sperwer unmanned aerial vehicle. The Spanish Army has fitted the Spike-ER to its Eurocopter Tiger attack helicopters. Both Israel and the United States have experimented with arming Black Hawk helicopters with the Spike missile; the US variant is used in UH-60M Battlehawk helicopters.

9K115-2 Metis-M (AT-13 Saxhorn-2) Russian Man-Portable Anti-Tank Guided Missile (ATGM)





Tiers:



Variants:

- **Metis-MI:** New Russian variant of AT-13,weighing 1 kg less, with 2000 m range
- **Metis-M/AT-13:** System with 9P151firing post adapted for and including the Metis-M missile, IOC 1992. The Mulat-115 thermal sight is likely to be used with the missile. This represents the Tier 3 OPFOR dismount ATGM system. The missile can be used on the AT-7 launcher, but cannot then defeat EO jammers.

System

Alternative Designations: 9P151 Firing Post, Metis Saxhorn (NATO)

Manufacturer: KBP Instrument Design Bureau

Crew: ea2

Primary Mount: Ground mount on tripod

Warhead: HEAT tandem warhead, Armor penetration behind ERA: 800 mm (Metis-M) 900-950 mm (Metis-M1) thermobaric anti-personnel/anti-material warhead is also available.

Engine: solid-fuel rocket

Operational Range: km1.5

Speed: m/s200

Guidance System: SACLOS wire-guided missile

Dimensions

Length: mm980

Diameter: mm130

Weight, ATGM: kg13.8

Weight, Launcher: kg10.2

Wingspan: INA

Warhead Weight: INA

Sights

Name: 1PBN86-VI thermal sight

Type: Thermal Sight

Notes:

The 9K115-2 Metis-M is a Russian anti-tank missile system. "9K115-2" is the GRAU designation of the missile system. Its NATO reporting name is AT-13 Saxhorn-2. The system is designed to augment the combat power of company-level motorized units. The Metis-M system adds to the usual positive qualities of a man-portable anti-tank guided missile with significant improvements in range, accuracy and lethality. Owing to the small dimensions and light weight of its components, this man portable system can be carried by its crew in compact packs over any distance and over a wide variety of terrain types, including stream crossing. The three-man crew carries personal weapons and an ammunition load of five missiles. One crew member carries a pack with a missile-loaded launcher, which considerably reduces the time of fire preparation and allows the crew to engage targets whilst moving. In the event of sudden appearance of a target, the operator can fire from the shoulder with the launcher rested against a local object. The two other crew members each carry a pack with two missiles. The Metis-M ATGM system has a semi-automatic missile guidance, with commands transmitted over a wire link. The guidance system is constructed so that the most sophisticated and costly components, such as a gyroscopic coordinator, electronic units and an onboard battery, are excluded from the missile. FEATURES * changes from the traveling to the firing position—and vice versa—in 15 – 20 seconds; * firing rate of 3 - 4 rounds per minute; * fired from organized and deployed sites in the prone and standing foxhole positions, as well as from combat vehicles; * can be shipped by any type of transport and can be air-dropped. * The Metis-M system comprises: combat assets; * maintenance facilities; * training aids.

9M133 Kornet-EM Russian 4x4 Anti-Tank Guided Missile (ATGM) Vehicle






Tiers:



Variants:

- **Kornet-E::** Export version of the Kornet system includes a light-weight launcher tripod, thermal night sight, and Kornet-LR missile. A version is offered for hot climates.
- **9P163-1::** Portable launcher with Kornet -LR missile. KBP suggests mounting the launcher on TUVs and other vehicles. A remote-operated version is available.
- **Kornet-MR::** Missile for a man-portable version of the launcher. Range is 2 km, with penetration 1,000 mm. It is unknown if the missile is currently fielded. Kornet-MR is tandem HEAT and HE (thermobaric).
- **Kornet-LR:** ATGM launcher vehicle system on BMP-3 Chassis with twin launchers.
- **Kornet-EM::** New ATGM launcher vehicle is based on a Russian Tigr armored 4x4 tactical utility vehicle. Two 4-missile modules jack up thru the roof. An IR auto-tracker gives simultaneous dual-launch LBR ACLOS guidance. The night sight is 3rd gen thermal, for a range of 5+ km. Kornet-EM (Kornet-d) missiles range 8 km for heat, 10 for thermobaric-HE. The tandem heat defeats 1,300 mm of armor. The HE offers a proximity fuse for multi-role use (e.g., against helicopters).

System

Alternative Designation: 9M133M Kornet-M; 9M133 Kornet-EM
Country of Origin: Russia
Crew: ea2
Warhead: 1,300 mm RHA after ERA, Thermobaric
Detonation Mechanism: Impact Fuze
Operational Range, Anti-Tank Warhead: m8,000
Operational Range, Thermobaric Warhead: m10,000
Speed: m/s300
Launch Platform: Kornet-D

Dimensions

Length: mm1,210

Weight: kg31

Warhead Weight: Thermobaric: 7-10 kg equivalent of TNT

Automotive

Chassis: Kornet-D

Length: m4.61

Crew: 2

Main Armament: 8 × 9M133 Kornet-EM anti-tank guided missiles

Engine: GAZ-562 or Cummins B180 or Cummins B215 197–215 hp

Operational Range: km1,000

Maximum Speed, Road: km/h140

Maximum Speed, Off-Road: km/h80

Fire Control

FCS Name: INA

Guidance: Laser Beam Rider

Automatic Target Tracker: Yes

FIre and Forget Missile: Yes

Jamming-Resistant: Yes

Number of Targets Simultaneously: 2

Note: The “fire and forget” capability allows a vehicle equipped with twin launchers to attack two different targets at once, increasing its rate of fire, decreases the number of vehicles needed for a mission, and can defeat vehicles equipped with an active protection system through salvo fire at one target.

Notes:

The 9M133M Kornet-M[2] (also known by the export designation 9M133 Kornet-EM) Russian anti-tank guided missile (ATGM) is an improved version of the 9M133 Kornet ATGM, with increased range, fire-and-forget capability, and an improved warhead. Kornet-EM missiles are chiefly used on the Kornet-D system. Kornet-M missiles are also compatible with standard Kornet man-portable tripod launchers. Introduced in 2012, it is equipped with an automatic target tracker, which essentially turns it into a "fire and forget" missile. The automatic target tracker also makes it jamming-resistant. The “fire and forget” capability allows a vehicle equipped with twin launchers to attack two different targets at once, increasing its rate of fire, decreases the number of vehicles needed for a mission, and can defeat vehicles equipped with an active protection system through salvo fire at one target. The system's use of an autotracker can make it more effective against low-flying aerial threats like helicopters and unmanned aerial vehicles (UAVs). Like the Kornet, the Kornet-M is designed to defeat vehicles with explosive reactive armor via a tandem-warhead. There’s also Kornet-M variants equipped with thermobaric warheads.

ERYX Canadian Short-Range Portable Anti-Tank Guided Missile (ATGM)





Tiers:

1 **2** 3 4

System

Alternate Mounts: Shoulder-launch: standing, kneeling, or prone

Alternative Designation: Anti-Char Courtee Portee (ACCP)

Country of Origin: France

Manufacturer: MBDA, MKEK (under license)

Crew : ea2.0

Reaction Time : sec4.0

In Service: 1994-Present

↳*Dimensions*

Height, Firing : m1.0

Length, Firing : m0.905

Width, Firing : m0.6

Weight, Total: kg26

Weight, Excluding Missile: kg13

Weight, Tripod: kg4

↳*Mount*

Primary mount: tripod

Armament

Combat Load, Ready : rds1.0

Combat Load, Stowed : rds0.0

Displacement Time : minless than 0.03

Elevation, Maximum : deg75 est.

Depression, Maximum: deg-30.0

Emplacement Time : sec 5.0

Fire on Move: INA

Launcher

Launch Method: Disposable launch canister

Name: Eryn

Rate of Fire : rd/min2.5

Fire Control System

Beacon or Tracker Type: Infrared laser diode

Command Link: Wire

Flight Time: secless than 4

Guidance: SACLOS

Tracker Type: Charge couple device (CCD)

↳*Survivability/Countermeasures*

Susceptible Countermeasures: EO Jammers, smoke, counter-fire

Missile

↳*Missile*

Name: Eryn

Type: Antitank Guided Missile

Designation: ACCP

Diameter : mm136.0

Weight : kg11 (in tube)

Armor Penetration : mm900.0

Average Velocity : m/s162.0

Probability of Hit: PCT90.0

Range, Maximum : m600.0

Range, Minimum : m50.0

Warhead Type: Tandem Shaped Charge (HEAT) CE

Sights

↳*Day Sight*

Name: Gunner

Acquisition Range : km600.0

Field of View : deg3.4

↳*Night Sights*

Acquisition Range : km1.2

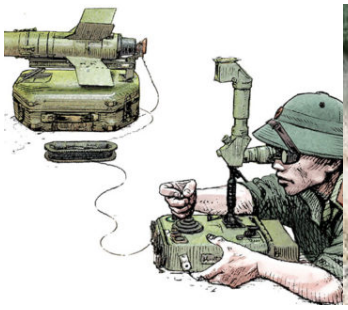
Field of View : deg8 X 6°

Name: Mirable

Notes:

ERYX is a short-range portable SACLOS-based wire-guided anti-tank missile (ATGM) produced by European company MBDA. It is used by several countries, including the Canadian Army, French, and Norwegian armies. The weapon can also be used against bunkers and pillboxes. It also has some capability in the anti aircraft role to bring down low flying helicopters, due to its wire guided system. An agreement was reached in 1989 between the French and Canadian governments to co-produce the ERYX missile system. It entered service in 1994. The Eryx began as a project in the late 1970s by the French Ministry of defense to replace the short range Luchaire's LRAC F1 STRIM 89mm rocket launcher in the French Army. The requirement was for a cost effective antitank weapon that could defeat any known or future main battle tank at a maximum range of 600 meters with considerable accuracy, including on windy days. Aérospatiale, the French defense and aerospace firm, believed it was, from a practical standpoint, impossible to design an unguided antitank rocket that could meet the strict requirements. The weapon system that Aérospatiale offered was basically a mini-short range wire guided antitank missile, the ACCP (Anti Char Courte Portée) which in French translates to Short Range Anti-tank Weapon System. The first prototype was delivered to the French Ministry of Defense for testing in 1982. The concept firing post (See: ACCP image) used a scaled-down version of the MILAN tracking and guidance system, but was found in field condition tests to be impractical both from a technical and cost standpoint. In 1989, France and Canada signed a joint venture to co-produce the ERYX missile. AlliedSignal Aerospace Canada Inc. developed the Mirabel thermal imager for the ERYX firing post. Canadian industries, including Simtran and Solartron Systems, also produced the Eryx Interactive Gunnery Simulator (EVIGS) and the Eryx Precision Gunnery Simulator (EPGS). The missile is ejected from its launch tube using a very low powered short burn rocket motor located in the tail. The launching motor completes its burn before leaving the container, protecting the gunner from being burned. After the missile coasts a safe distance the main sustainer motor ignites and burns until impacting the target or it reaches its maximum range of 600 meters. The main rocket motor is located at mid-body with two exhausts in the side (e.g. similar to the US BGM-71 TOW antitank missile). Unlike most wire guided antitank missiles the Eryx is propelled at a relative low speed of approximately 240 meters per second at its maximum range. The missile is guided in flight by two vanes located at mid body which act against the main rocket motors thrust. As the missile slowly rotates the launch units send signals commanding the correction by one of the two vanes to move against the missile motors thrust. For example, if the missile has to move to the left, the right thrust vector vane will actuate at the correct time. In addition the "soft launch" is what enables the Eryx to be fired from confined spaces (e.g. buildings) and not cause a massive launch signature that will reveal the Eryx gunners position to hostile counter fire. Aérospatiale claims that this "soft launch" feature enables the Eryx antitank team to be used effectively in urban antitank warfare. The Eryx missile uses a SACLOS guidance system, the launcher tracks a light source on the rear of the missile and compares its position with the center of the launcher's cross-hair, sending corrective signals down a trailing control wire. The missile increases resistance to jamming by having a beacon as the light source on the rear of the missile that pulsates or blinks at a special encoded rate recognized by the Eryx's tracking device located on the launch post. Unlike most wire guides antitank missiles that use SACLOS guidance, which require a complex optical tracker unit that has to zoom from a wide to narrow view in micro seconds after the missile is launched (e.g. the MILAN), the Eryx uses one charge-coupled device (CCD) matrix that operate in the IR spectrum, and two fields of view (one narrow and one large) with an automatic switch during missile flight. Again Aérospatiale also states that this unique and simplified SACLOS tracking system provides for a far more cost effective solution and enable the Eryx to be highly resistant to decoys or jamming and other enemy counter measures. The missile uses a tandem-charge HEAT warhead in order to defeat explosive reactive armour fitted to many armored vehicles today; a much small diameter warhead at the front of the missile body and a larger main warhead at the rear. Locating the main warhead at the rear of the missile body provides the correct stand off needed for the optimum effectiveness of the Eryx warhead without the need of a complex collapsible nose probe (e.g. the TOW) which is standard on most antitank missiles today. This simple solution keeps the missile's cost extremely low when compared to other antitank missiles but also for a compact missile design that can be produced in mass quantities.[

9M14 Malyutka (AT-3 Sagger) Russian Anti-Tank Guided Missile (ATGM) System





Tiers:

1 2 3 4

Variants:

- **I-RAAD:** Iranian upgrade SACLOS- guided with tandem warhead.
- **MALYUTKA-2/-2M:** Upgraded missile it is often linked to other upgrades.
- **9M14P1B1:** Slovenian missile upgrade (New motor and propellant lower smoke signature, nose probe, and 580mm penetration).
- **POLK:** Slovenian portable anti-armor launching set includes new launcher, guidance panel with binocular sight, and 3 ATGMs.
- **MALYUTKA 2000:** Swiss/Bulgarian missile defeats 850 mm+era.
- **MALYUTKA M2T:** Romanian missile with Milan 2T warhead. Similar to Milan 3, it defeats is 850 mm +era, to 3,000m.

System

Alternative Designations: Malyutka for missile and complex, Sagger (NATO)
Type: Wire-Guided Anti-Tank Guided Missile
Crew: ea3
Emplacement Time: min1.7
Fire from Inside Building: No

Ammunition

↳*AT-3/3a/3b SAGGER*

Max Aimed Range: m3,000
Max Effective Range: m3,000
Max Range: m3,000
Minimum Range: m500
Penetration: mm400, C
Warhead Type: Shaped Charge (HEAT)
Missile Weight: kg10.9
Average Velocity: m/s115

AT-3c SAGGER

Max Aimed Range: m3,000

Max Effective Range: m3,000

Max Range: m3,000

Minimum Range: m500

Penetration: mm520, C

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg11.4

Average Velocity: m/s115

↳*Malyutka-2/AT-3e*

Max Aimed Range: m3,000

Max Effective Range: m3,000

Max Range: m3,000

Minimum Range: m500

Penetration: mm800, C

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg12.5

Average Velocity: m/s130

Fire Control

FCS Name: 9S415/M/M1

Rangefinder: LRF

Infrared Searchlight: No

↳*9Sh16, 8x*

Type: Day Sight

Field of View: deg22.5

Acquisition Range: m4000

↳*Iskra TS-M Thermal*

Type: Night Sight

Field of View: degINA

Acquisition Range: m3000

Notes:

The 9M14 Malyutka (NATO reporting name: AT-3 Sagger) is a manual command to line of sight (MCLOS) wire-guided anti-tank guided missile (ATGM) system developed in the Soviet Union. It was the first man-portable anti-tank guided missile of the Soviet Union and is probably the most widely produced ATGM of all time—with Soviet production peaking at 25,000 missiles a

year during the 1960s and 1970s. In addition, copies of the missile have been manufactured under various names by at least five countries. Since supplemented by more advanced anti-tank guided missiles, the Sagger and its variants have seen widespread use in nearly every regional conflict since the 1960s. The missile can be fired from a portable suitcase launcher (9P111), ground vehicles (BMP-1, BRDM-2) and helicopters (Mi-2, Mi-8, Mi-24, Soko Gazelle). The missile takes about five minutes to deploy from its 9P111 fibreglass suitcase, which also serves as the launching platform. The missile is guided to the target by means of a small joystick (9S415), which requires intensive training of the operator. The operator's adjustments are transmitted to the missile via a thin three-strand wire that trails behind the missile. The missile climbs into the air immediately after launch, which prevents it from hitting obstacles or the ground. In flight, the missile spins at 8.5 revolutions per second—it is initially spun by its booster, and the spin is maintained by the slight angle of the wings. The missile uses a small gyroscope to orient itself relative to the ground; as a result, the missile can take some time to bring back in line with the target, which gives it a minimum range of between 500 and 800 m. For targets under 1,000 m, the operator can guide the missile by eye; for targets beyond this range the operator uses the 8x power, 22.5 degree field of view 9Sh16 periscope sight. The engagement envelope is a 3 km, 45 degree arc centered on the missile's launch axis. At ranges under 1.5 km, this arc reduces until, at the 500 m range, the missile can only hit targets 50 m either side of the center line. Accuracy falls off away from the launch axis—falling to approximately half its optimal accuracy at the extremes. While early estimates of the missile hitting the target ranged from 60 to 90%, experience has shown that it can drop to an efficiency between 2 and 25% in case of less than optimal conditions and lack of skill from the operator. In fact, MCLOS requires considerable skill on the part of the operator, nevertheless, the weapon has always been quite popular with its operators and has enjoyed a constant updating effort both in the Soviet Union/Russia and in other countries. The two most serious defects of the original weapon system are its minimum range of between 500 and 800 m (targets that are closer cannot be effectively engaged) and the amount of time it takes the slow moving missile to reach maximum range—around 30 seconds—giving the intended target time to take appropriate action, either by retreating behind an obstacle, laying down a smoke-screen, or by returning fire on the operator. Later versions of the missile addressed these problems by implementing the much easier to use SACLOS guidance system (though only available for ground vehicle and helicopter mounts), as well as upgrading the propulsion system to increase the average flight speed. The latest updates sport tandem warheads or probes in order to counteract explosive reactive armor, as well as thermal imaging systems. Even in these latest version, the Malyutka is probably the most inexpensive ATGM in service, with unitary price caps in the order of hundreds of dollars instead of the tens of thousands of the latest third generation models.

Bulsae-3 (AT-14 Spriggan) North Korean Man-Portable Anti-Tank Guided Missile (ATGM)



Tiers:



System

:
:
:

↳ ***Anti-Tank Guided Missile (ATGM)***

Name: Bulsae-3 (9M133 Kornet)
NATO Name: AT-14 Spriggan
Type: Anti-Tank Guided Missile (ATGM)
Manufacfturer: Degtyarev plant
Launcher Type: Twin launchers mounted on either side of the turret
Basic Load: ea4
Weight (with Launch Tube): kg29
Weight (with Tripod/Firing Unit): kg63.7
Length: mm1,200
Diameter: mm152
Warhead: 1,000–1,200 (9K135), 1,200 (E), 1,300 (D) mm RHA penetration after ERA with Tandem HEAT, Thermobaric
Warhead Weight: kg4.6
Detonation Mechanism: Impact Fuse
Wingspan: mm460
Propellant: Solid-fuel rocket
Operational Range (KORNET): m100-5,000
Operational Range (KORNET-EM): m10,000
Guidance system: SACLOS laser beam riding
Steering system: Two control surfaces
Accuracy: Less than 5 meters

Launch platform: Individual, vehicles, Kornet-T, Kornet-D, Bumerang-BM, Kornet-D1

↳*Missile Variant (Option 1)*

Name: 9M133-1 (Kornet/Kornet-E)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg26

Speed: m/s250

Range (Daytime): m100-5,500

Warhead: 152 mm tandem HEAT 1,000–1,200 mm RHA penetration after ERA 3–3.5 m of concrete

↳*Missile Variant (Option 2)*

Name: 9M133M-2 (Kornet-M/Kornet-EM)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg31

Speed: m/s300

Range (Daytime): m150-8,000

Warhead: 152 mm tandem HEAT 1,100–1,300 mm RHA penetration after ERA 3–3.5 m of concrete

↳*Missile Variant (Option 3)*

Name: 9M133F-1 (Kornet/Kornet-E)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg29

Speed: m/s250

Range (Daytime): m100-5,500

Warhead: Thermobaric 10 kg (22 lb) TNT equivalent

↳*Missile Variant (Option 4)*

Name: 9M133F-2 (Kornet-M/Kornet-EM)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg31

Speed: m/s300

Range (Daytime): m150-8,000

Warhead: Thermobaric 10 kg (22 lb) TNT equivalent

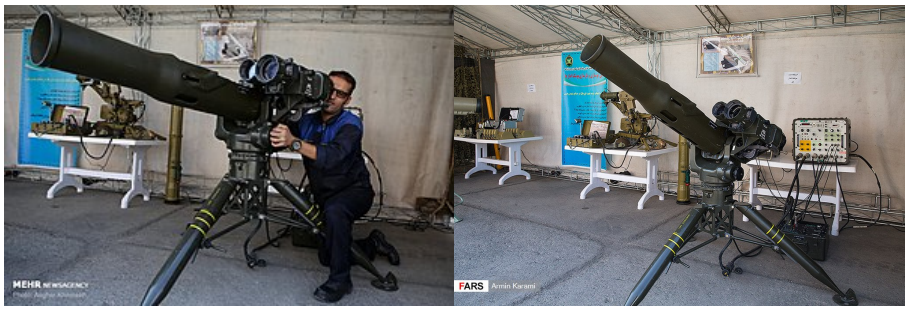
↳*Missile Variant (Option 5)*

Name: 9M133F-3 (Kornet-M/Kornet-EM)
Diameter: mm160
Length (Missile): m1.1
Weight (including Container): kg33
Speed: m/s320
Range (Daytime): m150-10,000
Warhead: Blast Fragmentation 7 kg (15 lb)

Notes:

North Korea – Unknown, reversed engineered Kornet-E under designation of Bulsae-3 The 9M133 Kornet (Russian: Корнет; "Cornet", NATO reporting name AT-14 Spriggan, export designation Kornet-E) is a modern Russian man-portable anti-tank guided missile (ATGM) intended for use against main battle tanks. It was first introduced into service with the Russian Army in 1998. The Kornet is among the most capable Russian ATGMs. It is not intended to fully replace previous systems, due to its high cost.[6] The Kornet comes in variants with thermobaric warheads for use against soft targets. It was further developed into the 9M133 Kornet-EM, which has increased range, fire-and-forget capability, and an improved warhead. The Kornet has been widely exported and is produced under license in several countries. It was first used combat in 2003 and has since been used in many conflicts. The NATO reporting name AT-14 Spriggan is derived from the spriggan, a legendary creature from Cornish faery lore. he 9M133 missile together with its 9P163-1 tripod launcher and 1PN79-1 thermal sight forms the 9K135 missile system, which can be carried and operated by a two-person infantry crew. The transfer to the firing position takes less than one minute, and preparation and production of a shot in at least one second. Kornet anti-tank missile system has been fitted with the ‘top attack’ capability. In addition to an infantry portable version, the 9K133 system has been integrated into a variety of other vehicles and weapons systems as either an upgrade package or a new weapon system. The 9K133 has been fitted into a BMP-3 to form the 9P163M-1 tank destroyer and is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missile are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).[16] NBC protection is provided for the two crew (gunner and driver) of each 9P163M-1 in addition to full armour protection equivalent to the standard BMP-3 chassis. The guidance system of the 9P163M-1 allows two missiles to be fired at once, each operating on different guidance (laser) channels. The KBP Instrument Design Bureau has also marketed the 9M133 missile as part of the Kvartet system for mounting on vehicles and boats; the system has four missiles on ready to launch rails along with associated guidance and sighting system all packaged in a single turret; the guidance system also allows two missiles to be fired at once. The turret has space for an additional five rounds and is operated by a single individual. Another upgrade possibility is the Kliver missile and gun turret, seen as an upgrade option for the BTR series of APC, BMP-1 IFV and patrol boats. It has similar capabilities as the Kvartet turret, but also carries a 30 mm 2A72 cannon; turret weight is 1,500 kg. Finally the 9M133 is also available in the BEREZHOK turret upgrade also made available by KBP. Since 2014, its serial production has been resumed for the domestic market with the designation B05YA01.

Toophan (BGM-71A TOW) Iranian Anti-Tank Guided Missile (ATGM)



Tiers:



Variants:

- **BGM-71B:** It has improved range to 3 750 m. This missile flies faster and has a longer wire. Otherwise it is similar to the basic BGM-71A.
- **ITOW (Improved TOW), or BGM-71C:** It was adopted by the US Army in 1976. This missile has improved shape-charged warhead. It also has an extensible probe that triggers detonation of the warhead and provides optimum detonation distance. The probe is extended after the launch. This missile penetrates 630 mm of steel armor.
- **TOW 2:** is an upgraded version of the TOW. It entered service with the US Army in 1983. This weapon system is composed of new BGM-71D missile, new reusable launcher, missile guidance set, and sight system. The launcher is lighter. It is compatible with all previous TOW missiles. It has thermal optics and can be used at night. The new missile has a larger warhead (5.9 kg) with extensible probe, as well as improved guidance. Over 77 000 BGM-71D anti-tank guided missiles were produced.
- **TOW 2A or BGM-71E:** It appeared in 1987. It has a tandem warhead and is intended to defeat tanks with Explosive Reactive Armor (ERA). It penetrates 900 mm of steel armor behind ERA. Newer missiles, starting from the TOW 2A are produced both in wireless and wire-guided forms. The wireless missiles require no special alterations to the launcher. Over 34 000 of the BGM-71E missiles have been delivered. In 2003 these missiles were used by US Marines in Iraq, destroying several Iraqi T-72 tanks.
- **TOW 2B or BGM-71F:** is a top-attack missile. It appeared in 1987. This missile explodes above a tank to penetrate its thin top armor. In concept it is similar to a Swedish RBS 56 BILL. It has a maximum range of 4 200 m. Its warhead weights 6.14 kg. This missile lacks extensible probe. These anti-tank missiles are produced in wireless and wire-guided forms. First unit was equipped with these missiles in 1992. In 2003 these missiles, alongside with the TOW 2As were used by US Marines in Iraq, destroying several Iraqi T-72 tanks. The conflict marked the first operational firing of the TOW 2B missiles. However during combat in Afghanistan the TOW 2B was found to be less effective than the older TOW 2A.
- **TOW 2N:** TOW 2N was an improved anti-tank system, that used missile with wireless data link. It appeared in 1989. However this weapon was not adopted by the US military.
- **BGM-71G:** BGM-71G is a top-attack missile with different warhead. It also lacks extensible probe.
- **BGM-71H:** BGM-71H is a bunker-busting missile. It is used against buildings or fortified structures. This missile has a range of 3 750 m. This missile is produced in wireless and wire-guided forms
- **TOW 2B Aero:** an extended-range version with a maximum range of 4.5 km. Previously this weapon was known as TOW 2B (ER). This missile is produced in wireless and wire-guided forms.
- **Toophan:** Toophan is an Iranian reverse-engineered version of the TOW.

System

Alternative Designation: BGM-71 TOW
Manufacturer: Hughes Aircraft Company
Type: Anti-Tank Guided Missile (ATGM)
Family: BGM-71 Series
In Service: 1970-Present

Crew: eaThree soldiers, including commander, gunner and assistance gunner.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Note: See ATGM System

Automotive

Man Portable: Yes

Communications

Primary: INA

ATGM System

↳*Launcher*

Name: BGM-71 TOW

Type: ATGM

Configuration: factory-sealed tube contains a cylindrical missile body w/pop-out cruciform wings indexed 45 deg off line from cruciform rudders; 2 rocket exhausts at mid-body; 2 guidance wire spools in tail

Container Length: m1.28

Container Diameter: mm218

Note: It is not a fire-and-forget type weapon. It requires the shooter to keep the target in the line of sight until the missile impacts.

↳*Missile*

Name: BGM-71A/B TOW

Type: ATGM

Missile Length: m1.16

Missile Diamter: m0.15

Fin Span: m0.46

Missile Weight: kg18.9

Warhead Type: HEAT

Warhead Weight: kg2.63

Maximum Range: km3

Armor Penetration: mm430

Guidance System: Wire-Guided

Speed: m/s300

Propulsion: 2 x Hercules solid-fuel rocket motors; first motor has short burn to allow TOW to clear tube; second motor sustains TOW flight until impact; TOW 2 motor provides 30 percent greater impulse than the basic TOW

Fire Control

Name: INA

Computerized FCS: Analog

Guidance System: Semi-automatic command to line-of-sight (SACLOS) wire guidance

Direct Fire: Yes

Optical Sensor: Yes

Infrared: automatic tracking of xenon or thermal beacon in tail

Night Sight: Texas Instruments AN/TAS-4 thermal

Thermal: INA

Proximity: INA

Notes:

The Toophan (Persian: طوفان "Storm", rarely Toofan) is an Iranian SACLOS anti-tank guided missile reverse-engineered from the American BGM-71 TOW missile. The Toophan 1, an unlicensed copy of the BGM-71A TOW missile, began mass production in 1988 and the Toophan 2, a BGM-71C ITOW variant, was publicly shown in 2000. The Toophan comes in at least 11 variants, many of which are poorly documented, including variants with laser guidance, thermobaric warheads, and tandem-warheads with increased penetration. The Toophan is manufactured jointly by the Aerospace Industries Organization of Iran and Iran Electronics Industries. The Toophan is normally deployed from ground-based tripods, and can also be mounted on fighting vehicles and helicopters. Like the BGM-71 TOW missile, the Toophan is a large, rugged, powerful, and reliable anti-tank guided missile deployed by small teams against tanks, armored vehicles, buildings, and other targets. The Toophan forms the backbone of the Iranian Armed Forces's ATGM inventory and is procured in large quantities in a variety of variants. The Toophan has been exported to the governments of Iraq and Syria and to a large number of non-state actors in the Middle East, and has been used in the Iran–Iraq War, the 2006 Lebanon War and the Iraqi, Syrian, and Yemeni Civil Wars. Identifying Toophan missiles is hard. The Toophan ATGM is very similar to the American BGM-71 TOW ATGM on which it is reverse engineered. Toophan missiles, launchers, control units, and crates are essentially interchangeable with their American counterparts and are regularly mixed together. The many variations of TOW and Toophan missiles also poses challenges. Toophan missiles can often be identified by their turquoise bands installed by Iran's Defense Industries Organization or by a faint black band on the rear end of the launcher. Toophan missiles, on their packaging, are instead labeled as TOW missiles; for example a Toophan 2M is labeled as a "TOW 2M". Iran was among the earliest countries to import the TOW missile, as far back as 1971. Extensive repair and assembly facilities were set up at the Iran Electronics Industries (IEI) by the Texas-based Emerson Energy Systems, as well as Hughes Missile Systems, to repair TOW and FGM-77A Dragon missiles. In May 1975, negotiations between Iran and Hughes Missile Systems on co-production of TOW and AGM-65 Maverick missiles stalled over disagreements in the pricing structure. Hughes set the royalty and initial investment costs for Iran at $20 million for the TOW and $25 million for the Maverick. The subsequent Iranian Revolution in 1979 ended all plans for such co-production. The Iran–Iraq war lead to Iran having an acute need for anti-tank guided missiles to counter Iraq's massive armored formations, leading Iran to import thousands more TOW missiles, as well as Soviet AT-3 Sagger ATGMs. Attempts at local production of both systems began in the first half of the war, with the TOW missile being prioritized due to its better performance. The earliest prototype version was ready in mid-1985, but performance was disappointing compared to Iran's US-made TOW missiles, which received widespread praise in Iran at the time. Following about a year and a half more of R&D work, the Toophan was tested against Iraqi tanks and showed better performance.[7][8] The missile was shown on an Iranian TV show on March 21, 1987, and production of what would be named the Toophan 1 began by early 1988. R&D and production work continued through the 1990s. The missile was not publicly revealed until 2000, when the Toophan 1 and Toophan 2 were publicly unveiled at the same time. The Toophan has since become Iran's primary anti-tank guided missile. n addition to Toophan missiles, Iran also produces reverse engineered tripod launchers, guidance sets, and storage boxes, all of which bear the Toophan name. Toophan missiles can be fired from TOW launchers, and their components are generally interchangeable. A number of sources say that the Toophan's quality is inferior to that of original American-made TOW missiles, but is still robustly capable. In 2014 Iran showed a Toophan/TOW simulator they built for helicopter-launched missiles. In a December 2016 military exercise Iran used the missile against naval targets. In 2018 Iran showed off thermal-sights which can be used with the Toophan. The Toophan can be mounted on Boragh APCs, ATVs, or Safir jeeps. Toophan missiles can be repaired by Iran's Shiraz Electronics Industries. The Toophan was later developed into the Sadid-1, an ambitious project to build a competitor to the Israeli Spike-ER fire-and-forget missile for attack helicopters and drones. The Sadid-1 had limited success, but was used to develop the successful Sadid-345 glide bomb, which in turn spun off a smaller counterpart, the Qaem air-to-ground munition.

9M119 Svir (AT-11 Sniper) Russian Anti-Tank Guided Missile (ATGM)







Tiers:

1 2 **3** 4

System

:
:
:

↳***9K119 Svir (AT-11 Sniper) Anti-Tank Guided Missile***

Name: 9K119 Svir (AT-11 Sniper)
Type: Anti-Tank Guided Missile (ATGM)
Manufacturer: KBP Instrument Design Bureau
Caliber: mm125
Round Type: 3UBK20 round
Guidance System: 9M119M Laser Guided Missile
Voltage Converter: 9S831 voltage converter.
Tracking System: IK13 tracker
Hit Probability: %80
Sight Assembly: coded laser guidance beam 1K13-49
Gunner's Night Sight: TPN-1-49 secondary night sight.
Fire Control System: 1A40-1
Penetration: up to 700mm of armor
Warhead Weight (HEAT): kg4.2

Laser Emitter: 1K13 sight's laser
Onboard Guidance System: Yes
Maximum Effective Range: m4,000

Notes:

The 9M119 Svir, 9M119M Refleks and AT-11 Sniper by NATO[4] are laser beam riding, guided anti-tank missiles developed in the former Soviet Union. The two missiles are similar, but vary in range and launch platform. Both are designed to be fired from smooth bore 125 mm tank and anti-tank guns (2A45, 2A46 and 2A46M). Their NATO reporting name is AT-11 Sniper. The name Svir comes from the River Svir, while Refleks means reflex. The 9M119 replaces, or supplants, the 9K112 Kobra.

9K115 Metis (AT-7 Saxhorn) Russian Man-Portable Anti-Tank Guided Missile (ATGM)





Tiers:

1 2 **3** 4

Variants:

- **Metis-MI:** New Russian variant of AT-13,weighing 1 kg less, with 2000 m range
- **Metis-M/AT-13:** System with 9P151firing post adapted for and including the Metis-M missile, IOC 1992. The Mulat-115 thermal sight is likely to be used with the missile. This represents the Tier 3 OPFOR dismount ATGM system. The missile can be used on the AT-7 launcher, but cannot then defeat EO jammers.

System

Alternative Designations: 9P151 Firing Post, Metis Saxhorn (NATO)
Manufacturer: KBP Instrument Design Bureau
Crew: ea2
Primary Mount: Ground mount on tripod
Warhead: HEAT shaped charge
Operational Range: 40–1,000 m
Speed: m/s223
Guidance System: Wire-guided SACLOS

Dimensions

Length: mm740
Diameter: mm94
Weight with Container: kg6.3
Wingspan: mm300
Warhead Weight: kg2.5

Fire Control

FCS Name: 9S816 Guidance system
Guidance: SACLOS
Command Link: Wire
Beacon Type: INA

Tracker Type: IR

Susceptible to Countermeasures: EO jammers, smoke, counter-fire Counter-Countermeasures AT-13 defeats EO jammers

Rangefinder: Available

↳*Sight*

Type: Day Sight

Field of View: degINA

Acquisition Range: mINA

↳*Russian 1PN86V/Mulat-115*

Type: Night Sight

Description: Thermal sight is available for launcher with detection at 3200 m and recognition beyond the missile’s 1500 m range.

Field of View: deg4.6

Notes:

The 9K115 Metis (English: "Mongrel"; NATO reporting name AT-7 Saxhorn) is a man-portable, tube launched, SACLOS wire-guided anti-tank guided missile of the Soviet Union. It is considered the Soviet counterpart to the American M47 Dragon ATGM. The relatively small AT-7 missile was generally underpowered compared to contemporary armored threats, and consequently it was little-exported and little used in combat. The missile was developed by the Tula KBP. It is very similar to the 9K111 Fagot in external appearance (having three main fins); however, the missile is much lighter—primarily because of the reduced fuel load, which reduces the maximum range to 1,000 metres (3,300 ft). During the 1980s, an upgraded version of the missile was developed—the Metis-M 9M131 (sometimes labelled Metis-2). Fired from the same launcher, the new missile is much larger and heavier, with an increased range and a larger warhead. The NATO designation for this missile is AT-13 Saxhorn-2. The missile is fired from the 9P151 launching post, which has a simple tripod for support. It can also be fired from the shoulder, but this apparently requires more skill on the part of the operator. The launching post weighs 10.2 kilograms (22 lb). The missile is launched from the tube by a booster rather than the gas generator used on the 9K111 Fagot system, despite both missiles being designed by the same design bureau. The 9S816 guidance system is powered by a thermal battery attached to the launch tube shortly before launch and the missile itself is remotely powered along the guidance wires. The missile can be launched from an enclosed space, such as a building or cave, but requires at least 6 metres (20 ft) behind the launcher, and a total internal volume of at least 100 cubic metres (3,500 cu ft). The missile has a short minimum range of 40 metres (130 ft) and can engage targets moving at up to 60 kilometres per hour (37 mph). The missile's warhead is a single HEAT shaped charge that can penetrate 460 mm of armor.

9M17 Fleyta (AT-2 Swatter) Russian Anti-Tank Guided Missile (ATGM)



Tiers:



Variants:

- **AT-2A Swatter A MCLOS:** 3M11 / 9M11
- **AT-2B Swatter B Range increased to 3.5 km.:** 9M17 9M17DB Modified system to work with the Mi-8TB (Hip-E). 9M17M Skorpion-M MCLOS 9K8 (Falanga-M). Launch weight 29 kg (64 lb), Maximum range 3,500 m. First seen in the 1973 Moscow Parade.
- **AT-2C Swatter C SACLOS Falanga-PV (Fleyta) 9K8.:** 9M17P First SACLOS version. 9M17MP Improved engine and guidance lamp. Maximum range 4,000 m. 9M17N

9M17 Fleyta (AT-2 Swatter) Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M17 Fleyta (AT-2 Swatter)
Type: Anti-Tank Guided Missile (ATGM)
In Service: 1964-Present
Manufacturer: Nudelman OKB-16
Weight: kg27
Length: cm116
Diamter: mm148
Warhead Type: HEAT
Warhead Weight: kg5.4
Engine: Solid fuel rocket
Wingspan: cm68
Operational Range: km0.5-2.5
Speed: 160 m/s (360 mph)
Guidance System: Radio command
Steering System: MCLOS
Launch Platform: Mi-4, Mi-8, Mi-24, Mi-25, BRDM-1, BRDM-2

Notes:

The AT-2 Swatter is the NATO reporting name for the 3M11 Fleyta (flute) MCLOS radio command anti-tank missile of the Soviet Union. he missile was developed by the Nudelman OKB-16 design bureau. It was developed at about the same time as the AT-1 Snapper as a heavy ATGM for use on both ground launchers and helicopters. It addressed some of the problems of the AT-1; it was much faster, and had slightly longer range. These improvements were achieved by sending commands via a radio link instead of a trailing guidance wire, which allowed the missile to travel faster. However, it did make it vulnerable to jamming. The missile system was shown to Soviet premier Nikita Khrushchev in September 1964, and accepted for service shortly afterwards. The AT-2 was the first Soviet ATGM to be deployed from helicopters. Small numbers were fitted to the Mi-4AV. The missile was deployed on the Mi-8 Hip as well as the Mi-24 and Mi-25 'Hind' series of helicopters. It was also deployed on the BRDM-1 and BRDM-2 infantry fighting vehicles. The original AT-2A (3M11 Falanga) missile was problematic; one Russian source describes the missile as "notable for its complexity and low reliability". Also, the missile's range was felt to be inadequate. An improved version of the missile was developed: the AT-2B (9M17 Skorpion). Externally, the missiles are very similar, however the AT-2B range is increased to 3.5 km. The standard production version was the 9M17M Skorpion-M, which entered service in 1968. The next development was to integrate SACLOS guidance, resulting in the AT-2 Swatter-C or 9M17P Skorpion-P. It entered service in 1969. A product improved version the 9M17MP was developed that had an improved engine and signal lamp. The missile has been used extensively in the following wars on the Mi-24 platform. *Angolan War of Independence *Soviet invasion of Afghanistan *1980s Iran–Iraq War *1982 Lebanon War It was replaced in Soviet service by the 9K114 Shturm ATGM.

HJ-73 (Red Arrow-73) Chinese Man-Portable Anti-Tank Guided Missile (ATGM) System



Tiers:

1 2 **3** 4

Variants:

- **HJ-73B:** USes a more advanced SACLOS interface and a better missile.
- **HJ-73C:** removes the joystick contract, allowing the operator to keep the target in the crosshairs; adds thermal imaging; and is also capable of firing 9M14 Malyutka / AT-3 Sagger missiles
- **HJ-73D:** Syria, Venezuela, and South Sudan version of the HJ-73 Red Arrow

System

Alternative Designation: HJ-73 Red Arrow

Manufacturer: NORINCO

Expected out of Service Date: 2040

Type: Short Range, Man Portable Anti-Tank Guided Missile (ATGM) System

Family: The HJ-73 is based of the Russian AT-3 Sagger B (9M114M) Malyutka wire-guided MCLOS

Crew: ea1

Displacement Time: INA

Emplacement Time: INA

Maximum Effective Range: km3

Air to Surface Capable: m/s220

Surface to Air Capable: m/s120

Status: Out of Production

Add on Parts: No

Note: The HJ-73 Red Arrow was built to replace the AT-3 Sagger

Launcher, Man Portable: Yes

SACLOS Guidance Capability: Yes

Note: The HJ-73 is the most widely used Antitank System in the People' sLiberation Army.

Dimensions

Length: m0.85

Diameter: mm125

Missile Weight at Launch: kg11

Automotive

Prime Mover Required: No

Man Portable: Yes

Infantry Fighting Vehicle Mount: Capable

Armored Personnel Carrier Mount: Capable

Attack Helicopters Mount: Capable

Armament and Ammunition

Name: HJ-73 (Red Arrow)

Type: Man Portable Anti-Tank Guided Missile (ATGM) System

Length/Caliber: mm125

Length, Barrel: mm860

Weight: kg10

Muzzle Velocity: m/s120

Effective Range: km3

Weight, Launcher: kg10

Weight, Missile: kg11.3

Range Finder Type: kmIntegrated Optics

Fuel System: Solid Fuel Rocket Motor

Penetration Equivalent: equal to eight hundred millimeters of Rolled Homogenous Armor (RHA)

Self-Destruct: INA

Max Rate of Fire: rpm4

Hit Probability: %70

Sights: Integrated Optics Set

Guidance System: Wire MCLOS

Missile Speed: km600

Feed/Loading System: Manually Loaded

↳*Ammunition (Option 1)*

Name: HEAT Projectile

Type: 125mm

Muzzle Velocity: m/s115

Armor Penetration: Yes

Fuzing System: 9E212

Fire Control

Name: INA

Computerized FCS: INA

Guidance System: Manual Command Line-Of-Sight (MCLOS)

Direct Fire: Yes

Protection

Countermeasures: Immune to Electronic Countermeasures

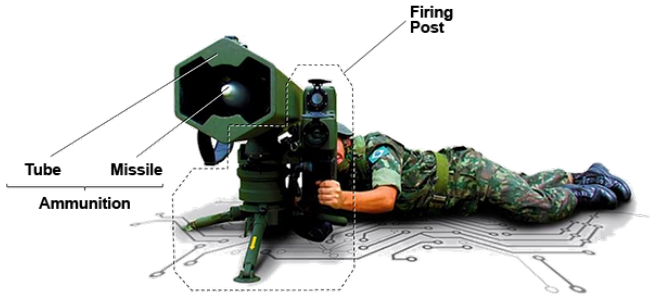
Notes:

The Chinese HJ-73 Red Arrow Anti-Tank Guided Missile System is a locally produced Chinese copy of the Soviet era 9M14 Malyutka. The Red Arrow 73 was China's first-generation anti-tank missile developed in the mid-1980s and had an estimated hit probability of 70 percent. The Chinese Red Arrow 73/HJ-73 used the same 'Manual Command to Line-of-Sight' or MCLOS guidance that the early AT-3 Sagger's in Soviet service relied upon to successfully strike distant tank targets. It was not until 1975 that the first Chinese MCLOS guided anti-tank missile (ATGM) was test-fired, while Soviet engineer's had succeeded in first firing the AT-3 in 1963 and by the first firing of the Chinese ATGM, the Soviets had developed a wire-guided version (using the same guidance technique employed by the first U.S. BGM-71 TOW.)

MSS 1.2 Brazilian Anti-Tank Guided Missile (ATGM)







Tiers:



System

Alternative Designation: MSS 1.2

Type: Anti-Tank Guided Missile

Crew: ea1

Launcher: Unlike most modern ATGMs in its class, the MSS 1.2 is not fired from a disposable launch tube, but rather a reloadable box launcher.

Displacement Time: INA

Emplacement Time: INA

Prime Mover Required: No

Man Portable: Yes

Note: The MSS 1.2 is a man-portable Anti-Tank Guided Missile (ATGM) manufactured in Brazil by Mectron. It is one of the most powerful missiles in its class, and is intended to give infantry an equalizer against even the most advanced main battle tanks.

Dimensions

Launch Tube Length: 1.38 m

Launcher Weight (Without Tripod): 17 kg

Tripod Weight: 11 kg

System Weight: 52.8 kg

Missile

Name:

Type: Anti-Tank Guided Missile

Missile Length: 1.38 m

Missile Diameter: 0.13 m

Fin Span: INA

Missile Weight: 15.5 kg

Warhead Type: HEAT

Warhead Weight: 3.2 kg

Guidance System: Semi-active laser

Maximum Range of Fire: 4 km

Effective Range of Effective Fire: 3.2 km

Armor Penetration: 700 mm RHAe

Fire Control

Name: INA

Computerized FCS: Yes

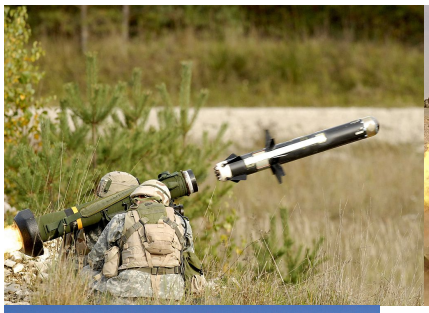
Guidance System: Semi-active laser

Direct Fire: Yes

Notes:

The Mectron MSS-1.2 is an Italian-Brazilian Anti-tank guided missile with laser guidance used for close-range fighting. It is the standard personal missile launch system of the Brazilian army and marine corps. The MSS 1.2 has a range of 500 to 3,000 m and can be used against tanks, armoured vehicles, infantry, bunkers, small buildings, boats, aircraft, and helicopters. Initially, this missile was jointly developed by OTO Melara in Italy and ENGESA in Brazil as the Missile Anticarro della Fanteria (MAF), with the program beginning in 1985. The MAF was later renamed the LEO, in honor of Minister of the Army Leonidas Goncalves, but that name as well gave-way to a later designation, the current MSS 1.2. After ENGESA went bankrupt in 1993, the program was handed over to ORBITA, and later Mectron (also a Brazilian company). OTO Melara eventually ceded the entire program to Mectron, who continued to develop it for an agonizingly long duration --- after 16 more years and at least one major redesign, the MSS 1.2 was formally accepted into service with the Brazilian armed forces in 2009. The CEO of Mectron, Gustavo Ramos, claimed in December 2012 that the MSS 1.2 was (in his own words) "developed and manufactured by a 100% Brazilian company". Though given articles on the MAF, LEO, and MSS 1.2 by Flight Global and other news outlets since the 1980s, this is somewhat exaggerated; without substantial assistance from OTO Melara, this missile would never have existed.http://www.military-today.com/missiles/mss_1_2.htm The missile is equipped with a warhead type hollow charge and a two-stage propulsion system. Guidance is performed by a laser beam projected by the fire control system. Similar in performance to the Russian 9M123 Khrizantema, it is meant to compete with other next generation missiles. The MSS-1.2 was designed to deal with current and future armored threats such as Russian T-90, American M-1 Abrams and British Challenger 2 tanks, but can also be used against low-altitude aircraft such as helicopters and unmanned aerial vehicles. It has successfully breached more than six meters of concrete in tests carried out by the Brazilian army. The anti-tank missile MSS 1.2 is in production, waiting for placement in the Brazilian Army. Although the requirement of EB was for a missile with a 2,000 meter range, during recent tests the missile remained "attitude of target", (i.e., it was guided and impacted on the target at ranges ranging from 3,500 to 4,000 meters) "We put a conservative in the serial range of 3000m. But it goes much further, and accurately, while maintaining full control." *Flight in controlled canards cruciform configuration *Bearing induced by the wings *Shaped warhead with HMX explosive *Engine two stages, with solid propellant, based on double occupancy. *Section of control and guidance system: digital electronics, microprocessor-based *Loop control with PID strategy *Canards electrically actuated

FGM-148 Javelin American Anti-Tank Guided Missile (ATGM)






Tiers:



System

Alternative Designation: FGM-148 Javelin
Type: Anti-Tank Guided Missile (ATGM)
Crew: ea2
Displacement Time: INA
Emplacement Time: INA
Engine: Solid-fuel rocket
Guidance System: infrared homing
Effective Firing Range: original CLU: 2,500 m (1.6 mi) Lightweight CLU: 4,000 m (2.5 mi) from vehicle: 4,750 m (2.95 mi
Launch Tube Assembly: Both the gunner and the ammunition bearer carry a disposable tube called the Launch Tube Assembly, which houses the missile and protects the missile from harsh environments. The tube also has built in electronics and a locking hinge system that makes attachment and detachment of the missile to and from the Command Launch Unit a quick and simple process.

Dimensions

Length, Launcher: 1.2 m
Length, Missile: 1.1 m
Diameter, Launcher: 142 mm
Diameter, Missile: 127 mm
Carry Weight: 22.3 kg
Detachable Command Launch Unit (CLU): 6.4 kg

Ammunition

Name: Javelin Missile

Type: HEAT

Warhead: Tandem shaped charge HEAT

Warhead Weight: 8.4 kg

Detonation Mechanism: Impact force

Penetration: 750mm+ RHA

Seeker: As a fire-and-forget missile, after launch the missile has to be able to track and destroy its target without the gunner. This is done by coupling an on-board imaging IR system (different from CLU imaging system) with an on-board tracking system. The gunner uses the CLU's IR system to find and identify the target then switches to the missile's independent IR system to set a track box around the target and establish a lock. The gunner places brackets around the image for locking. The seeker stays focused on the target's image continuing to track it as the target moves or the missile's flight path alters or as attack angles change. The seeker has three main components: focal plane array (FPA), cooling and calibration and stabilization.

Focal Plane Array (FPA): The seeker assembly is encased in a dome that is transparent to long-wave infrared radiation. The IR radiation passes through the dome and then through lenses that focus the energy. The IR energy is reflected by mirrors on to the FPA. The seeker is a two-dimensional staring FPA of 64×64 MerCad (HgCdTe) detector elements.[20] The FPA processes the signals from the detectors and relays a signal to the missile's tracker. The staring array is a photo-voltaic device where the incident photons stimulate electrons and are stored, pixel by pixel, in a readout integrated circuits attached at the rear of the detector. These electrons are converted to voltages that are multiplexed out of the ROIC on a frame-by-frame basis.

Fire Control

Name: INA

Computerized FCS: Yes

Guidance System: infrared homing

Direct Fire: Yes

Command Launch Unit: The gunner carries a reusable Command Launch Unit (in addition to the Launch Tube Assembly) more commonly referred to as a CLU (pronounced "clue") and is the targeting component of the two-part system. The CLU has three views which are used to find, target, and fire the missile and may also be used separately from the missile as a portable thermal sight. Infantry are no longer required to stay in constant contact with armored personnel carriers and tanks with thermal sights. This makes infantry personnel more flexible and able to perceive threats they would not otherwise be able to detect. In 2006, a contract was awarded to Toyon Research Corporation to begin development of an upgrade to the CLU enabling the transmission of target image and GPS location data to other units

Day Field of View: The first view is a 4× magnification day view. It is mainly used to scan areas for light during daylight operation, because light is not visible in the thermal views. It is also used to scan following sunrise and sunset, when the thermal image is hard to focus due to the natural rapid heating and/or cooling of the Earth.

Wide Field of View: he second view is the 4× magnification night view, and shows the gunner a thermal representation of the area viewed. This is also the primary view used due to its ability to detect infrared radiation and find both troops and vehicles otherwise too well hidden to detect. The screen shows a "green scale" view which can be adjusted in both contrast and brightness. The inside of the CLU is cooled by a small refrigeration unit attached to the sight. This greatly increases the sensitivity of the thermal imaging capability since the temperature inside the sight is much lower than that of the objects it detects. Due to the sensitivity this causes, the gunner is able to "focus" the CLU to show a detailed image of the area being viewed by showing temperature differences of only a few degrees. The gunner operates this view with the use of two hand stations similar to the control stick found in modern cockpits. It is from this view that the gunner focuses the image and determines the area that gives the best heat signature on which to lock the missile.

Narrow Field of View: The third field of view is a 12× thermal sight used to better identify the target vehicle. Once the CLU has been focused in WFOV, the gunner may switch to NFOV for target recognition before activating Seeker FOV. Once the best target area is chosen, the gunner presses one of the two triggers and is automatically switched to the fourth view; the Seeker FOV, which is a 9x magnification thermal view. This process is similar to the automatic zoom feature on most modern

cameras. This view is also available along with the previously mentioned views, all of which may be accessed with press of a button. However, it is not as popular as a high magnification view takes longer to scan a wide area. This view allows the gunner to further aim the missile and set the guidance system housed inside the actual missile. It is when in this view that information is passed from the CLU, through the connection electronics of the Launch Tube Assembly, and into the missile's guidance system. If the gunner feels uncomfortable with firing the missile, he can still cycle back to the other views without having to fire the missile. When the gunner is comfortable with the target picture, he pulls the second trigger and establishes a "lock". The missile launches after a short delay.

Lightweight CLU: The US Army is developing a new CLU as an improvement over the Block I version. The new CLU is 70 percent smaller, 40 percent lighter, and has a 50 percent battery life increase. Features of the lightweight CLU are: a long-wave IR sensor; a high-definition display with improved resolution; integrated handgrips; a five megapixel color camera; a laser point that can be seen visibly or through IR; a far target locator using GPS, a laser rangefinder, and a heading sensor; and modernized electronics.

Notes:

The FGM-148 Javelin is an American man-portable fire-and-forget anti-tank missile fielded to replace the M47 Dragon anti-tank missile in US service. It uses automatic infrared guidance that allows the user to seek cover immediately after launch, as opposed to wire-guided systems, like the Dragon, which require the user to actively guide the weapon throughout the engagement. The Javelin's HEAT warhead is capable of defeating modern tanks by attacking them from above where their armor is thinnest (see top-attack), and is also useful against fortifications in a direct attack flight. As of January 2019, over 5,000 Javelin missiles have been fired in combat. Javelin is a fire-and-forget missile with lock-on before launch and automatic self-guidance. The system takes a top-attack flight profile against armored vehicles (attacking the top armor, which is generally thinner), but can also take a direct-attack mode for use against buildings, targets inside the minimum top-attack engagement range, and targets under obstructions. The missile also has the ability to engage helicopters in the direct attack mode. It can reach a peak altitude of 150 m (500 ft) in top-attack mode and 60 m (190 ft) in direct-fire mode. It is equipped with an imaging infrared seeker. The tandem warhead is fitted with two shaped charges: a precursor warhead to detonate any explosive reactive armor and a primary warhead to penetrate base armor. The missile is ejected from the launcher so that it reaches a safe distance from the operator before the main rocket motors ignite – a "soft launch arrangement". This makes it harder to identify the launcher; however, back-blast from the launch tube still poses a hazard to nearby personnel. Thanks to this "fire-and-forget" system, the firing team may change their position as soon as the missile has been launched, or prepare to fire on their next target while the first missile is still in the air. The missile system is most often carried by a two-person team consisting of a gunner and an ammunition bearer, although it can be fired with just one person if necessary. While the gunner aims and fires the missile, the ammo bearer scans for prospective targets, watches for threats, such as enemy vehicles and troops, and ensures that personnel and obstacles are clear of the missile's back blast.

9K116-1 Bastion (AT-10 Stabber) Russian Anti-Tank Guided Missile (ATGM) System







Tiers:



Variants:

- **100 mm 9K116 Kastet:** The 100 mm Kastet guided round is similar to the Bastion variant but is designed to be fired from the 100 mm MT-12 towed anti-tank gun.
- **100 mm 9K116 system for the BMP-3 ICV:** The same 9M117M missile is used but the round has a significantly different propellant casing because of the ballistics of the 100 mm 2A70 gun used on the BMP-3.

System

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↳***9M117 Bastion (AT-10) Anti-Tank Guided Missile (ATGM)***

Name: 9M117 Bastion (AT-10)
Type: Anti-Tank Guided Missile
Caliber: mm100
Charge Type: Reduced Explosive Charge
Muzzle Velocity: m/s400-500
Length: mm1,048
Weight: kg27
Basic Load: ea8
Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds
Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.
Flight Time (4,000 meters): seconds12
Self Destruct Time: seconds26-41
Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)
Stabilising Fins: ea4
Searchlight: L4 IR searchlight
Effective Firing Range: m100-4,000
Warhead Type: HEAT
Penetration: mm650-750
Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Notes:

The 9M117 Bastion is a Russian laser beam-riding anti-tank missile. It is used in a number of separate weapon systems, including the 9K116-1 Bastion missile system (AT-10 Stabber), 9K118 Sheksna (AT-12 Swinger), T-12 antitank gun and the 3UBK12 fired from the BMP-3. The 100 mm projectile entered service in 1981. The 100 mm round resembles a normal 100 mm anti-tank round, and is loaded and fired in the same fashion. The round uses a reduced explosive charge to launch the projectile out of the barrel of the gun at around 400 to 500 m/s. After leaving the gun barrel, a small cover falls away from the window on the rear of the missile. The rocket motor ignites 1.5 seconds after firing the missile, and it burns for 6 seconds. The projectiles use beam-riding laser guidance. A cone of laser light divided into sectors is projected from the launching tank/vehicle/gun, each sector having a different frequency or modulation. The missile has a small window in the rear with a laser sensor to detect the modulation of the light. Using this modulation, the missile steers itself, maintaining its position in the cone. Laser beam is zoomed during the missile flight so it has the same diameter (about 6 meters) throughout the missile flightpath. The laser beam-riding guidance system is smaller than a radio command one, and cheaper and simpler than semi-active laser guidance. The missile is also not prone to radio or optical jamming. On the other hand, a target has to be tracked by laser sight all the time, and the system can not be reliably used on the move. The missile's flight time to 4,000 meters is approximately 12 seconds. After 26 to 41 seconds, the missile self-destructs.

MILAN 2 French Anti-Tank Guided Missile (ATGM) System





Tiers:

1 2 **3** 4

Parent:

MILAN French Anti-Tank Guided Missile (ATGM)

Variants:

- **MILAN 1:** Single, main shaped charge warhead (1972), calibre 103 mm
- **MILAN 2:** Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm
- **MILAN 2T:** Single main shaped charge, with smaller shape charge warhead at end of standoff probe to defeat reactive armour (1993)
- **MILAN 3:** Tandem, shaped charge warheads (1996) and electronic beacon
- **MILAN ER:** Extended range (3,000 m) and improved penetration

System

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↳*MILAN 2 Anti-Tank Guided Missile (ATGM)*

Country: France / Germany
Manufacturer: MBDA, MKEK (under license)
Unit Cost: £12,000 (2017)
Maximum Operational Range: m2,000
Minimum Operational Range: m25
Basic Load: ea10
Armor Penetration: mm350
Missile Length: mm918
Missile Diameter: mm125
Wing Span: mm267
Rate of Fire: rds/min3-4

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Type: High Explosive

Warhead Weight: kg2.7

Warhead Diameter: mm1158

Guidance System: Semi-Automatic command to line of sight by means of wires (SACLOS)

Steering System: Jet deflector

Launch Platform: Individual, vehicle

Firing Post Weight: kg16.4

Firing Post Length: mm900

Firing Post Width: mm420

Firing Post Height: mm650

Armor Penetration: mm352

Time of Flight to Max Range: sec12.5

Missile Speed: km/h720

Charge Type: Tandem Charge, used against Reactive Armor

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Notes:

MILAN (French: Missile d'infanterie léger antichar; English: Light anti-tank infantry missile, milan is French for kite) is a Western European anti-tank guided missile. Design of the MILAN started in 1962, it was ready for trials in 1971, and was accepted for service in 1972. It is a wire guided SACLOS (semi-automatic command to line-of-sight) missile, which means the sight of the launch unit has to be aimed at the target to guide the missile. The MILAN can be equipped with a MIRA or MILIS thermal sight to give it night-firing ability. MILAN is a product of Euromissile, a Franco-West German missile development program dating back to the 1960s. The system entered service in 1972 as a second generation anti-tank weapon and soon became a standard anti-tank weapon throughout NATO, in use by most of the alliance's individual armies. Consisting of two main components, the launcher and the missile, the MILAN system utilizes a semi-automatic command to line of sight (SACLOS) command guidance system. It tracks the missile either by a tail-mounted infrared lamp or an electronic-flash lamp, depending on the model. Because it is guided by wire by an operator, the missile cannot be affected by radio jamming or flares. However, drawbacks include its short range, the exposure of the operator, problems with overland powerlines, and a vulnerability to infrared jammers such as Shtora that can prevent the automatic tracking of the missile's IR tail light. The MILAN 2 variant, which entered service with the French, German and British armies in 1984, utilizes an improved 115 mm HEAT warhead. The MILAN 3 entered service with the French army in 1995 and features a new-generation localizer that makes the system more difficult to jam electronically. MILAN 2: Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm.

HJ-9 (Red Arrow-9) Chinese Anti-Tank Guided Missile (ATGM) System



Tiers:



Variants:

- **HJ-9A:** Semi-active millimetre wave radar guidance
- **HJ-9B:** Laser beam riding variant

System

Alternative Designation: HJ-9, Hongjian -9, Red Arrow-9

Manufacturer: NORINCO

Type: Anti-tank and air-to-surface missiles

Family: 3rd Generation Anti-Tank Missile System deployed by the PLA

Crew: ea3

Displacement Time: INA

Emplacement Time: INA

Minimum Effective Range: m100

Maximum Effective Range: km5.5

Air to Surface Capable: Yes

Surface to Air Capable: Yes

Launching Tube Type: Disposable Container/Launching Tube

Control Fins: ea4

Dimensions

Length: mm1,200

Diameter: mm152

Weight, Combat: kg37

Automotive

Prime Mover Required: Yes, in this image the HJ-9 is mounted onto a Chinese WZ551

Man Portable: No

NOTE: The HJ-9 can be mounted to a variety of vehicles that includes: Full Tracked Armored Vehicles, Trucks, Helicopters, and Coastal Craft.

Armament and Ammunition

Name: HJ-9 Red Arrow 9 Chinese Anti-Tank Guided Missile (ATGM)

Type: Tandem-HEAT Anti-tank and air-to-surface missile

Length/Caliber: INA

Guidance System: Laser-beam-riding & MMW radar

Engine: Rocket Motor

Propellant: Solid Fuel

Basic Load: 4 "Ready to Fire", 8 stored internally

Muzzle Velocity: Supersonic

Effective Range: m100-5,500

Range Finder Type: kmLaser

Armor Penetration: mm1100-1200

Warhead Type: Tandem HEAT warhead

Warhead Weight: INA

Detonation Mechanism: Contact Fuse

Max Rate of Fire: two missiles per minute

Sustain Rate of Fire: rds/min2

Time the Max Rate of Fire can be Sustained: INA

Hit Probability: %90

Launch Platform: Air and Ground

Fire Control

Name: INA

Computerized FCS: Yes, Laser beam-riding semi-automatic command-to-line of sight (SACLOS)

Guidance System: Laser-beam-riding & MMW radar

Direct Fire: Yes

Indirect Fire: Yes

Thermal Imaging Sights: Compatible

TV Goniometer: Yes

Thermal Sight: Yes

Notes:

The Hong Jian-9 is an advanced, third-generation anti-tank missile system deployed by the People's Liberation Army. The missile was developed by China North Industries Corporation (Norinco), and one of the chief designers was Yang Chunming. It is similar in appearance to the Israeli MAPATS (man portable anti-tank system), causing speculation about the link between the two missiles. It is also similar to the South African ZT3 Ingwe anti-tank missile. Like the MAPATS and ZT3, the HJ-9 is guided by laser beam riding. The HJ-9 has a maximum range of 5.5 km (3.4 mi), and a minimum range of 100 m (110 yd). Claimed armor

penetration is 1,200mm, which is greater than that of the HJ-8. The missile may be fitted with high-explosive or thermal effect warheads for use against non-armored point targets, bunkers and fortifications. Like the HJ-8, the HJ-9 utilizes a disposable container/launching tube, but the one for HJ-9 is heavier, weighing 37 kg (82 lb) because HJ-9 is larger than HJ-8. The diameter of the HJ-9 is 152 mm (6.0 in) and the missile is compatible with a variety of thermal imaging sights. In 2005, Norinco revealed in various public events that another version of HJ-9, the HJ-9A was already in service with Chinese armed forces, and this version used semi-active millimetre wave radar guidance. However, only photos of HJ-9A in service with Chinese paratroops were shown to the public. In these photos, the HJ-9A launcher is mounted on a jeep, and Norinco claimed the launcher on vehicles could be rapidly dismounted for foot soldiers. Norinco also revealed a further-developed advanced version of the HJ-9A, designated HJ-9B.

9M133 Kornet (AT-14 Spriggan) Russian Man-Portable Anti-Tank Guided Missile (ATGM)



Tiers:

1 **2** 3 4

System

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↳ ***Anti-Tank Guided Missile (ATGM)***

Name: 9M133 Kornet
NATO Name: AT-14 Spriggan
Type: Anti-Tank Guided Missile (ATGM)
Manufacfturer: Degtyarev plant
Launcher Type: Twin launchers mounted on either side of the turret
Basic Load: ea4
Weight (with Launch Tube): kg29
Weight (with Tripod/Firing Unit): kg63.7
Length: mm1,200
Diameter: mm152
Warhead: 1,000–1,200 (9K135), 1,200 (E), 1,300 (D) mm RHA penetration after ERA with Tandem HEAT, Thermobaric
Warhead Weight: kg4.6
Detonation Mechanism: Impact Fuse
Wingspan: mm460
Propellant: Solid-fuel rocket
Operational Range (KORNET): m100-5,000
Operational Range (KORNET-EM): m10,000
Guidance system: SACLOS laser beam riding
Steering system: Two control surfaces
Accuracy: Less than 5 meters

Launch platform: Individual, vehicles, Kornet-T, Kornet-D, Bumerang-BM, Kornet-D1

↳*Missile Variant (Option 1)*

Name: 9M133-1 (Kornet/Kornet-E)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg26

Speed: m/s250

Range (Daytime): m100-5,500

Warhead: 152 mm tandem HEAT 1,000–1,200 mm RHA penetration after ERA 3–3.5 m of concrete

↳*Missile Variant (Option 2)*

Name: 9M133M-2 (Kornet-M/Kornet-EM)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg31

Speed: m/s300

Range (Daytime): m150-8,000

Warhead: 152 mm tandem HEAT 1,100–1,300 mm RHA penetration after ERA 3–3.5 m of concrete

↳*Missile Variant (Option 3)*

Name: 9M133F-1 (Kornet/Kornet-E)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg29

Speed: m/s250

Range (Daytime): m100-5,500

Warhead: Thermobaric 10 kg (22 lb) TNT equivalent

↳*Missile Variant (Option 4)*

Name: 9M133F-2 (Kornet-M/Kornet-EM)

Diameter: mm160

Length (Missile): m1.1

Weight (including Container): kg31

Speed: m/s300

Range (Daytime): m150-8,000

Warhead: Thermobaric 10 kg (22 lb) TNT equivalent

↳*Missile Variant (Option 5)*

Name: 9M133F-3 (Kornet-M/Kornet-EM)
Diameter: mm160
Length (Missile): m1.1
Weight (including Container): kg33
Speed: m/s320
Range (Daytime): m150-10,000
Warhead: Blast Fragmentation 7 kg (15 lb)

Notes:

The 9M133 Kornet (Russian: Корнет; "Cornet", NATO reporting name AT-14 Spriggan, export designation Kornet-E) is a modern Russian man-portable anti-tank guided missile (ATGM) intended for use against main battle tanks. It was first introduced into service with the Russian Army in 1998. The Kornet is among the most capable Russian ATGMs. It is not intended to fully replace previous systems, due to its high cost.[6] The Kornet comes in variants with thermobaric warheads for use against soft targets. It was further developed into the 9M133 Kornet-EM, which has increased range, fire-and-forget capability, and an improved warhead. The Kornet has been widely exported and is produced under license in several countries. It was first used combat in 2003 and has since been used in many conflicts. The NATO reporting name AT-14 Spriggan is derived from the spriggan, a legendary creature from Cornish faery lore. he 9M133 missile together with its 9P163-1 tripod launcher and 1PN79-1 thermal sight forms the 9K135 missile system, which can be carried and operated by a two-person infantry crew. The transfer to the firing position takes less than one minute, and preparation and production of a shot in at least one second. Kornet anti-tank missile system has been fitted with the ‘top attack’ capability. In addition to an infantry portable version, the 9K133 system has been integrated into a variety of other vehicles and weapons systems as either an upgrade package or a new weapon system. The 9K133 has been fitted into a BMP-3 to form the 9P163M-1 tank destroyer and is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missile are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).[16] NBC protection is provided for the two crew (gunner and driver) of each 9P163M-1 in addition to full armour protection equivalent to the standard BMP-3 chassis. The guidance system of the 9P163M-1 allows two missiles to be fired at once, each operating on different guidance (laser) channels. The KBP Instrument Design Bureau has also marketed the 9M133 missile as part of the Kvartet system for mounting on vehicles and boats; the system has four missiles on ready to launch rails along with associated guidance and sighting system all packaged in a single turret; the guidance system also allows two missiles to be fired at once. The turret has space for an additional five rounds and is operated by a single individual. Another upgrade possibility is the Kliver missile and gun turret, seen as an upgrade option for the BTR series of APC, BMP-1 IFV and patrol boats. It has similar capabilities as the Kvartet turret, but also carries a 30 mm 2A72 cannon; turret weight is 1,500 kg. Finally the 9M133 is also available in the BEREZHOK turret upgrade also made available by KBP. Since 2014, its serial production has been resumed for the domestic market with the designation B05YA01.

HOT French Anti-Tank Guided Missile (ATGM)





Tiers:



Variants:

- **HOT or HOT-1:** the original model. Introduced in 1978, it can penetrate a maximum of 850 millimeters of armor.
- **HOT-2:** introduced in 1985. The HOT-2 is an improved version of the original HOT, with a larger warhead and lighter body. The HOT-2 has the same range of 4 kilometers, but can penetrate up to 1 250 millimeters of Rolled Homogeneous Armor (RHA).
- **HOT-2MP:** introduced in 1986. This variant features a fragmentation warhead with 1 000 steel balls in it. This weapon is highly useful against reinforced structures, infantry, and light vehicles. Penetration is about 350 mm of RHA. The HOT-2MP is not useful against tanks due to its low penetration.
- **HOT-3:** sometimes know as the HOT-2T, the HOT-3 was introduced in 1993. It features a 6.48-kilogram tandem HEAT warhead. The HOT-3 can penetrate 1 250 mm of RHA behind Explosive Reactive Armor (ERA). The range is also increased to 300 meters. The HOT-3 is nearly invulnerable to infrared jamming.

System

Alternative Designation: HOT

Type: Anti-Tank Guided Missile

Crew: ea1

Displacement Time: Under 2 min

Emplacement Time: Under 2 min

Prime Mover Required: No

Man Portable: Yes

Note: Despite its numerous advantages, the HOT can only be used on vehicles and helicopters, and it has a sluggishly slow speed compared to weapons like the TOW.

Dimensions

Launcher Length: INA

Launcher Weight: INA

Missile

Name: HOT

Type: Anti-Tank Guided Missile

Missile Length: 1.27 m

Missile Diameter: 0.14 m

Wingspan: 0.31 m

Missile Weight: 23.5 kg

Warhead Type: HEAT

Warhead Weight: 5 kg

Maximum Range of Fire: 4,000 m

Minimum Range of Fire: 75 m

Speed: 240 m/s

Guidance System: Wire-guided

Penetration: 850 millimeters of armor.

Fire Control

Name: INA

Computerized FCS: Yes

Guidance System: Wire-guided

Direct Fire: Yes

Notes:

The HOT (French: Haut subsonique Optiquement Téléguidé Tiré d'un Tube, or High Subsonic, Optical, Remote-Guided, Tube-Launched) is a second-generation long-range anti-tank missile system developed originally as an effort to meet a joint German-French Army requirement, by the then German firm Bölkow and the French firm Nord, to replace the older SS.11 wire guided missile which was in service with both nations. A few years later, Bölkow and Nord merged into MBB and Aérospatiale respectively, both of which firms later formed Euromissile to design and produce the MILAN, Roland and HOT. This firm (now MBDA), is a joint corporation of French and German defense firms. The HOT has become one of the most successful missiles of its class, with tens of thousands of missiles produced, used by no fewer than a dozen countries worldwide, and validated in combat in several wars. The missile system is also commonly mounted on light and medium armored vehicles, and attack helicopters. HOT entered limited production in 1976, with mass production of 800 missiles a month reached in 1978. HOT initially became operational with the German and French armies fitted to specialized armored antitank vehicles. In addition, Euromissile was in the enviable position of having large export orders from Middle East nations at the start of mass production. This was likely due to the situation in the late 1970s where many nations did not want to rely solely on arms purchases from the Soviets combined with the U.S. Congress restrictions on the export sales of the TOW antitank missile. In Europe, the end of the service life of the HOT missile system is in sight with the French opting to purchase Hellfire II missiles for their Tiger-HAD attack helicopters and the Germans planning to transition to the PARS 3 LR. Austria has decommissioned its HOT-carrying tank destroyers, while Spain is transitioning to Spike missiles to replace their HOT missile inventory. The HOT missile continues to be in widespread use in other areas of the world. Project studies by both firms started in 1964, at about the same time the US Army started a project that resulted in the TOW missile. Unlike TOW, which entered service in 1973, the development and testing phase for HOT took considerably longer. The design goal was to produce an antitank missile that could be fired from both vehicles and helicopters; that employed the SACLOS guidance system instead of the less reliable MCLOS system used by the SS.11; had a longer range combined with a better minimum engagement range; had a higher missile speed than the SS.11 resulting in a shorter flight time; and packed in a sealed container that also served as the launcher. The HOT missile is tube-launched and optically tracked using the SACLOS guidance system with command link through trailing wires which steers the missile using thrust vector controls on the sustainer motor during the missile's flight. When the gunner fires the HOT missile, the missile activates a thermal battery, flares and a small gas generator spins up the gyro. The same gases for the gyro pop the covers off both ends of the cylindrical container the HOT missile comes packed in. Moments later, both the sustainer motor and the booster are fired, ejecting the missile from the container. Unlike most antitank missiles, in which the booster burns completely before leaving the container and then the missile coasts a safe distance before the sustainer motor ignites, HOT's booster burns both inside the container and outside the container for approximately one second giving the missile a high speed. The sustainer motor burns for 17 seconds, a flight time whose path exceeds the length of the trailing wires which dictate the maximum range of the missile. Because of the more powerful booster and sustainer motor that burns during its complete flight, the HOT missile had a much shorter flight time than any other wire guided antitank missiles when it was introduced. The booster's four nozzles are located at the roots of the four spring out fins. The sustainer motor's single exhaust is located in the rear of the missile body, where a vane controls the missile through thrust vector control as it rotates in flight. After the missile

is fired, all the gunner has to do is keep the target in the sight's cross hairs, and the system will automatically track the missile's rear-facing flares, gather the missile into the gunner's sight, and send commands to steer the missile into the gunner's line of sight. Approximately 50 meters after ejecting from the container, the safety system arms the HEAT warhead's fuze and will detonate when the outer skin of the two-layer nose cone is crushed to contact with the inside skin, completing an electrical circuit. With this type of fuzing system, the missile does not have to hit the tip of the missile's nose to detonate the HEAT warhead. The HOT 1 and HOT 2 use the warhead fuzing system previously described. The latest version of the HOT family, the HOT 3, uses tandem charge feature to defeat tanks fitted with explosive reactive armor. A laser-proximity fuze located in the front half of the nose measures the distance between the target and the missile. At the correct range, the small nipple on the front nose containing a small HEAT warhead is ejected forward from the missile body to pre-detonate the reactive armor followed by the detonation of main HEAT warhead.

HJ-9A (Red Arrow 9A) Chinese Anti-Tank Guided Missile (ATGM)



Tiers:



System

Alternative Designation: HJ-9A; Red Arrow 9A
Type: Anti-Tank Guided Missile
Crew: ea2
Displacement Time: INA
Emplacement Time: INA
Prime Mover Required: No
Man Portable: Yes

Dimensions

Launcher Length: INA
Launcher Weight: INA

Missile

Name: HJ-9A
Type: Anti-Tank Guided Missile
Missile Length: 1.2 m
Missile Diameter: 0.15 m
Fin Span: INA
Missile Weight: 37 kg
Warhead Type: Tandem HEAT
Warhead Weight: INA
Guidance System: The HJ-9A is a radar-guided missile. It uses millimeter wave guidance.
Range of Fire: 5 km
Armor Penetration: 1 200 mm

Fire Control

Name: INA

Computerized FCS: Yes

Guidance System: The HJ-9A is a radar-guided missile. It uses millimeter wave guidance.

Direct Fire: Yes

Notes:

The HJ-9A (Hong Jian 9A or Red Arrow 9A) is a tripod-mounted version of the HJ-9 anti-tank guided missile, which was used on the AFT-9anti-tank missile carrier. It is a long-range, high-power anti-tank missile. Even though the HJ-9A has a tripod, it is not a true man-portable system due to its weight. It is normally mounted on various vehicles. The HJ-9A was designed to engage tanks, armored vehicles and fortifications. It is capable of defeating even the latest main battle tanks. The HJ-9A was officially revealed in 2005 and by the time was already in service with the People's Liberation Army. This missile is also being proposed for export customers. The HJ-9A is a radar-guided missile. It uses millimeter wave guidance. It is an improved version of the previous HJ-9. It has a longer range and is better protected from enemy jamming. It is similar in appearance to an American BGM-71D missile of the TOW 2system, Israeli MAPATS and South African Ingwe anti-tank missiles. However it is not confirmed, whether the HJ-9A uses TOW 2, MAPATS or Ingwe technology. The HJ-9A has a tandem High Explosive Fragmentation (HE-FRAG) warhead. It could potentially penetrate around 1 200 mm of steel armor behind Explosive Reactive Armor (ERA). So the HJ-9A can penetrate the front armor even of the latest main battle tanks. Once the missile is launched, operator only has to keep the sight's crosshair on the target. Maximum range of fire is around 5 km. So in terms of performance the HJ-9A could be similar to a Russian Kornet. The HJ-9 anti-tank missile system was demonstrated on a Nanjing NJ2046 4x4 light utility vehicle, which carries a single tripod-mounted launcher. Though it can be also mounted on any other light utility vehicle.

MILAN 2T French Anti-Tank Guided Missile (ATGM) System





Tiers:



Parent:

MILAN French Anti-Tank Guided Missile (ATGM)

Variants:

- **MILAN 1:** Single, main shaped charge warhead (1972), calibre 103 mm
- **MILAN 2:** Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm
- **MILAN 2T:** Single main shaped charge, with smaller shape charge warhead at end of standoff probe to defeat reactive armour (1993)
- **MILAN 3:** Tandem, shaped charge warheads (1996) and electronic beacon
- **MILAN ER:** Extended range (3,000 m) and improved penetration

System

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↳*MILAN 2T Anti-Tank Guided Missile (ATGM)*

Country: France / Germany
Manufacturer: MBDA, MKEK (under license)
Unit Cost: £12,000 (2017)
Maximum Operational Range: m2,000
Minimum Operational Range: m25
Basic Load: ea10
Armor Penetration: mm350
Missile Length: mm918
Missile Diameter: mm125
Wing Span: mm267
Rate of Fire: rds/min3-4

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Type: Tandem HEAT

Warhead Weight: kg2.7

Warhead Diameter: mm1158

Guidance System: Infrared guidance system.

Steering System: Jet deflector

Launch Platform: Individual, vehicle

Armor Penetration: 880 mm of rolled homogenous armor behind ERA.

Time of Flight to Max Range: sec12.5

Missile Speed: km/h720

Charge Type: Tandem Charge, used against Reactive Armor

Thermal Sight: New Generation MILIS Thermal Sight from the SAGEM

Jamming Resistance: Yes, via the new CCD Localiser

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Notes:

MILAN 2T, The 2T marked the introduction of a tandem HEAT warhead in the MILAN system. This was to counter the widespread use of Explosive Reactive Armor (ERA) among third-generation tanks, which by the late 1980s were impervious to most shoulder-launched anti-tank rockets. This missile penetrates 880 mm of rolled homogeneous armor behind ERA. MILAN (French: Missile d'infanterie léger antichar; English: Light anti-tank infantry missile, milan is French for kite) is a Western European anti-tank guided missile. Design of the MILAN started in 1962, it was ready for trials in 1971, and was accepted for service in 1972. It is a wire guided SACLOS (semi-automatic command to line-of-sight) missile, which means the sight of the launch unit has to be aimed at the target to guide the missile. The MILAN can be equipped with a MIRA or MILIS thermal sight to give it night-firing ability. MILAN is a product of Euromissile, a Franco-West German missile development program dating back to the 1960s. The system entered service in 1972 as a second generation anti-tank weapon and soon became a standard anti-tank weapon throughout NATO, in use by most of the alliance's individual armies. Consisting of two main components, the launcher and the missile, the MILAN system utilizes a semi-automatic command to line of sight (SACLOS) command guidance system. It tracks the missile either by a tail-mounted infrared lamp or an electronic-flash lamp, depending on the model. Because it is guided by wire by an operator, the missile cannot be affected by radio jamming or flares. However, drawbacks include its short range, the exposure of the operator, problems with overland powerlines, and a vulnerability to infrared jammers such as Shtora that can prevent the automatic tracking of the missile's IR tail light.

9M120 Ataka (AT-9 Spiral-2) Russian Anti-Tank Guided Missile





Tiers:



Variants:

- **9M120 Ataka:** 9M120 Ataka "AT-9 Spiral-2" SACLOS radio command guidance missile.
- **9M120:** 9M120 – This variant features a tandem HEAT warhead to defeat current and future armored fighting vehicles equipped with ERA.
- **9M120F:** 9M120F – This variant uses a thermobaric warhead for greater effect against buildings, unarmored targets, and bunkers.
- **9M220O:** This variant is included with an expanding rod warhead for use against helicopters. It is equipped with a proximity fuse to destroy aircraft, and detonates its fragmentation warhead when less than four meters from the target.
- **9M120M:** A modernized variant with an extended range of 8,000 m. The improved warhead can penetrate over 950 mm of RHA after ERA.
- **9M120D:** An improved variant with a range of 10 km
- **9M120-1 Ataka:** Upgraded Ataka missiles used by Ataka-T GWS
- **9M127-1 Ataka-VM:** New air to surface version for helicopters.

System

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↳ ***9M120 Ataka (AT-9 Spiral-2)***

Name: 9M120 Ataka (AT-9 Spiral-2)
Type: Anti-Tank Guided Missile
Manufacturer: Degtyarev plant
Missile Length: m1.83
Missile Diameter: m0.13
Fin Span: m0.36
Missile Weight: kg42.5
Warhead Type: tandem HEAT, fuel-air explosive, expanding rod
Warhead Weight: kg7.4
Range of Fire: km6
Guidance System: Radio-Guided & Semi-Automatic Command to Line of Sight (SACLOS) guidance

Speed: supersonic

Notes:

The 9M120 Ataka (Russian: Атака; Attack) is an anti-tank guided missile (ATGM) originating from the Soviet Union. The NATO reporting name of the 9M120 missile is the AT-9 Spiral-2. It is the next major generation in the 9K114 Shturm (AT-6 Spiral) family. The missile has radio command guidance and is also a Beam riding SACLOS. This missile's primary variant was designed to defeat tanks with composite armour and explosive reactive armor. The 9M120 Ataka system is often confused with the 9K121 Vikhr system, despite being different weapons systems developed by different companies. The former was designed by the KBM machine-building design bureau and manufactured by the Degtyarev plant. According to the Stockholm International Peace Research Institute, Russia exported the Ataka ATGM to Iran, Kazakhstan, and Slovenia. The Ataka missile is stored in a glass reinforced plastic tube, which also acts as its launcher. The missile is reported to be considerably faster than the 9K114 Shturm, with longer range than the original version. It still uses radio command guidance, but the system has been improved when compared to the earlier 9K114 Shturm. The system is carried by the multiple kinds of helicopters including the Mi-28 and Mi-35. It is also offered for ground vehicles like the BMPT and the 9P149. There are three main missiles that are compatible with the launch system. The first is a two-stage anti-armour weapon that features a tandem warhead for dealing with add-on armor. The second variant of the missile – designated as 9M120F – has a thermobaric warhead for use against infantry positions and bunkers. The third variant of the 9M120 Ataka is the 9M220, which features a proximity fused expanding rod warhead, providing the missile with air-to-air capability against low- and slow-flying aircraft.

MILAN 3 French Anti-Tank Guided Missile (ATGM) System



Tiers:

1 2 3 4

Parent:

MILAN French Anti-Tank Guided Missile (ATGM)

Variants:

- **MILAN 1:** Single, main shaped charge warhead (1972), calibre 103 mm
- **MILAN 2:** Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm
- **MILAN 2T:** Single main shaped charge, with smaller shape charge warhead at end of standoff probe to defeat reactive armour (1993)
- **MILAN 3:** Tandem, shaped charge warheads (1996) and electronic beacon
- **MILAN ER:** Extended range (3,000 m) and improved penetration

System

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↳***MILAN 3 Anti-Tank Guided Missile (ATGM)***

Country: France / Germany
Manufacturer: MBDA, MKEK (under license)
Unit Cost: INA
Maximum Operational Range: m2,000
Minimum Operational Range: m25
Armor Penetration: mm350
Missile Length: mm918
Missile Diameter: mm125
Wing Span: mm267
Rate of Fire: rds/min3-4
Total Weight with Launcher: kg13

Warhead Type: New, multi-effect warhead with HEAT

Warhead Weight: kg2.7

Warhead Diameter: mm1158

Armor Penetration: mm350

Guidance System: Infrared guidance system.

Steering System: Jet deflector

Launch Platform: Individual, vehicle

Time of Flight to Max Range: sec12.5

Missile Speed: km/h720

Charge Type: Tandem Charge, used against Reactive Armor

Thermal Sight: New Generation MILIS Thermal Sight from the SAGEM

Jamming Resistance: Yes, via the new CCD Localiser

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Notes:

MILAN 3, Introduced in 1996 the MILAN 3 had even larger 125 mm missile with tandem HEAT warhead and an infrared guidance system. MILAN (French: Missile d'infanterie léger antichar; English: Light anti-tank infantry missile, milan is French for kite) is a Western European anti-tank guided missile. Design of the MILAN started in 1962, it was ready for trials in 1971, and was accepted for service in 1972. It is a wire guided SACLOS (semi-automatic command to line-of-sight) missile, which means the sight of the launch unit has to be aimed at the target to guide the missile. The MILAN can be equipped with a MIRA or MILIS thermal sight to give it night-firing ability. MILAN is a product of Euromissile, a Franco-West German missile development program dating back to the 1960s. The system entered service in 1972 as a second generation anti-tank weapon and soon became a standard anti-tank weapon throughout NATO, in use by most of the alliance's individual armies. Consisting of two main components, the launcher and the missile, the MILAN system utilizes a semi-automatic command to line of sight (SACLOS) command guidance system. It tracks the missile either by a tail-mounted infrared lamp or an electronic-flash lamp, depending on the model. Because it is guided by wire by an operator, the missile cannot be affected by radio jamming or flares. However, drawbacks include its short range, the exposure of the operator, problems with overland powerlines, and a vulnerability to infrared jammers such as Shtora that can prevent the automatic tracking of the missile's IR tail light.

9M113 Konkurs Russian Anti-Tank Guided Missile (ATGM)





Tiers:



Variants:

- **9M113M Konkurs-M (NATO: AT-5B Spandrel B):** Tandem warhead - with extended explosive probe. The warhead penetration is 750–800 mm vs RHA.
- **Tosan:** Iranian-built missile

System

Name: 9M113 Konkurs (AT-5 Spandrel)
Type: Soviet SACLOS wire-guided anti-tank missile.
Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod
Varaints: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1
Crew: ea2-3
Weight (Missile): kg14.6
Weight (9P135 Launching Post): kg22.5
Length: mm1,150
Diameter: mm135
Warhead Weight: kg2.7
Warhead Type: HEAT
Detonation Mechanism: Contract
Engine: Solid-fuel rocket
Wingspan: mm468
Firing Range (Day): m100-4,000

Firing Range (Night): m2,500

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA/ERA

Thermal Imager: Available

Manual command to line of sight (MCLOS).: Yes

Accessories: Thermal sight 1PN65, sight-tracker

Operating Temperature: –50°C to +50°C

Notes:

The 9K113 Konkurs (NATO code AT-5 Spandrel) is Russian-made Semi-automatic command to line of sight (SACLOS) wire-guided anti-tank missile. The missile was designed and developed by the Russian Defense Company KBP (Konstruktorskoe Buro Priborostroeniya). The 9K113 Konkurs is designed to engage moving and stationary armoured targets provided with explosive reactive armour (ERA) protection. The Konkurs system can be carried by tracked or wheeled armoured vehicle. The 9K113 was introduced in the Russian army in 1977. The missile was seen for the first time during a military parade in Moscow, mounted on a BRDM-2 4x4 armoured vehicle.

M47 Dragon American Anti-Tank Guided Missile





Tiers:



Variants:

- **Dragon II:** Designed and upgraded from Dragon in 1985 when its penetration effectiveness was increased.
- **Super Dragon:** Upgraded from Dragon II in 1990, it was capable of penetrating 18 inches (460 mm) of armor at a maximum effective range of 1,500 m (1,600 yd).
- **Saeghe:** Iran has reverse-engineered a version of the Dragon, the Saeghe. They displayed it in 2002 at the Defendory exhibition in Athens, when it was in mass production. Hezbollah has acquired Saeghes for anti-tank and anti-armor uses. Known versions include Saeghe-1 and Saeghe-2.

System

Alternative Designation: None

Type: Wire Guided LOS ATGM

Crew: 1

Displacement Time: The gunner has to stay in position until the missile reaches the target and then can leave the position as quickly as they are capable

Emplacement Time: Less than 1 minute

Prime Mover Required: No

Man Portable: Yes

Guidance System: SACLOS (Semi-Automatic Command to Line of Sight)

Range: m75-1,500

Dimensions

Length, Launcher: m1.1

Length, Missile: mm856

Diameter: mm140

Weight, Combat: 14.6kg with day sight; 21.3kg with night sight

Weight, M175 Mount: kg37.6

Missile

Type: HEAT

Caliber: mm140

Speed: m/s200

Warhead: Hallow Charge

Armor Penetration: mm460

Fire Control

Guidance System: SACLOS

Day and Night Capable: Yes

Field of View: degrees6

Sight Magnification: 6 power for day, 4 power for night

Notes:

The M47 Dragon, is an American shoulder-fired, man-portable anti-tank guided missile system. It was phased out of U.S. military service in 2001, in favor of the newer FGM-148 Javelin system. The M47 Dragon uses a wire-guidance system in concert with a high explosive anti-tank warhead and was capable of defeating armored vehicles, fortified bunkers, main battle tanks, and other hardened targets. While it was primarily created to defeat the Soviet Union's T-55, T-62, and T-72 tanks, it saw use well into the 1990s, seeing action in the Persian Gulf War. The United States destroyed the last of its stocks of the missile in 2009. The weapon system remains in active service with other militaries around the world. The launcher system of the M47 Dragon consists of a smoothbore fiberglass tube, breech/gas generator, tracker, bipod, battery, sling, and forward and aft shock absorbers. In order to fire the weapon, non-integrated day or night sights must be attached. While the launcher itself is expendable, the sights can be removed and reused.

Shershen (Hornet) Belarusian Anti-Tank Guided Missile





Tiers:



Variants:

- **Shershen:** Base Version
- **Shershen-L:** light version (maximum range up to 2.5 km.)
- **Shershen-D:** version with two firing channels.
- **Shershen-Q:** version with two firing channels and auto lifting system (or without auto lift) for installation on a vehicle.

System

Alternative Designation: Shershen
Type: Anti-Tank Guided Missile
Crew: ea1
Displacement Time: INA
Emplacement Time: INA
Shershen Complex: The Shershen “complex” is made up of a collapsible tripod, a box-shaped control system, the launcher rail, the launch tube, and the command launch unit combining the TV guidance and modular thermal sights.

Dimensions

Note: See Main Weapon System

Automotive

Prime Mover Required: No
Man Portable: Yes

Main Weapon System

Note #1: In Belarus the Shershen is armed with two types of missile, the RK-2S with a tandem HEAT warhead and the RK-20F fragmentation round for defeating soft-skinned vehicles.

Note #2: The Shershen has two modes of firing. The operator can choose to guide it manually with a “see and fire” mode where operator paints the target with a jamming-and-weather resistant laser and guides the missile until impact.

↳*Launcher*

Name: Shershen

Type: Anti-Tank Guided Missile Launcher

Launcher Length: INA

Launcher Width: INA

Launcher Weight: 28 kg

Control panel Weight: 12 kg

Sight Weight: 16 kg

↳*Missile*

Name: RK-2S

Type: Anti-Tank Guided Missile

Missile Length: 1 360 mm

Missile Diameter: 130 mm

Fin Span: INA

Missile Weight (in container): 29.5 kg

Warhead Type: Tandem HEAT / Fragmentation

Warhead Weight: 8 kg

Guidance System: Laser-guided

Effective Firing Range: 7.5 km

Note: The missile travels for 24 seconds at maximum range.

Fire Control

Name: INA

Computerized FCS: Yes

Guidance System: Laser-guided

Direct Fire: Yes

Indirect Fire: No

Automatic Target Tracking: Yes

Notes:

The Shershen (Russian: Шершень; English: Hornet) is a Belarusian third generation anti-tank guided missile (ATGM), based on Ukrainian ATGM Skif but reportedly with additional capabilities. Designed to defeat modern armored vehicles, protected objects (such as bunkers, pillboxes, earth-and-timber emplacements) and low-speed low-altitude targets (helicopters, UAVs). The "Shershen" base version consists of a tripod, a universal combat module, an anti-tank guided missile, a guidance device (PN-S)

and a remote control, which allows the control of the unit from up to 100 m (with a wire channel) and up to 300 m (with radio). The two-man crew's combat task is to assemble "Shershen", find the target and launch. The pre-launch procedures, which include missile installation, PN-S connection and unit switch-on, take less than 2 minutes to complete. Once the missile is fired, the operator controls the "Shershen" and corrects the aim, if necessary, using the joystick on the remote control. Shershen is designed to destroy armored vehicles equipped with explosive reactive armor (ERA) and can attack stationary and moving targets. Shershen also has automated fire and forget targeting mode that doesn't require manual tracking of a target. All modern armored targets can be destroyed, irrespective of where the missile hits them, using the РК-2 (cal. 130 mm) and Б-2М (cal. 152 mm) guided missiles. The Р-2В missile (can be used with "Shershen-Q" and unified with ATGM "Barier-B") extends the maximum range to 7,500m. The ability to use different types of missiles without any system modification, in addition to a wide spectrum of targets makes it possible to consider this system not only as an ATGM, but as a mobile defence-assault fire system for infantry support up to battalion level.

HJ-10 (Red Arrow 10) Chinese Anti-Tank Guided Missile (ATGM) System




Tiers:



Variants:

- **AFT-10:** The AFT-10 is the surface-to-surface variant in the HJ-10 family, receiving designation of AFT-10. AFT-10 is a fiber-optic wire-guided missile that equipped with ZBD-04 Anti-tank platform. AFT-10 was first revealed in its deployment in Peace Mission 2014 joint military exercise
- **AKD-10:** The AKD-10 is the air-to-surface derivative in the HJ-10 family. AKD-10 can be launched from various platforms.[The development of the AKD-10 is based on the fact that on the modern battlefield, over 70% of the targets are not armored, such as bunkers, fortifications, and vehicles without armor. In recent Chinese airshows, a photo of an AKD-10 unarmored truck platform was shown in presentation materials. The platform is formed by a truck-like vehicle, a retractable launcher/sensor assembly and a rear-facing controller cabin. Launcher/sensor assembly is capable of detecting/attacking target while the vehicle stay behind a building or trees
- **BA-5:** Displayed at the 2018 Zhuhai Airshow, arming the CR500 UAV.
- **LJ-7:** The LJ-7 also known as BA-7, LJ-7 missile is an air to surface derivative of a semi-active laser guided HJ-10 for export market.The missile has been displayed at Eurosatory 2012 as the Blue Arrow 7.This missile is for anti-tank warfare, armor penetration is up to 1400 mm; it is achieved by increasing the warhead and reducing the fuel, resulting in the reduction of the maximum range.
- **BA-9:** The LJ-9 also known as BA-9 is a semi-actively guided missile, with a mass of 26.5 kg and a range of 6 km. The missile is based on BA-7, with a lighter weight thus enabling it to be equipped with light-weight helicopters.
- **BA-11:** Variant of the HJ-10.
- **BA-21:** Large air-to-surface variant, first unveiled at the 2016 Zhuhai Airshow. It adopts a millimeter-wave radar and lock-on after launch (LOAL) capability.
- **AR-1:** The AR-1 is reportedly another development of the HJ-10. It is a missile specifically designed to be carried by unmanned combat air vehicles (UCAV), such as the CH-3, which was unveilled at the 7th Zhuhai Airshow held at the end of 2008, when the AR-1 also made its debut. The AR-1 is similar in size to the HJ/AKD-10, but differs in shape. The diameter of the AR-1 is the same throughout its entire length. Two sets of control surfaces of the AR-1 are placed further apart, as opposed to immediately right next to each other in the case of the HJ/AKD-10. Instead of having a much larger set than the other, the sizes of two sets of control surfaces of the AR-1 are similar. The set of control surfaces at the front is swept instead of trapezoid-shaped like in the HJ/AKD-10, and they are closer to the tip of the missile.
- **AR-1B:** Larger and more capable version of the AR-1 with semi-active laser seeker, with lock-on before launch (LOBL) or lock-on after launch (LOAL) firing protocols.
- **AR-2:** The AR-2 is a small air-to-surface missile that is claimed to be comparable to the AGM-114 Hellfire.

System

Alternative Designation: HJ-10, Hongjian 10
Manufacturer: NORINCO
Status: In Service
Type: Non-line-of-sight Anti-tank / anti-helicopter / air-to-surface and surface-to-surface missile
Family: HJ-10

Emplacement Time: INA

Crew: eaINA

Displacement Time: INA

Maximum Effective Range: km10

Air to Surface Capable: Yes

Surface to Air Capable: Yes

Note: The Missile can be launched from platforms such as Armored Fighting Vehicles, Helicopters, or Tripod Launched.

Dimensions

Length: mm1,775

Diameter: mm170

Height: mINA

Weight, Launch: kg47

Automotive

Prime Mover Required: Yes

Man Portable: No

Armament and Ammunition

Name: HJ-10 Red Arrow

Type: Tandem HEAT

Length/Caliber: mm170

Engine Propellant: Solid Fuel

Muzzle Velocity: Supersonic

Guidance System: Fiber-optic wire-guided missile (AFT-10) semi-active laser homing and millimeter wave radar seeker (AKD-10) Infrared homing

Minimum Range: m2,000

Maximum Range: m8,000

Effective Range: km10

Warhead Type: Tandem HEAT

Warhead Weight: INA

Basic Load: the Red Arrow 10 ATGW system uses eight missiles launched from rails.

Range Finder Type: kmLaser

Armor Penetration: 1,400mm of conventional Steel Armor protected by Explosive Reactive Armor (ERA)

Self-Destruct: INA

Laser Designator Illumating Time (Single Round): Seconds17

Rapid Firing: Seconds47

Illuminating Distance: m6,000

Loading Type: Manual Loading

↳*Launch Platforms*

Attack Helicopter: CAIC Z-10

Attack Helicopter: Changhe Z-11WB

Attack Helicopter: Harbin Z-19

UAV: CASC Rainbow

Tank: ZBD-04A

Fire Control

Name: HJ-10 Red Arrow

Computerized FCS: Yes

Design: NLos

LoS Engagement Capable: Yes

Guidance System: semi-active laser (SAL) guidance system

Infrared Imaging: Yes

Direct Fire: Yes

Indirect Fire: Yes

Stabilisers: Four hydraulically operated stabilisers

Operating Modes: 3 illuminating Operation Modes

TV (Sensor Pod): Yes

IR (Sensor Pod): Yes

Night IR Detection Range: m6,000

Identification Range: m5,000

Day time TV Detection Range: m10,000

Notes:

HJ-10 (or "Red Arrow 10") is a Chinese ground-launched anti-tank missile developed by Norinco. It has a tandem high-explosive anti-tank (HEAT) warhead, that may penetrate 1,400 mm (55 in) of conventional steel armour protected by explosive reactive armour. The maximum range is 10 km (6.2 mi), with pre- or post-launch lock-on. Air-launched variants for helicopters and drones have also been developed. AFT-10, equipped on the ZBD-04A Anti-tank platform, is the ATGM version of the HJ-10 platform and it is the first one to be developed.

MILAN ER French Anti-Tank Guided Missile (ATGM) System



Tiers:

1 2 3 4

Parent:

MILAN French Anti-Tank Guided Missile (ATGM)

Variants:

- **MILAN 1:** Single, main shaped charge warhead (1972), calibre 103 mm
- **MILAN 2:** Single, main shaped charge warhead, with standoff probe to increase penetration (1984) – see photo to right, calibre 115 mm
- **MILAN 2T:** Single main shaped charge, with smaller shape charge warhead at end of standoff probe to defeat reactive armour (1993)
- **MILAN 3:** Tandem, shaped charge warheads (1996) and electronic beacon
- **MILAN ER:** Extended range (3,000 m) and improved penetration

System

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↳ ***MILAN ER Anti-Tank Guided Missile (ATGM)***

Country: France / Germany
Manufacturer: MBDA, MKEK (under license)
Unit Cost: INA
Maximum Operational Range: m3,000 (Upgraded over earlier models)
Minimum Operational Range: m25
Armor Penetration: mm350

Missile Length: mm918
Missile Diameter: mm125
Wing Span: mm267
Rate of Fire: rds/min3-4
Total Weight with Launcher: kg13
Warhead Type: New, multi-effect warhead with HEAT
Warhead Weight: kg2.7
Warhead Diameter: mm1158
Armor Penetration: penetrate 1,000mm explosive reactive armour (ERA) or rolled homogenous armour (RHA), or more than 3m of reinforced concrete
Guidance System: Infrared guidance system.
Steering System: Jet deflector
Launch Platform: Individual, vehicle
Time of Flight to Max Range: sec12.5
Missile Speed: km/h720
Charge Type: Tandem Charge, used against Reactive Armor
Thermal Sight: New Generation MILIS Thermal Sight from the SAGEM
Jamming Resistance: Yes, via the new CCD Localiser
Remote Operation Capable: Yes
Direct Attack Mode Capable: Yes
Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Notes:

Milan ER is the latest development of the combat-proven Milan weapon system that has already been selected by over 40 customers around the world.This latest generation high firepower weapon system has been specifically designed for land combat forces involved in sustained and demanding close combat operations. It combines precision and the versatility to address all the threats of the modern battlefield, static or moving, comprising the most heavily armed tanks as well as targets such as fortifications and infrastructures. It is suitable for both urban and open terrain thanks to Man In The Loop (MITL) operation for avoidance of collateral damage, friendly fire and to comply with increasingly complex rules of engagement.The MILAN ER missile has a range extended to 3,000m and a new, multi-effect warhead which can penetrate 1,000mm explosive reactive armour (ERA) or rolled homogeneous armour (RHA), or more than 3m of reinforced concrete. A direct attack mode has been added as well as improved anti-jamming capability. MILAN (French: Missile d'infanterie léger antichar; English: Light anti-tank infantry missile, milan is French for kite) is a Western European anti-tank guided missile. Design of the MILAN started in 1962, it was ready for trials in 1971, and was accepted for service in 1972. It is a wire guided SACLOS (semi-automatic command to line-of-sight) missile, which means the sight of the launch unit has to be aimed at the target to guide the missile. The MILAN can be equipped with a MIRA or MILIS thermal sight to give it night-firing ability. MILAN is a product of Euromissile, a Franco-West German missile development program dating back to the 1960s. The system entered service in 1972 as a second generation anti-tank weapon and soon became a standard anti-tank weapon throughout NATO, in use by most of the alliance's individual armies. Consisting of two main components, the launcher and the missile, the MILAN system utilizes a semi-automatic command to line of sight (SACLOS) command guidance system. It tracks the missile either by a tail-mounted infrared lamp or an electronic-flash lamp, depending on the model. Because it is guided by wire by an operator, the missile cannot be affected by radio jamming or flares. However, drawbacks include its short range, the exposure of the operator, problems with overland powerlines, and a vulnerability to infrared jammers such as Shtora that can prevent the automatic tracking of the missile's IR tail light.

HJ-8 (Red Arrow 8) Chinese Anti-Tank Guided Missile (ATGM) System



Tiers:

1 2 3 4

System

Alternative Designations: Hongjian-8, RA-8, HJ-8

Crew: 4

Manufacturer: NORINCO (Factory 282, Factory 5618)

Emplacement Time: INA

Displacement Time: INA

Engine: Solid-fuel rocket

Feed: Disposable Launch Canister

Operational Range: 3,000–4,000 m

Speed: m/s220

Guidance System: SACLOS wire guidance

Launch Platform: Tripod, vehicle, aircraft

Dimensions

Length: mm1,566

Diameter: mm120

Weight Travel: kg25

Sights

Name: Text

Type: Text

Sight Range Direct: Number

Sight Range Indirect: Number

Night Sights: Text

Armament

Caliber: mm120

Rate of Fire: rds/min2, 3

Fire on Move:

Elevation (deg min, max): deg-7, + 12

Ammunition

↳*Red Arrow-8A*

Type: ATGM

Max Range: m3000

Minimum Range: m100

Penetration: mm800, C

Warhead Type: Shaped Charge HEAT

Missile Diameter: mmNumber

Missile Weight: kg22.5

Total Weight: kg22.5

Average Velocity: m/s220

↳*Red Arrow-8E*

Type: ATGM

Max Range: m4000

Minimum Range: m100

Penetration: mm900, C

Warhead Type: Tandem Shaped Charge HEAT

Missile Diameter: mmINA

Missile Weight: kg22.5

Total Weight: kg24.5

Average Velocity: m/s210

↳*Red Arrow-8F*

Type: ATGM

Max Range: m4000

Minimum Range: m100

Penetration: mm1100, C

Warhead Type: Tandem Shaped Charge HEAT

Total Weight: kg25

Average Velocity: m/s220

Fire Control

FCS Name: Text

Main Gun Stabilization: Yes or No

Rangefinder: Text

Infrared Searchlight: Yes or No

↳*12x Magnification*

Type: Day Sight

↳*PTI-32*

Type: Night Sight

Field of View (deg): Number

Acquisition Range (m): 2000

Notes:

The HJ-8 or Hongjian-8 (literally: 'Red Arrow-8') is a second generation tube-launched, optically tracked, wire-guided anti-tank missile system which was originally deployed by China's People's Liberation Army since the late 1980s. The HJ-8 series can be considered the Chinese equivalent of the US BGM-71 TOW and Franco-German MILAN / Euromissile HOT anti-tank missiles. HJ-8 is a tube-launched, optically tracked and wire-guided missile system armed with a HEAT anti-tank warhead. The HJ-8 is a combination many experts believe of three Western antitank missile systems obtained from nations in the Middle East and Asia that were then examined and reverse engineered and modified: the tripod from the US BGM-71 TOW; the tracker-control unit from the French/German MILAN; and the missile from the UK Swingfire. There are numerous improved models following the original HJ-8, designated HJ-8A to HJ-8H, each incorporating improved features over the previous model. HJ-8E entered service in mid-1990. The HJ-8E anti-tank missile weighs 24.5 kg, has a range of up to 4,000 m, and can also defeat explosive reactive armour (ERA). The latest variant is the HJ-8H. Designed to be both dependable and accurate, HJ-8 is now the standard anti-tank armament of the WZ-9, Mi-17, and Gazelle (replacing the original Euromissile HOT first carried) helicopter gunships of the PLA. Turret launch platform A launching platform that can be installed on armoured fighting vehicles has been developed by Norinco for use as an HJ-8 launching platform, the SW-1 one-man turret. The all-steel welded SW-1 turret weighs 1,750 kg and can be installed on various tracked or wheeled vehicles. The turret is stated to be immune to 0.50 caliber armour-piercing rounds at close range (100 meters) and protection is further increased when add-on armour is installed. The turret can traverse 360 degrees and be elevated -40 to +60 degrees. The fire-control system, based on that of HJ-8H, is internally mounted. The primary armament of SW-1 includes four HJ-8H ATGM, with two mounted in the rear location on each side of the turret. The secondary armament comprises a 30 mm main gun and a coaxial 0.30 caliber machine gun. A variety of ammo can be used and the maximum rate of fire of the main gun is around 6 rounds per second, and automatic fire can be selected at various rates. The 30-mm gun is claimed to be effective against ground targets up to 4 km away and aerial targets at 2 km, while the HJ-8H missile is effective against ground targets at ranges of 4 km away, and against low and slow aerial targets at the same range. A follow-on model that is remotely operated weighing 1.4 ton has completed its development and entered Chinese service, designed by the same designer, Wu Lixin (□□□). Like its predecessor, this unmanned model was also first tested by using HJ-73C ATGM. The unmanned version carries 160 rounds of 30 mm ammunition.

HJ-12 (Red Arrow 12) Chinese Anti-Tank Guided Missile (ATGM)





Tiers:

1 2 3 4

System

Alternative Designation: HJ-12; Red Arrow 12

Type: Fire and Forget Anti-Tank Guided Missile

Crew: ea2

Displacement Time: Less than 2 min

Emplacement Time: Less than 2 min

Prime Mover Required: No

Man Portable: Yes, The HJ-12 is a man-portable weapon. It is shoulder-fired but can also be installed on the tripod or tracked and wheeled armor vehicles.

Reload Time: 15 seconds

Note: The HJ-12 is one of the most advanced man-portable anti-tank guide missile system in the world today. It can destroyed any current main battle tank. It can also engage bunkers, small boats and low-flying helicopters.

Dimensions

Launcher Tube Length: 1.2 m

Command Launch Unit (CLU) Weight: 6.5 kg

Missile

Name: HJ-12 Missile

Type: Anti-Tank Guided Missile

Missile Length: 1.1 m

Missile Diameter: 0.13 m

Fin Span: INA

Missile Weight: 13 kg

Warhead Type: Tandem HEAT

Warhead Weight: INA

Guidance System: Infrared imaging or TV imaging

Range of Fire: 2.5 km

Armor Penetration: 800 mm

Fire Control

Name: INA

Computerized FCS: Yes

Guidance System: Infrared imaging or TV imaging

Direct Fire: Yes

Note: This Chinese anti-tank missile adopts an infrared imaging seeker or a TV imaging seeker for all-weather day-and-night fire.

Notes:

The Hongjian-12 (literally: 'Red Arrow-12') is a third generation, man-portable, fire-and-forget infrared homing anti-tank missile of China. It was unveiled at the Eurosatory 2014 exhibition. Chinese equivalent of the Spike. The HJ-12 is a modern, third generation anti-tank missile developed by China North Industries Corporation (NORINCO). The HJ-12 is a fire-and-forget system utilizing Lock-On Before Launch (LOBL) and is capable of being fired within buildings and bunkers due to its soft launch system. Once launched, it will home autonomously onto its target, allowing the operator to immediately take cover or reload to engage another target. The warhead uses a tandem shaped charge design with an estimated penetration capability of up to 1,100 mm (43 in) of rolled homogeneous armour (RHA) after penetrating explosive reactive armor. When facing non-armored point targets, bunkers and fortifications, the missile can be fitted with either high-explosive or thermal effect warheads. Its fire-and-forget technology will reduce the number of anti-tank operators needed on a battlefield, which lowers probable casualties. When engaging enemy tanks and armored vehicles, the HJ-12 aims to destroy the top of its targets, the more vulnerable point. The HJ-12 is China's first portable anti-tank missile, increasing the ability of the People's Liberation Army Ground Force to have more modern and mobile infantry forces. It is intended to enable China to match up with anti-tank missile developments made by Western defense companies, like the FGM-148 Javelin and Spike. The missile is also available for export to armies in developing countries that would need to contend with third-generation main battle tanks, but the number of potential buyers is likely small due to its higher cost

3M6 Shmel (AT-1 Snapper) Russian Wire-Guided Anti-Tank Missile







Tiers:



System

Alternative Designation: 3M6 Shmel; NATO: AT-1 Snapper
Type: MCLOS wire-guided Anti-tank missile
Crew: ea
Configuration: Conical nose, cylindrical body, broad, cropped-delta wings in cruciform layout with vibrating trailing-edge spoilers
Engine: Solid-fuel rocket
Speed: 344 ft/sec (105 m/sec)
Maximum Range: 2,700 m
Minimum Range: 370 m
Warhead Type: High-explosive anti-tank (HEAT)
Penetration: 356-380 mm
Guidance System: Command-to-line-of-sight (CLOS); operator may be 50 meters from the launcher
TIme to Maximum Range: 20 seconds

Dimensions

Length: 1.13 m
Diameter: 140 mm
Wingspan: 0.775 m
Weight, Combat: 22.25 kg
Warhead Weight: 5.25 kg

Notes:

The 3M6 Shmel (Russian: 3М6 «Шмель»; English: bumblebee) is an MCLOS wire-guided Anti-tank missile of the Soviet Union. Its GRAU designation is "3M6" and its NATO reporting name is AT-1 Snapper. Too large to be manportable, it was typically deployed from specialised vehicles or helicopters. The missile was intended to supplement traditional anti-tank weapons, like the 100 mm anti-tank gun whose accuracy beyond 1,500 m is poor. The missile's accuracy in contrast remained high as far as its maximum range of 2,000 m. However, the system's bulk, slow speed and poor combat accuracy drove development of later SACLOS systems, like the AT-5 Spandrel. The 3M6 Shmel was based on the western ATGMs of the time, such as the Nord

Aviation SS.10; however, it is considerably larger. It was developed by the Special Mortar Design Bureau (SKB Gladkostvolnoi Artillery) in Kolomna, who were also responsible for the AT-3 Sagger. Development of the missile proceeded rapidly, with the first unguided flights in April 1958 followed by controlled flights in June and July 1958. On 28 August 1959, the new technology was shown to the command of armed forces. On 1 August 1960, it was accepted into the service. It was first publicly displayed in 1963. The missile is guided to the target by means of a joystick, which requires some skill on the part of the operator. The operator's adjustments are transmitted to the missile via a thin wire that trails behind the missile. The missile is steered by an unconventional arrangement of vibrating spoilers. As stated before, MCLOS requires considerable skill on the part of the operator. The system's effectiveness in combat drove the development of missiles based on the easier to use SACLOS system. One problem with the missile is the amount of time it takes to reach maximum range—around 20 seconds—giving the intended target time to take action, either by retreating behind an obstacle, laying down a smoke screen or firing on the operator. Also, the large size of the missile means that only a few rounds can be carried; the BRDM-1 vehicle can only carry three missiles.

→Anti-Tank Guns

2A45 Sprut-A Russian 125mm Towed Anti-Tank Gun



Tiers:



Variants:

- **2A45M Sprut-B:** self-propelled towed gun
- **2S25 Sprut-SD:** self-propelled gun mounted on the BMD-3 chassis with a turret mounting the stabilised 2A75 125 mm smoothbore gun
- **Sprut-SDM1:** Self-propelled gun with remote weapon station and fire control system

System

Alternative Designation: 2A45 Sprut-A
Manufacturer: Artillery Plant Number 9
Type: Anti-tank gun
Family: Sprut
Crew: ea7
Carriage: Tripod
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m7.12
Width: m2.66
Height: m2.09
Barrel Length: Bore: 51 calibres Bore axis: 0.925 m
Transport Weight: kg6,500
Firing Weight: kg6,575

Automotive Requirement

Prime Mover: MT-LB Carrier

Gun

↳*System*

Name: 2A45

Type: Anti-Tank Gun

Breech Type: INA

Length, Barrel: Bore: 51 calibres Bore axis: 0.925 m

Loader Type: Manual

Max Rate of Fire: rds/min6-8

Operational Range: 50 km in APU Mode

Max Elevation: deg+25

Min Elevation: deg-6

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Recoil: Hydro-pneumatic

↳*Ammunition (Option 1)*

Name: 3VBM3/3BM9/10

Type: Armour-Piercing Fin-Stabilized Discarding Sabot Tracer or APFSDS-T

Caliber: mm125

Projectile Dimension: mm410

Projectile weight (Including Sabot): kg5.67

Muzzle Velocity: m/s1,800

Basic Load: INA

Effective Range: m2,000

Armor Penetration: 245 mm at 0° at 2000 m, 70 mm - 150 mm at 60° at 2000 m

↳*Ammunition (Option 2)*

Name: 3VBK7/3BK12

Type: High-Explosive Anti-Tank Fin Stabilised or HEAT-FS

Caliber: mm125

Projectile Dimension: mm680

Projectile Weight: kg19

Muzzle Velocity: m/s905

Basic Load: INA

Effective Range: m12,200

Charge: shaped charge, steel liner, A-IX-1 (RDX phlegmatized with 5% wax), I-238 detonator

Armor Penetration: 420 mm RHA at 0 degrees

↳*Ammunition (Option 3)*

Name: 3VOF22/3OF19

Type: High Explosive fragmentation Fin Stabilised (HE-frag-FS)

Caliber: mm125

Round Weight: kg33

Projectile Weight: kg23

Muzzle Velocity: m/s850

Basic Load: INA

Effective Range: m12,200

Charge Weight: kg3.148

Charge: TNT

Armor Penetration: INA

Lethal Zone: The 90% lethal zone for infantry is reported to be 40 m wide and 20 m deep

↳*Available Ammunition*

125mm Ammunition the 2A45 Sprut-A can fire: 1 APFSDS-T 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2" 2 HEAT-FS 2.1 3VBK7/3BK12 2.1.1 3BK12M 2.2 3VBK10/3BK14 2.2.1 3BK14M 2.3 3VBK16/3BK18 2.3.1 3BK18M 2.4 3VBK17/3BK21 2.4.1 3BK21B 2.5 3VBK21/3BK25 2.6 3VBK25/3BK29 "Breyk" 2.6.1 3VBK25M/3BK29M 2.7 3VBK27/3BK31 "Start" 3 HE-frag-FS 3.1 3VOF22/3OF19 3.2 3VOF36/3OF26 3.3 3VOF128/3OF82 4 Shrapnel-FS 4.1 3VSh7/3Sh7 "Voron" 4.2 3VSh8/3Sh8 "Ainet" 5 ATGW/ATGM 5.1 9M112 Kobra 5.2 9M119 Refleks 5.3 3UBK21 Sprinter 6 Guided shell 6.1 Sokol-1 6.2 3UBK14F1/9M119F1

Fire Control

Computerized FCS: No

Direct Fire: Yes

Direct Fire Sighting Device: OP4M-48A Fire Sighting Device

Indirect Fire: Yes

Indirect Fire Sight: 2Ts33 Iron Sights

Night Vision Sight: 1PN53-1 Night-Vision Sight

Panoramic Sight: PG-1m Panoramic Sight

Notes:

The 2A45 is a towed, split-rail 125mm anti-tank gun. They are usually deployed on the flanks of a defensive position. They are very hard to spot until they shoot, and are effective at ranges of up to 2000m. The 2A45M shares similar ordnance to that of the T-72/T-80 MBTs. This ammunition is of the separate-loading type, but a dedicated round for the 2A45M may have been developed. The 2A45M is believed to be capable of firing the AT-11 SNIPER (Svir) laser beam riding, antitank guided missile which has a maximum range of 4000 meters.

2A45M Sprut-B Russian 125mm Self-Propelled Towed Gun





Tiers:



Variants:

- **2A45 Sprut-A:** 125mm towed gun
- **2S25 Sprut-SD:** self-propelled gun mounted on the BMD-3 chassis with a turret mounting the stabilised 2A75 125 mm smoothbore gun
- **Sprut-SDM1:** Self-propelled gun with remote weapon station and fire control system

System

Alternative Designation: 2A45M Sprut-B
Manufacturer: Artillery Plant Number 9
Type: Self Propelled Towed Gun
Family: Sprut
Crew: ea7
Carriage: Tripod
Displacement Time: min120-160 seconds
Emplacement Time: min90-120 seconds

Dimensions

Length: m6.79
Width: m2.66
Height: m2.35
Barrel Length: Bore: 51 calibres Bore axis: 0.925 m
Transport Weight: kg6,800

Automotive Requirement

Self-Propelled Mechanism: Auxiliary Propulsion Unit (APU)
Maximum Operational Mode in APU Mode: km50
Speed inn APU Mode: km/h14
Prime Mover: MT-LB Carrier

Gun

↳*System*

Name: 2A45
Type: Anti-Tank Gun
Breech Type: INA
Length, Barrel: Bore: 51 calibres Bore axis: 0.925 m
Loader Type: Manual
Max Rate of Fire: rds/min6-8
Operational Range: 50 km in APU Mode
Max Elevation: deg+25
Min Elevation: deg-6
Traverse Range: deg360
Traverse Right: deg180
Traverse Left: deg180
Recoil: Hydro-pneumatic

↳*Ammunition (Option 1)*

Name: 9M119 Svir / 9M119M Refleks (NATO: AT-11 Sniper)
Type: Laser Beam Riding, Guided Anti-Tank Missiles
Manufacturer: Degtyarev plant
In Service: 1980s-Present
Diameter: mm125
Weight: kg9M119 Svir 16.5 kg / 9M119M Refleks 17.2 kg
Warhead Type: Tandem hollow-charge
Warhead Weight: kg4.5
Operational Range: m9M119 Svir 4,000 m /9M119M Refleks 5,000 m
Speed: Subsonic
Guidance System: Laser Beam Riding
Armor Penetration: 700–900 mm of RHA
Time of Flight to 4,000 m: 11.7 seconds
Time of flight to 5,000 m: 17.6 seconds

↳*Ammunition (Option 2)*

Name: 3VBM3/3BM9/10
Type: Armour-Piercing Fin-Stabilized Discarding Sabot Tracer or APFSDS-T
Caliber: mm125

Projectile Dimension: mm410

Projectile weight (Including Sabot): kg5.67

Muzzle Velocity: m/s1,800

Basic Load: INA

Effective Range: m2,000

Armor Penetration: 245 mm at 0° at 2000 m, 70 mm - 150 mm at 60° at 2000 m

↳*Ammunition (Option 3)*

Name: 3VBK7/3BK12

Type: High-Explosive Anti-Tank Fin Stabilised or HEAT-FS

Caliber: mm125

Projectile Dimension: mm680

Projectile Weight: kg19

Muzzle Velocity: m/s905

Basic Load: INA

Effective Range: m12,200

Charge: shaped charge, steel liner, A-IX-1 (RDX phlegmatized with 5% wax), I-238 detonator

Armor Penetration: 420 mm RHA at 0 degrees

↳*Ammunition (Option 4)*

Name: 3VOF22/3OF19

Type: High Explosive fragmentation Fin Stabilised (HE-frag-FS)

Caliber: mm125

Round Weight: kg33

Projectile Weight: kg23

Muzzle Velocity: m/s850

Basic Load: INA

Effective Range: m12,200

Charge Weight: kg3.148

Charge: TNT

Armor Penetration: INA

Lethal Zone: The 90% lethal zone for infantry is reported to be 40 m wide and 20 m deep

↳*Available Ammunition*

125mm Ammunition the 2A45 Sprut-B can fire: 1 APFSDS-T 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2" 2 HEAT-FS 2.1 3VBK7/3BK12 2.1.1 3BK12M 2.2 3VBK10/3BK14 2.2.1 3BK14M 2.3 3VBK16/3BK18 2.3.1 3BK18M 2.4 3VBK17/3BK21 2.4.1 3BK21B 2.5 3VBK21/3BK25 2.6

3VBK25/3BK29 "Breyk" 2.6.1 3VBK25M/3BK29M 2.7 3VBK27/3BK31 "Start" 3 HE-frag-FS 3.1 3VOF22/3OF19 3.2 3VOF36/3OF26 3.3 3VOF128/3OF82 4 Shrapnel-FS 4.1 3VSh7/3Sh7 "Voron" 4.2 3VSh8/3Sh8 "Ainet" 5 ATGW/ATGM 5.1 9M112 Kobra 5.2 9M119 Refleks 5.3 3UBK21 Sprinter 6 Guided shell 6.1 Sokol-1 6.2 3UBK14F1/9M119F1

Fire Control

Computerized FCS: Yes, the 9S53 laser fire-control system, which allows the 2A45M Sprut-B to fire laser guided projectiles such as the 9M119 Svir or 9K120 Refleks

Direct Fire: Yes

Direct Fire Sighting Device: OP4M-48A Fire Sighting Device

Indirect Fire: Yes

Indirect Fire Sight: 2Ts33 Iron Sights

Night Vision Sight: 1PN53-1 Night-Vision Sight

Panoramic Sight: PG-1m Panoramic Sight

Notes:

A feature of the Sprut-B is its integrated engine, which can propel the gun on relatively flat surfaces (up to 15 degrees of slope) and at 14 km/h on roads. This gives the gun a measure of mobility on the battlefield. It takes two minutes to go from firing position to travelling position and 90 seconds to go from travelling position to firing position. Such guns are known in Russian as "self-moving" (самодвижущиеся) as opposed to self-propelled (самоходные), and outside of battle it is towed by an MT-LB. The gun features a crew of seven. An OP4M-48A direct fire sight is used the day, while a 1PN53-1 night-vision sight is used at night. For indirect fire, 2Ts33 iron sights are used, along with a PG-1m panoramic sight. The gun can reliably engage targets two metres high at a distance of 2,000 metres.[2] The barrel features a thermal sleeve to prevent temperature changes affecting the accuracy. The gun uses the same semi-fixed ammunition as the T-64, T-72, T-80 and T-90 tanks. With the addition of the 9S53 laser fire-control system, the gun can fire laser guided projectiles such as the 9M119 Svir or 9K120 Refleks. The 2A45M is believed to be capable of firing the AT-11 SNIPER (Svir) laser beam riding, antitank guided missile which has a maximum range of 4000 meters.

MATADOR Israeli 90mm Man-Portable Anti-Tank Anti Door Weapon System







Tiers:

1 **2** 3 4

Variants:

- **MATADOR-MP:** Multi-purpose weapon with a warhead effective against a wide variety of ground targets, from light armoured vehicles to fortified positions and urban walls. As with the initial MATADOR, this is achieved with a dual-mode fuse, which has been improved on the MATADOR-MP such that it now automatically discriminates between hard and soft targets rather than requiring the operator to manually make the selection. A dedicated targeting device, mounted on its Picatinny rail, incorporates a reflex sight and laser rangefinder to provide a high hit probability.
- **MATADOR-WB:** Specialised wall-breaching weapon, featuring an Explosively-Formed Ring (EFR) warhead that breaches a man-sized hole, between 75 cm (30 in) to 100 cm (39 in) across, in typical urban walls.
- **MATADOR-AS:** Anti-structure weapon with an advanced tandem warhead that can also be set between two modes. The anti-emplacement mode uses an enhanced blast effect to defeat structures and fortifications, while the penetrating/mouse-holing mode defeats light armoured vehicles and creates mouseholes in urban walls.MATADOR-AS has been ordered by the British Army, and is slated for service entry in 2009.

System

Alternative Designation: Matador
Type: Recoilless Gun
Family: Matador
Crew: ea1
Manufacturer: Dynamit Nobel Defence
Caliber: 90mm
Displacement Time: INA
Emplacement Time: INA
Air to Surface Capable: No
Surface to Air Capable: Yes
Muzzle Velocity: m/s150

Effective Firing Range: m500

Feed System: Disposable

Warhead: The warhead can be used in both High Explosive Anti-Tank (HEAT) and High Explosive Squash Head (HESH) modes against armor and walls or other fortifications respectively. Selection is done by extending a "probe" (most likely a fuse extender) for HEAT mode and leaving the "probe" retracted for HESH mode.

Countermass System: Similar to the Armbrust, the countermass counteracts the recoil of the weapon upon firing. The countermass consists of shredded plastic, which is launched out of the rear of the weapon when it is fired. This plastic is rapidly slowed by air resistance, allowing the weapon to be fired safely within an enclosed space. In addition, the positioning of the countermass takes into consideration the centre of gravity of the weapon to ensure good balance for better accuracy.

Dimensions

Length: m1

Width: m90mm

Height: INA

Weight, Combat: kg8.9

Sights

Note: Integral optical sights Night Vision Device on a Picatinny rail

Notes:

The MATADOR (Man-portable Anti-Tank, Anti-DOoR) is a 90-millimetre (3.5 in) man-portable, disposable anti-armor weapon system developed in collaboration between Israel and Singapore. It is an updated version of the German-Singaporean Armbrust design, and operates on the same principles. The development of this weapon began in 2000 and the MATADOR will eventually replace the German-Singaporean Armbrust Light Anti-tank Weapon, which has been in service since the 1980s. The MATADOR was developed jointly by the Singapore Armed Forces (SAF) and the Defence Science and Technology Agency (DSTA), in collaboration with Rafael Advanced Defense Systems and Dynamit Nobel Defence (DND) joint team. The MATADOR is among the lightest in its class. The warhead is effective against both vehicle armour and brick walls. The weapon has little backblast, making it safe for operation in confined spaces. The MATADOR is supposed to be capable of defeating the armour of most known armoured personnel carriers and light tanks in the world. The dual-capability warhead, when acting in the delay mode, creates an opening greater than 450 mm (18 in) in diameter in a double brick wall, and acts as an anti-personnel weapon against those behind the wall, offering an unconventional means of entry when fighting in built-up areas. The MATADOR's projectile is claimed to be insensitive to wind due to its propulsion system, which results in a highly accurate weapon system.

Type 89 Chinese 120mm Tank Destroyer







Tiers:

1 2 **3** 4

System

Alternative Designation: PTZ89
Manufacturer: NORINCO
Crew: 5
Maximum Effective Range: m2,000-2,500
Maximum Range: m9,000

Dimensions

Length: m6.41
Width: m3.24
Height: m1.47
Weight, Combat: kg30,000

Automotive

Engine Name: Deutz Type 12150L
Engine Type: Diesel
Engine Power: hp520
Cruising Range: km450
Speed, Maximum Road: km/h55
Speed, Average Cross: km/h32

Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %40
Vertical Step: m.70
Fording Depth: m1.3

Main Weapon System

↳*System*

Type: 120mm smoothbore gun
Maximum Rate of Fire: rds/min10
Basic Load: 30
Muzzle Velocity: m/s1,646
Chassis: Based on the existing chassis of the Type 321 tracked utility chassis
Max Elevation: degrees18
Max Depression: degrees-8

↳*Ammunition*

Name: 120-II
Type: APFSDS-T
Caliber: mm120
Basic Load: 30
Armor Penetration: 600mm or RHA at 2,000m
Other rounds carried: HE, HE-FRAG, and HEAT

Auxiliary Weapon System

↳*System*

Name: Type 88
Type: Heavy Machine Gun
Caliber: mm12.7mm
Sustained Rate of Fire: rpm100
Maximum Rate of Fire: rds/min600
Maximum Firing Range (Air): m1,500
Maximum Firing Range (Ground): m2,000

↳*Ammunition*

Type: AP-I

Caliber: 12.7 x 108

Basic Load: rounds300

Muzzle Velocity: m/s850

Auxiliary Weapon System

↳*System*

Name: Type 80

Type: Coaxial Machine Gun

Caliber: 7.62mm

Maximum Rate of Fire: rpm800

Rate of Fire: rpm250

↳*Ammunition*

Caliber: mm7.62

Muzzle Velocity: m/s840

Basic Load: rounds2,000

Effective Range: m1,500

Fire Control System

Name: TSFCS (tank simplified fire-control system)

Computerized FCS: Yes

Main Gun Stabilization: No

Indirect Fire: Yes. Range - 900m with HEAT

Night Vision: Yes

Laser Range Finder: Yes

Protection

Hull Armor: 50mm

Turret Armor: 50mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 2 x 4-tube grenade launchers

Notes:

The Type 89 is no longer in use. The Type 89 (designated as ‘’’PTZ-89’’’) tracked tank destroyer was a Chinese armored vehicle developed by Norinco for People’s Liberation Army. The vehicle is developed in 1980s and entered service in 1988. Armed with a 120mm smooth-bore gun, it was intended to combat newer generations of Western and Russian main battle tanks that were equipped with composite armor and 120 and 125mm caliber guns. Despite a successful development process, with the end of the Cold War it became apparent that the weapon was no longer needed. Production was halted in 1995 after around 100 examples had been built.[3] It had several shortcomings, including thin armor, high maintenance costs, and an unstabilized gun that could not fire on the move and had a relatively short range. It was phased out in favor of anti-tank guided missiles (ATGMs). An official retirement ceremony was held by the 39th Army Group on 3 November 2015

→Recoilless Guns

Carl Gustaf M2 Swedish 84mm Man-Portable Anti-Tank Recoilless Rifle




Tiers:



Variants:

- **M1 (1948):** Original, still in Service with Third-World Countries
- **M2 (1963):** An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version.
- **M3 (1991):** The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys. In recent years, the M3 has found new life in a variety of roles. The British Special Air Service, United States Army Special Forces and United States Army Rangers use M3s in bunker-busting and anti-vehicle roles, while the German Bundeswehr maintains a small number of M2s for battlefield illumination. Many armies continue to use it as a viable anti-armor weapon, especially against 1950s- and 1960s-era tanks and other armored vehicles still in use worldwide.
- **M3 MAAWS:** In November 2011, the U.S. Army began ordering the M3 MAAWS for regular units deployed in Afghanistan. Soldiers were being engaged with RPGs at 900 meters, while their light weapons had effective ranges of 500–600 meters. The Gustaf allows airburst capability of troops in defilade out to 1,250 meters, and high explosive use out to 1,300 meters. While the weapon provides enhanced effectiveness, its 9.5 kg (21 lb) weight burdens troops. On 28 March 2013, USSOCOM announced a call for sources to develop a kit to lighten the M3 MAAWS and reduce overall length without affecting handling or ruggedness. By that time, Saab was developing a weight-reduced version prior to the SOCOM release that demonstrated no decrease in performance, no increase in recoil, and nearly equivalent barrel life that could be ready for government testing in 2014. Saab has also developed a new high explosive round that has a direct fire range of 1,500 meters when using a fire control system. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years; testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018.
- **M4 (M3-E1):** At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds.

System

Alternate Name: Carl Gustaf M2
Type: recoilless rifle
Manufacturer: Saab Bofors Dynamics (formerly Bofors Anti-Armour AB), Howa (license)[

Caliber: 84 mm rifled (24 lands, progressive twist)

Cartdige: 84×246 mm R

Crew: 2 optimal, 1 minimal

Breech: Hinged

Rate of fire: 6 rounds per minute

Muzzle Velocity: 230–255 m/s

Effective Firing Range, Moving Vehicles: 350 to 400 m against moving vehicles

Effective Firing Range, Stationary Vehicles: 500 m against stationary vehicles

Effective Firing Range, using Smoke and High Explosive Rounds: m1000

Effective Firing Range, Rocket-Boosted Laser Guided Ammunition: m2000

Specifications

Length: 1.13m (M1); 1.13m (M2); 1.07m (M3); 1.0m (M4)

Weights: 14.2 kg (M2); 8.5 kg (M3); 7.0 kg (M4)

Ammunition

Ammunition Types: HEAT (tandem), HEDP, HEAT, HE, Smoke, Illumination

Note: Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason, several armies have retired the illumination rounds, while the U.S. Army requires that they be fired from a standing position.

↳*FFV 751*

Note: FFV401 is an Area Defence Munition designed as a close-range anti-personnel round. It fires 1100 flechettes over a wide area.

↳*FFV441*

Note: FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

↳*FFV441B*

Note: FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s.

↳*FFV469*

Note: FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at 255 m/s.

↳*FFV502*

Note: FFV502 is an HEDP round with the ability to be set to detonate on either impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration

exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.

↳*FFV509*

Note: FFV509 is an ASM (Anti-Structure Munition), designed especially for destroying buildings and other types of urban constructions. The fuse has two modes, impact or a delayed function.[

↳*FFV545*

Note: FFV545 is an illuminating star shell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the star shell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

↳*FFV551*

Note: FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[

↳*FFV552*

Note: FFV552 is a practice round with the same ballistics as the 551.

↳*FFV651*

Note: FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV551, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

↳*HEAT 655 CS*

Note: HEAT 655 CS (Confined Spaces) "high-explosive anti-tank (HEAT) round that can be fired by the 84 mm Carl Gustaf recoilless weapon from within small enclosures."

↳*FFV751*

Note: FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.

↳*FFV756*

Note: FFV756 is an MT (Multi Target) ammunition, designed for combat in built-up areas and for incapacitating an enemy under cover inside a building or some type of fortification. The MT 756 uses a tandem charge.[

↳*Guided Carl Gustaf Munition (GCGM)*

Note: Guided Carl Gustaf Munition (GCGM) is a laser guided projectile developed between Saab and Raytheon, featuring a multi-target warhead capable of defeating bunkers and moving light armored vehicles at a range of 2,000 m and capable of being fired from enclosed spaces; demonstrations planned for 2020.

Sights

Type: Iron sights, optical 3×, laser rangefinder, image intensification system for the newer M3 and M4 series

Notes:

Swedish arms designers began to experiment with recoilless antitank rifles in early 1940s. Their first design, a shoulder-fired, single shot weapon, fired a20mm solid projectile from a rifled barrel. This design has been adopted by Swedish army in 1942 as

the m/42, but its small-caliber solid projectile was hardly effective against the new tanks, which emerged during the Second Worldwar. By the mid-1940s, Swedish designers adopted the idea of the shaped-charge HEAT ammunition, and by the 1946 produced their first prototype of the large-caliber recoilless rifle, which fired HEAT grenades. This single-shot,shoulder fired weapon quickly evolved into the "Granatgevär 8.4cm m/48Carl-Gustaf", or "Grenade rifle, caliber 84mm, model of 1948".This simple and effective weapon attracted significant interest and has been adopted by a significant number of military forces around the world. Other than Sweden, Carl Gustaf recoilless rifles were adopted by Australia, Austria, Belgium,Canada, Germany, USA and several other countries. Initial production was by the FFV factories, latter transferred to the SAAB-Bofors Dynamics AB, which is the current manufacturer of both M3 rifle and 84mm ammunition. The ammunition alsois manufactured in several countries which use the Carl-Gustaf launchers,including the Belgium and India. While the Carl-Gustaf recoilless rifle / launcher was initially devised as an antitank weapon, its tactical role was quickly expanded with adoption of various other types of ammunition, such as high-explosive fragmentation rounds, close-defense shrapnel-type rounds, smoke, illumination and several other types of warheads.In fact, the Carl-Gustaf series recoilless rifles / launchers are among the most versatile weapons of the "one man artillery" type, extremely popular and widely used. Their only drawback is the bulk and weight of the launcher itself, which is significantly heavier than its major rival, the venerable RPG-7 antitank grenade launcher. The Carl-Gustaf series recoilless rifles /launchers are single shot, breech loading weapons with rifled barrels. Unitary ammunition of 84mm caliber is loaded into aluminum cases with open bottoms,closed by plastic pressure discs. The primers are located at the side of the cartridge case, so the round must be properly aligned in the bore upon the loading. To achieve that, the case rim has a special indexing recess. Most types of projectiles are just warheads which are "blown out" of the barrel by the propellant charge, but some most recently developed types of ammunition has built-in rocket boosters, which are ignited as the round reaches safe distance from the shooter, greatly improving the maximum effective range. The rear part of the barrel is fitted with venturi nozzle, which is hinged to allow loading of the ammunition and ejection of the fired cases or unfired rounds. The M2 (m/48) barrels are made from steel, and the M3 (m/86) barrels are made from thin steel liners enclosed into polymer wrapping, so the M3 launcher is significantly lighter. The firing unit consists of the pistol grip with the trigger and manual safety, which is linked to the ignition module at the rear of the weapon by the tube, located below and to the right of the barrel. Under the barrel, there's also a shoulder rest, an adjustable bipod, and a front support grip. The Carl-Gustaf recoilless rifles / launchers are fitted with folding open sights, located at the left side of the barrel, but usually issued with telescope sight of 2X or 3X magnification, which has range-finding reticule and can be adjusted for temperature and wing conditions. Standard crew for Carl-Gustaf recoilless rifle / launcher is two men, shooter and loader. Ammunition is usually carried in special plastic containers, which hold two types of ammunition each. Most modern HEAT rounds for Carl-Gustaffeature either single or a tandem shaped-charge warhead, and a rocket booster for increased range, and can penetrate up to 500 mm of armor behind the ERAprotection. The Gustaf was soon sold around the world and became one of the primary squad-level anti-tank weapons for many West European armies. An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version. The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys.

SPG-9 Kopye (Spear) Russian 73mm Tripod-Mounted Man-Portable Recoilless Gun







Tiers:



Variants:

- **SPG-9:** OLDER VERSION, WITH EARLIER PGO-9 DAY SIGHT, 1 GEN II NIGHT SIGHT, AND OLDER AMMUNITION. THE SPG-9 CAN FIRE THE NEWER AMMUNITION WITHOUT OTHER IMPROVEMENTS.
- **SPG-9D:** AIRBORNE VERSION WITH DETACHABLE WHEELS
- **SPG-9M:** IS EASILY MOUNTED ON VEHICLES SUCH AS APCS OR TACTICAL UTILITY VEHICLES USING A PINTLE MOUNT, AS AN IMPROVISED SP AT GUN.

System

Alternative Designations: INA
Crew: ea3
Rifling: None
Feed: Breech load
Breech Mechanism Type: Interrupted Screw
Emplacement Time: min1
Fire from Inside Building: No

↳*Dimensions*

Length Firing (m): m2.11
Width: 99 cm (3 ft 3 in) allowing for full weapon traverse
Height: cm80
Weight Firing: kg47.5
Weight Travel: kg47.5

Weight Tripod: kg12

Ammunition

↳*PG-9VNT*

Type: Tandem HEAT Grenade

Caliber: mm73mm

Max Eff Range, Day: m1000

Max Eff Range, Night: m1000

Penetration: mm550, C

Penetration after ERA: mm400, C

Penetration Concrete: m1

Penetration Brick: m1

Penetration Earth: m1.8

Muzzle Velocity: m/s400

↳*PG-9VS*

Type: HEAT Grenade

Caliber: 73mm

Max Eff Range, Day: m1300

Max Eff Range, Night: m1300

Penetration: mm400, C

Penetration after ERA: mm400, C

Penetration Concrete: m1

Penetration Brick: m1.5

Penetration Earth: m2

Muzzle Velocity: m/s435

Length: INA

Weight: kg4.4

↳*OG-9VM1*

Type: Frag HE Grenade

Caliber: 73mm

Max Eff Range, Day: m4500

Max Eff Range, Night: m1000

Casualty Radius: sq.m500

Muzzle Velocity: m/sINA

Length: mmINA

Weight: kg5.3

↳*Other Ammunition*

Description: SPG-9M CAN FIRE OLDER AMMUNITION FOR THE SPG-9. A ROCKET ASSIST CAN EXTEND FRAG-HE RANGE TO 6,000 M, BUT WITH INCREASED ERROR.

Sights

Name: 2Ts35

Type: FCS

Sight Range Direct: m1000

Sight Range Indirect: m4500

Night Sights: 2 gen II

Notes:

The SPG-9 Kopye (Spear) is a tripod-mounted man-portable, 73 millimetre calibre recoilless gun developed by the Soviet Union. It fires fin-stabilised, rocket-assisted HE and HEAT projectiles similar to those fired by the 73 mm 2A28 Grom low pressure gun of the BMP-1 armored vehicle. It was accepted into service in 1962, replacing the B-10 recoilless rifle. The projectile is launched from the gun by a small charge, which gives it an initial velocity of between 250 and 400 metres per second. The launch charge also imparts spin to the projectile by a series of offset holes. Once the projectile has traveled approximately 20 meters (65.6 feet) from the launcher, a rocket motor in its base ignites. For the PG-9 projectile, this takes it to a velocity of 700 metres per second (2,297 feet per second) before the motor burns out. The SPG-9 is light, and is normally transported by vehicle, and carried into position by its two crew. It can be deployed in around a minute. The weapon is in service with a large number of armed forces, and a variety of ammunition is produced; however, they are mostly copies of the original Soviet PG-9 HEAT and OG-9 FRAG-HE rounds. The SPG-9 is widely available to terrorists and maritime pirates such as in the Horn of Africa region, as well as in other regions to a lesser degree. It is not as popular as the RPG-7 because it has to be mounted on a vehicle or boat and cannot be easily carried and shoulder fired. The SPG-9 requires much more skill to fire accurately than the RPG-7. There have been reports of these mounted in skiffs and larger "mother ships". The SPG-9 can typically be found mounted on a wide variety of vehicles known as "technicals" in Somalia. A variant for use with airborne troops including detachable wheels was built as the SPG-9D. The SPG-9 was used by both sides during the Transnistria War, with at least one combat kill: a T-64BV of Russian peacekeepers was destroyed using an SPG.

Carl Gustaf M3 Swedish 84mm Man-Portable Anti-Tank Recoilless Rifle







Tiers:



Variants:

- **M1 (1948):** Original, still in Service with Third-World Countries
- **M2 (1963):** An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version.
- **M3 (1991):** The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys. In recent years, the M3 has found new life in a variety of roles. The British Special Air Service, United States Army Special Forces and United States Army Rangers use M3s in bunker-busting and anti-vehicle roles, while the German Bundeswehr maintains a small number of M2s for battlefield illumination. Many armies continue to use it as a viable anti-armor weapon, especially against 1950s- and 1960s-era tanks and other armored vehicles still in use worldwide.
- **M3 MAAWS:** In November 2011, the U.S. Army began ordering the M3 MAAWS for regular units deployed in Afghanistan. Soldiers were being engaged with RPGs at 900 meters, while their light weapons had effective ranges of 500–600 meters. The Gustaf allows airburst capability of troops in defilade out to 1,250 meters, and high explosive use out to 1,300 meters. While the weapon provides enhanced effectiveness, its 9.5 kg (21 lb) weight burdens troops. On 28 March 2013, USSOCOM announced a call for sources to develop a kit to lighten the M3 MAAWS and reduce overall length without affecting handling or ruggedness. By that time, Saab was developing a weight-reduced version prior to the SOCOM release that demonstrated no decrease in performance, no increase in recoil, and nearly equivalent barrel life that could be ready for government testing in 2014. Saab has also developed a new high explosive round that has a direct fire range of 1,500 meters when using a fire control system. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years; testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018.
- **M4 (M3-E1):** At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds.

System

Alternate Name: Carl Gustaf M3

Type: Recoilless rifle

Manufacturer: Saab Bofors Dynamics (formerly Bofors Anti-Armour AB), Howa (license)[

Caliber: 84 mm rifled (24 lands, progressive twist)

Cartdige: 84×246 mm R

Crew: 2 optimal, 1 minimal

Breech: Hinged

Rate of fire: 6 rounds per minute

Muzzle Velocity: 230–255 m/s

Effective Firing Range, Moving Vehicles: 350 to 400 m against moving vehicles

Effective Firing Range, Stationary Vehicles: 500 m against stationary vehicles

Effective Firing Range, using Smoke and High Explosive Rounds: m1000

Effective Firing Range, Rocket-Boosted Laser Guided Ammunition: m2000

Specifications

Length: 1.13m (M1); 1.13m (M2); 1.07m (M3); 1.0m (M4)

Weights: 14.2 kg (M2); 8.5 kg (M3); 7.0 kg (M4)

Ammunition

Ammunition Types: HEAT (tandem), HEDP, HEAT, HE, Smoke, Illumination

Note: Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason, several armies have retired the illumination rounds, while the U.S. Army requires that they be fired from a standing position.

↳*FFV 751*

Note: FFV401 is an Area Defence Munition designed as a close-range anti-personnel round. It fires 1100 flechettes over a wide area.

↳*FFV441*

Note: FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

↳*FFV441B*

Note: FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s.

↳*FFV469*

Note: FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at

255 m/s.

↳*FFV502*

Note: FFV502 is an HEDP round with the ability to be set to detonate on either impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.

↳*FFV509*

Note: FFV509 is an ASM (Anti-Structure Munition), designed especially for destroying buildings and other types of urban constructions. The fuse has two modes, impact or a delayed function.[

↳*FFV545*

Note: FFV545 is an illuminating star shell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the star shell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

↳*FFV551*

Note: FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[

↳*FFV552*

Note: FFV552 is a practice round with the same ballistics as the 551.

↳*FFV651*

Note: FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV551, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

↳*HEAT 655 CS*

Note: HEAT 655 CS (Confined Spaces) "high-explosive anti-tank (HEAT) round that can be fired by the 84 mm Carl Gustaf recoilless weapon from within small enclosures."

↳*FFV751*

Note: FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.

↳*FFV756*

Note: FFV756 is an MT (Multi Target) ammunition, designed for combat in built-up areas and for incapacitating an enemy under cover inside a building or some type of fortification. The MT 756 uses a tandem charge.[

↳*Guided Carl Gustaf Munition (GCGM)*

Note: Guided Carl Gustaf Munition (GCGM) is a laser guided projectile developed between Saab and Raytheon, featuring a multi-target warhead capable of defeating bunkers and moving light armored vehicles at a range of 2,000 m and capable of being fired from enclosed spaces; demonstrations planned for 2020.

Sights

Type: Iron sights, optical 3×, laser rangefinder, image intensification system for the newer M3 and M4 series

Notes:

Swedish arms designers began to experiment with recoilless antitank rifles in early 1940s. Their first design, a shoulder-fired, single shot weapon, fired a 20mm solid projectile from a rifled barrel. This design has been adopted by Swedish army in 1942 as the m/42, but its small-caliber solid projectile was hardly effective against the new tanks, which emerged during the Second Worldwar. By the mid-1940s, Swedish designers adopted the idea of the shaped-charge HEAT ammunition, and by the 1946 produced their first prototype of the large-caliber recoilless rifle, which fired HEAT grenades. This single-shot,shoulder fired weapon quickly evolved into the "Granatgevär 8.4cm m/48Carl-Gustaf", or "Grenade rifle, caliber 84mm, model of 1948".This simple and effective weapon attracted significant interest and has been adopted by a significant number of military forces around the world. Other than Sweden, Carl Gustaf recoilless rifles were adopted by Australia, Austria, Belgium,Canada, Germany, USA and several other countries. Initial production was by the FFV factories, latter transferred to the SAAB-Bofors Dynamics AB, which is the current manufacturer of both M3 rifle and 84mm ammunition. The ammunition alsois manufactured in several countries which use the Carl-Gustaf launchers,including the Belgium and India. While the Carl-Gustaf recoilless rifle / launcher was initially devised as an antitank weapon, its tactical role was quickly expanded with adoption of various other types of ammunition, such as high-explosive fragmentation rounds, close-defense shrapnel-type rounds, smoke, illumination and several other types of warheads.In fact, the Carl-Gustaf series recoilless rifles / launchers are among the most versatile weapons of the "one man artillery" type, extremely popular and widely used. Their only drawback is the bulk and weight of the launcher itself, which is significantly heavier than its major rival, the venerable RPG-7 antitank grenade launcher. The Carl-Gustaf series recoilless rifles /launchers are single shot, breech loading weapons with rifled barrels. Unitary ammunition of 84mm caliber is loaded into aluminum cases with open bottoms,closed by plastic pressure discs. The primers are located at the side of the cartridge case, so the round must be properly aligned in the bore upon the loading. To achieve that, the case rim has a special indexing recess. Most types of projectiles are just warheads which are "blown out" of the barrel by the propellant charge, but some most recently developed types of ammunition has built-in rocket boosters, which are ignited as the round reaches safe distance from the shooter, greatly improving the maximum effective range. The rear part of the barrel is fitted with venturi nozzle, which is hinged to allow loading of the ammunition and ejection of the fired cases or unfired rounds. The M2 (m/48) barrels are made from steel, and the M3 (m/86) barrels are made from thin steel liners enclosed into polymer wrapping, so the M3 launcher is significantly lighter. The firing unit consists of the pistol grip with the trigger and manual safety, which is linked to the ignition module at the rear of the weapon by the tube, located below and to the right of the barrel. Under the barrel, there's also a shoulder rest, an adjustable bipod, and a front support grip. The Carl-Gustaf recoilless rifles / launchers are fitted with folding open sights, located at the left side of the barrel, but usually issued with telescope sight of 2X or 3X magnification, which has range-finding reticule and can be adjusted for temperature and wing conditions. Standard crew for Carl-Gustaf recoilless rifle / launcher is two men, shooter and loader. Ammunition is usually carried in special plastic containers, which hold two types of ammunition each. Most modern HEAT rounds for Carl-Gustaffeature either single or a tandem shaped-charge warhead, and a rocket booster for increased range, and can penetrate up to 500 mm of armor behind the ERAprotection. The Gustaf was soon sold around the world and became one of the primary squad-level anti-tank weapons for many West European armies. An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version. The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys.

AT-4 Iranian 84mm Single-Use Anti-Tank Recoilless Rifle



Tiers:



Variants:

- **M136 AT4:** American version with modified launch tube bumpers, sights and slings.
- **AT8 (Bunker-Busting):** A version of the AT4 where the standard HEAT projectile is replaced with the bunker-busting warhead developed for the SMAW. No orders were ever placed
- **AT12-T:** In the early 1990s, there were tests of a tandem charge 120-mm version (Bofors AT 12-T) that would be able to penetrate the front armour of any modern main battle tank.

System

Alternative Designation: AT-4; AT4
Type: 84mm Single-Use Anti-Tank Recoilless Rifle
Family: AT-4
Manufacturer: Saab Bofors Dynamics
In Service: 1984-Present
Crew: ea1
Note: It was and remains one of the world's premier expendable infantry anti-tank weapons

Dimensions

Length: m1.02
Diameter: mm84
Height: INA
Weight, AT4: kg6.7
Weight, AT4-CS: kg8

Weapon System

↳*Launcher*

Name: AT-4
Type: The AT-4's gun tube is long and cylindrical, with numerous external fixtures
Note #1: A long tube covered by a conformal housing (which contains a cable used to fire the weapon) runs from the

trigger mechanism to the breech along the top of the tube

Note #2: the launcher can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13 night sights

↳*Projectile*

Name: INA Depends on the type of projectile warhead

Type: See Projectile Types

Projectile Types: The AT-4 can fire several types of 84mm Projectiles: 1. HEAT (High Explosive Anti-Tank) 2. HEDP 502 (High Explosive Dual Purpose) 3. HP (High Penetration) 4. AST (Anti Structure Tandem-warheads) 5. ER (Extended Range) 6. HE (High Explosive)

Length: mm462

Bore Diameter: mm84

Muzzle Velocity: m/s290

Effective Firing Range, Point Target: m300

Maximum Firing Range, Area Target: m500

Maximum Firing Range, Maximum: m2,100

Sights: Iron sights, optional night vision unit

Armor Penetration (RHA): mm420

Projectile Weight: INA

Time of Flight to 250 meters: less than 1 second

Operating Temperatures: −40 to +60 °C (−40 to +140 °F)

Notes:

Iran imports a large amount of their military vehicles and equipment from other countries. The AT4 (also AT-4) is an 84-mm unguided, portable, single-shot recoilless smoothbore weapon built in Sweden by Saab Bofors Dynamics (previously Bofors Anti-Armour Systems).[9] Saab has had considerable sales success with the AT4, making it one of the most common light anti-tank weapons in the world. It was and remains one of the world's premier expendable infantry anti-tank weapons The AT4 is intended to give infantry units a means to destroy or disable armoured vehicles and fortifications, although it is generally ineffective against current modern main battle tanks (MBT). The launcher and projectile are manufactured prepacked and issued as a single unit of ammunition, with the launcher discarded after a single use. The AT4 may be considered a disposable, low-cost alternative to a Carl Gustaf recoilless rifle. The AT4 took many of its design features from the Carl Gustaf, which operates on the principle of a recoilless weapon, where the forward inertia of the projectile is balanced by the inertia of propellant gases ejecting from the rear of the barrel. But unlike the Carl Gustaf, which uses a heavier and more expensive steel tube with rifling,[16] the disposable AT4 design greatly reduces manufacturing costs by using a reinforced smoothbore fiberglass outer tube. Being a disposable gun also allows for lighter and cheaper construction. In a single-use disposable gun, the barrel only needs to be able to contain a single pressure spike when firing, when it can be disposed of, even if it is ruined, burnt-out and strained, unlike traditional guns which are required to survive many pressure spikes without failure and thus need to be strongly overbuilt and made of heat-proof materials. Pressures are also kept quite low compared to many traditional guns. This lightweight and thin barrel and low pressure, combined with the almost complete lack of recoil, means that relatively large projectiles (comparable to those found in mortars and artillery systems) can be utilised, which would otherwise be impossible in a man-portable weapon. In the system originally developed by FFV for the Carl Gustaf, a plastic blowout plug is placed at the center rear of the shell casing containing the projectile and propellant, which itself is enclosed in the AT4 outer tube. When the gases build up to the correct pressure level, the blowout plug disintegrates, allowing the proper amount of gases to be vented to the rear, balancing the propellant gases pushing the projectile forward. The AT4 uses a unique method developed earlier by FFV and adopted for the AT4: the spring-loaded firing rod is located down the side of the outer tube, with the firing pin at the rear of the tube. When released, the firing pin strikes a primer located in the side of the casing's rim. he disadvantage of the recoilless design is that it creates a large back blast area behind the weapon, which can cause severe burns and overpressure injuries to friendly personnel in the vicinity of the user and sometimes even to the users themselves, especially in confined spaces. The back blast may also reveal the user's position to the enemy. The problem of back blast was solved with the AT4-CS (Confined Space) version, specially designed for urban warfare. This version uses a saltwater countermass in the rear of the launcher to absorb the back blast; the resulting spray captures and dramatically slows down the

pressure wave, allowing troops to fire from enclosed areas. The AT4-CS version also reduced its muzzle velocity from the original 290 m/s to 220 m/s as part of its effort to be user-safe in a confined space, making the AT4-CS version more difficult to use as the drop is more pronounced. The effectiveness of the HEAT warhead is not dependent on speed. To fire, the gunner first removes the safety pin located at the rear of the tube, which unblocks the firing rod. He then takes a firing position ensuring that no one is present in the back blast area. If firing from the prone position, he must also place his legs well to the side to avoid burning himself. Then the gunner moves back the front and rear sight covers, allowing the sights to pop up into their firing positions. The AT4 has iron sights that were originally developed for the cancelled Viper, and are similar in concept and use to those on assault rifles.He then removes the first of two safeties by moving the firing rod cocking lever (located on the left side) forward and then over the top to the right side. The gunner takes aim, while at the same time holding down the red safety lever located in front of the cocking lever, and then fires by pressing forward the red firing button with his right thumb. Both the red safety lever and the firing button must be pressed down at the same time to fire the AT4. The red firing button has a similar resistance to the trigger pull of a rifle, so the gunner does not have to jab at the firing button, which could throw his aim off. The AT4 is man-portable, as demonstrated by this French soldier wearing a FAMAS and an AT4. After firing, the AT4 is discarded. Unlike the heavier Carl Gustaf, the AT4 outer tube is built to take the stress of just one firing; it is not reusable and cannot be reloaded. The AT4 can mount an optical night sight on a removable fixture. In US military use, the launcher can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13 night sights. The AT4 requires little training and is quite simple to use, making it suitable for general issue. However, as the cost of each launcher makes regular live-fire training very expensive, practice versions exist that are identical in operation but fire reloadable 9×19mm or 20mm tracer ammunition. Both practice cartridges are unique to their respective weapons, with their trajectory matched to that of the live round. The 20mm version also has a recoilless weapon effect with the same high noise and back blast as the AT4 firing and is favoured by the Swedish army because of the added realism of the back blast as compared to the "plonk" sound of the 9mm round (similar to the sound of a finger tapping on an empty can).

B-10 Russian 82mm Towed Recoilless Rifle




Tiers:

1 2 3 4

Variants:

- **Type 65:** Chinese version that weighs only 28.2 kg with a tripod mount and no wheels.[
- **B-10:** Russian Version
- **Type 65-1:** Chinese lightened version (26 kg)
- **Type 78:** Chinese lightened version
- **RG 82:** East Germany version

System

Alternative Designation: B-10
Type: 82mm Towed Recoilless Rifle
Crew: 4
Carriage: Two wheeled with integrated tripod
Displacement Time: minutesUnder 1
Emplacement Time: minutesUnder 1

Dimensions

Length: 1.85 m (6 ft) travel position
Barrel Length: 1.66 m
Width: INA
Height: INA
Weight, Combat: 85.3 kg (188 lbs) 71.7 kg (158 lbs) without wheels

Cannon

↳*System*

Name: B-10
Type: Towed Recoilless Rifle
Caliber: mm82
Action: Single shot

Carriage: Two wheeled with integrated tripod

Elevation: -20/+35°

Traverse: 250° in each direction for 360 total.

Rate of Fire: 5 to 7 rpm

Maximum Firing Range: 4,500 m

Effective Firing Range: 400 m

Feed System: Breech loaded

Sights: Optical (PBO-2)

↳*Ammunition (Option 1)*

Name: m/sBK-881

Type: HEAT-FS

Caliber: mm82

Weight: 3.87 kg. 0.46 kg of RDX.

Fuze: GK-2 PIBD fuze

Basic Load: INA

↳*Ammunition (Option 2)*

Name: BK-881M

Type: HEAT-FS

Caliber: mm82

Weight: 4.11 kg. 0.54 kg of RDX.

Fuze: GK-2M PDIBD fuze.

Basic Load: INA

↳*Ammunition (Option 3)*

Name: O-881A

Type: HE-FRAG

Caliber: mm82

Weight: 3.90 kg. 0.46 kg of TNT/dinitronaphthalene

Fuze: GK-2 fuze.

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Notes:

The B-10 recoilless rifle (Bezotkatnojie orudie-10, known as the RG82 in East Germany) is a Soviet 82 mm smoothbore recoilless gun. It could be carried on the rear of a BTR-50 armoured personnel carrier. It was a development of the earlier SPG-82, and entered Soviet service during 1954. It was phased out of service in the Soviet Army in the 1960s and replaced by the SPG-9, remaining in service with parachute units at least until the 1980s. Although now obsolete it was used by a large number of countries during the Cold War. The weapon consists of a large barrel, with a PBO-2 sight mounted to the left. It is mounted on a small carriage, which has two large wheels, which can be removed. The carriage has an integrated tripod, from which the weapon is normally fired. A small wheel is fitted to the front of the barrel to prevent it touching the ground while being towed. It is normally towed by vehicle, although it can be towed by its four-man crew for short distances using the tow handle fitted to either side of the muzzle. The tripod can be deployed in two positions providing either a good field of fire or a low silhoutte. Rounds are inserted into the weapon through the breech, and percussion fired using a pistol grip to the right of the barrel. The PBO-2 optical sight has a 5.5x zoom direct fire sight, and a 2.5x zoom sight for indirect fire.

Armbrust (Crossbow) German 67mm Unguided Anti-Tank Recoilless Weapon



Tiers:



Variants:

- **Armbrust AT:**
- **Armbrust AP:** INA
- **Armbrust Ub:** INA
- **Armbrust SC:** INA

System

Alternative Designation: Crossbow
Manufactuer: Messerschmitt-Bölkow-Blohm (MBB) Pouderies Réunies de Belgique (PRB) ST Kinetics (STK)
Cailber: mm67
Crew : ea1
Fire from Inside Building: Yes
Action: Recoilless weapon
Muzzle Velocity: m/s210
Effective Firing Range: m300
Maximum Firing Range: m1,500
Feed System: Single shot

↳*Dimensions*

Length : mm850
Width: mm126
Height: mm140
Weight: kg6.3

Ammunition

↳*Ammunition (Option 1)*

Armor Penetration : mm CE300

GrenadeType: HEAT

Cailber/Length : mm67

Combat Load : rdsNA

Flight Time 300m: sec1.5

Muzzle Velocity : m/s210

Range, Effective : m400

Range, Maximum : m1500

Sights

↳*Night Sights*

Night Sights Available: Yes

↳*Sights 1*

Type: Reflex

Location: Left Side

Magnification: None

Sighting Range : m300

Notes:

The Armbrust is a preloaded, disposable, shoulder-fired antitank weapon. It has a low signature and low IR (infrared) detectability and can be safely fired from small enclosures or rooms. The muzzle does not emit smoke or blast and no flash can be seen from the rear. Only .8 m clearance is required between the rear of the weapon and the wall. It is quieter than a pistol shot. The entire weapon is considered a round of ammunition and the launcher is thrown away once the weapon is fired. The system is also manufactured by Singapore industries. Armbrust (German: Crossbow) is a lightweight unguided anti-tank weapon designed and developed by Messerschmitt-Bölkow-Blohm of Germany, who later sold its manufacturing rights to Chartered Industries of Singapore (the predecessor of ST Kinetics). he Armbrust is a recoilless weapon, and is one of the few weapons of this kind that may safely be fired in an enclosed space. The propellant charge is placed between two pistons with the projectile in front of one and a mass of shredded plastic in the rear. Unlike most recoilless weapons, it is a true counter-shot weapon, as the mass of the projectile is equal to the mass of the counterweight and they are ejected from the barrel at the same initial velocity. When the weapon is fired, the propellant expands, pushing the two pistons out. The projectile is forced out of the front and the plastic out of the back. The plastic disperses on leaving the back of the barrel, and is quickly stopped by air resistance. The pistons jam at either end of the barrel, locking the hot gases inside. Its warhead can penetrate up to 300 mm of armoured steel. Since 2004, Armbrusts have gradually been replaced by the Israeli-German-Singapore co-developed MATADOR.

M20 American 75mm Recoilless Rifle





Tiers:



Variants:

- **Type 52 Chinese Recoilless Rifle:** A Chinese copy of the M20 barrel and breech mechanism. It has a two-wheel carriage. Rifle weight, 60 kg; maximum horizontal range, 6,675 m; and muzzle velocity, 305 mps. The Type 52 fires HE and HEAT ammunition.
- **Type 56 Chinese Recoilless Rifle:** An improved version of the Type 52. It has new optical sights and uses a different tripod.

System

Alternate Designation: M20
Type: Recoilless Rifle
Caliber: mm75
Manufacturer: INA
Crew: 1-2
Recoil: Recoilless
Carriage: M1917A1 tripod
Elevation: −27° to +65°
Traverse: 360°
Muzzle Velocity: 300 m/s
Maximum Firing Range: 6.3 km

Dimensions

Length: 2.1 m
Barrel Length: 1.7 m
Weight: 47 kg

Ammunition

Name: INA
Type: HEAT, HE, or Smoke

Shell: 75 x 408 mm R

Shell Weight: 9.3–10.3 kg

Basic Load: INA

Notes:

The M20 recoilless rifle is a U.S. 75 mm caliber recoilless rifle T21E12 that was used during the last months of the Second World War and the M20 extensively during the Korean War. It could be fired from an M1917A1 .30 caliber machine gun tripod, or from a vehicle mount, typically a Jeep. Its shaped charge warhead, also known as HEAT, was capable of penetrating 100 mm of armor. Although the weapon proved ineffective against the T-34 tank during the Korean War and most other tanks, it was used primarily as a close infantry support weapon to engage all types of targets including infantry and lightly armored vehicles. The M20 proved useful against pillboxes and other types of field fortifications. Its poor armor penetration by the HEAT round was because of it being a spin-stabilized projectile rather than the later fin-stabilized rounds used in the 106mm M40 recoilless rifle.

Type 65 Chinese 82mm Recoilless Rifle




Tiers:

1 2 3 4

Variants:

- **Type 65:** Chinese version that weighs only 28.2 kg with a tripod mount and no wheels.[
- **B-10:** Russian Version
- **Type 65-1:** Chinese lightened version (26 kg)
- **Type 78:** Chinese lightened version
- **RG 82:** East Germany version

System

Alternative Designation: Type 65
Type: 82mm Recoilless Rifle
Crew: 4
Carriage: Two wheeled with integrated tripod
Displacement Time: minutesUnder 1
Emplacement Time: minutesUnder 1

Dimensions

Length: 1.85 m (6 ft) travel position
Barrel Length: 1.66 m
Width: INA
Height: INA
Weight, Combat: 85.3 kg (188 lbs) 71.7 kg (158 lbs) without wheels

Cannon

↳*System*

Name: Type 65
Type: Recoilless Rifle
Caliber: mm82
Action: Single shot

Carriage: Two wheeled with integrated tripod

Elevation: -20/+35°

Traverse: 250° in each direction for 360 total.

Rate of Fire: 5 to 7 rpm

Maximum Firing Range: 4,500 m

Effective Firing Range: 400 m

Feed System: Breech loaded

Sights: Optical (PBO-2)

↳*Ammunition (Option 1)*

Name: INA

Type: HEAT

Caliber: mm82

Weight: INA

Muzzle Velocity: 240 m/s.

Fuze: INA

Penetration: 356 mm versus RHA.

Basic Load: INA

↳*Ammunition (Option 2)*

Name: INA

Type: HE-FRAG

Caliber: mm82

Weight: INA

Muzzle Velocity: 175 m/s.

Warhead: Warhead contains approx 780 balls – lethal radius 20 m.

Fuze: INA

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Notes:

The Type 65 82mm Recoilless Rifle is a Chinese version of the Russian B-10 82mm Towed Recoilless Rifle. The Type 65 weight only 28.2 kg with a tripod mount and no wheeels. The B-10 recoilless rifle (Bezotkatnojie orudie-10, known as the RG82 in East Germany) is a Soviet 82 mm smoothbore recoilless gun. It could be carried on the rear of a BTR-50 armoured personnel carrier.

It was a development of the earlier SPG-82, and entered Soviet service during 1954. It was phased out of service in the Soviet Army in the 1960s and replaced by the SPG-9, remaining in service with parachute units at least until the 1980s. Although now obsolete it was used by a large number of countries during the Cold War. The weapon consists of a large barrel, with a PBO-2 sight mounted to the left. It is mounted on a small carriage, which has two large wheels, which can be removed. The carriage has an integrated tripod, from which the weapon is normally fired. A small wheel is fitted to the front of the barrel to prevent it touching the ground while being towed. It is normally towed by vehicle, although it can be towed by its four-man crew for short distances using the tow handle fitted to either side of the muzzle. The tripod can be deployed in two positions providing either a good field of fire or a low silhouette. Rounds are inserted into the weapon through the breech, and percussion fired using a pistol grip to the right of the barrel. The PBO-2 optical sight has a 5.5x zoom direct fire sight, and a 2.5x zoom sight for indirect fire.

Carl Gustaf M4 (M3-E1) Swedish 84mm Man-Portable Anti-Tank Recoilless Rifle







Tiers:



Variants:

- **M1 (1948):** Original, still in Service with Third-World Countries
- **M2 (1963):** An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version.
- **M3 (1991):** The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys. In recent years, the M3 has found new life in a variety of roles. The British Special Air Service, United States Army Special Forces and United States Army Rangers use M3s in bunker-busting and anti-vehicle roles, while the German Bundeswehr maintains a small number of M2s for battlefield illumination. Many armies continue to use it as a viable anti-armor weapon, especially against 1950s- and 1960s-era tanks and other armored vehicles still in use worldwide.
- **M3 MAAWS:** In November 2011, the U.S. Army began ordering the M3 MAAWS for regular units deployed in Afghanistan. Soldiers were being engaged with RPGs at 900 meters, while their light weapons had effective ranges of 500–600 meters. The Gustaf allows airburst capability of troops in defilade out to 1,250 meters, and high explosive use out to 1,300 meters. While the weapon provides enhanced effectiveness, its 9.5 kg (21 lb) weight burdens troops. On 28 March 2013, USSOCOM announced a call for sources to develop a kit to lighten the M3 MAAWS and reduce overall length without affecting handling or ruggedness. By that time, Saab was developing a weight-reduced version prior to the SOCOM release that demonstrated no decrease in performance, no increase in recoil, and nearly equivalent barrel life that could be ready for government testing in 2014. Saab has also developed a new high explosive round that has a direct fire range of 1,500 meters when using a fire control system. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years; testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018.
- **M4 (M3-E1):** At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds.

System

Alternate Name: Carl Gustaf M4; Carl Gustaf M3-E1

Type: Recoilless rifle

Manufacturer: Saab Bofors Dynamics (formerly Bofors Anti-Armour AB), Howa (license)[

Caliber: 84 mm rifled (24 lands, progressive twist)

Cartdige: 84×246 mm R

Crew: 2 optimal, 1 minimal

Breech: Hinged

Rate of fire: 6 rounds per minute

Muzzle Velocity: 230–255 m/s

Effective Firing Range, Moving Vehicles: 350 to 400 m against moving vehicles

Effective Firing Range, Stationary Vehicles: 500 m against stationary vehicles

Effective Firing Range, using Smoke and High Explosive Rounds: m1000

Effective Firing Range, Rocket-Boosted Laser Guided Ammunition: m2000

Dimensions

Length: mm942

Bore: mm84

Weight with Fire Control System: kg5.89

Ammunition

Ammunition Types: Current High Explosive, High Explosive Dual Purpose, Training; Future Illumination, Anti-Structure

Note: Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason, several armies have retired the illumination rounds, while the U.S. Army requires that they be fired from a standing position.

↳*FFV 751*

Note: FFV401 is an Area Defence Munition designed as a close-range anti-personnel round. It fires 1100 flechettes over a wide area.

↳*FFV441*

Note: FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

↳*FFV441B*

Note: FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s.

FFV469

Note: FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at 255 m/s.

↳*FFV502*

Note: FFV502 is an HEDP round with the ability to be set to detonate on either impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.

↳*FFV509*

Note: FFV509 is an ASM (Anti-Structure Munition), designed especially for destroying buildings and other types of urban constructions. The fuse has two modes, impact or a delayed function.[

↳*FFV545*

Note: FFV545 is an illuminating star shell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the star shell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

↳*FFV551*

Note: FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[

↳*FFV552*

Note: FFV552 is a practice round with the same ballistics as the 551.

↳*FFV651*

Note: FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV551, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

↳*HEAT 655 CS*

Note: HEAT 655 CS (Confined Spaces) "high-explosive anti-tank (HEAT) round that can be fired by the 84 mm Carl Gustaf recoilless weapon from within small enclosures."

↳*FFV751*

Note: FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.

↳*FFV756*

Note: FFV756 is an MT (Multi Target) ammunition, designed for combat in built-up areas and for incapacitating an enemy under cover inside a building or some type of fortification. The MT 756 uses a tandem charge.[

↳*Guided Carl Gustaf Munition (GCGM)*

Note: Guided Carl Gustaf Munition (GCGM) is a laser guided projectile developed between Saab and Raytheon, featuring a multi-target warhead capable of defeating bunkers and moving light armored vehicles at a range of 2,000 m and

capable of being fired from enclosed spaces; demonstrations planned for 2020.

Sights

Type: Iron sights, optical 3×, laser rangefinder, image intensification system for the newer M3 and M4 series

Fire Control

Type: Gen3, 1X Reflex, 15 degree field of vision

Notes:

At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years;[16] testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018. M3 was the name used for decades worldwide for the basic weapon. For the new, improved, lighter, titanium employing weapon, first displayed in 2014, the name everyone uses is: M4, except for the USA. In the US the Army designation for the US version of the improved M4 mentioned above was given the name: M3-E1. In 2017, the U.S. Army approved a requirement for 1,111 M3E1 units to be fielded to soldiers as part of an Urgent Material Release. The M3E1 is part of the Product Manager Crew Served Weapon portfolio. A key benefit of the M3E1 is that it can fire multiple types of rounds, giving soldiers increased capability on the battlefield. By using titanium, the updated M3E1, based on the M3A1 introduced in 2014, is more than six pounds lighter. The M3E1 is also 2.5 inches shorter and has an improved carrying handle, shoulder padding and an improved sighting system that can be adjusted for better comfort without sacrificing performance. The wiring harness was included in the M3E1 configuration that provides a foregrip controller and programmable fuze setter for an interchangeable fire control system. For added safety and cost savings, an automatic round counter enables Soldiers and logisticians to accurately track the service life of each weapon. The M3E1 uses the same family of ammunition as the M3, which has been successfully tested. In November 2017, the U.S. Marine Corps announced they planned to procure the M3E1 MAAWS. 1,200 M3E1s would be acquired with one fielded to every infantry squad. In addition to infantry use, the Marines are considering it to replace the Mk 153 SMAW in combat engineer squads. The weapons perform similar functions and the improvements incorporated into the new M3E1 place it in the same size and approximate weight class as the SMAW. While the SMAW weighs 2.5 lb (1.1 kg) less when loaded, the MAAWS has a greater variety of ammunition available and a maximum effective range of 1,000 meters, twice that of the SMAW. The Marines plan to test both weapons' effectiveness against bunkers to inform their decision.

M60 Former Yugoslavian 82mm Recoilless Gun



Tiers:

1 2 3 4

System

Alternative Designations: M60A

Crew: ea7

Weight Firing: kg122

Weight Travel: kg122

Length Travel: m2.4

Width Travel: m1

Height Travel: m0.83

Rifling: Yes

Feed: Breech load

Breech Mechanism Type: Vertically hinged w/ flanged rotate lock

Emplacement Time: min0.5

Fire from Inside Building: No

Armament

Caliber: mm82

Rate of Fire: rds/min4

Fire on Move: No

Elevation: deg-20, +35

Traverse: deg360

Ammunition

↳***M60***

Caliber: mm82

Type: HEAT

Max Aimed Range: m1500

Max Eff Range, Day: m500

Max Eff Range, Night: m

Penetration: mm200,C

Combat Load (: 0 Ready, 36 Stow

↳***M72***

Caliber: 73mm

Type: HEAT Grenade

Max Aimed Range: m1500

Max Eff Range Day: m1000

Max Eff Range, Night: m

Penetration: mm220, C

Combat Load: 0Ready, 36 Stow

Sights

Name: Optical telescopic

Sight Range Direct: m1500

Notes:

The M60 recoilless gun is an 82-mm antitank recoilless gun developed in the former Yugoslavia. It entered service with the Yugoslav People's Army in the 1960s. The M60 is mounted on a towing carriage with wheels for transport and firing. Aiming is done with an optical sight. Ammunition for the M60 includes two fin-stabilized HEAT rounds. The first HEAT projectile for the M60 had an effective range of 500 meters. The second was an improved version that used a rocket booster to increase the effective range to 1,000 meters. The maximum range of the piece is 4,700 meters. Direct fire is limited to 1,500 meters against stationary targets and 1,000 meters against moving targets. The M60 is credited with a 220mm penetration of armor with its HEAT round.

Carl Gustaf M1 Swedish 84mm Man-Portable Anti-Tank Recoilless Rifle







Tiers:



Variants:

- **M1 (1948):** Original, still in Service with Third-World Countries
- **M2 (1963):** An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version.
- **M3 (1991):** The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys. In recent years, the M3 has found new life in a variety of roles. The British Special Air Service, United States Army Special Forces and United States Army Rangers use M3s in bunker-busting and anti-vehicle roles, while the German Bundeswehr maintains a small number of M2s for battlefield illumination. Many armies continue to use it as a viable anti-armor weapon, especially against 1950s- and 1960s-era tanks and other armored vehicles still in use worldwide.
- **M3 MAAWS:** In November 2011, the U.S. Army began ordering the M3 MAAWS for regular units deployed in Afghanistan. Soldiers were being engaged with RPGs at 900 meters, while their light weapons had effective ranges of 500–600 meters. The Gustaf allows airburst capability of troops in defilade out to 1,250 meters, and high explosive use out to 1,300 meters. While the weapon provides enhanced effectiveness, its 9.5 kg (21 lb) weight burdens troops. On 28 March 2013, USSOCOM announced a call for sources to develop a kit to lighten the M3 MAAWS and reduce overall length without affecting handling or ruggedness. By that time, Saab was developing a weight-reduced version prior to the SOCOM release that demonstrated no decrease in performance, no increase in recoil, and nearly equivalent barrel life that could be ready for government testing in 2014. Saab has also developed a new high explosive round that has a direct fire range of 1,500 meters when using a fire control system. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years; testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018.
- **M4 (M3-E1):** At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds.

System

Alternate Name: Carl Gustaf

Type: recoilless rifle

Manufacturer: Saab Bofors Dynamics (formerly Bofors Anti-Armour AB), Howa (license)[

Caliber: 84 mm rifled (24 lands, progressive twist)

Cartdige: 84×246 mm R

Crew: 2 optimal, 1 minimal

Breech: Hinged

Rate of fire: 6 rounds per minute

Muzzle Velocity: 230–255 m/s

Effective Firing Range, Moving Vehicles: 350 to 400 m against moving vehicles

Effective Firing Range, Stationary Vehicles: 500 m against stationary vehicles

Effective Firing Range, using Smoke and High Explosive Rounds: m1000

Effective Firing Range, Rocket-Boosted Laser Guided Ammunition: m2000

Specifications

Length: 1.13m (M1); 1.13m (M2); 1.07m (M3); 1.0m (M4)

Weights: 14.2 kg (M2); 8.5 kg (M3); 7.0 kg (M4)

Ammunition

Ammunition Types: HEAT (tandem), HEDP, HEAT, HE, Smoke, Illumination

Note: Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason, several armies have retired the illumination rounds, while the U.S. Army requires that they be fired from a standing position.

↳*FFV 751*

Note: FFV401 is an Area Defence Munition designed as a close-range anti-personnel round. It fires 1100 flechettes over a wide area.

↳*FFV441*

Note: FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

↳*FFV441B*

Note: FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s.

↳*FFV469*

Note: FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at

255 m/s.

↳*FFV502*

Note: FFV502 is an HEDP round with the ability to be set to detonate on either impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.

↳*FFV509*

Note: FFV509 is an ASM (Anti-Structure Munition), designed especially for destroying buildings and other types of urban constructions. The fuse has two modes, impact or a delayed function.[

↳*FFV545*

Note: FFV545 is an illuminating star shell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the star shell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

↳*FFV551*

Note: FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[

↳*FFV552*

Note: FFV552 is a practice round with the same ballistics as the 551.

↳*FFV651*

Note: FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV551, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

↳*HEAT 655 CS*

Note: HEAT 655 CS (Confined Spaces) "high-explosive anti-tank (HEAT) round that can be fired by the 84 mm Carl Gustaf recoilless weapon from within small enclosures."

↳*FFV751*

Note: FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.

↳*FFV756*

Note: FFV756 is an MT (Multi Target) ammunition, designed for combat in built-up areas and for incapacitating an enemy under cover inside a building or some type of fortification. The MT 756 uses a tandem charge.[

↳*Guided Carl Gustaf Munition (GCGM)*

Note: Guided Carl Gustaf Munition (GCGM) is a laser guided projectile developed between Saab and Raytheon, featuring a multi-target warhead capable of defeating bunkers and moving light armored vehicles at a range of 2,000 m and capable of being fired from enclosed spaces; demonstrations planned for 2020.

Sights

Type: Iron sights, optical 3×, laser rangefinder, image intensification system for the newer M3 and M4 series

Notes:

The Carl Gustaf recoilless rifle (Swedish pronunciation: [kɑːˌ ˇgøsːtav]) is an 84-mm man-portable reusable anti-tank weapon produced by Saab Bofors Dynamics (formerly Bofors Anti-Armour AB) in Sweden. Introduced in 1946, it was one of the many recoilless rifle designs of that era. While similar weapons have generally disappeared from service, the Carl Gustaf is still being made and remains in widespread use today. The Carl Gustaf is a lightweight, low-cost weapon that uses a wide range of ammunition, which makes it extremely flexible and suitable for a wide variety of roles. The weapon's name is frequently shortened. In Sweden, it is officially called the Grg m/48 (Granatgevär – "grenade rifle", model 1948). British troops refer to it as the "Charlie G", while Canadian troops often refer to it as "Carl G". In U.S. military service, it is officially known as the "M3 Multi-Role Anti-Armor Anti-Personnel Weapon System" (MAAWS) or "Ranger Anti-tank Weapons System" (RAWS), but is often just called "Goose". In Australia, it is irreverently known as "Charlie Gutsache" (guts ache, slang for stomach pain), or "Charlie Swede". The basic weapon consists of the main tube with the breech-mounted Venturi recoil damper, with two grips near the front and a shoulder mount. The weapon is fitted with iron sights, but is normally aimed with the attached 3× optical sight with a 17 degree (300 mil) field of view. The most modern variants fielded by Swedish rifle companies have been fitted with the Swedish Aimpoint sighting system. Luminous front and rear sight inserts are available for the iron sights when aiming at night, and an image intensification system may also be used. The Gustaf can be fired from the standing, kneeling, sitting or prone positions, and a bipod may be attached in front of the shoulder piece. An operating handle called the "Venturi lock" is used to move the hinged breech to one side for reloading. The weapon is normally operated by a two-man crew, one carrying and firing the weapon, the other carrying ammunition and reloading.

B-11 Russian 107mm Recoilless Gun



Tiers:

1 2 3 4

System

Alternative Designations: RG107

Crew: ea5

Weight Firing: kg304.8

Weight Travel: kg304.8

Length Firing: m3.54

Length Travel: m3.56

Width Travel: m1.45

Height Firing: m1.19

Height Travel: m0.9

Rifling: No

Feed: Breech load

Breech Mechanism Type: Interrupted Screw

Emplacement Time: min1

Fire from Inside Building: No

Sights

Name: PBO-4 combination

Type: Optical, panoramic, iron

Sight Range Direct: m1800

Sight Range Indirect: m6650

Night Sights: Available

Armament

Caliber: (mm)107

Rate of Fire: (prac, cyclic)

Fire on Move: No

Elevation (min, max): deg-10, +45

Traverse: deg360

Ammunition

↳*BK-883*

Caliber: mm107

Type: HEAT

Max Aimed Range: m1400

Max Eff Range, Day: m450

Max Eff Range, Night: m

Penetration: mm381,C

Combat Load: ready, stow0, 10

↳*BK-883*

Caliber: mm107

Type: Frag HE

Max Aimed Range: m1300

Max Eff Range, Day: m

Max Eff Range, Night: m

Penetration: mm

Combat Load: ready, stow0, 20

Fire Control

FCS Name: Text

Rangefinder: 9S53 laser guidance

Infrared Searchlight:

↳*OP4M-48A Direct Fire 5.5x*

Type: Day Sight

Field of View: deg11

Acquisition Range: m4000

↳*1PN79*

Type: Night Sight

Acquisition Range: m3500

Notes:

The B-11 recoilless rifle (It is also known as RG107) is a Soviet 107 mm smoothbore recoilless gun. It entered service in 1954, and was typically towed by a 6x6 ZIL-157 truck or a UAZ 4x4 truck. Designed by KB Mashinostroyeniya (KBM), Kolomna. It is fitted using a PBO-4 sight which has a 5.5x zoom direct fire sight and a 2.5x zoom sight for indirect fire.

Type 75 Chinese 105mm Recoilless Gun





Tiers:

1 2 3 4

System

Alternate Designation(s): Type 75

Type: Recoilless Gun

Manufacturer: NORINCO - China North Industries Group Corporation - CNGC

Chassis: Beijing BJ2020S (BJ212) 4X4 lightweight vehicle

Crew: 5

Airlift Capability: The Type 75 is widely equipped by the PLA airborne forces due to its light weight. The vehicle can be airlifted by medium transport helicopters and fixed-wing transport aircraft, but it cannot be air-dropped by parachutes.

Note: The Type 75 is effective against enemy personnel, bunkers, fortifications, and light armoured vehicles. The weapon can be used for either direct or indirect fire. Its shape-charge warhead has limited armour penetration capability, thought it poses little or no threat to heavy armour target such as main battle tanks (MBT).

Dimensions (Chassis: BJ2020S (BJ212) 4X4 Lightweight Vehicle)

Length: mm4,080

Width: mm1,840

Height: mm1,870

Weight: INA

Automotive (Chassis: BJ2020S (BJ212) 4X4 Lightweight Vehicle)

Engine Name: 1499 cc 4A91 turbo I4 (2019 Zhanqi)

Engine Type: Petrol

Engine Power: INA

Transmission: 5 speed manual

Maximum Range: INA

Maximum Speed: km/h100

Main Weapon System

Name: Type 75

Type: Recoilless Gun

Caliber: mm105

Barrel Length: INA

Weight: INA

Rate of Fire: rds/min6

Maximum Range: m7,700

↳*Ammunition*

Name: INA

Type: High-Explosive (HE) and Fin-Stabilised High-Explosive Antitank (FS-HEAT) rounds.

Caliber: mm105

Projectile Length: INA

Projectile Weight: INA

Basic Load: 7 Rounds

Fire Control

FCS Name: INA

Computerized FCS: Yes, a primitive fire-control comprising optical sight, laser rangefinder, and fire-control computer.

Optical Sight: Yes

Protection

Hull Armor: INA

Applique Armor: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 75 105mm recoilless gun was developed in the mid-1970s for the PLA. Mounted on a Beijing BJ2020S (BJ212) 4X4 lightweight vehicle, the Type 75 is designed to provide a lightweight, self-propelled direct/indirect fire against enemy personnel, field fortifications, and light armoured vehicles. The weapon was fielded by the PLA ground forces in mass numbers, with a considerable number of them still in active service today.

Carl Gustaf M3 MAAWS Swedish 84mm Man-Portable Anti-Tank Recoilless Rifle





Tiers:



Variants:

- **M1 (1948):** Original, still in Service with Third-World Countries
- **M2 (1963):** An improved, lighter and slightly shorter version, the Carl Gustaf M2, was introduced in 1964 and quickly replaced the original version.
- **M3 (1991):** The current Carl Gustaf M3 version was introduced in 1991. It reduced the weight even further by replacing the forged steel tube with a thin steel liner containing the rifling, strengthened by a carbon fiber outer sleeve. The external steel parts were also replaced with plastics and aluminium alloys. In recent years, the M3 has found new life in a variety of roles. The British Special Air Service, United States Army Special Forces and United States Army Rangers use M3s in bunker-busting and anti-vehicle roles, while the German Bundeswehr maintains a small number of M2s for battlefield illumination. Many armies continue to use it as a viable anti-armor weapon, especially against 1950s- and 1960s-era tanks and other armored vehicles still in use worldwide.
- **M3 MAAWS:** In November 2011, the U.S. Army began ordering the M3 MAAWS for regular units deployed in Afghanistan. Soldiers were being engaged with RPGs at 900 meters, while their light weapons had effective ranges of 500–600 meters. The Gustaf allows airburst capability of troops in defilade out to 1,250 meters, and high explosive use out to 1,300 meters. While the weapon provides enhanced effectiveness, its 9.5 kg (21 lb) weight burdens troops. On 28 March 2013, USSOCOM announced a call for sources to develop a kit to lighten the M3 MAAWS and reduce overall length without affecting handling or ruggedness. By that time, Saab was developing a weight-reduced version prior to the SOCOM release that demonstrated no decrease in performance, no increase in recoil, and nearly equivalent barrel life that could be ready for government testing in 2014. Saab has also developed a new high explosive round that has a direct fire range of 1,500 meters when using a fire control system. The US Defense Department agreed to evaluate the shorter and lighter M4 version over the next two years; testing and qualifications were planned to be completed in spring 2017, and the weapon type classified as the M3E1 in fall 2017, making the system available for procurement to all Department of Defense services. The first unit is planned to be equipped with the M3E1 in 2018. In April 2019, a contract of SEK168 million (USD18.1 million) was approved to supply the Australian Army with ammunition for the Carl-Gustaf M4 84 mm multipurpose weapon systems ordered by the service in September 2018.
- **M4 (M3-E1):** At AUSA 2014, Saab Dynamics displayed its new Carl Gustaf M4 variant. Compared to the M3 MAAWS, the M4 is 3.4 kg (7.5 lb) lighter, weighing 6.6 kg (15 lb), and shorter with a 950 mm (37 in) overall length. The shorter length was in response to the need to wield the weapon in urban terrain, and weight savings were achieved through using lighter components whenever possible including a carbon fiber tube with titanium liner, as well as a new venturi design. Other new features include a red-dot sight, a travel safety catch to allow the M4 to be carried while loaded, an adjustable shoulder rest and forward grip for improved ergonomics, a shot counter to keep track of how many rounds have been fired to manage the weapon's 1,000-round barrel life, picatinny rails for grips and sight mounts, and a remote round management function so intelligent sights can "talk" to programmable rounds.

System

Alternate Name: Carl Gustaf M3 Multi-purpose Anti-armor Anti-personnel Weapon System (MAAWS)
Type: Recoilless rifle
Manufacturer: Saab Bofors Dynamics (formerly Bofors Anti-Armour AB), Howa (license)[
Caliber: 84 mm rifled (24 lands, progressive twist)

Cartdige: 84×246 mm R

Crew: 2 optimal, 1 minimal

Breech: Hinged

Rate of fire: 6 rounds per minute

Muzzle Velocity: 230–255 m/s

Effective Firing Range, Moving Vehicles: 350 to 400 m against moving vehicles

Effective Firing Range, Stationary Vehicles: 500 m against stationary vehicles

Effective Firing Range, using Smoke and High Explosive Rounds: m1000

Effective Firing Range, Rocket-Boosted Laser Guided Ammunition: m2000

Dimensions

Length: m1

Bore: mm84

Weight with Fire Control System: kg8.61

Ammunition

Ammunition Types: Current High Explosive, High Explosive Dual Purpose, Training; Future Illumination, Anti-Structure

Note: Improvements to the ammunition have been continual. While the older HEAT rounds are not particularly effective against modern tank armor, the weapon has found new life as a bunker-buster with an HEDP round. In addition, improved HEAT, high explosive (HE), smoke and illumination (star shell or flare) ammunition is also available. For full effectiveness, illumination rounds have to be fired at a very high angle, creating a danger for the gunner as the backblast from firing can burn him. For this reason, several armies have retired the illumination rounds, while the U.S. Army requires that they be fired from a standing position.

↳*FFV 751*

Note: FFV401 is an Area Defence Munition designed as a close-range anti-personnel round. It fires 1100 flechettes over a wide area.

↳*FFV441*

Note: FFV441 is an HE round, useful in a "lobbed" trajectory to 1,000m, which can be fused to either detonate on impact or as an airburst.

↳*FFV441B*

Note: FFV441B is an HE round with an effective range against personnel in the open of 1,100 m. The round arms after 20 to 70 m of flight, weighs 3.1 kg, and is fired at a muzzle velocity of 255 m/s.

↳*FFV469*

Note: FFV469 is a smoke round fired like the FFV441, with a range of about 1,300 m. The 3.1 kg round is also fired at 255 m/s.

↳*FFV502*

Note: FFV502 is an HEDP round with the ability to be set to detonate on either impact or one-tenth of a second afterwards. Effective range is 1,000 m against dispersed soft targets such as infantry in the open, 500 m against stationary targets and 300 m against moving targets. Minimum range is 15 to 40 m to arm the warhead. Penetration

exceeds 150 mm of rolled homogeneous armour (RHA). Ammunition weight is 3.3 kg and muzzle velocity is 230 m/s.

↳***FFV509***

Note: FFV509 is an ASM (Anti-Structure Munition), designed especially for destroying buildings and other types of urban constructions. The fuse has two modes, impact or a delayed function.[

↳***FFV545***

Note: FFV545 is an illuminating star shell, fired up to 2,300 m maximum range, but with an effective envelope of 300 to 2,100 m. Suspended by parachute, the star shell burns for 30 seconds while producing 650,000 candela, providing a 400 to 500 m diameter area of illumination.

↳***FFV551***

Note: FFV551 is the primary HEAT round and is a rocket-assisted projectile (RAP). Effective range is up to 700 m (400 m against moving targets) and penetration up to 400 mm of RHA. Ammunition weight is 3.2 kg and muzzle velocity is 255 m/s.[

↳***FFV552***

Note: FFV552 is a practice round with the same ballistics as the 551.

↳***FFV651***

Note: FFV651 is a newer HEAT round using mid-flight rocket assistance for ranges up to 1,000m. In theory, it has less penetration than the FFV551, but it includes a stand-off probe for the fuse to improve performance against reactive armour.

↳***HEAT 655 CS***

Note: HEAT 655 CS (Confined Spaces) "high-explosive anti-tank (HEAT) round that can be fired by the 84 mm Carl Gustaf recoilless weapon from within small enclosures."

↳***FFV751***

Note: FFV751 is a tandem-warhead HEAT round with an effective range of 500 m and ability to penetrate more than 500 mm of armour. Weight is 4 kg.

↳***FFV756***

Note: FFV756 is an MT (Multi Target) ammunition, designed for combat in built-up areas and for incapacitating an enemy under cover inside a building or some type of fortification. The MT 756 uses a tandem charge.[

↳***Guided Carl Gustaf Munition (GCGM)***

Note: Guided Carl Gustaf Munition (GCGM) is a laser guided projectile developed between Saab and Raytheon, featuring a multi-target warhead capable of defeating bunkers and moving light armored vehicles at a range of 2,000 m and capable of being fired from enclosed spaces; demonstrations planned for 2020.

Sights

Type: Iron sights, optical 3×, laser rangefinder, image intensification system for the newer M3 and M4 series

Fire Control

Type: Gen3, 1X Reflex, 15 degree field of vision

Notes:

The M3 Multi-role Anti-armor Anti-tank Weapon System (MAAWS) is the U.S. military designation for the Carl Gustaf M3 recoilless rifle. It is primarily used by United States Special Operations Command such as the Army Rangers, Army Special Forces, Marine Raiders, Navy SEALs, and JSOC operators. When used by the U.S. Army's 75th Ranger Regiment, the M3 is known as the Ranger Anti-tank Weapons System (RAWS). In the late 1980s, the Special Operations Forces Modernization Action Plan indicated need for a Ranger Anti-Armor/Anti-Personnel Weapon System (RAAWS) to replace the M67 recoilless rifle in use by the 75th Ranger Regiment. A market survey in 1987 indicated that the Carl Gustaf M3 was the best candidate for satisfying RAAWS requirements. On 29 September 1988, the M3 was selected as the RAAWS from candidate proposals submitted in response to the market survey compiled by ARDEC. A subsequent review of the contractor-supplied fatigue test data determined that the data did not meet U.S. Army requirements. Benét Laboratories conducted fatigue test of two tubes to establish an interim safe service life for the weapon. Tests were conducted in 1993. The manufacturer’s recommended life for the weapon was 500 rounds, but bore surfaces showed no indications of erosion until 2,360 rounds. The U.S. Navy SEALs became interested in the program and moved it to a Joint Integrated Product Team. The program name subsequently changed from the RAAWS to the Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS). Army Rangers found the M3 was best employed using a two-man team. One person would carry the launcher and be armed with a pistol for personal protection, and the other would carry 5–6 rounds of ammunition and act as a spotter for the gunner. Although the single-shot AT-4 is lighter and can be carried by one person, a Gustaf team with the heavier recoilless rifle can reload and fire more rounds. The M3 MAAWS fires the following ammunition: High Explosive Dual Purpose (HEDP) round High Explosive Anti-Tank (HEAT) round High Explosive (HE) round Illumination round Smoke round High Explosive Anti-Tank - Rocket Assisted Projectile (HEAT-RAP/551) In late 2012, the Army fielded 58 M3s and 1,500 rounds of ammunition to units deployed to Afghanistan to destroy enemy targets out to 1,000 meters. This was because RPG and machine gun teams could attack 900 meters away, while existing weaponry such as the M141 Bunker Defeat Munition, M72 LAW, M136 AT-4, and MK153 SMAW have effective ranges of only 500 meters. The AT-4 is lighter and cheaper but is made of reinforced fiberglass, while the M3's rifled metal/carbon fiber launch tube allows for reloading. Employing the 22 lb M3 is easier than the 50 lb FGM-148 Javelin with its launcher with missile and reusable command launch unit, is faster than waiting on mortars, and is cheaper than the Javelin and artillery shells for engaging targets in hard cover. Although Special Operations forces had been using the M3 since the early 1990s, light infantry unit commanders in Afghanistan had to submit operational needs statements to get the weapon. The M3 became an official program of record in the conventional Army in 2014, and a conditional materiel release was authorized in late 2015 to equip all brigade combat teams with one M3 launcher per infantry platoon.

AT-4 Swedish 84mm Single-Use Anti-Tank Recoilless Rifle







Tiers:



Variants:

- **M136 AT4:** American version with modified launch tube bumpers, sights and slings.
- **AT8 (Bunker-Busting):** A version of the AT4 where the standard HEAT projectile is replaced with the bunker-busting warhead developed for the SMAW. No orders were ever placed
- **AT12-T:** In the early 1990s, there were tests of a tandem charge 120-mm version (Bofors AT 12-T) that would be able to penetrate the front armour of any modern main battle tank.

System

Alternative Designation: AT-4; AT4
Date of Introduction: 1987
Proliferation: Widely Proliferated throughout Europe, North America, South America and the Pacific Total Produced: +600,000
Type: 84mm Single-Use Anti-Tank Recoilless Rifle
Family: AT-4
Manufacturer: Saab Bofors Dynamics
In Service: 1984-Present
Crew: ea1
Note: It was and remains one of the world's premier expendable infantry anti-tank weapons

Dimensions

Length: m1.02
Diameter: mm84
Height: INA
Weight, AT4: kg6.7
Weight, AT4-CS: kg8

Weapon System

↳*Launcher*

Name: AT-4
Type: The AT-4's gun tube is long and cylindrical, with numerous external fixtures
Note #1: A long tube covered by a conformal housing (which contains a cable used to fire the weapon) runs from the trigger mechanism to the breech along the top of the tube
Note #2: the launcher can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13 night sights

↳*Projectile*

Name: INA Depends on the type of projectile warhead
Type: See Projectile Types
Projectile Types: The AT-4 can fire several types of 84mm Projectiles: 1. HEAT (High Explosive Anti-Tank) 2. HEDP 502 (High Explosive Dual Purpose) 3. HP (High Penetration) 4. AST (Anti Structure Tandem-warheads) 5. ER (Extended Range) 6. HE (High Explosive)
Length: mm462
Bore Diameter: mm84
Muzzle Velocity: m/s290
Effective Firing Range, Point Target: m300
Maximum Firing Range, Area Target: m500
Maximum Firing Range, Maximum: m2,100
Sights: Iron sights, optional night vision unit
Armor Penetration (RHA): mm420
Projectile Weight: INA
Time of Flight to 250 meters: less than 1 second
Operating Temperatures: −40 to +60 °C (−40 to +140 °F)

Notes:

The AT4 (also AT-4) is an 84-mm unguided, portable, single-shot recoilless smoothbore weapon built in Sweden by Saab Bofors Dynamics (previously Bofors Anti-Armour Systems).[9] Saab has had considerable sales success with the AT4, making it one of the most common light anti-tank weapons in the world. It was and remains one of the world's premier expendable infantry anti-tank weapons The AT4 is intended to give infantry units a means to destroy or disable armoured vehicles and fortifications, although it is generally ineffective against current modern main battle tanks (MBT). The launcher and projectile are manufactured prepacked and issued as a single unit of ammunition, with the launcher discarded after a single use. The AT4 may be considered a disposable, low-cost alternative to a Carl Gustaf recoilless rifle. The AT4 took many of its design features

from the Carl Gustaf, which operates on the principle of a recoilless weapon, where the forward inertia of the projectile is balanced by the inertia of propellant gases ejecting from the rear of the barrel. But unlike the Carl Gustaf, which uses a heavier and more expensive steel tube with rifling, the disposable AT4 design greatly reduces manufacturing costs by using a reinforced smoothbore fiberglass outer tube. Being a disposable gun also allows for lighter and cheaper construction. In a single-use disposable gun, the barrel only needs to be able to contain a single pressure spike when firing, when it can be disposed of, even if it is ruined, burnt-out and strained, unlike traditional guns which are required to survive many pressure spikes without failure and thus need to be strongly overbuilt and made of heat-proof materials. Pressures are also kept quite low compared to many traditional guns. This lightweight and thin barrel and low pressure, combined with the almost complete lack of recoil, means that relatively large projectiles (comparable to those found in mortars and artillery systems) can be utilised, which would otherwise be impossible in a man-portable weapon. In the system originally developed by FFV for the Carl Gustaf, a plastic blowout plug is placed at the center rear of the shell casing containing the projectile and propellant, which itself is enclosed in the AT4 outer tube. When the gases build up to the correct pressure level, the blowout plug disintegrates, allowing the proper amount of gases to be vented to the rear, balancing the propellant gases pushing the projectile forward. The AT4 uses a unique method developed earlier by FFV and adopted for the AT4: the spring-loaded firing rod is located down the side of the outer tube, with the firing pin at the rear of the tube. When released, the firing pin strikes a primer located in the side of the casing's rim. he disadvantage of the recoilless design is that it creates a large back blast area behind the weapon, which can cause severe burns and overpressure injuries to friendly personnel in the vicinity of the user and sometimes even to the users themselves, especially in confined spaces. The back blast may also reveal the user's position to the enemy. The problem of back blast was solved with the AT4-CS (Confined Space) version, specially designed for urban warfare. This version uses a saltwater countermass in the rear of the launcher to absorb the back blast; the resulting spray captures and dramatically slows down the pressure wave, allowing troops to fire from enclosed areas. The AT4-CS version also reduced its muzzle velocity from the original 290 m/s to 220 m/s as part of its effort to be user-safe in a confined space, making the AT4-CS version more difficult to use as the drop is more pronounced. The effectiveness of the HEAT warhead is not dependent on speed. To fire, the gunner first removes the safety pin located at the rear of the tube, which unblocks the firing rod. He then takes a firing position ensuring that no one is present in the back blast area. If firing from the prone position, he must also place his legs well to the side to avoid burning himself. Then the gunner moves back the front and rear sight covers, allowing the sights to pop up into their firing positions. The AT4 has iron sights that were originally developed for the cancelled Viper, and are similar in concept and use to those on assault rifles. He then removes the first of two safeties by moving the firing rod cocking lever (located on the left side) forward and then over the top to the right side. The gunner takes aim, while at the same time holding down the red safety lever located in front of the cocking lever, and then fires by pressing forward the red firing button with his right thumb. Both the red safety lever and the firing button must be pressed down at the same time to fire the AT4. The red firing button has a similar resistance to the trigger pull of a rifle, so the gunner does not have to jab at the firing button, which could throw his aim off. After firing, the AT4 is discarded. Unlike the heavier Carl Gustaf, the AT4 outer tube is built to take the stress of just one firing; it is not reusable and cannot be reloaded. The AT4 can mount an optical night sight on a removable fixture. In US military use, the launcher can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13 night sights. The AT4 requires little training and is quite simple to use, making it suitable for general issue. However, as the cost of each launcher makes regular live-fire training very expensive, practice versions exist that are identical in operation but fire reloadable 9×19mm or 20mm tracer ammunition. Both practice cartridges are unique to their respective weapons, with their trajectory matched to that of the live round. The 20mm version also has a recoilless weapon effect with the same high noise and back blast as the AT4 firing and is favoured by the Swedish army because of the added realism of the back blast as compared to the "plonk" sound of the 9mm round (similar to the sound of a finger tapping on an empty can).

M79 Former Yugoslavian 82mm Recoilless Gun





Tiers:



Variants:

- **B-10:** RUSSIAN TOWED SYSTEM FROM WHICH THE M79 WAS DERIVED.
- **TYPE 65:** CHINESE VARIANT WEIGHS 28.2 KG (WITH TRIPOD BUT WITHOUT WHEELS). THE GUN USES THE TYPE 69 COMBINATION SIGHT AND FIRES A MIX OF AMMUNITION INCLUDING THE TYPE 65 HEAT ROUND.
- **TYPE 65-1:** CHINESE VARIANT WITH A TWO-PIECE GUN TUBE FOR LONG DISTANCE DISMOUNTED CARRY. ESTIMATED WEIGHT IS STILL 28.2 KG.
- **BST:** CROATIAN VERSION OF M79 USES THE CN-5 OPTICAL DAYSIGHT.

System

Alternative Designations: INA
Proliferation: 4 countries
Crew: 4
Weight Firing (kg): 30
Length Travel (m): 1.79
Rifling: Yes
Feed: Breech load
Breech Mechanism Type: Horizontally Hinged
Emplacement Time (min): 1
Fire from Inside Building: No

Ammunition

↳*M79*

Caliber(mm): 82
Type: HEAT
Max Eff Range, Day (m): 670
Max Eff Range, Night (m): 670
Penetration (mm): 350, C
Penetration after ERA (mm): INA

Penetration Concrete (m): INA

Penetration Brick (m): INA

Penetration Earth (m): INA

Muzzle Velocity (m/s): 322

Length (mm): INA

Weight (Kg): 4.87

↳*Type 65*

Caliber(mm): 82

Type: HEAT

Max Eff Range, Day (m): 670

Max Eff Range, Night (m): 670

Penetration (mm): 380, C

Penetration after ERA (mm): INA

Penetration Concrete (m): INA

Penetration Brick (m): INA

Penetration Earth (m): INA

Muzzle Velocity (m/s): 340

Length (mm): INA

Weight (Kg): INA

↳*M81*

Caliber(mm): 82

Type: Frag HE

Max Eff Range, Day (m): 1000

Max Eff Range, Night (m): 2700

Casualty Radius (sq.m): INA

Muzzle Velocity (m/s): 320

Length (mm): INA

Weight (Kg): INA

↳*Other Ammunition*

Description: OTHER AMMUNITION TYPES: O-881 HE, BK-881/BK-881M HEAT.

Sights

Name: ON M72B

Type: Optical

Sight Range Direct (m): 1000

Sight Range Indirect (m): 2700

Night Sights: 2 gen II

Notes:

The 82 mm round with TG81 (HE shell) is intended for annihilation of the enemy live force and armament in bunkers or fortified buildings at distances of up to 1000 m.

→Autocannons

M621 French 20mm Automatic Cannon



Tiers:

1 **2** 3 4

Variants:

- **THL 20:** Turreted cannon for helicopters.
- **POD NC 621:** Cannon pod for helicopters and light aircraft.
- **ARX 20:** Remotely controlled weapon station with M621 and a 7.62×51mm machinegun.
- **SH20:** Door mounted cannon for helicopters.[
- **CP 20:** Pintle-mounted cannon for vehicles and boats.
- **15A:** Cannon for naval ships.
- **NARWHAL:** Remote-controlled naval gun

System

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↳System

Name: M621
Type: Automatic Cannon
Caliber: mm20
Manufacturer: Nexter Systems
Length: 2,207 mm
Width: 202 mm
Height: 245 mm

Weight: 45.5 kg

Action: Blowback operated

Rate of Fire: 800 rounds/min

Muzzle Velocity: 1,005 m/s (3,297 ft/s) (AP-T) 985 m/s (3,231.6 ft/s) (HEI and TP)

Feed System: Open-link M12 belt

↳***Ammunition Weapon Station #2***

Name: INA

Type: Rifle

Caliber: mm20

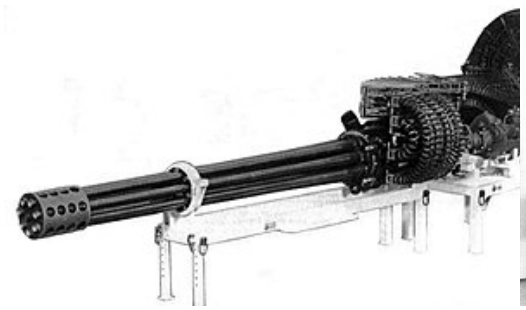
Cartridge: 20×102mm

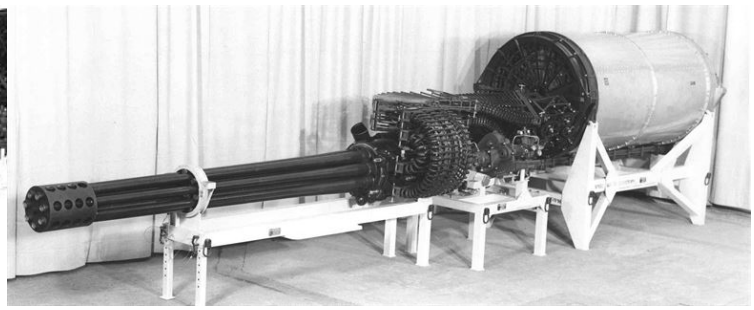
Basic Load: INA

Notes:

The M621 is a 20 mm automatic cannon of French design, developed by Nexter as on-board armament for armored vehicles, aircraft, helicopters and small coastal vessels of the French Navy.

GAU-8 Avenger American 30mm Seven-Barrel Gatling Autocannon





Tiers:



Variants:

- **Note:** Some of the GAU-8/A technology has been transferred into the smaller 25 mm GAU-12/U Equalizer, which was developed for the AV-8B Harrier II aircraft. The GAU-12 is about the same size as the 20 mm M61. GE has also developed the GAU-13/A, a four-barreled weapon using GAU-8/A components, which has been tested in podded form as the GPU-5/A. The Avenger also forms the basis for the Dutch-developed Goalkeeper CIWS naval air-defence gun. No current or contemplated aircraft other than the A-10 carries the full-up Avenger system.

System

Alternate Designation: GAU-8 Avenger
Manufacturer: General Dynamics
In Service: 1977-Present

Dimensions

Length: INA
Barrel Length: 2.30 m
Width: INA
Height: INA
Weight: 281 kg

Main Weapon System

↳*System*

Name: GAU-8 Avenger
Type: Autocannon
Caliber: 30mm
Barrels: 7-barrel (progressive RH parabolic twist, 14 grooves)
Action: Electrically controlled, hydraulic-driven
Recoil: Because the gun's recoil forces could push the entire plane off target during firing, the weapon itself is mounted laterally off-center, slightly to the port side of the fuselage centerline, with the actively "firing" barrel in the nine o'clock position (when viewed from the front of the aircraft), so that the firing barrel lies directly on the aircraft's centerline. The

firing barrel also lies just below the aircraft's center of gravity, being bore-sighted along a line 2 degrees below the aircraft's line of flight. This arrangement accurately centers the recoil forces, preventing changes in aircraft pitch or yaw when fired. This configuration also leaves space for the front landing gear, which is mounted slightly off-center on the starboard side of the nose. The GAU-8/A utilizes recoil adapters. They are the interface between the gun housing and the gun mount. By absorbing (in compression) the recoil forces, they spread the time of the recoil impulse and counter recoil energy transmitted to the supporting structure when the gun is fired. The A-10 engines were initially susceptible to flameout when subjected to gases generated in the firing of the gun. When the GAU-8 is being fired, the smoke from the gun can make the engines stop, and this did occur during initial flight testing. Gun exhaust is essentially oxygen-free, and is certainly capable of causing flameouts of gas turbines. The A-10 engines now have a self-sustaining combustion section. When the gun is fired the igniters come on to reduce the possibility of a flameout. The average recoil force of the GAU-8/A is 10,000 pounds-force (45 kN), which is slightly more than the output of each of the A-10's two TF34 engines of 9,065 lbf (40.3 kN). While this recoil force is significant, in practice a cannon fire burst slows the aircraft only a few miles per hour in level flight.

Rate of Fire: 3,900 rpm

Muzzle Velocity: 1,010 m/s

Maximum Firing Range: 3,660 m

Effective Firing Range: 1,220 m

Feed System: Linkless feed system

Accuracy: The GAU-8/A is extremely accurate and can fire 4,200 rounds per minute without complications. The 30-mm shell has twice the range, half the time to target, and three times the mass of projectiles fired by guns mounted in comparable close air support aircraft. The muzzle velocity of the GAU-8/A is about the same as that of the M61 Vulcan cannon, but the GAU-8/A uses heavier ammunition and has superior ballistics. The time of flight of its projectile to 4,000 feet (1,200 m) is 30 percent less than that of an M61 round; the GAU-8/A projectile decelerates much less after leaving the barrel, and it drops a negligible amount, about 10 feet (3.0 m) over the distance. The GAU-8/A accuracy when installed in the A-10 is rated at "5 mil, 80 percent", meaning that 80 percent of rounds fired will hit within a cone with an angle of five milliradians; this equates to a 40-foot (12-meter) diameter circle at the weapon's design range of 4,000 feet (1,200 m). By comparison, the M61 has an 8-milliradian dispersion.

↳*Ammunition*

Type: Rifle

Caliber: mm30

Cartridge: 30×173 mm

Basic Load: INA

Ammo Types: Ammo: *PGU-14/B API Armor Piercing Incendiary (DU) *PGU-13/B HEI High explosive incendiary *PGU-15/B TP Target Practice

Armor Penetration: Armor penetration of Armor-Piercing Incendiary ammunition, BHN-300 RHA, attack angle 30 degrees from vertical: *76 mm at 300 meters *69 mm at 600 m *64 mm at 800 m *59 mm at 1,000 m *55 mm at 1,220 m

Notes:

The General Electric GAU-8/A Avenger is a 30 mm hydraulically driven seven-barrel Gatling-style autocannon that is typically mounted in the United States Air Force's Fairchild Republic A-10 Thunderbolt II. Designed specifically for the anti-tank role, the Avenger delivers very powerful rounds at a high rate of fire. The GAU-8/A is also used in the Goalkeeper CIWS ship weapon system, which provides defense against short-range threats such as highly maneuverable missiles, aircraft, and fast maneuvering surface vessels. The GAU-8 itself weighs 620 pounds (280 kg), but the complete weapon, with feed system and drum, weighs 4,029 pounds (1,828 kg) with a maximum ammunition load. It measures 19 ft 5 1⁄2 in (5.931 m) from the muzzle to the rearmost point of the ammunition system, and the ammunition drum alone is 34.5 inches (88 cm) in diameter and 71.5 inches (1.82 m) long.[6] Power for operating the gun is provided by twin hydraulic motors pressurized from two independent hydraulic systems. The magazine can hold 1,174 rounds, although 1,150 is the typical load-out. Muzzle velocity when firing armor-piercing incendiary rounds is 1,013 m/s, almost the same as the substantially lighter M61 Vulcan's 20 mm round, giving the gun a muzzle energy of just over 200 kilojoules. The standard ammunition mixture for anti-armor use is a five-to-one mix of PGU-14/B Armor Piercing Incendiary, with a projectile weight of about 14.0 oz (395 grams or 6,096 grains) and PGU-13/B High

Explosive Incendiary (HEI) rounds, with a projectile weight of about 13.3 oz (378 grams or 5,833 grains).[8] The PGU-14/B's projectile incorporates a lightweight aluminum body, cast around a smaller caliber depleted uranium penetrating core. The Avenger proved lethal when tested against M47 Patton tanks in 1979. An innovation in the design of the GAU-8/A ammunition is the use of aluminum alloy cases in place of the traditional steel or brass. This alone adds 30% to ammunition capacity for a given weight. The projectiles incorporate a plastic driving band to improve barrel life. The cartridges measure 11.4 inches (290 mm) in length and weigh 1.53 pounds (0.69 kg) or more. The Avenger's rate of fire was originally selectable, 2,100 rounds per minute (rpm) in the low setting, or 4,200 rpm in the high setting. Later this was changed to a fixed rate of 3,900 rpm. At this speed it would take 18 seconds of sustained fire to empty the magazine. In practice, the cannon is limited to one and two-second bursts to avoid overheating and conserve ammunition; barrel life is also a factor, since the USAF has specified a minimum life of at least 20,000 rounds for each set of barrels. There is no technical limitation on the duration the gun may be continuously fired, and a pilot could potentially expend the entire ammunition load in a single burst with no damage or ill effects to the weapons system itself. However, this constant rate of fire would shorten the barrel life considerably and require added barrel inspections and result in shorter intervals between replacement. Each barrel is a very simple non-automatic design having its own breech and bolt. Like the original Gatling gun, the entire firing cycle is actuated by cams and powered by the rotation of the barrels. The seven-barrel carriage assembly itself is driven by the aircraft's dual hydraulic system. The GAU-8/A ammunition feed is linkless, reducing weight and avoiding a great deal of potential for jamming. The feed system is double-ended, allowing the spent casings to be recycled back into the ammunition drum, instead of ejected from the aircraft, which would require considerable force to eliminate potential airframe damage. The feed system is based on that developed for later M61 installations, but uses more advanced design techniques and materials throughout, to save weight.

2A72 (ZPT99) Russian 30mm Autocannon





Tiers:

1 2 **3** 4

System

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:
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↳***System***

Name: 2A72 (ZPT99)
Type: 30mm Automatic Cannon
Caliber: 30mm
Max Rate of Fire: rds/min330
Maximum Effective Firing Range (Air Targets): km4
Maximum Effective Firing Range (Ground Targets): km2
Maximum Effective Firing Range (Light Armor Vehicles): km1.5
Loader Type: Dual-belt feed
Maximum Elevation: deg-5
Minimum Elevation: deg+60
Fire on the Move: Yes
Traverse Range: deg360
Traverse Right: deg180
Traverse Left: deg180
Firing Modes: single shot, 10-round burst, or automatic mode.

↳***Ammunition (Option 1)***

Name: 3UBR8
Type: 195 AP rounds
Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Notes:

The 2A72 is a late Cold War era 30mm autocannon of Soviet origin. It was developed as a less complex and lighter alternative to the widely used 2A42. Studies revealed that the 2A42 was virtually always used at the low rate of fire setting. By modifying and simplifying the 2A42 design it could be produced at lower cost and be used for a wider range of applications. The 2A72 is used both as main armament and as a coaxial weapon for the 100mm 2A70 low pressure cannon. The 2A72 is a much simplified design based on the 2A42 consisting of only 349 parts instead of 578. Unlike the 2A42 it is not gas operated but recoil operated. Unlike the fixed barrel on the 2A42 the barrel moves rearward upon firing. A new design muzzle brake is used in order to retain enough recoil to cycle the weapon. Since the initial recoil impulse is lower the 2A72 can be fitted to lighter vehicles, such as the BTR-80A. The 2A72 fires the common 30x165mm round of which several types are available. The rate of fire is 330 rpm which is effectively similar to the earlier 2A42, which was hardly used at the higher rate of fire setting. The effective range is 1.5 km versus armored vehicles. The effective range for the high explosive rounds is about 2 km versus infantry, vehicles and aircraft although it has a slant range of 4 km. Compared to 2A42 the accuracy is lower due to the recoil motion of the barrel.

Shipunov 2A42 Russian 30mm Autocannon







Tiers:

1 2 **3** 4

System

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:
:

↳ ***System***

Name: Shipunov 2A42
Type: 30mm Auto-cannon
Length, Total: m3.027
Length, Barrel: mm2,416
Weight: kg115
Rate of Fire (Low): rds/min200-300
Rate of Fire (High): rds/min550-800
Barrels: ea1
Feed System: Twin Feed
Action: Gas Operated
Cage Cooling Sleeve: Yes
Traverse: deg360
Cage Cooling Sleeve: Yes

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)
Caliber: mm30
Muzzle Velocity: m/s1,275
Basic Load: rds125
Maximum Effective Range: m2,800
Min Range: mINA
Armor Penetration: Yes
Round Mass (Nominal): g675
Projectile Mass (Nominal): g220
Round Length: mm280
Tracer: 2.5
Cartridge Case: Steel
Primer: Percussion cap
Penetration at 1,000: >45mm RHA steel at 60° obliquity
Dispersion: Mils0.45
Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary
USSR Designation: UOF-84
Caliber: 30mm
Description: Shell filled with 48,5g HEI, with A-670M fuze
Muzzle Velocity: m/s960
Basic Load: ea225
Max Range: 5,000
Min Range: INA
Armor Penetration: Yes
Weight, Bullet: kg0.39

Notes:

The Shipunov 2A42, is a Soviet/Russian 30 mm autocannon. It is built by the Tulamashzavod Joint Stock Company. The 30 mm 2A42 autocannon was developed as a replacement for 2A28 Grom and has a dual feed. One is for HE-T and the other for AP-T rounds. The gunner can select one of two rates of full automatic fire, low at 200 to 300 rds/min and high at 550 to 800 rds/min. According to the manufacturer, effective range when engaging ground targets such as light armoured vehicles is 1,500 m while soft-skinned targets can be engaged out to 4,000 m. Air targets can be engaged flying at low altitudes of up to 2,000 m at subsonic speeds and up to a slant range of 2,500 m. In addition to being installed in a two-person turret on the BMP-2 mechanised infantry combat vehicle, this gun is also fitted in the BMD-2 airborne combat vehicle, BMD-3 airborne combat vehicle and BTR-90 (or GAZ-5923) (8 × 8) armoured personnel carrier. A small number of these have now entered service. More recently, the 30 mm 2A42 cannon has been installed in a new turret and fitted onto the roof of the BTR-T heavy armoured personnel carrier based on a modified T-54/T-55 MBT chassis. The cannon is also the main armament of BMPT (Tank Support

Fighting Vehicle). It is also used for various armament projects from various manufacturers. The design bureau for the 30 mm 2A42 cannon is the KBP Instrument Design Bureau. The 2A42 autocannon has also been used on the BMPT and Bumerang-BM, and on unmanned remote controlled weapon station turrets on the new Russian infantry fighting vehicles, Kurganets-25, VPK-7829 Bumerang. and T-15 Armata. Ammunition The 2A42 fires 30×165 ammunition, a cartridge introduced in the 1970s in the Soviet Union to replace previous 30 mm autocannon cartridges. Other weapons using this size of cartridge case include the 2A38, 2A38M, and 2A72 autocannons for various vehicle, helicopter and air defence applications, as well as numerous single-, dual- and six-barrel naval and air force cannons. The 2A42, 2A38, 2A38M, and 2A72 fire percussion-primed ammunition; the naval and aerial cannons use electrical priming, and therefore their ammunition is not interchangeable with the land-based ammunition types, despite the same cartridge case size. Originally three basic types of ammunition were developed in the Soviet Union for the land-based weapons: high-explosive incendiary, high-explosive fragmentation with tracer, and an armour-piercing ballistic capped with tracer. Later a sub-caliber armour-piercing round was introduced, and today also countries other than Soviet Union/Russia manufacture 30 x 165 percussion-primed ammunition.

Nudelman-Rikhter NR-30 Russian 30mm Autocannon





Tiers:



System

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↳*System*

Name: Nudelman-Rikhter NR-30
Type: Autocannon
Caliber: 30
Manufacturer: Russia
Length: 2,153 mm
Barrel Length: 1,600 mm
Width: 181 mm
Height: 186 mm
Weight: 66 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 850–1,000 rpm
Muzzle Velocity: 780 m/s

↳*Ammunition*

Type: Projectile
Caliber: mm30
Cartridge: 30x155mm
Projectile Weight: 410 grams (14½ oz), 840 g (1 lb 13½ oz) complete
Launch Charge: 95 g to 99 g of 6/7fl VBP smokeless powder

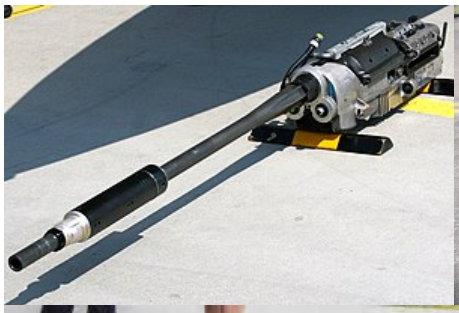
Types of Ammunition: HEI, AP, TP, Chaff dispensers

Basic Load: 500

Notes:

The Nudelman-Rikhter NR-30 was a Soviet autocannon widely used in military aircraft of the Soviet Union and Warsaw Pact. It was designed by A.E. Nudelman and A. A. Rikhter, entering service in 1954. The NR-30 was a single-barrel, short recoil operated cannon, essentially an enlarged version of the 23 mm NR-23 weapon introduced in 1949. It fired a massive projectile (more than twice the weight of the NR-23's 23 mm shell), requiring a muzzle brake with an integrated flame damper to prevent airframe damage from its firing. Before this gun, the Soviet standard fighter armament was two 23 mm and one 37 mm gun, that were ballistically quite different. The 23 mm was quite powerful, but with a relatively low initial velocity, while the 37 mm was lacking in rate of fire and ammunition reserve. A MiG-15 typically had 80 cartridges for each 23 mm gun and 40 for the single 37 mm N-37. The 30 mm gun had destructive power and ballistic qualities comparable to the 37 mm, and rate of fire better than the 23 mm NR-23. It had a velocity of around 800 m/s, a projectile weighing 400 grams (twice that of the 23 mm and half that of 37 mm guns), a rate of fire of 900 cycles per minute, even greater than NR-23, and a typical load of 70 shells for each gun. It was usually fitted into the wings rather than in the nose. There were 20 different types of ammunition; the most used were AP and HEI, the latter of 40–48 g HE internal charge, several times larger than 20 mm ammunition. An unusual munition was the Chaff dispenser PRL, with 48,000 chaff particles internally; it is not known how it was used. It was clear that this gun was meant to fire heavy projectiles, as DEFA guns firing the far less powerful 30x113 ammunition had projectiles weighing around 270 g, with similar velocity, but a higher rate of fire of 1200-1300 rounds per minute, making them more suitable for air-to air engagements. DEFAs had typically 120-140 cartridges each. The NR-30 was also remarkably light, with more firepower (rate of fire and projectile weight) despite being one-third lighter. The GSh-301 is the only lighter 30 mm gun. The NR-30 was used mainly in the MiG-19 (before this model, MiGs had 23 and 37 mm mixed armament), early MiG-21 models, the Sukhoi Su-7, and the Sukhoi Su-17. It was also used on the Shenyang J-6, the Chinese copy of the MiG-19, with a third gun in the nose. The Chinese manufactured their own version, the Type-30, basically similar though with slightly different characteristics. Although its rate of fire makes it more suited for air-to-ground use, it is, by all accounts, a formidable weapon combining reasonable accuracy and devastating hitting power. It also appears that a version of the gun was modified for use in space, with successful testing on a military Almaz station.

Mauser BK-27 German 27mm Revolver Cannon







Tiers:

1 2 **3** 4

System

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↳ ***System***

Name: Mauser BK-27
Type: Revolver Cannon
Caliber: 27mm
Manufacturer: Mauser (now Rheinmetall)
Length: 2.31 m
Barrel Length: 27×145 mm
Weight: 100 kg
Barrels: Single barrel
Action: Revolver
Rate of Fire: 1,000–1,700 rpm
Muzzle Velocity: 1,100 m/s

↳ ***Ammunition***

Type: Rifle

Caliber: mm27

Shell: 27×145 mm

Basic Load: 4,000 Rounds

Notes:

The BK 27 (also BK27 or BK-27) (German acronym for Bordkanone, "on-board cannon") is a 27 mm (1.063 in) caliber revolver cannon manufactured by Mauser (now part of Rheinmetall) of Germany. It was developed in the late 1960s for the MRCA (Multi Role Combat Aircraft) program that ultimately became the Panavia Tornado. The BK 27 is a gas-operated cannon firing a new series of 27×145 mm cartridges with a typical projectile weight of 260 g (9.2 oz), and a total weight for the complete round of 516 g (1.14 lb). Most models use a linked feed system for the ammunition; however, the Eurofighter Typhoon makes use of a specially developed variant of the BK 27 that uses a linkless feed system instead, which is intended to improve reliability. The Mauser BK 27 is used in the Panavia Tornado, the Alpha Jet, the JAS 39 Gripen, and the Eurofighter Typhoon. At one time the USAF was considering to license its production for the F-35 Lightning II, but instead elected for the GAU-22/A. Rheinmetall has also developed remote controlled naval versions, the MN 27 GS and the MLG 27 fully automatic naval guns, which are installed on many ships of the German Navy. Ninety-nine MLG 27s have been ordered by the German Navy so far. The cannon is a single-barrel, high performance, breech-cylinder gun operated by a fully automatic electrically fired gas-operated system at a selective rate of 1000 or 1700 rounds per minute. The Mauser BK 27 utilizes pyrotechnic cocking charges to cycle the action. The BK27 has a much lower nominal fire rate than the M61 Vulcan, but its fire rate is constant throughout shooting due to the fact the cannon need not spin up. As a result, in conjunction with the higher caliber, the Mauser BK 27 fires in the first half second 4 kg of projectiles in contrast to the 2 kg of the M61 Vulcan which also needs about 25 kW electrical power on the maximum fire rate. As for ammunition types the gun mainly fires mine shells as these have the best effect against aircraft but the gun also has access to several types of armor piercing shells like the frangible armour piercing shell named Fap 27 mm x 145 mm ammunition/peb327 (DM103).

→Grenades

RKG-3 Russian Anti-Tank Grenade



Tiers:



System

Alternate Designation(s): RKG-3
Primary Function / Type: Anti-Tank Grenade
Effective Firing Range: 15–20 m
Filling: TNT/RDX with a steel lined shaped charge with 220 mm penetration of RHA.
Detonation Mechanism: Impact fuse

Dimensions

Length: mm362
Diameter: INA
Weight: kg1.07
Filling Weight: 0.567 kg (1.25 lbs.)

Notes:

RKG-3 is a series of Russian anti-tank hand grenades. It superseded the RPG-43, RPG-40 and RPG-6 series of grenades. It entered service in 1950, but is still used by Iraqi and Afghan insurgents in the 2000s and 2010s, against vehicles of NATO forces. RKG stands for Ruchnaya Kumulyativnaya Granata ("handheld shaped-charge grenade"). The grenade has an odd strap-like lever (or "spoon") that covers the base of the handle and runs up each side of the handle. When the pin is pulled, the "spoon" falls away, and when the grenade is thrown a spring deploys a four-panelled drogue parachute. This parachute stabilizes the grenade in flight and ensures that the grenade strikes the target at a 90 degree angle, maximising the effect of the shaped charge. Realistic accurately thrown ranges are within 15 to 25 meters. The lethality radius is within 2 meters from concussion and fragmentation. The casualty radius is within 20 meters and the danger space from fragmentation is within 50 meters. The fuze in the handle activates the grenade. When the parachute deploys, its ejection throws a weight to the rear of the handle and disables the safety. When it impacts or stops, inertia causes the weight to fly forward and hit the spring-loaded firing pin, which activates the primer detonator in the base. This sets off the booster charge in the base of the shaped charge, detonating and enhancing the main charge. The sensitive fuze guarantees that the grenade will detonate if it impacts any target. Armour penetration depends on the model. The original RKG-3 used a basic shaped charge with a steel liner and had a penetration of 125 mm against Rolled Homogeneous Armor (RHA). The RKG-3M used a copper-lined shaped-charge warhead and had a penetration of 165 mm; the RKG-3T had an improved copper liner that had a penetration of 170 mm. The RKG-3EM has a larger warhead and boasts a penetration of 220 mm. The RKG-3 was adopted into service in 1950. A few years later it was replaced by the improved RKG-3M and enhanced RKG-3T. Thicker top armor caused the Soviets to develop the larger RKG-3EM. In early 1970s the Soviet Army replaced this grenade with the RPG-18, but many other countries and guerrilla movements are still using the RKG-3 in their armed forces. It was used extensively during the 1973 Yom Kippur War. Ulrike

Meinhof was injured by an RKG-3 while training with the PLO in a Syrian training camp. RKG-3 grenades were widely used by Iraqi insurgents against American Humvees, Strykers and MRAPs.It is mentioned and featured in one of the scenes of the 2014 motion picture American Sniper.

F1 Australian Time-Fused Grenade



Tiers:



System

Alternate Designation(s): F1

Primary Function / Type: Time-Fused Grenade

Manufacturer: A number of failures of the F1 grenades to detonate were reported in 2006 during combat operations in the Middle East. Later, in September 2007, the grenade was temporarily withdrawn from service after a civilian Defence employee was seriously injured in an accident at the Defence Proof and Experimental Establishment at Graytown, Victoria. Stocks of the M67 grenade were procured from the United States in the interim.[3] The grenade was returned to service in October 2007 after it was deemed technically sound.[4] In 2013 it was announced that Thales in partnership with German company Diehl will develop an insensitive munitions variant.

Filling: RDX (phlegmatized with paraffin wax)

Detonation Mechanism: Timed Fuse .Fuze delay : 5seconds

Dimensions

Length: mm96

Diameter: mm58

Weight: grams375

Filling Weight: grams62

Notes:

The F1 fragmentation hand grenade is manufactured by Thales Australia and is used by the Australian Defence Force. The F1 grenade replaced the M26 grenade in Australian service in the late 1990s.[1] It is a high explosive, anti-personnel grenade with a lethal radius of 6 metres (6.6 yd), casualty radius of 15 metres (16 yd) and a safety radius of 30 metres (33 yd). The grenade weighs 375g and contains over 4000 2.4 mm steel ball fragments arranged to achieve uniform distribution of lethal fragments through 360° upon functioning. It has a fuse time of 4.5 to 5.5 seconds.[2] Thales Australia also manufactures an F3 practice grenade, being a non-fragmentation replica of the F1 used for training, incorporates a high impact aluminium die cast body and hazard band with a distinctive appearance. The F3 practice hand grenade has a replaceable pyrotechnic fuze that displays an audible output and a distinct cloud of white smoke visible to 200 metres (220 yd) to indicate functioning. A number of failures of the F1 grenades to detonate were reported in 2006 during combat operations in the Middle East. Later, in September 2007, the grenade was temporarily withdrawn from service after a civilian Defence employee was seriously injured in an accident at the Defence Proof and Experimental Establishment at Graytown, Victoria. Stocks of the M67 grenade were procured from the United States in the interim. The grenade was returned to service in October 2007 after it was deemed technically sound. In 2013 it was announced that Thales in partnership with German company Diehl will develop an insensitive munitions variant.

Mk 2 American Time-Fused Grenade



Tiers:



Variants:

- **Grenade, hand, fragmentation, Mk 2:** EC powder filler, uses M10 series igniting fuse
- **Grenade, hand, fragmentation, high explosive, Mk 2:** TNT, Trojan grenade powder, 50/50 amatol/nitrostarch, or Grenite filler, uses M5 series detonating fuse. In 1930, "high explosive" was dropped from the designation.
- **Grenade, hand, fragmentation, Mk 2A1:** EC powder or TNT filler, uses M10/M11 series igniting fuse (EC powder) or M6 or M204 series detonating fuse (flaked TNT). Has no base plug because it is filled through the fuse well.
- **Grenade, hand, practice, Mk 2:** Black powder "spotting" charge in a cardboard tube connected to a M10 series igniting fuse. Has a standard body with a wooden or cork base plug that pops out during detonation, creating a loud report and smoke to indicate ignition. The body could be reused and reloaded as long as it remained intact.
- **Grenade, hand, practice, M21:** Black powder "spotting" charge, uses M10 series igniting fuse. Has a heavier body and no baseplug. Its body was embossed with the vertical letters R, D and X on the knobs in a column on one side (because it was originally designed to be for an HE grenade with a more powerful RDX filler). When detonated, it makes a loud report and smoke comes out of the fuse vents.

System

Alternate Designation(s): Mk 2

Primary Function / Type: Time-Fused Grenade

Detonation Mechanism: percussion cap & time fuse: 4–5 second delay

Dimensions

Length, Overall: mm114

Length, Body: mm89

Diameter: mm58

Weight: About 1 lb 5 oz (595 g) depending upon filling

Filling Weight: Varied

Notes:

The Mk 2 grenade (initially known as the Mk II) is a fragmentation type anti-personnel hand grenade introduced by the U.S. armed forces in 1918. It was the standard issue anti-personnel grenade used during World War II and in later conflicts, including the Vietnam War. Replacing the failed Mk 1 grenade of 1917, it was standardized in 1920 as the Mk II, and redesignated the Mk 2 on April 2, 1945. The Mk 2 was replaced by the M26-series (M26/M61/M57) and later M33 series (M33/M67). It was phased out gradually in service beginning with the Korean War. Due to the tremendous quantity manufactured during World War II, it was in limited standard issue with the US Army and US Marine Corps throughout the 1950s and 1960s. The U.S. Navy was one of the last users when it was discontinued in 1969. The Mk 2 grenade replaced the failed Mk 1 grenade used by the U.S. military during World War I. 44 million were ordered and more than 21 million were completed (it was possible to convert Mk 1 grenade

bodies to the Mk 2 configuration) before the war ended, but few reached American troops overseas. It was formally standardized in 1920. The Mk 2, like the Mk 1, was manufactured of cast iron with a grooved surface divided into 40 knobs in 5 rows of 8 columns. This was to enhance fragmentation (in practice, it was found that the grooves did not enhance fragmentation as much as desired and provide a better grip when handling and throwing the grenade. The grooves and knobs gave it the appearance of a pineapple, and are the origin of that nickname. It was also commonly referred to as a "frag" grenade, in contrast to other types of grenades such as the Mk 3 grenade concussion grenade.

RGO Russian Fragmentation Grenade




Tiers:



System

Alternate Designation(s): RGO

Primary Function / Type: Fragmentation Grenade

Filling: A-IX-1 (96% RDX phlegmatized with 4% wax)

Detonation Mechanism: UDZS Impact fuze arming after 1 to 1.8 seconds or time delay after 3.2 to 4.2 seconds.

Dimensions

Length: mm114

Diameter: mm60

Weight: 520 to 530 grams

Filling Weight: grams90

Notes:

The RGO hand grenade (Ruchnaya Granata Oboronitel'naya, ("Hand Grenade Defensive") is a defensive Soviet fragmentation hand grenade. It consists of a double layered steel pre-fragmented body. It is very similar to the single-layered offensive aluminium-bodied RGN hand grenade. It uses the UDZS dual action fuze, which has both impact and time delay functions. The impact fuze arms after a pyrotechnic delay of 1 to 1.8 seconds. If the impact fuze has not triggered the grenade after 3.2 to 4.2 seconds a second pyrotechnic delay triggers the grenade. The fragments produced by the grenade generate a lethal radius of between 6 metres (20 ft) and 20 metres (66 ft), with the safety radius being 100 metres (330 ft). Unlike the two-part hemispherical RGN, the RGO is made up of 4 quadrants. One of the lower quadrants has a diamond-shaped cross-hatching in the outer shell. This is designed to help the operator to distinguish it by touch from the smooth-shelled RGN in low-light or dark conditions. The RGN and RGO grenades were developed under Project BAZALT ("Basalt") during the Soviet–Afghan War to supplement the RGD-5. When in combat in the mountains Soviet troops found their grenades were less effective. The steep terrain often caused grenades to accidentally bounce or roll back towards the thrower's position and cause friendly casualties. The long fuse time allowed the enemy forces to get under cover – or even throw or knock the grenade back if they were lucky. The RGO's time delay fuze prevents friendly casualties if it impacts too soon or will air-burst over an enemy under cover if it hadn't impacted. The impact fuze detonates when it hits any terrain – even sand, snow, or water. The grenade is still in production in Russia and Ukraine and is in service with a number of countries.

M67 American Fragmentation Grenade







Tiers:



Variants:

- **M33 Fragmentation Grenade:** The M33 was the original successor to the M26 fragmentation grenade. It was essentially identical to the M67, but lacked the safety clip that is fitted to the safety lever of the M67.
- **M68 Fragmentation Grenade:** This is a variant of the M67 fitted with the M217 impact fuze and a safety clip on the safety lever. This fuze has an electrical impact function which arms within 1 to 2 seconds and will detonate the grenade upon impact, and a back-up pyrotechnic delay function which will initiate the grenade after 3 to 7 seconds if the impact function fails. The M68 has the same statistics and markings as the M67 except it has a red-painted fuze and lever to indicate it has an impact fuze.
- **M33A1 and M59 Fragmentation Grenades:** Predecessors to the M68, these impact fuzed grenades used the M33 grenade body fitted with the M217 impact fuze, without a safety clip on the safety lever, and are marked in a similar manner to the M68.
- **M69 Practice Grenade:** The M69 grenade is used for grenade training to safely simulate the M67 grenade. The fuze screws into the body, and is replaceable after use. The simulator produces a report and small puff of white smoke when properly employed. The M69 has a blue-painted lever and a blue body. This is to indicate that it is a safe practice grenade rather than a live fragmentation grenade like the M33 or M67.

System

Alternate Designation(s): M678

Primary Function / Type: Fragmentation Grenade

Filling: Composition B

Detonation Mechanism: Pyrotechnic delay M213 fuze—4-5.5 seconds

Wounding Radius: wounding radius of 15 m (49 ft) – half that of older style grenades, which can still be encountered – and can be thrown about 40 m (130 ft). Fragments may travel more than 200 m (660 ft)

Dimensions

Length: mm90

Diameter: mm64

Weight: grams400

Filling Weight: grams180

Notes:

The M67 grenade is a fragmentation hand grenade used by the United States military. The M67 is a further development of the M33 grenade, itself a replacement for the M26-series grenades used during the Korean and Vietnam Wars, and the older Mk 2 "pineapple" grenade used since World War I. The current US issue grenade is the ‘baseball’ M67 Fragment Grenade. It is 14 oz

in weight, containing 6.5 oz of Comp B explosive and using a pre-segmented body to produce an even and lethal spread of shrapnel. The fuse is designed for 4 seconds, +/- 1 sec. The stated kill radius is 5 meters, and wounding at 15 meters which can be confusing to those expecting a 100% result at those ranges. The 5/15 meter figure is actually rated as a 50% chance of. Don’t have it in your head that if you or a hostile are in those windows that it’s automatically lights out. Grenades aren’t a guarantee kill anymore than bullets are. Always assume the bad guy is still able to fight! The shrapnel spread from the M67 is very even, so the chances of an enemy coming out completely unscathed are low. The M67 grenade has a spherical steel body that contains 6.5 oz (180 g) of composition B explosive. It uses the M213 pyrotechnic delay fuze. The M67 grenade weighs 14 oz (400 g) in total and has a safety clip to prevent the safety pin on the grenade from being pulled accidentally. The safety pin prevents the safety lever, or "spoon" o the grenade from moving and releasing the spring-loaded striker which initiates the grenade's fuze assembly.The M67 is typically known as a "baseball" grenade, because it is shaped like a ball that can be easily thrown.Other variations include the "pineapple" grenade and the World War 2 era "stick" grenade. The M67 can be thrown 30 to 35 metres (98 to 115 ft) by the average male soldier.[citation needed] Its fuze delays detonation between 4 and 5 seconds after the spoon is released. Steel fragments (not to be confused with shrapnel) are provided by the grenade body and produce an injury radius of 15 metres (49 ft), with a fatality radius of 5 metres (16 ft), though some fragments can disperse as far out as 250 metres (820 ft). To deploy the M67 grenade, the user first removes the safety clip from the grenade. Next, the grenade's pull ring is grasped with the non-throwing hand while maintaining a firm grasp on the body of the grenade and safety lever (also referred to as the "spoon") with the throwing hand. The pull ring and safety pin assembly are fitted so that a right-handed thrower can grasp the grenade with the fuse assembly on top and the safety lever held down by the right thumb. A left-handed thrower should grasp the grenade with the fuse assembly on the bottom and the safety lever held down by the left thumb. The user then pulls the grenade and pull ring assembly apart, removing the safety pin from the fuse assembly. At this time, the fuse remains unfired, as the throwing hand's thumb is holding the safety lever down. The user then throws the grenade at the intended target, taking care that the grenade does not strike an obstacle that could deflect the grenade, bounce it back towards the thrower or allow it to roll towards the thrower or an unintended place. When the grenade is thrown, the safety lever will fly free (under pressure from the striker spring) and the striker will hit the cap, igniting the pyrotechnic delay element. When the delay element has burned approximately 4 to 5 seconds it will initiate the grenade's explosive filler, causing a large number of metal fragments to be projected at high velocities. The thrower and friendly personnel in the vicinity should take cover to protect themselves from unintended injury.

HG-85 Swedish Time-Fused Fragmentation Grenade








Tiers:



Variants:

- **L109A1:** In September 2000 a six-year contract with Swiss Ammunition Enterprise Corporation (a RUAG subsidiary) was announced, committing the UK to purchased circa 363,000 grenades for combat and live training, first deliveries scheduled for March 2001. The L109 is the British designation for the HG 85. It differs from the HG 85 in that it has a special safety clip (matte black in colour, which is similar to the safety clip on the American M67 grenade.
- **L110A1:** The L110 (Drill Grenade) is an entirely inert (no explosive content) version of the L109. Identical in size, weight and shape, as the live grenade and is used for training purposes, specifically correct handling and throwing. It can be easily distinguished from the live grenade as it is dark blue with white markings. The body is solid aluminium with a textured plastic coating made in the same form as the live grenade, the textured coating ensuring a good gripping surface. A hole drilled up from the bottom indicates an empty store as well as ensuring the drill grenade is of the same weight as a live grenade. A bushing on top of the grenade has a dummy fuze mechanism permanently attached with a slot for the pull ring to clip into to prevent it being accidentally pulled. The fuze mechanism, under the plastic cover is very similar in appearance to the American fuze mechanisms. Internally there is an extension on the striker to allow it to be re-cocked during training and there is a leaf spring safety that clips around the safety lever and neck of the grenade preventing the lever from rotating even if the safety pin is pulled. The markings are 'GREN HAND INERT DRILL L110A1' and a manufacturers marking "SM" meaning Swiss Munitions. The fuze mechanism is marked on the wide bottom portion of the lever "HG2 DM 82 CH".
- **L111A1:** This practice grenade has a small simulation charge (flash/bang) that imitates a live grenade for training purposes. It is distinguishable from the wholly inert L110 by being a much lighter blue and is fitted with a distinctive gold/orange plastic cap and safety lever. The body of the L111A1 is made of steel and is covered in a textured plastic material with and has the word 'PRACTICE' embossed near the top of the body, near a top portion is larger than the bushing on the live grenade. Like the L110 there is a large aperture in the bottom of the grenade which demonstrates it is not a live grenade but in the L111A this aperture allow gas from the practice fuze to escape. Consisting of two parts, a grey reusable striker mechanism and an L162 practice fuze (which has a blue body with a brown base and is fitted with a silver washer) the practice fuze is fitted into the bottom of the reusable striker mechanism then the entire assembly is screwed into the top of the grenade. In this version the safety lever is attached by a plastic strap to prevent loss, the entire unit, apart from the expended L162 practice fuze, being reused. Markings, again in white, include 'GREN HAND PRAC L111A1', a manufacturers mark 'SM' meaning Swiss Munitions, and a lot number.
- **Nr300:** The Nr300 is the Dutch designation for the HG 85. It is exactly like the L109.

System

Alternate Designation(s): HG-85

Primary Function / Type: Time-Fused Fragmentation Grenade

Filling: TNT

Detonation Mechanism: Time Fuse

Dimensions

Length: mm97

Diameter: mm65

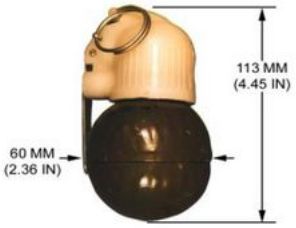
Weight: grams465

Filling Weight: grams155

Notes:

The HG 85 (Hand Granate M1985) is a round fragmentation hand grenade designed for the Swiss Armed Forces and still produced by RUAG Ammotec in Switzerland. HG 85 is the internal designation of the Swiss Army and replaces the HG 43 from WWII. On detonation the steel body, containing 155g TNT, releases around 1800 fragments weighing on average 0.1 grams. UK grenade range safety data suggests the L109 - and by extension all live versions - may represent a danger at ranges up to 200 m. Intended for use mainly when fighting in built-up areas, trench clearing, and wood clearing, it is effective against unprotected personnel up to 10 m (33 ft) away, and protected personnel up to 5 m (16 ft). The grenade is spherical with a bushing on the top threaded internally to accept the DM 82 CH fuze mechanism. Due to its specially constructed fuze and packaging, the grenade is considered very secure. It is designed to be effective against opponents wearing body armour, up to 20 layers of Kevlar and 1.6mm of titanium. A supplementary spring steel safety clip is clipped over the safety lever and bushing on top of the grenade preventing the safety lever from moving.

RGN Russian Fragmentation Grenade





Tiers:



Variants:

- **RGO Grenade:**

System

Alternate Designation(s): RGN
Primary Function / Type: Fragmentation Grenade
Filling: A-IX-1 (96% RDX phlegmatized with 4% wax)
Detonation Mechanism: UDZS Impact fuze arming after 1 to 1.8 seconds or time delay after 3.5 to 4 seconds.

Dimensions

Length: mm113
Diameter: mm60
Weight: grams290
Filling Weight: grams97

Notes:

The RGN hand grenade (Ruchnaya Granata Nastupatel'naya, "Hand Grenade Offensive") is an offensive Soviet fragmentation hand grenade. It consists of a single layered aluminium pre-fragmented body. It is very similar to the defensive RGO hand grenade. The grenade shell consists of two internally serrated aluminium hemispheres. The UDZS fuze has both impact and time delay functions, the impact fuze arms after a pyrotechnic delay of 1 to 1.8 seconds. If the grenade strikes an object after this time a spherical lead shot filled impact weight will trigger detonation. If the grenade has not struck anything after 3.5 to 4 seconds the second pyrotechnic delay will detonate the grenade. The grenade has a stated lethal radius of 4 meters to a maximum of 10 meters, and a safety radius of 25 meters with the fragments quickly losing effectiveness past the lethal radius due to the aluminum pre-fragmented body, which was designed similarly to the RGN-86 (a variant of the RGD-5). It can be thrown 30 to 40 meters. The grenade is currently in production in Russia and Ukraine, and is in service with a number of other countries. The RGN and RGO grenades were developed under Project BAZALT ("Basalt") during the Soviet–Afghan War to supplement the RGD-5. When in combat in the mountains Russian troops found their grenades were less effective. The steep terrain often caused grenades to accidentally bounce or roll back towards the thrower's position and cause friendly casualties. The long fuse time allowed the enemy forces to get under cover - or even throw or knock the grenade back if they were lucky. The time delay fuze prevents friendly casualties if it impacts too soon or will air-burst over an enemy under cover if it hadn't impacted after 3.5 to 4 seconds. The impact fuze detonates when it hits any terrain - even sand, snow, or water.

MK3 American Concussion Grenade







Tiers:



Variants:

- **MK3 (Mk.III offensive blast grenade) [1918]:** The MK3 has a cardboard body and crimped metal top and bottom. The top has a raised fuze well that was threaded for a fuze assembly. It used the reliable Mk.II fuze, which used a Mills-bomb style striker but with a straight lever. It was replaced by the MK3A1. It can be identified by its black body with yellow markings.
- **MK3A1 (Mk.III A1 offensive grenade):** The MK3A1 had a water-resistant laminated-paper body and top and bottom caps made from die-cast metal. The top had a threaded fuze well in the center. It originally used the M6A1 fuse, which had a four to five second delay. It was upgraded to the M6A2, and then the M6A3 fuze sometime in the early 1940s and the M6A4D fuze in 1944. The grenade contained 7 ounces [0.20 kg.] of flaked TNT filler. It can be identified by its black body and a yellow band pasted across the middle marked "Grenade, Hand - Offensive MK.III A1" in black lettering. It differs from the MK3 in having a fuze well that is flush with the surface of the top cap. The grenades weighed 0.69 lbs. each.The MK3, like all TNT-filled grenades and bombs, were shipped without their fuzes as a safety measure. They were packed in cardboard storage tubes in crates of 24 or 50. Fuzes were shipped separately in boxes containing 25 fuzes.
- **MK3A2:** The MK3A2 had a waterproof asphalt-impregnated fiberboard cylinder and its top and bottom were made from the same material. The top had a fuze well directly threaded in its center. It originally used the M6A4D fuze, which had a four to five second delay. This was later replaced with the updated M206 series fuze (currently using the M206A2), which was smokeless— and noiseless—burning and had a five-second delay. It contained an 8 oz. TNT charge. It can be identified by its cylinder, which is in two halves and is secured in the middle with a wide black band. The yellow lettering is printed directly on the surface of the grenade and reads "Grenade Hand - Offensive MK3A2 - TNT". The grenades weighed 0.96 lbs. each.[4] They came packed in storage tubes in crates of 30 grenades.

System

Alternate Designation(s): MK3

Primary Function / Type: Concussion Grenade

:

Dimensions

Length: INA

Diameter: INA

Weight: INA

Notes:

The MK3 offensive hand grenade is a cylindrical concussion grenade designed to produce casualties during close combat while minimizing danger to friendly personnel exposed in the open owing to minimal fragmentation, affecting small vessels of the nervous system, shrinking muscles and even the organ, causing a slight paralysis. There is a secondary fragmentation hazard though from rocks, gravel, wood splinters, glass, etc. The grenade is also used for concussion effects in enclosed areas, for

blasting, or for demolition tasks. The shock waves (overpressure) produced by this grenade when used in enclosed areas are greater than those produced by the fragmentation grenade. It is, therefore, very effective against enemy soldiers located in bunkers, buildings, and fortified areas. It is commonly known as the "concussion" or "demo" (from demolition) grenade. The first version was created in March, 1918. It was designed to be used during trench assaults to knock out bunkers and clear trenches without producing fragmentation that could injure the user or friendly forces nearby. There are three variants: the basic MK3, the MK3A1, and the MK3A2. They differ in their construction and the type of fuse used. They were designated Mk III (Roman numbers) prior to 2 April 1945.

→Landmines

→→Anti-Personnel Landmines

POM-1S Russian Anti-Personnel Fragmentation Mine



Tiers:



System

Country of Manufacture: Russia
Emplacement Method: remote-surface (UMZ, helicopter, PKM portable)
Length: mm80
Width: mm80
Height: mm80
Armor Penetration (mm)/ Kill Mechanism: fragmentation
Effective Range: m4
Detectability/ Composition: Visual
Anti-Handling: yes
Fuze Type/Self Neutralize: tripwires, S=Self-destruct
Explosive Type & Weight/Total Weight (kg): kg.1 Total: .750
Comment: copy of US BLU-42B

Notes:

The POM-1 and POM-1S are ground or aircraft dispensed, scatterable, electro and hydro mechanically armed, anti disturbance, antipersonnel (APERS) landmines. The POM-1S also incorporates a self-destruct feature. Both mines deploy eight 6.00-meter (19.69-feet)-long tripwires. The POM-1 and POM-1S are identical in external appearance.

PFM-1 (Green Parrot) Russian Anti-Personnel Mine







Tiers:



System

Country of Manufacture: Russia	
Emplacement Method: remote-surface (UMZ, MRL, helicopter, PKM portable)	
Length: mm120	
Width: mm61	
Height: mm120	
Armor Penetration (mm)/ Kill Mechanism: blast	
Effective Range: m1	
Detectability/ Composition: visual plastic	
Anti-Handling: no	
Fuze Type/Self Neutralize: pressure (5 kg) Self-destruct: 85% over 40 hr	
Explosive Type & Weight/Total Weight (kg): kgliquid plastic-VS-6D: .040 Total: .070	
Operating Pressure: kg5-25	
Comment: copy of US BLU-43B	

Notes:

PFM-1 anti-infantry high-explosive mine; NATO name: Green parrot, also known as butterfly mine) is a land mine of Soviet production, very similar to the BLU-43 US Army landmine. Both devices are very similar in shape and principles, although they use different explosives. The mine is, in essence, a plastic container containing explosive liquid. The mine is stored with a pin restraining a detonating plunger. Once the arming pin is removed, the plunger is slowly forced forward by a spring until it contacts the detonator, at which point it is armed. This takes between one and forty minutes, allowing the mine to be deployed manually, or air dropped. Deformation of the soft plastic skin of the mine forces the arming plunger to strike the detonator, detonating the mine. Because the body of the mine is a single cumulative pressure primer, it is extremely dangerous to handle the mine: A single press of 5 kg or more will make it function. The charge is usually nonlethal, although sufficient to destroy part of the foot if stepped on. The shape of the PFM-1 derives from close-packing within the dispenser casing. The resultant shape and bright colour is attractive to children, inspiring Western media claims that they were deliberately designed to look like a toy.[1][2] This has always been denied by the Soviets. The plastic body can be moulded in a variety of colours for best camouflage. As existing stocks were in European green, rather than sand coloured, the first examples used in 1980s Afghanistan were green and so easily visible. This led to their name of 'green parrots' and encouraged the deliberate toy theory.[3] The mine can be deployed both from helicopters and by infantry. In the latter variant, a number of mines are spread over a circle with a diameter of ~15 meters. Once the fuze on a PFM-1 mine is armed it cannot be disarmed. A variant of the mine, PFM-1S, self-destroys after one to forty hours, with 85% of the mines destroyed by 80 hours. The standard render-safe procedure is to destroy the mine on site by detonating a small explosive charge next to it.

PMN-2 Russian Anti-Personnel Mine



Tiers:

1 2 3 **4**

System

Emplacement Method: manual mechanical
Diameter: 125
Height: mm54
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mlimited
Detectability/ Composition: plastic easy-metal content
Anti-Handling: possible
Fuze Type/Self Neutralize: pressure-15 kg self neutral: no
Explosive Type & Weight/Total Weight (kg): kgTG-40: .115 Total: .450
Fuze: MD-9 (stab-sensitive)
Comment: Successor to PMN. Blast resistant

Notes:

The PMN-2 is a plastic-cased, pressure operated, anti-personnel blast mine (including a complex arming-delay and blast resistance mechanism). Made in the former Soviet Union, it has been found in Afghanistan, Angola, Azerbaijan, Cambodia, Chechnya, Eritrea, Ethiopia, Georgia, Honduras, Lebanon, Mozambique, Nicaragua, Tajikistan and Thailand. The mine has a body that is usually green plastic (occasionally brown) with a black rubber cross on top. The PMN-2 detonator is integral but the booster charge screws into the base. The HE charge is entirely on the side of the mine opposite the arming pin (it is lacquered black in the picture above). To destroy the mine with a small explosive charge, the charge must be placed on the side adjacent to the HE charge. Although a complex mine (which often means 'unreliable') the PMN-2 remains functional in most ground conditions for many years.

Valmara 69 Italian Bouncing Anti-Personnel Mine





Tiers:



System

Type: Bouncing anti-personnel mine
Emplacement Method: manual
Length: D (Top):130mm D: (Bottom) 107mm
Height (mm): mm205
Armor Penetration (mm)/ Kill Mechanism: bounding .45m frag
Effective Range: m27
Detectability/ Composition: plastic case easy to detect: fragments are steel
Anti-Handling: probable, 2nd fuze well
Fuze Type/Self Neutralize: pressure: 6, 10 kg tripwire self neutral: no
Explosive Type & Weight/Total Weight (kg): kgComp B: .4 Total: 3.2
Filling: Composition B
Detonation Mechanism: 10 kg push or 6 kg pull

Notes:

Valmara 69 or V-69 is an Italian bouncing anti-personnel mine manufactured by Valsella. The mine was developed from the V-59 mine, and although the mine is no longer produced in Italy, a number of copies were produced in other countries e.g. the "SPM-1" manufactured by Singapore. The South African version was called the J-69, and was an identical copy of the Italian version. A single centre prong version was also produced. It is no longer produced by South Africa who are compliant with the Mine Ban Treaty requirements. The mine has a short tubular olive green or sand colored plastic body inside which is the steel bounding body of the mine. On top of the mine is a round fuze cap with five prongs. The mine is triggered when the fuze cap tilts, either because of pressure on one of the prongs or a pull on an attached tripwire. The tilting fuze mechanism is not affected by overpressure. When the mine is triggered, a spring-loaded firing pin fires a percussion cap inside the fuze, which ignites a propelling charge at the base of the mine. The propellant charge launches the mine up out of the ground and into the air. When the mine reaches a height of approximately 50 cm above ground, an integral tether wire (connecting it to the plastic body from which it was launched) tugs on a spring-loaded firing pin in the body of the mine, which detonates the main explosive charge. Embedded in a plastic fragmentation sleeve surrounding the main explosive charge are approximately 1,000 pre-cut steel fragments, which are projected at high velocity in all directions. The mine has a lethal radius of 25 m, but the fragments remain dangerous at a considerable distance beyond that e.g. can inflict deeply penetrating eye wounds. The time taken from triggering the mine to detonation is approximately one second, so there is no time to take cover from the blast. This mine has significant metal content, which makes it easy to find using a metal detector. However, like the majority of bounding mines, most of the Valmara 69 is hidden underground and may be difficult to see, particularly in heavy undergrowth. Additionally, the Valmara 69 may be laid along with minimum metal mines such as the VS-50, VS MK2, TS-50, SB-33 and SB-81, which complicates the clearance process. Valsella also manufactured a completely separate electronic anti-handling device

known as the VS-AR. This was a tilt-operated device, specifically designed to be fitted to any of the following Valsella products: the VS-50 (standard version, not the VS-50AR) and Valmara 69 anti-personnel mines, as well as the VS-1.6 and VS-1.2 anti-tank mines. The VS-AR4 has a series of fuze adaptors which allow it to be screwed into the bottom of any of those mines. It has a 10-minute mechanical arming delay (started by removing a pin) followed by a 30-minute electronic arming delay. The power source are two 1.5 V batteries and the operational life is longer than a year. The Valmara 69 is found in Angola, Egypt, Iran, Iraq, Turkey, Kuwait, Mozambique, Sudan, and the Western Sahara

OZM-3 Russian Anti-Personnel Mine







Tiers:



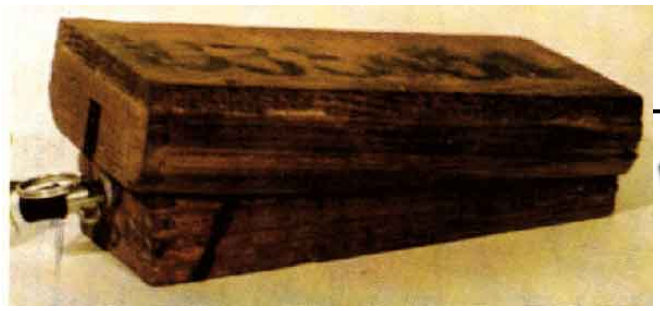
System

Emplacement Method: manual
Diameter: 75
Height: mm120
Weight: kg3.2
Armor Penetration / Kill Mechanism: bounding fragmentation
Effective Range: mmax: 25 lethal: 10 min: 0 bound height 1.5 to 2.4 m
Detectability/ Composition: Easy metal
Anti-Handling: possible no 2nd fuze well
Fuze Type/Self Neutralize: tripwire (2 to 5 kg) or cmd detonated (electrical) or pressure self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: .075 Total: 3
Comment: not waterproof

Notes:

The OZM-3, OZM-4 and OZM-72 are Soviet manufactured bounding type anti-personnel mines. (fragmentation-barrier mine , in the Russian and other post-Soviet armies as informally called "frog mine" or "witch") They are normally painted olive green, and issued with a spool of tripwires and two green painted wooden or metal stakes for affixing the tripwires. Both OZM-3 and OZM-4 have cast iron fragmenting bodies while the OZM-72 also contains preformed steel fragments, and all three are issued with empty fuze wells, so a variety of fuzing options are possible. The mines can be activated by a variety of fuzes, including electronic fuzes or command initiation, although they are most commonly fitted with an MUV booby trap switch which is activated by a tripwire. On firing, a metal base plate remains in the ground, while the mine body is thrown up by a small lifting charge, but remains attached to a strong wire tether. When the end of the tether is reached at a height of approximately 0.5 m, the main charge explodes and scatters fragments of the casing across a wide area. OZM mine may sometimes be laid directly on top of an MS-3 mine. The MS-3 is an anti-handling device which closely resembles a PMN mine, except that it has a "blister" on top and operates purely as a pressure-release boobytrap. Lifting an OZM mine (without rendering safe the MS-3 placed underneath) will trigger detonation.

PMD-6 Russian Anti-Personnel Mine







Tiers:



System

Country of Manufacture: Russia Namibia Serbia
Emplacement Method: manual
Length: mm196
Width: mm87
Height: mm50
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range (meter): m1
Detectability/ Composition: detectable wood metal in fuze
Anti-Handling: possible
Fuze Type/Self Neutralize: pressure, tripwire (1 kg) self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: .20 Total: .40
Operating Pressure: 1 to 10 kg
Comment: Probing for low pressure threshold fuze is dangerous

Notes:

The PMD-6, PMD-7 and PMD-57 series mines are Soviet Union blast-type anti-personnel mines that consist of a wooden box with a hinged lid with a slot cut into it. The slot presses down against a retaining pin, which holds back the striker. When sufficient pressure is applied to the lid of the box the retaining pin moves, allowing the striker to hit the detonator. The mines typically have an operating pressure of 1 to 10 kg. All the mines in the series use MOV series fuzes. As with other wooden box mines, the mine has a relatively short lifetime since the box is vulnerable to rotting and splitting, disabling the mine. It is, however, more dangerous than conventional metal mines, as it cannot be found with a metal detector. The mines are sometimes used with mortar bombs in place of the normal explosive blocks. Variants PMD-6 - original version of the mine, first used in the 1939 Winter War between the Soviet Union and Finland. PMD-6M - slightly larger version of the mine, with a leaf spring installed inside the box to increase operating pressure, which allows safer handling during minelaying. PMD-6F - a version used extensively during the Siege of Leningrad, with an ammonium nitrate/fuel oil (ANFO) main charge. PMD-7 - smaller version of the mine, using a cylindrical main charge. PMD-7ts - consists of a solid wooden block hollowed out to accept the main charge and fuse. PMD-57 - A later, larger box mine, using a larger warhead.

PP-Mi-Sr II Czechoslovakian Anti-Personnel Mine



Tiers:



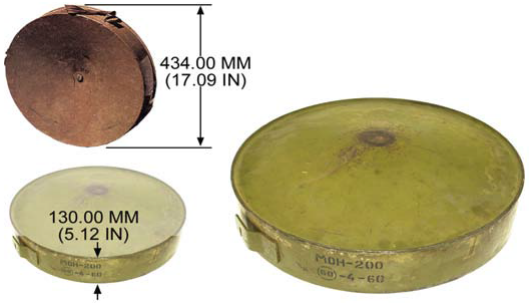
System

Country of Manufacture: Czech
Emplacement Method: manual
Diameter: mm102
Height (mm): mm152
Armor Penetration (mm)/ Kill Mechanism: bounding fragmentation
Effective Range: mmax: 20 m min: 0 bound height 1 m
Detectability/ Composition: Easy metal case and fragmentation
Anti-Handling: possible
Fuze Type/Self Neutralize: tripwire (4 to 8 kg), pressure (3 to 6 kg) command detonated self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: .36 Total: 3.2
Comment: Fielded in 1955. Exact copy of its predecessor the PP-Mi-Sr

Notes:

PP Mi-Sr II is a newer version of the same landmine with minor modifications. This bounding fragmentation landmine can be used as a pressure-actuated landmine with a RO-8 fuze or as a tripwire actuated landmine with an RO-1 fuze. The landmine is cylindrical in shape with a centrally located fuze well on top. On the top surface, there are two slotted screw heads and a central fuze well. The larger of the screws is the filler plug, while the smaller one seals the detonator into position. Beneath the central fuze well is a tube, which houses a delay element and propelling charge. This well is covered by a transit cap until the landmine is armed.

MON-200 Russian Directional Type Anti-Personnel Mine



Tiers:

1 2 3 **4**

System

Country of Manufacture: FSU Bulgaria
# of User Countries: 25+
Emplacement Method: manual
Diameter: mm431
Height: mm130
Armor Penetration (mm)/ Kill Mechanism: directional fragmentation 900 pieces
Effective Range: m200 m width of kill zone @ 200 m= 10.5-14.5
Detectability/ Composition: visual metal case
Anti-Handling: possible but not likely
Fuze Type/Self Neutralize: electrical, self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: 12 Total: 25
Operating Pressure: INA
Comment: Larger version of MON-100 Also effective against LAVs

Notes:

The MON-200 is a directional type anti-personnel mine designed and manufactured in Soviet Union. It is an enlarged version of the MON-100 mine. Because of its large size, this directional blast mine can also be used against light-skinned vehicles and helicopters.

PTM-1S Russian Anti-Personnel Mine



Tiers:

1 2 3 4

System

Country of Manufacturer: Russia
Emplacement Method: remote-surface: UMZ, MRL,aircraft, PKM portable inf
Length: mm320
Width: mm65
Height: mm75
Armor Penetration (mm)/ Kill Mechanism: track breaker on contact/blast
Effective Range: m1
Detectability/ Composition: visual plastic
Anti-Handling: no
Fuze Type/Self Neutralize: contact, pressure neutralize: yes-0 to 24 hrs
Explosive Type & Weight/Total Weight (kg): kgPVV-12S liquid plastic: 1.4
Comment: Anti-vehicle mine similar to German AT-1

Notes:

This scatterable antivehicular blast mine complements the PFM-1 (and PFM-1S) antipersonnel mine. Both of these mines have been extensively used by former Soviet forces in Afghanistan. After ejection from the scattering system, a pyrotechnic element arms the mine (following a 30-second delay), initiates a clockwork self-destruct delay timer, and releases a safety bock enabling the mine pressure sensor. The clockwork timer has 12 incremental settings ranging from 1 to 20, presumably hours. Longitudinally inside the mine is a pressure tube that transmits pressure to the fuze. The mine is OD green.

Type 69 Chinese Anti-Personnel Mine



Tiers:



System

Country of Manufacture: China
Emplacement Method: manual
Diameter: mm60
Height: mmH: w/o fuze 114 H: w/fuze 168
Armor Penetration (mm)/ Kill Mechanism: fragmentation iron body breaks into approx 240 fragments
Effective Range: mmax: 11m min: 0 bound height 0 to 1.5 m
Detectability/ Composition: easy iron case
Anti-Handling: possible has detonator well
Fuze Type/Self Neutralize: pressure (7 to 20 kg) tripwire (1.5 to 4) command detonated self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: 0.105 Total: 1.35
Comment: Closely patterned after the OZM-4., waterproof

Notes:

The Type 69 is a Chinese cylindrical, steel bodied anti-personnel bounding landmine which is designed to wound or kill by its fragmentation. The landmine is about the size of a pop/soda can and has a smooth finish. It is usually painted olive green. The Type 69 has a centre-mounted detonator cavity with a screw on cap. The cap has a large wire ring through it. A protruding percussion cap is offset from centre. This cap is threaded to accept a variety of fuzes but the most common is a plastic bodied pull fuze which is peculiar to the Type 69. On actuation, the landmine is propelled upward and explodes. The 110g explosive charge propels approximately 240 fragments to a hazardous radius of 50 metres. The landmine can be located visually or using metal detectors under most field conditions. The Type 69 can be defeated by blast overpressure from explosive breaching systems. This bounding fragmentation landmine is similar in appearance to the Russian OZM-3 and OZM-4, though it is noticeably smaller. It has an outer sheet-steel casing and a cast-iron body containing a propelling charge and a TNT main charge. A channel runs through the centre of the main charge, at the base of which is a pyrotechnic delay element. The detonator is placed (open end down) into the central tube and held in place by a long removable plug, which screws into the top of the landmine. To one side of this plug is a threaded spigot, which accepts a Type 69 mechanical combination stab-sensitive igniter element. The fuze has a spring-loaded striker retained inside a slotted plastic plunger by a split pin. This pin, sitting in a groove around the striker, acts in much the same way as retaining balls would in a conventional fuze. A safety pin runs through the plunger and striker to secure the assembly. The landmine is normally painted olive green with characters stencilled in black.

M61 (Piquet) French Anti-Personnel Mine



Tiers:

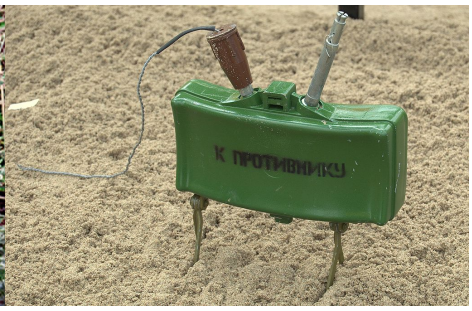
1 2 3 4

System

Country of Manufacture: France
# of User Countries: 2+
Emplacement Method: manual
Diameter: 35
Width: mmD: 35
Height: mm270
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mlimited (typical for contact-fuzed blast-effect mines)
Detectability/ Composition: very difficult plastic
Anti-Handling: yes-will detonate if pulled from the ground
Fuze Type/Self Neutralize: pressure, anti-removal
Explosive Type & Weight/Total Weight (kg): kgTetryl: .030 Total: .10
Comment: waterproof

MON 50 Russian Directional Type Anti-Personnel Mine





Tiers:



System

Country of Manufacture: FSU
# of User Countries: 23+
Emplacement Method: manual
Length: mm220
Width: mm45
Height: mm105
Armor Penetration (mm)/ Kill Mechanism: directional fragmentation 485 pieces.
Effective Range: mwidth of kill zone @ 50m=45
Detectability/ Composition: visual plastic case
Anti-Handling: possible
Fuze Type/Self Neutralize: electric cmd, tripwire, tension, tension release self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgRDX: .70 Total: 20
Fuse #1: Command detonated using PN manual inductor attached by demolition cable to an EDP-R electric detonator.
Fuse #2: (one of the following) MUV Series Mechanical Pull MVE-72 Electric Breakwire (battery powered) VP13 Seismic Controller (battery powered)
Comment: Copy of US M18A1 claymore Chopped wire fragments (5x5mm).

Notes:

The MON-50 is a claymore shaped (rectangular, slightly concave), plastic bodied, directional type of anti-personnel mine designed and manufactured in the Soviet Union. It is designed to wound or kill by explosive fragmentation. The mine is similar to the American M18 Claymore with a few differences. It has folding scissor type legs for supporting and aiming, but it also has an attachment point on the bottom for connecting a special clamp/spike which can be attached to wood, metal etc. It has a peep sight centered on the top which is flanked by two detonator cavities. The mine contains 700g of RDX (PVV-5A) to propel approximately 540 or 485 fragments to a lethal range of 50 meters in a 54° arc (spread of 45 meters at 50 meter range). The fragments can be steel balls (540) or short steel rods (485) depending on the variant. The MON-50 is usually command actuated using a PN manual inductor and an EDP-R electric detonator. It can also be actuated by a variety of booby trap (BT) switches including the MUV series pull; the MVE-72 electric brake wire; or the VP13 seismic controller. The MON 50 will usually be mounted above ground level on the surface or up in trees to give the greatest dispersion of fragments. It is waterproof and will function effectively from +50 to -50 °C (it can be buried in snow as long as the pack in front of the mine doesn't exceed 10 cm, any more will greatly reduce the mine effectiveness). The mine can be located visually or with metal detectors under most field conditions. Depending on its actuation method the MON-50 may be resistant to blast overpressure from explosive

breaching systems like the Giant Viper and M58 MICLIC. The MON-50 is currently manufactured in Russia and also manufactured for export in Bulgaria. The MON 50 is widely used in many parts of the world. It comes in a two pouch cloth bandolier which holds all the components for securing and command actuating the mine. It may also come packed in a VKPM-2 set which contains 4 mines complete with miscellaneous fuzes, control panel and wire. The mine has conventional or advanced seismic influence fuzing. It is a hand laid directional fragmentation mine which is normally command actuated (always secure command wires). The MON-50 is known to be used with the VP13 seismic controller which prevents close approach for any clearance operations, or to a variety of BT fuzes. On detonation the mine will normally propel lethal fragmentation to a range between 40 and 60 meters, although the actual hazard range for these types of mines can be as high as 300 metres based on US Army tests of the M18A1 "Claymore" (this is directly in front of the mine, fragmentation range and density drop off to 125 meters to the sides and rear of these mines).

PRB M35 Belgium Anti-Personnel Mine



Tiers:



System

Country of Manufacture: Belgium
# of User Countries: 4+
Emplacement Method: manual
Diameter: mm64
Height: mm40
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: m0
Detectability/ Composition: plastic
Anti-Handling: possible
Fuze Type/Self Neutralize: pressure (5 to 15 kg)
Explosive Type & Weight/Total Weight (kg): kgTNT/KN03: 0.1 Total: 0.58
Comment:

PMN-1 Russian Anti-Personnel Mine





Russian PMN-1 Landmine





Tiers:



System

Height: mm57
Diameter: mm112
Main charge weight: 240 g TNT (initiated by a 9 gram tetryl booster)
Total Weight: g600
Fuze: MD-9 (stab-sensitive)
Operating pressure: 5.8 kg

Notes:

The design of the PMN-1 mine dates from the late 1950s. It is particularly deadly because it contains an unusually large explosive filling when compared to most other anti-personnel landmines. For comparison, most anti-personnel blast mines (e.g. the VS-50) contain around 50 grams of high explosive, which typically destroys all or part of a victim's foot. In marked contrast, a PMN-1 contains 249 grams of explosive which can easily destroy a victim's entire leg (frequently requiring amputation high above the knee) in addition to inflicting severe injuries on the adjacent limb, which may also require some form of amputation due to blast injury. The majority of anti-personnel mine victims (e.g. those who step on an M14 mine containing 29 grams of explosive) have a very high probability of survival, though inevitably they suffer permanent disability regarding their gait. However, the amount of explosive inside a PMN-1 mine is so large that the risk of victims dying is significantly greater and, assuming that they survive their injuries, the degree of disability inflicted is much more severe. These mines are palm sized and cylindrical in shape. The PMN-1 has a bakelite case (brown or black in colour) with a black rubber pressure-plate and contains TNT explosive. The PMN-1 mine is armed by removing a steel ring-pull at the end of the horizontal fuze. When in position, the pin on the end of the ring-pull holds a spring-loaded striker back from the stab-detonator. Pulling out the ring-pull starts an arming delay, which comprises a thin steel wire (held under tension by the spring-loaded striker) which must cut through a small strip of lead before it is freed. The process of cutting through the lead strip takes between 2 and 12 minutes, depending on ambient temperature. After the wire has completely cut through the lead strip, the spring-loaded striker is freed and slides forward a few millimetres before stopping, blocked by the sliding gate of the pressure plate mechanism. At this point the mine is fully armed i.e. the only thing holding back the spring-loaded striker from the stab-detonator is a weak creep-spring on the pressure plate mechanism. Subsequently, any downward pressure on the pressure plate (i.e. when someone steps on the mine) overcomes the upward pressure of the creep-spring and pushes down the sliding gate that holds back the spring-loaded striker. This action frees the striker which flips forward into the stab detonator, firing both it and the adjacent tetryl booster which triggers detonation of the main TNT explosive filling. It is not a blast resistant mine.

M16 American Bounding Anti-Personnel Mine



Tiers:

1 2 3 4

Variants:

- **M16A1:** Redesigned detonator and delay elements
- **M16A2:** Single bounding delay element, reducing the weight
- **KM16A2:** South Korean produced version of the M16A2

System

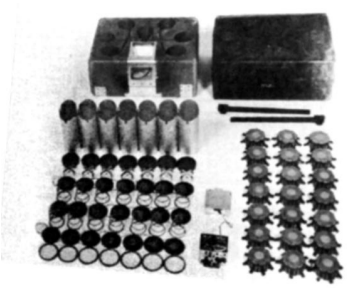
Country of Manufacture: US India
# of User Countries: 6+
Emplacement Method: manual
Diameter: mm103
Height: mm203
Armor Penetration (mm)/ Kill Mechanism: bounding fragmentation
Effective Range: m27 bound height 1
Detectability/ Composition: easy metal
Anti-Handling: possible no 2nd fuze well
Fuze Type/Self Neutralize: tripwire, pressure (2, 5 kg) self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: 0.6 Total: 3.67
In Service: 1957-Present
Proliferation: Millions
Detonation Mechansim: Various, including: S.Mi.Z 35 (pressure), Z.Z.35 (pull), Z.U.Z.Z. (tension release), E.S.Mi.Z (pressure and electric)
Comment: not waterproof

Notes:

The M16 mine is a United States-made bounding anti-personnel mine. It was based on captured plans of the World War II era German S-mine and has similar performance. The mine consists of a cast iron body in a thin steel sleeve. A central fuze well on the top of the mine is normally fitted with a pronged M605 pressure and tilt fuze. Sufficient pressure on the prongs or tension on an attached tripwire causes the release of a striker. The freed striker is forced into a percussion cap which ignites a short pyrotechnic delay. The purpose of this delay is to allow the victim to move off the top of the mine, to prevent its upward movement from being blocked. Once the delay has burned through, a 4.5-gram black powder charge is ignited, which launches

the inner iron body of the mine up into the air (leaving behind the steel outer sleeve). The charge also ignites a second pair of pyrotechnic delays. The mine rises to a height of 0.3 to 1.7 meters before one or both of the pyrotechnic delays detonates the main charge of the mine, which sprays high-velocity steel fragments 360° around the point of detonation. These metal fragments have an expected casualty radius of 27 meters for the M16 and M16A1 mines, and out to 30 meters for the M16A2 mine. The M16 and M16A1 mines are similar; the M16A1 has redesigned detonators and boosters but remains largely the same. The M16A2 is considerably different, having an offset fuse well and only a single pyrotechnic delay element. This change reduces the weight of the mine considerably (2.83 kilograms) while allowing it to carry a slightly larger main charge (601 grams) The mines were sold widely and copies were produced in several countries including Greece, India, South Korea and Turkey. They can be found in the 'wild' in Angola, Burma, Cambodia, Chile, Cyprus, Eritrea, Ethiopia, Iran, Iraq, Korea, Lebanon, Laos, Malawi, Mozambique, Myanmar, Oman, Rwanda, Somalia, Thailand, Vietnam, the Western Sahara, and Zambia. The United States retains stocks of M16A2 mines for use in any resumption of war in Korea. When emplaced, most of an M16 mine is buried underground so it can be extremely difficult to spot them visually, particularly in areas of long grass, heavy undergrowth or other debris. The M16 contains large amounts of metal, so is very easy to detect using a mine detector. However, it is important to note that the act of moving the detection head over the ground may strike the prongs and trigger the mine. In any case, other minimum metal mines may have been planted near to an M16 in order to protect it from mine clearance personnel. Additionally, if long tripwires are fitted, the M16 may "see" the deminers before they have chance to find it. When tracking the path of tripwires fitted to any bounding mine, great care must be taken: it is quite possible that additional antipersonnel blast mines (e.g. the M14) may have been buried beneath its path. An extra complicating factor is that some M16 mines may have been fitted with an anti-handling device e.g. placing an M26 grenade underneath it with an M5 pressure-release boobytrap firing device screwed into it.Deliberately triggering the mines from cover, using some form of grappling hook attached to a long rope may be useful in some situations and provide an initial way into the minefield before further clearance work begins.

M131 American Modular Pack Mine System (MOPMS)





Tiers:



Variants:

- **M136:** The M136 is an inert dispenser for training use; it is externally similar to the M131, but has a light to indicate the receipt of a firing signal.

System

Alternative Designation: M131

Type: Modular Pack Mine System (MOPMS)

Manufacturer: Hughes Aircraft Company, Ground Systems Group Aerojet Alliant Techsystems Inc was systems integrator with responsibility for the mines

Crew: The MOPMS modules are taken to the operation site by truck and carried by two men to the required position. If unused they can be retrieved and redeployed. The M71 RCU allows one person to control up to 15 groups of MOPMS modules from a remote location.

Remote: Modules are fired using an M71 coded Remote-Control Unit (RCU), or by a signal sent through a cable connected to a standard US Army blasting device on the dispenser module.

Type of Mines: Each MOPMS unit contains a mixture of Anti-Tank (AT) mines and Anti-Personnel (AP) mines. The mines contain three Large Scale Integrated (LSI) microelectronic chips in the electronics package, which also includes a command destruct/recycle receiver and a sensor circuit.

Batteries: ammonium/lithium batteries

AT Mine: The AT mine, like the BLU-91/B 'GATOR' has a Misznay Schardin (MS) warhead on either side, with a clearing charge to remove debris. The magnetic influence fuze gives the mine a full-width attack capability. The AP mine is activated by one of four tripwires ejected from the top surface. These are automatically deployed on landing and, when disturbed, initiate a fragmentation warhead. The mines are supplied with preset self-destruction devices, or can be detonated by remote control.

Timers: The built-in timers can be reset to extend the life of the minefield and, if the mines have not been dispensed, the sealed dispenser can be moved intact to a new location.

Total Dispensing Tubes: 7

Total Mines: 21 mines total (17 AT, 4 AP)

Self Destruct Time: 4 hour self destruct time(SD), recycle up to three times (16 hours). Mines start to SD at 3 hrs, 12 min (80% of SD time); all mines SD by 4 hrs.

Mine Projectile Maximum Distance: Mines are propelled 35 meters to the front and sidess

Mission Employment: *Close lane *Deliberate protective minefield (cases emplaced, not dispensed) *Nuisance minefield *Ambushes and booby traps *Tactical minefield with Fix or Disrupt intents *In support of MOUT Operations

Emplacement: *Issued as standared Class V munition and drawn from ASP *Site selection, achieving optimum effect *Dispensers are arranged in patterns to achieve necessary frontage, depth, and density *RCU unit can control up to 15 dispensers out to 1 kilometer, can SD all mines on command and recycle the SD time three times *Recycled mines will start to SD 12 hrs, 48 min; all mines will have SD by 16 hrs *Mines must be recycled every 3 hrs and 12 min or some will SD before 4 hrs *Dispensers controlled by blasting machine cannot be recycled mines or command detonated *Establish trigger points for closing lanes

Dimensions

Length: INA

Width: INA

Height: INA

Package: The package fits within 95 cm3

Weight, Combat: kg68

Notes:

M131 Modular Pack Mine System (MOPMS) DESCRIPTION: The MOPMS is a man-portable anti-tank (AT) and anti-personnel (AP) mine system. The M131 module weighs approximately 165 pounds and contains a mix of 17 M78 AT and four M77 AP mines. This module is stored, shipped and emplaced without any modification to the container. The MOPMS module may be initiated by hardwire or radio control. The hardwire capability uses currently available wire and electrical firing devices. The M71 hand-held radio control unit (RCU) allows one individual to control as many as 15 groups of MOPMS modules from a remote location. The AT mine has a magnetic influence fuse and a Miznay-Schardin kill mechanism. The AP mines deploy four tripwires upon ejection which initiate a fragmenting kill mechanism. Both the AP and AT mines contain a radio frequency receiver which allows the mines to be remotely-controlled (recycle self-destruct time and command destruct) with the RCU once the mines are dispensed. The factory set self-destruct time is four hours. STATUS: MOPMS fielding is in progress. The U.S. Army Engineer School was the first unit equipped on 6 MAR 92. EMPLOYMENT CONCEPT: The MOPMS will be employed to close lanes and gaps in minefields, at chokepoints, to reinforce obstacles, to emplace point minefields and for protective mining. Infantry, Armor, Engineer and other units with a protective mining mission will employ MOPMS in support of their tactical missions in all areas of the battlefield. If the mines are not dispensed from the MOPMS module, they may be recovered and reused. A M71 remote control unit (RCU) or an electronic initiating device, such as the M34 hand-blasting machine connected to the container by field wire, dispenses mines on command. Once dispensed, mines cannot be recovered or reused. Operators can disarm and recover the container for later use, if mines are not dispensed. The RCU can recycle the 4-hour self-destruct time of the mines three times, for a total duration of 16 hours (4 hours after initial launch and three 4-hour recycles). This feature makes it possible to keep the minefield in place for longer periods, if necessary. The RC can also self-destruct mines on command. It allows a unit to counterattack or withdraw through the minefield, as necessary, rather than wait until the self-destruct time has expired. The RCU can control up to 15 containers or groups of containers via separate pulse-coded frequencies, out to 300 to 1,000 meters. Coded frequencies defeat threat electronic counter-measures directed against the system. The M34 50-cap blasting machine can detonate one MOPMS at a maximum range of 3,000 meters. (Internal resistance decreases the maximum range by 400 meters for each additional MOPMS connected in series.) When controlled by direct wire, MOPMS dispensers cannot be command-detonated, and the self-destruct time cannot be recycled. BASIS OF ISSUE: MOPMS will be a Class V item of issue and will be issued to those units that are authorized a basic load of mines. It will be substituted for conventional mines currently in a unit's basic load. The M71 RCU will be a TOE item, issued to Engineer Companies (four RCUs each), Armor, Infantry and Cavalry Companies (two RCUs each), and other selected companies with a protective mining mission (one RCU each). TRAINING/PERSONNEL: U.S. Army Combat and Combat Support Schools will provide training during basic and advanced courses of instruction on MOPMS employment. At the unit level, training will be primarily conducted using the M136 Training Dispenser and M71 RCU.

PROM-1 Yugoslavian Anti-Personnel Mine



Tiers:

1 2 3 4

System

Country of Manufacture: Former Yugoslavia
# of User Countries: 5+
Emplacement Method: manual
Diameter: mm75
Height (mm): mmH: w/o fuze 178 H: w/fuze 260
Armor Penetration (mm)/ Kill Mechanism: bounding fragmentation
Effective Range (meter): max: 22 min: 0 bound height .7
Detectability/ Composition: Easy Steel
Anti-Handling: possible
Fuze Type/Self Neutralize: pressure (9 kg) tripwire (3 kg) self-neutralize; no
Explosive Type & Weight/Total Weight (kg): kgTNT: 0.43 Total: 3
Operating Pressure: 9 kg to 16 kg or 3 kg to 5 kg pull
Comment: Delayed ejection and detonation by 1 to 2 seconds to ensure target is clear of the upward path.

Notes:

The PROM-1 is a Yugoslavian manufactured bounding type of anti-personnel mine. It consists of a cylindrical body with a pronged fuze inserted into the top of the mine. It is broadly similar in operation to the German S-mine. The mine is triggered by the tilting of the prongs situated on top of the mine. This is caused by either direct pressure on the prongs or by tension on a tripwire attached to them. Tilting the prongs allows at least one of three striker retaining balls to escape. This releases the spring-loaded striker, which is flipped downwards into the percussion cap and fires the three gram propellant charge. The explosion of the propellant charge forces the upper half of the mine body out of the ground and up into the air, shearing off several brass screws and leaving the base plug of the mine behind in the ground. The mine's body is tethered to its base by a short length of wire, which unwinds behind it as it rises. When the mine reaches a height of approximately 65 centimetres the wire is pulled. This jerks the detonator assembly downwards into the striker. The detonator fires, triggering the main explosive charge, which shatters the internally grooved body into a large number of high-velocity steel fragments, which spray in all directions. Because the time taken from triggering the mine to detonation is so short (typically one second), there is no time to take cover from the blast. As with all bounding mines the PROM-1 is lethal at relatively long distances. It is capable of projecting dangerous fragments to range of 100 metres or more, with a potentially lethal range of around 50 metres. This mine will almost certainly kill or seriously injure anyone caught within 30 metres of the blast. As with any bounding mine, wearing standard kevlar body armour offers no guarantee of safety: the large number of fragments produced by a PROM-1 will wound the unprotected limbs, face and eyes of its victim(s). he PROM-1 can be particularly hard to spot in undergrowth because, apart from the prongs, most of it is buried underground and therefore cannot be seen. Although this mine contains lots of steel

(thereby making it easy to detect with a mine-detector) the act of sweeping the detection head over the ground can easily strike the prongs (or connected tripwire) and detonate the mine. In any case, PROM-1s in a minefield may be surrounded by various types of minimum metal antipersonnel blast mines (e.g. the VS-50) which further hinders the clearance process. The PROM-1 is difficult to render safe because its fuze becomes unstable after being exposed to weather for several years. Most deminers therefore recommend that this mine is destroyed in situ by detonating an explosive charge next to it. Usually (though not always) trip-wires measuring around 20 feet (6 meters) in length are fitted to this mine in order to increase its activation area. When tracking trip-wires back to their source, deminers must keep in mind that other landmines may have been planted along its length. It is all too easy to concentrate on following a trip-wire back to its source, forgetting that there could be PMA-3, PMN or similar blast mines lying buried underneath. The mine has been found in Angola, Bosnia, Chile, Croatia, Eritrea, Iraq, Kosovo, Mozambique and Namibia.

MON-100 Anti-Personnel Mine




Tiers:



Variants:

- **MDH-10:** Vietnam, a copy of the MON-100
- **KN-10:** Cambodia, a simplified version of the MDH-10

System

Country of Manufacture: FSU, Bulgaria
# of User Countries: 27+
Emplacement Method: manual
Diameter: mm220
Height (mm): mm80
Armor Penetration (mm)/ Kill Mechanism: directional fragmentation 400 pieces
Effective Range: m100 width of kill zone @ 100 m = 6.5-9.5
Detectability/ Composition: metal case
Anti-Handling: possible but not likely
Fuze Type/Self Neutralize: electric command, tension release (2 to 5 kg)
Explosive Type & Weight/Total Weight (kg): kgTNT: 2 Total: 5
Fuse 1: Command detonated using PN manual inductor attached by demolition cable to an EDP-R electric detonator
Fuse 2: MUV Series Mechanical Pull or MVE-72 Electric Breakwire (battery powered) or VP13 Seismic Controller (battery powered).
Comment: Effective against lightly armored vehicles. At 100m 50% of frag will strike w/in 5 m of aim.

Notes:

The MON-100 is a circular, sheet metal bodied, directional type of anti-personnel mine designed and manufactured in the early 1960s by the Soviet Union. It is designed to wound or kill by fragmentation and resembles a large bowl. The MON-100 mine body has a smooth, well finished appearance with a webbing handle mounted on the upper edge, it is usually attached to a mounting shackle by wing nuts on either side of the mine body (the shackle is connected to a spike for securing the mine to buildings, trees etc.). The concave face of the mine has a detonator cavity in its center (this is the side aimed at the target). The mine contains 2 kg of explosive to propel 450 steel rod fragments to a lethal range of 100 m, at maximum range the spread of the fragmentation is 9.5 m. The mine alone weighs 5 kg but with the shackle and mounting spike the weight is 7.53 kg. The MON 100 can be command actuated using a PN manual inductor attached by demolition cable to an EDP-R electric detonator. It can also be actuated by a variety of booby trap (BT) switches including: * MUV series pull * MVE-72 electric

breakwire * VP13 seismic controller. The MON-100 will usually be mounted above ground level on the surface or up in trees to give the greatest dispersion of fragments. The mine can be located visually or with metal detectors under most field conditions. Depending on its actuation method the MON-100 may be resistant to blast overpressure from explosive breaching systems like the Giant Viper and M58 MICLIC. The mine is also produced for export to Poland. Because it is a directional type of mine, it should never be approached from the front, always from the rear or side. The MON-90 is known to be used with the VP13 seismic controller which prevents close approach for any clearance operations. If the mine is encountered with any type of electrical wires running from it, secure both ends of the wire before approaching the mine, because it could be linked to another mine or other booby trap device. On detonation the mine will normally propel lethal fragmentation to a range between 75 and 125 meters. The actual hazard range for this mines can be as high as 160 metres (this is directly in front of the mine, fragmentation range and density drop off to 125 meters to the sides and rear of these mines). Always be alert for well concealed blast mines laid along tripwires (don't get tripwire fixation).

POM-2S Russian Scatterable Anti-Personnel Fragmentation Landmine





Tiers:

1 2 **3** 4

System

Country of Manufacture: FSU
# of User Countries: 12+
Emplacement Method: remote-surface (UMZ, helicopter, PKM portable) cylinder:
Length: mm60
Height: INA
Armor Penetration (mm)/ Kill Mechanism: fragmentation
Effective Range: m16
Detectability/ Composition: visual, readily
Anti-Handling: no
Fuze Type/Self Neutralize: tripwires (.2 kg) Self-destruct: 4 to 100 hr
Explosive Type & Weight/Total Weight (kg): kgTNT: .14 Total: 1.6

Notes:

The Russian POM-2S is a scatterable, anti-personnel, fragmentation landmine. It has a cylindrical cast-steel body with tripwire dispensers and a central fuzing system. Surrounding the fuzing system is the main charge of TNT. Once dispensed from the delivery system, the landmine is armed and various components are ejected. After landing six spring-loaded metal fins bring the landmine into an upright position. After a few seconds, the top is blown off allowing the release of 4 spring-loaded spools of plastic tripwire. The tripwires are attached to an arm of the striker release mechanism. Tripping a wire rotates the arm and the spring-loaded striker releases onto the central stab-sensitive detonator assembly. Only 300g of force is required to release the mechanism.

VS-50 Italian Anti-Personnel Blast Mine





Tiers:



Variants:

- **VS-50 EO3:** version fitted with an electronic anti-handling device.
- **SPM-1:** copy produced under licence in Singapore.
- **YM-IB:** copy produced by Iran
- **T/79:** copy produced by Egypt

System

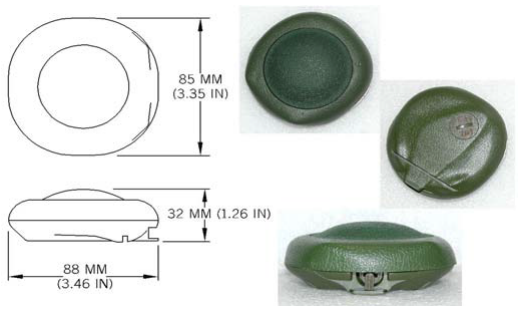
Country of Manufacture: Italy Singapore (SPM-1) Egypt (T/79)
# of User Countries: 14+
Emplacement Method: manual remote surface
Diameter: mm90
Height: mm45
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mlimited
Detectability/ Composition: Plastic difficult
Anti-Handling: yes, the VS-50AR variant
Fuze Type/Self Neutralize: pressure-10 kg self neutral: no
Explosive Type & Weight/Total Weight (kg): kgTNT: .075 Total: .185
Comment: Designed to be scattered from helicopters. Countermeasure blast (fuel- air-explosive line charge)-resistant. Underwater 1 meter
Operating Pressure: kg10

Notes:

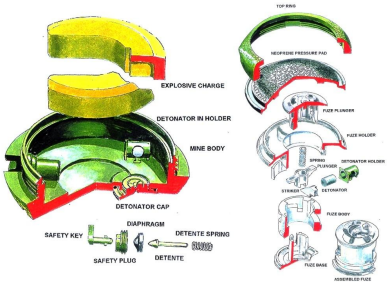
The VS-50 is a circular plastic cased anti-personnel blast mine, formerly manufactured by the now-defunct Valsella Meccanotecnica SpA, an Italian high-tech defence industry specialized in area denial systems which was also the manufacturer of the Valmara 69 and one of the first industries in the world to implement plastic construction for landmines. The design is similar to the TS-50 and VS-MK2 mine. It is blast resistant and can be used in a minimum metal configuration. Though unlikely to kill, the explosive charge contained within a VS-50 is quite sufficient to destroy the victim's foot: the blast is capable of penetrating 5 mm of mild steel leaving an 80 mm-diameter hole. The mine consists of three sections, a bottom section containing the main explosive charge, a middle section which contains the fuze and safety/arming mechanism, and the top section which consists of a neoprene pressure pad. The neoprene pressure pad is sometimes reinforced with an 18 gram mild steel plate, which makes the mine detectable by metal detectors. However, the majority of VS-50s were manufactured as

minimal metal mines and are therefore much harder to detect. The case is waterproof and can be used in water up to one metre deep. The mine can be deployed by helicopters or ground vehicles or laid by hand. A sustained downward force of approximately ten kilograms on the pressure plate for a minimum of 0.10 seconds compresses the firing spring and cocks the striker. Continuous downward movement allows the trigger assembly to pivot, slowly forcing the air out of an anti-shock bladder and flips the striker down into the stab sensitive M41 detonator, at which point the mine explodes. The air pressure delay mechanism effectively blocks detonation if the force on the pressure plate is of short duration, because air does not have enough time to leave the small anti-shock bladder. This has two direct applications, it allows the mine to be dropped from helicopter mine scattering systems, and it dramatically increases the mine's resistance to explosive-based mine clearance techniques. It can therefore be regarded as a blast resistant mine.

SB-33 Italian Anti-Personnel Mine







Tiers:

1 2 **3** 4

Variants:

- **EM-20:** a Greek copy of the mine.
- **M/412:** a Portuguese copy of the mine.
- **P-5:** a Spanish copy of the mine produced under license. It is no longer in service with Spain, and all but 4,000 of the mines have been destroyed.

System

Country of Manufacture: Italy, Spain, Greece (EM-20), Portugal (M412)
# of User Countries: 10+
Emplacement Method: manual, scatterable
Length: mm85
Width: mm85
Height: mm30
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: contact
Detectability/ Composition: Plastic difficult w/handheld detectors
Anti-Handling: yes: antihandling SB-33/AR
Fuze Type/Self Neutralize: pressure 10 kg
Explosive Type & Weight/Total Weight (kg): kgRDX: .35 Total: .140
Operating Pressure: kg8
Comment: Countermeasure blast (fuel air/explosive line charge) resistant.

Notes:

The SB-33 is a small Italian minimum metal blast type anti-personnel mine formerly manufactured by Misar, that entered service in 1977. The SB-33 can be emplaced by hand or scattered using the helicopter mounted SY-AT system. The body of the mine is made of two glass reinforced polycarbonate halves, with the top surface having a central neoprene pressure pad. The body has an irregular shape to make the mine harder to distinguish on the ground. To arm an SB-33, a small pin is removed from the side of the mine. After the mine has been armed, gradual pressure on the pressure plate (i.e. when the victim steps on it) rotates a locking collar until the striker is released, which flips into a stab-detonator and the mine explodes. However, sudden pressure (e.g. from a mine-clearing charge) causes the striker to lock the rotating collar in position for the duration of the pressure, preventing the mine from detonating. The combination of low metal content and resistance to overpressure make

the mine extremely difficult to remove. Another version of the SB-33 called the SB-33AR (AR standing for Anti-Rimozione, "Counter-Removal") exists. It looks identical to the standard SB-33 mine. However, the SB-33AR has an integral anti-handling device specifically designed to injure deminers. The anti-handling device in an SB-33AR consists of a mercury tilt switch and battery connected to the detonator. When an SB-33AR is moved a few degrees from the horizontal (i.e. when a deminer lifts it), it detonates, blowing the victim's hand off. Generally, a small number of SB-33AR landmines would be sown inside a minefield containing standard SB-33 mines in order to hinder and deter any attempt to conduct demining operations. Copies of the mine were produced in several countries and the mine was in service with the Netherlands, Spain, Greece and Argentina. This mine is no longer produced and Italy has destroyed all operational stocks and any associated machinery required for its manufacture. However, uncleared minefields containing SB-33 mines do exist e.g. in Afghanistan, Djibouti, the Falkland Islands, Iran, Iraq, Kurdistan, and the Western Sahara.

Mle 1951 (MI AP ID 51) French Anti-Personnel Blast Mine



Tiers:



System

Country of Manufacture: France
# of User Countries: 1
Emplacement Method: manual
Diameter: mm70
Height: mm52
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mlimited
Detectability/ Composition: very difficult plastic-no metal content
Anti-Handling: possible no 2nd fuze well self-neutralize: no
Fuze Type/Self Neutralize: pressure (14 to 24 kg)
Explosive Type & Weight/Total Weight (kg): kgPETN: .051 Total: .09
Operating Pressure: kg5
Comment: waterproof

Notes:

The Mle 1951 (Model 1951) or MI AP ID 51 is a small circular French brown plastic cased minimum metal mine anti-personnel blast mine. The mine uses a pressure fuze that works by driving a firing pin through a friction sensitive compound (a mixture of Red Phosphorus and glass). The mines safety is a small cap that sits over the pressure fuze and prevents it being pressed. The mine can be used with anti-handling devices. The mines was in service with the French Army and was used in Algeria. It was superseded by the Mle 1955 mine (MI AP DV 59)

OZM-4 Russian Anti-Personnel Mine







Tiers:

1 2 3 **4**

System

Country of Manufacture: FSU
# of User Countries: 19+
Emplacement Method: manual
Diameter: 75
Height: mm120
Weight: kg5.4
Armor Penetration / Kill Mechanism: bounding fragmentation
Casing Material: Cast Iron
Fragmentation Charge (TNT): grams170
Length of the sensor target (one-way): m13
Sensor sensitivity: 1–17 kg
Radius of guaranteed lethal destruction: m13
Temperature usage range: -60 to +60 Degrees Celsius

Notes:

The OZM-3, OZM-4 and OZM-72 are Soviet manufactured bounding type anti-personnel mines. (fragmentation-barrier mine , in the Russian and other post-Soviet armies as informally called "frog mine" or "witch") They are normally painted olive green, and issued with a spool of tripwires and two green painted wooden or metal stakes for affixing the tripwires. Both OZM-3 and OZM-4 have cast iron fragmenting bodies while the OZM-72 also contains preformed steel fragments, and all three are issued with empty fuze wells, so a variety of fuzing options are possible. The mines can be activated by a variety of fuzes, including electronic fuzes or command initiation, although they are most commonly fitted with an MUV booby trap switch which is activated by a tripwire. On firing, a metal base plate remains in the ground, while the mine body is thrown up by a small lifting charge, but remains attached to a strong wire tether. When the end of the tether is reached at a height of approximately 0.5 m, the main charge explodes and scatters fragments of the casing across a wide area. OZM mine may sometimes be laid directly on top of an MS-3 mine. The MS-3 is an anti-handling device which closely resembles a PMN mine, except that it has a "blister" on top and operates purely as a pressure-release boobytrap. Lifting an OZM mine (without rendering safe the MS-3 placed underneath) will trigger detonation.

PMN-4 Russian Anti-Personnel Mine





Tiers:



Variants:

- **PMN-1:** The design of the PMN-1 mine dates from the late 1950s. It is particularly deadly because it contains an unusually large explosive filling when compared to most other anti-personnel landmines. For comparison, most anti-personnel blast mines (e.g. the VS-50) contain around 50 grams of high explosive, which typically destroys all or part of a victim's foot. In marked contrast, a PMN-1 contains 249 grams of explosive which can easily destroy a victim's entire leg (frequently requiring amputation high above the knee) in addition to inflicting severe injuries on the adjacent limb, which may also require some form of amputation due to blast injury. The majority of anti-personnel mine victims (e.g. those who step on an M14 mine containing 29 grams of explosive) have a very high probability of survival, though inevitably they suffer permanent disability regarding their gait. However, the amount of explosive inside a PMN-1 mine is so large that the risk of victims dying is significantly greater and, assuming that they survive their injuries, the degree of disability inflicted is much more severe. These mines are palm sized and cylindrical in shape. The PMN-1 has a bakelite case (brown or black in colour) with a black rubber pressure-plate and contains TNT explosive.
- **PMN-2:** The PMN-2 mine casing is made from injection-molded plastic. In general, the color is leaf-green, but occasionally brown examples may be encountered. The top of the mine has a black rubber X-shaped pressure plate. The filling is an RDX/TNT based explosive that is quite similar to Composition B. As with the PMN-1, the PMN-2 has an unusually large explosive filling when compared to many other anti-personnel landmines.

System

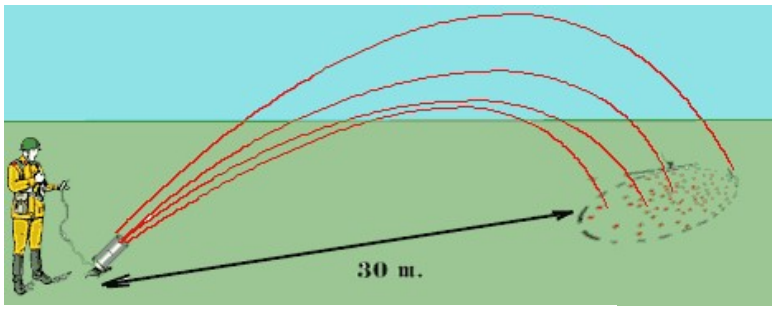
Country of Manufacturer: FSU China Iraq
# of User Countries: 35+
Emplacement Method: manual, chute
Diameter: mm95
Height (mm): mm46
Armor Penetration (mm)/ Kill Mechanism: blast
Explosive Charge Weight: grams55
Total Weight: grams300

Notes:

The PMN (Rus.противопехотная мина нажимная (En: Antipersonnel pressure mine)) series of blast anti-personnel mines were designed and manufactured in the Soviet Union. They are one of the most widely used and commonly found devices during demining operations. The PMN-4 is a delay-armed, pressure-fired blast-mine. The pressure-plate is black and the body is reddish-brown or khaki. The black rubber pressure-plate has a plastic pressure "spider" concealed underneath, shaped like flower-petals. The diameter of the mine is 95mm and the height is 46mm. The explosive charge weight is 55 grams. This comprises 52 grams of 'TG-40' (a 40/60 TNT/RDX mixture) plus a 3 gram pentolite booster. The total weight of the mine is 300 grams. PMN-4 mines contain a significant amount of metal components, so they are readily detectable with a mine detector. Details of the fuze mechanism are scarce, though given that the PMN-4 was designed during the early 1980s, it is logical to

assume that the fuze is more sophisticated and/or reliable than the fuze in the PMN-2 (a mid-1970s design) to compensate for having a smaller explosive filling with significantly reduced destructive power. Similarly, the PMN-4 is almost certainly a blast resistant mine due to the design of the flower-shaped pressure "spider" under the pressure-plate.[2] Cross-sectional diagrams of the PMN-4 showing its components support the view that the PMN-4 is a more sophisticated design then the PMN-2.Examples of the PMN-4 have been encountered in Ukraine and Southern Syria.

PMK-1 Russian Portable Mining Kit



PKM-1 Portable Mining Kit ["Veter-M"



Tiers:



System

Alternate Designation: PKM-1
Date of Introduction: INA
Type: Portable Mining Kit
Manufacturer: INA
Proliferation: INA
In Service: INA
Crew: 1
Kit: The kit is composed of a primitive baseplate, a PM-4 demolitions devce, 2 cable lengths (50 meters each) and a bag.

Dimensions

Length: INA
Diameter: INA
Height: INA
Weight: 2.6 kg

Main Weapon System

↳*Launcher*

Base Plate: The baseplate is a small sheet of metal with a launch base attached to it at 45 degrees and equipped with an electric contact. Attached to this will be containers with anti-tank or AP mines for firing.
Operation: The principle of operation is simple: once the mine casing is attached, the metal contacts are linked

between the baseplate and the casing. Once an electric signal is sent from the demolitions device or other current source, a powder charge is ignited in the casing, and the mines are thrown out to 30-35 meters.

Maximum Range: 35 km

↳ ***Mines***

KSF-1 Case: The KSF-1 case holds 72 PFM-1 mines.

KSF-1S-0.5: The KSF-1S-0.5 holds 36 PFM-1 and 36 PFM-1S mines.

KSF-1S: The KSF-1S hold 64 PFM-1S mines.

KSO-1: The KSO-1 holds 8 POM-1 AP mines

KPOM-1: The KPOM-1 holds 4 POM-2 AP mines

KPTM-3: The KPTM-3 holds 1 PTM-3 AT mine

KPTM-1: The KPTM-1 holds 3 PTM-1 AT mines.

Notes:

The PKM-1 portable mining kit is the simplest remote mining system available to combined arms units. It can be used by infantry and armor personnel to install anti-infantry and anti-tank landmines before their front lines, both ahead of time and in direct combat. This improves the tactical options available to combined arms units. The kit is composed of a primitive baseplate, a PM-4 demolitions devce, 2 cable lengths (50 meters each) and a bag. Total weight is 2.6 kilograms. The baseplate is a small sheet of metal with a launch base attached to it at 45 degrees and equipped with an electric contact. Attached to this will be containers with anti-tank or AP mines for firing. The principle of operation is simple: once the mine casing is attached, the metal contacts are linked between the baseplate and the casing. Once an electric signal is sent from the demolitions device or other current source, a powder charge is ignited in the casing, and the mines are thrown out to 30-35 meters. The different types of cases differ only in their markings. Their size is identical. The KSF-1 case holds 72 PFM-1 mines. The KSF-1S-0.5 holds 36 PFM-1 and 36 PFM-1S mines. The KSF-1S hold 64 PFM-1S mines. The KSO-1 holds 8 POM-1 AP mines The KPOM-1 holds 4 POM-2 AP mines The KPTM-3 holds 1 PTM-3 AT mine The KPTM-1 holds 3 PTM-1 AT mines. The mines are thrown out to form an ellipse. For example a KSF-1 or KSO-1 case form an ellipse 8-10 meters wide and 18-20 meters long. PFM mines fall about 0.6-2 meters from each other, allowing for a 30-50% chance of striking. POM mines fall at 1.5-7 meters from each other, but their cables stretch out to 2 meters and enable a 70% chance of striking. AT mines are thrown out to a distance of 100 meters and form an ellipse of a similar size. Given how AT minefields permit a gap of 9-12 meters between mines, the methods of installing AT minefields and AP minefields are similar. A one-line minefield can be installed by moving along a trench and launching one charge every 8-10 meters, or by simultaneous launch from a row of PKM devices. This can also be done by a centralized control panel linked to any number of devices Multiple-layer minefields can be installed by moving the launch line backwards after every launch. At minimum it must be moved back 30 meters to avoid the minefields overlapping. Density can be improved by firing 2-3 or more casings from a given location. The value of the system is its simplicity. It allows mining from concealment and installing minefields by surprise, at any time and any place.

M14 (Toepopper) American Anti-Personnel Mine







Tiers:



System

Country of Manufacture: US India (M-14) Vietnam (MN-79 & MD 82B)

# of User Countries: 20+

Emplacement Method: manual

Diameter: 56

Height: mm40

Armor Penetration (mm)/ Kill Mechanism: blast

Effective Range (meter): m1 contact

Detectability/ Composition: very difficult with hand-held detector plastic body (only metal is steel striker tip)

Anti-Handling: possible

Fuze Type/Self Neutralize: pressure (9-16 kg)

Explosive Type & Weight/Total Weight (kg): kgTNT: .029 Total: 1

Operating Pressure: 9 to 16 kilograms

Notes:

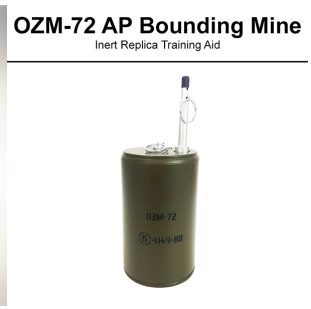
The M14 mine "Toepopper" is a small (56 mm [2.2 in] diameter) anti-personnel land mine first deployed by the United States circa 1955.[1] The M14 mechanism uses a belleville spring to flip a firing pin downwards into a stab detonator when pressure is applied. Once deployed, the M14 is very difficult to detect because it is a minimum metal mine, i.e. most of its components are plastic. Because of this, the design was later modified to ease mine clearance via the addition of a steel washer, glued onto the base of the mine. In order to activate the M14, the base plug is removed and discarded and an M46 stab detonator is screwed into the base of the mine. Then the mine is placed into a shallow hole in the ground (flush with the surface) and the pressure plate is carefully rotated from its safety position to the armed position using the special arming spanner supplied in each crate of mines. Finally, the U-shaped metal safety clip is removed from the pressure plate by pulling on the attached cord. At this point, the mine is fully armed. When deployed by the USA, M14s are often laid together with other mines in their inventory i.e. the M16, M15 or M19. In a "mixed minefield" the anti-tank mines protect anti-personnel mines and vice versa. Similarly, M14s can be laid among other mine-types manufactured by different nations e.g. alongside the PMA-2, VS-50, Valmara 69 or TM-62. The top of an M14 has a simple arming indicator (an arrow embossed on the pressure plate) which can point to either A(rmed) or S(afe), giving a clear indication of its status. When the arrow points to "A", the M14 will detonate if stepped on. Disarming the M14 requires the arming steps to be performed in reverse. However, due to the possibility of a booby trap or some other type of anti-handling device being fitted underneath, it is often standard demining practice to destroy land mines in situ, without attempting to remove and disarm them. The M14 has not been in active US service since 1974. However, as of 2010 the United States retains a stockpile of 1.5 million mines held in reserve for emergency use on the Korean peninsula, because they are regarded as reliable and effective weapons. This mine has been widely exported and used by various countries, so uncleared minefields containing M14s do exist. The M14 has been found in Angola, Cambodia, Chad, Chile, El Salvador, Eritrea,

Ethiopia, Cyprus, Iran, Iraq, Jordan, Laos, Lebanon, Malawi, Mozambique, Somalia, Vietnam and Zambia. Additionally, copies of the M14 design have been manufactured locally by countries such as India and Vietnam. There are indications that as of 2008, an unlicensed copy of the M14 landmine was being manufactured in Burma by Myanmar Defense Products Industries at Ngyaung Chay Dauk, in Bago Division. The mine is extensively used by the local Burmese Army. Just as with the VS-MK2 (33 gram explosive charge), SB-33 (35 gram charge) or PMA-3 (35 gram charge), the 29 grams of high explosive in an M14 mine is quite small because it is specifically designed to disable victims, not kill them. Although the blast wound from an M14 is unlikely to be fatal (assuming that prompt emergency medical care is provided) it usually destroys a significant part of the victim's foot, thereby leading to some form of permanent disability regarding their gait. The fact that the explosive charge in an M14 is slightly cone shaped (like a shaped charge) focuses most of the blast upwards, increasing its destructive effects. In situations where M14 victims are barefoot or wearing sandals (e.g. in Burma), the wounds are more severe. Due to the relative simplicity of the firing mechanism, the M14 mine is not resistant to blast-clearing methods, unlike more modern antipersonnel mine designs such as the TS-50 mine.

OZM-72 Russian Anti-Personnel Mine







Tiers:



System

Country of Manufacture: FSU
# of User Countries: 19+
Emplacement Method: manual
Diameter: mm108
Height: mm172
Weight: kg5
Armor Penetration / Kill Mechanism: bounding fragmentation
Casing Material: Cast Iron
Fragmentation Charge (TNT): grams660
Sensor Sensitivity: 1–17 kg
Radius of guaranteed lethal destruction: m25
Temperature usage range: -60 to +70 Degrees Celsius
Number of preformed steel fragments: 2400 pcs.

Notes:

The OZM-3, OZM-4 and OZM-72 are Soviet manufactured bounding type anti-personnel mines. (fragmentation-barrier mine , in the Russian and other post-Soviet armies as informally called "frog mine" or "witch") They are normally painted olive green, and issued with a spool of tripwires and two green painted wooden or metal stakes for affixing the tripwires. Both OZM-3 and OZM-4 have cast iron fragmenting bodies while the OZM-72 also contains preformed steel fragments, and all three are issued with empty fuze wells, so a variety of fuzing options are possible. The mines can be activated by a variety of fuzes, including electronic fuzes or command initiation, although they are most commonly fitted with an MUV booby trap switch which is activated by a tripwire. On firing, a metal base plate remains in the ground, while the mine body is thrown up by a small lifting charge, but remains attached to a strong wire tether. When the end of the tether is reached at a height of approximately 0.5 m, the main charge explodes and scatters fragments of the casing across a wide area. OZM mine may sometimes be laid directly on top of an MS-3 mine. The MS-3 is an anti-handling device which closely resembles a PMN mine, except that it has a "blister" on top and operates purely as a pressure-release boobytrap. Lifting an OZM mine (without rendering safe the MS-3 placed underneath) will trigger detonation.

POMZ-2M Russian Anti-Personnel Mine





Tiers:



System

Country of Manufacture: FSU China (Type 59) North Korea Germany
# of User Countries: 33+
Emplacement Method: stake mine manual
Length: mm107
Height: mm60
Armor Penetration (mm)/ Kill Mechanism: fragmentation
Effective Range: mMax: 8 Min: 0
Detectability/ Composition: visual, detection cast iron
Anti-Handling: possible
Fuze Type/Self Neutralize: tripwire (1 kg force) self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: 75 Total: 1.7
Comment: Normally emplaced on stake 30 cm above ground. Fuze delay arm Underwater: no

Notes:

The POMZ-2M is a stake-mounted anti-personnel fragmentation mine made in the former Soviet Union. The body of the mine is a cast-iron thick-walled tube with five rows of cast fragmentation "chunks". This is usually mounted on a short wooden stake. Because the mine is easy to copy, dimensions and colour may vary. The body of the mine is usually painted olive green. The wooden stakes may be green, brown or unpainted. The POMZ-2M has a threaded hole in the top into which its fuze is screwed. The mine has been copied in many countries.

M18A1 Claymore American Anti-Personnel Mine







Tiers:



Variants:

- **M68 Inert Training Kit:** The M68 kit is designed to familiarize personnel with the placement and arming of a real M18 directional mine. It comes with all the components of a real Claymore kit packed in an M7 bandoleer. The light blue or black plastic M33 Inert Anti-Personnel Mine is the training and practice version of the M18A1 Claymore. Some inert mines were green with a light blue band. It does not contain an explosive or pyrotechnic filler of any kind. It is packed in a Claymore bag with inert M10 simulated detonator cap wire, an M57 "clacker" firing control, and an M40 circuit test kit.
- **Mini-Multi-Purpose Infantry Munition:** In early 2015, the U.S. Army began testing a smaller version of the Claymore called the Mini-Multi-Purpose Infantry Munition (M-MPIMS). It weighs 2 lb (0.91 kg) and has a 50 m (160 ft) effective range, similar to the full-size Claymore. At its optimized range of 30 m (98 ft), the fragmentation zone is 23 m (75 ft) wide and 2 m (6.6 ft) high, with a minimum of five hits per 1 m2 (11 sq ft). It has the surface space of an average smartphone and includes a Picatinny rail for camera, laser, or other attachments. The M-MPIMS is designed to be more controllable than the Claymore with less collateral damage, using an insensitive munitions explosive that is poured rather than packed for more uniform distribution results in more consistent blast pattern. Rear-safety distance has been decreased to 15 m (49 ft) and shelf life has been increased to 25 years.[

System

Country of Manufacture: US South Korea (K440) Pakistan (P5 Mark I) Iran Chile S. Africa (No.2) FSU (MON-50)
Introduction: 1960
# of User Countries: 22+
Emplacement Method: manual
Length: mm216
Width: mm35
Height: mm83
Armor Penetration (mm)/ Kill Mechanism: directional steel fragments
Effective Range (meter): m50
Maximum Firing Range: m250
Detectability/ Composition: visual plastic case (fiberglass)
Anti-Handling: possible
Fuze Type/Self Neutralize: electric command, tripwire, tension, tension release
Explosive Type & Weight/Total Weight (kg): kgC4: .68 Total: 1.60
Sights: Peep sight on early models, later a knife edge sight

Filling: C-4

Detonation Mechansim: Blasting Cap Assembly M4

Muzzle Velocity: m/s1,218

Notes:

The M18A1 Claymore is a directional anti-personnel mine developed for the United States Armed Forces. Its inventor, Norman MacLeod, named the mine after a large medieval Scottish sword. Unlike a conventional land mine, the Claymore is command-detonated and directional, meaning it is fired by remote-control and shoots a pattern of metal balls into the kill zone like a shotgun. The Claymore can also be victim-activated by booby-trapping it with a tripwire firing system for use in area denial operations. The Claymore fires steel balls, out to about 100 m (110 yd) within a 60° arc in front of the device. It is used primarily in ambushes and as an anti-infiltration device against enemy infantry. It is also used against unarmored vehicles. Many countries have developed and used mines like the Claymore. Examples include former Soviet Union models MON-50, MON-90, MON-100, and MON-200, as well as MRUD (Serbia), MAPED F1 (France), and Mini MS-803 (South Africa). The M18A1 Claymore mine has a horizontally convex gray-green plastic case (inert training versions are light blue or green with a light blue band). The shape was developed through experimentation to deliver the optimum distribution of fragments at 50 m (55 yd) range. The case has the words "FRONT TOWARD ENEMY" embossed on the front of the mine. A simple open sight on the top surface allows for aiming the mine. Two pairs of scissor legs attached to the bottom support the mine and allow it to be aimed vertically. On both sides of the sight are fuse wells set at 45 degrees. Internally the mine contains a layer of C-4 explosive behind a matrix of about seven hundred 1⁄8-inch-diameter (3.2 mm) steel balls set into an epoxy resin. When the M18A1 is detonated, the explosion drives the matrix forward, out of the mine at a velocity of 1,200 m/s (3,937 ft/s),[1] at the same time breaking it into individual fragments. The steel balls are projected in a 60° fan-shaped pattern that is 6.5 feet (2.0 m) high and 50 m (55 yd) wide at a range of 50 m (55 yd). The force of the explosion deforms the relatively soft steel balls into a shape similar to a .22 rimfire projectile.[1] These fragments are moderately effective up to a range of 100 m (110 yd), with a hit probability of around 10% on a prone man-sized 1.3-square-foot (0.12 m2) target. The fragments can travel up to 250 m (270 yd). The optimum effective range is 50 m (55 yd), at which the optimal balance is achieved between lethality and area coverage, with a hit probability of 30% on a man-sized target. The weapon and all its accessories are carried in an M7 bandolier ("Claymore bag"). The mine is detonated as the enemy personnel approaches the killing zone. Controlled detonation may be accomplished by use of either an electrical or non-electrical firing system. When mines are employed in the controlled role, they are treated as individual weapons and are reported in the unit fire plan. They are not reported as mines; however, the emplacing unit must ensure that the mines are removed, detonated, or turned over to a relieving unit. The 100-foot (30 m) M4 electric firing wire on a green plastic spool is provided in each bandoleer. The M57 firing device (colloquially referred to as the "clacker") is included with each mine. An M40 circuit test set is packed in each case of six mines. When the mines are daisy-chained together, one firing device can detonate several mines. The mine can be detonated by any mechanism that activates the blasting cap. There are field-expedient methods of detonating the mine by tripwire, or by a timer, but these are rarely used.

→→Anti-Tank Landmines

PRB M3/PRB M3A1 Belgian Anti-Tank Blast Mine





Tiers:



System

Country of Manufacture: Belgium
Emplacement Method: manual
Length: mm230
Width: mm230
Height: mm130
Armor Penetration/ Kill Mechanism: blast
Effective Range: m1
Detectability/ Composition: very difficult with hand held detectors plastic
Anti-Handling: yes two secondary fuze wells
Fuze Type/Self Neutralize: pressure (250 kg)
Explosive Type & Weight/Total Weight (kg): RDX/TNT 6.5 Total: 6.8
Comment: aka PRB ATK-M3, waterproof
Operating Pressure: kg250

Notes:

The PRB M3 and PRB M3A1 are plastic cased minimum metal anti-tank blast mine produced by the Belgian company Poudreries Réunies de Belgique in the 1970s and 1980s. The mine is square with an olive drab body[2] constructed from polythene with a webbing carrying handle on the side and an ammonia-free bakelite seating for the pressure plate to be screwed into.The fuze well is in the centre of the seating, with the pressure plate screwed into it after the fuze has been inserted. The cylindrical pressure plate consists of two plastic plates, one of which moves under the weight of a vehicle driving over the mine to transmit the force to the fuze,[2] shearing pins which hold it in place. The PRB M3A1 variant has two secondary fuze wells, and is often deployed with a M30 anti-lift device. The M30 fuze detonates the mine if it is lifted more than 3 cm. It is also a minimum metal mine, with the only metal components being two spring steel wire strikers and two aluminium percussion caps. Both versions of the mine are waterproof when new, and can be laid in shallow water, but the mine casing often splits and warps in hot climates, although small splits do not affect the mine's performance.[3] The mines are prone to sympathetic detonation if laid closer together than 2 m. The mine is found in Angola, Chad, Eritrea, Ethiopia, Iraq, Lebanon, Libya, Mali, Rwanda, Somalia, Sudan, the Western Sahara, and Zambia. In April 2011 it was reported that the rebel forces in the 2011 Libyan civil war were deploying these mines, in contravention of earlier promises not to use land mines. The Libyan National Transitional Council subsequently issued a communique promising to stop using anti-personnel and anti-vehicle landmines, and that their forces will be requested to destroy all stocks of landmines.

PT-Mi-Ba-III Czechoslovakian Anti-Tank Blast Mine







Tiers:



System

Emplacement Method: manual, mechanical, chute
Diameter: mm330
Height: mm101
Armor Penetration (mm)/ Kill Mechanism: blast defeats known belly armor
Effective Range (meter): 1
Detectability/ Composition: plastic/bakelite (metal in fuze only-2.9 gr)
Anti-Handling: yes with RO-4 fuze
Fuze Type/Self Neutralize: pressure (200 kg) self-destruct or neutral: no
Explosive Type & Weight/Total Weight (kg): kgTNT 7.2 Total: 9.9

Notes:

The PT Mi-Ba-III is a large Bakelite cased circular Czechoslovakian anti-tank blast mine. It is no longer produced but it is found in Angola, Kuwait, Mozambique, and Namibia. A Bulgarian copy of the mine, the PMT-BA-III exists.

TMA-3 Yugoslavian Anti-Tank Blast Mine







Tiers:

1 2 3 **4**

System

Country of Manufacture: Former Yugoslavia
Emplacement Method: manual, mechanical
Diameter: mm262
Height: mm140 w/fuze 100 w/o fuze
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range (meter): m1
Detectability/ Composition: very difficult with hand held detectors, plastic coating
Anti-Handling: Yes
Fuze Type/Self Neutralize: pressure (180 kg) self-destruct or neutral: no
Explosive Type & Weight/Total Weight (kg): kgcast TNT 6.5 Total: 7.0
Operating Pressure: kg180

Notes:

The TMA-3 is a circular Yugoslavian minimum metal anti-tank blast mine. It is very similar in appearance to the TMA-4. The mine consists of a cast circular block of explosive cased in resin reinforced fabric. The top of the mine has three fuze wells which each take a UTMA-3 fuze, and a fourth secondary fuze well is provided in the base of the mine to fit an anti-handling device. The fuze wells may also accept a number of other fuzes, including the UPROM-1, and other fuzes, potentially allowing tripwire activation. The small pressure plate area of the UTMA-3 fuzes gives the mine good resistance to minefield clearance techniques which used blast overpressure techniques i.e. explosive charges. The mine is found in Albania, Angola, Bosnia, Croatia, Kosovo, Lebanon, and Namibia.

TMD-B Russian Anti-Tank Blast Mine







Tiers:

1 2 3 4

System

Emplacement Method: manual
Length: mm315
Width: mm290
Height: mm160
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range (meter): 1
Detectability/ Composition: difficult with hand held detectors - wood
Anti-Handling: Possible
Fuze Type/Self Neutralize: pressure (200-500 kg) self-destruct or neutral: no
Explosive Type & Weight/Total Weight (kg): TNT 9.0 kg Total: 9.7

Notes:

The TMD-44 and TMD-B are simple rectangular Soviet wooden box cased anti-tank blast mines, they were both used during the Second World War. Both mines are similar in design, differing only in fuzing mechanism. The wooden construction of both the mines makes them unpredictable as rot and insects can eat away the wooden case, reducing activation pressure to as little as 3 kg. Both mines are found in a number of countries including Afghanistan, Angola, Chad, Cuba, Egypt, Korea, Mozambique, Namibia, Rwanda, Yemen, Zambia, and Zimbabwe. he TMD-B was developed before the start of the Second World War and is simply a wooden box filled with explosives, there are three raised boards on the top of the box, the central one being hinged. The central hinged board is locked into place by a strip of wood inserted into a groove that runs along the edge of all three boards. When enough pressure is applied to the top of the mine the boards collapse onto the plunger of the MV-5 detonator, triggering the mine. A fabric carrying handle is typically fixed to one side of the mine. It was normally painted olive green, gray or white. One problem with the mine was that when it got wet the hinged board would tend to swell making it difficult to disarm the mine, this issue was addressed in the TMD-44 mine. The mine has been copied by a number of other countries, including the Chinese Model 1951, the North Korean ATM-72, and the Yugoslavian TDM-1 and TMD-2.

DM-11 German Anti-Tank Blast Mine





Tiers:



System

Country of Manufacture: Germany Sweden (LI-II)
Emplacement Method: manual
Diameter: mm82
Height: mm34
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mlimited (typical for contact-fuzed blast-effect mines)
Detectability/ Composition: very difficult plastic
Anti-Handling: possible. no 2nd fuze well
Fuze Type/Self Neutralize: pressure (5 kg)
Explosive Type & Weight/Total Weight (kg): kgTNT: 0.12 Total: 0.23
Comment: waterproof

Notes:

The DM-11 is a German anti-tank mine popular in countries of Africa, not suited to be disarmed or neutralized

PT-Mi-Ba II Czechoslovakian Anti-Tank Blast Mine



Tiers:

1 2 3 4

System

Country of Manufacture: Czech
Emplacement Method: manual
Length: mm397
Width: mm230
Height: mm135
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: m1
Detectability/ Composition: difficult plastic or metal
Anti-Handling: probable-1 or 2 fuzes. Any disturbance detonates the mine after it has been emplaced.
Fuze Type/Self Neutralize: Pressure (200 to 450 kg)
Explosive Type & Weight/Total Weight (kg): kgRO-7-II: 6.44 Total: 10.2
Operating Pressure: 200 to 450 kg

Notes:

The PT Mi-Ba-II is a large Bakerlite cased Czechoslovakian anti-tank blast mine. The mine is unusual in that it has two plunger fuses instead of a pressure plate. The plunger fuses give the mine resistance to overpressure, also the plastic body makes it difficult to detect. The mine is no longer produced, and it is found in Africa.

M15 American Anti-Tank Blast Mine



Tiers:



System

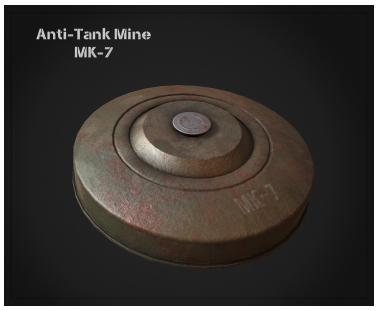
Emplacement Method: manual
Diameter: mm334
Height: mm150
Weight: kg14.3
Armor Penetration / Kill Mechanism: blast
Effective Range: m0, typical with contact mine
Detectability/ Composition: Easy Metal
Anti-Handling: yes 3 fuze wells
Fuze Type/Self Neutralize: pressure (159-340 kg) tilt-rod
Explosive Type & Weight/Total Weight (kg): COMP B 10.3 Total: 14.27
Operating Pressure: 160 to 340 kg (for the M603 pressure fuze)

Notes:

The M15 mine is a large circular United States anti-tank blast mine, first deployed during the Korean War. Essentially, it is a larger version of the M6A2 anti-tank mine, which it replaced. Although the M15 has been superseded by the M19 mine (a plastic-cased minimum metal mine of more modern design), the U.S. retains large stocks of M15s because they are still regarded as reliable and effective weapons. When used against main battle tanks the M15 is primarily a "track-breaker" which creates mobility kills, but has a comparatively small likelihood of causing crew fatalities. However, when used against lighter vehicles such as APCs or unarmored vehicles such as trucks the damage inflicted is much more severe. The mine consists of a large, circular rounded steel case, with a central pressure plate. In the center of the pressure plate is the M4 arming plug, which has an arming lever which can be set to "ARMED" or "SAFE". The pressure plate sits on top of a belleville spring, which in turn rests directly over the M603 fuze. When sufficient downward pressure is applied to the pressure plate (i.e. when a vehicle drives over it) the concertina spring is compressed. This action transfers pressure onto the M603 fuze which fires, triggering detonation. Because this mine has a metallic case, it is very easy to find it using even the most basic mine detector. However, a complicating factor is posed by the two secondary fuze wells. These enable anti-handling devices to be fitted: one on the side of the mine and one underneath. Additionally, a minefield containing M15 mines may also contain a number of minimum metal M19 mines, plus various antipersonnel mines of different types (e.g. the VS-MK2, SB-33, TS-50, PMA-2 or PMA-3), all of which are specifically designed to be difficult to find using metal mine detectors. The M15 mine was originally intended to be fitted with the M600 single-impulse fuze, which contained a glass ampoule of liquid explosive. Unfortunately, the M600 fuze was sensitive to temperature variations and therefore unreliable. For example, freezing temperatures made the mine inert as the liquid froze, whereas temperatures above 50 degrees Celsius could cause the fuze to detonate spontaneously. Just as problematic was the fact that M600 fuzes were inherently unstable, making them dangerous to handle, particularly after having been kept in storage for some time. Because of these shortcomings, the M600 chemical fuze was removed from service around 1953[1] and replaced by the M603 single-impulse fuze, which used a mechanical trigger mechanism i.e. a belleville spring. The

M603 fuze is inherently safe to handle and much more reliable. In addition to the standard M603 fuze, two additional fuzes are available: the M624 tilt-rod fuze (which offers full-width attack capability) and the M608 double-impulse fuze. The M624 fuze requires 3.75 pounds of pressure to move the tilt rod, and once it exceeds 20 degrees of tilt the mine will detonate. The M608 double-impulse fuze will not detonate the mine when the first tank drives over it: instead, it simply arms itself so that the mine detonates when the second vehicle (e.g. an APC or perhaps a truck towing a howitzer) following in the tracks of the first tank drives over it – an event which might occur seconds, hours or even weeks later. The M608 double-impulse fuze is particularly useful when fitted to mines located on the outer edges of minefields, because this gives tanks a false sense of security. The lead tank, for instance, can drive over 30 mines fitted with double-impulse fuzes without detonating any of them. This lures tanks deep into the minefield, where they eventually trigger mines fitted with the M603 or M624 fuze (both of which operate exclusively in single-impulse mode) and become trapped. Attempts to recover the tanks or rescue victims are hindered by the fact that the M608-fitted mines previously driven over are now operating in single-impulse mode, and also because minefields containing M15 mines usually contain various antipersonnel mines as well, for instance the M14 mine and M16 bounding mine. An additional benefit of double-impulse fuzes is that they give mines a degree of protection against clearance techniques which use blast overpressure or mine roller systems.

Mk 7 British Anti-Tank Blast Mine



Tiers:

1 2 3 4

System

Country of Manufacture: United Kingdom
Emplacement Method: manual
Diameter: 325
In Service: The two most modern variants of the mine, the Mk 7/4 (standard) and the Mk 7/7 (waterproof), were taken out of service by the UK by March 2003, after which disposal of existing stockpiles commenced.
Height: mm130
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range (meter): m1
Detectability/ Composition: Easy detect metal
Anti-Handling: Yes
Fuze Type/Self Neutralize: pressure (150 kg), tilt rod available
Explosive Type & Weight/Total Weight (kg): kgTNT 8.9 Total: 13.6
Detonation Mechanism: Double-impulse fuze, tilt-rod fuze (L93A1), anti-handling device

Notes:

The Mk 7 mine was a circular British anti-tank blast mine. It replaced the World War 2-era Mk 5 mine, and has in turn been replaced by the L9 Bar Mine. The Mk 7 can be laid either by hand or from a mechanical mine layer. The mine is conventional in design. It has a steel casing with a central, main fuze well, below which is a tetryl booster charge, both surrounded by the main explosive filling of TNT. The mine can be fitted with a variety of fuzes, including a double-impulse fuze (which gives it some resistance to explosive demining methods) or the L93A1 tilt-rod fuze, which gives it a full width attack capability. The mine has a secondary fuze well for an anti-lifting device and a mechanical anti-handling device was also produced for the mine, although this is reported to have never been used. The mine is currently being phased out of service with the British army. The mine is found in Afghanistan, Angola, Cyprus, Egypt, Eritrea, Ethiopia, Lebanon, Libya, Namibia, Oman, Somalia, and Zambia. The two most modern variants of the mine, the Mk 7/4 (standard) and the Mk 7/7 (waterproof), were taken out of service by the UK by March 2003, after which disposal of existing stockpiles commenced. A Mk 7 was responsible for the deaths of 10 Afghan girls, aged between nine and thirteen years, in December 2012.

TM-62 Russian Anti-Tank Blast Mine







Tiers:

1 2 **3** 4

Variants:

- **TM-62M:** Metallic case
- **TM-62P:** Plastic case
- **TM-62B:** Caseless
- **TM-62D:** Wooden

System

Alternative Designations: none
Date of Introduction: 1960
Proliferation: Over 30 countries
Shape: Circular
Color: Green
Length: mm110
Height: mm101.8
Diameter: mm320
Total Weight: kg8.5
Maximum: 20
Minimum: None
Fuze types (Pressure, seismic, magnetic): Yes
Actuation Force: kg200 /150 to 550
Resistant to Explosive Neutralization: Yes
Operating Pressure: 150 to 550 kg
Explosive Content: 7.5 kg of TNT (although sometimes combinations of RDX/TNT/Aluminium or Amatol mixes are used)

Performance

Armor Penetration: mm27
Effect: Blast

Effective Range: m1

Self-Destruct: No

Underwater Emplacement: Yes

Remotely detonated: Yes

Detonation Height: N/A

Explosive Composition

Type: Pentryt

Weight: 7.5 to 8.3

Booster: Yes

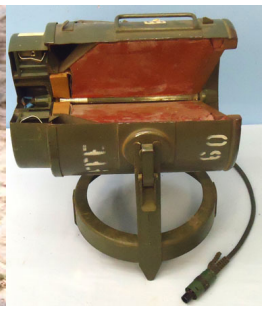
Weight-: gr0.75

Notes:

TM-62 is the designation for a series of Soviet anti-tank blast mines. The mines have a central fuze and typically have a 7.5 kg explosive charge, however they vary greatly in detail. The mines can be laid manually or automatically from a mine laying machine including the PMR-1, PMR-2 wheeled towed mine layers, the GMZ tracked mine laying vehicle and the VMR-2 helicopter mine laying system. In a static test, the TM-62M proved capable of penetrating the hull of a Centurion tank, killing the simulated crew of animals inside. The TM-62 series of mines can be fitted with the same fuzes as the TM-72 series of mines, which include MVN-72 and MVN-80 fuzes which are vibration and magnetism sensitive. Variants TM-62M - The TM-62M uses a circular metal case. It is the most widely employed of the TM-62 series of mines. TM-62B - The TM-62B paper or cardboard case and is basically a block of cast explosive with a fuze set into the center. TM-62D - The TM-62D uses a wooden case. TM-62P, TM-62P2, TM-62P3 - all 3 types use plastic cases. However, the TM-62P and TM-62P2 mine cases have ribbed sides, whereas the TM-62P3 has a smooth casing. TM-62T - The TM-62T has a fabric and epoxy casing, with a central fuze. Fuzes MVZ-62 MVCh-62 - The MVCh-62 uses a clockwork arming delay of 30 to 120 seconds. MVN-62 MVN-72 - The MVN-72 fuze uses a combination of electronics and clockwork, after an initial arming delay the magnetic influence fuze is enabled, powered by a 1.5 V battery. MVN-80 - The MVN-80 is an improved version of the MVN-72 fuze. VM-62Z MVP-62 - The MVP-62 uses a pneumatic bellows arming delay of 20 to 300 seconds. The delay mechanism uses a minimum of metal making it difficult to detect when used with one of the minimum metal cases. MVP-62M ZN-97 - magnetic influence fuze (made in Poland). Note: magnetic influence fuzes give full-width attack i.e. any part of the target vehicle passing over the mine will trigger detonation, not just the track or wheels. However, since magnetic fuzes are electronic, their operational life relies on battery power. Ultimately the battery will run down, after which the mine no longer functions. In contrast, a purely mechanical fuze (usually triggered via a belleville spring) gives a much longer operational life e.g. mines planted 50 years previously will still detonate if a target vehicle drives over them.

MIACAH F1 French Anti-Tank Landmine





Tiers:

1 2 **3** 4

System

Country of Manufacture: France UK (L14A1) Netherlands (#29)
# of User Countries: 4+
Emplacement Method: manual
Length: mm260
Diameter: mm200
Height: INA
Armor Penetration (mm)/ Kill Mechanism: 70 RHAE @ 40 m shapedcharge
Effective Range: m80
Detectability/ Composition: visual metal
Anti-Handling: No
Fuze Type/Self Neutralize: Break wire, command, IR influence neutralize: no
Explosive Type & Weight/Total Weight (kg): kgHexolite: 7 Total: 12

Notes:

The MIACAH F1 (L14A1 in British service) is a French off-route anti-tank landmine. It uses a large Misznay Schardin effect warhead to project a powerful self forging fragment capable of penetrating 70 millimetres of armour at a range of 40 metres. The mine consists of a horizontal cylindrical main body with a large inset plate in the front. The detonator protrudes from the centre of the front plate. The main body is supported on two arms which are attached to a circular base with three stakes. The mine can be triggered by a 50-metre breakwire, command or electronically triggered by an external sensor. The mine is no longer in production, and has been withdrawn from service from the French and British armies. The mine has been reported in Iraq.

MPB Polish Anti-Tank Mine





Tiers:



System

Country of Manufacturer: Poland
Emplacement Method: manual
Length: mm450
Width: mm390
Height: mm700
Weight: kg45
Armor Penetration (mm)/ Kill Mechanism: EFP
Effective Range: m50
Detectability/ Composition: visual metal
Anti-Handling: Yes
Fuze Type/Self Neutralize: Acoustic and Infrared Contact (K Model)
Explosive Type & Weight/Total Weight (kg): kgTNT: 22(est.) Total: 45

Notes:

The MPB is a Polish off-route anti-tank mine. It was developed by BELMA (BZE BELMA S.A.) with its partner Military Institute of Engineer Technology. The MPB consists of a metal cylinder filled with explosives, mounted horizontally in an adjustable frame. The mine is intended to be hidden from direct view of the intended target, off to the side of a probable vehicle route, usually a road, to attack the weaker armour on the sides and rear of a vehicle. The mine can be triggered by either a contact fuze (MPB-ZK variant) or an influence fuze (MPB-ZN variant) based on infra-red and acoustic sensors, and is also fitted with an anti-handling device. When used with the passive infrared fuze, an acoustic sensor detects approaching vehicles and activates the infra-red sensor, which triggers the mine at an optimal moment as the target passes. The mine can be programmed to self-destruct after either 1, 10 or 30 days have passed. The mine uses the Misznay–Schardin effect to project an explosively formed projectile to an effective range of roughly 50 meters, where it can penetrate up to 100 millimeters of rolled homogeneous armour (RHA) plate. The energy carried by the projectile is large enough that it can often significantly damage a vehicle that it hits.

TMM-1 Yugoslavian Anti-Tank Blast Mine







Tiers:



System

Country of Manufacture: Yugoslavia
# of User Countries: 2+
Emplacement Method: manual, mechanical
Diameter: mm326
Height (mm): mm90
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mcontact
Detectability/ Composition: easy to detect metal
Anti-Handling: probable- 2nd fuze well
Fuze Type/Self Neutralize: Pressure (130 w/pressure plate-70 w/o plate) selfdestruct
Explosive Type & Weight/Total Weight (kg): kgTNT 5.6 Total: 8.7
Operating Pressure: 130 to 420 kg
Comment: Commonly surface laid and use extensively in roadblocks. Limited underwater to .25 m

Notes:

The TMM-1 is a circular, metal-cased, Yugoslavian anti-tank blast mine. It is a direct copy of the German Tellermine 43. The mine has a central fuze well that is covered by a screw on pressure plate. Two secondary fuze well are fitted to the side and bottom of the mine allowing the installation of anti-handling devices. The mine is found in Bosnia, Croatia, and Kosovo.

PT-Mi-K Czechoslovakian Anti-Tank Landmine




Tiers:



System

Country of Manufacture: Czechoslovakia	
Emplacement Method: manual, mechanical	
Diameter: mm300	
Height: mm106	
Weight: kg7.2	
Armor Penetration (mm)/ Kill Mechanism: blast	
Effective Range: mcontact	
Detectability/ Composition: easy detect metal	
Anti-Handling: possible	
Fuze Type/Self Neutralize: pressure (200-400KG)	
Explosive Type & Weight/Total Weight (kg): kgTNT: 4.9 Total: 7.6	
Activation Pressure: kg330	

Notes:

The PT Mi-K is a Czechoslovakian metal-cased anti-tank blast landmine. The mine uses a metal grid instead a pressure plate, this gives it resistance to overpressure. The mine is no longer produced, but is found in Afghanistan, Cambodia, Eritrea, Namibia, Nicaragua and the Western Sahara. The mine has a circular metal case inside which is the doughnut shaped main charge, in the centre of which the fuse is inserted. On top of the mine is a metal pressure grid. The grid is held in place by a thin metal wall. Sufficient pressure on the grid causes the wall to collapse sideways, allowing the grid to press down on a plunger triggering a 3.5 oz (0.1 kg) Toul (Tetryl) booster charge, detonating the mine. The mine can be fitted with two main fuzes, the RO-5 and the RO-9 fuse. The RO-5 fuse may be fitted with an RO-3 anti-lifting device, which will trigger the mine if it is raised.

TM-57 Russian Anti-Tank Blast Mine





Tiers:

1 2 3 4

System

Country of Manufacture: Russia
Emplacement Method: manual, mechanical, chute
Diameter: mm316
Height: mm101
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: m1
Detectability/ Composition: easy, sheet metal
Anti-Handling: yes
Fuze Type/Self Neutralize: pressure (200/2.5/.5- 6 kg) delayarmed, tilt rod, pull (booby trap) neutralize:no
Explosive Type & Weight/Total Weight (kg): kgTNT or TGA 60/24/16: 6.3 Total: 8.47
Operating PRessure: 120–400 kg or 21 kg tilt.

Notes:

The TM-57 mine is a large, circular Soviet metal-cased blast anti-tank mine. It can either be triggered by a pressure or a tilt-rod fuze. A development of the TM-46 mine, it is found in Africa, the Middle East, and South East Asia. The TM-57 has a larger main charge and improved fuzing compared to the earlier TM-46. It is circular with a metal case and a central fuze well. A secondary MUV or VPF fuze can be fitted on the side of the mine, which serves as an anti-handling device. The tilt rod fuze gives the mine improved resistance to blast; it is activated when it is forced to a deflection of 25 to 30 degrees. A training version of the mine that produces smoke is designated the TM-60.

Mk 3 British Anti-Tank Mine



Tiers:



System

Country of Manufacture: Great Britain
# of User Countries: 6+
Emplacement Method: manual
Diameter: 150
Height: 133
Weight: kg2.6
Armor Penetration (mm)/ Kill Mechanism: blast
Filling: TNT
Detonation Mechanism: Pressure plate

TM-89 Russian Anti-Tank Mine






Tiers:



System

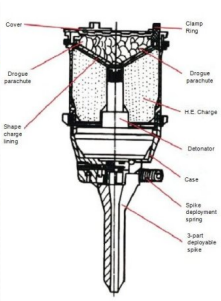
Country of Manufacture: FSU
# of User Countries: 15+
Emplacement Method: manual, mechanical
Diameter: mm320
Height: mm132
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mproximity
Detectability/ Composition: Metal
Anti-Handling: Probable
Fuze Type/Self Neutralize: pressure, magnetic, and electrically
Explosive Type & Weight/Total Weight (kg): kgTG-40 6.7 Total: 11.5

Notes:

The TM-89 is a Russian anti-tank mine first publicly shown in 1993. The mine uses a Misznay Schardin effect warhead capable of producing a 60 mm diameter hole in 100 mm of armour. The mine is fitted with a two-channel magnetic influence fuze, and can be laid from the GMZ-3 mine layer or by the VMR-2 helicopter mine layer.

Type 84 Chinese Anti-Tank Mine







Tiers:

1 **2** 3 4

Variants:

- **Delivered by GLD220 rocket:** Magnetic influence fuse, disarms after 72 hours when the battery becomes discharged.
- **Delivered by GLD220A rocket:** Magnetic influence fuse, self-destructs after a factory pre-set time (4.5, 13.6, 22.8, 36.4, or 72 hours)
- **Delivered by GLD221 rocket:** Tilt-rod fuse

System

Alternate Designation: NA

Type: Rocket Delivered Anti-Tank Mine

Manufacturer: INA

Dimensions

Diameter: mm114

Height: mm160

Weight: kg3.12

Notes:

The Type 84 is a Chinese air-dispersed scatterable anti-tank mine, normally deployed by a rocket. The rockets are launched from a BM-21 Grad or similar multiple rocket launcher system that can hold up to 24 of the rockets. A time fuse on the rocket is set before launch, which activates at a predetermined distance after firing. Upon activation, the rocket head bursts, ejecting the mines, which descend with small green parachutes that slow their fall. The mine consists of a cylindrical body with three prong legs that form a spike, which pierces the ground and arms the mine. If the mine strikes soft ground, the spike is driven into the ground and the mine is held upright. Three variants of the mine exist: one with a magnetic fuse which detonates upon magnetic influence, one with a self-extending tilt rod fuse, and another with a contact baffle. In addition, the magnetic fuse mine has an anti-handling device. The mine's penetrator warhead uses the Misznay-Schardin effect to project an explosively formed penetrator to penetrate up to 110 millimetres of rolled homogeneous armor. The mines also have a self-destruct function which can be set to between 4 and 72 hours, and will disarm itself after 72 hours.

TM-83 Russian Anti-Tank Mine





Tiers:

1 **2** 3 4

System

Alternative Designations: none

Date of Introduction: INA

Proliferation: Over 13 countries

Shape: Cylinder

Color: Green or Yellow

Height: mm440

Diameter: mm250

Total Weight (kg): kg20.4

Maximum: INA

Minimum: INA

Fuze types (Pressure, seismic, magnetic): Yes

Actuation Force: INA

Resistant to Explosive Neutralization: Yes

Performance

Armor Penetration: mm100

Effect: EFP, side-attack

Effective Range: m50

Self-Destruct: 30

Underwater Emplacement: INA

Remotely detonated: Yes

Detonation Height: INA

Explosive Composition

Type: TG40/60

Weight: kg9.6

Booster: INA

Weight (gr): INA

Notes:

The TM-83 is a Soviet off-route anti-tank mine, first shown publicly in 1993. The mine consists of a large Misznay Schardin effect warhead and infra-red and seismic sensors. The mine is positioned 5 metres from the road it is intended to attack and aimed using an integrated sight. The seismic sensor detects an approaching vehicle and activates the infra-red sensor. When the vehicle reaches the optimum target point the warhead is triggered. The mine can also be remotely triggered from up to 100 meters away. The mine can remain operational for up to 30 days. Armour penetration is claimed to be 100–400 mm at a range of 50 meters.

TM-46 Russian Anti-Tank Mine





Tiers:



System

Country of Manufacture: FSU North Korea (ATM-46) Germany Bulgaria Egypt (M/71) Israel (No. 6)
# of User Countries: 28+
Emplacement Method: manual, mechanical
Diameter: mm306
Height (mm): mm94
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range (meter): m1
Detectability/ Composition: easy to detect, sheet metal
Anti-Handling: TMN-46 yes
Fuze Type/Self Neutralize: pressure (180/132 kg), tilt rod neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT, amatol 2.9 Total: 5.7
Operating Pressure: 120–400 kg (21 kg tilt pressure)
Comment: The TM-46 and TMN-46 are identical except for the additional fuze well

Notes:

The TM-46 mine is a large, circular, metal-cased Soviet anti-tank mine. It uses either a pressure fuze or tilt-rod, which is screwed into the top. Anti-tank mines with this type of fuze were capable of inflicting much more damage to armored vehicles.[1] The TMN-46 is a variant of the mine fitted with a secondary fuze well on the bottom (where it cannot be seen) which is slightly off-set from the centre of the mine. This secondary fuze well can be fitted with a pull-fuze which functions as an anti-handling device. The mine was used by the North Vietnamese forces during the Vietnam War, and is found in many countries in Africa, the Middle East and South East Asia. Because the TM-46 has a metal casing, it is very easy to detect with a mine-detector. However, mine-fields containing TM-46s may have also been sown with minimum metal mines, e.g. the PMA-2.

M19 American Anti-Tank Blast Mine





Tiers:

1 2 3 4

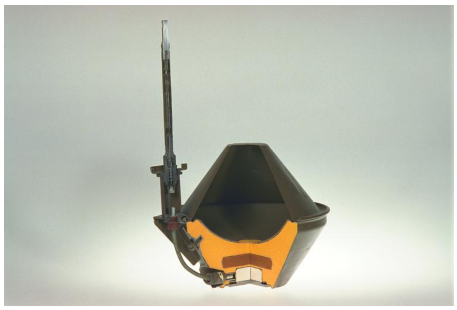
System

Country of Manufacture: US Chile Iran South Korea Turkey
# of User Countries: 13
Emplacement Method: manual
Length: mm332
Width: mm332
Height: mm94
Armor Penetration (mm)/ Kill Mechanism: Blast
Effective Range (meter): m1
Detectability/ Composition: difficult with hand held detectors, plastic
Anti-Handling: Yes
Fuze Type/Self Neutralize: pressure (182 kg)
Explosive Type & Weight/Total Weight (kg): kgCOMP B 9.5 Total: 12.6
Operating Pressure: 118 to 226 kg (although possibly as low as 90 kg)

Notes:

The M19 is a large square plastic cased United States anti-tank blast mine. Intended to replace the M15 mine, the design dates from the mid-1960s and contains only two metal components: the copper detonator capsule and a stainless steel firing pin which weighs 2.86 grams. It is a minimum metal mine, which makes it very difficult to detect after it has been emplaced. This mine is produced under licence in Chile, South Korea and Turkey. A copy is produced in Iran. It is found in Afghanistan, Angola, Chad, Chile, Cyprus, Iran, Iraq, Jordan, South Korea, Lebanon, the Western Sahara, and Zambia. U.S. stocks of the mine were approximately 74,000 before the 1990 Gulf war and had fallen to 63,000 by 2002. An inert version of the mine intended for training purposes (called the M80) is also produced. The plastic casing of the mine is usually dark olive green, and has a large central fuze well. Normally it has a carrying handle on one side. The mine is normally fitted with the M606 fuze which has an arming switch with two settings, S(afe) and A(rmed). These markings are either painted in yellow or embossed into the plastic. When the switch is set to "A" and the safety clip is removed, the mine will detonate if a vehicle drives over it. The firing mechanism is triggered by a belleville spring which flips the firing pin downwards into the stab detonator, setting off the adjacent booster charge and main explosive filling. The mine is also fitted with two secondary fuze wells which allow anti-handling devices to be fitted e.g. the M1 pull fuze or M5 "mouse-trap" anti-lift fuze. Either or both of the secondary fuze wells on an M19 mine may be fitted with an anti handling device. It is worth noting that a minefield containing M19s is usually protected by various anti-personnel mines such as the M14 and M16 bounding mine.

TMK-2 Russian Anti-Tank Mine







Tiers:



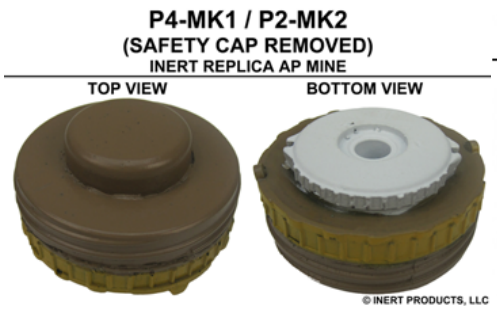
System

Country of Manufacture: FSU
# of User Countries: 13+
Emplacement Method: manual, Tilt-rod
Length: mmD max: 301 D min: 75
Width: mmD max: 301 D min: 75
Height: mm262 w/o
Armor Penetration (mm)/ Kill Mechanism: 250 RHAE belly attack plate charge
Effective Range: m1
Detectability/ Composition: Easy Metal
Anti-Handling: Possible
Fuze Type/Self Neutralize: tilt rod (8-12kg) self-destruct or neutral: no
Explosive Type & Weight/Total Weight (kg): kgTG-50, TNT Total: 12.5
Operating Pressure: 8 to 12 kg tilt

Notes:

The TMK-2 is a Soviet steel cased anti-tank mine. It uses a tilt-rod fuze combined with a shaped charge to attack the belly of vehicles as they pass over the mine. It was originally designed in 1955, but is now obsolete. The mine consists of a case shaped like two truncated cones joined at the base. The MVK-2 tilt rod assembly is held to one side of the mine. The lower truncated cone contains the main charge, and dished metal charge liner. When a vehicle passes over the mine, the tilt rod is bent by 24 to 36 degrees, which allows retaining balls holding the striker to escape, which is driven by a spring into the MD-7M detonator. This then ignites a detonator cord, which carries the detonation wave into the main body of the mine and the DUM-2 detonator, fixed at the bottom of the main charge. The main charge is triggered, and the blast wave travels around a wave shaper, which improves the efficiency of the shaped charge. The resulting blast can penetrate between 60 and 110 millimeters of around depending on if the slightly less powerful TNT, or the more powerful TG-50 explosive is used. It is found in Afghanistan, Angola, Azerbaijan, Eritrea, Ethiopia, Iraq, Mozambique and Namibia.

P2 Mk 2 / P3 Mk 2 Pakistani Anti-Tank Blast Mine





Tiers:



System

Country of Manufacture: Pakistan
# of User Countries: 5+
Emplacement Method: manual
Diameter: mm270
Height: mm130
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: m0, typical with contact mine
Detectability/ Composition: very difficult plastic, only metal is spring, striker tip, and shear wire
Anti-Handling: probable- 2nd fuze well
Fuze Type/Self Neutralize: pressure (180-300 kg)
Explosive Type & Weight/Total Weight (kg): kg6 Total: 6.5
Operating Pressure: 180 to 300 kg when fitted with pressure plate, 10 kg without
Comment: Very difficult to detect w/hand held-detectors. Can also be used as very large AP mine

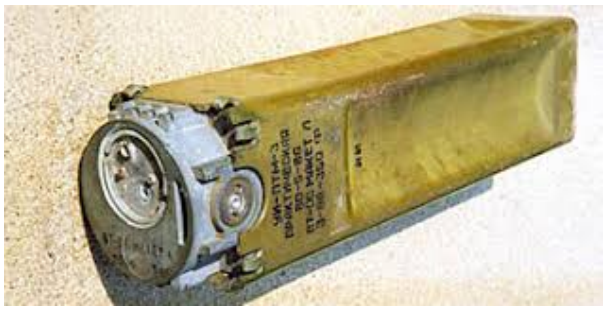
Notes:

The P2 Mk2 and P3 Mk2 are Pakistani plastic cased minimum metal anti-tank blast mines. The P2 Mk2 has a square case with a central circular ribbed pressure plate, the P3 is circular with a central circular pressure plate. Both mines use anti-personnel mines as the fuse, typically the either the P4 Mk1 or P2 Mk2 anti-personnel mines. The anti-personnel mine sits in a cavity below the pressure plate, when enough pressure is place on the pressure plate of the mine, it collapses onto the anti-personnel mine triggering it and the main charge which sits below it. A yellow canvas carrying strap is normally fitted to the side of the mine. The mines have a secondary fuse well on the bottom which can be used with anti-handling devices. A GLM-2 electronic booby trap can be fitted to the cavity under the pressure plate. The mine is supplied with a steel disc which makes the mine more easily detectable, although this is seldom used. Since 1997 only a detectable version of the mine has been produced, and to comply with the Convention on Conventional Weapons amended protocol II, Pakistani stocks of the mine are being retrofitted with steel detection discs. The mines are found in Afghanistan, Angola, Eritrea, Ethiopia, Pakistan, Somalia, and Tajikistan.

PTM-3 Russian Anti-Tank Mine







Tiers:

1 2 **3** 4

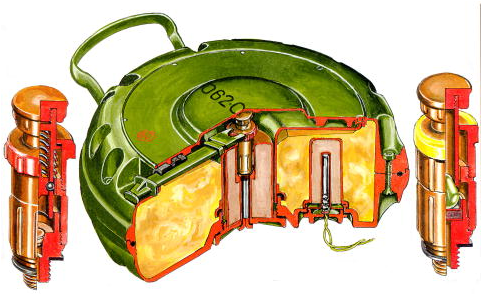
System

Country of Manufacture: FSU
# of User Countries: 12+
Emplacement Method: remote-surface: UMZ, helicopter, PKM portable inf
Length: mm330
Width: mm84
Height: INA
Armor Penetration (mm)/ Kill Mechanism: 70 mm: penetrates tank belly & destroys running gear
Effective Range: m1
Detectability/ Composition: visual mine detectors cause detonation plastic
Anti-Handling: Yees
Fuze Type/Self Neutralize: proximity, magnetic self-destruct: yes-16 to 24 hrs
Explosive Type & Weight/Total Weight (kg): kgTG-40: 1.8 Total: 5
Comment:

Notes:

The PTM-3 is a Soviet scatterable anti-tank mine that can be deployed either by hand, vehicle, artillery, or helicopter. The mine's case is configured to produce a shaped charge effect on five sides. Once deployed the mine arms itself after sixty seconds. The mine uses a magnetic influence fuze that detonates the mine when a vehicle passes over it. It is also reported to have an anti-handling device which is sensitive to movement.

PM-60 (K-1) German Anti-Tank Blast Mine



Tiers:



System

Country of Manufacture: Former E. Germany
# of User Countries: 5+
Emplacement Method: manual
Diameter: mmD (max): 320 D (min): 237
Height: mm125
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: m0, typical with contact mine
Detectability/ Composition: somewhat difficult (only 20 gr metal) plastic
Anti-Handling: probable 2nd fuze well
Fuze Type/Self Neutralize: pressure (200-500 kg)
Explosive Type & Weight/Total Weight (kg): kgTNT 9.9 Total: 11
Activation Pressure: 200 to 500 kg
Comment: waterproof

Notes:

The PM-60 or K-1 is a German round plastic cased minimum metal anti-tank blast mine. The case of the mine consists of two halves joined together by sixteen plastic nuts, giving the mine a distinctive appearance. The top of the mine has a large pressure plate which rests on top of the fuze assembly. Two fuzes are available for the mine, a conventional ball bearing retained striker and a chemical fuze, containing a glass ampule of acid over a flash composition. When the mine is deployed with the chemical fuze it is very difficult to detect because the only metal in the mine is the detonator capsule. There is a secondary fuze well on the bottom of the mine that can accept a fuze allowing remote command detonation of the mine. The mine was originally produced in East Germany by the State factories, but is no longer produced. It is found in Eritrea and Ethiopia.

TM-41 Russian Anti-Tank Mine





Tiers:

1 2 3 **4**

System

Country of Manufacture: FSU China North Korea Cambodia
# of User Countries: 10+
Emplacement Method: manual
Length: mm252
Height: mm145
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mcontact
Detectability/ Composition: Metal
Anti-Handling: No
Fuze Type/Self Neutralize: pressure (160 kg no)
Explosive Type & Weight/Total Weight (kg): kgTNT: 4 Total: 5.4
Activation Pressure: kg160
Comment: Can be used underwater

Notes:

The TM-41 was a circular, metal-cased Soviet anti-tank landmine used during the Second World War. The mines case consisted of a short cylinder with the entire top surface being used as a pressure plate. The mine has a carrying handle on the side of the mine. It was normally painted olive drab and was broadly similar to the larger, later, TM-44 mine. The mine could be waterproofed with washers and laid underwater, where it can remain operational for two months. Pressure on the pressure plate resulted in lock balls being force out of position, releasing a striker, which triggers a detonator, then a booster and then the mines main charge. The mine was used with anti-handling devices. A Chinese copy of the mine was also produced.

→→Anti-Helicopter Landmines

AHM-200 Bulgarian Anti-Helicopter Mine



Tiers:



System

Country of Manufacture: Bulgaria
Emplacement Method: manual
Armor Penetration / Kill Mechanism: 10mm @ 100 m
Effective Range: mmax 200
Detectability/ Composition: visual
Target Velocity: INA
Fuze Type: combined acoustic & Doppler SHF
Warhead Type/Total Weight: Total weight: 90 kg

Notes:

The 4AHM-100, AHM-200, AHM-200-1, AHM-200-2, PMN-150, and PMN-250 are Bulgarian directional fragmentation mines that can be used with proximity fuzes to function as anti-helicopter mines. The systems were developed by the Bulgarian Institute of Metal Science, and are based around electronic fuzes with broadly similar functionality. The fuzes use two sensors. The first, an acoustic sensor, arms the mine as a helicopter approaches. The second sensor is a radar, which locates the target and triggers the mine at the appropriate point. The mines all use a number of large Misznay Schardin effect warheads to project large numbers of fragments to an effective range of around 200 meters. Jane's Mines and Mine Clearance speculates that IFF could be integrated into the fuze circuit to discriminate against friendly aircraft, lowering the chances of friendly fire. The AHM-200 weighs 35 kilograms and contains 12 kilograms of TNT. The mine's warhead has two sections, a large rectangular warhead with a pre-notched fragmentation liner that produces 1,960 fragments, and a secondary warhead with five Misznay Schardin plates that produce large self-forging fragments. The fragments scatter in an arc of 20 degrees to an effective range of 200 meters, and will penetrate 10 millimeters of armour at 100 meters.

Helkir Austrian Anti-Helicopter Mine



Tiers:

1 2 3 4

System

Country of Manufacture: Austria

# of User Countries: 1

Emplacement Method: manual

Armor Penetration (mm)/ Kill Mechanism: 6 @ 50 m 2 @ 150 m

Maximum Effective Range: m500

Detectability/ Composition: visual

Target Velocity: INA

Fuze Type: dual acoustic & IR

Warhead Type/Total Weight (kg): Total weight: 43 kg

Status: in production

Detonation Mechanism: Acoustic & IR sensors

Detectability

Ready: Visual

Explosive Composition

Type: INA

Weight: kg20

Fuze/Sensor

Types: Dual, Acoustic, and IR

Number of Fuze Wells: INA

Resistant to Explosive Neutralization: Yes

Performance

Armor Penetration: mm6 @ 50 m or 2 @ 150 m

Effect: Directed Fragmentation

Effective Range: m150

Target Speed: km/h250

Emplacement Method: Manual

Controllable (remotely detonated): Yes

Antihandling Device: Yes

Self-destruct: INA

Notes:

The Helkir is an anti-helicopter mine developed by the Austrian company Hirtenberger. It uses an IR sensor and an acoustic sensor to detect airborne targets. Once the mine is armed and ready to engage, the acoustic sensor listens for a valid noise input. This enables the IR sensor which is located coaxially to the warhead. When the IR sensor detects a hot signature, the mine blasts off fragments that can penetrate up to 6 mm of armored steel at 50 meters and 2 mm of mild steel at 150 meters. The mine is active for a period of 1 to 120 days, after which it returns to a safe mode. Helkir, as well as other mines developed by Hirtenberger, like the APM-1 and the APM-2 anti-personnel directional mines (discontinued in 1994), do not appear on the company's current website.

→→Other Types of Landmines

UKA-63 Hungarian Multipurpose Landmine





Tiers:



System

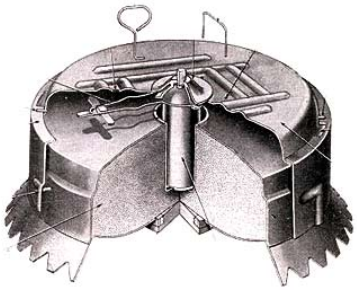
Country of Manufacture: Hungary
Emplacement Method: manual mechanical scatterable chute
Diameter: mm300
Height: mm75
Armor Penetration (mm)/ Kill Mechanism: explosively formed fragments
Effective Range: mPlate charge. Trackattack; sideattack effective 0 to 50 meters (see note)
Detectability/ Composition: easy metal
Anti-Handling: Probable
Fuze Type/Self Neutralize: pressure, seismic, magnetic, and electrically fired command detonated, tilt-rod neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT 6 Total: 9
Comment: Can operate as a belly-attack, track-attack, or side-attack mine. The plate-charge will probably have only limited success against tank armor in side-attack mode but is successful against lightly armored vehicles.

Notes:

The UKA-63 is a cylindrical mine with a plate-charge lethal mechanism. The UKA-63 is multipurpose in that it can operate as a belly-attack, track-attack, or side-attack mine with effective ranges from 0 to 50 meters. The plate-charge will probably have only limited success against tank armor when used in the side-attack mode but would be very successful against lightly armored vehicles. The size of this mine is consistent with that of other mines manufactured by the former Warsaw Pact countries. The UKA-63 can be emplaced mechanically as well as manually and by means of a chute. Although not expected to be encountered, there is a whole family of other fuzes designed for use in this mine, including a tilt-rod fuze. The UKA-63 is a metallic-cased cylindrical mine which produces its effect by means of explosively formed fragments. Few technical details are known, but comparative analysis of this and other similar mines has yielded some information. It is reported that four fuzing schemes are possible of which only a tilt-rod fuze is known. Other candidate fuzes are pressure, seismic, magnetic, and electrically fired command detonated. The UKA-63 is unique in that it can supposedly operate as a belly-attack, track-attack, or side-attack mine with effective ranges from 0 to 50 meters. Penetration is unknown. The size of this mine is consistent with that of other former Warsaw Pact mines, which can be emplaced mechanically as well as manually and by means of a chute. Counter-countermeasures are reported but only in general terms; counterblast and antidisturbance features are suspected. A training version is available. The mine is OD green.

PMZ-40 Russian Multi-Purpose Landmine





Tiers:



System

Emplacement Method: manual	
Length (mm): D: 280	
Width (mm): INA	
Height (mm): 120	
Armor Penetration (mm)/ Kill Mechanism: blast	
Effective Range (meter): contact	
Detectability/ Composition: Easy, steel	
Anti-Handling: possible no 2nd fuze well or AD features	
Fuze Type/Self Neutralize: pressure (225 AT or 68 AP) self-destruct or neutralize: no	
Explosive Type & Weight/Total Weight (kg): TNT 3.6 Total: 9	
Comment: The AP/AT feature allows a single type mine to be used in a mixed minefield. Preferable in roadblocks. Replaced by the TM- 41 AT mine	

Notes:

The PMZ-40 was a circular metal-cased Soviet multi-purpose landmine used during the Second World War. It was similar in design to the earlier Finnish Panssarimiina m/36 which was used during the Winter War. The mine had a serrated lower edge that allowed it to be deployed on sheet ice. The pressure plate was held over the fuse by four sheer bolts, rotating the pressure plate allows it to rest directly on the fuse, making it sensitive enough to be used as an anti-personnel mine. The mine proved to be too dangerous to use, and was replaced by the TM-41 anti-tank mine.

PARM 2 German Off-Route Mine



Tiers:



Variants:

- **PARM 1 (DM-12):** The PARM 1 is mounted on a small tripod, allowing it to be traversed through 360 degrees and elevated to 90 degrees and depressed to -45 degrees. The mine is manually emplaced, and incorporates an arming delay of five minutes. It can be either command detonated or by a fibre optic trigger cable, which triggers the mine when it is crushed. The mine has an effective range of between 2 and 40 metres. The rocket has a velocity of approximately 120 metres per second, and has a claimed armour penetration of 600 millimeters.

System

Country of Manufacturer: Germany
Emplacement Method: manual
Length: INA
Height: 300 to 700 mm
Warhead Diameter: mm110
Weight: kg20
Warhead Weight: kg1.9
Armor Penetration (mm)/ Kill Mechanism: 600 rocket propelled shaped-charge
Effective Range: 4 to 100 m
Detectability/ Composition: visual metal
Anti-Handling: No
Fuze Type/Self Neutralize: neutralize: 20, 40, 60 days

Notes:

The PARM 1 (DM-12) and PARM 2 are German off-route mines that fire small fin stabilized rockets. The mine was developed in the early 1980s to meet the US MIL-STD-331A and US MIL-STD-810C requirements. Trials of the mine were conducted between March 1983 and March 1988. In June 1988 it was accepted into service with the German army, with the Army receiving the first batch of 25,000 between 1991 and 1994. The PARM 2 was a development of PARM 1 incorporating an infra-red sensor, and an improved rocket. The PARM 2 incorporates an infra-red sensor, the SAPIR, which acts to accurately fire the rocket to ranges up to 100 meters. The warhead of the PARM 2 has been upgraded, with an armour penetration of 750 millimeters and a capability against reactive armour. It can be programmed to be active from between hours and 30 days.

PARM 1 (DM-12) German Off-Route Mine



Tiers:



Variants:

- **PARM 2:** The PARM 2 incorporates an infra-red sensor, the SAPIR, which acts to accurately fire the rocket to ranges up to 100 meters. The warhead of the PARM 2 has been upgraded, with an armour penetration of 750 millimeters and a capability against reactive armour. It can be programmed to be active from between hours and 30 days.

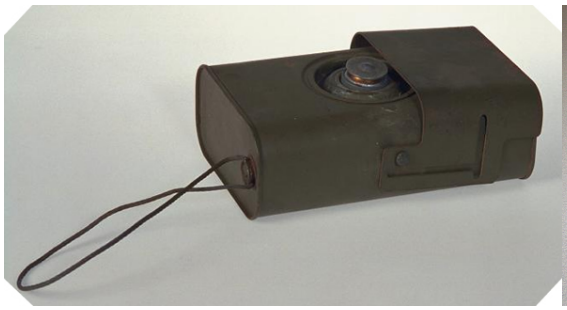
System

Country of Manufacture: Germany
Emplacement Method: manual
Length: mm640
Height (mm): mm391
Warhead Diameter: mm132
Weight: kg10
Warhead Weight: kg1.45
Armor Penetration (mm)/ Kill Mechanism: 600 rocket propelled shaped-charge
Effective Range (meter): 2 to 40 m
Detectability/ Composition: visual metal
Anti-Handling: No
Fuze Type/Self Neutralize: neutralize: 20, 40, 60 days

Notes:

The PARM 1 (DM-12) and PARM 2 are German off-route mines that fire small fin stabilized rockets. The mine was developed in the early 1980s to meet the US MIL-STD-331A and US MIL-STD-810C requirements. Trials of the mine were conducted between March 1983 and March 1988. In June 1988 it was accepted into service with the German army, with the Army receiving the first batch of 25,000 between 1991 and 1994. The PARM 2 was a development of PARM 1 incorporating an infra-red sensor, and an improved rocket. The PARM 1 is mounted on a small tripod, allowing it to be traversed through 360 degrees and elevated to 90 degrees and depressed to -45 degrees. The mine is manually emplaced, and incorporates an arming delay of five minutes. It can be either command detonated or by a fibre optic trigger cable, which triggers the mine when it is crushed. The mine has an effective range of between 2 and 40 metres. The rocket has a velocity of approximately 120 metres per second, and has a claimed armour penetration of 600 millimeters.

M7A2 American Anti-Vehicle Mine





Tiers:

1 2 3 **4**

System

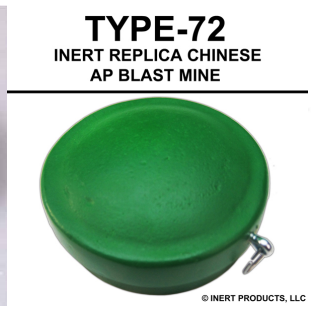
Country of Manufacturer: USA
Emplacement Method: manual
Length: mm178
Width: mm114
Height: mm63
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: msee note
Detectability/ Composition: Easy metal
Anti-Handling: Yes Two Fuze wells
Fuze Type/Self Neutralize: pressure (159-340 kg)
Explosive Type & Weight/Total Weight (kg): kgTetryl 1.62 Total: 2.19
Comment: Designed more as anti-vehicle (trucks and LAVs) For tanks 2–5 mines used

Notes:

The American M7A2 is a rectangular, sheet metal bodied, anti-vehicle landmine which is designed to damage or destroy vehicles by its blast effect. The landmine has rounded edges and crimped on end covers with a prominent filling plug in one end. The fuze cavity is open and the M603 pressure fuze is exposed. The pressure plate is slotted and is secured to the sides of the landmine body by two rivets. The landmine has an anti-disturbance fuze cavity which is often used to hold the main firing system. Because of its low explosive content, the landmine is often stacked (two together) for greater effect. The M7A2 can be located using metal detectors under most field conditions as well as visually if set in the tripwire mode.

Type 72 Chinese Landmine







Tiers:



System

Country of Manufacture: China, S. Africa
# of User Countries: 10+ Angola Bosnia Herzegovina Cambodia China Eritrea Ethiopia Iraq Jordan Lebanon Mozambique Rwanda Somalia South Africa Sudan Uganda Zambia
Emplacement Method: manual, mechanical, scatterable
Diameter: mm270
Height: mm100
Armor Penetration (mm)/ Kill Mechanism: blast
Effective Range: mcontact
Detectability/ Composition: very difficult plastic
Anti-Handling: possible
Fuze Type/Self Neutralize: pressure (300 to 800 kg) self-destruct or neutralize : no
Explosive Type & Weight/Total Weight (kg): kgTNT/RDX 5.4 Total: 6.5
Operating Pressure: 300 to 800 kg
Comment: Very difficult to detect with hand held detectors underwater: yes

Notes:

Type 72 Non-Metallic is a Chinese circular, plastic bodied landmine which is designed to damage or destroy a vehicle by blast effect. The mine has a slightly domed pressure plate made from flexible plastic with a raised 6 spoke wagon wheel pattern on top. Type 72 has a telescopic carrying handle molded into the bottom of the mine and a large diameter filler plug on the side just above the handle position. The mine has a crimp around the top edge where the mine body meets the pressure plate. The mine contains 5.4 kg of 50:50 RDX/TNT and is actuated when pressure of 300 kg deforms the flexible plastic pressure plate long enough to release the cocked striker fuze. When the pressure plate is moved approximately 9 mm downwards it exerts pressure on the fuze. If fuzed with the T-72 clear plastic-cased blast resistant fuze, pressure on the top of the fuze will depress the casing which will revolve due to the depression of the spring which is attached to the casing. The revolution is controlled by lugs on the inner fuze assembly which fit in grooves in the fuze casing. When the fuze casing is revolved and depressed sufficiently, the two retaining balls to will fall away in groove in the outer casing, which releases the striker. The striker is driven down by the spring, initiating the detonator, which in turn initiates the booster and the main charge. The mine is blast resistant since rapid depression of the fuze will push the fuze casing straight down without any revolution. The lugs on the inner fuze assembly will then slide into vertical groves instead of the diagonal ones. The striker retaining balls will then be prevented from coming in line with the groves in the outer casing and the striker will not be released. Instead the pressure plate will bounce back into its original position. Two similar plastic bodied AT mines manufactured in China are the Type 69 and the Type 81, although it is entirely possible that there is no difference between the Type 69, Type 72 and Type 81 mines other than their

fuzes. The basic descriptions (dimensions, weights, appearance, colour) for Type 69 and Type 81 mines match the Type 72 very closely. The fuzes are all blast resistant and the mine name may only vary depending on the fuze used. Because of its low metal content, the Type 72 cannot be located using metal detectors under most field conditions. The Type 72 is resistant to shock and overpressure from explosive breaching systems such as the Giant Viper and MICLIC. A copy of the mine, the YM-III (sometimes YM-3), is produced in Iran. It is slightly heavier at 7 kg, with a slightly heavier 5.7 kg Composition B main charge, with a slightly higher activation pressure of 450 to 900 kg. Additionally, a copy is produced in South Africa as "Non-metallic anti-tank mine".

LMG Russian Rocket Propelled Mine



Tiers:



System

Country of Manufacture: FSU
# of User Countries: 13+
Emplacement Method: rocket propelled shaped-charge
Armor Penetration (mm)/ Kill Mechanism: track breaker on contact/blast
Effective Range (meter): m27
Detectability/ Composition: visual metal
Anti-Handling: No
Fuze Type/Self Neutralize: Tension (1 kg), tripwire neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: 3.2 Total: 10

Notes:

The LMG rocket mine consists of a rocket, a rocket launching base, an initiation and propellant charge, an MUV fuze, and a tripwire. As the target vehicle acts on the tension wire, the retaining pin on the MUV fuze is withdrawn. The fuze, in turn, sets off the ignition and propellant charge and launches the rocket. Upon impact, the warhead is detonated by means of a secondary percussion base detonating fuze. Additionally this mine can be initiated by an observer utilizing a wire connected to the MUV retaining pin.

→Mortars

→→Non-Self Propelled Mortar Systems

Type 53 Chinese 120mm Mortar



Tiers:



Variants:

- **Type 53:** China version
- **Type 55:** A more robust but heavier version, the Type 55, was developed by Norinco.
- **Helwan Model UK 2.:** Egypt also produced a locally modified variant, the Helwan Model UK 2.

System

Alternate Designation: Type 53
Type: 120mm Mortar
Manufacturer: China; Company: INA
In Service: 1943-Present
Crew: 6

Dimensions

Length: INA
Barrel Length: INA
Weight: 275 kg

Main Weapon System

↳System

Name: Type 55
Type: Mortar
Caliber: 120mm
Breech: muzzle loaded
Elevation: +45° to +80°

Traverse: t could accommodate small-angle shifts of up to 6 degrees without having to shift the baseplate though.

Rate of Fire: 9 rpm maximum, 70 rds/hr sustained

Muzzle Velocity: 272 m/s

Effective Firing Range: 5,700 m (6,200 yd) maximum, 500 m (550 yd) minimum

↳*Ammunition*

Type: Mortar Projectile

Caliber: 120mm

Basic Load: INA

Types of Ammunition: FRAG-HE and HE

Notes:

The Type 53 120mm Mortar is a Chinese version of the Russian M1943 120mm Mortar The M1943 Mortar also known as the SAMOVAR is a Soviet 120 millimeter calibre smoothbore mortar first introduced in 1943 as a modified version of the M1938 mortar. It virtually replaced the M1938 as the standard weapon for mortar batteries in all Soviet infantry battalions by the late 1980s, though the armies of the Warsaw Pact utilised both in their forces. This muzzle-loading mortar can be easily broken down into three parts – barrel, bipod and baseplate – for movement over short distances or towed by a GAZ-66 truck on a two-wheel tubular carriage. The baseplate mounting permits all-azimuth firing, however as with most Soviet mortars it was difficult to turn rapidly over a wide traverse. It could accommodate small-angle shifts of up to 6 degrees without having to shift the baseplate though.

MO-120 RT-61 (MO-120-RT) French 120mm Heavy Mortar





Tiers:



Variants:

- **Turkish copy:** It was copied without license in Turkey and manufactured by MKEK as the HY 12 mortar.
- **Japanese Type 96:** The Japan Ground Self-Defense Force have a self-propelled version of the RT-61 with 50 rounds, the Type 96.
- **2R2M:** The 2R2M is a derivative of the MO-120-RT-61 designed to be carried on light armoured vehicles, with a semi-automatic loading. The system has also been modified by the USMC as the Dragon Fire
- **Expeditionary Fire Support System:** The United States Marine Corps began looking for an Expeditionary Fire Support System (EFSS) in 2001 after the start of operations in Afghanistan exposed their lack of expeditionary artillery lighter than a 155 mm howitzer but heavier than a 60 mm mortar. Early on, the weapon became tied to the development of the MV-22 Osprey, which would contain a Growler ITV jeep that would tow it; both efforts were troubled and experienced delays. The EFSS was first used operationally in Afghanistan in February 2011, firing an M1105 illumination projectile. The full EFSS was introduced in 2009, consisting of two light vehicles, one towing the mortar and the other an ammunition trailer, that fit inside an MV-22 or CH-53E Super Stallion; an EFSS battery is made up of roughly 50 Marines. From 2011 to 2015, the Marines and Raytheon developed the precision extended range munition (PERM) for the EFSS, a GPS-guided round that delivers greater range and better accuracy. The 35 lb (16 kg) round increased range from 8 km (5.0 mi) to 16 km (9.9 mi), falling within 10 meters of the target and as close as two meters, costing $18,000 each, and having 2.5–3 times more lethality. The extra range came from tail fins for stabilization and canards near the nose to make in-flight adjustments and make it glide as it descends, and the greater lethality was a result of this flight path; normal artillery rounds impact at a 45 degree angle, which blows the top half of the round straight up into the air, but descending at a sharp angle places more energy and fragmentation directly on a target. It was even capable of hitting reverse slope positions by shaping its trajectory. Greater accuracy also reduces logistical burdens, as using fewer rounds to destroy one target means a unit can last longer without needing resupply. The PERM was to begin fielding in 2018. Raytheon planned to add semi-active laser (SAL) guidance to PERM rounds to enable them to hit moving targets. By December 2017, the U.S. Marines had divested the EFSS. With the Marines working to extend the range of their artillery arsenal, the EFSS' limited range was not seen as well suited for future missions, so it was chosen for divestment in favor of moving more resources for precision fires.

System

Alternate Designation: The MO-120 RT-61 (factory designator) or MO-120-RT

Date of Introduction: 1973

Proliferation: Bangladesh: Belgium: 52 delivered in 1965–1966. Cameroon: 16 delivered in 1973. Colombia: 38 Turkish HY1-12 delivered in 2009. Cyprus: 114 delivered in 1990–1991, 112 in service in 2016. Djibouti: 20 delivered in 1981. Gabon: 4 delivered in 1986. France: 128 in 2016. Italy: 139 delivered between 2000 and 2004. The Military Balance gives 142 in service as of 2016. Japan: 462 delivered between 1990 and 2017. Kuwait: ~12 in service. Mexico: 32 delivered in 1988, still in service. Netherlands: 145 delivered in 1966–1968 Saudi Arabia: 200 delivered in 1990–1991 and 25 2R2M in 2009–2010, both used by the National Guard. Turkey: 127 deployed in Northern Cyprus as of 2016.

Manufacturer: TDA Armements (France), Thomson-CSF/Daimler Benz Aerospace (Germany), Hotchkiss Brandt (Netherlands), MKEK (Turkey), Howa (Japan)

In Service: 1973-Present

Crew: 4 gunners

Dimensions

Length: INA
Barrel Length: 280 cm (9 ft 2 in)
Weight: 582 kg (1,283 lb)

Main Weapon System

↳*System*

Name: MO-120 RT-61 (MO-120-RT)
Type: Heavy Mortar
Caliber: mm120
Carriage: wheeled
Elevation: 30–85°
Traverse: ±14° from centreline
Rate of Fire: 6 to 10 rpm
Effective Firing Range: 8,140 m (8,900 yd) with standard projectile 12,850 m (14,050 yd) with rocket projectile

↳*Ammunition*

Type: Mortar Projectile
Caliber: mm120
Shell Weight: 18.7 kg
Basic Load: INA

Notes:

The MO-120 RT-61 (factory designator) or MO-120-RT is a heavy mortar of French origin. The RT in the designator stands for rayé, tracté, which means rifled, towed. The RT-61 is currently used by the French Army (where it is known as RT F1 or Mortier de 120mm Rayé Tracté Modèle F1—"120 mm rifled towed mortar, model F1"), and is produced under licence in various countries. The MO-120 RT-61 is issued to artillery units, where it augments the 155 mm towed artillery. The RT-61 uses standard NATO rounds as well as the specially designed PR-14 (HE) and the PRPA (HERA). The weapon can be fired either by dropping the round down the tube (after aligning of the rifling bands) resulting in an automatic firing once the bomb hits the tube base, or by a controlled firing by dropping the bomb down the tube and pulling on a lanyard that will in turn set off the triggering mechanism in the base of the tube. Rounds fired from the mortar can reach as high as 8,000 ft (2,400 m) and hit the ground with an effective kill radius of nearly 250 ft (76 m). In French service, this weapon is normally towed by the VTM 120 (Véhicule Tracteur Mortier de 120 mm), a wheeled armored vehicle that is a derivative of the VAB 4×4 series of armored personnel carrier. Towing is accomplished by a towing hitch that is screwed onto the muzzle of the weapon. The VTM 120 also carries 70 rounds for the mortar and offers basic ballistic protection from small arms fire and shrapnel for the crew. The RT-61 can also be towed by the AMX-10 TM (Tracteur de Mortier), which is a version of the AMX-10P tracked APC. The mortars, which originally equipped infantry regiments, have now all been transferred to the artillery regiments, where they augment the 155 mm towed artillery.

M252 American 81mm Mortar



Tiers:



System

Alternate Designation: M252

Type: 81mm Mortar

Manufacturer: INA

In Service: 1987-Present

Crew: 5

Dimensions

Length: 1.27 m

Barrel Length: 1.27 m

Weight: 41.3 kg

Armament

↳*System*

Name: M252

Type: Mortar

Caliber: mm81

Elevation: 45°–85.2°

Traverse: 5.6°

Rate of Fire: 8–16 rpm sustained 20–30 rpm in exceptional circumstances and for short periods

Effective Firing Range: HE: 91–5,935 m

Feed System: muzzle-loaded

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm81

Types of Rounds: While the M252 does fire a weapon specific series of ammunition, it can also fire rounds from the M29 Mortar (only at charge 3 or below though). The M252 Mortar can fire the following principal classifications of training and service ammunition: High explosive (HE): Designations M821, M821A1, M889, M889A1, M372-series, and M362. Used against personnel and light materiel targets. Advanced Capability Extended Range Mortar (ACERM): Developmental guided round that adds wings, control fins, GPS navigation, a laser seeker, and an enhanced warhead; increases accuracy to within one meter and can reach a range of 20 km (12 mi) in five minutes. Smoke Cartridge: Designations M819 and M375-series. Used as a screening, signaling, or marking munition. Illumination (ILLUM): Designations M853A1 and M301-series. Used in night missions requiring illumination for assistance in observation. Non-Lethal Indirect Fire Munition: Developmental round based on the M853A1 that disperses flash bang submunitions to temporarily daze people. Training practice (TP): Designations M880, M879, M68, and sabot. Used for training in limited areas. Infrared Illumination (IR): Produces illumination which is only visible through the use of night vision devices.

Fuzes: The M224 rounds have two fuze types: the Multioption Fuze (M734) and the Point-Detonating Fuze (M935). The M734 is used for the M720 HE round and can be set to function as proximity burst, near-surface burst, impact burst, or delay burst.

Note: The range of a mortar is controlled by the number of propellant "C-charges" attached. A charge is a semi-circular donut of nitrocellulose, which resembles a puffy letter "C." A round for the M252 mortar comes with four charges attached. Longer-range shots require more propellant than can fit in the tail of the round, hence the necessity of external charges. When the target is ranged, the first assistant ammunition bearer adjusts the amount of propellant by removing C-charges from the projectile. The mortar squad leader verifies the number of charges; then the assistant gunner drops the round down the muzzle of the tube. The round, pulled by gravity, accelerates down the smooth bore of the mortar until the primer (in the base of the tail boom of the round) strikes the firing pin located in the bottom of the mortar tube. The primer detonates, igniting the charge in the tail fin, which in turn ignites the C-charges on the round. The C-charges detonate, releasing hot, expanding gas which pushes against the obturator band on the projectile, sealing the gas behind the projectile. The pressure from the expanding gas accelerates the projectile until it leaves the end of the tube.

Notes:

The M252 81 mm medium weight mortar is a British designed smooth bore, muzzle-loading, high-angle-of-fire weapon used for long-range indirect fire support to light infantry, air assault, and airborne units across the entire front of a battalion zone of influence. In the U.S. Army and U.S. Marine Corps, it is normally deployed in the mortar platoon of an infantry battalion. The M252 system weighs 91 lb (41 kg) completely assembled and is composed of the M253 Cannon (35 lb, 16 kg), M177 Mount (27 lb, 12 kg), M3A1 Baseplate (29 lb, 13 kg), and the M64A1 Sight Unit (2.5 lb, 1.1 kg). The mount consists of a base plate and a bipod, which is provided with screw type elevating and traversing mechanisms to elevate/traverse the mortar. The M64A1 sight unit (also used on the M224) is attached to the bipod mount. The M252 is a gravity-fired smoothbore system. Attached to the muzzle of the weapon is the Blast Attenuation Device (BAD), used to reduce the blast effects on the mortar crew. To increase cooling efficiency, the breech end is finned; though first-hand accounts attest that the level of cooling is negligible. The cannon also has a crew-removable breech plug and firing pin. High explosive rounds fired by the M252 weigh 10 lb (4.5 kg) and can have an effective kill radius of 35 m (115 ft). In 2017, the Marines revealed they were developing precision guided rounds for the 81 mm mortar, similar to efforts for the 120 mm Expeditionary Fire Support System but in a man-portable system. Crew A crew of five enlisted personnel operate the M252: the squad leader, the gunner, the assistant gunner, the first ammunition bearer, and the second ammunition bearer. The squad leader stands directly behind the mortar where he can command and control his squad. In addition to having general oversight of all squad activities, he also supervises the emplacement, laying, and firing of the weapon. The gunner stands to the left of the mortar where he can manipulate the sight, traversing handwheel, and elevating handwheel. He places firing data on the sight and lays the mortar for deflection and elevation. He makes large deflection shifts by shifting the bipod assembly and keeps the bubbles level during firing. The assistant gunner stands to the right of the mortar, facing the barrel and ready to load. In addition to loading, he swabs the bore after 10 rounds have been fired or after each fire mission. The assistant gunner is the person who actually fires the weapon. The first ammunition bearer stands to the right rear of the mortar. He has the duty of preparing the ammunition (charge settings, fuzes, etc...) and passing it to the assistant gunner. The second ammunition bearer stands to the right rear of the mortar behind the first ammunition bearer. He maintains and keeps a record of the ammunition in addition to the data corresponding to each fire mission. His twofold records include a written table of firing data, type, and number of rounds fired, and the safety pins pulled from each round to provide physical evidence to the accuracy of the table. In addition he provides local security for the mortar position.

Strix Swedish 120mm Terminal-Homing Mortar



Tiers:



System

Alternative Designations: N/A

Producer: Saab Bofors

Range: 1-4km with special expulsion charge 1.7-8km with charge plus attachment of sustainer motor

Guidance System: IR seeker, 12 thruster rockets 16-bit micro- processor retains path data and target identification data

Acquisition Radius: m150

Crew: ea1 additional member in mortar crew to load seeker data

Loading Method: Hand-load or auto-load without sustainer motor Hand-load only with sustainer motor

Equipment / Modifications Required: A computer (e.g., small 2-lb notebook type) is used to load target description data (from target library) into the round Rounds may require less target detail if other hot systems are not in the area

Systems Using This Munition: Any 120mm smoothbore mortar and combination gun can fire the round. The Advanced Mortar System (AMOS) can fit on a variety of vehicle chassis.

Employment Time: 1-5 minutes, depending on system

Rate of Fire: rpmUp to 9, although most point targets will require 1-6 rounds

Counter-Measure Vulnerability: IR absorbing paint, camouflage material, IR suppressing smoke, or tenting can affect the seeker. Target can hide under dense tree canopy, building cover, etc. Decoy targets such as heated plates may deflect the seeker. Any challenge to location accuracy, such as smoke, dust, or target speed, may decrease the possibility that the target is within the seeker footprint. If targets disperse when under attack, some may be able to avoid the footprint.

Dimensions

Weight: kg17.0

Length: m.83

Lethality Mechanism

Type: Shaped-charge (HEAT)

Fuze Type: Point Detonating

Penetration: mm600

Probability of Kill Given a Hit: %90

Number per kill, Moving Target: 4-6 (P-hit 20% est)

Number per kill, Stationary Target: 1-2 (P-hit 75% est)

Target Types

Description: High-value target vehicles include approaching tanks, IFVs, SP artillery, scatterable mine launcher vehicles, ATGM vehicles, etc Vehicles must be hot (sun or recent move). Stationary vehicle targets are preferred

Notes:

The Pansarsprängvinggranat, M94, STRIX is a Swedish end phase-guided projectile fired from a 120mm mortar originally manufactured by Saab Bofors Dynamics. STRIX is fired like a conventional mortar round. The round contains an infrared imaging sensor that it uses to guide itself onto any tank or armored fighting vehicle in the vicinity where it lands. The seeker is designed to ignore targets that are already burning. Launched from any 120mm mortar, STRIX has a normal range of up to 4.5km. With the addition of a special sustainer motor, however, range can be increased to 7.5km. The STRIX mortar round uses twelve midsection lateral thruster rockets to provide terminal course corrections. The tail unit is loaded first with the necessary propelling charges (up to eight increments), then the sustainer motor (if required) and finally, the programmed projectile. A hand-held programming unit is connected to the projectile by cable prior to loading to feed in flight time before seeker activation, and with allowances for terminal phase ballistic conditions. As well as being fired by conventional mortars, STRIX can be fired by the Advanced Mortar System, an automatic dual 120mm mortar mounted in a turret for fitting to armored fighting vehicles. Feasibility and project definition studies began in 1983, as a joint private venture between FFV Ordnance and Saab Missiles. The first fully guided flight took place in 1988.

Type 53 Chinese 82mm Mortar





Tiers:

1 2 3 **4**

System

Alternate Designation: Type 53
Type: Mortar
Caliber: 82mm
Manufacturer: Norinco
Crew: 2
Elevation: +45° to +75°
Traverse: 6° to 15°
Rate of Fire: 25–30 rpm
Muzzle Velocity: 211 m/s
Maximum Firing Range: 3,040 m

Dimensions

Barrel Length: 1.22 m
Weight: 56 kg
Shell Weight: 3.05 kg

Notes:

The Type 53 82mm Mortar is a Chinese version of the Russian M-37 (82-BM-37). The M-37 or 82-BM-37 (батальонный миномёт) is a Soviet 82mm caliber mortar designed by B.I. Szayrin and accepted into service in 1937. The design of the M-37 is based on the earlier French Brandt mle 27/31 mortar with Russian modifications. The main difference between the 82-PM-37 and the earlier 82-PM-36 was the adoption of a round base-plate, revised traverse/elevation controls, simplified sights and spring-loaded shock absorbers on the bi-pod to reduce the amount of relaying needed between shots. The German designation for captured M-37 mortars was 8.2 cm GrW 274/2(r). The M-37M is an improved version with lighter base plate and a device to prevent double loading. It was produced in China by Norinco as the Type 53, in Egypt by the Helwan Machine Tools Company as the Model 69 and in Bulgaria by Arsenal as the M-82 Mod 1937.

M-37 (82-BM-37) Russian 82mm Mortar



Tiers:



System

Alternate Designation: M-37 or 82-BM-37

Manufacturer: INA

In Service: Still in Service

Crew: 1

Dimensions

Length: INA

Barrel Length: 1.2 m

Weight: 56 kg

Armament

↳*System*

Name: M-37

Type: Mortar

Caliber: 82mm

Elevation: +45° to +75°

Traverse: 6° to 15°

Rate of FIre: 25–30 rpm

Muzzle Velocity: 211 m/s

Maximum Firing Range: 3,040 m

↳*Ammunition*

Name: INA

Type: Mortar Projectile

Caliber: 82mm

Shell: 3.05 kg

Notes:

The M-37 or 82-BM-37 (батальонный миномёт) is a Soviet 82 millimeter calibre mortar designed by B.I. Szayrin and accepted into service in 1937. The design of the M-37 is based on the earlier French Brandt mle 27/31 mortar with Russian modifications. The main difference between the 82-PM-37 and the earlier 82-PM-36 was the adoption of a round base-plate, revised traverse/elevation controls, simplified sights and spring-loaded shock absorbers on the bi-pod to reduce the amount of relaying needed between shots. The German designation for captured M-37 mortars was 8.2 cm GrW 274/2(r). The M-37M is an improved version with lighter base plate and a device to prevent double loading. It was produced in China by Norinco as the Type 53, in Egypt by the Helwan Machine Tools Company as the Model 69 and in Bulgaria by Arsenal as the M-82 Mod 1937.

HM 16 Hadid Iranian 120mm Mortar





Tiers:

1 2 **3** 4

System

Alternate Designation: HM 16 Hadid
Manufacturer: Defense Industries Organization
In Service: INA
Crew: 3

Dimensions

Length: INA
Barrel Length: 1726 mm
Weight, Total: 138.5 kg

Armament

↳*System*

Name: HM 16 Hadid
Type: 120mm Mortar
Caliber: 120mm
Rate of Fire: 10 rounds per minute
Effective Firing Range: 7,200 metres
Elevation: 45° to 85°
Traverse: 360°
Feed System: Manual

↳*Ammunition*

Name: INA
Type: See Ammuntion Types
Caliber: 120mm

Shell: INA

Shell Weight: INA

Ammuntion Types: *XM395 precision guided munition *M929 smoke cartridge (White Phosphorus) *XM930 illumination round *XM930E1 illumination round *XM931 practice round *M933 high explosive round *M934 high explosive round *M934A1 high explosive round *XM983 illumination round

Notes:

The HM 16 Hadid is an Iranian unlicensed copy of the Israeli Soltam K6 120 mm mortar. It is manufactured by the Ammunition & Metallurgy Industries Group, part of Iran's Defense Industries Organization. It is a smoothbore and barrel-loading mortar with 360° field of firing and can be taken apart and carried by infantry. Under the "Hadid" line, Iran also produces 60 mm and 81 mm mortars.

M120 American 120mm Mortar




Tiers:



Variants:

- **Soltam K6:** Israeli Version

System

Alternate Designation: M120; Israel: Soltam K6
Manufacturer: Soltam Systems
In Service: INA
Crew: 5

Dimensions

Length: INA
Barrel Length: 1726 mm
Weight, Total: 144.7 kg
M298 Cannon Assembly Weight: 50 kg
M190 Bipod Assembly Weight: 32 kg
M9 Base Plate Weight: 62 kg
M1100 Trailer Weight: 181 kg
M67 SIght Unit Weight: 1.1 kg

Armament

↳*System*

Name: M120
Type: 120mm Mortar
Caliber: 120mm
Rate of Fire: 16 RPM max, 4 RPM sustained
Effective Firing Range: 7,240 metres

Feed System: Manual

↳*Ammunition*

Name: INA
Type: See Ammuntion Types
Caliber: 120mm
Shell: INA
Shell Weight: INA
Ammuntion Types: *XM395 precision guided munition *M929 smoke cartridge (White Phosphorus) *XM930 illumination round *XM930E1 illumination round *XM931 practice round *M933 high explosive round *M934 high explosive round *M934A1 high explosive round *XM983 illumination round

Notes:

The K6 entered service with the United States Army in 1991 as the M120 Mortar System. Its mission is to provide heavy weapon, high-angle organic indirect fire support to the unit commander. The M120 is used by both mechanized units and light infantry in certain situations. Another feature of the M120 is the M303 Sub-Caliber insert, which allows the mortar to fire 81 mm ammunition. The M120 is transported on the M1100 Trailer by the M998 Humvee. The version that is mounted on the M1064 and M1129 mortar carriers is known as the M121. The Soltam K6 is a 120 mm (4.75 inch) mortar that was developed by Soltam Systems of Israel. It is the long-range version of the Soltam K5 and has replaced older systems, such as the 107-millimetre (4.2 in) M30, in several armies including the United States Army. It is much lighter than the M30, has a greater range, and can sustain a rate of fire of four rounds per minute, while the M30 could sustain only three. The K6 fires fin-stabilized ammunition from a smoothbore barrel. Unlike its smaller ammunition cousins, the 81 mm and 60 mm mortars, the fin blades of the ammunition fired from the M120 are not canted. Thus, no spin is imparted to the projectile in flight. Although heavy mortars require trucks or tracked mortar carriers to move them, they are still much lighter than field artillery pieces. They outrange light and medium mortars, and their explosive power is much greater. An improved version is known as the K6A3. High explosive rounds fired by the M120 weigh about 31 lb (14 kg) and can have a lethality radius of 225 ft (69 m).

M1943 (120-PM-43) Russian 120mm Mortar



Tiers:



Variants:

- **Type 53:** China version
- **Type 55:** A more robust but heavier version, the Type 55, was developed by Norinco.
- **Helwan Model UK 2.:** Egypt also produced a locally modified variant, the Helwan Model UK 2.

System

Alternate Designation: M1943; Samovar ; 120-PM-43
Type: 120mm Mortar
Manufacturer: Russia; Company: INA
In Service: 1943-Present
Crew: 6

Dimensions

Length: INA
Barrel Length: INA
Weight: 275 kg

Main Weapon System

↳*System*

Name: M1943
Type: Mortar
Caliber: 120mm
Breech: muzzle loaded
Elevation: +45° to +80°
Traverse: t could accommodate small-angle shifts of up to 6 degrees without having to shift the baseplate though.
Rate of Fire: 9 rpm maximum, 70 rds/hr sustained
Muzzle Velocity: 272 m/s

Effective Firing Range: 5,700 m (6,200 yd) maximum, 500 m (550 yd) minimum

↳*Ammunition*

Type: Mortar Projectile

Caliber: 120mm

Basic Load: INA

Types of Ammunition: FRAG-HE and HE

Notes:

The M1943 Mortar also known as the SAMOVAR is a Soviet 120 millimeter calibre smoothbore mortar first introduced in 1943 as a modified version of the M1938 mortar. It virtually replaced the M1938 as the standard weapon for mortar batteries in all Soviet infantry battalions by the late 1980s, though the armies of the Warsaw Pact utilised both in their forces. This muzzle-loading mortar can be easily broken down into three parts – barrel, bipod and baseplate – for movement over short distances or towed by a GAZ-66 truck on a two-wheel tubular carriage. The baseplate mounting permits all-azimuth firing, however as with most Soviet mortars it was difficult to turn rapidly over a wide traverse. It could accommodate small-angle shifts of up to 6 degrees without having to shift the baseplate though.

2B25 Russian 82mm Mortar



Tiers:

1 2 3 4

System

Alternate Designation: 2B25

Type: 82mm Mortar

Manufacturer: INA

Crew: 2

Maximum Firing Range: 1,200 m

Minimum Firing Range: 100

Maximum Rate of Fire Without Relaying: 15 RMP

Elevation: 45-85 deg

Traverse, on Bipod: 4 deg

Traverse, by Moving Bipod: 360 deg

Time to Transfer the Morar from Travelling to COmbat Position And Vice Versa: 30 seconds Max

Dimensions

Length: INA

Width: INA

Height: INA

Weight: 13 kg

Note: 2B25 mortar can be transferred from combat to travelling position and vice versa without its disassembling into parts. To short distances it is carried with the help of straps attached to the mortar. To large distances the mortar may be transported in a standard box by any means of transportation or by the crew in a rucksack. Due to its small size and weight, 2B25 mortar can easy be carried by one soldier.

Notes:

2B25 mortar is used to engage the enemy troops situated both in the open and in uncovered field entrenchments and is effective against personnel wearing individual armour. 2B25 can deliver indirect fire against visible and non observable targets from various types of ground both in the day and night time, at ambient temperature -50 to +50 °C. The unique design of 2B25 mortar and its 3VO35 bomb provides the advantage of concealed operation. The mortar fire attack is not expected by the enemy because of the mortar low acoustic signature, absence of flash and smoke. 2B25 mortar can be transferred from combat to travelling position and vice versa without its disassembling into parts. To short distances it is carried with the help of straps

attached to the mortar. To large distances the mortar may be transported in a standard box by any means of transportation or by the crew in a rucksack. Due to its small size and weight, 2B25 mortar can easy be carried by one soldier. All these advantages make the mortar attractive for Special Forces, especially in counter-terrorism operations.

MO-120-RT (MO-120 RT-61) French 120mm Mortar





Tiers:



Variants:

- **120 2R2M:** Mounted in light armored vehicles such as the MOWAG Piranha APC or the Turkish FMC-NUROL mortar vehicle

System

Alternative Designation : RT-61, Mortier 120mm Rayé Tracté Modèle F1
Crew : 4
Displacement Time : min2
Emplacement Time : min1.5
Gound Clearance : m0.35
Prime Mover: VAB M120 4x4 wheeled

Dimensions

Height, Overall: m1.1
Length, Chassis Overall: m5.98
Length, Overall: m2.7
Width, Overall: m1.55
Weight, Combat: kg582

Automotive

Prime Mover: VTM M120 4x4 wheeled

Engine Type: Renault VI MIDS, 220 hp, diesel engine

Range, Cruising : km1,000

Speed, Maximum Cross-Country: km/h30

Speed, Maximum Off-Road: km/h60

Speed, Maximum On-Road: km/h92

Ground Clearance: m.35

Main Armament

Cailber/Length : mm120

Elevation : deg+30/+85

Loader Type: Manual

Rate of Fire, Burst : rd/min18.0

Rate of Fire, Normal : rd/min10.0

Rate of Fire, Sustained : INA

Traverse : deg15.0

Traverse, Left : deg7.5

Traverse, Right : deg7.5

Ammunition

↳*Ammunition (Option 1)*

Name: PR-14

Type: Frag-HE

Cailber/Length : mm120.0

Fuze Type: M557 PD

Maximum Indirect Fire Range : m8,135

Range, Minimum : m1,100

Maximum Velocity : m/sINA

Weight : kg18.6

↳*Ammunition (Option 2)*

Name: PRPA (Rocket Assist)

Type: HE-RA

Cailber/Length : mm120.0

Fuze Type: M557 PD

Maximum Indirect Fire Range : m13,000

Range, Minimum : m1,100

Maximum Velocity : m/sINA

Weight : kg18.6

↳Other Munitions

: All standard 120-mm smoothbore mortar projectiles without fold-out fins.

Fire Control System

Collimator: INA

Indirect Fire: INA

Notes:

The RT-61 is a rifled mortar capable of firing pre-engraved spin-stabilized and smoothbore 120mm mortar projectiles with or without rocket assist. However, it is not capable of firing smoothbore mortar projectiles with fold out fins (spring-loaded tail assemblies with straight fins). The RT-61 is a three-piece mortar system consisting of a rifled tube, a baseplate, and a wheeled carriage. Trigger firing is the normal method of firing for this mortar. Drop firing can be accomplished only with smoothbore mortar projectiles.

Type 55 Chinese Towed 120mm Mortar




Tiers:

1 2 3 **4**

Variants:

- **Type 53:** China version
- **Helwan Model UK 2.:** Egypt also produced a locally modified variant, the Helwan Model UK 2.

System

Alternate Designation: Type 55
Type: 120mm Mortar
Manufacturer: China; Company: INA
Crew: 6

Dimensions

Length: INA
Barrel Length: INA
Weight: More than 275 kg

Main Weapon System

↳ ***System***

Name: Type 55
Type: Mortar
Caliber: 120mm
Breech: muzzle loaded
Elevation: +45° to +80°
Traverse: t could accommodate small-angle shifts of up to 6 degrees without having to shift the baseplate though.
Rate of Fire: 9 rpm maximum, 70 rds/hr sustained
Muzzle Velocity: 272 m/s
Effective Firing Range: 5,700 m (6,200 yd) maximum, 500 m (550 yd) minimum

↳*Ammunition*

Type: Mortar Projectile
Caliber: 120mm
Basic Load: INA
Types of Ammunition: FRAG-HE and HE

Notes:

The Type 55 120mm Mortar is a Chinese version of the Russian M1943 120mm Mortar. A more robust but heavier version, the Type 55, was developed by Norinco. The M1943 Mortar also known as the SAMOVAR is a Soviet 120 millimetre caliber smooth-bore mortar first introduced in 1943 as a modified version of the M1938 mortar. It virtually replaced the M1938 as the standard weapon for mortar batteries in all Soviet infantry battalions by the late 1980s, though the armies of the Warsaw Pact utilized both in their forces. This muzzle-loading mortar can be easily broken down into three parts – barrel, bipod and base plate – for movement over short distances or towed by a GAZ-66 truck on a two-wheel tubular carriage. The base plate mounting permits all-azimuth firing, however as with most Soviet mortars it was difficult to turn rapidly over a wide traverse. It could accommodate small-angle shifts of up to 6 degrees without having to shift the base plate though.

HY 12 Turkish 120mm Heavy Mortar



Tiers:



Variants:

- **Turkish copy:** It was copied without license in Turkey and manufactured by MKEK as the HY 12 mortar.
- **Japanese Type 96:** The Japan Ground Self-Defense Force have a self-propelled version of the RT-61 with 50 rounds, the Type 96.
- **2R2M:** The 2R2M is a derivative of the MO-120-RT-61 designed to be carried on light armoured vehicles, with a semi-automatic loading. The system has also been modified by the USMC as the Dragon Fire
- **Expeditionary Fire Support System:** The United States Marine Corps began looking for an Expeditionary Fire Support System (EFSS) in 2001 after the start of operations in Afghanistan exposed their lack of expeditionary artillery lighter than a 155 mm howitzer but heavier than a 60 mm mortar. Early on, the weapon became tied to the development of the MV-22 Osprey, which would contain a Growler ITV jeep that would tow it; both efforts were troubled and experienced delays. The EFSS was first used operationally in Afghanistan in February 2011, firing an M1105 illumination projectile. The full EFSS was introduced in 2009, consisting of two light vehicles, one towing the mortar and the other an ammunition trailer, that fit inside an MV-22 or CH-53E Super Stallion; an EFSS battery is made up of roughly 50 Marines. From 2011 to 2015, the Marines and Raytheon developed the precision extended range munition (PERM) for the EFSS, a GPS-guided round that delivers greater range and better accuracy. The 35 lb (16 kg) round increased range from 8 km (5.0 mi) to 16 km (9.9 mi), falling within 10 meters of the target and as close as two meters, costing $18,000 each, and having 2.5–3 times more lethality. The extra range came from tail fins for stabilization and canards near the nose to make in-flight adjustments and make it glide as it descends, and the greater lethality was a result of this flight path; normal artillery rounds impact at a 45 degree angle, which blows the top half of the round straight up into the air, but descending at a sharp angle places more energy and fragmentation directly on a target. It was even capable of hitting reverse slope positions by shaping its trajectory. Greater accuracy also reduces logistical burdens, as using fewer rounds to destroy one target means a unit can last longer without needing resupply. The PERM was to begin fielding in 2018. Raytheon planned to add semi-active laser (SAL) guidance to PERM rounds to enable them to hit moving targets. By December 2017, the U.S. Marines had divested the EFSS. With the Marines working to extend the range of their artillery arsenal, the EFSS' limited range was not seen as well suited for future missions, so it was chosen for divestment in favor of moving more resources for precision fires.

System

Alternate Designation: HY 12

Manufacturer: TDA Armements (France), Thomson-CSF/Daimler Benz Aerospace (Germany), Hotchkiss Brandt (Netherlands), MKEK (Turkey), Howa (Japan)

In Service: 1973-Present

Crew: 4 gunners

Dimensions

Length: INA

Barrel Length: 280 cm (9 ft 2 in)

Weight: 582 kg (1,283 lb)

Main Weapon System

↳*System*

Name: HY 12

Type: Heavy Mortar

Caliber: mm120

Carriage: wheeled

Elevation: 30–85°

Traverse: ±14° from centreline

Rate of Fire: 6 to 10 rpm

Effective Firing Range: 8,140 m (8,900 yd) with standard projectile 12,850 m (14,050 yd) with rocket projectile

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm120

Shell Weight: 18.7 kg

Basic Load: INA

Notes:

The HY 12 120mm Heavy Mortar is a Turkish version of the French MO-120 RT-61 (MO-120-RT) 120mm Heavy Mortar The MO-120 RT-61 (factory designator) or MO-120-RT is a heavy mortar of French origin. The RT in the designator stands for rayé, tracté, which means rifled, towed. The RT-61 is currently used by the French Army (where it is known as RT F1 or Mortier de 120mm Rayé Tracté Modèle F1—"120 mm rifled towed mortar, model F1"), and is produced under licence in various countries. The MO-120 RT-61 is issued to artillery units, where it augments the 155 mm towed artillery. The RT-61 uses standard NATO rounds as well as the specially designed PR-14 (HE) and the PRPA (HERA). The weapon can be fired either by dropping the round down the tube (after aligning of the rifling bands) resulting in an automatic firing once the bomb hits the tube base, or by a controlled firing by dropping the bomb down the tube and pulling on a lanyard that will in turn set off the triggering mechanism in the base of the tube. Rounds fired from the mortar can reach as high as 8,000 ft (2,400 m) and hit the ground with an effective kill radius of nearly 250 ft (76 m). In French service, this weapon is normally towed by the VTM 120 (Véhicule Tracteur Mortier de 120 mm), a wheeled armored vehicle that is a derivative of the VAB 4×4 series of armored personnel carrier. Towing is accomplished by a towing hitch that is screwed onto the muzzle of the weapon. The VTM 120 also carries 70 rounds for the mortar and offers basic ballistic protection from small arms fire and shrapnel for the crew. The RT-61 can also be towed by the AMX-10 TM (Tracteur de Mortier), which is a version of the AMX-10P tracked APC. The mortars, which originally equipped infantry regiments, have now all been transferred to the artillery regiments, where they augment the 155 mm towed artillery.

M19 American 60mm Mortar



Tiers:

1 2 3 4

System

Alternate Designation: M19

Manufacturer: USA

In Service: Still in Service

Dimensions

Length: 81.9 cm (2 ft 8.2 in)

Barrel Length: 72.6 cm (2 ft 4.6 in)

Weight: 23.4 kilograms (52 lb) (M5 mount) 9.3 kilograms (21 lb) (M1 mount)

Armament

↳*System*

Name: M19

Type: Mortar

Caliber: 60mm

Elevation: +40° to +85° on M5 mount free on M1 mount

Traverse: 14° on M5 mount free on M1 mount

Muzzle Velocity: 89 m/s

Maximum Firing Range: 747 m

Effective Firing Range: 68 m

Feed System: Manual

↳*Ammunition*

Name: INA

Type: Mortar Projectile

Caliber: 60mm

Shell: 1.36 kg

Notes:

The M19 Mortar is a light, smoothbore, muzzle-loading, high-angle-of-fire weapon for light infantry support developed and produced in the United States. It has been replaced in service by the more modern 60 mm M224 Mortar, which has a much longer range and improved ammunition. The original M19 just had a simple spade-like M1 baseplate, leaving the elevation and traverse free for the firer. This of course was found to be too inaccurate, and the infantry initially refused the M19. A new mount, the M5, was developed, which used a conventional baseplate and bipod with elevation and traverse adjustment. This gave the M19 better accuracy, but made it heavier than the M2 Mortar with less range. The M19 fired the same ammunition used in the M2 mortar, which it would replace. The 60 mm mortar is used by the infantry to lob high-explosive and white phosphorus smoke shells at well-protected hostile locations. The weapon can also fire illumination rounds to light up the battlefield at night. The primary difference between the M2 and M19 was that the M2 was drop-fire only while the M19 could be drop-fired or a round loaded and then fired by a lever-like trigger at the base of the tube. M19 development began in 1942 as the T18E6 to replace the M2 Mortar. It was a very simple and light weapon, but was too inaccurate without a mounting. The conventional M5 mount for the M2 mortar was fitted to it. It began to be fielded during the Korean War to replace the M2 and saw limited use in the Vietnam War. Many M19s were scrapped or exported to other countries.

HM 12 Fateh (Hadid) Iranian 60mm Mortar



Tiers:



System

Alternate Designation: HM 12 Feteh; Hadid
Manufacturer: Defense Industries Organization
In Service: Still in Service
Crew: 2

Dimensions

Length: INA
Barrel Length: 677mm
Weight: 6,5 kg

Armament

↳*System*

Name: HM 12
Type: Mortar
Caliber: 60mm
Elevation: 45° to 85°
Traverse: 360°
Rate of Fire: 20 round per minute
Maximum Firing Range: 1050m

↳*Ammunition*

Name: INA
Type: Mortar Projectile
Caliber: 60mm
Shell: INA

Notes:

The HM 12 Fateh (or Hadid) is an Iranian 60mm mortar manufactured by the Ammunition & Metallurgy Industries Group, part of Iran's Defense Industries Organization. It is an unlicensed copy of Israel's Soltam 60 mm mortar. It is generally operated by two people but in urgent cases it can be operated by one as well.

M29 American 81mm Mortar



Tiers:



System

Alternate Designation: M29

Manufacturer: USA

Crew: The weapon was usually serviced by a crew of five. The normal crew consisted of a squad leader, a gunner, an assistant gunner and two ammunition handlers.

Dimensions

Length: INA

Barrel Length: INA

Weight: 23.4 kilograms (52 lb) (M5 mount) 9.3 kilograms (21 lb) (M1 mount)

Armament

↳*System*

Name: M29

Type: Mortar

Caliber: 81mm

Feed System: Manual

Rate of Fire: The maximum rate of fire is 30 rounds for the first minute followed by 4 to 12 rounds per additional minute

Maximum Firing Range: he range is 5,140 yards.

↳*Ammunition*

Name: INA

Type: Mortar Projectile

Caliber: 81mm

Shell: INA

Notes:

The M29 is an American-produced 81 millimeter mortar. It began replacing the M1 mortar in U.S. service in 1952 being lighter and with greater range. It was subsequently replaced by the M252 mortar in 1987. Variants included the M29E1 and M29A1, adopted in 1964. These were produced with a hard chrome-plated bore to prolong barrel life and ease of cleaning. The maximum rate of fire is 30 rounds for the first minute followed by 4 to 12 rounds per additional minute. The range is 5,140 yards. The weapon was usually serviced by a crew of five. The normal crew consisted of a squad leader, a gunner, an assistant gunner and two ammunition handlers.

L16 British 81mm Mortar



Tiers:



Variants:

- **F2 81mm Mortar:** The version produced and used by Australia is named the F2 81mm Mortar, whilst the version used by the U.S. armed forces is known as the M252.

System

Alternate Designation: L16
Type: 81mm Mortar
Date of Introduction: 1956
Proliferation: Widley Proliferated
Manufacturer: Royal Ordnance (barrel and bipod)
In Service: 1956-Present
Crew: 3

Dimensions

Length: INA
Barrel Length: mm1,280
Weight: 35.3 kg

Armament

↳*System*

Name: L16
Type: Mortar
Caliber: mm81
Action: Muzzle loading
Breech: None
Recoil: Baseplate and spring buffered mounting clamp

Rate of Fire: 15 rpm, 1–12 rpm sustained, 20 rpm for short periods

Muzzle Velocity: 225 m/s

Maximum Firing Range: 5,650 m

Effective Firing Range: HE: 100–5,675 m (109–6,206 yd) Smoke: 100–5,675 m (109–6,206 yd) Flare: 400–4,800 m (437–5,249 yd)

Feed System: Manual

Sights: Optical (C2) with Trilux illumination

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm81

Basic Load: INA

Notes:

The United Kingdom's L16 81mm mortar is the standard mortar used by the British armed forces. It originated as a joint design by the UK and Canada. The version produced and used by Australia is named the F2 81mm Mortar, whilst the version used by the U.S. armed forces is known as the M252. It was introduced in 1965–66, replacing the Ordnance ML 3 inch Mortar in UK service, where it is used by the British Army, the Royal Marines and the RAF Regiment. In UK armoured/mechanised infantry battalions, the L16 mortar is mounted in an FV 432 AFV (six per battalion mortar platoon). British army light role infantry battalions and the Royal Marines may transport their mortars in BvS 10 vehicles (the replacement for the Bv 206). Otherwise, it is carried disassembled in three loads, (barrel, baseplate and bipod with sights, each approximately 11 kg), normally carried by a vehicle or helicopter and assembled for firing from the ground. The weapon can be man-packed by the mortar detachment, in which case the ammunition would be carried by other soldiers of the battalion. In addition to their normal equipment, each soldier would carry four bombs in a pair of two-bomb plastic containers (known as greenies in the British Army). The mortar has been used by many countries' armed forces.

2B24 Russian 82mm Mortar





Tiers:



System

Alternative Designation: NA

Date of Introduction: 2018

Proliferation: INA

Crew: 5

Emplacement Time: 30 seconds maximum

Displacement Time: 30 seconds maximum

Maximum Effective Range: m6,000

Minimum Effective Range: m100

Transportation: Is man portable for short distances by the 5 man squad. Can be transported by a single ATV. Can be mounted on combat vehicles to be fired from a mounted position.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: kg45

Weight, Barrel: INA

Weight, Baseplate: INA

Weight, Bipod: INA

Weight, Sight: INA

Armament

↳*System*

Loader Type: Muzzle loaded

Max Rate of Fire: rds/min20

Sustain Rate of Fire: rds/minINA

Max Elevation: deg85°

Min Elevation: deg45°

Traverse Range: ±4° (without bipod repositioning); 360° (with bipod repositioning)

↳*Ammunition*

Type: HE, Smoke, Illum, HE Frag

Caliber: mm82

Muzzle Velocity: m/s320

Fuse Type: INA

Basic Load: INA

Effective Ranges: 100m-6,000m

Armor Penetration: INA

Weight of Round: INA

Note:: HE Frag Rounds: 3-O-26, O-832 D, O-832 DU and 3-O-12. Other types of mortar rounds can also be used to perform certain tactical and fire tasks: smoke (D-832DU and D-832 A), illuminating (S-832 S) and leaflet (A-832 A) rounds.

Fire Control

Computerized FCS: No

Direct Fire: INA

Indirect Fire: Yes

Collimator: Yes

Notes:

The 82 mm 2B24 mortar is also in Rosoboronexport`s mortars portfolio. The mortar is designed to suppress and destroy enemy`s manpower and weapon systems. It should be noted that 2B24 features enhanced maneuverability and combat effectiveness. The mortar can be installed on various types of wheeled or tracked chassis. According to the specifications, 2B24 has a firing range of 100-6,000 m, a firing rate of 20 rounds per minute, a weight of 45 kg, and a crew of five servicemen.

Type 67 Chinese 82mm Mortar



Tiers:

1 2 3 4

System

Alternate Designation: Type 67
Type: Mortar
Caliber: 82 mm
Manufacturer: INA
In Service: 1967-Present
Crew: 2
Lethal Radius: 26 m

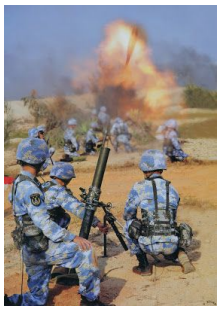
Dimensions

Length: INA
Width: INA
Height: INA
Total Weight: INA
Shrapnel Weight: 3.32 kg
TNT Weight: 0.4 kg

Notes:

The Type 67 82mm Mortar is Chinese infantry support weapon developed in year 1967. It is a modernization of the older Type 53 82mm mortar, which is the Chinese copy of Soviet PM-41 82mm mortar. The mortar was widely used in the Vietnam War by the People's Army of Vietnam (NVA). This mortar can be used in nearly horizontal direction, which means it can be used to destroy pillbox and obstructions. The Type 67 82mm mortar can use different types of shells. The shrapnel of this mortar weights 3.32 kg, with a 0.4 kg TNT, and the lethal radius of this shrapnel is 26m.

Type 71 Chinese 100mm Towed Mortar



Tiers:



System

Manufacturer: NORINCO

Weight of System: 75kg

Weight of Round: 8kg

Muzzle Velocity: 210 m/sec

Range: 4,700m

Ammunition

Types Available: HE, Smoke, and Illum

Notes:

The Type 71, 100mm mortar served with the Chinese People's Liberation Army (PLA). The PLA was the only military in the world to use a 100mm mortar. China used 100mm mortars as the standard regimental level weapon in airborne, highland, jungle and light infantry units that were deployed in the southern part of the country. The Type 71 was basically a larger caliber version of the 82mm Type 67 mortar. The Type 71 consisted of a tube, bi-pod and triangular-shaped base plate. It fired high-explosive (HE), smoke and illuminating (Illum) rounds. The Type 71 was used in the 1979 Sino-Vietnamese border conflicts. The Type 71 is no longer in use.

Type 56 Chinese 160mm Towed Mortar




Tiers:

1 2 3 4

Variants:

- **M-160:** The Soviet 160 mm Mortar M-160 is a smoothbore breech loading heavy mortar which fired a 160 mm bomb. It replaced the 160mm Mortar M1943 in Soviet service after World War II.

System

Alternative Designation: Type 56
Type: 160mm Towed Mortar
In Service: INA
Crew: INA
Carriage: It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66.
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: INA
Barrel Length: 4.55 m
Width: INA
Height: INA
Weight, Combat: 1,300 kg

Automotive Requirement

Prime Mover: It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66.

Main Weapon System

↳*System*

Name: Type 56
Type: Towed Mortar

Caliber: mm160

Elevation: +50° to +80°

Traverse: 24°

Rate of Fire: 2-3 rounds/minute

Muzzle Velocity: 343m per second

Effective Firing Range: 8.040kg

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm160

Shell: 41.5 kg

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Notes:

The Type 56 160mm Towed Mortar is a Chinese variant of the Russian M-160 160mm Towed Mortar. The Soviet 160 mm Mortar M-160 is a smooth-bore breech loading heavy mortar which fired a 160 mm bomb. It replaced the 160mm Mortar M1943 in Soviet service after World War II. It is very similar to the M1943 mortar but has a longer barrel, thus enabling greater range. It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66. China copied it as the Type 56 mortar. It was introduced in 1953. Originally deployed as a standard mortar for all types of division, it is currently particularly used as mountain or urban artillery. Some countries still use it as field artillery. China originally deployed 12 Type 56 mortars per field division. The M-160 saw service during the Arab–Israeli conflict, including the Lebanese Civil War, and with the Indian Army during the Indo-Pakistani War of 1971. It was also used during the Syrian Civil War by the loyalist forces.

M1943 (MT-13) Russian 160mm Towed Heavy Mortar



Tiers:

1 2 3 4

System

Alternative Designation: M1943; MT-13
Type: 160mm Towed Heavy Mortar
Caliber: 160mm
Crew: INA
Carriage: INA
Elevation: +45° to +80°
Traverse: 25°
Rate of Fire: 25°
Muzzle Velocity: 245 m/s
Effective Firing Range: 5,150 m
Emplacement Time: INA
Displacement Time: INA

Dimensions

Length: INA
Barrel Length: 3.03 m
Width: INA
Height: INA
Weight, Combat: 1,170 kg

Ammunition

Name: INA
Type: Mortar
Caliber: 160mm
Shell Weight: 40.8 kg

Basic Load: INA

Fire Control

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Notes:

The Soviet 160 mm Mortar M1943 is a smoothbore breech loading heavy mortar which fired a 160 mm bomb. The M1943 (also called the MT-13) was one of the heaviest mortar used by Soviet troops in World War II. Around 535 of these weapons were fielded with Soviet forces during the war. It was replaced in Soviet service after World War II by the M-160 mortar of the same caliber. Originally a simple scaling-up of the 120 mm M1938 mortar, it soon became apparent that drop-loading a 40 kg bomb into a 3 meter high tube would be too difficult for any man to do. It was redesigned into a breech loading weapon, and contains a substantial recoil system to soak up the massive shock of firing a 160 mm bomb and prevent the baseplate from burying itself too deeply. The barrel sits in a cradle which is attached to a baseplate and tripod. To load the weapon, the barrel is hinged forward which exposes the rear end of the tube. The bomb is then loaded, retained in place by a catch, and the barrel is swung back into the cradle, which in effect closes the breech. Because of the weight of the mortar, it is equipped with wheels and is designed to be towed by a motor-driven vehicle.

F2 Australian 81mm Mortar



Tiers:



Variants:

- **L16:** The United Kingdom's L16 81mm mortar is the standard mortar used by the British armed forces.

System

Alternate Designation: F2
Type: 81mm Mortar
Date of Introduction: 1956
Proliferation: Widley Proliferated
Manufacturer: Royal Ordnance (barrel and bipod)
In Service: 1956-Present
Crew: 3

Dimensions

Length: INA
Barrel Length: mm1,280
Weight: 35.3 kg

Armament

↳*System*

Name: L16
Type: Mortar
Caliber: mm81
Action: Muzzle loading
Breech: None
Recoil: Baseplate and spring buffered mounting clamp
Rate of Fire: 15 rpm, 1–12 rpm sustained, 20 rpm for short periods

Muzzle Velocity: 225 m/s

Maximum Firing Range: 5,650 m

Effective Firing Range: HE: 100–5,675 m (109–6,206 yd) Smoke: 100–5,675 m (109–6,206 yd) Flare: 400–4,800 m (437–5,249 yd)

Feed System: Manual

Sights: Optical (C2) with Trilux illumination

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm81

Basic Load: INA

Notes:

The United Kingdom's L16 81mm mortar is the standard mortar used by the British armed forces. It originated as a joint design by the UK and Canada. The version produced and used by Australia is named the F2 81mm Mortar, whilst the version used by the U.S. armed forces is known as the M252. It was introduced in 1965–66, replacing the Ordnance ML 3 inch Mortar in UK service, where it is used by the British Army, the Royal Marines and the RAF Regiment. In UK armoured/mechanised infantry battalions, the L16 mortar is mounted in an FV 432 AFV (six per battalion mortar platoon). British army light role infantry battalions and the Royal Marines may transport their mortars in BvS 10 vehicles (the replacement for the Bv 206). Otherwise, it is carried disassembled in three loads, (barrel, baseplate and bipod with sights, each approximately 11 kg), normally carried by a vehicle or helicopter and assembled for firing from the ground. The weapon can be man-packed by the mortar detachment, in which case the ammunition would be carried by other soldiers of the battalion. In addition to their normal equipment, each soldier would carry four bombs in a pair of two-bomb plastic containers (known as greenies in the British Army). The mortar has been used by many countries' armed forces.

Soltam K5 (M65) Israeli 120mm Mortar



Tiers:



Variants:

- **M3 Mk. D:** - a M3 Half-track based 120 mm mortar carrier (used exclusively by Israel Defense Forces until replaced by the M1064 mortar carrier),

System

Alternate Designation: Soltam K5 (M65); Soltam M-65
Date of Introduction: 1953
Proliferation: Honduras: Honduran Army Israel: Israel Defense Forces (primary user) Nicaragua Portugal: Portuguese Army Singapore: Singapore Army South Africa: South African Army United States: United States Army
Manufacturer: Soltam Systems
In Service: 1953-Present
Crew: 6

Dimensions

Length: INA
Barrel Length: INA
Weight: 231 kg (firing position), 351 kg (travelling)

Mortar System

↳*System*

Name: M-65
Type: 120mm Mortar
Caliber: 120mm
Carriage: M151 Jeep style carriage wheels
Elevation: +30°/+80°
Traverse: -20°/+20°
Rate of Fire: 1st minute: 16 rounds burst, 4 rounds per minute sustained thereafter.

Maximum Firing Range: 6500m

↳*Ammunition*

Name: INA

Type: Mortar Projectile

Caliber: 120mm

Shell: Standard 120mm NATO mortar round

Notes:

The Soltam M-65 is a 120 mm mortar that was developed by Tampella in 1953 via introduction of new baseplate for 120 Krh/40 invented by Hans Otto Donner. In 1960s Soltam Systems of Israel bought a license. The mortar system comes in two versions, a standard mortar and a long-range version. This heavy mortar is light enough to be transported by helicopter sling load, drop by parachute or carried in an APC such as the M113 Armored Personnel Carrier. It can also be towed as a normal artillery piece or even manhandled if necessary. The wheels on the carriage are the same as fitted to the M151 Jeep, and have handling rings to aid in manhandling it. All components are made of chrome-plated or stainless steel to resist wear and corrosion.

Type W86 (W86) Chinese 120mm Towed Mortar



Tiers:



System

Alternative Designation: W86

Carriage: 2 wheeled available

Crew: 7-9

Date of Introduction: 1980s

Prime Mover: Can be towed by any vehicle or beast of burden. Can be carried on the Type 63 or Type 85 APCs and the YW-531H.

Proliferation: Algeria

Dimensions

Height, Overall: m1.08

Length, Chassis Overall Travel: m2.36

Width, Travel: m1.56

Weight, Combat: 206kg (firing), 291kg (traveling)

Armament

↳*Mortar*

Cailber/Length: mm120mm

Elevation: deg+40 to +80

Rate of Fire, Burst: rd/min20

Traverse: 5 deg left and right on bipod, 360 when on baseplate

Range: 400m to 7.7km

Ammunition

Note:: Rounds were developed specifically for this system however, the Type 86 can fire any previously Russian or Chinese developed 120mm mortar rounds with a reduction in range.

Notes:

Developed to replace the Type 55 mortar. The Type 86 (W86) is a 120mm smoothbore that is lighter and more modern than its predecessor. It has a recoil buffer that is wrapped around the barrel. A conventional bi-pod and triangular baseplate are available. During travel a small two wheel carriage is used to transport the Type 86, which is towed by its muzzle. Although the Type 86 can be disassembled into several pieces, it is far too heavy to be considered man-portable. The two wheel carriage allows it to be towed by troops into position and over long distances by light weight vehicles.

2S12 Sani Russian 120mm Towed Heavy Mortar





Tiers:



Variants:

- **SMM 74 B1.10 "Tundzha-Sani":** Bulgarian version on MT-LB.
- **SM120:** Belarusian version on MT-LBu.
- **Aybat:** Kazakh version on MT-LB.

System

Alternative Designation: 2S12 Sani
Date of Introduction: 1981
Proliferation: Algeria Azerbaijan Belarus: 61 Bulgaria Georgia: 14 Kazakhstan Kyrgyzstan: 6 Russia: more than 1,700 as of 2016, including 1,000 in store Tajikistan Ukraine: 214 Uzbekistan: 19 Venezuela: 48
Type: 120mm Towed Heavy Mortar
Manufacturer: Uraltransmash Works (Ekaterinburg, Russia) Motovilikha Plants Corporation (Perm, Russia)
In Service: 1981-Present
Crew: 4 gunners, 1 commander (plus 2 prime mover crew)
Carriage: 2F510 2×1 wheeled transport chassis, GAZ-66 4×4 truck (prime mover)
Chassis: 2×1 wheeled chassis 2L81
Displacement Time: minutesunder 2
Emplacement Time: minutesunder 2

Dimensions

Length: INA
Barrel Length: INA
Weight, Combat: 190.5 kg (420 lb) without transport chassis

Automotive Requirement

Prime Mover: GAZ-66-15 4×4 truck.

Main Weapon System

↳*System*

Name: 2S12 Sani
Type: Towed Heavy Mortar
Caliber: 120mm
Carriage: 2F510 2×1 wheeled transport chassis, GAZ-66 4×4 truck (prime mover)
Elevation: 45°–80°
Traverse: ±5° from center
Rate of Fire: 12 rds per minute
Effective Firing Range: Minimum: 0.5 km (0.31 mi) Maximum: 7.1 km (4.4 mi)
Sights: MPM-44M graduated sight

↳*Ammunition*

Type: HE Mortar Projectile
Caliber: mm120
Shell: 120 mm HE mortar bombs
Basic Load: INA

Fire Control

Name: INA
Computerized FCS: NO
Direct Fire: No
Indirect Fire: Yes

Notes:

The 2S12 "Sani" ("sleigh") (GRAU index) is a 120 mm heavy mortar system used by the Russian Army and other former Soviet states. First fielded in 1981, the 2S12 is a continued development on the towed mortars first used in World War II. 2S12 is in fact the designator for the combination of the 2B11 "Sani" heavy mortar with its transport vehicle 2F510, a GAZ-66-15 4×4 truck. The 2B11 weighs nearly 500 lb when fully assembled, and thus must be mounted to the 2×1 wheeled chassis 2L81 and towed to the emplacement site by the truck. The GAZ-66 prime mover also transports the ammo load: 24 70-lb crates of 120mm HE mortar bombs, 2 bombs per crate, for a total of 48 available rounds. Once on site, it is unloaded from the transport chassis and manually emplaced by the crew of 5. It is the largest caliber indirect artillery employed at the battalion level. There is also an improved model, the 2B11M, that can fire the laser-guided round "Gran" with a range of 7,500 m. 2S12A and 2S12B improved models are in service now. 2S12A got a new "Ural" family transport vehicle with high power diesel engine and electric hoist for loading the mortar and a new base plate with a hinge that allows for pointing horizontally without turning the heavy support.

Type 87 Chinese 82mm Mortar



Tiers:



System

Manufacturer: NORINCO
Weight of System: 27 kg
Length: 1.4 m
Elevation: 45 degrees to 85 degrees
Traverse: 4 degrees to the left and to the right
Rate of Fire: 20 r/min
Effective Firing Range: Between 120m and 5.6km. 6km could be reached with an assisted round

Ammunition

Types Available: INA

Notes:

The Type 87 82mm Mortar is a Chinese infantry mortar developed by Norinco in 1987. It is a replacement for the older Type 67 82mm mortar used at the battalion level. An 81mm version called the W87 was also developed for export markets.

2B14 Podnos Russian 82mm Mortar



Tiers:



System

Alternative Designation: M82 (Bulgarian production)

Date of Introduction: 1983

Proliferation: Georgia, Malaysia, Russia, Syria, Ukraine

Crew: 4

Displacement Time: INA

Emplacement Time: INA

Maximum Effective Range: 4.1km (5.6km for M-74 HE)

Minimum Effective Range: km0.08

Transportation: Is man portable by 3 soldiers for short distances or can be loaded into any vehicle for transportation. The mortar can also be mounted on and fired from a vehicle.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: kg41.88

Weight, Barrel: kg15.7

Weight, Baseplate: kg10.5

Weight, Bipod: kg15.7

Weight, Sight: kg.9

Mortar

↳***Mortar***

Loader Type: Muzzle loaded

Max Rate of Fire: rds/min30

Sustain Rate of Fire: rds/min24

Max Elevation: deg85°

Min Elevation: deg45°

Traverse Range: ±8° (without bipod repositioning)

↳*Ammunition*

Type: HE, Illum, M-74 HE, Smoke, WP

Caliber: mm82

Muzzle Velocity: INA

Fuse Type: INA

Basic Load: INA

Effective Ranges: Minimum: 80m, Maximum: 4,100m (M-74 max range: 5,600)

Armor Penetration: INA

Weight of Round: kg3.14

Note:: Can fire all ammunition designed for earlier model 82mm Soviet / Russian mortars

Fire Control

Computerized FCS: No

Direct Fire: INA

Indirect Fire: Yes

Collimator: Yes

Notes:

The 2B14 Podnos is a Russian 82 mm mortar. The 2B14 was designed in early 1980s as a light, indirect fire weapon for the use of airborne and other light infantry forces. It was developed to replace the older M47 and is lighter and has better range than its predecessor. Despite the intent to field the 2B14 with light infantry units, the 2B14 appears to have been fielded with regular motor rifle units as well at a scale of six per battalion.

Type 63-1 Chinese 60mm Mortar



Tiers:



Variants:

- **Type 31:** The Type 31 is the original Chinese "copy" of the US M2, 60mm mortar which is a copy of the French Modele 1935 60mm mortar. Improvements of the Type 31 became the Type 63.
- **Type 63:** The Type 63 has a rectangular base plate in comparison to the Type 31's oval base plate.

System

Crew: ea1

Carriage: Man-portable

Emplacement Time: Less than 1 minute

Displacement Time: Less than 1 minute

Maximum Effective Range: m1,550

Action: Manually operated, pin strike

Caliber: mm60

Maximum Rate of Fire: rounds/min30

Dimensions

Length: mm610

Weight: kg12.1

Barrel Weight: kg4.1

Base Plate Weight: kg3.3

Bipod Weight: kg4.1

Sight Weight: kg.6

Mortar

↳*Ammunition*

Type: HE, Illum, Smoke, WP

Caliber: mm60

Muzzle Velocity: m/s152

Effective Range: 95m to 1550m

Fire Control

Computerized FCS: No

Direct Fire: Yes

Collimator: Yes

Sights: Adjustable elevation mechanism

Notes:

China produced a version of the US's M2 mortar, which was designated as the Type 31. Some were supplied to North Korea and North Vietnam. It was later modified as the Type 63 and then as the Type 63-1. This latter type has been produced under license by Pakistan Machine Tool Factory Limited in Pakistan and by Helwan Machine Tools Company in Egypt.

Soltam K6 Israeli 120mm Mortar




Tiers:



System

Alternate Designation: Soltam K6; US Army: M120
Date of Introduction: INA
Proliferation: Armenia: 12; M120 variant Bolivia: M120 variant Denmark: 20 Georgia: 18 Iraq: 450; M120 variant Israel: 600 Kazakhstan M120 variant Latvia: 25; M120 variant Poland: 95; M120 variant United States: 1,076 M120 and M121 variants
Manufacturer: Soltam Systems
In Service: INA
Crew: 5

Dimensions

Length: INA
Barrel Length: 1726 mm
Weight, Total: 144.7 kg
M298 Cannon Assembly Weight: 50 kg
M190 Bipod Assembly Weight: 32 kg
M9 Base Plate Weight: 62 kg
M1100 Trailer Weight: 181 kg
M67 SIght Unit Weight: 1.1 kg

Armament

↳*System*

Name: Soltam K6
Type: 120mm Mortar
Caliber: 120mm
Rate of Fire: 16 RPM max, 4 RPM sustained
Effective Firing Range: 7,240 metres

Feed System: Manual

↳*Ammunition*

Name: INA

Type: See Ammuntion Types

Caliber: 120mm

Shell: INA

Shell Weight: INA

Ammuntion Types: *XM395 precision guided munition *M929 smoke cartridge (White Phosphorus) *XM930 illumination round *XM930E1 illumination round *XM931 practice round *M933 high explosive round *M934 high explosive round *M934A1 high explosive round *XM983 illumination round

Notes:

The Soltam K6 is a 120 mm (4.75 inch) mortar that was developed by Soltam Systems of Israel. It is the long-range version of the Soltam K5 and has replaced older systems, such as the 107-millimetre (4.2 in) M30, in several armies including the United States Army. It is much lighter than the M30, has a greater range, and can sustain a rate of fire of four rounds per minute, while the M30 could sustain only three. The K6 fires fin-stabilized ammunition from a smoothbore barrel. Unlike its smaller ammunition cousins, the 81 mm and 60 mm mortars, the fin blades of the ammunition fired from the M120 are not canted. Thus, no spin is imparted to the projectile in flight. Although heavy mortars require trucks or tracked mortar carriers to move them, they are still much lighter than field artillery pieces. They outrange light and medium mortars, and their explosive power is much greater. An improved version is known as the K6A3. High explosive rounds fired by the M120 weigh about 31 lb (14 kg) and can have a lethality radius of 225 ft (69 m). The K6 entered service with the United States Army in 1991 as the M120 Mortar System. Its mission is to provide heavy weapon, high-angle organic indirect fire support to the unit commander. The M120 is used by both mechanized units and light infantry in certain situations. Another feature of the M120 is the M303 Sub-Caliber insert, which allows the mortar to fire 81 mm ammunition. The M120 is transported on the M1100 Trailer by the M998 Humvee. The version that is mounted on the M1064 and M1129 mortar carriers is known as the M121. In 2007, the U.S. Army ordered 588 M326 MSS (Mortar Stowage Systems) from BAE Systems. Here, the assembled mortar is mounted on a truck, Humvee or M1101 trailer and can be mounted and dismounted in less than 20 seconds. In November 2016, Elbit Systems announced it was awarded an Indefinite Delivery/Indefinite Quantity (ID/IQ) contract for the production of the M121.

M30 American 106.7mm Heavy Mortar



Tiers:

1 2 3 4

System

Alternate Designation: M30

Date of Introduction: 1951

Proliferation: Widely Proliferated Worldwide

Manufacturer: INA

In Service: 1951-Present

Crew: 1

Dimensions

Length: 1.524 m

Weight: 305 kg

Armament

↳*System*

Name: M30

Type: 106.7mm Heavy Mortar

Caliber: 106.7mm

Rate of Fire: 18 rpm max., 3 rpm sustained

Maximum Firing Range: 770 m to 6,840 m

Effective Firing Range: 6,840 m

↳*Ammunition*

Type: See Type of Rounds

Caliber: 106.7mm

Type of Rounds: *HE M329A1—max range 5,650 m (6,180 yd), weight 12.3 kg (27 lb) *HE M329A2—max range 6,840 m (7,480 yd), weight 10 kg (22 lb) *WP M328A1—max range 5,650 m (6,180 yd) *ILLUM M325A2—max range 5,490 m (6,004 yd), 90-second burn time *ILLUM M335A2—max range 5,290 m (5,785 yd), 70-second burn time ILLUM is

illumination, a parachute flare round with fixed timed detonation. Deployment height above ground is determined by gun elevation angle and propelling charge. HE (high-explosive) and WP (white phosphorus) rounds could be fitted with various fuses before firing, including a proximity fuse set for detonation at about 30 feet above ground to maximize the effected target area and to spray shrapnel down into foxholes. There was also a sub-caliber training device that utilized blank 20-gauge shotgun shells to propel an inert training round a few hundred meters. This training was for the gunnery skill of laying (in a sense, aiming) the guns. This device had originally been developed during WWII for the M2 mortar.

Notes:

The M30 106.7 mm (4.2 inch, or "Four-deuce") heavy mortar is an American rifled, muzzle-loading, high-angle-of-fire weapon used for long-range indirect fire support to infantry units. The M30 system weighs 305 kg including the complete mortar with a welded steel rotator, M24A1 base plate and M53 sight. A point of interest in the design of this mortar is the rifled barrel. A rifled barrel requires the round to be a very tight fit to the bore in order for the rifling to engage the round and impart rotation to it. But, in a muzzle-loading mortar, the round has to be loose enough in the bore to drop in from the front. In order to have it both ways, these rounds have an expandable ring at the base, which expands into the rifling under the pressure of the firing charge that propels the round. Additionally, imparting a spin to a round causes it to drift away from the direction of fire during flight and the longer the flight (greater range to target), the farther the drift, so the computation for setting the direction for firing at a specific target has to account for this drift. American rounds are designed to be drop-safe and bore-safe. As such, the fuzes in the rounds for this rifled mortar did not arm unless the round was spun a certain number of times i.e. the round was not armed until it had exited the barrel spinning and traveled a safe distance from the gun emplacement.

M-160 Russian 160mm Towed Mortar



Tiers:

1 2 3 4

Variants:

- **Type 56:** Chinese Version

System

Alternative Designation: M-160
Date of Introduction: 1953
Proliferation: Russia: 300 Cambodia Mongolia Nicaragua: 4 in store Syria
Type: 160mm Towed Mortar
In Service: 1953-Present
Crew: INA
Carriage: It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66.
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: INA
Barrel Length: 4.55 m
Width: INA
Height: INA
Weight, Combat: 1,300 kg

Automotive Requirement

Prime Mover: It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66.

Main Weapon System

↳*System*

Name: M-160

Type: Towed Mortar

Caliber: mm160

Elevation: +50° to +80°

Traverse: 24°

Rate of Fire: 2-3 rounds/minute

Muzzle Velocity: 343 m per second

Effective Firing Range: 8.040 kg

↳*Ammunition*

Type: Mortar Projectile

Caliber: mm160

Shell: 41.5 kg

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Notes:

The Soviet 160 mm Mortar M-160 is a smoothbore breech loading heavy mortar which fired a 160 mm bomb. It replaced the 160mm Mortar M1943 in Soviet service after World War II. It is very similar to the M1943 mortar but has a longer barrel, thus enabling greater range. It is mounted on a wheeled carriage, in order to be towed by trucks such as the GAZ-66. China copied it as the Type 56 mortar. It was introduced in 1953. Originally deployed as a standard mortar for all types of division, it is currently particularly used as mountain or urban artillery. Some countries still use it as field artillery. China originally deployed 12 Type 56 mortars per field division. The M-160 saw service during the Arab–Israeli conflict, including the Lebanese Civil War, and with the Indian Army during the Indo-Pakistani War of 1971. It was also used during the Syrian Civil War by the loyalist forces.

2B11 Russian 120mm Mortar



Tiers:



System

Alternative Designations: 2S12, Sani, Sled, M120

Date of Introduction: 1981

Proliferation: Azerbaijan, Georgia, Estonia, Lithuania, Poland, and Egypt

Crew: ea5

Components: Launch tube, bipod assembly, baseplate, and an MPM-44M optics set.

Time Required to Transition from Traveling to Firing: minsLess than 3

Dimensions of the Mortar

Combat Weight: 210kg (firing) / 297kg (traveling)

Wheeled Carriage 2L81: kg87

Baseplate: kg80

Bipod: kg55

Automotive

Engine Type: ZMZ-66, 115 hp V-8 water cooled gasoline

Cruising Range (km): 600

Max Road Speed (km/h): 87

Max Off-Road Speed (km/h): 35

Cross-Country Speed (km/h): INA

Fording Depths (m): .80

Emplacement Time (min): 3 (est)

Displacement Time (min): 3 (est)

Radio: R-123M

Vehicle Platform (chassis): GAZ-66

Combat Weight (mt): 3.64

Chassis Length Overall (m): 5.66

Height Overall (m): 2.44

Width Overall (m): 2.34

Protection

Armor Front (mm): None

Armor Side (mm): None

Armor Roof (mm): None

Self-Entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Fire Control

Indirect Fire: INA

Collimator: INA

Fire Control Computer: None

Position Location System: None

Armament

↳*2B11*

Caliber/Length: mm120

Action: Muzzle fed, pin activated

Rate of Fire Burst (rpm): 15

Rate of Fire Normal (rpm): 10

Rate of Fire Sustained (rpm): 4 (est)

Loader Type: Manual

Traverse Left (degrees): 5 (on bipod)/360 (moving the bipod)

Traverse Right (degrees): 5 (on bipod)/360 (moving the bipod)

Traverse Total (degrees): 10 (on bipod)/360 (moving the bipod)

Elevation (degrees): +45/+80

Maximum Range: km7.1

Minimum Range: m460

Ammunition

Other Ammunition Types: All standard 120-mm mortar rounds, including Frag-HE-RA to 9,100m. See pgs 7-59-61, and -71.

3OF843B

Caliber/Length (mm): 120-mm
Type: Frag-HE
Minimum Indirect Fire Range (m): 450
Maximum Indirect Fire Range (m): 7000
Complete Projectile Weight (kg): 16.80
Muzzle Velocity (m/s): 325
Fuze Type: GVMZ-7 PD

↳***Smoke***

Caliber/Length (mm): 120-mm
Type: Smoke
Minimum Indirect Fire Range (m): 1000
Maximum Indirect Fire Range (m): 6800
Complete Projectile Weight (kg): 16.70
Muzzle Velocity (m/s): INA
Fuze Type: PD

↳***S-843***

Caliber/Length (mm): 120-mm
Type: Illumination
Minimum Indirect Fire Range (m): 1000
Maximum Indirect Fire Range (m): 5300
Complete Projectile Weight (kg): 16.80
Muzzle Velocity (m/s): INA
Fuze Type: T-1 TSQ

Notes:

The 2B11 is a 120mm mortar of Russian origin. The 2B11 has the nickname Sani and is a much improved version of the World War 2 era M43 120mm mortar. It was developed to provide a longer range and better mobility than the World War 2 era M43. The 2B11 is a muzzle loaded smoothbore mortar of a conventional design. It features a longer and stronger barrel. The 2B11 can be dismantled in a base plate, barrel and tripod, but is normally transported in an assembled state on a two wheel carriage. Some sources state that the 2S12 is the nomenclature for the system which includes one each prime mover, Ural 4x4 truck, and one each mortar, 2B11.

↳

→→Self-Propelled Mortar Systems

Type 05 (PLL-05) Chinese 120mm Self-Propelled Mortar Howitzer (SPMH)



Tiers:

1 **2** 3 4

System

Alternative Designation: PLL-05, Type 05, WMA029 120 mm SPMH
Manufacturer: NORINCO
Status: In Service and Production
Estimated out of Service Date: 2040
Type: 120mm Self-Propelled Mortar Howitzer (SPMH)
Family: PLL Family
Crew: ea4
Chassis: Based off of the Chinese WZ551 APC hull.
Displacement Time: INA
Emplacement Time: INA
Maximum Effective Range (Road): km800
Maximum Effective Range (Howitzer): km9.5

Dimensions

Length: m6.7
Width: m2.8
Height: m2.82
Weight, Combat: kg16,500
Ground Pressure: INA
Ground Clearance: m0.41

Automotive

Engine Name: Deutz BF8L413FV
Engine Type: V-8, air-cooled diesel engine

Engine Power: hp320

Transmission: ZF 6HP500 automatic transmission

Fuel Capacity: liter400

Cruising Range: km800

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h75

Speed Maximum Swim: km/h8

Fully Amphibious: Yes

Powered Steering: Yes, Standard

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1.2

Fording Depth: Amphibious

Suspension: Coil springs and hydraulic shock absorbers

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: 120mm Self-Propelled Mortar Howitzer (SPMH)

Type: Mortar Howitzer

Length, Barrel: INA

Loader Type: semi-automatic ammunition loading system.

Breech Type: vertical sliding breech mechanism

Fume Extractor: No

Thermal Sleeve: No

Muzzle Break: No

Max Rate of Fire: 6-8 rds/min for HE, 10 rds/min for Mortar Bomb, 4-6 rds/min for HEAT

Sustain Rate of Fire: See Above

Time the Max Rate of Fire can be Sustained: INA

Max Elevation: deg+80

Min Elevation: deg-4

Traverse Range: deg360

Range Finder Type: Laser

Note: The PLL-05 can also fire the GP120, GP4, GP120 GMB, and GP120A

↳*Ammunition (Option 1)*

Type: HE (WMA 029)

Caliber: mm120

Length: mm709

Weight: kg13.9

Payload: 1.8 kg TNT

Muzzle Velocity: m/s425

Fuse Type: INA

Basic Load: 30 Total, anytype of projectile combination

Maximum Effective Range: m8,500

Minimum Effective Range: m400

Armor Penetration: Yes

Pre-Engraved Casing: No

↳*Ammunition (Option 2)*

Type: HE (WMA 029)

Caliber: mm120

Length: mm600

Weight: kg17.3

Payload: 5 kg TNT

Muzzle Velocity: m/s425

Fuse Type: INA

Basic Load: 30 Total, anytype of projectile combination

Maximum Effective Range: m9,500

Minimum Effective Range: m1,000

Armor Penetration: Yes

Pre-Engraved Casing: No

↳*Ammunition (Option 3)*

Type: HEAT (WMA 029)

Caliber: mm120

Length: mm625

Weight: kg10

Payload: HEAT

Muzzle Velocity: m/s425

Fuse Type: INA

Basic Load: 30 Total, anytype of projectile combination

Maximum Effective Range: m1,200

Minimum Effective Range: m600

Armor Penetration: Yes

Pre-Engraved Casing: Yes

↳*Ammunition (Option 4)*

Type: Cargo (BM3)

Caliber: mm120

Length: mm621

Weight: kg17.3

Payload: 30 bomblet

Muzzle Velocity: INA

Fuse Type: INA

Basic Load: 30 Total, anytype of projectile combination

Maximum Effective Range: m9,000

Minimum Effective Range: INA

Armor Penetration: INA

Pre-Engraved Casing: No

↳*Ammunition (Option 5)*

Type: Rocket-assisted projectile (RAP)

Caliber: mm120

Length: mm600

Weight: kg17.3

Payload: kg3.25

Muzzle Velocity: m/s265

Fuse Type: INA

Basic Load: 30 Total, anytype of projectile combination

Maximum Effective Range: m13,500

Minimum Effective Range: INA

Armor Penetration: Yes

Pre-Engraved Casing: Yes

Coaxial Weapon System

↳*System*

Name: QJZ-89 or Type 89

Type: mm12.7

Manufacturer: NORINCO

Cartridge: mm12.7x108

Length, Total: mm2,119

Length, Barrel: mm1,003

Weight (Gun Only): kg17.5

Weight (Tripod Only): kg8.5

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min450-600

Time the Max Rate of Fire can be Sustained: INA

Sights: Iron/Optical

Action: Gas/Recoil

Feed System: Belt

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: INA

Maximum Effective Range: m1,600

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: No

Aiming Mode: Automatic, Semi-automatic, and Manual

Direct Fire: Yes, Primary Mission

Indirect Fire: Yes

Protection

Hull Armor: Welded Steel Turret, small arms fire and shell splinters.

Turret Armor: Welded Steel Turret, small arms fire and shell splinters.

Applique Armor: Available

Automatic Fire-Extinguishing System: Yes

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

IR Signature: INA

Grenade Launchers: Yes, 76mm Smoke Grenades

Grenade Launcher Maximum Distance: m100

Smoke Equipment: Yes

Smoke Screen: m120-150

Smoke Screen Duration: sec2-4

Notes:

The Type 05 / PLL-05 is a Chinese self-propelled gun-mortar in use by Chinese mechanized infantry formations. Conceptually it is similar to the Russian 2S23 "Nona-SVK" (the turret and weapon system of the 2S9 Nona mounted on a BTR-80 chassis) three of which China purchased for evaluation. At one time it was reported that China would purchase 100 of the Russian vehicles however, this failed to occur, nor does it appear that there was a formal transfer of technology to China. The Chinese system features a longer barreled weapon mounted on the Type 92 variant of the WZ551 armored personnel carrier.

2S34 Hosta/Chosta Russian 120mm Self-Propelled Mortar (SPM)




Tiers:

1 2 3 4

System

Alternative Designation: 2S34 "Chosta" or "Hosta"

Manufacturer: Motovilikha Plants Corporation

Type: Self-Propelled Mortar

Family: 2S34

Crew: ea4

Chassis: The same chassis as the 2S1 Gvasdika

Dimensions

Length (Gun Forward): m7.57

Lenght (Hull): m7.26

Width: m2.85

Height: m2.83

Weight, Combat: tons16

Ground Pressure: kg/mINA

Automotive

Engine Name: YaMZ-238N

Engine Type: Diesel

Engine Power: hp300

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h40

Speed Maximum Swim: km/hINA

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m2.4

Fording Depth: mAmphibious

Communications

Primary Radio: R-173 (Standard Radio for Russian Tanks)

Secondary Radio: R-168-100U (Standard VHF)

Main Gun

↳*System*

Name: 2A80-1 120mm Rifled Gun/Mortar

Type: 120mm Howitzer/mortar

Max Rate of Fire: rds/min8-10

Evacuator Type: powered bore evacuator

Breech Mechanism: semi-automatic wedge breach mechanism with a plastic obturator

Maximum Firing Range: km7.2-13

Muzzle Brake Type: INA

Max Elevation: deg+80

Min Elevation: deg-2

Traverse Range: km360

Traverse Left: deg180

Traverse Right: deg180

Recoil System: hydraulic recoil system

Direct Fire: Yes

Indirect Fire: Yes

Note: The 2A80-1 120mm Rifled Gun/Mortar can fire all types of Russian and foreign 120mm mortar shells as well as Nato standard mortar mines.

↳*Ammunition (Option 1)*

Name: VOF-110

Type: HE

Caliber: mm120

Muzzle Velocity: m/sINA

Basic Load: ea40

Projectile Weight: kg17.3

Maximum Range: km13

Lethal Area Size: 2,800 m² in size.

↳*Ammunition (Option 2)*

Name: Kitolov-2M
Type: Laser Guided 120mm Round
Caliber: mm120
Muzzle Velocity: m/sINA
Basic Load: ea10
Maximum Range: km13
Note: The round is guided by tripod or sensor suite-mounted laser designators

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds/min200-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Action: Gas-operated, open bolt
Length (Overall): mm1,203
Length (Barrel): mm605
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Muzzle Velocity: m/s855
Basic Load: ea1,500
Accuracy of fire at 300 m: mm90

Fire Control

Name: Name is classified

Computerized FCS: Yes

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Infra-Red Night Vision Lights: Yes

Protection

Hull Armor: welded steel armor hull, which provides protection against small arms fire and artillery shell splinters.

Turret Armor: welded steel turret which provides protection against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

IR Signature: INA

Notes:

The 2S34 "Chosta" or "Hosta" is a 120mm self-propelled mortar carrier designed and manufactured in Russia. The 2S34 was first revealed at the TVM-2014 Moscow Defense exhibition, August 2014. The vehicle is an evolution of the soviet-made 2S1 "Gvozdika". While the chassis stays the same as the 2S1, the main evolution is the replacement of 122mm 2A31 series main gun by an upgrade of 120mm 2A80 mortar gun, the 2A80-1. The 2S34 is produced by the Motovilikha Plants Corporation of Perm, in Russia, that also produces, or has produced, the 2S9 and the 2S31. In February 2014, approximately 30 2S34 are in service with the Russian army and could be in service with the 21st Mechanized Brigade, in Totskoye. Accessories: Standard equipment includes infra-red night vision lights (mounted at the commander's hatch) and an NRBC system. 2S34, like 2S1, is fully amphibious, being propelled in the water by its tracks. Before entering the water the bilge pump is switched on, the trim vane is erected at the front of the hull, shrouds are fitted to the hull above the drive sprocket and front road wheels and water deflectors on the rear track covers are lowered. Any water that enters the hull during amphibious operations is removed via the exhaust outlet using the bilge pump. Russian sources state that the 2S1, so probably also the 2S34, takes 20 minutes to be prepared for amphibious operations.

2S9-1M Russian 120mm Self-Propelled Mortar (SPM)







Tiers:



Parent:

2S9 NONA Russian 120mm Self-Propelled Mortar (SPM)

Variants:

- **2S23 NONA-SVK:** A BTR-80 based version is the 2S2
- **NONA-K:** towed 2B16 version
- **2S9:** The 2S9 NONA (Новейшее Орудие Наземной Артилерии - Newest Ordnance of Ground Artillery) is an extremely light-weight self-propelled and air-droppable 120 mm gun-mortar designed in the Soviet Union, which entered service in 1981. The 2S9 chassis is designated the S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier. More generally, the 120 mm mortar is referred to as the Nona, with the 2S9 also known as the Nona-S. A BTR-80 based version is the 2S23 or Nona-SVK and the towed 2B16 version is named the Nona-K. Although no figures have been released, it is estimated that well over 1,000 2S9 were built.
- **SO-120 2S9 Anona:** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.

System

Alternative Designation: 2S9-1M
Type: 20mm Self-Propelled Mortar (SPM)
Family: 2S9 Family
Crew: ea4
Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier
Displacement Time: min30
Emplacement Time: min30
Airborne Capable: Yes

Dimensions

Length (Gun Forward): m6.02

Length (Hull): m5.89

Width: m2.63

Height: m2.3

Weight, Combat: mt8.8

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: mAmphibious

Communications

Main Gun

↳*System*

Name: 2A60 120mm gun/mortar

Type: mm120

Breech Type: Combined semi-automatic breechblock with wedge locking mechanism and powder gases plastic obturator

Length, Barrel: 24 calibers

Loader Type: Manual, with ramming being automatic

Max Rate of Fire: rds/min8-10

Rate of Fire, Sustained: rds/min4

Muzzle Brake Type: INA

Max Elevation: deg+80

Min Elevation: deg-4

Traverse Range: deg70

Traverse Left: deg35

Traverse Right: deg35

Maximum Range of Fire (Ordinary Projectiles): km8.85

Maximum Range of Fire (Rocket Assisted Projectiles): km12.8

Maximum Range of Fire (Mines): km7.15

Note: The 2S9-1M can fire the Kitolov-2 guided artillery shell.

↳*Ammunition (Option 1)*

Type: OF-49 HE-FRAG/OF-51 HE-FRAG Projectile

Caliber: mm120

Muzzle Velocity: m/s367

Explosive: A-IX-2 explosive

Basic Load: 25 total, any combination of 120mm Projectiles

Effective Range: km8.85

Projectile Weight: kg17.3

↳*Ammunition (Option 2)*

Type: OF-50 HEAT (Rocket Assisted) Projectile

Caliber: mm120

Muzzle Velocity: m/s560

Fuse Type: INA

Basic Load: 25 total, any combination of 120mm Projectiles

Maximum Effective Range: 12.8

Rocket Motor Start Time: 10-13 seconds after the projectile leaves the barrel

Fin Stabilized: Yes

Pentration: mm650

↳*Ammunition (Option 3)*

Type: OF-843B Mortar Bombs

Caliber: mm120

Muzzle Velocity: m/s119-331

Fuse Type: INA

Basic Load: 25 total, any combination of 120mm Projectiles

Maximum Effective Range: km8.8

Variants: OF-843B, OF-34 and OF-38 high-explosive fragmentation, S-843 and 3S9 illumination, 3Z2 incendiary and 3D5 smoke

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: mm7.62
Max Rate of Fire: rds/min650
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces
In Service: 1961-present
Manufacturer: Degtyaryov plant
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Overall): mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights
Note: The 7.62 PKT can be controlled remotely

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Muzzle Velocity: m/s825
Basic Load: ea1,500
Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: No Name, but it's reported that the 2S9-1M has a updated FCS, INS, and Sensor suite.
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes, with three day vision devices
Thermal Sight Gunner: Yes, with panoramic day sight
Main Gun Stabilization: INA
Indirect Fire: Yes
Direct Fire: INA
Land Navigation: Yes

Protection

Hull Armor: Capable of stopping 12.7mm rounds at the front of the vehicle with protection from 7.62mm rounds from the side

Turret Armor: mm16

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: PAZ NBC system

Smoke Equipment: INA

Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service. It's reported that the 2S9-1M has a updated FCS, INS, and Sensor suite.

2S23 Nona-SVK Russian 120mm Self-Propelled Mortar System (SPMS)





Tiers:

1 2 3 4

System

Alternative Designation: 2S23 Nona-SVK

Type: Wheeled self-propelled mortar carrier.

Family: 2S3 Family

Crew: 4 (commander, gunner, loader and driver)

Chassis: Modified BTR-80 APC

Chassis Configuration: 8x8

Displacement Time: min1

Emplacement Time: min1

Note: These 120 mm rifled weapons combine the features of a howitzer and mortar in one system. In many respects they are unique weapons as there is no similar system in the West.

Dimensions

Length: m7.5

Width: m2.9

Height: m2.75

Weight, Combat: tons14.5

Ground Pressure: INA

Automotive

Engine Name: KamAZ-7403

Engine Type: Diesel

Engine Power: hp280

Cruising Range: km500

Speed, Maximum Road: km/h80

Speed, Average Cross: km/h65

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Stem: m0.5

Trench: m2

Fording Depth: Amphibious

Communications

Primary: R-173

Main Gun

↳*System*

Name: 2A60 120mm gun/mortar

Type: mm120

Breech Type: Combined semi-automatic breechblock with wedge locking mechanism and powder gases plastic obturator

Length, Barrel: 24.2 calibers

Loader Type: Autoloader

Max Rate of Fire: rds/min8-10

Rate of Fire, Sustained: rds/min4

Muzzle Brake Type: INA

Max Elevation: deg+80

Min Elevation: deg-4

Traverse Range: deg70

Maximum Range of Fire (Ordinary Projectiles): km8.85

Maximum Range of Fire (Rocket Assisted Projectiles): km12.8

Maximum Range of Fire (Mines): km7.15

Note: The 2S23 use specially developed rifled rounds

↳*Ammunition (Option 1)*

Type: OF-49 HE-FRAG/OF-51 HE-FRAG Projectile

Caliber: mm120

Muzzle Velocity: INA

Explosive: A-IX-2 explosive

Basic Load: 30 Total (Any Combination)

Effective Range: km8.85

Projectile Weight: kg17.3

Note: The 2S23 Nona can fire the Kitolov-2 precision guided munitions. The Kitolov-2 has a kill probability of 0.8 to 0.9

↳*Ammunition (Option 2)*

Type: OF-50 HEAT (Rocket Assisted) Projectile

Caliber: mm120

Muzzle Velocity: INA

Effective Range: km12.8

Basic Load: 30 Total (Any Combination)

Rocket Motor Start Time: 10-13 seconds after the projectile leaves the barrel

Fin Stabilized: Yes

Pentration: mm650

↳*Ammunition (Option 3)*

Type: OF-843B Mortar bombs

Caliber: mm120

Muzzle Velocity: INA

Effective Range: INA

Basic Load: 30 Total (Any Combination)

Variants: OF-843B, OF-34 and OF-38 high-explosive fragmentation, S-843 and 3S9 illumination, 3Z2 incendiary and 3D5 smoke

Coaxial Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: 2,400
Maximum Firing Range: m3,800
Effective Range (With Sight Adjustments): m1,500

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: INA
Direct Fire: Yes, DF Telescopic Sight
Indirect Fire: Yes
Collimator: K-1
Note: This mortar system can be used as mortar or howitzer, delivering direct or indirect fire.

Protection

Hull Armor: All-round protection is against 7.62 mm armor-piercing rounds and artillery shell splinters.
Turret Armor: All-round protection is against 7.62 mm armor-piercing rounds and artillery shell splinters.
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: Six 81mm smoke grenade launchers
IR Signature: INA
Note: The 2S23 Nova carries two Igla shoulder-launched anti-aircraft missiles and 15 hand grenades.

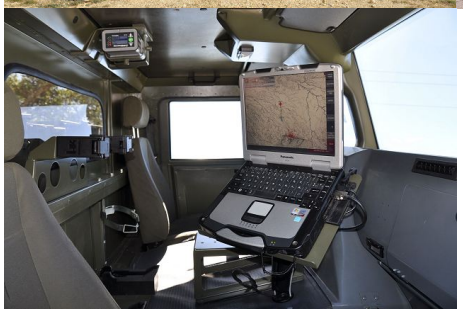
Notes:

The 2S23 also named Nona-SVK is a Russian made wheeled self-propelled mortar carrier. The 2S23 was first revealed at a defense exhibition in Asia in late 1990 when a complete system was displayed for the first time. According to Russian sources the 2S23 entered service with its land forces in 1990. The 120mm 2S23 Nona-SVK battalion level self-propelled gun (SPG) is designed for use against enemy troops, armament and military equipment. Its armor protection, cross country mobility and maneuverability are identical to the wheeled armored personnel carrier BTR-80. The 2S23 Nona-SVK is capable of applying

aimed fire both from direct and indirect laying positions with mortar bombs and with standard artillery shells. In addition to standard artillery rounds, the gun fires all types of mortar shells designed for use by foreign-made 120mm mortars

EIMOS Spanish 60mm / 81mm Self-Propelled Integrated Mortar System





Tiers:

1 **2** 3 4

Parent:

URO VAMTAC Spanish 4x4 High-Mobility Tactical Vehicle

Variants:

- **VAMTAC I3:** 166-hp Steyr diesel engine
- **VAMTAC S3:** 188-hp Steyr diesel engine, reinforced suspension with greater payload capacity
- **FAMTAC BN3:** Up-armored version with 220-hp Steyer M16TCA-3 6-cylinder engine with a top speed of 135 k/hr

System

Alternative Designations: EIMOS-60; EXPAL EIMOS 60mm Integrated Mortar System
Description: The EXPAL Integrated Mortar System (EIMOS) is a self-propelled system capable of carrying either 60-mm or 81-mm mortars
Manufacturer: EXPAL
In Service: 2009-Present
Crew: 3 (gunner, driver, loader)
Passengers: None

Dimensions

Chassis Length: 5.55 m
Chassis Width: m2.18
Chassis Height: m1.90
Chassis Curb Weight: 3,500 kg

Chassis Payload Weight: 2,500 kg

Chassis Towing Capacity: 3,000 kg

Note: The Chassis is based off of the URO VAMTAC Spanish 4x4 High-Mobility Tactical Vehicle

Automotive

Automotive Performance: 1 x Steyr turbocharged 4-cyl diesel; 166 hp; or 1 x Steyr turbocharged 6-cyl diesel; 188 hp

Engine Type: Turbo-charged 4-cylinder or – cylinder diesel

Engine Powerr: hp166-188

Fuel Capacity: liters110

Transmission: 5 speed automatic

Maximum Range: km600

Speed: 126 km/h to 135 km/h

Gradient: %75

Side Slope: %40

Vertical Step: m0.5

Trench: m0.5

Fording, without Preperation: m0.75

Fording, with Preperation: m1.5

Suspension: 4-wheel independent (double wishbones with coil-springs)

Note: The Chassis is based off of the URO VAMTAC Spanish 4x4 High-Mobility Tactical Vehicle

Communications

Radio: Customer Dependent

Main Weapon System

Note: The EXPAL EIMOS is a autonomous soft-recoil mortar system installed on a turntable mount on the back of a Urovesa VAMTAC 4 x 4 high-mobility utility vehicle

↳*System*

Name: EIMOS-60

Type: High Explosive (HE) Mortar

Caliber: mm60

EIMOS Barrel Length: m1.00

EIMOS Diameter (Base): m0.78

EIMOS Hieght: m1.75

EIMOS Overall Weight: kg800

Length of Recoil: m0.30

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Effective Range (Using Charge 5): m4,900

Time to Engage Target: Less than 20 seconds

Rate of Fire: 16-18 rounds per minute

Circular Error Probable: 10-15 meters with GT-KIT mortar guidance system

↳*Ammunition*

Name: M720A1

Type: High Explosive (HE) Mortar

Caliber: mm60

Length: mm377

Weight: kg1.7

Ammunition Types: High explosive, White phosphorus (smoke), Hexachloroethane/zinc oxide (smoke) illuminating

Basic Load: INA

Fire Control

FCS Name: INA, a EZPAL Developed Application

Fire Control System: Yes, Laptop-based Fire-Control System. Techfire w/ inertial navigation

Ballistic Software: NATO Standard Agreement (STANAG)-compliant ballistic software

GPS: Yes, differential GPS

Mortar Tube Control: The mortar tube can be rotated and aimed using a joystick located on the mortar unit itself

Guidance System: GT-KIT mortar guidance system

Meteorological Station: Yes, onboard meteorological station

Protection

Armor (turret front): INA

Applique aArmor: No

Explosive Reactive Armor: No

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: INA

Notes:

The Spanish Defense Company EXPAL (weapon systems and ammunition) has developed its integrated mortar system EIMOS. EIMOS is a unique system in the market integrating an EXPAL 81 mm or 60 mm mortar, in a 4X4 lightweight vehicle. Automatic aiming and control system facilitates firing procedures and it allows EIMOS to get into firing position rapidly. The system improves precision with minimum effort, requires less instruction and less personnel are required, and improved accuracy saves firepower.

2S9 NONA Russian 120mm Self-Propelled Mortar (SPM)






Tiers:

1 **2** 3 4

Variants:

- **2S23 NONA-SVK:** A BTR-80 based version is the 2S2
- **NONA-K:** Towed 2B16 version
- **2S9-1:** The 2S9-1 is an improved version of the SO-120, it is thought to be reconfigured so that the vehicle can sustain independent fire missions for longer.
- **SO-120 2S9 Anona:** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.

System

Alternative Designation: SO-120 2S9 Anona

Type: 120mm Self-Propelled Mortar (SPM)

Family: 2S923

Crew: ea4

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: INA

Emplacement Time: INA

Airborne Capable: Yes

Dimensions

Length (Gun Forward): m6.02

Length (Hull): m5.89

Width: m2.63

Height: m2.3

Weight, Combat: mt8.5

Ground Pressure: kg/mINA

Automotive

Engine Name: 5D20

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: Amphibious

Main Gun

↳*System*

Name: 2A60 120mm gun/mortar

Type: mm120

Breech Type: Combined semi-automatic breechblock with wedge locking mechanism and powder gases plastic obturator

Length, Barrel: 24 caliber

Loader Type: Manual, with ramming being automatic

Max Rate of Fire: rds/min8-10

Rate of Fire, Sustained: rds/min4

Muzzle Brake Type: INA

Max Elevation: deg+80

Min Elevation: deg-4

Traverse Range: deg70

Traverse Left: deg35

Traverse Right: deg35

Maximum Range of Fire (Ordinary Projectiles): km8.85

Maximum Range of Fire (Rocket Assisted Projectiles): km12.8

Maximum Range of Fire (Mines): km7.15

Note: The 2S9 NONA can fire German and French 120 mm mortar rounds

↳*Ammunition (Option 1)*

Type: OF-49 HE-FRAG/OF-51 HE-FRAG Projectile

Caliber: mm120

Muzzle Velocity: m/s367

Explosive: A-IX-2 explosive

Basic Load: 25 total, any combination of 120mm Projectiles

Effective Range: km8.85

Projectile Weight: kg17.3

↳*Ammunition (Option 2)*

Type: OF-50 HEAT (Rocket Assisted) Projectile

Caliber: mm120

Muzzle Velocity: m/s560

Fuse Type: INA

Basic Load: 25 total, any combination of 120mm Projectiles

Maximum Effective Range: 12.8

Rocket Motor Start Time: 10-13 seconds after the projectile leaves the barrel

Fin Stabilized: Yes

Pentration: mm650

↳*Ammunition (Option 3)*

Type: OF-843B Mortar Bombs

Caliber: mm120

Muzzle Velocity: m/s119-331

Fuse Type: INA

Basic Load: 25 total, any combination of 120mm Projectiles

Maximum Effective Range: km8.8

Variants: OF-843B, OF-34 and OF-38 high-explosive fragmentation, S-843 and 3S9 illumination, 3Z2 incendiary and 3D5 smoke

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,500

Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, with three day vision devices

Thermal Sight Gunner: Yes, with panoramic day sight

Main Gun Stabilization: INA

Indirect Fire: Yes

Direct Fire: INA

Land Navigation: Yes

Protection

Hull Armor: Capable of stopping 12.7mm rounds at the front of the vehicle with protection from 7.62mm rounds from the side

Turret Armor: mm16

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: PAZ NBC system

Smoke Equipment: INA

Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The 2S9 NONA (Новейшее Орудие Наземной Артилерии - Newest Ordnance of Ground Artillery) is an extremely light-weight self-propelled and air-droppable 120mm gun-mortar designed in the Soviet Union, which entered service in 1981. The 2S9 chassis is designated the S-120 and based on the aluminum hull of the BTR-D airborne multi-purpose tracked armored personnel carrier. More generally, the 120mm mortar is referred to as the Nona, with the 2S9 also known as the Nona-S. A BTR-80 based version is the 2S23 or Nona-SVK and the towed 2B16 version is named the Nona-K. Although no figures have been released, it is estimated that well over 1,000 2S9s were built.

2S9-1 Russian 120mm Self-Propelled Mortar (SPM)






Tiers:

1 2 **3** 4

Parent:

2S9 NONA Russian 120mm Self-Propelled Mortar (SPM)

Variants:

- **2S23 NONA-SVK:** A BTR-80 based version is the 2S2
- **NONA-K:** Towed 2B16 version
- **2S9:** The 2S9 NONA (Новейшее Орудие Наземной Артилерии - Newest Ordnance of Ground Artillery) is an extremely light-weight self-propelled and air-droppable 120 mm gun-mortar designed in the Soviet Union, which entered service in 1981. The 2S9 chassis is designated the S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier. More generally, the 120 mm mortar is referred to as the Nona, with the 2S9 also known as the Nona-S. A BTR-80 based version is the 2S23 or Nona-SVK and the towed 2B16 version is named the Nona-K. Although no figures have been released, it is estimated that well over 1,000 2S9 were built.
- **SO-120 2S9 Anona:** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.

System

Alternative Designation: 2S9-1

Date of Introduction: After 1985

Type: 20mm Self-Propelled Mortar (SPM)

Family: 2S9 Family

Crew: ea4

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: min30

Emplacement Time: min30

Airborne Capable: Yes

Dimensions

Length (Gun Forward): m6.02

Length (Hull): m5.89

Width: m2.63

Height: m2.3

Weight, Combat: mt8.7

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: mAmphibious

Main Gun

↳*System*

Name: 2A60 120mm gun/mortar

Type: mm120

Breech Type: Combined semi-automatic breechblock with wedge locking mechanism and powder gases plastic obturator

Length, Barrel: 24 calibers

Loader Type: Manual, with ramming being automatic

Max Rate of Fire: rds/min8-10

Rate of Fire, Sustained: rds/min4

Muzzle Brake Type: INA

Max Elevation: deg+80

Min Elevation: deg-4

Traverse Range: deg70

Traverse Left: deg35

Traverse Right: deg35

Maximum Range of Fire (Ordinary Projectiles): km8.85

Maximum Range of Fire (Rocket Assisted Projectiles): km12.8

Maximum Range of Fire (Mines): km7.15

Note: The 2S9-1 NONA can fire German and French 120 mm mortar rounds

↳*Ammunition (Option 1)*

Type: OF-49 HE-FRAG/OF-51 HE-FRAG Projectile

Caliber: mm120

Muzzle Velocity: m/s367

Explosive: A-IX-2 explosive

Basic Load: 40 total, any combination of 120mm Projectiles

Effective Range: km8.85

Projectile Weight: kg17.3

↳*Ammunition (Option 2)*

Type: OF-50 HEAT (Rocket Assisted) Projectile

Caliber: mm120

Muzzle Velocity: m/s560

Fuse Type: INA

Basic Load: 40 total, any combination of 120mm Projectiles

Maximum Effective Range: 12.8

Rocket Motor Start Time: 10-13 seconds after the projectile leaves the barrel

Fin Stabilized: Yes

Pentration: mm650

↳*Ammunition (Option 3)*

Type: OF-843B Mortar Bombs

Caliber: mm120

Muzzle Velocity: m/s119-331

Fuse Type: INA

Basic Load: 40 total, any combination of 120mm Projectiles

Maximum Effective Range: km8.8

Variants: OF-843B, OF-34 and OF-38 high-explosive fragmentation, S-843 and 3S9 illumination, 3Z2 incendiary and 3D5 smoke

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,500

Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, with three day vision devices

Thermal Sight Gunner: Yes, with panoramic day sight

Main Gun Stabilization: INA

Indirect Fire: Yes

Direct Fire: INA

Land Navigation: Yes

Protection

Hull Armor: Capable of stopping 12.7mm rounds at the front of the vehicle with protection from 7.62mm rounds from the side

Turret Armor: mm16

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: PAZ NBC system

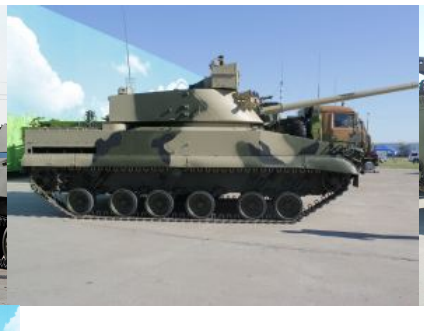
Smoke Equipment: INA

Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The 2S9-1 is an improved version of the SO-120, it is thought to be reconfigured so that the vehicle can sustain independent fire missions for longer. The 2S9-1 is very similar to the 2S9 NONA Russian 120mm Self-Propelled Mortar (SPM), but it can carry a total of 40 120mm Projectiles instead of the 25 that the 2S9 NONA Russian 120mm Self-Propelled Mortar (SPM) carries.

2S31 Vena Russian Amphibious 120mm Self-Propelled Mortar System



Tiers:



Variants:

- **1B172-2 command vehicle:** The 1B172-2 unified artillery command-observation post/command-and-staff vehicle is based on the same hull as the 2S31. It is fitted with additional communications equipment and a mast-mounted sensor package.
- **120-mm 2S34 Khosta:** This is an upgraded 2S1 self-propelled howitzer fitted with the complete 120-mm 2A80 gun from the 2S31, which is fitted with a muzzle brake. See separate record for more information.

System

Alternative Designation: 2S31 Vena
Type: Self-Propelled Mortar System
Caliber: mm120
Chassis: INA
Crew: 4 (commander, gunner, loader, driver)
Emplacement Time:
Displacement Time:

Dimensions

Hull Length: 7.51 m
Hull Width: 3.37 m
Hull Height: 3.44 m
Maximum Ground Clearance: 510 mm
Minimum Ground Clearance: 190 mm

Track, Ground Length: 4.06 m

Track, Width: 380 mm

Combat Weight: 19,080 kg

Automotive

Engine Name: 1 x UTD-29M

Engine Type: 10-cyl, 4 stroke V-shaped diesel

Engine Power: hp500

Range: 600 km

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: km/h9

Gradient: %60

Side Slope: %30

Vertical Step: 0.80 m

Trench: m2.50

Fording: Amphibious, 2 Waterjets

Main Weapon System

↳*System*

Name: 2A80 Rifled Gun-Mortar

Type: Gun-Mortar System

Length, Barrel: INA

Weight: INA

Elevation: -4 deg to 80 deg (-71 mils to 1,422 mils)

Traverse: 360 deg (6,400 mils)

Rate of Fire: 8 to 10 round/min

Maximum Firing Range: 13,000 m

↳*Ammunition (Option #1)*

Name: INA

Type: HE FRAG

Caliber: mm120

Shell: INA

Maximum Range: 13,000 m

Basic Load: 70 Rounds

Armor Penetration: 120-mm 2A80 rifled semi-automatic gun firing mortar bombs, conventional armor-piercing and

artillery rounds and Kitolov-2M laser-guided projectiles

↳***Ammunition (Option #1)***

Name: INA

Type: Mortar Bomb

Caliber: mm120

Shell: INA

Maximum Range: 7,200 m

Basic Load: 70 Rounds

Auxiliary Weapon System

↳***System***

Name: PKMT

Type: General-Purpose Machine Gun

Caliber: mm7.62

Quantity: 1 x PKMT General-Purpose Machine Gun

Length: 1,192 mm

Barrel Length: 605 mm

Weight: 7.5 kg

Action: Gas-operated, open bolt

Rate of Fire: 650 rounds/min

Muzzle Velocity: 825 m/s

Maximum Firing Range: 3,800 m

Effective Firing Range: 1,000 m

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: INA

Armor Penetration: INA

Fire Control System

Name: INA

Computerized FCS: Yes, "Vena" features modern fire control system.

Main Gun Stabilization: INA

Direct Fire: Yes

Indirect Fire: Yes

Laser Detector: Yes, A laser detector is mounted on the low part of the turret front, either side of the 120 mm 2A80 ordnance and on either side of the turret roof at the rear which is used in conjunction with the smoke grenade system.

Protection

Hull Armor: The steel armor protects the crew from small arms fire and shells splinters. Since the mortar is breech loaded the 2S31 is operated from under armor protection. The prototypes were fitted with the Shtora-1 active protection system, but this may not be fitted to all units in service.

Turret Armor: The steel armor protects the crew from small arms fire and shells splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes

Notes:

The 2S31 Vena (Russian: 2C31 Вена) is a Russian amphibious self-propelled 120 mm mortar system. "2S31" is its GRAU designation. The 2S31 Vena is a self-propelled gun/mortar of Russian origin. It was developed as a more capable and more high end alternative to the wheeled 2S23 Nona. The 2S31 was to be more capable in the direct fire role, and more useful as an artillery piece. The 2S31 is based on the chassis of the BMP-3 mechanized infantry combat vehicle. The driver is located at the front, the turret in the center and the engine and drivetrain art located at the rear. The 2S31 features a high level of automation, advanced fire control system and an active protection system. The 120mm 2A80 rifled gun/mortar is the main armament. It is longer than the 120mm gun/mortars found on the tracked 2S9 and wheeled 2S23. Although rifled, it can fire 120mm shells designed for smoothbore and rifled barrels. Laser guided shells can also be fired. A total of 70 shells of 120mm ammunition are carried, about twice as many as carried by 2S9 or 2S23. The effective range is highly dependent on type of ammunition. Regular shells can be fired out to 5 or 9 km. Assisted projectiles can be fired up to 13 or 17 km, depending on type. Maximum rate of fire is quoted as 8 to 10 rpm. The tracked chassis provides the 2S31 with good off road mobility and the ability to keep up with mechanized infantry. The UTD-29 diesel engine provides up to 450 hp. The maximum speed is 70 km/h on roads. The 2S31 is amphibious and propelled in the water via water jet.

→Incendiary Devices

→Special Purpose Weapons

Infantry Vehicles

→Infantry Fighting Vehicles (IFVs)

→→Infantry Fighting Vehicle (IFV)

VN-17 Chinese Tracked Infantry Fighting Vehicle (IFV)



Tiers:

1 2 3 4

System

Alternative Designation: INA
Manufacturer: NORINCO
Type: Common Chassis Infantry Fighting Vehicle
Crew: ea3
Troop Compartment Capacity: ea8
Maximum Effective Range: km500

Dimensions

Length: m7.5
Width: m3.2
Height: m2.5
Weight, Combat: kg27,216
Ground Pressure: kg/mINA

Automotive

Engine Name: FX0012
Engine Type: Diesel

Engine Power: hp1,000

Engine Mount: Front

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed, Maximum Swim: km/hINA

Gradient: deg60

Side Slope: degINA

Trench: m2.7

Vertical Step: m0.85

Fording Depth: m1.1

Communications

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Type 730

Type: 30mm Auto-cannon

Alternate Designation: H/PJ12.

Date of Introduction: 2003

Rate of Fire: rds/m300

Barrels: ea7

Feed System: dual-feed mechanism

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

Variants: Type 730B/C, LD-2000, Type 1130

Ammunition (Option 1)

Type: HE-I
Caliber: mm30
Muzzle Velocity: m/s1,800
Basic Load: ea500
Maximum Effective Range: km1-1.5
Max Range (Aerial Targets): km3
Armor Penetration: Yes

↳*Ammunition (Option 2)*

Type: APDS
Name: mm30
Muzzle Velocity: m/s1,800
Basic Load: ea500
Maximum Effective Range: km1-1.5
Max Range (Aerial Targets): km2.8

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun
Type: 7.62mm Heavy Machine Gun
Manufacturer: Norinco
Length: mm1,192
Barrel Length: mm658
Action: Gas Operated
Rate of Fire: rds/min700-800
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR
Caliber: mm7.62
Muzzle Velocity: m/s840
Basic Load: Belts in 100/200/250 round boxes
Effective Firing Range: m100-1,500
↳**Armor Penetration:** INA

Anti-Tank Guided Missile

↳*System*

Name: HJ-12 (Hongjian-12) Red Arrow-12
Type: Anti-Tank Guided Missile
Manufacturer: Norinco
Date of Introduction: 2014
Length, Launch Tube: m1.2
Diameter, Launch Tube: cm17
Length, Missile: m0.98
Warhead: tandem HEAT

↳*Ammunition*

Type: Anti-Tank Guided Missile
Weight, Carry: kg22
Weight, Missile: kg17
Weight, (IIR/EO Targeting Sight): kg5
Length, Missile: m0.98
Diameter, Missile: cm13.5
Effective Firing Range, Daytime: m4,000
Effective Firing Range, Nighttime: 2,000
Warhead: Tandem shaped charge HEAT
Detonation Mechanism: Impact Force
Armor Penetration: Yes
Engine: Solid Fuel Rocket
Guidance System: Infrared homing, CCD
Penetration: penetrating 1,100 mm of RHA behind ERA at an incidence of 0 deg

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Vehicle Commander: Yes, panoramic sight
Thermal Gunner: Yes, panoramic sight
Main Gun Stabilization: Yes
Laser Range Finder: Yes
CCD Camera: Yes
Thermal Image Channel: Yes

Protection

Hull Armor: All-welded steel armor, which provides protection from small arms fire
Turret Armor: All-welded steel armor, which provides protection from small arms fire
Applique Armor: Yes, add-on armor plate over the glacis and Anti Mine Skirt
Explosive Reactive Armor: Yes, reactive bricks arranged in a row across the front.
Active Protection System: Yes
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: INA
Smoke Equipment: 12

Notes:

In 2017 a new Infantry Fighting Vehicle (IFV) emerged in China. This armored vehicle is being proposed for export customers as the VN17. It is an entirely new design, rather than clone of Western or Russian designs. The VN17 is based on a VT5 light tank chassis. This new Chinese IFV weights around 30 t. It is fitted with modular add-on armor kit. This new IFV is better protected than ZBD-08, used by the Chinese army. This armored vehicle follows the current trend for better protected IFVs. Most likely that front armor of the VN17 withstands 30 mm armor-piercing rounds.The VN17 is armed with a 30 mm automatic cannon. There are also two HJ-12 anti-tank missile launchers. This armored vehicle has got a coaxial 7.62 mm machine gun.

BMP-1P Russian Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

BMP-1 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-1:** BMP-1 is the first mass produced, tracked IFV of the erstwhile USSR. It is the first variant of the now obsolete BMP model designed in 1966. Considered to be the world's first true IFV, it is also a radical departure from the armoured vehicle designs of the USSR since the Second World War. With over 55,000 BMP-1s and variants having been produced, it is numerically one of the most significant armoured vehicles produced across the world.
- **BMP-1 Ambulance (Iraq):** Evacuate wounded
- **BMP-1M:** Kliver turret & drop down gate
- **Type 86/WZ-501 (China):** Chinese BMP-1 IFV
- **BMP-1 KShM (Command Vehicle):** Communication equipment similar to BMD KShM variant
- **BMP-1G ICV:** AT-4/AT-5 ATGM & 30-mm AGS-17 AGL
- **BMP-1K (BMP 1974):** Command variant with additional radios, sealed right-side firing ports, & antenna
- **BMP-1 with Soviet modifications in Afghanistan:** Applique armor, AT-4 ATGM mount; some with AGS-17 30-mm AGL
- **BMP-IRM ("Zhuk"-Beetle):** Engineer recon vehicle with front mine claws; 1 MG only
- **BMP-1 with mine plow:** KMT-8 or KMT-10 mine-clearing plows attached
- **MP-31:** Modernized command vehicle
- **BMP-R (BMP M1976):** Recon vehicle with larger rear hatches & 2-man turret
- **BRM-1/BRM-1K Reconnaissance:** BMP-R with a GS-12 Tall Mike radar ILO AT-3 Sagger (see Chapter 1)
- **BREM-2:** Light recovery vehicle w/crane
- **BMP-40:** Larger turret; carries 6 soldiers, prototype model only
- **PRP-3/PRP-4 (Radar):** Artillery recon vehicle with 7.62 MG ILO 73-mm cannon
- **VP-90 (Czech Republic):** Recon with OT-64 turret; 14.5-mm & 7.62-mm MGs
- **SVO Mineclearer (Czech Republic):** Turretless BMP-1 with 24 245-mm explosive rockets
- **BMP-PP0:** Training variant w/o turret
- **Snezka (Czech Republic):** Battlefield surveillance vehicle
- **PRAM-S (Czech Republic):** SP 120-mm mortar carrier
- **BMP-1 Finnish variant:** East German vehicles with autoloaders removed
- **BMP-1 with Poyaud engine (Egypt):** 150 with replaced 10.47-liter Poyaud 6-cylinder engine
- **BMP-1 with applique armor (Iraq):** Armor added to resist 12.7-mm & 14.5-mm armor-piercing shells at 200 m
- **BMP-1A1 Ost:** In 1990, Germany created more space (6 passengers) & removed the automatic loader

- **BMP-1 with CERAWA armor (Poland):** CERAWA ERA on the glacis, hull, & turret front
- **OT-90 (Czech Republic):** OT-64 1-man turret with 14.5-mm & 7.62-mm machine guns
- **BPzV (Czech Republic):** Recon with Tall Mike radar
- **DP-90 (Czech Republic):** Recon with Tall Mike ra0T-90 maintenance variant adar
- **MU-90 (Czech Republic):** Turretless mine-laying OT-90
- **MLI-84 (Romania):** Larger & heavier w/ 12.7-mm machine gun
- **Pansarbandvgn 501 (Pbv 501 (Sweden):** East German vehicles to mechanized Swedish infantry
- **BREM-4 recovery vehicle:** No turret & crane (Czech version is the VPV)
- **BRM-23 (Bulgaria):** Recon with 23-mm cannon
- **82-mm SP Automatic mortar (Hungary):** Vasilyek mortar ILO troop compartment

System

Development Designation: Objekt 765 Sp4, Sp5

NATO designation: BMP Model 1981, BMP Model 1979/2

Manufacturer: Kurganmashzavod (Soviet Union)[

Description: IFV with exit doors in the rear with space for 8 soldiers; 4 firing ports on each side; 1 firing port in left rear door

Crew: ea3

Passengers: ea7

Dimensions

Length: m6.74

Width: m2.94

Height: m2.15

Weight, Combat: tons13.4

Automotive

Engine Name: UTD-23 (Upgraded Engine)

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: 45

Speed, Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Trench: m0.7

Vertical Step: m2.2

Fording Depth: mAmphibious

Fuel Capacity: liters462

Communications

Type: R-123M Radio

Radio Range: km16-55

Main Weapon System

↳*System*

Name: 2A28 Grom
Type: ow pressure smooth bore semi-automatic gun
Caliber: mm73
In Service: 1966 - Present
Manufacturer: KBP
Proliferation: INA
Weight: kg115
Length: mm1,195
Width: mm218
Height: mm322
Barrels: ea1
Maximum Elevation: deg+33
Minimum Elevation: deg-4
Traverse Range: deg40
Traverse Left: deg20
Traverse Right: deg20
Rate of Fire: rds/min8
Maximum Firing Range: m4,500
Sights: 1PN22M, 1PN22M2[
Loader Type: Autoloader

↳*Ammunition (Option 1)*

Name: PG-15V
Type: HEAT
Caliber: mm73
Muzzle Velocity: m/s665
Maximum Firing Range: m4,500
Shell Variants: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP)
Basic Load: ea40

Wire-Guided Anti-Tank Guided Missile (ATGM)

9M113 Konkurs (AT-5 Spandrel), SACLOS Wire-Guided Anti-Tank Guided Missile (ATGM)

Type: SACLOS Wire-Guided Anti-Tank Guided Missile (ATGM)

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Variants: 9M14M, 9M14P1, Malyutka-2, Malyutka-2F

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contract

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Basic Load: ea4

↳*9K111 Fagot SACLOS Wire-Guided Anti-Tank Missile (ATGM)*

Type: SACLOS Wire-Guided Anti-Tank Missile (ATGM)

Manufacturer: Tula Machinery Design Bureau (Tula KBP)

In Service: 1970-present

Launcher Type: 9P135 launching post

Missile Weight: kg12.5

9P135 Launching Post Weight: kg22.5

Length: mm1,100

↳

Diameter: mm120

Action: 400 mm versus RHA or 200 mm towards armour inclined at 60°

Rate of Fire: rds/min3

Muzzle Velocity (At Launch): m/s80

Muzzle Velocity (In Flight): m/s186

Effective Firing Range: m10-2,500

Warhead Type: HEAT

Warhead Weight: kg1.7

Guidance system: SACLOS wire-guided missile

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+20

Minimum Elevation: deg-20

Basic Load: ea4

Grenade Launcher

Name: AGS-17 Plamya, 30mm Automatic Grenade Launcher

Type: Automatic Grenade Launcher

Manufacturer: Molot plant

In Service: 1970-Present

Proliferation: Widely Proliferated

Weight: kg31

Length: mm840

Rate of Fire: rds/min400

Effective Firing Range: m800-1,700

Maximum Effective Range: m1,700

Action: Blowback

Feed system: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

Variants: AG-17A helicopter-mounted version

↳*Ammunition*

Name: VOG-17M

Type: 30mm Grenade

Cartridge: 30×29mm grenade

Muzzle Velocity: m/s185

Warhead: high explosive fragmentation warhead.

Effective Firing Range: 800-1,700

Basic Load: ea40

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea950

Accuracy of fire at 300 meters: mm90

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes, TKN-3B day night sight with variable magnification

Thermal Gunner: Yes, TVNE-1PA active IR night vision metascope

Main Gun Stabilization: No

Gyrocompass: Yes, GPK-59 electrical gyrocompass

Firing Ports: ea9

Day Periscopes: ea4

Search Light: OU-3GK IR search light

Search Light Range: m400

Protection

Armor (turret front): mm19-23

Applique Armor: mmKovriki turret armour

Explosive Reactive Armor: mmAvailable

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: GO-27 radioactive and chemical agent detector

Chemical Decontamination Kits: TDP chemical decontamination kits

Smoke Equipment: Yes, a upgraded 81mm 902V "Tucha" smoke grenade launcher

Survivability Equipment: INA

Grenade Launcher: Yes, RPG-7 light grenade launcher with grenades

Scavenger System: Yes

Mine Plough: Yes, KMT-10 plough-type mine-clearing system

Fire-Extinguisher System: Yes

Notes:

The BMP-1P is an upgraded variant of the BMP-1 "A variety of upgrades are available: improved tracks, spall liners, air conditioning, smoke generator launchers, laser warning receivers, & more powerful engines. French SNPE ERA & other kits are available, but are hazardous during dismounted operations. Additional armor may jeopardize amphibious capability. Kornet ATGM launcher can be mounted on other BMP-1 variants. Russian AGS-17 & AG-30 30-mm automatic grenade launchers are also available. Key limitation for BMP-1s is the 1-man turret, but BMP-1S can be upgraded to 2-man turrets."

CV 9035DK Danish Infantry Fighting Vehicle (IFV)






Tiers:



Variants:

- **CV9030:** Export version with a 30 mm Bushmaster II autocannon. Adopted by Norway, Switzerland and Finland. Within BAE Systems Hägglunds, the original version of the Norwegian CV9030N is known as the CV90 MK I. The Finnish CV9030FIN and Swiss CV9030CH vehicles are known as the CV90 MK II. The CV90 MK II is also available as CV9030 COM – Command & Control Vehicle. The recently upgraded CV9030N infantry fighting, command & control and reconnaissance vehicles for Norway are known as CV90 MkIIIb, and this is the most advanced variant currently in service.
- **CV9035:** Armed with a Bushmaster III 35/50 cannon. Adopted by the Netherlands as CV9035NL and Denmark as CV9035DK. Within BAE Systems Hägglunds, CV9035 is known as the CV90 MK III.
- **CV90105:** Light tank equipped with 105 mm rifled tank gun/turret. Designed by Hägglunds (BAE Systems) and GIAT (Nexter). A newer version features the Cockerill XC-8 turret.
- **CV90120-T:** Light tank equipped with a tank turret equipped with a smoothbore 120 mm gun. (RUAG 120 mm Compact Tank Gun)
- **CV90 CZ:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic, manned turret variant.[
- **CV90 CZr:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic featuring a Kongsberg MCT-30 unmanned, remote controlled turret, a slightly raised hull and periscope system.
- **Armadillo:** Armoured personnel carrier version built on a modular CV90 Mk III chassis. The CV90 Armadillo can be modified to become a personnel carrier, an ambulance, a command and control centre, a recovery vehicle and many other non-turreted variants at low cost due up to 80% commonality among variants.[31] Currently, only the APC version has been built, with five delivered to Denmark for trials.
- **CV90 STING:** Combat engineering variant built on CV90 Mk I chassis. This vehicle can be outfitted with either a mine plow or a mine roller, and it also has a robotic arm. 16 have been ordered by the Norwegian Army.
- **CV90RWS Multi BK:** Mortar carrier variant built on a CV90 Mk I chassis. This vehicle is armed with a VingPos Mortar Weapon System outfitted with an 81mm L16A2 mortar. 16 have been ordered by the Norwegian Army.
- **CV90 MkIV:** BAE-developed upgraded variant revealed in January 2018, marketed to the Czech Republic as well as existing customers as an upgrade package. Features include a Scania engine with up to 1000 horsepower, X300 transmission, and an increased payload of 2 tonnes. The system also includes BAE's Fighting computer system, which claims to enhance situational awareness, aid decision making, improve ergonomics, and enable autonomous support and remote operation.
- **CV 9035DK:** This is the Danish variant of the CV 9035. It is armed with an ATK 35/50-mm Bushmaster III cannon and a 7.62-mm machine gun. The vehicle is equipped with a computerized fire-control system with stabilized day and night sights. The gunner is equipped with a third-generation thermal imager. It carries a crew of three and seven troops. The Danish vehicles are all in the infantry fighting vehicle configuration, although a small number were fitted with additional

communications equipment for service as command vehicles. A cupola over the rear troop compartment is provided for the squad leader.

System

Alternative Designation: CV 9035DK

Type: Infantry Fighting Vehicle

Family: Combat Vehicle 90

Crew: 3 (commander, driver, gunner)

Passenger Capacity: 7

Dimensions

Length: 6.47 m

Width: 3.19 m

Height, Hull Top Front: 1.64 m

Height, Top Rear: 1.73 m

Height, Turret Roof: 2.50 m

Track Length on the Ground: 3.98 m

Track Width: 0.53 m

Ground Clearance: 0.45 m

Weight: 22,800 kg

Ground Pressure: 0.53 kg/sq cm

Automotive

Engine Name: Scania DI 14

Engine Type: turbo-charged diesel

Engine Power: 550 hp

Fuel Capacity: 525 liters

Transmission: Perkins (license-built Detroit Diesel Allison) X-300-5N automatic cross-drive; 4 forward/2 reverse gears

Speed, Forward: 70 km/h

Speed, Reverse: 43 km/h

Acceleration: 7 sec, (0-30 km/h)

Range: 300 km

Trench: 2.40 m

Vertical: 1.20 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳***System***

Name: 1 x 35mm Bushmaster III
Type: Autocannon
Caliber: 35mm
Quantity: 1 x 35mm Bushmaster III
Length: 4.0 m
Width: 0.4 m
Height: 0.5 m
Weight: 218 kg
Barrels: 1
Rate of Fire: semi-automatic or 200 rds/min
Recoil: 14,000 lb (62,272 N)
Cleaning Method: open bolt
Safety: absolute hangfire protection
Case Ejection: forward
Power Required to Fire: 3 hp at 24 volts (external)

↳***Ammunition***

Type: Rifle
Caliber: mm35
Shell: INA
Basic Load: INA

Coaxial Weapon System

↳***System***

Name: MG3
Type: General-Purpose Machine Gun
Caliber: mm7.62
Quantity: 1 x MG3 General-Purpose Machine Gun
Length: 1,225 mm
Barrel Length: 565 mm
Weight: 27.5 kg (mounted on tripod)
Action: Recoil-operated, roller locked
Rate of Fire: 1,000–1,300 rpm
Muzzle Velocity: 820 m/s
Maximum Firing Range: 1,200 m

Effective Firing Range: 200–1,200 m sight adjustments

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: INA

Fire Control

Name: CelsiusTech Electronics UTAAS protected by an armored shutter

Computerized FCS: Yes

Thermal Imager: Yes, third-generation

Laser Range-Finder: Yes

GPS Receiver: Yes

Compass: KVH Compass

Stabilized Day and Night Sights: Yes

Protection

Hull Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials

Turret Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Grenades: 2 x Lyran flare grenade launchers on rear turret roof 1 x bank of GALIX grenade launchers on either side of the turret

Notes:

CV 9035DK This is the Danish variant of the CV 9035. It is armed with an ATK 35/50-mm Bushmaster III cannon and a 7.62-mm machine gun. The vehicle is equipped with a computerized fire-control system with stabilized day and night sights. The gunner is equipped with a third-generation thermal imager. It carries a crew of three and seven troops. The Danish vehicles are all in the infantry fighting vehicle configuration, although a small number were fitted with additional communications equipment for service as command vehicles. A cupola over the rear troop compartment is provided for the squad leader. The Combat Vehicle 90 (CV90; Sw. Stridsfordon 90, Strf90) is a family of Swedish tracked combat vehicles designed by Sweden's Defense Materiel Administration (Försvarets Materielverk, FMV), Hägglunds and Bofors during the mid-1980s and early 1990s and entered service in Sweden in the mid-90s. The CV90 platform design has continuously evolved in steps from Mk0 to current MkIV with

advances in technology and in response to changing battlefield requirements. The Swedish version of the main infantry fighting vehicle is fitted with a turret from Bofors that is equipped with a 40 mm Bofors autocannon. Export versions are fitted with Hägglunds E-series turrets, armed with either a 30 mm or a 35 mm Bushmaster autocannon. Developed specifically for the Nordic sub-arctic climate, the vehicle has very good mobility in snow and wetlands while carrying and supporting six to eight fully equipped dismount soldiers. Other variants include Forward Observation, Command and control, anti-aircraft, armoured recovery vehicle, electronic warfare and so forth. The CV90 and Hägglunds E-series turrets have been under continuous development with more than 4 million hours invested and are still produced with modern protection, armament and network enabled solutions. Currently, 1,280 vehicles in 15 variants are in service with seven user nations, four of which are NATO members, under BAE Systems Hägglunds AB.

CV 9030 Swedish Infantry Fighting Vehicle (IFV)



Tiers:



Variants:

- **CV9030:** Export version with a 30 mm Bushmaster II autocannon. Adopted by Norway, Switzerland and Finland. Within BAE Systems Hägglunds, the original version of the Norwegian CV9030N is known as the CV90 MK I. The Finnish CV9030FIN and Swiss CV9030CH vehicles are known as the CV90 MK II. The CV90 MK II is also available as CV9030 COM – Command & Control Vehicle. The recently upgraded CV9030N infantry fighting, command & control and reconnaissance vehicles for Norway are known as CV90 MkIIIb, and this is the most advanced variant currently in service.
- **CV9035:** Armed with a Bushmaster III 35/50 cannon. Adopted by the Netherlands as CV9035NL and Denmark as CV9035DK. Within BAE Systems Hägglunds, CV9035 is known as the CV90 MK III.
- **CV90105:** Light tank equipped with 105 mm rifled tank gun/turret. Designed by Hägglunds (BAE Systems) and GIAT (Nexter). A newer version features the Cockerill XC-8 turret.
- **CV90120-T:** Light tank equipped with a tank turret equipped with a smoothbore 120 mm gun. (RUAG 120 mm Compact Tank Gun)
- **CV90 CZ:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic, manned turret variant.[
- **CV90 CZr:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic featuring a Kongsberg MCT-30 unmanned, remote controlled turret, a slightly raised hull and periscope system.
- **Armadillo:** Armoured personnel carrier version built on a modular CV90 Mk III chassis. The CV90 Armadillo can be modified to become a personnel carrier, an ambulance, a command and control centre, a recovery vehicle and many other non-turreted variants at low cost due up to 80% commonality among variants.[31] Currently, only the APC version has been built, with five delivered to Denmark for trials.
- **CV90 STING:** Combat engineering variant built on CV90 Mk I chassis. This vehicle can be outfitted with either a mine plow or a mine roller, and it also has a robotic arm. 16 have been ordered by the Norwegian Army.
- **CV90RWS Multi BK:** Mortar carrier variant built on a CV90 Mk I chassis. This vehicle is armed with a VingPos Mortar Weapon System outfitted with an 81mm L16A2 mortar. 16 have been ordered by the Norwegian Army.
- **CV90 MkIV:** BAE-developed upgraded variant revealed in January 2018, marketed to the Czech Republic as well as existing customers as an upgrade package. Features include a Scania engine with up to 1000 horsepower, X300 transmission, and an increased payload of 2 tonnes. The system also includes BAE's Fighting computer system, which claims to enhance situational awareness, aid decision making, improve ergonomics, and enable autonomous support and remote operation.
- **CV 9035DK:** This is the Danish variant of the CV 9035. It is armed with an ATK 35/50-mm Bushmaster III cannon and a 7.62-mm machine gun. The vehicle is equipped with a computerized fire-control system with stabilized day and night sights. The gunner is equipped with a third-generation thermal imager. It carries a crew of three and seven troops. The Danish vehicles are all in the infantry fighting vehicle configuration, although a small number were fitted with additional communications equipment for service as command vehicles. A cupola over the rear troop compartment is provided for the squad leader.

System

Alternative Designation: CV 9030

Type: Infantry Fighting Vehicle

Family: Combat Vehicle 90

Crew: 3 (commander, driver, gunner)

Passenger Capacity: 8

Dimensions

Length: 6.55 m

Width: 3.19 m

Height, Hull Top Front: 1.63 m

Height, Axis of FIre: 2.00 m

Height, Overall: 2.78 m

Track Length on the Ground: 3.98 m

Track Width: 0.53 m

Ground Clearance: 0.45 m

Weight: 26,000 kg

Ground Pressure: 0.59 kg/sq cm

Automotive

Engine Name: Scania DI 16

Engine Type: V8 4-cycle diesel

Engine Power: 680 hp at 2,200 rpm

Fuel Capacity: 840 liters

Transmission: Perkins X-300-0 automatic; 4 forward/2 reverse gears

Speed, Forward: 70 km/h

Speed, Reverse: 43 km/h

Acceleration: 7 sec, (0-30 km/h)

Range: 600 km

Trench: 2.40 m

Vertical: 1.20 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x 30-mm ATK Bushmaster II

Type: Chain Gun

Caliber: 30mm

Quantity: 1 x 30-mm ATK Bushmaster II

Length: 2.58 m
Width: 318 mm
Height: 373 mm
Weight: 119 kg
Bore: 25-mm/81-cal, rifled
Maximum Range: 2,000 m
Recoil: 9,000 lb
Muzzle Velocity: 1,345 mps
Rate of Fire: 100, 200, or 500 rpm, cyclic
Elevation: -10 deg to 45 deg
Traverse: 360 deg

↳*Ammunition*

Type: PGU/20
Name: API-T
Caliber: mm30
Length: 223 mm
Weight: 533 g
Basic Load: 160 ready + 240 stowed

Coaxial Weapon System

↳*System*

Name: MG3
Type: General-Purpose Machine Gun
Caliber: mm7.62
Quantity: 1 x MG3 General-Purpose Machine Gun
Length: 1,225 mm
Barrel Length: 565 mm
Weight: 27.5 kg (mounted on tripod)
Action: Recoil-operated, roller locked
Rate of Fire: 1,000–1,300 rpm
Muzzle Velocity: 820 m/s
Maximum Firing Range: 1,200 m
Effective Firing Range: 200–1,200 m sight adjustments
Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt
Sights: Open tangent iron sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: INA

Fire Control

Name: CelsiusTech Electronics UTAAS protected by an armored shutter

Computerized FCS: Yes

Thermal Imager: Yes

Laser Range-Finder: Yes

GPS Receiver: Yes

Compass: KVH Compass

Protection

Hull Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials

Turret Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment:

Grenades: 2 x Lyran flare grenade launchers on rear turret roof 1 x bank of GALIX grenade launchers on either side of the turret

Notes:

The Combat Vehicle 90 (CV90; Sw. Stridsfordon 90, Strf90) is a family of Swedish tracked combat vehicles designed by Sweden's Defense Materiel Administration (Försvarets Materielverk, FMV), Hägglunds and Bofors during the mid-1980s and early 1990s and entered service in Sweden in the mid-90s. The CV90 platform design has continuously evolved in steps from Mk0 to current MkIV with advances in technology and in response to changing battlefield requirements. The Swedish version of the main infantry fighting vehicle is fitted with a turret from Bofors that is equipped with a 40 mm Bofors autocannon. Export versions are fitted with Hägglunds E-series turrets, armed with either a 30 mm or a 35 mm Bushmaster autocannon. Developed specifically for the Nordic sub-arctic climate, the vehicle has very good mobility in snow and wetlands while carrying and supporting six to eight fully equipped dismount soldiers. Other variants include Forward Observation, Command and control, anti-aircraft, armoured recovery vehicle, electronic warfare and so forth. The CV90 and Hägglunds E-series turrets have been under continuous development with more than 4 million hours invested and are still produced with modern protection, armament and network enabled solutions. Currently, 1,280 vehicles in 15 variants are in service with seven user nations, four of which are NATO members, under BAE Systems Hägglunds AB. CV9030 Export version with a 30 mm Bushmaster II autocannon. Adopted by Norway, Switzerland and Finland. Within BAE Systems Hägglunds, the original version of the Norwegian CV9030N is known as the CV90 MK I. The Finnish CV9030FIN and Swiss CV9030CH vehicles are known as the CV90 MK II. The CV90 MK II is also available as CV9030 COM – Command & Control Vehicle. The recently upgraded CV9030N infantry fighting, command & control and reconnaissance vehicles for Norway are known as CV90 MkIIIb, and this is the most advanced variant currently in service.

Marder 1A3 German Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **Marder 1A2:** Since 1983, all the German Marder 1s have been upgraded to the A2 standard. Fitted with thermal imaging sight equipment instead of the image intensifier. New sighting system.
- **Marder 1A3:** new armour kit mounted on the side of the hull. . New stowage boxes are provided along the sides of the upper part of the hull and a new radio installation is provided.
- **Marder 1 A1(−) (1979–1982)::** as A1(+) but without thermal imager. 350 vehicles upgraded to this standard.
- **Marder 1 A1A3::** a Marder A1 with SEM 80/90 cryptographic radios. Marder 1 A1A as 1 A1 but without any passive night vision equipment. 1,112 vehicles upgraded to this standard.
- **Marder 1 A1A4::** a Marder A1A with SEM 80/90 cryptographic radios. Marder 1 A1A2: a converted Marder 1 with A1 turret and A2 chassis
- **Marder 1 A1A5:** a Marder A1A2 with SEM 80/90 cryptographic radios.
- **Marder 1 A2 (1984–1991):** Between 1984 and 1991, all German Marder 1s were upgraded to A2 standard, this included substantial modification of the suspension, fuel tanks, cooling system and water-jet cleaning system. Additionally a new sighting system was installed. The infrared search light equipment was removed, and all vehicles were fitted with thermal imagers except for the 674 A1(+) vehicles, which already had them.
- **Marder 1 A2A1:** a Marder 1A2 with SEM 80/90 cryptographic radios.
- **Marder 1 A3 (1988–1998):**
- **Marder 1 A4:** a Marder 1 A3 with SEM 93 cryptographic radio
- **Marder 1 A5 (2003–2004):** Additional anti-mine armor and completely remodeled interior in order to avoid blast and shock injuries to the crew when hit by a mine. Applied to 74 Marder 1 A3s only.
- **Marder 1 A5A1 (2010–2011:** Equipped with air conditioning system, jammer for IED-protection and multi-spectral camouflage

System

Alternative Designation: Marder (IFV)
Manufacturer: Rheinmetall Landsysteme
Type: Infantry Fighting Vehicle (IFV)
Family: Marder IFV Family
Crew: ea3
Passenger Capacity: ea7

Dimensions

Length: m6.79
Width: m3.24
Height: m2.98

Weight, Combat: tons28.5

Ground Pressure: kg/mINA

Automotive

Engine Name: MTU MB 833 Ea-500

Engine Type: Diesel

Engine Power: hp591

Cruising Range: km520

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Transmision: RENK HSWL 194

Fuel Capacity: liters652

Ground clearance: m0.45

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.5

Fording Depth (with preperation): m2

Communications

Primary Radio: SEM 80 Radio

Secondard Radio: SEM 90 Radio

Range: km30

Main Gun

↳*System*

Name: Rheinmetall Mk 20 RH-202, 20mm Autocannon

Type: mm20

Manufacturer: Rheinmetall

Weight: kg83

Length: mm2,612

Height: mm241

Rate of Fire: rds/min880-1,300

Action: Gas-unlocked sliding breech block, blowback, recoiling base

Effective Firing Range (vs. aircraft): m1,600

Effective Firing Range (vs. ground targets): m2,500

Maximum Elevation: deg+65

Minimum Elevation: deg-17

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳***Ammunition***

Type: Rifle

Caliber: mm20

Cartridge: NATO standard 20 × 139 mm cartridge with disintegrating belt

Shell: 20 × 139 mm

Muzzle Velocity (With HEI): m/s1,044

Muzzle Velocity (With AP): m/s1,100

Basic Load: ea1,250

Ammunition Types: HEI-T, TP-T, API-T, and APDS-T.

Coaxial Weapon System

↳***System***

Name: Rheinmetall MG 3

Type: mm7.62

In Service: 1960–present

Manufacturer: Rheinmetall

Proliferation: over 1 million

Max Rate of Fire: rds/min1,000-1,300

Weight (Gun Only): kg11.5

Weight (Mounted on a Tripod): kg27.5

Length (With Stock): mm1,225

Length (With Stock): mm1,097

Barrel Length: mm565

Action: Recoil-operated, roller locked

Effective Firing Range: 200–1,200 m sight adjustments

Maximum Firing Range (Bipod): m600

Maximum Firing Range (Tripod): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed system: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO cartridge

Muzzle Velocity: m/s820

Basic Load: ea5,000

Anti-Tank Guided Missile (ATGM)

↳*MILAN Anti-Tank Guided Missile (ATGM)*

Country: France / Germany

Service: 1972-present

Proliferation: thousands deployed by the French, German, Belgian, and Spanish armies, but Italy and soon India were assembling MILANs under license. All in all, the MILAN's customer list has reached 41 countries and at least several non-state groups.

Range: km2

Basic Load: ea5

Armor Penetration: mm350

Missile Length: mm918

Missile Diameter: mm103

Fin Span: mm267

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Weight: kg2.7

Warhead Type: High Explosive

Guidance System: Wire-Guided

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: PERI-Z 11 and PERI Z 11 A1

Thermal Sight Gunner: PERI-Z 11 and Zeiss thermal imager

Main Gun Stabilization: No

Periscopes (Commander): ea8

Periscopes (Gunner): ea3

Protection

Hull Armor: Welded steel, protection up to 20 mm APDS DM43 from 0 m and 25 mm APDS from 200 m

Turret Armor: Welded steel, protection up to 20 mm APDS DM43 from 0 m and 25 mm APDS from 200 m

Front Hull Armor: Protection from 20 mm APDS projectiles

Applique Armor: Available

Passive Armor Package: Yes

Explosive Reactive Armor: No

Active Protection System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, 76 mm smoke grenade launchers

IR Signature: INA

Notes:

The Marder (German for "marten") is a German infantry fighting vehicle operated by the German Army as the main weapon of the Panzergrenadiere (mechanized infantry) from the 1970s through to the present day. Developed as part of the rebuilding of Germany's armoured fighting vehicle industry, the Marder has proven to be a successful and solid infantry fighting vehicle design. While it used to include a few unique features, such as a fully remote machine gun on the rear deck and gun ports on the sides for infantry to fire through, these features have been deleted or streamlined in later upgrade packages to bring it more in line with modern IFV design (the MG has been moved to be a coaxial, the gun ports entirely welded shut and up armored). It is overall a simple and conventional machine with one large rear exit hatch and three top hatches for mounted infantry to fire from. The Marder is currently being replaced by its successor, the Puma.

FV 510 Warrior British Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **FV510 Infantry Section Vehicle:** This is the principal version operated by the British Army, as described above. 489 were produced (including 105 as platforms for the mobility of ATGW teams, originally equipped with MILAN and later with Javelin).
- **FV511 Infantry Command Vehicle:** 84 of these were produced.
- **FV512 Mechanised Combat Repair Vehicle.:** Operated by REME detachments in Armoured Infantry battalions. It is equipped with a 6.5 tonne crane plus power tools and is able to tow a trailer carrying two Warrior power packs or one Challenger power pack. 105 of these were produced.
- **FV513 Mechanised Recovery Vehicle (Repair):** Also operated by REME detachments in Armoured Infantry battalions. It is equipped with a 20 tonne winch and 6.5 tonne crane plus power tools and (like the FV512) is able to tow a trailer carrying two Warrior power packs or one Challenger power pack. 39 of these were produced.
- **FV514 Mechanised Artillery Observation Vehicle:** This is operated by the Royal Artillery as an Artillery Observation Post Vehicle (OPV) and is fitted with mast-mounted Man-packable Surveillance and Target Acquisition Radar (MSTAR) and Position and Azimuth Determining System (PADS), with Image Intensifying and Infra Red equipment. The only armament is the 7.62 mm machine gun, as the 30 mm Rarden cannon is replaced by a dummy weapon. This allows space for the targeting and surveillance equipment while still keeping largely the same outward appearance of a standard Warrior in order to avoid becoming a priority target. 52 of these were produced.
- **FV515 Battery Command Vehicle:** This is operated by the Royal Artillery. 19 of these were produced. Desert Warrior. This was an export version adapted for operations in hostile desert conditions. It was fitted with the Delco turret as used on the LAV-25 wheeled IFV, mounting a stabilised M242 Bushmaster 25 mm chain gun with coaxial 7.62 mm chain gun and 2 x Hughes TOW ATGM launchers (one mounted on each side). In 1993, Kuwait purchased 254 Desert Warrior vehicles.
- **Warrior 2000.:** This was a new version developed for the Swiss Army. It did not enter production. It featured an all-welded aluminium hull, increased armour, digital fire control system and more powerful engine. It was fitted with the Delco turret, or a Land Systems Hagglunds E30 turret with Alliant Techsystems Bushmaster II Mk 44 30 mm cannon.

System

Alternative Designation: Originally known as the MCV-80. Some Warrior variants in service with the UK have an alpha-numerical designation
Type: Infantry Fighting Vehicle (IFV)
Manufacturer: GKN Sankey/BAe Systems
Estimated Service Life: years50+
Family: Warrior Class
Crew: ea3
Passenger Capacity: ea7

Dimensions

Length: m6.34

Width: m3.03

Height: m2.7

Weight, Combat: tons25.7

Automotive

Engine Name: Perkins CV8 TCA

Engine Type: Diesel

Engine Power: hp550

Cruising Range: km660

Speed, Maximum Road: km/h75

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.75

Trench: m2.5

Fording Depth: m1.3

Transmission: Allison X-300-4B transmission

Communications

Primary Radio: Bowman digital radio system

HF Radio: High Capacity Data Radio (HCDR)

Main Gun

Note: A future upgrade to the Warrior will be a 40mm CTA International CT40 Cannon

↳*System*

Name: 30 mm L21A1 RARDEN cannon

Type: mm30

Load Type: Manual with three round clips

Automatic Firing Mode: rounds6

Overall Length: m3.15

Barrel Length: m2.44

Total Weight: kg110

Barrel Weight: kg24.5

Ammunition Types: Armour Piercing Secondary Effect (APSE), High Explosive Incendiary (HEI), Armour Piercing

Discarding Sabot (APDS)

Maximum Effective Range: m2,000

Rate of Fire: rds/min90

↳***Ammunition***

Type: APSE, HEI

Caliber: mm30

Cartridge: 30×170mm

Basic Load: ea250

Muzzle Velocity: m/s1,070

Maximum Effective Range: m2,000

Coaxial Weapon System

↳***System***

Name: L94A1, Hughes EX-34 Chain Gun

Type: 7.62mm Chain Gun

Manufacturer: Heckler & Koch

In Service: 1980-present

Max Rate of Fire: INA

Weight: kg17.86

Total Length: m1.25

Barrel Length: mm703

Action: Electrically driven

Feed System: disintegrating link belt

Variants: EX-31, L95A1 (short barreled version)

↳***Ammunition***

Type: RIfle (Chain Gun)

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (linked)

Muzzle Velocity: m/s862

Basic Load: eaINA

Effective Firing Range: m200-3,000

Penetration: No, Low penetration makes it ineffective against armor

Fire Control

Name: INA

Computerized FCS: Yes, Fire-Control (STAG FC) . Dual channel sight with integrated FCS for gunner

Thermal Sight Vehicle Commander: Yes, Battle Group Thermal Imaging (BGTI) system

Thermal Sight Gunner: Yes, Battle Group Thermal Imaging (BGTI) system

Main Gun Stabilization: No

CCD Camera for Commander: Yes

Commander Flat Panel Display: Yes

Platform Battlefield Infrastructure System Application (P-BISA): Yes

Protection

Hull Armor (Front Arc): all-round protection against 25mm armor-piercing rounds

Hull Armor (Sides and Back): all-round protection against 14.5 mm armor-piercing rounds.

Turret Armor: all-round protection against 25mm armor-piercing rounds

Applique Armor: Yes, after 2007 the Warrior IFV have the Warrior Added Protection (WRAP 2) avaialble

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: Available, dozer blades or light mine-clearing ploughs.

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, two banks of four 66 mm smoke grenade

Firing Ports: No, to aid in protecting the vehicle

Engine Fire Protection System: Yes

Joint Combat Identification Marking System: Yes

Note: Around 70 vehicles, upgraded to Theatre Entry Standard Herrick (TES (H)) protection kit

Notes:

The Warrior tracked vehicle family is a series of British armored vehicles, originally developed to replace the older FV430 series of armored vehicles. The Warrior started life as the MCV-80, "Mechanised Combat Vehicle for the 1980s". One of the requirements of the new vehicle was a top speed able to keep up with the projected new MBT, the MBT-80 - later canceled and replaced by what became the Challenger 1 - which the then-current FV432 could not. The project was begun in the 1970s. GKN Defence won the production contract in 1980. GKN Defence was purchased by BAE Systems, via Alvis plc. A total of 789 FV510 and variants were manufactured for the British Army, and 254 of a modified version (Desert Warrior) was produced for the Kuwaiti Army. The Warrior incorporates several design features in keeping with the UK's battlefield experience. In particular, there are no firing ports in the hull, in line with British thinking that the role of the armored personnel carrier/infantry fighting vehicle (APC/IFV) is to carry troops under protection to the objective and then give firepower support when they have disembarked. The absence of firing ports also allows additional appliqué armor to be fitted to the sides of the vehicle, which is invariably applied to Warriors involved in active operations. The cage armor used at one stage was replaced in 2007 by "Wrap Two" appliqué armor. The basic armor provides all-around protection against small arms ball ammunition. The crew of a Warrior comprises the driver, seated in the front hull, and the gunner and commander, who are both seated in the turret. The embarked infantry section can number up to seven soldiers, who are seated facing each other in the rear hull compartment. Passenger access is through a single electric ram powered door at the rear of the hull, rather than a drop-down ramp as in the US M113 APC and M2 Bradley IFV. Warrior Section Vehicles are able to carry and support seven fully equipped soldiers together with supplies and weapons, including a number of anti-tank weapons, for a 48-hour battlefield day in nuclear/biological/chemical conditions. The Warrior is driven by a Perkins-Rolls-Royce V8 Condor engine through a four-speed automatic gearbox. It is capable of a road speed of 46 miles per hour (74 km/h). The Warrior has the speed and performance to keep up with a Challenger 2 main battle tank over the most difficult terrain. The vehicle is fitted with a two-man GKN Sankey turret, armed with a non-stabilized L21A1 30 mm RARDEN cannon capable of destroying some APCs at a maximum range of

1,500 meters (1,600 yd), and an L94A1 EX-34 7.62 mm Hughes Helicopters coaxial chain gun. It is fitted with two clusters of four defensive grenade launchers (usually used with Visual and Infrared Screening Smoke – VIRSS). All Warrior Infantry Section Vehicles are now equipped with Bowman radios, which replaced the earlier Clansman radios, for enhanced communications, command and control. When first introduced, the vehicles were fitted with passive Image intensifier night vision sights. These have since been progressively replaced with Thales Optronics Battle Group Thermal Imaging (BGTI) sights to upgrade night fighting capabilities, with 8x magnification. As of 2007, 350 vehicles were fitted with BGTI.

Puma German Infantry Fighting Vehicle (IFV)





Tiers:

1 **2** 3 4

Variants:

- **Command post vehicle:** This variant retains the 30-mm turret. The rear is modified for the command-post role and fitted with additional communications equipment.
- **Driver training vehicle:** Eight of the 350 Pumas ordered by the German army will be in the specialized driver training role. They are not fitted with the 30-mm turret.

System

Alternative Designation: Puma
Type: Infantry Fighting Vehicle (IFV)
Crew: eaInfantry Fighting Vehicle (IFV)
Passengers: 6

Dimensions

Length: 7.6 m
Width: 3.9 m
Height: 3.1 m
Track Width: 0.5 m
Ground Clearance: 450mm
Weight, Maximum Load: 43,000 kg
Weight, Air-Transportable: 31,450 kg
Weight, Ground-Transport: 40,700 kg

Automotive

Engine Name: 1 x MTU 10V 892
Engine Type: 10-cyl high-power density diesel
Engine Power: 1,073 hp (800 kW) at 4,250 rpm
Speed, Forward: 38 mph (70 km/h)
Speed, Reverse: 22 mph (40 km/h)

Range: 310 mi (500 km)

Vertical Obstacle: 2 ft 7 in (0.80 m)

Trench: 8 ft 2 in (2.50 m)

Fording without Preparation: 3 ft 11 in (1.20 m)

Main Gun

↳*System*

Name: Mauser MK30-2

Type: 30 mm Rifled Gun

Quantity: 1 x Mauser MK30-2

Caliber: mm30

Length: mm3780

Weight: kg198

Rate of Fire: 200 rounds per minute

Traverse: 360 deg

Elevation: -10 deg to 45 deg

Range: 9,840 ft (3,000 m)

Notes: dual ammunition feeding allows varied alternate shots

↳*Ammunition*

Type: APFSDS-T and KETF (ABM)

Caliber: mm30

Basic Load: 200 rounds ready to fire, 200 rounds in storage

Coaxial Weapon System

↳*System*

Name: Heckler and Koch MG4 (also known as the HK123)

Type: Light machine gun

Manufacturer: Heckler & Koch

Proliferation: Albania: Standard light support weapon of Albanian Land Forces Brazil: Limited use on the Brazilian Army Estonia: Used by ESTSOF. Germany: Standard platoon-level support weapon of the German Army, adopted in 2005. Malaysia: Used by PASKAL special operations force tactical of the Royal Malaysian Navy, adopted in 2006. Portugal Spain: Ordered 1,800–2,000 MG4E machine guns in 2007 with deliveries expected to continue over the next four years. Standard LMG for the Spanish Army, usually fitted with an ACOG sight. Turkey Air Force MAK SF

In Service: 2005-present

Length: 1,030 mm (40.6 in) stock extended / 830 mm (32.7 in) stock folded (MG4, MG4E) 950 mm (37.4 in) stock extended / 750 mm (29.5 in) stock folded (MG4KE)

Barrel Length: 450 mm (17.7 in) (MG4, MG4E) 370 mm (14.6 in) (MG4KE)

Width: 90 mm (3.5 in)

Height: 250 mm (9.8 in)

Weight: 8.15 kg (17.97 lb) (MG4) 7.90 kg (17.4 lb) (MG4E) 7.70 kg (17.0 lb) (MG4KE)

Action: Gas-operated, rotating bolt

Rate of Fire: 890 (± 60) RPM (MG4) 775 (± 50) RPM (MG4E, MG4K)

Effective Firing Range: Approx. 1,000 m (MG4, MG4E) Approx. 900 m (MG4KE)

Feed System: M27 linked disintegrating belt

Sights: Iron sights; MIL-STD-1913 rail provided for optics, German Army models are equipped with telescopic sights with 3× magnification.

↳*Ammunition*

Type: Rifle

Caliber: mm5.56

Cartridge: 5.56 x 45mm NATO

Basic Load: 1,000 rounds ready to fire, 1,000 rounds in storage

Anti-Tank Guided Missile System

↳*System*

Name: Spike

Type: fire-and-forget anti-tank guided missile and anti-personnel missile

Length: 1,200 mm (3 ft 11 in)

Diameter: 130 mm (5.1 in)

Weight: Spike-ER from helicopter: • Missile in canister: 34 kg (74 lb 15 oz) • Launcher: 55 kg (121 lb 4 oz) • Launcher + 4 missiles: 187 kg (412 lb 4 oz) Spike-MR/LR from ground: • Missile round: 14 kg (30 lb 14 oz) • Command & launch unit (CLU): 5 kg (11 lb 0 oz) • Tripod: 2.8 kg (6 lb 3 oz) • Battery: 1 kg (2 lb 3 oz) • Thermal sight: 4 kg (8 lb 13 oz)

Rate of Fire: Ready to launch in 30 seconds, reload in 15 seconds

Effective Firing Range: 200–2,500 m (220–2,730 yd)

Sights: 10× optical sight

Warhead: Tandem-charge HEAT warhead

Detonation Mechanism: Piezoelectric trigger

Engine: Solid-propellant rocket

Guided System: Infrared homing – Electro Optical (CCD, Imaging Infrared (IIR) or Dual CCD/IIR), Passive CCD or dual CCD/IIR seeker

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: INA

Note #1: The Puma offers improvements in situational awareness. The fully stabilized 360° periscope (PERI) with six different zoom stages offers a direct glass optic link to either the commander or the gunner. Since this is an optical line, it had to be placed in the turret center, one of the reasons why the main cannon is mounted off-center on the turret. Via an additional CCD camera the picture from this line can also be fed into the on-board computer network and displayed on all electronic displays within the vehicle. Besides that, the periscope offers an optronic thermal vision mode and a wide-angle camera with three zoom stages to assist the driver, as well as a laser range finder. The whole array is hunter-killer capable; the commander also has 5 vision blocks. The gunner optics, which can be completely protected with a slide hatch, are mounted coaxially to the main gun. The gunner has a thermal vision camera and laser range finder (identical to those on the PERI) and an optronic day sight, rounded off with a vision- and a glass block. The driver has three of them, as well as an image intensifier and one display for optronic image feeds. Even the passenger cabin has a hatch and three vision blocks on the rear right side of the vehicle, one of them in a rotary mount. The rear cabin also has two electronic displays. All in all, the Puma has an additional five external cameras at its rear in swing-mounts for protection while not in use. Apart from the glass optic periscope view directly accessible only by the commander and gunner (but indirectly via the CCD camera), all optronic picture feeds can be displayed on every electronic display within the vehicle. The provisions for the rear cabin enable the passengers to be more active than previously in assisting the vehicle crew either directly through the vision blocks and hatches, or by observing one or more optronic feeds. The whole crew has access to the on board intercom.

Note #2: The gunner's control unit enables him to optimize the type of ammunition for a particular target. Options include tanks, armored infantry fighting vehicle, armored personnel carrier, helicopter, line of skirmishers, soldiers in a covered position and a squad column.

Protection

Hull Armor: The Puma incorporates protection against mines to NATO Standard Agreement (STANAG) 4569 requirements, shaped charges and kinetic energy ammunition as well as nuclear, biological and chemical weapons. The vehicle features passive, reactive and active armor elements. The hull is of all-welded steel armor with applique passive armor for higher levels of ballistic protection. The Puma has two levels of protection. It is air-transportable at protection level A, which includes full mine protection and ballistic protection from machine guns up to 14.5-mm in caliber through 360 degrees. Add-on armor brings the Puma to protection level C. This defends against hand-held anti-tank weapons, medium-caliber weapons, artillery fragments and bomblets. Mine protection is effective against heavy blast mines and explosively formed projectiles (EFP). The belly provides protection against anti-tank mines containing 22 lb (10 kg) of explosive as well as explosively formed penetrators (EFPs).

Turret Armor: The hull and turret roof are protected against bomblets. The rear of the Puma has been strengthened to withstand the impact of another vehicle in case of collision.

Applique Armor: The modular passive armor package allows the vehicle to be rapidly upgraded with new technology or for changing threats.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Puma is a German infantry fighting vehicle (Schützenpanzer or short SPz) designed to replace the aging Marder IFVs currently in service with the German Army. Production of the first batch of 350 vehicles began in 2010 and is scheduled for completion by August 2020. A second batch of 210 Pumas has received funding. Mass production began on 6 July 2009. The companies responsible for this project are Krauss-Maffei Wegmann and Rheinmetall Landsysteme, who created a joint venture in the form of Projekt System Management GmbH (PSM). The Puma is one of the world's best-protected IFVs, while still having a high power-to-weight ratio. SAIC offered a derivative of the Puma as its contender in the now cancelled American GCV Infantry Fighting Vehicle program. The Puma, while externally not very different from existing IFVs, incorporates a number of advances and state-of-the-art technologies. The most obvious of these is the incorporated ability to flexibly mount different armour (see below for details). Another feature is the compact, one-piece crew cabin that enables direct crew interaction ("face-to-face"; like replacing the driver or gunner in case of a medical emergency) and minimizes the protected volume. The cabin is air conditioned, NBC-proof with internal nuclear and chemical sensors and has a fire suppressing system using non-toxic agents. The engine compartment has its own fire extinguishing system. The only compromise of the otherwise nearly cuboid cabin is

the driver station, located in a protrusion in front of the gunner, in front of the turret. One measure to achieve the one-piece cabin is the use of an unmanned, double-asymmetrical turret (see photo): while slightly off-center turrets are common in IFVs, the Puma's turret is on the left-hand side of the vehicle, while the main cannon is mounted on the right side of the turret and thus on the middle axis of the hull when the turret is in the forward position. The outer hull (minus the turret) is very smooth and low to minimize bullet traps and the general visual signature. The whole combat-ready vehicle in its base configuration will be air transportable in the Airbus A400M tactical airlifter. Its 3+6 persons crew capability is comparable to other vehicles of comparable weight, like the US American M2 Bradley IFV, the same as in the Marder, but smaller than the 3+8 of the CV9030 and CV9035.

CV 9040 Swedish Infantry Fighting Vehicle (IFV)





Tiers:

1 **2** 3 4

Variants:

- **CV9030:** Export version with a 30 mm Bushmaster II autocannon. Adopted by Norway, Switzerland and Finland. Within BAE Systems Hägglunds, the original version of the Norwegian CV9030N is known as the CV90 MK I. The Finnish CV9030FIN and Swiss CV9030CH vehicles are known as the CV90 MK II. The CV90 MK II is also available as CV9030 COM – Command & Control Vehicle. The recently upgraded CV9030N infantry fighting, command & control and reconnaissance vehicles for Norway are known as CV90 MkIIIb, and this is the most advanced variant currently in service.
- **CV9035:** Armed with a Bushmaster III 35/50 cannon. Adopted by the Netherlands as CV9035NL and Denmark as CV9035DK. Within BAE Systems Hägglunds, CV9035 is known as the CV90 MK III.
- **CV90105:** Light tank equipped with 105 mm rifled tank gun/turret. Designed by Hägglunds (BAE Systems) and GIAT (Nexter). A newer version features the Cockerill XC-8 turret.
- **CV90120-T:** Light tank equipped with a tank turret equipped with a smoothbore 120 mm gun. (RUAG 120 mm Compact Tank Gun)
- **CV90 CZ:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic, manned turret variant.[
- **CV90 CZr:** Export variant designed in collaboration with VOP CZ marketed to the Czech Republic featuring a Kongsberg MCT-30 unmanned, remote controlled turret, a slightly raised hull and periscope system.
- **Armadillo:** Armoured personnel carrier version built on a modular CV90 Mk III chassis. The CV90 Armadillo can be modified to become a personnel carrier, an ambulance, a command and control centre, a recovery vehicle and many other non-turreted variants at low cost due up to 80% commonality among variants.[31] Currently, only the APC version has been built, with five delivered to Denmark for trials.
- **CV90 STING:** Combat engineering variant built on CV90 Mk I chassis. This vehicle can be outfitted with either a mine plow or a mine roller, and it also has a robotic arm. 16 have been ordered by the Norwegian Army.
- **CV90RWS Multi BK:** Mortar carrier variant built on a CV90 Mk I chassis. This vehicle is armed with a VingPos Mortar Weapon System outfitted with an 81mm L16A2 mortar. 16 have been ordered by the Norwegian Army.
- **CV90 MkIV:** BAE-developed upgraded variant revealed in January 2018, marketed to the Czech Republic as well as existing customers as an upgrade package. Features include a Scania engine with up to 1000 horsepower, X300 transmission, and an increased payload of 2 tonnes. The system also includes BAE's Fighting computer system, which claims to enhance situational awareness, aid decision making, improve ergonomics, and enable autonomous support and remote operation.
- **CV 9035DK:** This is the Danish variant of the CV 9035. It is armed with an ATK 35/50-mm Bushmaster III cannon and a 7.62-mm machine gun. The vehicle is equipped with a computerized fire-control system with stabilized day and night sights. The gunner is equipped with a third-generation thermal imager. It carries a crew of three and seven troops. The Danish vehicles are all in the infantry fighting vehicle configuration, although a small number were fitted with additional communications equipment for service as command vehicles. A cupola over the rear troop compartment is provided for the squad leader.

System

Alternative Designation: CV 9040

Type: Infantry Fighting Vehicle

Family: Combat Vehicle 90

Crew: 3 (commander, driver, gunner)

Passenger Capacity: 8

Dimensions

Length: 6.47 m

Width: 3.19 m

Height, Hull Top Front: 1.64 m

Height, Top Rear: 1.73 m

Height, Turret Roof: 2.50 m

Track Length on the Ground: 3.98 m

Track Width: 0.53 m

Ground Clearance: 0.45 m

Weight: 22,800 kg

Ground Pressure: 0.53 kg/sq cm

Automotive

Engine Name: Scania DI 14

Engine Type: turbo-charged diesel

Engine Power: 550 hp

Fuel Capacity: 525 liters

Transmission: Perkins (license-built Detroit Diesel Allison) X-300-5N automatic cross-drive; 4 forward/2 reverse gears

Speed, Forward: 70 km/h

Speed, Reverse: 43 km/h

Acceleration: 7 sec, (0-30 km/h)

Range: 300 km

Trench: 2.40 m

Vertical: 1.20 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x 40-mm Bofors L/70B

Type: Autocannon

Caliber: 40mm

Quantity: 1 x 40-mm Bofors L/70B

Length: 6.3 m
Barrel Length: 2.8 m
Width: 2.3 m
Height: 2.4 m
Weight: 5,150 kg
Barrels: 1
Carriage: 522 kg
Elevation: -8 deg to 35 deg
Traverse: 360 deg
Rate of Fire: 240-330 round/min
Muzzle Velocity: 1,021 m/s
Maximum Firing Range: 12,500 m

↳***Ammunition***

Type: Projectile
Caliber: mm40
Shell: 40×365mmR
Shell Weight: 0.9 kg
Basic Load: 24 rounds in magazine, 48 in carousel, 168 in hull

Coaxial Weapon System

↳***System***

Name: MG3
Type: General-Purpose Machine Gun
Caliber: mm7.62
Quantity: 1 x MG3 General-Purpose Machine Gun
Length: 1,225 mm
Barrel Length: 565 mm
Weight: 27.5 kg (mounted on tripod)
Action: Recoil-operated, roller locked
Rate of Fire: 1,000–1,300 rpm
Muzzle Velocity: 820 m/s
Maximum Firing Range: 1,200 m
Effective Firing Range: 200–1,200 m sight adjustments
Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt
Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: INA

Fire Control

Name: CelsiusTech Electronics UTAAS protected by an armored shutter
Computerized FCS: Yes
Thermal Imager: Yes
Laser Range-Finder: Yes
GPS Receiver: Yes
Compass: KVH Compass

Protection

Hull Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials
Turret Armor: Protection against 20- to 30-mm projectiles,may include Kevlar composite materials
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: INA
Grenades: 2 x Lyran flare grenade launchers on rear turret roof 1 x bank of GALIX grenade launchers on either side of the turret

Notes:

CV 9040 IFV This is the definitive version of the CV 90. It is equipped with 40-mm 40/70 cannon, a 7.62-mm co-axial machine gun and has the UTAAS. The Combat Vehicle 90 (CV90; Sw. Stridsfordon 90, Strf90) is a family of Swedish tracked combat vehicles designed by Sweden's Defense Materiel Administration (Försvarets Materielverk, FMV), Hägglunds and Bofors during the mid-1980s and early 1990s and entered service in Sweden in the mid-90s. The CV90 platform design has continuously evolved in steps from Mk0 to current MkIV with advances in technology and in response to changing battlefield requirements. The Swedish version of the main infantry fighting vehicle is fitted with a turret from Bofors that is equipped with a 40 mm Bofors autocannon. Export versions are fitted with Hägglunds E-series turrets, armed with either a 30 mm or a 35 mm Bushmaster autocannon. Developed specifically for the Nordic sub-arctic climate, the vehicle has very good mobility in snow and wetlands while carrying and supporting six to eight fully equipped dismount soldiers. Other variants include Forward Observation, Command and control, anti-aircraft, armoured recovery vehicle, electronic warfare and so forth. The CV90 and Hägglunds E-series turrets have been under continuous development with more than 4 million hours invested and are still produced with modern protection, armament and network enabled solutions. Currently, 1,280 vehicles in 15 variants are in service with seven user nations, four of which are NATO members, under BAE Systems Hägglunds AB.

K200 KIFV South Korean Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **Vulcan Air Defense Carrier:** KIFV with 20-mm Vulcan AD system & AN/PVS-2 range-only radar
- **Mortar Carrier:** 81-mm (7-man) or 107-mm (5-man) fires through roof; dismount option available
- **Recovery Vehicle:** 3500 kg crane & 20,000 kg winch
- **NBC Recon Vehicle:** No firing ports, single left-opening door, 5 crew members, & NBC equipment
- **Command Post (Malaysia):** Roof-mounted 12.7-mm MG with additional communication equipment
- **Ambulance (Malaysia):** Handles wounded personnel
- **40-mm Turret:** 40-mm gun mounted in turret
- **Smoke Generation:** Creates smoke on the battlefield
- **K200A1:** Upgraded variant to 70 km/hr; quicker dash speed; faster amphibious speed
- **Gun Carriers:** Prototype vehicles with either a 30-mm or 90-mm cannon
- **TOW Carrier:** Proposed variant with turret with 2 TOW missiles in the ready-to-fire position

System

Alternative Designations: None

Description: IFV derived from the FMC YPR 765 with exit ramp in the rear with space for 9 soldiers; firing ports

Manufacturer: Hanwha Defense (originally Daewoo Heavy Industries, later renamed as Doosan DST, follow by Hanwha Defense Systems)

Crew: ea3 (driver, commander, gunner)

Dimensions

Chassis Length Overall (m): 5.49

Width Overall (m): 2.85

Height Overall (m): 1.93 (2.52 with MG shield)

Combat Weight (mt): 12.9

Ground Pressure (kg/cm2): 0.67

Automotive

Engine Name: MAN-Doosan D2848T

Engine Type: V-8 Diesel

Engine Power: 350

Cruising Range: km480
Speed (Max Road): km/h74
Speed (Max Swim) (km/h): km/h6
Fording Depths: Amphibious
Transmission: Allison Transmission X200-5K
Suspension: Torsion bar

Armament

↳*M2*

Caliber/length: 12.7-mm
Type: Machine Gun
Ammo: INA on Rounds carried: AP, API, APIT
Maximum Effective Range: 1800 m
Armor Penetration: 22.2 mm at 91 m; 19 mm at 500 m
Muzzle Velocity: m/s884

↳*Pintle-mounted*

Caliber/length: 7.62-mm
Type: Machine Gun
Ammo: AP, Tracer, Ball
Maximum Effective Range: 1100 m
Armor Penetration: AP: 7 mm at 500 m
Muzzle Velocity (m/s): m/s853

Protection

Armor (turret front): INA
Applique Armor: Welded aluminum armor with applique laminated steel plates
Explosive Reactive Armor: INA
Active Protection System: INA
Self-entrenching Blade: No
NBC Protection System: Yes (Details INA)
Smoke Equipment: 6 Smoke grenade launchers
Survivability Equipment: INA

Notes:

The K200 KIFV (Korea Infantry Fighting Vehicle) is a South Korean armoured personnel carrier, originally produced by Daewoo Heavy Industries as a domestic replacement for older armored personnel carriers, such as the M113, in front line service with the Republic of Korea Armed Forces at the time of the K200's development. Since 2009 the K200 has been supplemented by the K21. A total of 2,383 K200 vehicles of all configurations were produced between 1985 and 2006, among which are 111

K200A1 vehicles exported to Malaysia. The K200 series of vehicles transport mechanized infantry platoon is designed to keep personnel safe from small arms fire. The hull of the KIFV is of all-welded aluminium armour with an additional layer of spaced laminate steel armour bolted to it. This composite armour provides a higher level of protection for less weight. It can protect against 12.7 mm on the side and 7.62 mm on the rear, and against anti-personnel mines. The engine compartment is located at the front right of the vehicle and is separated from the remainder of the vehicle by a bulkhead. The engine compartment is fitted with a fire extinguishing system that can be operated by the driver or from outside the vehicle. The air inlet, air outlet louvres and the exhaust pipe are located on the roof of the vehicle to allow amphibious operations. The K200 has six electrically operated smoke grenade launchers mounted across the front of the hull as countermeasures against electro-optical and infrared targeting. If the KIFV variant features a turret, the smoke grenade launchers mount on the turret (three on each side). K200 can provide infantry firepower support with 12.7 mm and 7.62 mm machine guns. Stronger anti-infantry and anti-material firepower can be brought to bear by equipping a 20 mm Vulcan gun, or 81 mm and 107 mm mortars. Anti-tank capability can be added by equipping the Metis-M anti-tank missile system. The K200 is highly modular, and its variants provide additional combat supports such as air defense and vehicle recovery by outfitting many different equipments. The vehicles accommodate 12 people including one infantry squad, the driver, and gunners. In November 2015, Doosan and CMI Defence revealed they had joined to create the Cockerill Protected Weapon Station (CPWS) to increase the firepower of the K200. The turret can support cannons between 20–30 mm, plus a 7.62 mm coaxial machine gun, including the: CPWS20 20 mm; CPWS 25 mm which can be armed with the M242 Bushmaster, Nexter M811, or Oerlikon KBA; and CPWS30 armed with the M230LF.

BMP-1D Russian Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

BMP-1 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-1:** BMP-1 is the first mass produced, tracked IFV of the erstwhile USSR. It is the first variant of the now obsolete BMP model designed in 1966. Considered to be the world's first true IFV, it is also a radical departure from the armoured vehicle designs of the USSR since the Second World War. With over 55,000 BMP-1s and variants having been produced, it is numerically one of the most significant armoured vehicles produced across the world.
- **BMP-1P:** BMP-1P (Ob'yekt 765 Sp4). The main changes were the replacement of the largely ineffective 9M14M Malyutka ATGM with the more reliable, longer range and more powerful 9P135M or 9P135M-1 ATGM launcher.
- **BMP-1M:** Kliver turret & drop down gate
- **Type 86/WZ-501 (China):** Chinese BMP-1 IFV
- **BMP-1 KShM (Command Vehicle):** Communication equipment similar to BMD KShM variant
- **BMP-1G ICV:** AT-4/AT-5 ATGM & 30-mm AGS-17 AGL
- **BMP-1K (BMP 1974):** Command variant with additional radios, sealed right-side firing ports, & antenna
- **BMP-1 with Soviet modifications in Afghanistan:** Applique armor, AT-4 ATGM mount; some with AGS-17 30-mm AGL
- **BMP-IRM ("Zhuk"-Beetle):** Engineer recon vehicle with front mine claws; 1 MG only
- **BMP-1 with mine plow:** KMT-8 or KMT-10 mine-clearing plows attached
- **MP-31:** Modernized command vehicle
- **BMP-R (BMP M1976):** Recon vehicle with larger rear hatches & 2-man turret
- **BRM-1/BRM-1K Reconnaissance:** BMP-R with a GS-12 Tall Mike radar ILO AT-3 Sagger (see Chapter 1)
- **BREM-2:** Light recovery vehicle w/crane
- **BMP-40:** Larger turret; carries 6 soldiers, prototype model only
- **PRP-3/PRP-4 (Radar):** Artillery recon vehicle with 7.62 MG ILO 73-mm cannon
- **VP-90 (Czech Republic):** Recon with OT-64 turret; 14.5-mm & 7.62-mm MGs
- **SVO Mineclearer (Czech Republic):** Turretless BMP-1 with 24 245-mm explosive rockets
- **BMP-PP0:** Training variant w/o turret
- **Snezka (Czech Republic):** Battlefield surveillance vehicle
- **PRAM-S (Czech Republic):** SP 120-mm mortar carrier
- **BMP-1 Finnish variant:** East German vehicles with autoloaders removed
- **BMP-1 with Poyaud engine (Egypt):** 150 with replaced 10.47-liter Poyaud 6-cylinder engine
- **BMP-1 with applique armor (Iraq):** Armor added to resist 12.7-mm & 14.5-mm armor-piercing shells at 200 m
- **BMP-1A1 Ost:** In 1990, Germany created more space (6 passengers) & removed the automatic loader
- **BMP-1 with CERAWA armor (Poland):** CERAWA ERA on the glacis, hull, & turret front
- **OT-90 (Czech Republic):** OT-64 1-man turret with 14.5-mm & 7.62-mm machine guns
- **BPzV (Czech Republic):** Recon with Tall Mike radar
- **DP-90 (Czech Republic):** Recon with Tall Mike ra0T-90 maintenance variant adar
- **MU-90 (Czech Republic):** Turretless mine-laying OT-90
- **MLI-84 (Romania):** Larger & heavier w/ 12.7-mm machine gun
- **Pansarbandvgn 501 (Pbv 501 (Sweden):** East German vehicles to mechanized Swedish infantry
- **BREM-4 recovery vehicle:** No turret & crane (Czech version is the VPV)

- **BRM-23 (Bulgaria):** Recon with 23-mm cannon
- **82-mm SP Automatic mortar (Hungary):** Vasilyek mortar ILO troop compartment

System

Alternate Designation: BMP-1 'Afghan' (BMP Desantnaya (Assault))

Manufacturer: Kurganmashzavod (Soviet Union)[

Description: IFV with exit doors in the rear with space for 8 soldiers; 4 firing ports on each side; 1 firing port in left rear door

Crew: ea3

Passengers: ea7

Dimensions

Length: m6.74

Width: m2.94

Height: m2.15

Weight, Combat: tons14.5

Automotive

Engine Name: UTD-23 (Upgraded Engine)

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: 45

Speed, Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Trench: m0.7

Vertical Step: m2.2

Fording Depth: mNot Amphibious

Fuel Capacity: liters462

Ground Pressure: 0.65 kg/cm²

Communications

Type: R-123M Radio

Radio Range: km16-55

Main Weapon System

↳***System***

Name: 2A28 Grom

Type: ow pressure smooth bore semi-automatic gun

Caliber: mm73

In Service: 1966 - Present

Manufacturer: KBP

Proliferation: INA

Weight: kg115

Length: mm1,195

Width: mm218

Height: mm322

Barrels: ea1

Maximum Elevation: deg+33

Minimum Elevation: deg-4

Traverse Range: deg40

Traverse Left: deg20

Traverse Right: deg20

Rate of Fire: rds/min8

Maximum Firing Range: m4,500

Sights: 1PN22M, 1PN22M2[

Loader Type: Autoloader

↳*Ammunition (Option 1)*

Name: PG-15V

Type: HEAT

Caliber: mm73

Muzzle Velocity: m/s665

Maximum Firing Range: m4,500

Shell Variants: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP)

Basic Load: ea40

Wire-Guided Anti-Tank Guided Missile (ATGM)

↳*9M113 Konkurs (AT-5 Spandrel), SACLOS Wire-Guided Anti-Tank Guided Missile (ATGM)*

Type: SACLOS Wire-Guided Anti-Tank Guided Missile (ATGM)

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia

Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Variants: 9M14M, 9M14P1, Malyutka-2, Malyutka-2F

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contract

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Basic Load: ea4

↳*9K111 Fagot SACLOS Wire-Guided Anti-Tank Missile (ATGM)*

Type: SACLOS Wire-Guided Anti-Tank Missile (ATGM)

Manufacturer: Tula Machinery Design Bureau (Tula KBP)

In Service: 1970-present

Launcher Type: 9P135 launching post

Missile Weight: kg12.5

9P135 Launching Post Weight: kg22.5

Length: mm1,100

Diameter: mm120

Action: 400 mm versus RHA or 200 mm towards armour inclined at 60°

Rate of Fire: rds/min3

Muzzle Velocity (At Launch): m/s80

Muzzle Velocity (In Flight): m/s186

Effective Firing Range: m10-2,500

Warhead Type: HEAT

Warhead Weight: kg1.7

Guidance system: SACLOS wire-guided missile

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+20

Minimum Elevation: deg-20

Basic Load: ea4

Grenade Launcher

Name: AGS-17 Plamya, 30mm Automatic Grenade Launcher

Type: Automatic Grenade Launcher

Manufacturer: Molot plant

In Service: 1970-Present

Proliferation: Widely Proliferated

Weight: kg31

Length: mm840

Rate of Fire: rds/min400

Effective Firing Range: m800-1,700

Maximum Effective Range: m1,700

Action: Blowback

Feed system: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

Variants: AG-17A helicopter-mounted version

↳*Ammunition*

Name: VOG-17M

Type: 30mm Grenade

Cartridge: 30×29mm grenade

Muzzle Velocity: m/s185

Warhead: high explosive fragmentation warhead.

Effective Firing Range: 800-1,700

Basic Load: ea40

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: Machine Gun
Caliber: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds/min250-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Action: Gas-operated, open bolt
Length (Overall): mm1,203
Length (Barrel): mm605
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights
Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR km
Muzzle Velocity: m/s855
Basic Load: ea950
Accuracy of fire at 300 meters: mm90

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Vehicle Commander: Yes, TKN-3B day night sight with variable magnification
Thermal Gunner: Yes, TVNE-1PA active IR night vision metascope
Main Gun Stabilization: No
Gyrocompass: Yes, GPK-59 electrical gyrocompass
Firing Ports: ea9+, additional firing ports have been added onto the top hatches of the troop compartment

Day Periscopes: ea4

Search Light: OU-3GK IR search light

Search Light Range: m400

Protection

Armor (turret front): mmProtection from 12.7mm AP rounds

Applique Armor: mmKovriki turret armour, plus 5-6 mm thick appliqué steel armour on the sides of the hull as well as five plates per side covering the suspension and additional armour under the commander's and driver's seats for protection against mines.

Explosive Reactive Armor: mmAvailable

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: GO-27 radioactive and chemical agent detector

Chemical Decontamination Kits: TDP chemical decontamination kits

Smoke Equipment: Yes, a upgraded 81mm 902V "Tucha" smoke grenade launcher

Survivability Equipment: INA

Grenade Launcher: Yes, RPG-7 light grenade launcher with grenades

Scavenger System: Yes

Mine Plough: Yes, KMT-10 plough-type mine-clearing system

Fire-Extinguisher System: Yes

Notes:

A non-amphibious BMP-1D (the so-called 'Afghan' variant), was built in 1982 for assault units in Afghanistan. It had 5 mm thick appliqué steel armor plates on the hull sides with holes for side firing ports as well as armor plate under the commander's and driver's seats for added protection against mines. It also had large steel armored skirts fitted to the sides of the hull covering the suspension. Firing ports were added into the top hatches of the troop compartment and a stowage box was placed on the roof at the rear of the hull on some vehicles. The 9S428 ATGM launcher was often removed and replaced by an AGS-17 automatic grenade launcher. Due to experience in Afghanistan, a new version with enhanced fighting capabilities, the BMP-2, was introduced in 1980. It had a new two-man turret armed with a 30 mm 2A42 multi-purpose autocannon and a 9P135M-1 ATGM launcher capable of firing SACLOS guided 9M113 Konkurs and 9M113M Konkurs-M as well as 9M111 and 9M111-2 Fagot ATGMs. Later modernization plans included mounting the turret of the BMD-2 IFV on to BMP-1s, but the vehicle never left the design phase. Recent proposals for the modernization of BMP-1s include mounting new turrets armed with a 2A72 30 mm (1.2 in) autocannon, finally approved in 2018, or a TKB-799 Kliver one-man weapons station with a computerized fire control system, armed with a missile pod (which can be armed with either four 9M133 Kornet (AT-14 Spriggan) or 9M133F Kornet ATGMs or 9K38 Igla (SA-18 Grouse) SAMs), a 30 mm 2A72 dual-purpose autocannon and a 7.62 mm (0.300 in) PKTM coaxial machine gun (BMP-1AM ‘Basurmanin’ and BMP-1M respectively).

QN-506 Chinese Infantry Fighting Vehicle (IFV)



Tiers:

1 2 3 4

System

Alternative Designation: QN-506
Manufacturer: Wuhan Gaode Infrared
Type: Fire Support Vehicle
Family: Type 79
Crew: ea3, one driver and two controllers for the vehicle's weapon systems
Chassis: Type 59 tank's chassis
Note: The QN-506 can be used as a urban assault vehicle. It has been called the "new king of ground warfare"

Dimensions

Length (Overall): m9.0
Length (Full): m6.04
Width: m3.27
Height: m2.59
Weight, Combat: kg30,000
Ground Clearance: m0.425
Ground Pressure: 0.8 kg/cm²
Track (Vehicle): m2.85
Track (Normal): mm580
Track Width: mm580
Length of track on ground:: m3.84

Automotive

Engine Name: 12150L
Engine Type: V-12, water cooled, diesel
Engine Power: hp520

Power to Weight Ratio: hgp/ton14.44

Maximum Range (Main Fuel Supply): km720

Maximum Range (Main Fuel Supply with additional fuel tanks)): km600

Speed, Maximum Road: km/h50

Speed, Average Cross: 35

Speed Maximum Swim: km/hNot Amphibious

Fording Depth (Without Preperation): m1.4

Fording Depth (with Preperation): m5.5

Gradient: deg60

Side Slope: deg40

Vertical Obstacle: m0.79

Trench: m2.7

Suspension: torsion bar

Electrical System: v24

Communications

↳*TB-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Nudelman-Rikhter NR-30

Type: mm30

Max Rate of Fire: rds/min850-1,000

Maximum Effective Range: km5

Range Finder type: Laser range finder

Maximum Elevation: deg+53

Minumum Elevation: deg0

Weight: kg66

Length (Total): mm2,153

Length (Barrel): mm1,600

Width: mm181

Height: mm186

Barrels: ea1

Action: Short Recoil

Variants: Norinco Type 30

Note: The 30mm Chain Gun is similar to the Soviet 2A72.

↳*Ammunition*

Type: Rifle

Caliber: mm30

Cartridge: 30x155mm

Muzzle Velocity: m/s780

Basic Load: ea300

Maximum Effective Range: km5

Armor Penetration: INA

Auxiliary Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: mm7.62mm Heavy Machine Gun

Manufacturer: Norinco

Date of Introduction: 1985

Max Rate of Fire: rds/min700-800

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: mmINA

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: RIfle

Caliber: 7.62×54mmR

Muzzle Velocity: m/s840

Basic Load: ea2,000

Effective Range: km1.2

Armor Penetration: Available

Anti-Tank Missiles (Option 1)

Name: QN-502C Guided Anti-Tank Missile

Type: Optical-fiber-guided, Anti-Tank Missiles

Muzzle Velocity: INA

Basic Load: ea4

Effective Range: km8

↳*Anti-Tank Missiles (Option 2)*

Name: QN-201 Rockets

Type: Multipurpose missiles

Caliber: mm70

Muzzle Velocity: INA

Basic Load: ea20

Effective Range: km4

↳*Anti-Tank Missiles (Option 3)*

Name: S570 missiles

Type: Small Cruise Missiles

Muzzle Velocity: INA

Basic Load: ea4

Effective Range: km10

Unmanned Aerial Vehicle (UAV)

Type: Chinese Drone. Name: INA

UAV Range: Reports claim the type of drone assigned to the QN-506 can fly at a maximum range of 10km

Note: A UAV is equipped for situational awareness and battlefield information analysis

Fire Control

Fire Control System: Yes, Name: INA

Computerized Fire Control: Yes

Laser Target Desinator: Yes

Day Camera: Yes

Night Camera: Yes

Thermal Imager: Yes

Panoramic Sight: Yes

Protection

Armor: Classified

Applique Armor: No

Active Protection System: Yes, Anti-personnel active protection complex and a "hard-kill" active protection system

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Counter-Sniper Fighting Devices: Yes

Laser Warning Receivers: Yes

Electro-Optical Sensors: Yes, mounted on the roof

Notes:

QN-506 Fire Support Vehicle was developed by Wuhan Guide Infrared and is designed to suppress enemy forces in urban areas and during counterterrorism operations.The base of the QN-506 is a chassis of Type 59 tank, on which the ZPT99 weapon station is mounted. The crew consists of 3 people - the driver, the commander and the gunner.The combat weight of the vehicle is 30 tons, while the QN-506 has possibility to upgrade in the future. Universal ZPT99 weapon station has the following weapons: 30-mm automatic gun, similar to the Soviet 2A72 (ammunition of 80 armor-piercing tracer and 120 high-explosive fragmentation projectiles) 7.62-mm machine gun (ammunition of 2000 rounds) Two modular launchers with ammunition: 4 QN-502 anti-tank guided missiles with a combined control mode (developed by Wuhan Guide Infrared), which have a range of attack speed and air targets of 6 kilometers, and 20 units of 70-mm QN-201 missiles Four S570 missiles, which are located in slanted launchers in the rear of the ZPT99 weapon station. Anti-personnel active protection complex Integrated drone Counter-sniper fighting devices

Marder 1A5 German Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

Marder 1A3 German Infantry Fighting Vehicle (IFV)

Variants:

- **Marder 1A2:** Since 1983, all the German Marder 1s have been upgraded to the A2 standard. Fitted with thermal imaging sight equipment instead of the image intensifier. New sighting system.
- **Marder 1A3:** new armour kit mounted on the side of the hull. . New stowage boxes are provided along the sides of the upper part of the hull and a new radio installation is provided.
- **Marder 1 A1(−) (1979–1982)::** as A1(+) but without thermal imager. 350 vehicles upgraded to this standard.
- **Marder 1 A1A3::** a Marder A1 with SEM 80/90 cryptographic radios. Marder 1 A1A as 1 A1 but without any passive night vision equipment. 1,112 vehicles upgraded to this standard.
- **Marder 1 A1A4::** a Marder A1A with SEM 80/90 cryptographic radios. Marder 1 A1A2: a converted Marder 1 with A1 turret and A2 chassis
- **Marder 1 A1A5:** a Marder A1A2 with SEM 80/90 cryptographic radios.
- **Marder 1 A2 (1984–1991):** Between 1984 and 1991, all German Marder 1s were upgraded to A2 standard, this included substantial modification of the suspension, fuel tanks, cooling system and water-jet cleaning system. Additionally a new sighting system was installed. The infrared search light equipment was removed, and all vehicles were fitted with thermal imagers except for the 674 A1(+) vehicles, which already had them.
- **Marder 1 A2A1:** a Marder 1A2 with SEM 80/90 cryptographic radios.
- **Marder 1 A3 (1988–1998):**
- **Marder 1 A4:** a Marder 1 A3 with SEM 93 cryptographic radio
- **Marder 1 A5 (2003–2004):** Additional anti-mine armor and completely remodeled interior in order to avoid blast and shock injuries to the crew when hit by a mine. Applied to 74 Marder 1 A3s only.
- **Marder 1 A5A1 (2010–2011:** Equipped with air conditioning system, jammer for IED-protection and multi-spectral camouflage

System

Alternative Designation: Marder 1A5
Manufacturer: Rheinmetall Landsysteme
Type: Infantry Fighting Vehicle (IFV)
Family: Marder IFV Family
Crew: ea3
Passenger Capacity: ea5

Dimensions

Length: m6.79

Width: m3.24

Height: m2.98

Weight, Combat: tons37

Ground Pressure: kg/mINA

Ground Clearance: m0.44

Automotive

Engine Name: MTU MB 833 Ea-500

Engine Type: Diesel

Engine Power: hp591

Cruising Range: km520

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Transmision: RENK HSWL 194

Ground clearance: m0.45

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.5

Fording Depth (with preperation): m2

Fuel Capacity: liters652

Fuel Tank Protection: Yes, with Blast Protection

Communications

Primary Radio: SEM 80 Radio

Secondard Radio: SEM 90 Radio

Range: km30

Main Gun

↳*System*

Name: Rheinmetall Mk 20 RH-202, 20mm Autocannon

Type: mm20

Manufacturer: Rheinmetall

Weight: kg83

Length: mm2,612

Height: mm241

Rate of Fire: rds/min880-1,300

Action: Gas-unlocked sliding breech block, blowback, recoiling base

Effective Firing Range (vs. aircraft): m1,600

Effective Firing Range (vs. ground targets): m2,500

Maximum Elevation: deg+65

Minimum Elevation: deg-17

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳***Ammunition***

Type: Rifle

Caliber: mm20

Cartridge: NATO standard 20 × 139 mm cartridge with disintegrating belt

Shell: 20 × 139 mm

Muzzle Velocity (With HEI): m/s1,044

Muzzle Velocity (With AP): m/s1,100

Basic Load: ea1,250

Ammunition Types: HEI-T, TP-T, API-T, and APDS-T.

Coaxial Weapon System

↳***System***

Name: Rheinmetall MG 3

Type: mm7.62

In Service: 1960–present

Manufacturer: Rheinmetall

Proliferation: over 1 million

Max Rate of Fire: rds/min1,000-1,300

Weight (Gun Only): kg11.5

Weight (Mounted on a Tripod): kg27.5

Length (With Stock): mm1,225

Length (With Stock): mm1,097

Barrel Length: mm565

Action: Recoil-operated, roller locked

Effective Firing Range: 200–1,200 m sight adjustments

Maximum Firing Range (Bipod): m600

Maximum Firing Range (Tripod): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed system: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO cartridge

Muzzle Velocity: m/s820

Basic Load: ea5,000

Anti-Tank Guided Missile (ATGM)

↳*MILAN Anti-Tank Guided Missile (ATGM)*

Country: France / Germany

Service: 1972-present

Proliferation: thousands deployed by the French, German, Belgian, and Spanish armies, but Italy and soon India were assembling MILANs under license. All in all, the MILAN’s customer list has reached 41 countries and at least several non-state groups.

Range: km2

Basic Load: ea5

Armor Penetration: mm350

Missile Length: mm918

Missile Diameter: mm103

Fin Span: mm267

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Weight: kg2.7

Warhead Type: High Explosive

Guidance System: Wire-Guided

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Fire Control

Name: INA
Computerized FCS: INA
Thermal Sight Vehicle Commander: PERI-Z 11 and PERI Z 11 A1
Thermal Sight Gunner: PERI-Z 11 and Zeiss thermal imager
Main Gun Stabilization: No
Periscopes (Commander): ea8
Periscopes (Gunner): ea3

Protection

Hull Armor: Welded steel, protection up to 20 mm APDS DM43 from 0 m and 25 mm APDS from 200 m
Turret Armor: Welded steel, protection up to 20 mm APDS DM43 from 0 m and 25 mm APDS from 200 m
Front Hull Armor: Protection from 20 mm APDS projectiles
Applique Armor: Yes, Additional RHA shields are also fitted to the sides of the hull.
Passive Armor Package: Yes
Explosive Reactive Armor: No
Active Protection System: Yes
Mine Protection System: Yes, Integrated mine protection system
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: Yes, 76 mm smoke grenade launchers
IR Signature: INA
Safety Belts: Automatic crew safety belts
Blast-Attenuating Seats: Yes

Notes:

Marder 1A5 has improved mine protection. Additional anti-mine armor was fitted and interior was completely remodeled in order to improve survivability against mine blasts. A total of 74 Marder 1A3 vehicles were upgraded to the 1A5 standard between 2003 and 2004.The Marder 1A5 can be recognised by the stowage box on the glacis plate and two stowage boxes mounted one either side on the roof at the rear. It also has new armoured side skirts that protect the upper part of the suspension and these have a straight lower part rather than the wavy rubberised reinforced skirt fitted to the standard Marder 1A3.

YPR-765 (AIFV) American Infantry Fighting Vehicle (IFV)





Tiers:

1 2 **3** 4

Variants:

- **EIFV:** Holds only 6 soldiers that can dismount; M242 Bushmaster 25-mm gun with 900 rounds of ammo; BGM-71 TOW AT weapon with 6 rounds; M240 Machine Gun with 4400 rounds
- **Mortar Prime Move (Netherlands: YPR 765 PRMR):** Tows the 120-mm Thomson-Brandt mortar with crew of 7
- **Cargo Carrier (Netherlands: YPR 765 PRVR-A/B):** Crew of 2 can carry cargo into the combat zone
- **TOW Missile Carrier (Netherlands: YPR 765 PRAT):** Similar to the US M901 ITOW variant of the M113 with an Emerson TOW AT system
- **Ambulance (Netherlands: YPR 765 PRGWT):** Unarmed variant with a crew of 4
- **Bn Command (Netherlands: YPR 765 PRCO-C1):** Specialized for infantry battalion commanders
- **Bn Gunnery Center (Netherlands PRCO-C2):** Specialized for use by artillery battalions
- **Mortar Fire-Control Vehicle (Netherlands PRCO-C3):** Specialty vehicle to control indirect mortar fire
- **Anti-Aircraft Control Vehicle (Netherlands PRCO-C4):** Specially designed for air defense command & control
- **YPR 765 PRCO-C5 (Netherlands):** Observation vehicle with only a 4-man crew
- **YPR 765 PRRDR (Netherlands):** Operated the British ZB 298 battlefield surveillance radar
- **YPR PRRDR-C (Netherlands):** Radar/Command Vehicle
- **YPR 765 PRI/I (Netherlands):** Squad vehicle with M113 cupola, M2 HB MG, 9 soldiers, & driver
- **YPR 806 PRBRG (Netherlands):** Recovery vehicle with HIAB crane, crew of 4, & 8 smoke grenade launchers
- **YPR-2000 (Netherlands):** Upgrade included more storage containers
- **Command Vehicle:** Room for 9-man crew with additional communication equipment
- **AIFV-B (Belgium):** 40-caliber MG, NBC protection, & Halon fire-extinguishing system
- **AIFV-B-CP (Belgium):** Pintle-mounted 12.7-mm MG, crew of 7, NBC protection, & Halon fire-extinguishing system
- **Philippine Variant:** Converted to accept 50-caliber MG ILO 25-mm cannon
- **YPR-765 KMAR Military Police Vehicle:** YPR-765 PRI/I modified for use by military police
- **Turkish ACV:** See separate vehicle for the FNSS IFV

System

Alternative Designations: Egyptian Infantry Fighting Vehicle (EIFV); See Variants

Description: IFV modified from the M113 with exit ramp in the rear with space for 7 soldiers; 2 firing ports on each side & 1 firing port in the left of the ramp

Specifications

Crew: 3 (driver, commander, gunner)

Combat Weight (mt): 13.7

Chassis Length Overall (m): 5.26

Height Overall (m): 2.79 (2.01 hull top)

Width Overall (m): 2.82

Ground Pressure (kg/cm2): 0.67

Automotive Performance: 6V-53T

Engine Type: Water-cooled, turbocharged, 2-stroke, V-6 diesel Allison

Cruising Range (km): 490 (483-EIFV)

Speed (Max Road) (km/h): 61 (66-EIFV)

Speed (Max Off-Road) (km/h): INA

Speed (Average Cross-Country) (km/h): INA

Speed (Max Swim) (km/h): 7

Fording Depths (m): Amphibious

Radio: INA

Armament

↳*Oerlikon KBA-B02*

Caliber/length: 25-mm

Type: Cannon

Ammo: 180 Ready rounds; 144 in reserve HEI-T; APDS-T Other types available: SAPHEI-T, TP-T, APP-T, FAPDS

Maximum Effective Range (m): 2000 m

Armor Penetration (m): INA

Muzzle Velocity (m/s): HEI-T: 1360 APDS-T: 1100

↳*Turret Coaxial*

Caliber/length: 7.62-mm

Type: Machine Gun

Ammo: 230 Ready rounds; 1610 in reserve: AP, Tracer, Ball

Maximum Effective Range (m): 1100 m

Armor Penetration (mm): AP: 7 mm at 500 m

Muzzle Velocity (m/s): 853

Protection

Armor (turret front) (mm): INA (sides on EIFV protected against 14.5-mm AP rounds)

Applique Armor (mm): Aluminum hull with spaced laminate steel on front & sides

Explosive Reactive Armor (mm): INA

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Yes (Details INA)

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: INA

Notes:

The AIFV (Armored Infantry Fighting Vehicle) is a tracked light armored vehicle that serves as an infantry fighting vehicle (IFV) in the armies of several countries. It is a development of the M113A1 armored personnel carrier. The hull of the vehicle is made of welded aluminum, with spaced steel laminate armor bolted onto the side and front. The voids of the armor are filled with polyurethane foam, which gives the vehicle extra buoyancy when travelling in the water. Original production AIFV's can swim without deploying flotation curtains, using only a large front-mounted trim vane; they are propelled in the water by their tracks. The engine sits on the front right of the hull, behind a hatch that can be used to remove the complete powerpack. The powerpack is similar to the M113A1, except for a larger radiator capacity and turbocharger. The transmission is also fitted with heavy duty components from the M548 tracked cargo carrier. Immediately to the left of the engine is the driver, above whom is a hatch that opens to the right. The driver has four M27 day periscopes. The driver's center periscope can be replaced by a passive infra-red periscope for night driving. The commander sits immediately behind the driver, and has a cupola that can be completely traversed. The cupola has five periscopes, four of which are M17 day periscopes, the fifth has 1x to 6x variable magnification. The turret is fitted on the right side of the hull behind the engine. The turret, which has electro-hydraulic traverse, can elevate from -10 to +50° and can traverse and elevate at a speed of 60°/sec. The turret mounts an Oerlikon Contraves 25 mm KBA-B02 cannon with a dual ammunition feed and 180 rounds of ready use ammo, with another 144 rounds stored in the hull. Mounted to the left of this gun is a 7.62 mm FN MAG machine gun, which has 230 rounds of ready ammo, with a further 1,610 in the hull. There is a six-barrel smoke discharger mounted at the front, just above the large trim vane. The troop compartment is at the rear of the hull; a large power operated ramp allows access through the rear of the vehicle, a door is also provided in the ramp. Additionally a single piece hatch covers the top of the troop compartment. The compartment contains seven troops in the Dutch variant, with six sitting back to back facing outwards and a single passenger sitting between the command and the turret facing backwards. There are two firing ports in each side of the hull and a single firing port in the rear. The side firing ports are provided with M17 periscopes, the rear one is fitted with an M27 periscope.

→→Amphibious Infantry Fighting Vehicle (IFV)

AMX-10 PAC 90 French Tank Destroyer / SP Artillery Piece



Tiers:



Parent:

AMX-10P French Infantry Fighting Vehicle (IFV)

Variants:

- **AMX-10P Marines:** The AMX-10P Marines is a variant of the AMX-10P specifically developed to provide improved amphibious capabilities at sea or in rivers of the original AMX-10P.
- **AMX-10 PAC 90:** The primary role of the AMX-10 PAC 90 is that of anti-tank and fire support on the battlefield at ranges between 1,000 and 2,500 m, but it can also be used as a reconnaissance vehicle or as an APC.
- **AMX-10 ECH:** The AMX-10 ECH is an ARV based on the hull of the AMX-10P. It is designed to support AMX-10P vehicles in combat and maintain readiness by conducting repairs as close to the battlefield as possible.
- **AMX-10 Ambulance:** The AMX-10P is also used to perform as a battlefield ambulance. It is based on the same hull as the AMX-10P to ensure that it can perform alongside other armoured formations.
- **AMX-10PC:** The AMX-10PC is an armoured command post designed to support the operations of armoured formations during combat.
- **AMX-10 HOT:** This was the basic AMX-10P, with the Toucan II turret replaced by a new two-man Lancelot turret based on the TH 20, with four ready-to-launch 4,000 m range MBDA HOT missiles and a further 14 missiles carried in the rear of the hull. The crew of five consisted of the commander and gunner in the turret, two missile loaders, and the driver.
- **AMX-10 VOA:** This was based on the AMX-10PC command vehicle chassis and has been designed for use by artillery observers. Its crew of four consisted of a commander, observer, radio operator, and driver. The turret, which was manned by one or two men, was provided with equipment for day and night observation and local defence.
- **AMX-10 SOA:** The AMX-10 SOA was used for battlefield observation and artillery fire-control. It was essentially an AMX-10P with its Toucan II turret replaced by a new two-man turret armed with an externally-mounted 7.62 mm MG on the right side.
- **AMX-10 SAF:** This was also known as the AMX-10PC SAF and was used with the ATILA artillery FCS. It had a crew of five consisting of the radio operator, driver, two warrant officers, and one commanding officer.
- **AMX-10 TM:** This model towed a 120 mm TDA Model MO-120-RT-61 muzzle loaded rifled mortar, and carried 60 rounds of ammunition, for the mortar. The AMX-10 TM had a crew of six consisting of commander, aimer, artificer, loader, ammunition carrier and driver, and was fitted with a Toucan I turret.
- **AMX-10 SAT:** This was based on the AMX-10 PC command vehicle but had been modified internally to carry a gyrostabilised theodolite, a topographic survey theodolite, distance measuring equipment, and a navigation system.
- **AMX-10P with RATAC radar:** This had no turret and was fitted with a roof-mounted radar for field artillery fire (RATAC) pulse Doppler radar scanner. The vehicle had a crew of five: commander; radar operator; assistant radar operator; radio operator; driver. The radar had four operating modes: ground surveillance; acquisition and identification; angular deviation measurement; automatic tracking.
- **AMX-10P upgrade:** The AMX-10P ICV upgrade included the installation of a new passive armour package to the front, sides, rear, and hull top to provide an enhanced level of survivability. Other enhancements included a modified rear power-operated ramp, new torsion bars, and reinforced transmission. The original AMX-10P was fully amphibious, propelled in the water by two water-jets mounted one either side of the hull at the rear. These and the trim vane installed at the front of the hull were removed to save weight but the vehicle retained its fording capability.

System

Alternative Designation: AMX-10 PAC 90

Date of Introduction: 1979

Proliferation: Indonesia, which placed an order for 34 vehicles, Singapore ordered 44

Manufacturer: Nexter Systems

Function: Fire Support Vehicle

Type: Infantry Fighting Vehicle (IFV)

Family: AMX-10

Crew: ea3

Passenger Capacity: ea4

Dismounts: ea4

Dimensions

Length: m5.87

Width: m2.83

Height: m2.73

Weight, Combat: tons14.5

Ground Pressure: kg/m0.56 kg/cm²

Ground Clearance: m0.45

Track Width: mm425

Track Length (on the ground): m2.93

Automotive

Engine Name: Baudouin 6 F11 SRX

Engine Type: V-8 Diesel

Engine Power: hp300

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m1.6

Fording Depth: mAmphibious

Fuel Capacity: liters518

Propellers: 2 each (305mm Diameter)

Emergency Pneumatic Engine Starter: Yes

Water Exchanger: Yes

Communications

Main Gun

↳*System*

Name: GIAT CS-90F-4 90mm High Velocity Rifled Gun

Type: mm90

Barrel Length: 52 Calibers

Maximum Rate of Fire: rds/minINA (32-36 rds/min)

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Electric Traverse: Yes, with two speed modes of 13 deg and 5 deg

Maximum Elevation: deg+15

Minimum Elevation: deg-8

Basic Load (Total): 10 90mm projectiles can be carried onboard with normally a combination of 12 HEAT and 8 HE

Ammo Compatible: 90mm HE, HE long range, HEAT, smoke, and APFSDS Projectiles

↳*Ammunition (Option 1)*

Type: HEAT

Caliber: mm90

Muzzle Velocity: m/sINA

Basic Load: ea12

Maximum Firing Range: km19

↳*Ammunition (Option 2)*

Type: HE

Caliber: mm90

Muzzle Velocity: m/sINA

Basic Load: ea8

Maximum Firing Range: km17.9

Coaxial Weapon System

↳*System*

Name: AA-52, 7.62mm Machine Gun

Type: mm7.62

Manufacturer: Manufacture d'armes de Saint-Étienne (MAS)

Max Rate of Fire: rds/min900

Weight: kg9,970

Length: mm1,080

Barrel Length: mm600

Action: Lever-delayed blowback

Effective Firing Range: m600

Maximum Firing Range: m3,200

Feedd System: Belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳***Ammunition***

Type: Rifle

Caliber: mm7.72

Cartridge: 7.5×54mm French, 7.62×51mm NATO

Muzzle Velocity: m/s830

Basic Load: ea2,000

Anti-Tank Guided Missile (ATGM)

↳***MILAN Anti-Tank Guided Missile (ATGM)***

Country: France / Germany

Service: 1972-present

Prolioferation: thousands deployed by the French, German, Belgian, and Spanish armies, but Italy and soon India were assembling MILANs under license. All in all, the MILAN’s customer list has reached 41 countries and at least several non-state groups.

Range: km2

Basic Load: ea10

Armor Penetration: mm350

Missile Length: mm918

Missile Diameter: mm103

Fin Span: mm267

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Weight: kg2.7

Warhead Type: High Explosive

Guidance System: Wire-Guided

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, The commander has seven day (three M556 and four M554) periscopes

Thermal Sight Gunner: Yes, the gunner five (three M556 and two M554). Also a M563 telescopic sight

Main Gun Stabilization: Non-stabilized

Periscopes: ea4

Protection

Hull Armor: welded from aluminum armor plates, which protect the vehicle from 14.5mm rounds

Turret Armor: New Dragar Turret.

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Two 80 mm smoke grenade dischargers

IR Signature: INA

Anti-Corrosion Lining: Yes

Notes:

Known as a "Tank Destroyer," The AMX-10 PAC 90 is a dedicated fire support and anti-tank variant of the AMX-10P infantry fighting vehicle. Its production commenced in 1979. This vehicle is in service with France, Brazil and possibly some other countries. This fire support vehicle was designed to operate alongside the main battle tanks and infantry fighting vehicles. At the time of its introduction it was capable of taking anti-tank combat, however by current standards its armament its too week to knock out a modern MBT. It was also intended as a reconnaissance and infantry support vehicle. Aluminum armor of this fire support vehicle provides all-round protection against small arms fire and artillery shell splinters. Front armor withstands 14.5 mm heavy machine gun rounds. Vehicle has an NBC protection system.

BMP-3 Russian Amphibious Infantry Fighting Vehicle (IFV)




Tiers:



Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3M Ataka:** BMP-3M version with a two men turret armed with 30 mm 2A72 autocannon, and 9M120-1 Ataka ATGM
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3K:** Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BT-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
- **BRM-3K "Rys" (Ob.501):** Surveillance and reconnaissance variant with 1PN71 thermal sight (3.7x/11x, 3 km range), 1PN61 active-pulse night vision device (3 km range), 1RL-133-1 ("TALL MIKE") I-band surveillance radar (3 km man, 12 km vehicle), 1V520 computer and a TNA-4-6 navigation system. The armament consists of the stabilized 30 mm autocannon 2A72 (600 rounds) and a coaxial 7.62 mm machine gun (2,000 rounds) or AU-220M Baikal remote weapon station with 57 mm BM-57 autocannon and 7.62mm PKMT machine gun.
- **BMP-3 Dragoon:** New IFV version with an unmanned turret which can be armed with a variety of combat modules, including standard BMP-3's Bakhcha-U turret with a 2A70 100 mm cannon, a 2A72 30 mm autocannon and a PKTM 7.62 mm machine gun, the AU-220M Baikal remote weapon station module with a 57 mm BM-57 gun and a module with a 125 mm 2A82-1M tank gun, the new 816 h.p.
- **BREM-L "Beglianka" (Ob.691):** Armoured recovery vehicle with five-tonne crane and 20/40 metric tonne capacity winch.
- **BMP-3 "Khrizantema-S":** Self-propelled anti-tank version with 9M123 Khrizantema (AT-15) ATGM system with radar and laser guidance. The 9P157-2 carries two 9M123 missiles on launch rails, which are extended from a stowed position; the radar is also stowed during transit. The missiles are re-loaded automatically from an internal magazine with 15 rounds (missiles are stored and transported in sealed canisters) and can also accept munitions manually loaded from outside the vehicle.
- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).
- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype,

further development led to the 2S31 Vena.

- **DZM "Vostorg-2":** Combat engineer vehicle with a dozer blade and excavating bucket. Prototype.
- **UR-07:** Mine clearing system. The UR-07 might replace the UR-77 "Meteorit". It has the same chassis as the BMP-3 but a bigger steel hull with two launch ramps in the rear. The ramps are used to fire rockets towing hose-type mine-clearing line charges to clear mine fields.
- **UNSh (Ob.699):** Basic chassis for specialised variants.
- **Hermes or TKB-841:** Air-defence vehicle with high-velocity missiles and radar system. Prototype.[68] 2S31 Vena – Self-propelled mortar carrier equipped with a 120 mm mortar based on BMP-3 chassis. It entered production in 1996 and service in 2010.
- **2S38 ZAK-57 Derivatsiya-PVO:** Self-propelled air defense vehicle based on BMP-3 chassis fitted with a 57 mm autocannon and passive reconnaissance and target tracking equipment.[72] It is designed to shoot down unmanned aerial vehicles (UAVs), cruise missiles, air-to-surface missiles, aircraft, helicopters, and MLRS rockets.
- **UDAR UGV:** Unmanned ground vehicle based on the tracked chassis of the BMP-3 with the center hull raised to fit the DUBM-30 Epoch armed with 2A42 autocannon, 7.62mm PKMT machine gun, and Kornet-M ATGM.
- **Vikhr UGV:** Unmanned ground vehicle based on BMD-3 equipped with a smaller turret armed with 2A72 autocannon, 7.62mm coaxial machine gun and six anti-tank guided missiles 9M133M Kornet-M, three on each side of the turret.
- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.

System

Alternative Designation: BMP-3

Manufacturer: Kurganmashzavod

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: BMP-3

Crew: ea3

Passenger Capacity: ea7

Fighting Module: 2K23 Fighting Module

Dimensions

Length (Hull): m7.2

Width: m3.23

Height: m2.45

Weight, Combat: tons18.7

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: 10 cylinder, 4 stroke, v-shaped, water colled diesel

Engine Power: hp500

Cruising Range: km600

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Communications

Primary Radio: R-173

Secondary Radio: R-173P

Main Gun

Note: The complete weapon system of the BMP-3 infantry combat vehicle is known as the 2K23 and consists of the 100 mm gun 2A70 with a 30 mm 2A72 automatic cannon (see later in this section) mounted coaxially to the right and a 7.62 mm PKT coaxial machine gun.

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min8-10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: m5,000

Maximum Effective Range (Day): m4,000

Maximum Effective Range (Night): mINA

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

↳*Ammunition*

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Muzzle Velocity: m/s330

Basic Load: ea40 Total Rounds of any 100mm Russian Projectile

Warhead Type: HEAT

Cartridge: 3UBK23-3 cartridge

Soft Launch: Yes

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

In Service: 1983-present

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea8

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Coaxial Weapon System

↳*System*

Name: 2A72, 30mm Automatic Cannon

Type: mm30

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Commander and Driver's Weapons System

Note: The BMP-3 is equipped with a total of two 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: 1K13-2

Computerized FCS: Yes

Thermal Sight Vehicle Commander: optical sight 1PZ-10, a day/night vision device TKN-3MB

Thermal Sight Gunner: 1K13-2 II night channel, 5.5x

Gunner Day Sights: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

Protection

Armor Type: welded of aluminum alloy armor

Hull Armor (Front): protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, Collective

Smoke Equipment: 6 VEESS

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Notes:

The BMP-3 [BMP = Boyevaya Mashina Pyekhota - Infantry Fighting Vehicle], which represents a totally different design concept from BMP-1/2, is a light tank that can hold a squad of infantry. It has a 100mm main gun that fires HE to demolish buildings, can fire long-range ATGMs through its barrel, and a 30mm autocannon and a medium machine gun as a single unit in the turret. The innovative BMP-3 armament suite has been subjected to criticism in the Russian military, which has focused on deficiencies in the barrel-fired ATGM. The performance obtained from the 500 horsepower engine powering this 18 ton of vehicle compares favorably to the American Bradley, which has an engine of similar power for a 33 ton of vehicle. The BMP-3, first seen in public during a parade in Moscow in 1990, was built by Kurganmashzavod, developer and manufacturer of the BMP-2 infantry combat vehicle. The hull of the BMP-3 resembles the BMD Airborne Infantry Fighting Vehicle, with a new turret in the center of the vehicle. The troop compartment at the rear of the hull is accessed via a pair of doors in the hull rear. The BMP-3 is fully amphibious, propelled in water by two water-jets mounted at the rear of the hull.

VN-18 (ZBD-05) Chinese Amphibious Infantry Fighting Vehicle (IFV)



Tiers:

1 2 3 4

Variants:

- **ZTD-05:** The ZTD-05 is a fire support vehicle based on the Type 05 hull. It is designed to have the same mobility and protection as the ZBD-05 however it is armed with a large-calibre direct-fire gun. It is designed to provide overwhelming fire support for ZBD-05 formations against embedded infantry and heavily armoured vehicles.
- **PLZ-07B:** The PLZ-07B is an SPH designed for the Chinese Marine Corps. It is based on the Type 05 hull and uses the weapon system from the PLZ-07, which is based on a different hull. The vehicle is designed to have the same mobility and protection as the ZBD-05, however, it is equipped with a large-calibre howitzer and attendant FCS so that it can provide organic indirect fire support for ZBD-05 formations.
- **Type 001:** The Type 001 is an APC based on the Type 05 hull. It is believed that the Type 001 is more likely to be found in service with the amphibious elements of the PLA rather than the Marine Corps, as it has been shown on exercises with the 74th Army Group. It is designed to perform as an APC and is capable of carrying a section of equipped infantry into combat alongside other Type 005 variants.

System

Alternative Designation: Type 05; ZBD-05, ZTD-05, PLZ-07B

Estimated out of Service Date: 2055

Manufacturer: Norinco

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: Type 05

Crew: ea3

Troop Compartment Capacity: 11

Maximum Effective Range: km500

Dimensions

Length: m9.5

Width: m3.36

Height: m3.04

Weight, Combat: tons26.5

Ground Pressure: kg/mINA

Automotive

Engine Name: INA

Engine Type: Four-stroke turbocharged water-cooled diesel

Engine Power (Land): hp500

Engine Power (Sea): hp1,577

Transmission: Machanical

Cruising Range (Land): km500

Cruising Range (Sea): kmINA, estimates have it going as far as 2/3 of it's land range.

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed, Maximum Swim: km/h25 (Wow that is fast for a IFV)

Tracks: racks are supported by two return rollers located between the first and last pairs of road wheels.

Suspension: Hydropneumatic

Wheels: 6, unevenly-spaced road wheels per side

Gradient: %60

Vertical Obstacle: m0.6

Trench: m2.9

Fording Depth: mAmphibious

Sea State Capable: Sea State 4

Buoyancy Reserve: Yes

Communications

Blue Force Tracker: Yes

↳***TBR-121***

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

Turret Type: 2 Person

↳*System*

Name: 30 mm ZPT-99 (2A72) cannon

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Cage Cooling Sleeve: Yes

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity: m/s1,275

Basic Load: rds125

Maximum Effective Range: m2,800

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: 2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mils0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: 30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: 5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Max Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Anti-Tank Guided Missile (ATGM)

ATGM Type: HJ-73 Red Arrow Anti-Tank Missile System

↳*HJ-73 Red Arrow ATGM (Option 1)*

Name: Red Arrow 73B

Type: Anti-Tank Missile System

Muzzle Velocity: m/s120

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 200 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 2)*

Name: Red Arrow 73D

Type: Anti-Tank Missile System

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Tandem-Heat

Hit Probability: %90

Penetration Probability: %80

Penetration: 280 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 3)*

Name: Red Arrow 73E

Type: Anti-Tank Missile System

Muzzle Velocity: m/s135

Maximum Range: m3,000

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 4)*

Name: Red Arrow 73F

Type: Anti-Tank Missile System (Bunker Buster)

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Fuel Air Explosive Warhead

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

Fire Control

Name: BMS System
Computerized FCS: Yes
Thermal Vehicle Commander: Yes
Thermal Gunner: Yes
Main Gun Stabilization: Yes
3D Map of the OE: Yes, Standard
Satellite Navigation System: BeiDou Satellite
Battle Management System: Yes
Navigation System: BeiDou satellite navigation system,

Protection

Hull Armor Type: Hull is of aluminium base armour protected by composite appliqué armour.
Hull Armor: mm30
Sides and Rear Armor: mm14.5
Turret Armor: INA
Applique Armor: Yes
Explosive Reactive Armor: INA
Active Protection System: Yes
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: Yes, 8 Total, 4 on each side 76mm
Bow Blade: Yes
Belly Plate: Yes
Self-Sealing Fuel Tank: Yes, capable of stopping a 25 mm APFSDS round at 2,000 m.
Automatic Fire Suppression Device.: Yes

Notes:

VN-18 (ZBD-05) The Type 05 armored fighting vehicle is a family of dedicated designed amphibious infantry fighting vehicle developed by Norinco for People's Liberation Army. The family includes ZBD-05 amphibious infantry fighting vehicle and ZTD-05 amphibious tank (assault gun) as well as several other variants including command vehicle and recovery vehicle. The vehicle could be launched at sea, from an amphibious assault ship over the horizon. It features a hydroplane, and a design concept that has been compared to the US cancelled Expeditionary Fighting Vehicle (EFV) program.

K-17 Bumerang Russian 8x8 Amphibious Infantry Fighting Vehicle (IFV)







Tiers:



System

Alternative Designation: Boomerang, VPK-7829 Bumerang

Crew: ea3

Passenger Capacity: 7

Maximum Effective Range: m4,000

Dimensions

Length: m8

Width: m3

Height: m3

Weight, Combat: kg20,000

Automotive

Engine Name: UTD-32TR

Engine Type: Diesel

Engine Power: hp510

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed Maximum Swim: km/h12

Fording Depth: Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2

Main Gun

↳*System*

Name: 2A42 on a Boomerang-BM remote control turret

Type: Auto-cannon

Max Rate of Fire: rpm800

Sustain Rate of Fire: rpm300

Range Finder Type: Laser

↳*Ammunition Option 1*

Type: HE-I

Caliber: mm30

Muzzle Velocity: m/s960

Basic Load: 500 (160 armor piercing / 340 HE-Frag) rounds

Max Effective Range: km4

Min Range: km0

Armor Penetration: INA

Bursting Charge: g49

Projectile Weight: g389

↳*Ammunition Option 2*

Type: HE-T

Projectile Weight: g385

Bursting Charge: g11.5

Muzzle Velocity: m/s960

↳*Ammunition Option 3*

Type: APBC-T

Projectile Weight: g400

Bursting Charge: NA

Muzzle Velocity: m/s970

↳*Ammunition Option 4*

Type: APDS

Projectile Weight: g304

Bursting Charge: NA

Muzzle Velocity: m/s1120

↳*Ammunition Option 5*

Type: APFSDS-T

Projectile Weight: g235

Bursting Charge: NA

Muzzle Velocity: m/s1260

Coaxial Weapon System

↳*System*

Name: PKT

Type: Machine Gun

Max Rate of Fire: rpm500

↳*Ammunition Option 1*

Type: Ball

Caliber: mm7.62

Muzzle Velocity: m/s855

Basic Load: rounds2,000

Effective Range: km1,500

Cartridge Weight: g21.8

Bullet Weight: g9.6

↳*Ammunition Option 2*

Type: AP

Cartridge Weight: g21.7

Bullet Weight: g9.4

Muzzle Velocity: m/s855

↳*Ammunition Option 3*

Type: Tracer

Cartridge Weight: g22

Bullet Weight: g9.65

Muzzle Velocity: m/s824

Ammunition Option 4

Type: AP-I
Cartridge Weight: g22.6
Bullet Weight: g10.39
Muzzle Velocity: m/s834

Auxiliary Weapon System

↳*System*

Name: Kornet-EM
Type: ATGM
Max Rate of Fire: INA
Range Finder Type: Laser

↳*Ammunition*

Type: Fire and Forget ATGM
Caliber: INA
Velocity: m/s300
Basic Load: 4
Effective Range: km10
Armor Penetration: 1,300mm of RHA after ERA, Thermobaric
Weight: kg31
Length: mm1210
Warhead Weight: kg10
Fuze: Impact Fuze
Range (AT Warhead): m8,000
Range (Thermobaric Warhead): m10,000

Fire Control

Name: INA
Turret: Bumerang-BM Remote Control Turret
Computerized FCS: Electro-Optical Target Acquisition and Missile Guidance System
Thermal Sight Vehicle Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes
Range, Day Sight: INA
Range, Thermal Sight: INA

Protection

Hull Armor: V-Shaped, ceramic hull provides protection agains 14.5mm and artillery shrapnel
Turret Armor: Unmanned Turret
Applique Armor: Yes, Ceramic
Explosive Reactive Armor: Optional
Active Protection System: Optional
Mine Clearing: No
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: Yes
360 degree field of view for crew: Yes

Notes:

In the early 1990s, the BTR-90 was developed as a replacement for the BTR-80 in the Russian Army. While it was a moderate improvement in armament, protection, mobility, and internal space over its predecessor, it all came at the cost of greatly increased unit price. It wasn't accepted into service (except in small numbers) as the modest increase in performance wasn't seen as enough justification for its cost and complexity. Purchases of the BTR-80 stopped in 2010 and the improved BTR-82 was obtained as a stop-gap measure. In mid-2011, the Russian Ministry of Defense issued a requirement for a new modular wheeled family of armored vehicles instead of buying the BTR-90. Development this new wheeled IFV is being done alongside the new and similarly armed and armored but tracked Kurganets-25 infantry fighting vehicle and heavy T-15 Armata IFV. The Boomerang vehicle is based on Armata Universal Combat Platform. It is amphibious and is able to negotiate and overcome water obstacles using two waterjets. In a departure with the previous BTR (Like BTR-70) series of vehicles, the engine will be located in the front instead of the rear. Engine location was a significant drawback of BTR vehicles, where soldiers had to exit the vehicles through cramped side doors. The Boomerang has rear doors and roof hatches for troop entry and exit. It has a crew of three consisting of the driver, gunner, and commander and holds seven troops. Protection comes from ceramic armor and technologies to prevent shell splinters. Like BTRs, the Boomerang is an 8×8 wheeled vehicle, and is equipped with a 750 hp turbocharged diesel engine. Several components and subsystems will be interchangeable between the Boomerang and Kurganets-25 IFV, and it is hoped that both vehicles will be powered by the same engine though that is not the case to date. The K-17 Boomerang infantry fighting vehicle (IFV), is heavily armed with the Boomerang-BM RWS with a 30mm cannon and Kornet-EM anti-tank missiles or AU-220M with 57mm BM-57 autocannon and 7.62mm PKMT machine gun. In November 2011, media reports said the new project had been approved. In February 2012, a high ranking Russian general officer said that the Russian Army would be taking the first deliveries of the Boomerang prototype in 2013. Large-scale deliveries were to began in 2015. At least 2,000 Boomerangs vehicles are to replace the BTR-80 and BTR-82/A in Russian service.

AMX-10P (Marines) French Amphibious Infantry Fighting Vehicle (IFV)






Tiers:



Parent:

AMX-10P French Infantry Fighting Vehicle (IFV)

Variants:

- **AMX-10P Marines:** The AMX-10P Marines is a variant of the AMX-10P specifically developed to provide improved amphibious capabilities at sea or in rivers of the original AMX-10P.
- **AMX-10 PAC 90:** The primary role of the AMX-10 PAC 90 is that of anti-tank and fire support on the battlefield at ranges between 1,000 and 2,500 m, but it can also be used as a reconnaissance vehicle or as an APC.
- **AMX-10 ECH:** The AMX-10 ECH is an ARV based on the hull of the AMX-10P. It is designed to support AMX-10P vehicles in combat and maintain readiness by conducting repairs as close to the battlefield as possible.
- **AMX-10 Ambulance:** The AMX-10P is also used to perform as a battlefield ambulance. It is based on the same hull as the AMX-10P to ensure that it can perform alongside other armoured formations.
- **AMX-10PC:** The AMX-10PC is an armoured command post designed to support the operations of armoured formations during combat.
- **AMX-10 HOT:** This was the basic AMX-10P, with the Toucan II turret replaced by a new two-man Lancelot turret based on the TH 20, with four ready-to-launch 4,000 m range MBDA HOT missiles and a further 14 missiles carried in the rear of the hull. The crew of five consisted of the commander and gunner in the turret, two missile loaders, and the driver.
- **AMX-10 VOA:** This was based on the AMX-10PC command vehicle chassis and has been designed for use by artillery observers. Its crew of four consisted of a commander, observer, radio operator, and driver. The turret, which was manned by one or two men, was provided with equipment for day and night observation and local defence.
- **AMX-10 SOA:** The AMX-10 SOA was used for battlefield observation and artillery fire-control. It was essentially an AMX-10P with its Toucan II turret replaced by a new two-man turret armed with an externally-mounted 7.62 mm MG on the right side.
- **AMX-10 SAF:** This was also known as the AMX-10PC SAF and was used with the ATILA artillery FCS. It had a crew of five consisting of the radio operator, driver, two warrant officers, and one commanding officer.
- **AMX-10 TM:** This model towed a 120 mm TDA Model MO-120-RT-61 muzzle loaded rifled mortar, and carried 60 rounds of ammunition, for the mortar. The AMX-10 TM had a crew of six consisting of commander, aimer, artificer, loader, ammunition carrier and driver, and was fitted with a Toucan I turret.
- **AMX-10 SAT:** This was based on the AMX-10 PC command vehicle but had been modified internally to carry a gyrostabilised theodolite, a topographic survey theodolite, distance measuring equipment, and a navigation system.
- **AMX-10P with RATAC radar:** This had no turret and was fitted with a roof-mounted radar for field artillery fire (RATAC) pulse Doppler radar scanner. The vehicle had a crew of five: commander; radar operator; assistant radar operator; radio operator; driver. The radar had four operating modes: ground surveillance; acquisition and identification;

angular deviation measurement; automatic tracking.

- **AMX-10P upgrade:** The AMX-10P ICV upgrade included the installation of a new passive armour package to the front, sides, rear, and hull top to provide an enhanced level of survivability. Other enhancements included a modified rear power-operated ramp, new torsion bars, and reinforced transmission. The original AMX-10P was fully amphibious, propelled in the water by two water-jets mounted one either side of the hull at the rear. These and the trim vane installed at the front of the hull were removed to save weight but the vehicle retained its fording capability.

System

Alternative Designation: AMX-10P Marines

Date of Introduction: 1973

Proliferation: Indonesia, which placed an order for 34 vehicles, Singapore ordered 44

Manufacturer: Nexter Systems

Type: Infantry Fighting Vehicle (IFV)

Family: AMX-10

Crew: ea2

Passenger Capacity: ea13

Turret Type: New Dragar Turret

Dimensions

Length: m5.77

Width: m2.78

Height: m2.75

Weight, Combat: tons14.5

Ground Pressure: kg/m0.56 kg/cm²

Ground Clearance: m0.45

Track Width: mm425

Track Length (on the ground): m2.93

Automotive

Engine Name: Baudouin 6 F11 SRX

Engine Type: V-8 Diesel

Engine Power: hp300

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m1.6

Fording Depth: mAmphibious

Fuel Capacity: liters518

Propellers: 2 each (305mm Diameter)

Emergency Pneumatic Engine Starter: Yes

Water Exchanger: Yes

Communications

Main Gun

NOTE: The AMX-10P Marines can be outfitted with either a Nexter Systems one-man turret armed with a .50 (12.7 mm) M2 HB machine gun or it can be outfitted with the Nexter Systems TS 90 two-man turret armed with a 90 mm F4 gun and 7.62 mm coaxial machine gun.

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: mm12.7 (.50 Caliber)

In Service: 1933-Present

Manufacturer: Current: General Dynamics, Fabrique Nationale

Proliferation: Over 3 Million

Max Rate of Fire (M2HB Version): rds/min450-600

Max Rate of Fire (AN/M2 Version): rds/min750-850

Max Rate of Fire (AN/M3 Version): rds/min1,200-1,300

Weight (Gun Only): kg38

Weight (Gun and Tripod): kg58

Length (Total): mm1,654

Length (Barrel): mm1,143

Action: Short recoil-operated

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s450-1,300 (Depending on model)

Basic Load: ea

Effective Range: m1,800-2,000

Coaxial Weapon System

↳*System*

Name: AA-52, 7.62mm Machine Gun

Type: mm7.62

Manufacturer: Manufacture d'armes de Saint-Étienne (MAS)

Max Rate of Fire: rds/min900

Weight: kg9,970

Length: mm1,080

Barrel Length: mm600

Action: Lever-delayed blowback

Effective Firing Range: m600

Maximum Firing Range: m3,200

Feedd System: Belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳***Ammunition***

Type: Rifle

Caliber: mm7.72

Cartridge: 7.5×54mm French, 7.62×51mm NATO

Muzzle Velocity: m/s830

Basic Load: ea2,000

Anti-Tank Guided Missile (ATGM)

↳***MILAN ATGM***

Country: France / Germany

Service: 1972-present

Prolioferation: thousands deployed by the French, German, Belgian, and Spanish armies, but Italy and soon India were assembling MILANs under license. All in all, the MILAN’s customer list has reached 41 countries and at least several non-state groups.

Range: km2

Basic Load: ea10

Armor Penetration: mm350

Missile Length: mm918

Missile Diameter: mm103

Fin Span: mm267

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Weight: kg2.7

Warhead Type: High Explosive

Guidance System: Wire-Guided

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, M371 day sight with a magnification of ×1 and ×6

Thermal Sight Gunner: Tes, OB-40 day/night periscope

Main Gun Stabilization: Non-stabilized

Periscopes: ea5

Protection

Hull Armor: welded from aluminum armor plates, which protect the vehicle from 14.5mm rounds

Turret Armor: New Dragar Turret.

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 4 × turret mounted 80 mm Smoke grenade launcher (2 × 2)

IR Signature: INA

Anti-Corrosion Lining: Yes

Notes:

The AMX-10P Marines was developed as a private venture by Nexter Systems (previously Giat Industries) Roanne facility specifically for the export market for use by marines and other armed forces having an amphibious capability. The first customer was Indonesia, which placed an order for 34 vehicles in two versions, 24 fitted with the Nexter Systems one-man turret armed with a .50 (12.7 mm) M2 HB machine gun and 10 fitted with the Nexter Systems TS 90 two-man turret armed with a 90 mm F4 gun and 7.62 mm coaxial machine gun. This turret is also installed on a number of other armored vehicles including the Panhard ERC Sagaie (6 × 6) and Renault Trucks Defense VBC 90 (6 × 6) armored cars. AMX-10P Marine: AMX-10P with improved amphibious capabilities and a modified propulsion system that allowed for top speeds of up to 10 km/h in water.[4] This variant was developed for the Indonesian Marine Corps

BMP-2M Berezhok Russian Amphibious Infantry Fighting Vehicle (IFV)






Tiers:



Parent:

BMP-2 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-2 obr.:** Improved version with "kovriki" armour on turret front
- **BMP-2 obr. 1986:** Late-production model with new BPK-2-42 sight instead of the BPK-1-42.
- **BMP-2D:** Fitted with additional spaced type steel appliqué armour on the hull sides, under the driver's and commander's stations, and 6 mm thick appliqué armour on the turret.
- **BMP-2K:** Command variant fitted with two whip antennas mounted on the rear of the hull, one behind the turret and one on the right-hand side of the rear of the vehicle, one IFF antenna (pin stick) on the left-hand side of the rear of the vehicle and a support for a telescopic mast in the front of the IFF antenna
- **BMP-2M:** This is the general designator for upgraded (modernizirovannyj) versions
- **BMP-2M "Berezhok":** Modernized version from KBP. This version has B05Ya01 Berezhok turret equipped with 2A42 30mm autocannon, PKMT 7.62mm coaxial machine gun, AGS-30 grenade launcher, 2+2 launchers for ATGM 9M133M "Kornet-M" and new day/night sights as found on the BMD-4.
- **BMO-1:** Transport vehicle for a flamethrower squad armed with 30 RPO-A "Shmel" 93 mm napalm rocket launchers.
- **BVP-2V or VR 1p:** Former Czechoslovakia version
- **VPV:** Equipped with a powered crane with 5 tonnes capacity, heavy winch, wider troop compartment etc. Hatches on top of the turret and the troop compartment were removed.
- **BMP-2 "Sarath":** Also known as BMP-II – Indian licence-produced variant of the BMP-2,built by Ordnance Factory Medak. The first vehicle, assembled from components supplied by KBP, was ready in 1987.
- **BMP-2 Light Tank:** India Version, DRDO developed light tank on BMP-2 Chassis DRDO light tank.
- **BMP-2 UGV "Muntra" – unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and:** India Version. unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and chemical contamination while the "M" version is designed to detect mines.
- **BMP-2MD:** Finnish modernisation of the BMP-2, which includes thermal camouflage, thermal sights, anti-aircraft sight and new day/night optics for the gunner and commander, heated cabin and seats, new external storage boxes functioning also as spaced armour and new radio and communications systems

System

Alternative Designation: BMP-2M Berezhok
Type: Amphibious Infantry Fighting Vehicle (IFV)
Family: BMP-2
Manufacturer: Kurganmashzavod Joint Stock Company
Crew: ea3
Passenger Capacity: ea7

Dimensions

Length: m6.72

Width: m3.15

Height: m2.45

Weight, Combat: tons14.3

Ground Pressure: kg/m0.63

Automotive

Engine Name: UTD-23

Engine Type: Diesel

Engine Power: hp370

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Off Road: km/h45

Speed, Average Cross: km/h35

Speed Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2.5

Fording Depth: mAmphibious

Note: Initial production BMP-2 is partially amphibious, and propelled in water by its tracks

Communications

Primary: R-123M transceiver

Secondary: R-173

Main Gun

↳ ***System***

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

Firing Modes: Automatic and semi-automatic

Effective Ground Engagement Range: m1,800

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartidge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: 500 total of any combination 30mm projectile

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,260

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,120

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Anti-Tank Guided Missile (ATGM)

System

Name: 9M133 Kornet
NATO Name: AT-14 Spriggan
Type: Anti-Tank Guided Missile (ATGM)
Manufacfturer: Degtyarev plant
In Service: 1998-present
Proliferation: 35,000 (2009)
Launcher Type: Twin launchers mounted on either side of the turret
Basic Load: ea4
Weight (with Launch Tube): kg29
Weight (with Tripod/Firing Unit): kg63.7
Length: mm1,200
Diameter: mm152
Warhead Weight: kg4.6
Detonation Mechanism: Impact Fuse
Wingspan: mm460
Propellant: Solid-fuel rocket
Operational Range (KORNET): m100-5,000
Operational Range (KORNET-EM): m10,000
Guidance system: SACLOS laser beam riding
Steering system: Two control surfaces
Accuracy: Less than 5 meters
Launch platform: Individual, vehicles, Kornet-T, Kornet-D, Bumerang-BM, Kornet-D1

Fire Control

Name: INA
Computerized FCS: Yes
Commander Periscopes: Two TNPO-170A periscopes, plus a single TKN-3B binocular rear-view prism. Additionally, the Commander has a 1PZ-3 day monocular sight
Thermal Sight Gunner: Sozh panoramic sight
Driver's Central Day Periscope: TNP-350B
Main Gun Stabilization: Yes, digital weapon stabiliser
Effective Ground Engagement Range: m1,800
Searchlight: OU-3GA2 searchlight and the FG-126 searchlight
Digital Battle Management System: Yes
Multi-Channel Optical System: Yes

Advanced Target Detection System: Yes

Laser Range Finder: Yes, PL-1 laser illuminator

Thermal Imaging System: Yes

Ballistic Computer: Yes

Protection

Hull Armor: All-welded steel that is believed to be between 5 and 19 mm thick

Turret Armor: mm23-33

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: KMT-8 mine plow available

Self-Entrenching Blade: INA

NBC Protection: Collective, GO-27 Radioactive and chemical agent detector

Smoke Equipment: 6 smoke grenade launchers, VEESS

Smoke Screen: TDA System using engine

Notes:

The BMP-2M infantry fighting vehicle (IFV) is an upgraded version of the BMP-2 IFV. Designed and developed by Kurganmashzavod JSC, the IFV offers improved mobility and fire power for armed forces. The weapon system for the upgraded vehicle is provided by KBP Instrument Design Bureau. The amphibious vehicle was displayed at an international forum known as Engineering Technologies 2010 held in June 2010 and KADEX-2012, Kazakhstan. The manufacturer also demonstrated the vehicle at Comprehensive Security Exhibition 2015 in Tampere. KBP received an order from Algeria for the modernization of 360 BMP-2 vehicles to BMP-2M standard. A total of 693 BMP-2/2K vehicles of the Indian Army are also being upgraded to BMP-2M standard. The Russian Defense Ministry placed a ten-year contract with KBP for the supply of 540 modernized BMP-2M and BMD-2 airborne vehicles in 2017. The upgraded vehicle is being offered in two different configurations, which include BMP-2M (sb4-2) and BMP-2M (sb4-3). The design of the BMP-2M tracked armored fighting vehicle is based on the BMP-2 IFV, which was commissioned by the Russian Army in 1980. Combat efficiency of the vehicle has been highly improved with advanced armament, while cross-country speed has also been increased. The modernized vehicle can carry three crew members, including a driver, gunner and commander. The troop compartment offers seating for up to seven soldiers. The vehicle retains the design specifications of BMP-2, and measures 6.73m-long, 3.15m-wide and 2.45-high. The combat weight of the vehicle is approximately 16,000kg. The IFV is equipped with a KBM-2 air conditioning system to offer a comfortable environment to the crew when operating in high temperatures. The BMP-2M IFV is equipped with a Berezhok (B05S011) combat module integrating four 9M133 Kornet series anti-tank guided missiles. The missiles are launched from the twin launchers mounted on either side of the turret. The turret is also armed with a 30mm 2A42 automatic gun, a 7.62mm PKT coaxial machine gun and a 30mm AG-17 automatic grenade launcher (AGL). The 30mm cannon has the capability to fire 500 rounds of ammunition a minute, while the 7.62mm gun offers a rate of fire of 2,000 rounds a minute. The AGL can launch 250 grenades a minute for a maximum range of 1,730m. The hull of the IFV is protected by applique armor, which enables the vehicle to withstand 12.7mm B-3232 rounds and high-explosive anti-tank (HEAT) missiles. Observation and fire control The BMP-2M IFV is equipped with a multi-channel optical system for stabilization of view during firing. The vehicle has an advanced target detection system, a laser range-finder and a thermal imaging system to improve the accuracy of target detection and mission efficiency. An armament stabilizer and ballistic computer, as well as a BPK-3-42 gunner’s sight are fitted to the vehicle enable the firing of main armament. The vehicle is also installed with PL-1 laser illuminator. The target detection ranges of the vehicle during the day and night are 5,000m and 3,000m respectively.

AMX-10P French Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

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- **AMX-10PC:** The AMX-10PC is an armoured command post designed to support the operations of armoured formations during combat.
- **AMX-10 HOT:** This was the basic AMX-10P, with the Toucan II turret replaced by a new two-man Lancelot turret based on the TH 20, with four ready-to-launch 4,000 m range MBDA HOT missiles and a further 14 missiles carried in the rear of the hull. The crew of five consisted of the commander and gunner in the turret, two missile loaders, and the driver.
- **AMX-10 VOA:** This was based on the AMX-10PC command vehicle chassis and has been designed for use by artillery observers. Its crew of four consisted of a commander, observer, radio operator, and driver. The turret, which was manned by one or two men, was provided with equipment for day and night observation and local defence.
- **AMX-10 SOA:** The AMX-10 SOA was used for battlefield observation and artillery fire-control. It was essentially an AMX-10P with its Toucan II turret replaced by a new two-man turret armed with an externally-mounted 7.62 mm MG on the right side.
- **AMX-10 SAF:** This was also known as the AMX-10PC SAF and was used with the ATILA artillery FCS. It had a crew of five consisting of the radio operator, driver, two warrant officers, and one commanding officer.
- **AMX-10 TM:** This model towed a 120 mm TDA Model MO-120-RT-61 muzzle loaded rifled mortar, and carried 60 rounds of ammunition, for the mortar. The AMX-10 TM had a crew of six consisting of commander, aimer, artificer, loader, ammunition carrier and driver, and was fitted with a Toucan I turret.
- **AMX-10 SAT:** This was based on the AMX-10 PC command vehicle but had been modified internally to carry a gyrostabilised theodolite, a topographic survey theodolite, distance measuring equipment, and a navigation system.
- **AMX-10P with RATAC radar:** This had no turret and was fitted with a roof-mounted radar for field artillery fire (RATAC) pulse Doppler radar scanner. The vehicle had a crew of five: commander; radar operator; assistant radar operator; radio operator; driver. The radar had four operating modes: ground surveillance; acquisition and identification; angular deviation measurement; automatic tracking.
- **AMX-10P upgrade:** The AMX-10P ICV upgrade included the installation of a new passive armour package to the front, sides, rear, and hull top to provide an enhanced level of survivability. Other enhancements included a modified rear power-operated ramp, new torsion bars, and reinforced transmission. The original AMX-10P was fully amphibious, propelled in the water by two water-jets mounted one either side of the hull at the rear. These and the trim vane installed at the front of the hull were removed to save weight but the vehicle retained its fording capability.

System

Alternative Designation: AMX-10P

Manufacturer: GIAT Industries

Type: Infantry Fighting Vehicle (IFV)

Family: AMX-10

Crew: ea3

Passenger Capacity: ea8

Dimensions

Length: m5.77

Width: m2.78

Height: m2.57

Weight, Combat: tons14.5

Ground Pressure: kg/m0.53 kg/cm2

Ground Clearance: m0.45

Automotive

Engine Name: Hispano-Suiza HS-115

Engine Type: Diesel

Engine Power: hp276

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: 40

Speed Maximum Swim: km/h8

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m1.6

Fording Depth: mAmphibious

Fuel Capacity: liters528

Communications

Main Gun

↳*System*

Name: GIAT M693 (F2) Main Gun, 20mm Duel Feed Cannon

Type: mm20

Max Rate of Fire: rds/min900

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+50

Minimum Elevation: deg-8

Length: mm2,600

Barrel Length (calibres): 100

Recoil Stoke: mm60

Height: mm260

Weight: kg71

Maximum Effective Range: m1,500

↳***Ammunition***

Type: Rifle

Caliber: mm20

Muzzle Velocity: m/s1,050

Basic Load: ea800

Maximum Effective Range: m1,500

Penetration: 20mm of armor plating at a range of 1,000 meters

Coaxial Weapon System

↳***System***

Name: AA-52, 7.62mm Machine Gun

Type: mm7.62

Manufacturer: Manufacture d'armes de Saint-Étienne (MAS)

Max Rate of Fire: rds/min900

Weight: kg9,970

Length: mm1,080

Barrel Length: mm600

Action: Lever-delayed blowback

Effective Firing Range: m600

Maximum Firing Range: m3,200

Feedd System: Belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.5×54mm French, 7.62×51mm NATO

Muzzle Velocity: m/s830

Basic Load: ea900

Anti-Tank Guided Missile (ATGM)

↳*MILAN Anti-Tank Guided Missile (ATGM)*

Country: France / Germany

Service: 1972-present

Prolferation: thousands deployed by the French, German, Belgian, and Spanish armies, but Italy and soon India were assembling MILANs under license. All in all, the MILAN's customer list has reached 41 countries and at least several non-state groups.

Range: km2

Basic Load: ea10

Armor Penetration: mm350

Missile Length: mm918

Missile Diameter: mm103

Fin Span: mm267

Missile Weight: kg6.73

Total Weight with Launcher: kg24

Warhead Weight: kg2.7

Warhead Type: High Explosive

Guidance System: Wire-Guided

Note: The iconic MILAN is the most successful Western European anti-tank missile ever made and is only surpassed by the BGM-71 TOW when it comes to international customers.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, M371 day sight with a magnification of ×1 and ×6

Thermal Sight Gunner: Tes, OB-40 day/night periscope

Main Gun Stabilization: Non-stabilized

Protection

Hull Armor: welded from aluminum armor plates, which protect the vehicle from 14.5mm rounds

Turret Armor: welded from aluminum armor plates, which protect the vehicle from 14.5mm rounds

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 4 × turret mounted 80 mm Smoke grenade launcher (2 × 2)

IR Signature: INA

Notes:

The AMX-10P is a French amphibious infantry fighting vehicle. It was developed after 1965 to replace the AMX-VCI in service with the mechanized regiments of the French Army; the first prototypes were completed in 1968. Production commenced between 1972 and 1973. The AMX-10P is fully amphibious, being propelled through water at speeds of up to 7 km/h by twin waterjets. It is also fitted as standard with a trim vane and bilge pumps to assist with the flotation process. AMX-10Ps were popular with a number of Arab armies and have been operated by Iraq, Qatar, Saudi Arabia, and the United Arab Emirates.[2] Special marine variants were also developed for Singapore and Indonesia, including a fire support model known as the AMX-10 PAC 90, which mated the AMX-10P chassis to the complete turret and 90 mm gun assembly of the Panhard ERC-90 Sagaie. AMX-10Ps share a number of common transmission and chassis components with their armored car counterpart, the AMX-10RC. AMX-10P hulls are fabricated from a welded steel or aluminum alloy[and notable for their parallel incorporation of the driving and engine compartments. The driver is seated at the front of the vehicle and to the left. An AMX-10P's driving compartment is provided with a single hatch cover opening to the rear and three periscopes intended for observation purposes when the hatch is closed. Night vision equipment was not fitted as standard to the base production model; however, one of the three driving periscopes could be replaced with combined day/night intensification sights as needed. The troop compartment is at the rear of the hull and provided with two roof hatches. Passengers embark and debark from a ramp, which is accessed through two doors at the rear. The transmission consists of a hydraulic torque converter coupled to a gearbox with one reverse and four forward driving gears. The AMX-10P utilizes a torsion bar suspension, which supports five road wheels with the drive sprocket at the front and idler near the rear. These can be accessed from inside the hull through maintenance panels. Standard AMX-10P turrets are equipped with a GIAT M693 automatic cannon firing two different types of both high explosive ammunition and armor-piercing ammunition. More than one ammunition type may be loaded at once and fired alternatively. The high explosive rounds have a muzzle velocity of 1,050 m/s, while the latest armor-piercing round has a muzzle velocity of 1,300 m/s and is capable of penetrating 20 mm of rolled homogeneous armor at an incidence of 60°. The autocannon has a cyclic rate of fire of 740 rounds per minute, with the gunner being able to switch between semiautomatic, limited burst, or fully automatic fire as necessary.

BMP-3M Russian Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

BMP-3 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3 UAE:** The BMP-3 with a upgraded cooling system, which allows the vehicle to operate in the hot desert
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3K:** Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BT-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
- **BRM-3K "Rys" (Ob.501):** Surveillance and reconnaissance variant with 1PN71 thermal sight (3.7x/11x, 3 km range), 1PN61 active-pulse night vision device (3 km range), 1RL-133-1 ("TALL MIKE") I-band surveillance radar (3 km man, 12 km vehicle), 1V520 computer and a TNA-4-6 navigation system. The armament consists of the stabilized 30 mm autocannon 2A72 (600 rounds) and a coaxial 7.62 mm machine gun (2,000 rounds) or AU-220M Baikal remote weapon station with 57 mm BM-57 autocannon and 7.62mm PKMT machine gun.
- **BMP-3 Dragoon:** New IFV version with an unmanned turret which can be armed with a variety of combat modules, including standard BMP-3's Bakhcha-U turret with a 2A70 100 mm cannon, a 2A72 30 mm autocannon and a PKTM 7.62 mm machine gun, the AU-220M Baikal remote weapon station module with a 57 mm BM-57 gun and a module with a 125 mm 2A82-1M tank gun, the new 816 h.p.
- **BREM-L "Beglianka" (Ob.691):** Armoured recovery vehicle with five-tonne crane and 20/40 metric tonne capacity winch.
- **BMP-3 "Khrizantema-S":** Self-propelled anti-tank version with 9M123 Khrizantema (AT-15) ATGM system with radar and laser guidance. The 9P157-2 carries two 9M123 missiles on launch rails, which are extended from a stowed position; the radar is also stowed during transit. The missiles are re-loaded automatically from an internal magazine with 15 rounds (missiles are stored and transported in sealed canisters) and can also accept munitions manually loaded from outside the vehicle.
- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The

Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).

- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype, further development led to the 2S31 Vena.
- **DZM "Vostorg-2":** Combat engineer vehicle with a dozer blade and excavating bucket. Prototype.
- **UR-07:** Mine clearing system. The UR-07 might replace the UR-77 "Meteorit". It has the same chassis as the BMP-3 but a bigger steel hull with two launch ramps in the rear. The ramps are used to fire rockets towing hose-type mine-clearing line charges to clear mine fields.
- **UNSh (Ob.699):** Basic chassis for specialised variants.
- **Hermes or TKB-841:** Air-defence vehicle with high-velocity missiles and radar system. Prototype.[68] 2S31 Vena – Self-propelled mortar carrier equipped with a 120 mm mortar based on BMP-3 chassis. It entered production in 1996 and service in 2010.
- **2S38 ZAK-57 Derivatsiya-PVO:** Self-propelled air defense vehicle based on BMP-3 chassis fitted with a 57 mm autocannon and passive reconnaissance and target tracking equipment.[72] It is designed to shoot down unmanned aerial vehicles (UAVs), cruise missiles, air-to-surface missiles, aircraft, helicopters, and MLRS rockets.
- **UDAR UGV:** Unmanned ground vehicle based on the tracked chassis of the BMP-3 with the center hull raised to fit the DUBM-30 Epoch armed with 2A42 autocannon, 7.62mm PKMT machine gun, and Kornet-M ATGM.
- **Vikhr UGV:** Unmanned ground vehicle based on BMD-3 equipped with a smaller turret armed with 2A72 autocannon, 7.62mm coaxial machine gun and six anti-tank guided missiles 9M133M Kornet-M, three on each side of the turret.
- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.

System

Alternative Designation: BMP-3M

Manufacturer: Kurganmashzavod

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: BMP-3

Crew: ea3

Passenger Capacity: ea7

Fighting Module: 2K23 Fighting Module

Dimensions

Length (Hull): m7.2

Width: m3.23

Height: m2.45

Weight, Combat: tons22

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-32T

Engine Type: V-10, turbocharged, water cooled, diesel

Engine Power: hp660

Cruising Range: km650

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Communications

Primary Radio: R-173

Secondary Radio: R-173P

Satalite Navigation: Yes

Main Gun

Note: The complete weapon system of the BMP-3 infantry combat vehicle is known as the 2K23 and consists of the 100 mm gun 2A70 with a 30 mm 2A72 automatic cannon (see later in this section) mounted coaxially to the right and a 7.62 mm PKT coaxial machine gun.

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min8-10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: m5,000

Maximum Effective Range (Day): m4,000

Maximum Effective Range (Night): mINA

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

↳*Ammunition*

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Muzzle Velocity: m/s330

Basic Load: ea40 Total Rounds of any 100mm Russian Projectile

Warhead Type: HEAT

Cartridge: 3UBK23-3 cartridge

Soft Launch: Yes

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Anti-Tank Guided Missile (ATGM)

↳***System***

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

In Service: 1983-present

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea8

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Coaxial Weapon System

↳***System***

Name: 2A72, 30mm Automatic Cannon

Type: mm30

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Commander and Driver's Weapons System

Note: The BMP-3 is equipped with a total of two 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: 1K13-2

Computerized FCS: Yes, a new improved FCS over what the BMP-3 is equipped with. The new FCS allows the BMP-3M to extend the range of the Arkan gun-launched missiles to 5,500 m

Thermal Sight Vehicle Commander: optical sight 1PZ-10, a day/night vision device TKN-3MB

Thermal Sight Gunner: SOZh Sight System

Gunner Day Sights: SOZh Sight System

SOZh Sight System Max Range (MBT Size Vehciles): m7,000

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

Battle Management System: Yes, the Automated Battlefield Management Equipment Set (ABMES)

Vesna-K System: Yes, the VESNA-K provides automatic target tracking and thermal image capable optics

Vesna-K System Maximum Range (MBT Size Vechiles): m4,500

Protection

Armor Type: welded of aluminum alloy armor

Hull Armor (Front): protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, Collective

Smoke Equipment: 6 × turret mounted 81 mm smoke grenade launcher

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Notes:

The BMP-3M has an upgraded new engine and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with a laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM. The BMP-3M is also able to fire various ammunition types, including new 100 mm laser-guided projectiles, new 100 mm HE-FRAG (high explosive fragmentation) rounds and new 30 mm APDS (armor-piercing discarding sabot) rounds. Its additional auxiliary armor shields are effective against 12.7 mm armor-piercing rounds from a range of 50 m. Explosive reactive armor is available as an option. The new uprated engine is the UTD-32, which is rated at 660 hp. There are actually several different M models, some fitted with additional armor, "Arena-E" or "Shtora-1" active protection systems, air conditioner etc. BMP-3M – KBP and Kurganmashzavod have upgraded the vehicle with a new engine and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with a laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM. The BMP-3M is also able to fire various ammunition types, including new 100 mm laser-guided projectiles, new 100 mm HE-FRAG (high explosive fragmentation) rounds and new 30 mm APDS (armor-piercing discarding sabot) rounds. Its additional auxiliary armor shields are effective against 12.7 mm armor-piercing rounds from a range of 50 m. Explosive reactive armor is available as an option. The new uprated engine is the UTD-32, which is rated at 660

hp. There are actually several different M models, some fitted with additional armor, "Arena-E" or "Shtora-1" active protection systems, air conditioner etc.

ZBD-04A (Type 4) Chinese Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

ZBD-04 (Type 4) Chinese Infantry Fighting Vehicle (IFV)

Variants:

- **ZBD-97:** Designation for ZBD-04 prototype.
- **ZBD-04:** Standard variant.
- **ZBD-04 HJ-8:** Based on original ZBD-04 with four additional HJ-8 anti-tank missile mounted on the turret.
- **ZBD-04A:** The ZBD-04A (industrial designation WZ502G, sometimes referred to as ZBD-08) is an improved variant that sacrifices amphibious performance for better armor protection; add-on armor can be fitted, and the frontal arc can withstand 30 mm rounds along with side skirts added. Although the vehicle is still amphibious, able to propel itself by its tracks to ford lakes and rivers, it lacks waterjets and can no longer operate in open sea.
- **ZBD-04A AT (AFT-10 Anti-Tank Missile Carrier):** ZBD-04A's chassis works as the mobile launching platform for AFT-10 (HJ-10) anti-tank missile. Noted the AFT-10 is a specific version of HJ-10 missile that designed for firing from vehicle launching platform such as ZBD-04A.
- **ZBD-04A Command Vehicle:** Modified from original ZBD-04A, featuring a crew cabin with higher ceiling.
- **ZBD-04A Combat Reconnaissance Vehicle:** Equipped with radars and electric-optic sights for battlefield surveillance, the chassis of the Combat Reconnaissance Vehicle is modified from standard ZBD-04A. The recon equipment is mounted on a retractable mast.
- **ZBD-04A Armored Recovery Vehicle:** Equipped with a crane for emergency vehicle service.
- **VN12:** Export variant based on ZBD-04A.

System

Alternative Designation: ZBD-04, Type 04, WZ502 (Industrial Designation), VN11

Type: Amphibious APC/IFV

Crew: ea3

Troop Compartment Capacity: ea7

Maximum Effective Range: km400

Amphibious: Yes

Note: It is the primary vehicle of China's mechanised infantry brigades

Dimensions

Length: m7.52

Width: m3.4

Height: m2.53

Weight,.Combat: tons24

Ground Clearance: m0.45

Max Speed: km/h70

Range (On Road): km400

Automotive

Engine Name: 404 kW (541 bhp) six-cylinder, water-cooled turbo-diesel

Engine Type: Turbo-diesel

Engine Power: hp590

Engine Location: Front Right

Cruising Range: km600

Speed, Maximum Road: km/h75

Speed, Average Cross: 50

Speed, Maximum Swim: km/h6

Gradient: %60

Side Slope: %30

Vertical Step: m0.7

Trench: m2.7

Fording Depth: m1.4

Suspension: Traditional torsion bar configuration, with each side having six dual rubber-tyred road wheels and a driver sprocket at the front, idler at the rear and track return rollers. Only the upper part of the suspension is covered.

Note: Due to increased Armor, the Maximum Swim speed of the ZBD-04A is reduced to only 6 km/h

Communications

Digital Transmission Capable: Yes

Data Bus Technology: Yes

Digital Radios: Yes, Standard

Wireless Internet Connection Capable: Yes

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 100 mm 2A70 rifled gun/missile launcher,

Type: rifled gun/missile launcher,

Manufacturer: KBP Instrument Design Bureau

Max Rate of Fire: rds/min8-10

Weight, Combat: kg332

Automatic Loader: Yes

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+60

Minimum Elevation: deg-6

Note: The 100 mm gun is capable of firing two natures of conventional ammunition as well as a guided missile.

↳*Ammunition (Option 1)*

Name: PFHE BTE3

Type: 100mm Projectile

Maximum Effective Range: m7,000

Splinters: ea2,400

Basic Load: 41 (Inclusive of guided missiles)

↳*Ammunition (Option 2)*

Name: HE BTE1

Type: 100mm Projectile

Maximum Effective Range: m4,000

Basic Load: ea41 (Inclusive of guided missiles)

Auxiliary Weapon System

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Manufacurer: Tulamashzavod

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition*

Type: Auto-cannon

Caliber: mm30x165

Muzzle Velocity: m/s960

Basic Load: rdsINA

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Armor Penetration: Yes

Coaxial Weapon System

↳*System*

Name: PK 7.62mm Machine Gun (Pulemyot Kalashnikova)

Type: 7.62mm Coaxial Machine Gun

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +100 Million

Weight: kg9

Length, Total: mm1,203

Length, Barrel: mm605

Rate of Fire: rds/min650

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes.

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Varients: PK PKS PKT PKM PKMS

↳*Ammunition*

Type: 7.62mm Coaxial Machine Gun

Caliber: 7.62mmx54mmR

Muzzle Velocity: m/s825

Basic Load: INA

Effective Firing Range (Normal): m1,000

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Armor Penetration: Available

Fire Control

Name: A advanced FCS, Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes, panoramic sight

Thermal Gunner: Yes, panoramic sight

Gunner Sight: a laser guidance system for the 100 mm laser-guided missile.

Main Gun Stabilization: Yes

Meteorological Sensor: Yes

Fire on the Move: the FCS enables the vehicle to engage stationary and moving targets under all weather conditions, even when firing on the move.

Protection

Armor Material: Welded steel and modular armour panels

Hull Armor (Front): Protection against 30mm projectiles from a distance of 1,000 meters

Hull Armor (Side): Protection against 14.5mm projectiles at a distance of 200 meters

Hull Armor (Rear and Roof): Protection from 7.62mm AP projectiles and artillery fragments

Under the Hull Armor: The ZBD-04A withstands mine blasts equivalent to 10 kg of TNT anywhere under the hull.

Applique Armor: Yes, added to the front and sides of the hull

Explosive Reactive Armor: Yes

Active Protection System: Yes, A bank of three electrically operated grenade launchers is mounted either side of the turret.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes

Automatic Fire Suppression Systems: Yes

Battle Management System: Yes

Navigation Suite: Yes, Beidou satellite navigation system

Firing Port: The vehicle's final 'weapon system' is a firing port and viewing aid on each side toward the rear of the hull.Dismounts can also fire out of rear hatches, using the hatch covers locked vertically as shields.

Notes:

The ZBD-04A is an upgraded version of the ZBD-04. It forms the base platform for several other vehicles and carries improved armor but reduced mobility over the ZBD-04. It is the primary vehicle of China's mechanized infantry brigades, and provides sufficient firepower and protection to transport a section of fully-equipped infantry into a high-intensity battle. It is designed to operate alongside the Type 99A MBT and conduct mobile operations as part of a combined arms formation. The ZBD-04A was displayed in public for the first time during the 2015 Victory Day parade through Beijing, although development was competed the year before.

Kurganets-25 Russian Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **Armored Recovery Vehicle:** Equipped with a crane, a winch, and armed with a 12.7mm heavy machine gun
- **Armored Ambulance:** Proposed addition to the Russian army
- **82mm Vasilek Mortar Carrier:** Proposed addition to the Russian army
- **Anti-tank Vehicle:** Proposed addition to the Russian army
- **Reconnaissance Vehicle:** Proposed addition to the Russian army
- **Command Vehicle:** Proposed addition to the Russian army
- **Armored Engineering Vehicle:** Proposed addition to the Russian army
- **Self Propelled Anti-Aircraft Gun (SPAAG):** Proposed addition to the Russian army
- **Self Propelled Gun (125mm):** Proposed addition to the Russian army

System

Alternative Designation: T-15
Crew: ea3
Passenger Capacity: 6
Maximum Effective Range: m4,000

Dimensions

Length: m7.2
Width: m4
Height: m3.2
Weight, Combat: kg25,000

Automotive

Engine Name: YaMZ-780 inline engine with two turbochargers

Engine Type: Diesel

Engine Power: hp750

Cruising Range: km500

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Fording Depth: mAmphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.7

Trench: m1.8

Main Gun

↳*System*

Name: 2A42 on a Bumerang-BM remote control turret

Type: Auto-cannon

Max Rate of Fire: rpm800

Sustain Rate of Fire: 300

Range Finder Type: Laser

↳*Ammunition Option 1*

Type: HE-I

Caliber: mm30

Muzzle Velocity: m/s960

Basic Load: rounds500 (160 armor piercing / 340 HE-Frag)

Max Effective Range: m2,000

Max Range: km4

Min Range: km0

Armor Penetration: INA

Projectile Weight: g389

Bursting Charge: g49

↳*Ammunition Option 2*

Type: HE-T

Projectile Weight: g385

Bursting Charge: g11.5

Muzzle Velocity: m/s960

↳***Ammunition Option 3***

Type: APBC-T

Projectile Weight: g400

Bursting Charge: NA

Muzzle Velocity: m/s970

↳***Ammunition Option 4***

Type: APDS

Projectile Weight: g304

Bursting Charge: NA

Muzzle Velocity: m/s1120

↳***Ammunition Option 5***

Type: APFSDS-T

Projectile Weight: g235

Bursting Charge: NA

Muzzle Velocity: m/s1260

Coaxial Weapon System

↳***System***

Name: PKT

Type: Machine Gun

Max Rate of Fire: rpm500

↳***Ammunition Option 1***

Type: Ball

Caliber: mm7.62

Muzzle Velocity: m/s855

Basic Load: rounds2,000

Effective Range: km1,500

Cartridge Weight: g21.8

Bullet Weight: g9.6

↳***Ammunition Option 2***

Type: AP

Cartridge Weight: g21.7

Bullet Weight: g9.4

Muzzle Velocity: m/s855

↳*Ammunition Option 3*

Type: Tracer

Cartridge Weight: g22

Bullet Weight: g9.65

Muzzle Velocity: m/s824

↳*Ammunition Option 4*

Type: AP-I

Cartridge Weight: g22.6

Bullet Weight: g10.39

Muzzle Velocity: m/s834

Auxiliary Weapon System

↳*System*

Name: Kornet-EM

Type: ATGM

Max Rate of Fire: INA

Range Finder Type: Laser

↳*Ammunition*

Type: Fire and Forget ATGM

Caliber: mmINA

Velocity: m/s300

Basic Load: 4

Effective Range: km10

Armor Penetration: 1,300mm of RHA after ERA, Thermobaric

Weight: kg31

Length: mm1210

Warhead Weight: kg10

Fuze: Impact Fuze

Range (AT Warhead): m8,000

Range (Thermobaric Warhead): m10,000

Fire Control

Name: INA
Turret: Bumerang-BM Remote Control Turret
Computerized FCS: Electro-Optical Target Acquisition and Missile Guidance System
Thermal Sight Vehicle Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes
Range, Day Sight: INA
Range, Thermal Sight: INA

Protection

Hull Armor: Aluminum Alloy
Turret Armor: Unmanned
Applique Armor: Optional
Explosive Reactive Armor: Optional
Active Protection System: Yes, Drozd-2 or Afghanit or modified Shtora
Self-Entrenching Blade: Yes
NBC Protection: Yes
Smoke Equipment: INA

Notes:

The Kurganets-25 is a tracked, 25-ton modular vehicle that can be used as either an infantry fighting vehicle or an armored personnel carrier depending upon the turret that is mounted to the hull. As part of the Russian army’s efforts to modularize their combat systems, the Kurganets-25 will evolve into various models, gradually replacing BMP, BMD, MT-LB and other types of tracked Soviet armored platforms. The Kurganets-25 will have modular armor that can be upgraded for specific threats. The Kurganets-25 IFV and APC variants were first seen in public during rehearsals for the 2015 Moscow Victory Day Parade. The Kurganets-25 is designed to bring the Russian tracked troop carrier fleet up to standard with Western designs like the American M2 Bradley and British Warrior, which outclassed their Soviet Cold War BMP-series counterparts. Kurganets-25 is based on Armata Universal Combat Platform while being lighter than the T-15 Armata "heavy IFV" based on the same and similar to wheeled VPK-7829 Bumerang. The heavily armed infantry fighting vehicle carries 6-7 troops and a lightly armed APC carries 8 troops. Other variants proposed for the Kurganets include an armored ambulance, an 82 mm Vasilek mortar carrier, anti-tank vehicle, armored recovery vehicle, a reconnaissance vehicle, a command vehicle, and an armored engineering vehicle. The vehicle represents a departure from traditional Russian low profile designs, having a higher floor more suited for mounted combat rather than troop carrying, which also provides better IED and mine protection. While the T-15 is expected to be deployed with T-14 tanks in armored formations, Kurganets-25 platforms will equip mechanized units.

ZBD-05 (ZBD-2000) Chinese Amphibious Infantry Fighting Vehicle






Tiers:

1 2 3 4

System

Alternative Designation: VN-18

Manufacturer: Norinco

Family: Type 05

Crew: ea3

Capacity for Infantryment: ea10

Dimensions

Length: m9.5

Width: m3.36

Height: m3.04

Weight, Combat: tons28.5

Ground Pressure: INA

Automotive

Engine Name: INA

Engine Type: Four-stroke turbocharged water-cooled diesel

Engine Power (Land): hp500

Engine Power (Sea): hp1,577

Transmission: Machanical

Cruising Range (Land): km500

Cruising Range (Sea): INA, estimates have it going as far as 2/3 of it's land range.

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h40

Speed, Maximum Swim: INA

Maximum Distance at Sea: km90

Tracks: Tracks are supported by two return rollers located between the first and last pairs of road wheels.

Suspension: Hydropneumatic

Wheels: 6, unevenly-spaced road wheels per side

Gradient: %60

Side Slope: %30

Vertical Obstacle: m0.6

Trench: m2.9

Fording Depth: Amphibious

Sea State Capable: Sea State 4

Buoyancy Reserve: Yes

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Type: mm30

Rate of Fire: rds/min1,000

Maximum Firing Range: m5,000

Traverse Range: deg360

Maximum Elevation: deg+53

Minimum Elevation: deg0

Action: Short Recoil

↳*Ammunition*

Basic Load: 300

Penetration: INA

Caliber: 30x155mm

Muzzle Velocity: m/s780

Anti-Tank Guided Missile (ATGM)

ATGM Type: Hong Jian-73C

↳*Hong Jian-73C*

Type: Anti-Tank Missile System
Maximum Range: m5,000
Basic Load: 2; one each on either side of the turret

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun
Manufacturer: Norinco
Type: 7.62mm Heavy Machine Gun
Length, Total: mm1,192
Length, Barrel: mm658
Diameter: INA
Action: Gas Operated
Rate of Fire: rds/min700-800
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR
Caliber: mm7.62x54
Muzzle Velocity: m/s840
Basic Load: Belts in 100/200/250 round boxes
Max Range: m100-1,500
Min Range: m100
Armor Penetration: INA

Commander's Weapon System

↳*System*

Name: QJZ-89 or Type 89
Type: 12.7mm Heavy Machine Gun
Manufacturer: NORINCO
Length, Total: mm2,119

Length, Barrel: mm1,003

Weight (Gun Only): kg17.5

Weight, (Tripod Only): kg8.5

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min400-600

Action: Gas/Recoil

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Basic Load: ea1,200

Max Effective Range: m1,600

Fire Control

Name: BMS System

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: Yes

3D Map of the OE: Yes, Standard

Satellite Navigation System: BeiDou Satellite

Battle Management System: Yes

Navigation System: BeiDou satellite navigation system,

Protection

Hull Armor Type: Hull is of aluminium base armour protected by composite appliqué armour.

Hull Armor: mm30

Sides and Rear Armor: mm14.5

Turret Armor: INA

Applique Armor: Yes

Explosive Reactive Armor: INA

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 8 Total, 4 on each side 76mm

Bow Blade: Yes

Belly Plate: Yes

Self-Sealing Fuel Tank: Yes, capable of stopping a 25 mm APFSDS round at 2,000 m.

Automatic Fire Suppression Device.: Yes

Notes:

The ZBD-05 also called VN-18 is an amphibious Infantry Fighting Vehicle (IFV) based on tracked armored using the chassis of the ZBD2000 family of tracked armored. The ZBD-05 uses the same chassis as the ZTD-05. The ZBD-05 has a crew of three, with the driver seated at front and the commander and gunner situated inside the 30mm cannon turret. The layout of the ZBD-05 or VN-18 consists of three main parts with the powerpack at the front, turret in the centre of the hull and troop's compartment at the rear. It has a crew of three including driver, commander and gunner and can accommodate up to ten fully equipped soldiers. The driver is seated on the left side at the front of the hull with the engine on its right. Commander and gunner are positioned inside in the turret. The troops can enter and leave the vehicle via a single door mounted at the rear of the hull that opens to the right. The hull and the turret of the ZTD-05 are of all-welded steel armour construction, which give protection against fire of small arms and shell splinters. The ZBD-05 or VN-18 is propelled by a strong-powered engine and can navigate at a high speed in water. The powerpack is mounted to the front of the vehicle. The vehicle can run at a maximum road speed of 65 km/h and 45km/h in the water. It has a maximum cruising range of 500 km and can negotiate a gradient of 60% and side slope of 30%. It can cross a vertical obstacle of 0.7 m and trench of 2 m. The ZTD-05 features a large flat, boat-like hull, with six double road wheels and three return rollers. The upper part of the suspension is can be protected with armor plates. The ZBD-05 or VN-18 is fully amphibious, in the water the vehicle is propelled by two large water jets mounted to the rear side of the hull. According to Chinese sources standard equipment includes satellite navigation systems, night vision, NRBC (Nuclear, Radiological, Biological and Chemical) protection system, fire control computer and laser range finder, all of these devices so that vehicles equipped with the sort of "ultra-horizon" environment daytime / night-time amphibious capability. The ZBD-2000 is a family of Chinese tracked amphibious assault vehicles. They are designed for beach assault missions and to accompany infantry as ground forces move inland. The vehicle resembles the (now cancelled) U.S. Expeditionary Fighting Vehicle (EFV).

Type 86 Chinese Amphibious Infantry Fighting Vehicle







Tiers:



Variants:

- **WZ-501:** Converted into an NBC reconnaissance vehicle with a raised troop compartment. Also converted into a battlefield surveillance vehicle.
- **YW-501:** Export variant of WZ-501.
- **NFV-1:** (N stands for NORINCO, F stands for FMC and V-1 stands for Vehicle 1) – An export variant which was the product of a co-operative project between the Chinese NORINCO and US FMC companies in the 1980s. Its goal was to fit a FMC large vertical slab-sided turret with a chamfered front called "Sharpshooter", onto a modified Type 86 hull. It was to be armed with a 25 mm M242 Bushmaster autocannon with a two plane stabilization system and a 7.62 mm M240 coaxial machine gun (on the left hand side of the main gun). The vehicle carries 344 rounds for the main gun, 200 rounds are for 'ready use' while 144 are kept in storage. 2,300 rounds are carried for the machine gun. The gun is moved in the horizontal and vertical planes by an electromechanical system, it can also be moved manually. The gun can be depressed or elevated between −7° and +44°. The gunner has the M36E3 dual mode day/night sight and 4 periscope vision blocks which are located in the front and on the sides of the turret. Also an additional periscope vision block can be fitted to the back of the turret. The tracks have been slightly modified. As the result of all these changes the weight of the vehicle increased to 13.6 tonnes and the maximum range was reduced to 460 km. The vehicle is also wider (2.97 m) and higher (2,248 m). The prototype was shown to the public for the first time in November 1986. It never left the prototype stage because the US government prohibited any further collaboration with China.
- **Type 86-I:** Improved variant of the Type 86 designed by the Chinese together with the US FMC company at the end of the 1980s. It is fitted with a one-man overhead mount turret armed with a licensed copy of the 25 mm M242 Bushmaster autocannon and a coaxial 7.62 mm Type 59 machine gun. The overhead mount turret is the same as the one on the ZSL92 wheeled IFV. The vehicle carries 400 rounds for the main gun and 2000 rounds for the machine gun. It is powered by a new 6V150F 29.41-litre diesel engine which is a powered-up version of the 6V150. It develops 400 hp (298 kW). Maximum road speed has increased to 70 km/h. The tracks have been slightly modified. The weight of the vehicle has increased to 13.6 tonnes. 350 were produced. Its industrial designation is WZ-501A. It is also called Type 86-1.
- **Type 86A:** Modernization fitted with a new turret armed with a 30 mm autocanon although the ATGM launcher for the HJ-73 ATGMs was retained and is positioned on the right hand side of the roof of the turret. The turret was equipped with two clusters of three smoke grenade launchers (one on each side of the turret). It is sometimes called the Type 86Gai, G stands for Gai – improved.
- **Type 86B:** Variant developed by NORINCO for Chinese naval infantry. It features a slightly higher hull, an amphibious kit, an exhaust extension, a bow extension, a larger trim vane, a mount for an outboard motor on the rear of the hull to improve its swimming performance, a raised engine air intake on the right hand side of the front of the hull, detachable pontoons in the front and rear of the hull, a high snorkel and large side screens for better streamlining. Also the turret was improved by adding two clusters of three smoke grenade launchers (one on each side of the turret). Its industrial

designation is WZ-501C.

- **WZ-502:** WZ-501 equipped with a mortar.
- **WZ-503:** WZ-501 converted into an APC. It lacks the turret and has a taller troop compartment. The number of passengers was increased from 8 to 13. The vehicle's armament consists of one centrally mounted 12.7 mm heavy machine gun operated by the commander/gunner. It did not leave the prototype stage.[3][23][29] WZ-506 – WZ-503 converted into an armored command post for the divisional or regimental commanders of armored formations. The personnel compartment can accommodate six staff members, four radios and an auxiliary electricity generator. It can be recognized by its four whip antennas.
- **WZ-504 (Type 504):** The troop compartment was replaced by a weapons compartment which incorporates an elevatable weapon station armed with four HJ-73 "Red Arrow 73" cable-guided ATGM rail launchers mounted under the roof of the weapons station and equipped with optical sights. The launcher can be retracted into the compartment when not in use. The vehicle carries 16 ATGMs. It never left the prototype stage.
- **WZ-505:** WZ-501 converted into an armored ambulance with raised troop compartment and armed with one machine gun.
- **Type 86G:** This variant is equipped with a 30-mm cannon turret and a HJ-73 ATGM launcher.
- **The Boragh:** In service with Iran

System

Alternative Designation: WZ-501, YW-501

Crew: 3

Passenger Capacity: 8

Dimensions

Length: m6.74

Width: m2.97

Height: m2.16

Weight, Combat: kg13,300

Weight, Empty: kg12,100

Automotive

Engine Name: UTD20

Engine Type: Water-cooled, V-6 diesel

Engine Power: 300 hp at 2,000 rpm

Cruising Range: 550-600 km

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/h7

Fording Depth: Amphibious

Obstacle, Vertical: m0.08

Obstacle, Trench: m2020

Gradient: %60

Side Slope: %30

Main Gun

↳***System***

Type: 73mm Gun

Max Rate of Fire: 8-10 rds/min

↳***Ammunition***

Type: HEAT

Caliber: mm73

Muzzle Velocity: m/s400

Basic Load: 40

Armor Penetration: 280-350 mm

Coaxial Weapon System

↳***System***

Name: Type 59T

Type: 7.62mm Machine Gun

Max Rate of Fire: 800rpm

↳***Ammunition***

Caliber: mm7.62

Muzzle Velocity: m/s8,547

Basic Load: 2,000

Effective Range: m460

ATGM

↳***System***

Name: Red Arrow HJ-73

Basic Load: 5 (one ready to fire, four at the ready for manual reload)

Maximum Range: m3,000

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: No

Range, Day Sight: INA

Range, Thermal Sight: INA

Protection

Hull Armor: 19mm

Turret Armor: 19-23 mm

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: No

Mine Clearing: Available

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes

Notes:

A Chinese copy of the BMP-1 (Ob'yekt 765Sp3). It is armed with an ATGM launcher for the HJ-73 "Red Arrow 73" ATGM which is a copy of the Soviet 9M14 "Malyutka". It is powered by the Type 6V150 diesel engine which is a copy of the Soviet UTD-20. Equipment includes the A-220A radio (a copy of the Soviet R-123M), A-221A intercom (a copy of the Soviet R-124), two 7.62 mm machine guns, a 40 mm rocket propelled grenade (RPG) launcher and a HN-5 or QW-1 MANPADS. Its industrial designation is WZ-501

BMP-1 Russian Amphibious Infantry Fighting Vehicle (IFV)






Tiers:



Variants:

- **BMP-1P:** The BMP-1P is an upgraded variant of the BMP-1 and weighed 13.4 tonnes. Protection capabilities in the BMP-1P and its sub variant BMP-1PG ('Granatomyot' - grenade launcher) were improved by fitting them with the 81 mm 902V "Tucha" smoke grenade launcher and an AGS-17 "Plamya" AGL respectively.
- **BMP-1 Ambulance (Iraq):** Evacuate wounded
- **BMP-1M:** Kliver turret & drop down gate
- **Type 86/WZ-501 (China):** Chinese BMP-1 IFV
- **BMP-1G ICV:** AT-4/AT-5 ATGM & 30-mm AGS-17 AGL
- **BMP-1 with Soviet modifications in Afghanistan:** Applique armor, AT-4 ATGM mount; some with AGS-17 30-mm AGL
- **BMP-IRM ("Zhuk"-Beetle):** Engineer recon vehicle with front mine claws; 1 MG only
- **BMP-1 with mine plow:** KMT-8 or KMT-10 mine-clearing plows attached
- **MP-31:** Modernized command vehicle
- **BMP-R (BMP M1976):** Recon vehicle with larger rear hatches & 2-man turret
- **BRM-1/BRM-1K Reconnaissance:** BMP-R with a GS-12 Tall Mike radar ILO AT-3 Sagger (see Chapter 1)
- **BREM-2:** Light recovery vehicle w/crane
- **BMP-40:** Larger turret; carries 6 soldiers, prototype model only
- **PRP-3/PRP-4 (Radar):** Artillery recon vehicle with 7.62 MG ILO 73-mm cannon
- **VP-90 (Czech Republic):** Recon with OT-64 turret; 14.5-mm & 7.62-mm MGs
- **SVO Mineclearer (Czech Republic):** Turretless BMP-1 with 24 245-mm explosive rockets
- **BMP-PP0:** Training variant w/o turret
- **Snezka (Czech Republic):** Battlefield surveillance vehicle
- **PRAM-S (Czech Republic):** SP 120-mm mortar carrier
- **BMP-1 Finnish variant:** East German vehicles with autoloaders removed
- **BMP-1 with Poyaud engine (Egypt):** 150 with replaced 10.47-liter Poyaud 6-cylinder engine
- **BMP-1 with applique armor (Iraq):** Armor added to resist 12.7-mm & 14.5-mm armor-piercing shells at 200 m
- **BMP-1A1 Ost:** In 1990, Germany created more space (6 passengers) & removed the automatic loader
- **BMP-1 with CERAWA armor (Poland):** CERAWA ERA on the glacis, hull, & turret front
- **OT-90 (Czech Republic):** OT-64 1-man turret with 14.5-mm & 7.62-mm machine guns
- **BPzV (Czech Republic):** Recon with Tall Mike radar
- **DP-90 (Czech Republic):** Recon with Tall Mike ra0T-90 maintenance variant adar
- **MU-90 (Czech Republic):** Turretless mine-laying OT-90
- **MLI-84 (Romania):** Larger & heavier w/ 12.7-mm machine gun
- **Pansarbandvgn 501 (Pbv 501 (Sweden):** East German vehicles to mechanized Swedish infantry

- **BREM-4 recovery vehicle:** No turret & crane (Czech version is the VPV)
- **BRM-23 (Bulgaria):** Recon with 23-mm cannon
- **82-mm SP Automatic mortar (Hungary):** Vasilyek mortar ILO troop compartment
- **BMP-1K / BMP-1KSh / BMP M1974 Command Vehicle:** This is the company command version of the BMP-1. It has additional communications equipment, an additional radio aerial on the right rear of the hull, a redesigned troop compartment to incorporate tables and a map board. The firing ports were eliminated. The BMP-1K has two roof hatches, each equipped with a roof-mounted TNPO-170A aiming device. The 73-mm gun is provided with 20 rounds of ready use ammunition, which is loaded manually. Two man-portable surface-to-air missiles are carried. The BMP-1K1 and K2 are equipped with two R-123M radios and a semi-telescopic antenna. The K3 features an R123M radio, R130M and a 33-ft (10-m) telescopic antenna. Another variant, the BMP-1KSh (not to be confused with the KShM) was a regimental and divisional command post vehicle. It was similar to the BMP-1K, except that it was unarmed, has a larger Hawk Eye radio antenna and carries more radio equipment (R-137, R-140M or R-145BM, each with four or five radios). A TNA-3 navigation system is fitted. The crew is provided with a portable 7.62-mm PK machine gun for self-defense. Ref: Military Periscope, April 2016

System

Alternative Designations: BMP Model 1970, Korshun

Manufacturer: Kurganmashzavod (Soviet Union)[

Description: IFV with exit doors in the rear with space for 8 soldiers; 4 firing ports on each side; 1 firing port in left rear door

Crew: ea3

Passengers: ea8

Driver's Station: The driver sits in the front on the left side of the hull. He has three TNPO-170 periscope vision-blocks to provide vision when his hatch is closed. The driver's center vision block can be replaced with a TVNO-2 active night binocular vision device for use in night and poor visibility conditions or with a TNPO-350B extended periscope when swimming with the trim vane erected. The BMP was the first Soviet armored vehicle to use a simple yoke steering system.

Commander's Station: The commander's station is located behind the driver's station and is provided with a removable OU-3GA2 or OU-3GK infrared searchlight with an effective range of about 400 metres (440 yd). A dual mode (day/night) TKN-3B 5x/4.2x magnification binocular vision device is coupled to the infrared searchlight. Two periscope vision blocks are also fitted with a heating and cleaning system. The commander's station is equipped with an R-123M radio set.

Turret: The BMP-1 has a conical turret equipped with a fume extraction system and an electric traverse drive with a manual backup system.[14] The main gun has a dead-zone over the commander's hatch (between the 10:00 and 11:00 o'clock positions), where the gun must be elevated over the infra-red searchlight to avoid crushing it. When the gun is facing backwards, it prevents hatches on top of the troop compartment from opening. The low profile of the turret makes it a difficult target. The same turret is used in the BMD-1.

Gunner's Station: The gunner's station is located to the left of the main gun. The gunner has a dual mode (day/night) 1PN22M1 6x/6.7x magnification image intensifying monocular periscope sight, four day-use periscope vision blocks, and an OU-3GK removable infrared or white-light searchlight. The 1PN22M1 sight has a maximum range of 400 metres (440 yd) at night, 900 metres (980 yd) with the use of the infra-red searchlight. The sight is marked stadiametric with the apparent size of a 2.7 metres (8.9 ft) tall tank at various ranges. The original sight was replaced with the 1PN22M2, which has an additional scale for the OG-15V HE-Frag rounds used by the Ob'yekt 765Sp3, produced from July 1974. The new sight has two day scales for the two projectiles – one from 200 to 1,600 metres (220 to 1,750 yd) and the other from 400 to 1,300 metres (440 to 1,420 yd).

Dimensions

Length: m6.74

Width: m2.94

Height: m2.15

Weight, Combat: tons13

Automotive

Engine Name: UTD-23 (Upgraded Engine)

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h45

Speed, Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Trench: m0.7

Vertical Step: m2.2

Fording Depth: mAmphibious

Fuel Capacity: liters462

Communications

Type: R-123M Radio

Radio Range: km16-55

Main Weapon System

↳*System*

Name: 2A28 Grom

Type: Smooth bore semi-automatic gun

Caliber: mm73

In Service: 1966 - Present

Manufacturer: KBP

Proliferation: INA

Weight: kg115

Length: mm1,195

Width: mm218

Height: mm322

Barrels: ea1

Maximum Elevation: deg+33

Minimum Elevation: deg-4

Traverse Range: deg40

Traverse Left: deg20

Traverse Right: deg20

Rate of Fire: rds/min8

Maximum Firing Range: m4,500

Sights: 1PN22M, 1PN22M2[

Loader Type: Autoloader

↳***Ammunition (Option 1)***

Name: PG-15V

Type: HEAT

Caliber: mm73

Muzzle Velocity: m/s665

Maximum Firing Range: m4,500

Shell Variants: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP)

Basic Load: ea40

Wire-Guided Anti-Tank Guided Missile (ATGM)

↳***9M14 Malyutka, MCLOS Wire-Guided Anti-Tank Guided Missile (ATGM)***

Type: Manual Command to Line of Sight (MCLOS) wire-guided anti-tank guided missile (ATGM)

Manufacturer: Soviet Union, Russia as successor state and other countries under license and domestic versions

In Service: 1963-present

Proliferation: Widely Proliferated, more than 100 countries operate this ATGM

Variants: 9M14M, 9M14P1, Malyutka-2, Malyutka-2F

Weight (9M14M): kg10.9

Weight (9M14P1): kg11.4

Weight (Malyutka-2): kg12.5

Weight (Malyutka-2F): kg12

Launcher and Guidance System Weight: kg30.5

Length: mm860

Width: mm393

Diameter: mm125

Effective Firing Range: m500-3,000

Warhead Weight (9M14M, 9M14P1): kg2.6

Warhead Weight (Malyutka-2, Malyutka-2F): kg3.5

Speed (9M14M, 9M14P1): m/s115

Speed (Malyutka-2, Malyutka-2F): m/s130

Guidance system: MCLOS, SACLOS

Armor Penetration: 200mm at 60 degs

Steering: Manual via a joystick controler

Missle Load Time: sec50

Basic Load: ea4

Launcher Type: 9S415 launch rail

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea950

Accuracy of fire at 300 meters: mm90

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes, TKN-3B day night sight with variable magnification

Thermal Gunner: Yes, TVNE-1PA active IR night vision metascope

Main Gun Stabilization: No

Gyrocompass: Yes, GPK-59 electrical gyrocompass

Firing Ports: ea4

Day Periscopes: ea4

Search Light: OU-3GK IR search light

Search Light Range: m400

Protection

Armor (turret front): mm19-23

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: GO-27 radioactive and chemical agent detector

Chemical Decontamination Kits: TDP chemical decontamination kits

Smoke Equipment: VEESS

Survivability Equipment: INA

Grenade Launcher: Yes, RPG-7 light grenade launcher with grenades

Scavenger System: Yes

Mine Plough: Yes, KMT-10 plough-type mine-clearing system

Notes:

The BMP-1 is a Soviet amphibious tracked infantry fighting vehicle. BMP stands for Boyevaya Mashina Pekhoty 1 (Russian: Боевая Машина Пехоты 1; БМП-1), meaning "infantry fighting vehicle". The BMP-1 was the first mass-produced infantry fighting vehicle (IFV) of the Soviet Union. It was called the M-1967, BMP and BMP-76PB by NATO before its correct designation was known. The Soviet military leadership saw any future wars as being conducted with nuclear, chemical and biological weapons and a new design, like the BMP, combining the properties of an armored personnel carrier (APC) and a light tank would allow infantry to operate from the relative safety of its armored, radiation-shielded interior in contaminated areas and to fight alongside it in uncontaminated areas. It would increase infantry squad mobility, provide fire support to them, and also be able to fight alongside main battle tanks. The BMP-1 was first tested in combat in the 1973 Yom Kippur War, where it was used by Egyptian and Syrian forces. Based on lessons learned from this conflict, and early experiences in the Soviet–Afghan War, a version with improved fighting qualities was developed, called the BMP-2. It was accepted into service in August 1980. In 1987, the BMP-3, a radically redesigned vehicle with a completely new weapon system, entered service in limited numbers with the Soviet Army. The BMP-1 is a fully amphibious tracked vehicle, with a front-engined chassis developed especially for it, a welded steel hull with a sharp, sloping front with a conspicuously ridged surface, a centrally located, flat, truncated cone turret and a troop compartment at the rear. The driver sits in the front on the left side of the hull. He has three TNPO-170 periscope vision-blocks to provide vision when his hatch is closed. The driver's center vision block can be replaced with a TVNO-2 active night binocular vision device for use in night and poor visibility conditions or with a TNPO-350B extended periscope when swimming with the trim vane erected. The BMP was the first Soviet armored vehicle to use a simple yoke steering system. The commander's station is located behind the driver's station and is provided with a removable OU-3GA2 or OU-3GK infrared searchlight with an effective range of about 400 metres (440 yd). A dual mode (day/night) TKN-3B 5x/4.2x magnification binocular vision device is coupled to the infrared searchlight. Two periscope vision blocks are also fitted with a heating and cleaning system. The commander's station is equipped with an R-123M radio set. The BMP-1 has a conical turret equipped with a fume extraction system and an electric traverse drive with a manual backup system. The main gun has a dead-zone over the commander's hatch (between the 10:00 and 11:00 o'clock positions), where the gun must be elevated over the infra-red

searchlight to avoid crushing it. When the gun is facing backwards, it prevents hatches on top of the troop compartment from opening. The low profile of the turret makes it a difficult target. The same turret is used in the BMD-1. The gunner's station is located to the left of the main gun. The gunner has a dual mode (day/night) 1PN22M1 6x/6.7x magnification image intensifying monocular periscope sight, four day-use periscope vision blocks, and an OU-3GK removable infrared or white-light searchlight. The 1PN22M1 sight has a maximum range of 400 metres (440 yd) at night, 900 metres (980 yd) with the use of the infra-red searchlight. The sight is marked stadiametric with the apparent size of a 2.7 metres (8.9 ft) tall tank at various ranges. The original sight was replaced with the 1PN22M2, which has an additional scale for the OG-15V HE-Frag rounds used by the Ob'yekt 765Sp3, produced from July 1974. The new sight has two day scales for the two projectiles – one from 200 to 1,600 metres (220 to 1,750 yd) and the other from 400 to 1,300 metres (440 to 1,420 yd).

ZBD-08 (WZ502G) Chinese Infantry Fighting Vehicle (IFV)







Tiers:

1 **2** 3 4

Variants:

- **Note:** There are several variants. One is fitted with a similar turret to the ZBD-04 with a new external design. An armored personnel carrier fitted with a cupola-mounted 12.7-mm machine gun has also been identified. Another variant features a turret-mounted 120-mm mortar with direct- and indirect-fire modes. That turret appears to be the same as that fitted to the PLL-05 6 x 6 self-propelled mortar already in Chinese service. There are said to be command, missile carrier, short-range air defense, artillery radar carrier and cargo vehicle variants. A shortened version with five road wheels has also been reported.

System

Alternative Designation: ZBD-08; WZ502G

Type: Infantry Fighting Vehicle

Family: ZBD

Crew: ea3

Passenger Capacity: ea7

Dimensions

Length: m7.2

Width: m3.2

Height: m2.5

Weight, Combat: 25 tons

Ground Pressure: INA

Automotive

Engine Name: BF8M1015CP

Engine Type: Diesel

Engine Power: hp590

Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: km/h7

Gradient: %60

Side Slope: %40

Vertical Step: m0.7

Trench: m1.8

Fording Depth: Amphibious

Note: It lacks waterjets, however on water it is propelled by its tracks. It can still ford lakes and inland rivers, but it no longer capable to operate at sea.

Main Gun

↳*System*

Name: INA

Type: 100mm Rifled Gun

Caliber: 100mm

Length: INA

Diameter: INA

Weight: INA

Effective Range: km4

Autoloader: Yes

Rate of Fire: 10 rounds per minute.

Note: This gun can fire both ordinary projectiles and anti-tank guided missiles.

↳*Ammunition*

Type: HE-FRAG

Caliber: mm100

Basic Load: 30

Note: The ZBD-08 carries 22 ordinary HE-FRAG rounds and 8 anti-tank guided missiles.

Coaxial Weapon System

↳*System*

Name: Type 53 (SG43)

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Manufacturer: People's Republic of China

Proliferation: Widely Proliferated

Length: 1,150 mm

Barrel Length: 720 mm

Weight: 13.8 kg (30.42 lb) gun body 41 kg (90.39 lb) on wheeled mount

Action: Gas-operated

Rate of Fire: 500–700 rounds/min

Muzzle Velocity: 800 m/s

Effective Firing Range: 1100 m

Maximum Firing Range: 1,500 meters

Feed System: 200 or 250 round belts

Sights: Iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 1,000 rds

Auxiliary Weapon System

↳*System*

Name: Nudelman-Rikhter NR-30

Type: Autocannon

Caliber: 30

Manufacturer: Russia

Proliferation: Soviet Union Russian Federation China

Length: 2,153 mm

Barrel Length: 1,600 mm

Width: 181 mm

Height: 186 mm

Weight: 66 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 850–1,000 rpm

Muzzle Velocity: 780 m/s

↳***Ammunition***

Type: Projectile

Caliber: mm30

Cartridge: 30x155mm

Projectile Weight: 410 grams (14½ oz), 840 g (1 lb 13½ oz) complete

Launch Charge: 95 g to 99 g of 6/7fl VBP smokeless powder

Types of Ammunition: HEI, AP, TP, Chaff dispensers

Basic Load: 500

Anti-Tank Guided Missile (ATGM)

Note: This gun can fire both ordinary projectiles and anti-tank guided missiles. It is compatible with Chinese indigenously designed ATGMs, derived from the Soviet AT-10 Stabber, are capable of penetrating up to 600 mm of armor behind ERA blocks and pose serious threat to main battle tanks. It is claimed that hit probability of the missile is at least 80%.

Basic Load: 8

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Protection

Hull Armor: Welded steel armor hull. It is claimed that front arc withstands 30 mm armor-piercing rounds. Sides withstand 14.5 mm rounds.

Turret Armor: Welded steel armor hull. Turret roof and rear end provide protection from 7.62 mm armor-piercing rounds.

Applique Armor: Yes, Add-on modular armor can be fitted for a higher level of protection.

Explosive Reactive Armor: INA

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: 6 x Smoke Grenades

Notes:

The ZBD-08 is a new Chinese infantry fighting vehicle. Its industrial designation is the WZ502G. It is a revised and improved version of the previous ZBD-04, which is already in service with the PLA. The new improved vehicle appeared in 2007. It seems that the ZBD-08 IFV, together with its numerous variants, is being produced in large numbers for the Chinese army. It is replaces the Type 86 IFV, which is a copy of the Soviet BMP-1. The new ZBD-08 has a number of improvements. Its hull was

slightly redesigned in order to improve armor protection at a cost of reduced amphibious capabilities. The previous ZBD-04 IFV has great amphibious capability and can operate at Sea State 2-3. However this feature is not required by typical army units. Overall height of the vehicle was reduced. Also the new vehicle is heavier due to increased armor. The ZBD-08 infantry fighting vehicle has a welded steel armor hull. Baseline armor is thicker and presumably offers better protection. Add-on modular armor can be fitted for a higher level of protection. It is claimed that front arc withstands 30 mm armor-piercing rounds. Sides withstand 14.5 mm rounds. Turret roof and rear end provide protection from 7.62 mm armor-piercing rounds. Side skirts were added for improved protection. Also it may be fitted with indigenous active laser protection system.

BMP-2 Russian Amphibious Infantry Fighting Vehicle (IFV)







Tiers:

1 2 **3** 4

Variants:

- **BMP-2 obr.:** Improved version with "kovriki" armour on turret front
- **BMP-2 obr. 1986:** Late-production model with new BPK-2-42 sight instead of the BPK-1-42.
- **BMP-2D:** Fitted with additional spaced type steel appliqué armour on the hull sides, under the driver's and commander's stations, and 6 mm thick appliqué armour on the turret.
- **BMP-2K:** Command variant fitted with two whip antennas mounted on the rear of the hull, one behind the turret and one on the right-hand side of the rear of the vehicle, one IFF antenna (pin stick) on the left-hand side of the rear of the vehicle and a support for a telescopic mast in the front of the IFF antenna
- **BMP-2M:** This is the general designator for upgraded (modernizirovannyj) versions
- **BMP-2M "Berezhok":** Modernized version from KBP. This version has B05Ya01 Berezhok turret equipped with 2A42 30mm autocannon, PKMT 7.62mm coaxial machine gun, AGS-30 grenade launcher, 2+2 launchers for ATGM 9M133M "Kornet-M" and new day/night sights as found on the BMD-4.
- **BMO-1:** Transport vehicle for a flamethrower squad armed with 30 RPO-A "Shmel" 93 mm napalm rocket launchers.
- **BVP-2V or VR 1p:** Former Czechoslovakia version
- **VPV:** equipped with a powered crane with 5 tonnes capacity, heavy winch, wider troop compartment etc. Hatches on top of the turret and the troop compartment were removed.
- **BMP-2 "Sarath":** also known as BMP-II – Indian licence-produced variant of the BMP-2,built by Ordnance Factory Medak. The first vehicle, assembled from components supplied by KBP, was ready in 1987.
- **BMP-2 Light Tank:** India Version, DRDO developed light tank on BMP-2 Chassis DRDO light tank.
- **BMP-2 UGV "Muntra" – unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and:** India Version. unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and chemical contamination while the "M" version is designed to detect mines.
- **BMP-2MD:** Finnish modernisation of the BMP-2, which includes thermal camouflage, thermal sights, anti-aircraft sight and new day/night optics for the gunner and commander, heated cabin and seats, new external storage boxes functioning also as spaced armour and new radio and communications systems

System

Alternative Designation: BMP-2
Type: Amphibious Infantry Fighting Vehicle (IFV)
Family: BMP-2

Manufacturer: mKurganmashzavod

Crew: ea3

Passenger Capacity: ea7

Dimensions

Length: m6.72

Width: m3.15

Height: m2.45

Weight, Combat: tons14.3

Ground Pressure: kg/m0.63

Automotive

Engine Name: UTD-20S1

Engine Type: Diesel

Engine Power: hp300

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Off Road: km/h45

Speed, Average Cross: 35

Speed Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2.5

Fording Depth: mAmphibious

Note: initial production BMP-2 is partially amphibious, and propelled in water by its tracks

Communications

Primary: R-123M transceiver

Secondary: R-173

Main Gun

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

Firing Modes: automatic and semi-automatic

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartidge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: ea500 total of any combination 30mm projectile

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,260

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,120

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M113 Konkurs (AT-5 Spandrel)
Type: Soviet SACLOS wire-guided anti-tank missile.
Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod
In Service: 1974-Present
Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version
Variants: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1
Basic Load: ea4
Weight (Missile): kg14.6
Weight (9P135 Launching Post): kg22.5
Length: mm1,150
Diameter: mm135
Warhead Weight: kg2.7
Detonation Mechanism: Contact
Engine: Solid-fuel rocket
Wingspan: mm468
Maximum Operational Range: km4
Minimum Operational Range: m70
Speed: m/s208
Guidance System: Wire-guided SACLOS
Steering system: Two control surfaces
Launch platform: Individual, vehicle
Penetration: 600mm of RHA

Fire Control

Name: INA
Computerized FCS: Yes
Commander Periscopes: two TNPO-170A periscopes, plus a single TKN-3B binocular rear-view prism. Additionally, the Commander has a 1PZ-3 day monocular sight
Thermal Sight Gunner: BPK-1-42 Sight

Driver's Central Day Periscope: TNP-350B

Main Gun Stabilization: Yes, two-plane stabilisation system designated as 2E36-1

Searchlight: OU-3GA2 searchlight and the FG-126 searchlight

Protection

Hull Armor: All-welded steel that is believed to be between 5 and 19 mm thick

Turret Armor: mm23-33

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: KMT-8 mine plow available

Self-Entrenching Blade: INA

NBC Protection: Collective, GO-27 Radioactive and chemical agent detector

Smoke Equipment: 6 smoke grenade launchers, VEESS

Smoke Screen: TDA System using engine

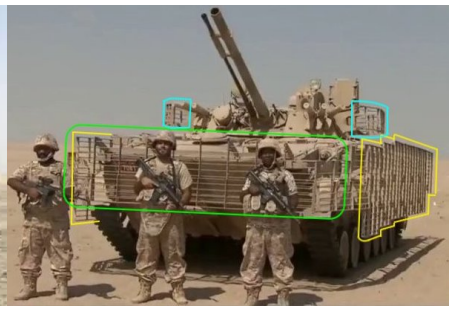
Notes:

The BMP-2 [BMP = Boyevaya Mashina Pyekhota - Infantry Fighting Vehicle] infantry combat vehicle, fielded in the early 1980's [initially designated BMP 1981], is an improved version of the BMP-1 incorporating major armament changes. The new two-man turret mounts a 30-mm automatic gun with a long thin tube and double-baffle muzzle brake that can be used against aircraft and helicopters. The ATGM launcher on top of the turret can employ either AT-4 SPIGOT or AT-5 SPANDREL missiles, though the AT-5 Spandrel canister is normally mounted. Given the enlarged turret, there are two roof hatches in the rear fighting compartment, rather than the four of the BMP-1, and the the BMP-2 accommodates one less passenger. Each side of the troop compartment has three firing ports with associated roof-mounted periscopes.The BMP-2 is the base IFV of the family, it is designed to support MBTs during an assault and is expected to engage vehicles that are in a similar category to itself. In the centre of the vehicle is the welded steel turret, which seats the commander and gunner, both of whom have hatches. The commander sits to the right and has three day-vision periscopes, a 1PZ-3 day-sight designed for anti-aircraft use with 1×, 2× and 4× magnification, an OU-3GA2 infra-red searchlight, a TNP-165A designator and a TKN-3B binocular sight with 4.75× day magnification and 4× night-sight magnification. The gunner sits to the commander's left and has a smaller rectangular hatch with a rearward-facing day periscope, additionally, there are three other day periscopes facing forward and left. The gunner has a BPK-1-42 binocular sight with a moon/starlight vision range of 650 metres, or 350 metres using the infra-red searchlight, and a TNPT-1 designator. An FG-126 infra-red searchlight is mounted coaxially to the 30 mm cannon. The driver sits in the front left of the vehicle, with the engine in a separate compartment to his right. The driver has his own entry hatch above him, with three day-periscopes. The centre TNPO-170A periscope can be replaced with either a TNPO-350B extended periscope for amphibious operation or a TVNE-1PA night vision scope. An infantryman sits immediately behind the driver, and has a firing port and vision block. TNPO-170A periscopes are used throughout the vehicle and are electrically heated. In the BMP-1 and BMP-2 ammunition is stored near or even inside the compartment, which can lead to a catastrophic failure in case of a hull breach. The BMP-1 and BMP-2 share the same chassis and have almost identical road performance. The BMP-2 is heavier, but also has a more powerful engine to compensate. The BMP-2 is amphibious with little preparation, using hydrodynamic fairings to convert track momentum into water jets. Peacetime regulations require that any BMPs entering water must have a working radio set, since its bearings are not airtight and it can be carried away by currents in case of loss of engine power (the vehicle lacks an anchor). The main armament is a turret with a stabilized 30 mm 2A42 autocannon with dual ammunition feeds, which provide a choice of 3UBR6 AP-T and 3UOR6 HE-T / 3UOF8 HE-I ammunition and 9M113 Konkurs ATGM. The gun has a selectable rate of fire, either slow at 200 to 300 rounds per minute or fast at 550 rounds per minute. The original stabilization provides reasonable accuracy up to a speed of about 35 kilometres per hour. The AP-T ammunition can penetrate 15 millimetres of armour at sixty degrees at 1,500 metres, while a new APDS-T tungsten round can penetrate 25 millimetres at the same distance. A typical ammunition load is 160 rounds of AP ammunition and 340 rounds of HE ammunition. The ammunition sits in two trays located on the turret floor rear. The gun can be fired from either the commander's or the gunner's station. The commander's 1PZ-3 sight is specifically designed for anti-aircraft operation and combined with the high maximum elevation of 74 degrees, it allows the 30 mm cannon to be used effectively against helicopters and slow flying aircraft. The turret traverse and elevation are powered and it can traverse 360 degrees in 10.28 seconds and elevate through 74 degrees in 12.33 seconds. Reloading the BMP-2's 30 mm cannon can be somewhat problematic and can take up to two hours, even if the ammunition is prepared.

Additionally, the cannon is normally only used on the slow rate of fire, otherwise, fumes from the weapon would build up in the turret faster than the extractor fan can remove them. The effective range of the 30 mm cannon is up to 1,500 metres against armour, 4,000 metres against ground targets, and 2,500 metres against air targets. A coaxial 7.62 mm PKT machine gun is mounted to the left of the 30 mm cannon, and 2,000 rounds of ammunition are carried for it. On the roof of the turret is an ATGM launcher, on Russian vehicles this fires AT-5 Spandrel missiles, but on export models, it normally fires AT-4 Spigot missiles. A ground-mount for the missile is also carried, allowing it to be used away from the vehicle. The missiles are a substantial improvement on the AT-3 Sagger missiles used on the BMP-1, in both range and accuracy. Behind the turret is the troop compartment that holds six troops, the seventh sits just behind the driver. The troops sit back to back, along the centre of the vehicle. Down each side of the compartment are three firing ports with periscopes. Access to the compartment is by the two rear doors, which also hold fuel tanks, both doors have integral periscopes and the left door has a firing port. In addition to the main weapons, it can carry a man-portable surface-to-air missile launcher and two missiles, and an RPG launcher and five rounds. The vehicle is fitted with a PAZ overpressure NBC system and fire suppression system, and carries a GPK-59 gyrocompass.

BMP-3 UAE Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3M Ataka:** BMP-3M version with a two men turret armed with 30 mm 2A72 autocannon, and 9M120-1 Ataka ATGM
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3K:** Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BT-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
- **BRM-3K "Rys" (Ob.501):** Surveillance and reconnaissance variant with 1PN71 thermal sight (3.7x/11x, 3 km range), 1PN61 active-pulse night vision device (3 km range), 1RL-133-1 ("TALL MIKE") I-band surveillance radar (3 km man, 12 km vehicle), 1V520 computer and a TNA-4-6 navigation system. The armament consists of the stabilized 30 mm autocannon 2A72 (600 rounds) and a coaxial 7.62 mm machine gun (2,000 rounds) or AU-220M Baikal remote weapon station with 57 mm BM-57 autocannon and 7.62mm PKMT machine gun.
- **BMP-3 Dragoon:** New IFV version with an unmanned turret which can be armed with a variety of combat modules, including standard BMP-3's Bakhcha-U turret with a 2A70 100 mm cannon, a 2A72 30 mm autocannon and a PKTM 7.62 mm machine gun, the AU-220M Baikal remote weapon station module with a 57 mm BM-57 gun and a module with a 125 mm 2A82-1M tank gun, the new 816 h.p.
- **BREM-L "Beglianka" (Ob.691):** Armoured recovery vehicle with five-tonne crane and 20/40 metric tonne capacity winch.
- **BMP-3 "Khrizantema-S":** Self-propelled anti-tank version with 9M123 Khrizantema (AT-15) ATGM system with radar and laser guidance. The 9P157-2 carries two 9M123 missiles on launch rails, which are extended from a stowed position; the radar is also stowed during transit. The missiles are re-loaded automatically from an internal magazine with 15 rounds (missiles are stored and transported in sealed canisters) and can also accept munitions manually loaded from outside the vehicle.
- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).
- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype,

further development led to the 2S31 Vena.

- **DZM "Vostorg-2":** Combat engineer vehicle with a dozer blade and excavating bucket. Prototype.
- **UR-07:** Mine clearing system. The UR-07 might replace the UR-77 "Meteorit". It has the same chassis as the BMP-3 but a bigger steel hull with two launch ramps in the rear. The ramps are used to fire rockets towing hose-type mine-clearing line charges to clear mine fields.
- **UNSh (Ob.699):** Basic chassis for specialised variants.
- **Hermes or TKB-841:** Air-defence vehicle with high-velocity missiles and radar system. Prototype.[68] 2S31 Vena – Self-propelled mortar carrier equipped with a 120 mm mortar based on BMP-3 chassis. It entered production in 1996 and service in 2010.
- **2S38 ZAK-57 Derivatsiya-PVO:** Self-propelled air defense vehicle based on BMP-3 chassis fitted with a 57 mm autocannon and passive reconnaissance and target tracking equipment.[72] It is designed to shoot down unmanned aerial vehicles (UAVs), cruise missiles, air-to-surface missiles, aircraft, helicopters, and MLRS rockets.
- **UDAR UGV:** Unmanned ground vehicle based on the tracked chassis of the BMP-3 with the center hull raised to fit the DUBM-30 Epoch armed with 2A42 autocannon, 7.62mm PKMT machine gun, and Kornet-M ATGM.
- **Vikhr UGV:** Unmanned ground vehicle based on BMD-3 equipped with a smaller turret armed with 2A72 autocannon, 7.62mm coaxial machine gun and six anti-tank guided missiles 9M133M Kornet-M, three on each side of the turret.
- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.

System

Alternative Designation: BMP-3 UAE Version

Manufacturer: Kurganmashzavod

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: BMP-3

Crew: ea3

Passenger Capacity: ea7

Fighting Module: 2K23 Fighting Module

Note: KBM-3M2 air-conditioning system, which allows the BMP-3 UAE to operate in the desert

Dimensions

Length (Hull): m7.2

Width: m3.23

Height: m2.45

Weight, Combat: tons18.7

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: 10 cylinder, 4 stroke, v-shaped, water colled diesel

Engine Power: hp500

Cruising Range: km600

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Communications

Primary Radio: R-173

Secondary Radio: R-173P

Main Gun

Note: The complete weapon system of the BMP-3 infantry combat vehicle is known as the 2K23 and consists of the 100 mm gun 2A70 with a 30 mm 2A72 automatic cannon (see later in this section) mounted coaxially to the right and a 7.62 mm PKT coaxial machine gun.

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min8-10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: m5,000

Maximum Effective Range (Day): m4,000

Maximum Effective Range (Night): mINA

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

↳*Ammunition*

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Muzzle Velocity: m/s330

Basic Load: ea40 Total Rounds of any 100mm Russian Projectile

Warhead Type: HEAT

Cartridge: 3UBK23-3 cartridge

Soft Launch: Yes

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

In Service: 1983-present

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea8

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Coaxial Weapon System

↳*System*

Name: 2A72 (ZPT99)

Type: 30mm Automatic Cannon

Caliber: 30mm

Proliferation: Widely Proliferated

In Service: 1980s-Present

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Commander and Driver's Weapons System

Note: The BMP-3 is equipped with a total of two 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: 1K13-2

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Athos thermal optic Sight

Thermal Sight Gunner: Athos thermal optic Sight

Gunner Day Sights: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

Sighting System: Namut sighting system

CCIR TV: standard 625-line CCIR TV output

Protection

Armor Type: welded of aluminum alloy armor

Hull Armor (Front): protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes, a dozer blade

NBC Protection: Yes, Collective

Smoke Equipment: 6 VEESS

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Air-Conditioning System: KBM-3M2 Air-Conditioning System

Air-Conditioning System operating timeline: hours8

Air-Conditioning System Temperature Sets: maintains temperatures inside the vehicle between 25°C and 29°C.

Unditching Beam: Yes

Notes:

The BMP-3s deployed by the UAE are fitted with improved cooling systems that allow the vehicles to operate in the country's harsh climate. The standard BMP-3 is incapable of operating in any weather that is warmer than the average European heat wave (35-40°C). Despite this, the vehicle competed against the M2 Bradley and Warrior IFV during the UAE tender, and was successful nonetheless. The BMP-3 is a Soviet and Russian infantry fighting vehicle, successor to the BMP-1 and BMP-2. The abbreviation BMP stands for boevaya mashina pehoty (боевая машина пехоты, literally "infantry combat vehicle"). The BMP-3 is one of the most heavily armed infantry combat vehicles in service, original version of BMP-3 has a turret fitted with a low-velocity 2A70 100 mm rifled gun, which can fire conventional shells or 9M117 Bastion ATGMs (AT-10 Stabber). 40 100mm-rounds and 8 ATGMs are carried. A 2A72 30 mm dual feed autocannon with 500 (300 HEI and 200 APT) rounds and a rate of fire of 350 to 400 RPM, and a 7.62mm PKT machine gun with 2,000 rounds, all mounted coaxially in the turret. The main gun elevates from −5° to +60°. There are also two 7.62mm PKT bow machine guns, again with 2,000 rounds each. The BMP-3 is capable of engaging targets out to 5,000–6,000 meters with its ATGM weapon system 9K116-3 "Basnya". With conventional ammunition, such as the HE-Frag shell 3OF32, the 2A70 gun has a range of 4,000 meters. According to the manufacturer's web-site, all weapons can be fired from the halt, on the move, and afloat with the same effectiveness. The ability to hit targets

on the move with missiles was successfully demonstrated during competitive evaluations in the UAE in 1991. The turret is fitted with the 2K23 system, which consists of an autoloader with 22 rounds (the remaining 18 rounds are stored in the hull), a 1V539 ballistic computer, a cross-wind sensor, a 2E52-2 stabilising system, a 1D16-3 laser range finder, a 1K13-2 gunner's sight/guidance device, a PPB-1 gunner's sight and an OU-5-1 IR searchlight. Optional autoloader for ATGM missiles is also available. The commander has a combined optical sight 1PZ-10, a day/night vision device TKN-3MB and an IR searchlight OU-3GA2.[6] Since 2005, the BMP-3 can be fitted with a new fire control system from the "Peleng" Joint Stock Company from Belarus. This consists of a SOZH-M gunner's main sight with an integrated laser range-finder and missile-guidance channel, a Vesna-K targeting system with thermal imaging camera and automatic target tracker AST-B, an armament stabilisation system, a ballistic computer with data input sensors and a PL-1 IR laser projector.Since 2017, the BMP-3 is fitted with a new fire control system from the "Vologda Optical-Mechanical Plant" from Russia. This consists of a Sodema two-plane stabilized gunner's main sight with an integrated laser range-finder and missile-guidance channel plus a SOZH-M thermal imaging camera. Standard equipment includes five firing ports with associated vision blocks, an R-173 transceiver, an R-173P receiver, a GO-27 radiation and chemical agent detector, an FVU filtration system, an automatic fire extinguisher and six 902V "Tucha-2" 81 mm smoke grenade launchers. BMP-3M is equipped with Bakhcha-U turret, which has similar weapons to the original BMP-3 turret but with a new dual-channel FLIR gunner's sight, commander's panoramic thermal imaging device, vertical-storage conveyor, new autoloader, and a new sighting system. It also has a stronger armor on the turret, and two-axis stabilisation. The turret of the BMP-3 has been fitted to the Patria Armoured Modular Vehicle and on the Turkish-UAE RABDAN 8x8 IFV. In August 2017, a BMP-3M was presented with a new ATGM remote weapon station fitted on the standard turret carrying two 9M120 Ataka (AT-9 Spiral-2) missiles. In June 2018, the Russian Defense Ministry announced that BMP-3s would be fitted with the AU-220M combat module equipped with a 57 mm cannon. The module can carry 80 rounds and fire 80 rounds per minute including air burst, high-explosive, fragmentation, armor-piercing and guided munitions with a maximum range of 14.5 km (9.0 mi), and can even punch through side armor of main battle tanks.

BMP-3K Russian Amphibious Infantry Fighting Vehicle (IFV)




Tiers:



Parent:

BMP-3 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3M Ataka:** BMP-3M version with a two men turret armed with 30 mm 2A72 autocannon, and 9M120-1 Ataka ATGM
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BT-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
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- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank

destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).

- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype, further development led to the 2S31 Vena.
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- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.

System

Alternative Designation: NA

Manufacturer: Kurganmashzavod

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: BMP-3

Crew: ea3

Passenger Capacity: ea3

Fighting Module: 2K23 Fighting Module

Navigation Unit: TNA-4-6 Navigation Unit

Dimensions

Length (Hull): m7.2

Width: m3.23

Height: m2.45

Weight, Combat: tons18.7

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: 10 cylinder, 4 stroke, v-shaped, water colled diesel

Engine Power: hp500

Cruising Range: km600

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Portable Power Unit: Yes, the AB-R28

Communications

Primary Radio: R-173

Secondary Radio: R-173P

R-173P Radio Effective Range: km20-40

Intercom: Yes

Main Gun

Note: The complete weapon system of the BMP-3 infantry combat vehicle is known as the 2K23 and consists of the 100 mm gun 2A70 with a 30 mm 2A72 automatic cannon (see later in this section) mounted coaxially to the right and a 7.62 mm PKT coaxial machine gun.

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min8-10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: m5,000

Maximum Effective Range (Day): m4,000

Maximum Effective Range (Night): mINA

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

Air Burst Round Detonation System: Yes, the "AINET"Air Burst Round Detonation System

↳*Ammunition*

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Muzzle Velocity: m/s330

Basic Load: ea40 Total Rounds of any 100mm Russian Projectile

Warhead Type: HEAT

Cartridge: 3UBK23-3 cartridge

Soft Launch: Yes

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

In Service: 1983-present

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea3 (the BMP-3K can only carry 3 ATGM's compared to the BMP-3,which can carry 8 ATGMs due to the C2 equipment.

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Coaxial Weapon System

↳*System*

Name: 2A72, 30mm Automatic Cannon

Type: mm30

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact,

and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Commander and Driver's Weapons System

Note: The BMP-3 is equipped with a total of two 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: 1K13-2

Computerized FCS: Yes

Thermal Sight Vehicle Commander: optical sight 1PZ-10, a day/night vision device TKN-3MB

Thermal Sight Gunner: 1K13-2 II night channel, 5.5x

Gunner Day Sights: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

PAB-2M Magnetic Aiming Circle: Equipped

Protection

Armor Type: welded of aluminum alloy armor

Hull Armor (Front): protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, Collective

Smoke Equipment: 6 VEESS

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Notes:

Command vehicle BMP-3K is a BMP-3 based one intended to control a subunit, to communicate with the major unit commander and to carry on combined tactical operations with the subunit as well. BMP-3K is equipped with navigation devices, two radio sets, receiver, intercom for seven users, portable power unit, At customer's request the BMP-3K armament system may be additionally equipped with SAT thermal imager sight. Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3

BMP-2K Russian Amphibious Infantry Fighting Vehicle (IFV)



Tiers:



Parent:

BMP-2 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-2 obr.:** Improved version with "kovriki" armour on turret front
- **BMP-2 obr. 1986:** Late-production model with new BPK-2-42 sight instead of the BPK-1-42.
- **BMP-2D:** Fitted with additional spaced type steel appliqué armour on the hull sides, under the driver's and commander's stations, and 6 mm thick appliqué armour on the turret.
- **BMP-2K:** Command variant fitted with two whip antennas mounted on the rear of the hull, one behind the turret and one on the right-hand side of the rear of the vehicle, one IFF antenna (pin stick) on the left-hand side of the rear of the vehicle and a support for a telescopic mast in the front of the IFF antenna
- **BMP-2M:** This is the general designator for upgraded (modernizirovannyj) versions
- **BMP-2M "Berezhok":** Modernized version from KBP. This version has B05Ya01 Berezhok turret equipped with 2A42 30mm autocannon, PKMT 7.62mm coaxial machine gun, AGS-30 grenade launcher, 2+2 launchers for ATGM 9M133M "Kornet-M" and new day/night sights as found on the BMD-4.
- **BMO-1:** Transport vehicle for a flamethrower squad armed with 30 RPO-A "Shmel" 93 mm napalm rocket launchers.
- **BVP-2V or VR 1p:** Former Czechoslovakia version
- **VPV:** equipped with a powered crane with 5 tonnes capacity, heavy winch, wider troop compartment etc. Hatches on top of the turret and the troop compartment were removed.
- **BMP-2 "Sarath":** also known as BMP-II – Indian licence-produced variant of the BMP-2,built by Ordnance Factory Medak. The first vehicle, assembled from components supplied by KBP, was ready in 1987.
- **BMP-2 Light Tank:** India Version, DRDO developed light tank on BMP-2 Chassis DRDO light tank.
- **BMP-2 UGV "Muntra" – unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and:** India Version. unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and chemical contamination while the "M" version is designed to detect mines.
- **BMP-2MD:** Finnish modernisation of the BMP-2, which includes thermal camouflage, thermal sights, anti-aircraft sight and new day/night optics for the gunner and commander, heated cabin and seats, new external storage boxes functioning also as spaced armour and new radio and communications systems

System

Alternative Designation: BMP-2K
Type: Amphibious Infantry Fighting Vehicle (IFV)
Family: BMP-2
Manufacturer: mKurganmashzavod
Crew: ea3
Passenger Capacity: ea7

Dimensions

Length: m6.72

Width: m3.15

Height: m2.45

Weight, Combat: tons14.3

Ground Pressure: kg/m0.63

Automotive

Engine Name: UTD-20S1

Engine Type: Diesel

Engine Power: hp300

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Off Road: km/h45

Speed, Average Cross: 35

Speed Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2.5

Fording Depth: mAmphibious

Note: initial production BMP-2 is partially amphibious, and propelled in water by its tracks

Communications

Primary: R-123M HF/VHF Transceivers

R-123M Radio Band: MHz10-51.5

R-123M Radio Channels: 1,261 Channels

R-123M Radio Range: km16-55

Secondary: R-11

Antenna (when vehicle is in motion): 4 meter whip antenna

Antenna (when vehicle is stationary): 10 m half-telescopic antenna

Navigation System: GPK-69 Navigation System, while some of the BMP-2K's are equipped with a GLONASS Navigiation System

Note: The BMP-2K can be recognized from the BMP-2 due to the additional radio antennae at the rear of the vehicle.

Main Gun

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

Firing Modes: automatic and semi-automatic

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartidge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: ea500 total of any combination 30mm projectile

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,260

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator.

Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,120

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M113 Konkurs (AT-5 Spandrel)

Type: Soviet SACLOS wire-guided anti-tank missile.

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Variants: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1

Basic Load: ea4

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contact

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance System: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Fire Control

Name: INA
Computerized FCS: Yes
Commander Periscopes: two TNPO-170A periscopes, plus a single TKN-3B binocular rear-view prism. Additionally, the Commander has a 1PZ-3 day monocular sight
Thermal Sight Gunner: BPK-1-42 Sight
Driver's Central Day Periscope: TNP-350B
Main Gun Stabilization: Yes, two-plane stabilisation system designated as 2E36-1
Searchlight: OU-3GA2 searchlight and the FG-126 searchlight

Protection

Hull Armor: All-welded steel that is believed to be between 5 and 19 mm thick
Turret Armor: mm23-33
Applique Armor: Available
Explosive Reactive Armor: Available
Active Protection System: INA
Mine Clearing: KMT-8 mine plow available
Self-Entrenching Blade: INA
NBC Protection: Collective, GO-27 Radioactive and chemical agent detector
Smoke Equipment: 6 smoke grenade launchers, VEESS
Smoke Screen: TDA System using engine
Note: Unlike the BMP-2,which has firing ports, the BMP-2K has no firing ports and is a C2 BMP version

Notes:

BMP-2K: command variant with two antennas mounted on the rear of the hull, one behind the turret and one on the right-hand side of the rear of the vehicle, one IFF antenna on the left-hand side of the rear of the vehicle and a support for a telescopic mast in the front of the IFF antenna. The firing port equipped with the periscope was removed from either side of the vehicle.

VN-11 Chinese Amphibious Infantry Fighting Vehicle (IFV)





Tiers:

1 2 3 4

Parent:

ZBD-04 (Type 4) Chinese Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **ZBD-97:** Designation for ZBD-04 prototype.
- **ZBD-04:** Standard variant.
- **ZBD-04 HJ-8:** Based on original ZBD-04 with four additional HJ-8 anti-tank missile mounted on the turret.
- **ZBD-04A:** The ZBD-04A (industrial designation WZ502G, sometimes referred to as ZBD-08) is an improved variant that sacrifices amphibious performance for better armor protection; add-on armor can be fitted, and the frontal arc can withstand 30 mm rounds along with side skirts added. Although the vehicle is still amphibious, able to propel itself by its tracks to ford lakes and rivers, it lacks waterjets and can no longer operate in open sea.
- **ZBD-04A AT (AFT-10 Anti-Tank Missile Carrier):** ZBD-04A's chassis works as the mobile launching platform for AFT-10 (HJ-10) anti-tank missile. Noted the AFT-10 is a specific version of HJ-10 missile that designed for firing from vehicle launching platform such as ZBD-04A.
- **ZBD-04A Command Vehicle:** Modified from original ZBD-04A, featuring a crew cabin with higher ceiling.
- **ZBD-04A Combat Reconnaissance Vehicle:** Equipped with radars and electric-optic sights for battlefield surveillance, the chassis of the Combat Reconnaissance Vehicle is modified from standard ZBD-04A. The recon equipment is mounted on a retractable mast.
- **ZBD-04A Armored Recovery Vehicle:** Equipped with a crane for emergency vehicle service.
- **VN12:** Export variant based on ZBD-04A.

System

Alternative Designation: VN-11 is the export version of the ZBD-04
Type: Amphibious APC/IFV
Crew: ea3
Troop Compartment Capacity: ea7
Maximum Effective Range: km400

Amphibious: Yes

Dimensions

Length: m7.52

Width: m3.3

Height: m2.5

Weight,.Combat: tons21.5

Ground Clearance: m0.45

Max Speed: km/h70

Range (On Road): km400

Automotive

Engine Name: 404 kW (541 bhp) six-cylinder, water-cooled turbo-diesel

Engine Type: Turbo-diesel

Engine Power: hp541

Engine Location: Front Right

Cruising Range: km400

Speed, Maximum Road: km/h70

Speed, Average Cross: 50

Speed, Maximum Swim: km/h13

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording Depth: m1.4

Suspension: Traditional torsion bar configuration, with each side having six dual rubber-tyred road wheels and a driver sprocket at the front, idler at the rear and track return rollers. Only the upper part of the suspension is covered.

Communications

↳***TBR-121***

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 100 mm 2A70 rifled gun/missile launcher,

Type: rifled gun/missile launcher,

Manufacturer: KBP Instrument Design Bureau

Max Rate of Fire: rds/min8-10

Weight, Combat: kg332

Automatic Loader: Yes

Traverse: deg360

Elevation: deg-6 through +60

↳*Ammunition (Option 1)*

Name: 3UOF17

Type: HE fragmentation projectile

Caliber: mm100

Muzzle Velocity: m/s355

Basic Load (Total): ea41

Max Range: m7,000

Min Range: INA

Armor Penetration: Yes

Weight, Complete Round: kg22.9

Weight, Missle: kg19.4

↳*Ammunition (Option 2)*

Type: Laser beam-riding Anti-Tank Guided Missile

Name: 9M117 Bastion

Caliber: mm100

Entered Service: 1981

Muzzle Velocity: m/s400-500

Basic Load: ea8

Max Range: m4,000

Min Range: INA

Armor Penetration: Yes

Rocket Burn: sec6

Rocket Motor Ignites Time: sec1.5

Guidance: Beam-Riding Laser

Prone to Radio or Optical Jamming: No

Missile Flight Time: m4,000

Self Destruct Time: sec26-41

Auxiliary Weapon System

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Manufacurer: Tulamashzavod

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition*

Type: Auto-cannon

Caliber: mm30x165

Muzzle Velocity: m/s960

Basic Load: rdsINA

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Armor Penetration: Yes

Coaxial Weapon System

↳*System*

Name: PK 7.62mm Machine Gun (Pulemyot Kalashnikova)

Type: 7.62mm Coaxial Machine Gun

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +100 Million

Weight: kg9

Length, Total: mm1,203

Length, Barrel: mm605

Rate of Fire: rds/min650

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes.

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Varients: PK PKS PKT PKM PKMS

↳*Ammunition*

Type: 7.62mm Coaxial Machine Gun

Caliber: 7.62mmx54mmR

Muzzle Velocity: m/s825

Basic Load: INA

Effective Firing Range (Normal): m1,000

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Armor Penetration: Available

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes

Gunner Sight: a laser guidance system for the 100 mm laser-guided missile.

Main Gun Stabilization: Yes

Range, Day Sight: mINA

Range, Thermal Sight: mINA

Fire on the Move: the FCS enables the vehicle to engage stationary and moving targets under all weather conditions, even when firing on the move.

Protection

Hull Armor: mm90

Turret Armor: No Profile

Front Armor: the front arc provides protection from 90 mm armor-piercing projectiles.

Side Armor: Sides can withstand hits from rocket launchers, such as RPG-7, and some anti-tank guided missiles.

Under the Hull Armor: The VN11 withstands mine blasts equivalent to 10 kg of TNT anywhere under the hull.

Applique Armor: INA

Explosive Reactive Armor: Yes

Active Protection System: Yes, A bank of three electrically operated grenade launchers is mounted either side of the turret.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes

Automatic Fire Suppression Systems: Yes

Battle Management System: Yes

Navigation Suite: Yes

Firing Port: The vehicle's final 'weapon system' is a firing port and viewing aid on each side toward the rear of the hull.Dismounts can also fire out of rear hatches, using the hatch covers locked vertically as shields.

Notes:

The VN11 is a new Chinese heavy armored personnel carrier. It was converted from obsolete Type 59 medium tank. The VN11 was first publicly revealed in 2017. This armored vehicle is mainly aimed at export customers. In concept the VN11 is similar to Ukrainian BMP-55 heavy APC. During conversion the Type 59 medium tank was refurbished and its powerpack and running gear were upgraded. Tank's turret was removed and replaced with a superstructure in order to create a troop compartment. Additional armor was fitted for a higher level of protection. China and numerous other countries operate or keep in storage thousands of out-dated Chinese Type 59 or similar Soviet T-55 tanks that offer little value on modern battlefield. These old tanks are vulnerable to most modern anti-tank weapons. Instead these surplus tanks could be converted to VN11 troop carriers in order to extend their operational lives. On the other hand Israel is so far the only country to use heavy APCs, converted from similar medium tanks. Other similar vehicles, such as Russian BTR-T, Ukrainian BMP-55, or Indian Tarmour, never reached production. Only Israeli Achzarit was produced in quantity. The VN11 offers much better protection for the crew and troops than most modern armored personnel carriers and infantry fighting vehicles. Front mounted engine provides additional protection. The main role of the VN11 is to carry troops on the battlefield under enemy fire. Sometimes these machines are referred as battlefield taxi. The VN11 is invulnerable to heavy machine gun fire. It seems that the front arc provides protection from 90 mm armor-piercing projectiles. Sides can withstand hits from rocket launchers, such as RPG-7, and some anti-tank guided missiles. The VN11 withstands mine blasts equivalent to 10 kg of TNT anywhere under the hull. Vehicle also withstands nearby explosions of artillery shells. The VN11 is fitted with NBC protection and automatic fire suppression systems. The VN11 has a low-profile turret, armed with a 30 mm cannon. Similar turret was used on Type 86G infantry fighting vehicle, which is widely used by the Chinese Army in large numbers. The cannon can engage armored targets at a range of 1 500 m, ground targets at a range of 4 000 m and helicopters at a range of up to 2 500 m. It looks like there is a launching rail for HJ-73 anti-tank guided missile. This missile has a range of 3 000 m. This armored vehicle has got no coaxial machine gun. The VN11 has a crew of 3, including commander, gunner and driver. This heavy APC accommodates around 6 dismounts. Troops enter and leave the vehicle via rear doors. Troop compartment is located at the rear part of the vehicle. Rear powerpack arrangement of the Type 59 tank became an issue in attempt to make the troop compartment in the rear part of the vehicle. Designers of the VN11 found a simple solution and swapped front end of the vehicle with the rear. So the VN11 is driving backwards comparing with the original Type 59 tank. The Type 59 tank is powered by a diesel engine, developing 520 hp. Most likely that the VN11 heavy APC received new engine and transmission.

ZBD-04 (Type 04) Chinese Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **ZBD-04A:** The ZBD-04A (industrial designation WZ502G, sometimes referred to as ZBD-08) is an improved variant that sacrifices amphibious performance for better armor protection; add-on armor can be fitted, and the frontal arc can withstand 30 mm rounds along with side skirts added. Although the vehicle is still amphibious, able to propel itself by its tracks to ford lakes and rivers, it lacks waterjets and can no longer operate in open sea.
- **ZBD-04A AT (AFT-10 Anti-Tank Missile Carrier):** ZBD-04A's chassis works as the mobile launching platform for AFT-10 (HJ-10) anti-tank missile. Noted the AFT-10 is a specific version of HJ-10 missile that designed for firing from vehicle launching platform such as ZBD-04A.
- **ZBD-04A Command Vehicle:** Modified from original ZBD-04A, featuring a crew cabin with higher ceiling.
- **ZBD-04A Combat Reconnaissance Vehicle:** Equipped with radars and electric-optic sights for battlefield surveillance, the chassis of the Combat Reconnaissance Vehicle is modified from standard ZBD-04A. The recon equipment is mounted on a retractable mast.
- **ZBD-04A Armored Recovery Vehicle:** Equipped with a crane for emergency vehicle service.
- **ZBD-97:** Designation for ZBD-04 prototype.
- **ZBD-04 HJ-8:** Based on original ZBD-04 with four additional HJ-8 anti-tank missile mounted on the turret.
- **VN12:** Export variant based on ZBD-04A.

Systems

Alternative Designation: ZBD-04, Type 04, WZ502 (Industrial Designation), VN11 (Export), ZBD-97 / Type 97
Type: Amphibious APC/IFV
Crew: ea2
Troop Compartment Capacity: ea7
Maximum Effective Range: km400
Amphibious: Yes

Dimensions

Length: m7.52

Width: m3.3

Height: m2.5

Weight,.Combat: tons21.5

Ground Clearance: m0.45

Max Speed: km/h70

Range (On Road): km400

Automotive

Engine Name: 404 kW (541 bhp) six-cylinder, water-cooled turbo-diesel

Engine Type: Turbo-diesel

Engine Power: hp541

Engine Location: Front Right

Cruising Range:

Speed, Maximum Road: km/h70

Speed, Average Cross: 50

Speed, Maximum Swim: km/h13

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording Depth: m1.4

Suspension: Traditional torsion bar configuration, with each side having six dual rubber-tyred road wheels and a driver sprocket at the front, idler at the rear and track return rollers. Only the upper part of the suspension is covered.

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 100 mm 2A70 rifled gun/missile launcher,

Type: rifled gun/missile launcher,

Manufacturer: KBP Instrument Design Bureau

Max Rate of Fire: rds/min8-10

Weight, Combat: kg332

Automatic Loader: Yes

Traverse: deg360

Elevation: deg-6 through +60

↳*Ammunition (Option 1)*

Name: 3UOF17

Type: HE fragmentation projectile

Caliber: mm100

Muzzle Velocity: m/s355

Basic Load (Total): ea41

Max Range: m7,000

Min Range: INA

Armor Penetration: Yes

Weight, Complete Round: kg22.9

Weight, Missle: kg19.4

↳*Ammunition (Option 2)*

Type: Laser beam-riding anti-tank missile.

Name: 9M117 Bastion

Caliber: mm100

Entered Service: 1981

Muzzle Velocity: m/s400-500

Basic Load: ea8

Max Range: m4,000

Min Range: INA

Armor Penetration: Yes

Rocket Burn: sec6

Rocket Motor Ignites Time: sec1.5

Guidance: Beam-Riding Laser

Prone to Radio or Optical Jamming: No

Missile Flight Time: m4,000

Self Destruct Time: sec26-41

Auxiliary Weapon System

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Manufacurer: Tulamashzavod

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition*

Type: Auto-cannon

Caliber: mm30x165

Muzzle Velocity: m/s960

Basic Load: rdsINA

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Armor Penetration: Yes

Coaxial Weapon System

↳*System*

Name: PK 7.62mm Machine Gun (Pulemyot Kalashnikova)

Type: 7.62mm Coaxial Machine Gun

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +100 Million

Weight: kg9

Length, Total: mm1,203

Length, Barrel: mm605

Rate of Fire: rds/min650

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes.

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Varients: PK PKS PKT PKM PKMS

↳*Ammunition*

Type: 7.62mm Coaxial Machine Gun

Caliber: 7.62mmx54mmR

Muzzle Velocity: m/s825

Basic Load: INA

Effective Firing Range (Normal): m1,000

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Armor Penetration: Available

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes

Gunner Sight: a laser guidance system for the 100 mm laser-guided missile.

Main Gun Stabilization: Yes

Range, Day Sight: mINA

Range, Thermal Sight: mINA

Fire on the Move: the FCS enables the vehicle to engage stationary and moving targets under all weather conditions, even when firing on the move.

Protection

Hull Armor: mm90

Turret Armor: No Profile

Front Armor: the front arc provides protection from 90 mm armor-piercing projectiles.

Side Armor: Sides can withstand hits from rocket launchers, such as RPG-7, and some anti-tank guided missiles.

Under the Hull Armor: The VN11 withstands mine blasts equivalent to 10 kg of TNT anywhere under the hull.

Applique Armor: INA

Explosive Reactive Armor: Yes

Active Protection System: Yes, A bank of three electrically operated grenade launchers is mounted either side of the

turret.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes

Automatic Fire Suppression Systems: Yes

Battle Management System: Yes

Navigation Suite: Yes

Firing Port: The vehicle's final 'weapon system' is a firing port and viewing aid on each side toward the rear of the hull.Dismounts can also fire out of rear hatches, using the hatch covers locked vertically as shields.

Notes:

The ZBD-04 (VN11) is the tracked infantry fighting vehicle (IFV) based on the ZBD-97 IFV. The ZBD-04 is developed for the PLA in the late 1990s. The vehicle was designed to provide protected transport for an infantry squad on the battlefield; to provide fire support for dismounted infantry, and to engage enemy tanks and armored vehicles. The ZBD-04 is currently equipped by the amphibious mechanized divisions in South Military Region. The ZBD-04 was designed as the successor to the Type 86 and has been in service with the PLA ground forces since 2006, in the armored units of the Guangzhou and Nanjing military regions. Besides the infantry fighting vehicle (IFV) variant, an armored recovery vehicle (ARV) variant is also available. A further improved variant is known as the ZBD-04A. The ZBD-04 has a crew of three (a commander, a driver, and a gunner) and is able to carry seven troops. The commander and gunner are seated in the two-man turret located in the middle, and the driver with one passenger is located in tandem to the left of the power compartment, located at the front right. Six infantrymen are located in the troop compartment at the rear. There are firing ports in the left, right, and exit door that allow infantrymen to fire assault rifles or light machine guns from inside the vehicle, even on the move. The vehicle has amphibious capability, designed to swim to shore from a ship. For high-speed swimming, it has two large water jet ports.

Boragh Iranian Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Boragh:** Reverse engineered BMP-1 or Type 86 (WZ-501) converted into an APC. It is very similar to Chinese WZ-503 APC. It has V-8 turbocharged diesel engine which delivers 330 hp (246 kW). It also has road wheels from the US M113 APC. Combat weight was reduced to 13 tonnes. The other upgrades include a higher road speed and stronger armor. Number of passengers was increased from 8 to 12. The 12.7 mm DShK 1938/46 heavy machine gun (1,000 rounds) serves as a main weapon of the vehicle.
- **Raad-1 (Thunder-1):** Boragh converted into a self-propelled howitzer fitted with a turret from the 2S1 Gvozdika
- **Raad-2 (Thunder-2):** Boragh converted into a self-propelled howitzer fitted with a turret that has a similar layout to the M109A1 155mm/39-cal self-propelled howitzer fitted with 155 mm HM44 howitzer manufactured by the Hadid facility of the Iranian Defence Industries Organisation. The gun looks exactly like 155mm/39-cal M185 gun from M109A1 and is fitted with a double baffle muzzle brake, fume extractor, screw breech mechanism, hydro-pneumatic recuperator and a hydraulic recoil brake
- **Cobra:** Concept vehicle for the Boragh armed with 23 mm anti-aircraft gun for use as a fire support vehicle.
- **Khatim 1:** Sudanese designation for Boragh

System

Alternative Designation: Boragh or Boraq
Type: Amphibious Armored Personnel Carrier (APC)
Crew: 3 (commander, driver, gunner)
Passengers: 8

Dimensions

Length: 6.65 m
Width: 3.25 m
Height: 1.75 m
Tracks, Length on Ground: 3.60 m
Ground Clearance: 0.45 m
Weight, Combat: 13,000 kg

Automotive

Engine Name: INA
Engine Type: V-8 diesel

Engine Power: 330 hp (246 kW)

Power-to-Weight Ration: 25.4 hp/tonne (18.9 kW/tonne)

Suspension: torsion bar

Range: 550 km

Fuel: 1,255 gal (475 liters)

Speed, Road: 65 km/h (road) 45 km/h (off-road)

Speed, Cross-Country: 45 kph

Speed, Water: 7 kph

Vertical Obstacle: 0.7 m

Trench: 2.5 m

Fording: Amphibious

Gradient: 60 percent

Side Slope: 40 percent

Main Gun

↳*System*

Name: DShK 1938

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,625 mm

Barrel Length: 1,070 mm

Weight: 34 kg (74.96 lb) (gun only) 157 kg (346.13 lb) on wheeled mounting

Action: Gas-operated, flapper locking

Rate of Fire: 600 rounds/min

Muzzle Velocity: 850 m/s

Maximum Firing Range: 2,500 m

Effective Firing Range: 2,000 m

Feed System: 50 round belt

Sights: Iron/optical

Elevation: 60 deg

Traverse: 360 deg

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: Gas-operated, flapper locking

Basic Load: 4,000 Rounds

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: INA
Thermal Sight Gunner: INA
Main Gun Stabilization: No

Protection

Hull Armor: Welded rolled steel
Turret Armor: Welded rolled steel
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA
NBC Protection: Yes
Smoke Equipment: INA

Notes:

boragh or Boraq (Persian: نفربر براق) is an Iranian-made armored personnel carrier. Boragh is believed to be a reverse engineered and upgraded model of the Chinese Type 86 (BMP-1). The upgrades include a reduction in weight, a higher road speed, and stronger armor. The vehicle is fully amphibious and is fitted with an NBC protection system and infra-red night vision equipment. It was reported in May 2002 that three additional variants are produced by the Vehicle and Equipment Group (VEIG) of the Iranian Defense Industries Organisation (DIO). These are a 120 mm mortar carrier, an ammunition resupply vehicle, and an armored personnel carrier (APC) fitted with improved armaments. Boragh is a tracked APC. Rubber elements on the track are added to prevent damage on paved surfaces. It has a crew of three (driver, commander and gunner). It can transport up to 8 infantry soldiers. Boragh's main armament consists of the DShK 1938/46 12.7 mm heavy machine gun on a rotatable mount. Some vehicles have the machine gun mount protected all around by an armored shield. The vehicle is equipped with an NBC protection system and is capable of laying down a defensive smoke screen by injecting diesel fuel into the exhaust outlet. The vehicle is named after the Buraq, a winged steed from Islamic mythology.

→→Airborne Infantry Fighting Vehicle (IFV)

ZBD-03 (WZ-506) Chinese Airborne Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **ZLC-2000:** The ZLC-2000 has been in service with the People's Liberation Army Air Force (PLAAF) Airborne Corps since 2003. China decided to develop the ZLC-2000 in the late 1990s after a failure to reach agreement with Russia over the purchase or licensed-production of BMD-series vehicles. The first prototype is thought to have been delivered in 2003. Development of the K/STW-17 vehicle air dropping system was completed in 2004. The ZLC-2000 was first seen in operational service in 2005 and was noted as a participant in the Peace Mission 2005 exercise with Russia. The vehicle was first displayed publicly as part of the Oct. 1, 2010, parade celebrating the 60th anniversary of the founding of the People's Republic of China.
- **ZBD-03 Command Post:** The command and control version features a higher rear hull to accommodate staffs.
- **ZBD-03 ATGM Carrier:** Armed with the HJ-8 ATGM anti-tank guided missile.

System

Alternative Designation: ZBD-2000; ZLC-2000; VN10 (export designation)
Type: Airborne Infantry Fighting Vehicle (IFV)
Crew: ea3
Troop Compartment Capacity: 5
Maximum Effective Range: km500
Amphibious: Yes
Airborne Capable: Yes
Number of Parachutes: Four large parachutes and four smaller parachutes.
Parachute Location: parachute system is installed on the roof of the vehicle behind the turret
Total Area, Parachute System: 760 m2
Weight, Parachute System: kg100

Dimensions

Length: m6
Width: m2.35
Height (to Turret Roof): m2.2

Weight: kg8,000

Ground Clearance: m0.40

Automotive

Engine Name: INA

Engine Type: Air-cooled Diesel

Engine Power: hp350

Power to Weight Ratio: 43.75 hp/tonne

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed, Maximum Swim: km/h6

Fording Depth: m

Gradient: %60

Side Slope: %30

Vertical Obstacle (Forwards): m0.65

Trench: m1.6

Suspension: Hydro-pneumatic

"Squat" enabled: Yes, (hull lowered fully) or "kneel" (front/rear of the hull lowered).

Running Gear: Tracked

Air Conditioning: Yes

Communications

Digital Communication System: Yes

Blue Force Tracking: Yes

↳***TBR-121 VHF Radio***

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation:

Manufacturer: Tulamashzavod

Date of Introduction: 1980

Rate of Fire (Low): fds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity (at 21°) (nominal): m/s1,275

Basic Load: 125

Maximum Effective Range: m2,800

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: sec2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mills0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: mm30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: m5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: HJ-73 Red Arrow Anti-Tank Missile System

Type: Anti-Tank Missile System

Length, Total: mm1,005

Length, Barrel: mm860

Rate of Fire: rds/min4

Sights: Integrated Optics

↳*Ammunition (ATGM)*

Name: HJ-73 Arrow-73 (Base Series Name; Manual Command-to-Line-Of-Sight. MCLOS)

Type: Anti-Tank Missile System

Date of Introduction: 1979

Caliber: 125mm

Muzzle Velocity: m/s130

Basic Load: INA

Max Effective Range: m3,001

Min Range: INA

Armor Penetration: Yes

Guidance System: SACLOS

TV Goniometer: Yes

Variant 1: Red Arrow 73B: Armed with a tandem-HEAT warhead, this missile has a maximum range of 2,800 m, a hit probability of 90%, and a penetration probability of 80%. At maximum range the 73B takes around 20 seconds to reach the target at a speed of 120 m/s, and if a hit is achieved is capable of penetrating 200 mm of RHA set at 68° and protected by ERA.

Variant 2: Red Arrow 73D: This missile is much the same as the 73B, however it is slightly longer and capable of penetrating 280 mm of RHA set at 68° and protected by ERA. The flight speed of the missile is increased to 130 m/s.

Variant 3: Red Arrow 73E: The 73E is a further improvement of the above systems. The range is extended to 3,000 m and the RHA penetration increased to 300 mm.

Variant 4: Red Arrow 73F: The 73F is described as a bunker buster. It has a maximum range of 2,800 m and has the same accuracy statistics of the 73B. It is fitted with a fuel air explosive warhead, designed to defeat bunkers and fortifications through overpressure effects.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes, dual-channel sight

Driver Periscopes: ea3

Main Gun Stabilization: Yes

Range, Day Sight: mINA

Range, Night Sight: mINA

Navigation System: Yes, BeiDou Satellite Navigation system

Accuracy: to within several meters

Blue Force Tracking: Yes

Protection

Armor Type: Welded steel protects against small arms and shell splinters.

Hull Armor: 12.7mm Projectiles

Side Armor: mm7.62mm Projectiles

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection Armor: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: yes

Smoke Equipment: Yes, The vehicle also carries six smoke grenade launchers that can be used to launch aerosol grenades to obscure the vehicle from targeting lasers, or fragmentation projectiles for close range defense from infantry.

Note: The protection is limited by the need for the ZBD-03 to be deployed by parachute; as such it is thought to be focused on countering small arms fire and shell fragments.

Notes:

The ZBD-03 or Type 03 (industrial designation WZ506) is a Chinese airborne infantry fighting vehicle. It features a light-weight chassis and hydropneumatic suspension for airborne operations. The ZBD-03 bears some external resemblance to the BMD-3, particularly with regards to its main armament. However, the chassis and internal subsystems possess a different layout. The ZBD-03 retains the Russian parachute system for landing from an Il-76 transport aircraft. The ZBD-03 has a crew of three (a commander, a driver, and a gunner) and is able to carry five infantry passengers in a troop compartment. The ZBD-03 bears some external resemblance to the BMD-3, particularly with regards to its main armament. However, the chassis and internal subsystems possess a different layout. The ZBD-03 retains the Russian parachute system for landing from an Il-76 transport aircraft. The ZBD-03 has a crew of three (a commander, a driver, and a gunner) and is able to carry five infantry passengers in a troop compartment. The gunner is seated in the single-man turret located in the middle of the chassis. The driver and commander are located in tandem to the left of the power compartment in the front right of the chassis. The troop compartment is located in the rear with two overhead hatches and a rear exit. The suspension system of ZBD-03 consists of five lightweight road wheels and three return rollers with a front-mounted drive sprocket. The hydropneumatic suspension has variable ground clearance, minimum exhibited in the commission of landing the plane in order to reduce the force of impact on the ground. The ZBD-03 is equipped with a single-man turret with a 30mm gun capable of firing armor-piercing round. A missile rail launcher at the top of the turret is included as part of the HJ-73C anti-tank guided missile (ATGM). Secondary weaponry includes a coaxial 7.62mm machine gun and three smoke grenade dischargers mounted to each side of the turret. The ZBD-03 armor protection is limited by its weight restrictions necessary for airdropping. With a combat weight of 8 tonnes, the vehicle’s armor is thin and sloped to maximize resistance to small caliber weapons. The gunner has a day/night thermal scope and an emergency back-up day sight. The gun system is fully stabilized. The driver and commander has their own observation instruments installed on the hatch.

BMD-1 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMD:** First production model.
- **BMD-1K:** (K stands for komandirskaya – command) – Command variant fitted with R-126 and R-107 transceivers, two Clothes Rail antennas and a generator box. It's sometimes called BMD-K
- **BMD-1P:** BMD-1 modernization with its 9S428 ATGM launcher replaced by pintle-mounted 9P135M-1 ATGM launcher capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. Entered service in 1977.
- **2S9 NONA Russian 120mm Self-Propelled Mortar (SPM):** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1 Russian 120mm Self-Propelled Mortar (SPM):**
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.
- **BMD-1PK:** (K stands for komandirskaya – command) – Command variant of BMD-1P. It is fitted with an additional R-123M radio set, a generator, the GPK-59 gyroscopic compass, the PRKhR radiation and chemical reconnaissance unit and two attachable tables. The machine gun mounted in the left corner of the bow of the hull has been eliminated as well as one of the seats. The crew consists of 6 men. The ammo load was reduced by one 9M113 "Konkurs" (AT-5 Spandrel) ATGM and 250 7.62 mm machine gun rounds
- **BMD-1M:** BMD-1 with smoke grenade launchers on the rear of the turret, improved ventilation and road wheels
- **BMD-2 (Ob'yekt 916):** BMD-1 variant with a new one-man turret armed with stabilized 30 mm 2A42 multi-purpose autocannon and 7.62 mm PKT coaxial tank machine gun (mounted on the right hand side of the main gun). The vehicle carries 300 rounds for the main gun (180 AP and 120 HE) and 2,940 rounds for the machine gun. The gun has a maximum elevation of 75° and can be used to fire at air targets. The turret is also armed with pintle-mounted 9P135M launcher, on the right hand side of the roof of the turret, with semi-automatic control capable of firing SACLOS guided 9M113 "Konkurs" (AT-5 Spandrel) and 9M113M "Konkurs-M" (AT-5B Spandrel B) ATGMs. The new turret seats the gunner on the left hand side of the main gun. On top of the turret there's one single piece circular hatch opening to the front. Located in front of the said hatch is the gunner's sight which is the same one as the one used in BMP-2. Another gunner's sight is located on the left hand side of the main gun and moves in vertical planes along with it. It is a high angle of fire sight used when the gunner is aiming at air targets. The vehicle also has additional periscopes that provide it with vision on the sides. A white searchlight is mounted in front of the turret. The amount of bow mounted tank machine guns decreased from two to one. The right hand side bow mounted machine gun was preserved. NATO gave it the designation BMD M1981/1
- **BTR-D (Ob'yekt 925):** Lengthened variant (with 6 rather than 5 road wheels), slightly up-armoured at the front. The

BTR-D has no turret, but is armed with two bow-mounted machine guns PKB and can be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Entered service in 1974 and can carry 10 passengers. Combat weight: 8.5 tons.

System

Alternative Designation: BMD-1 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)

Manufacturer: Volgograd Tractor Plant

Type: Airborne Amphibious Infantry Fighting Vehicle (IFV)

Family: 2S923

Crew: ea2 (driver, gunner)

Passengers: 6 troopers (including commander and machine gunner seated next to the driver and 3 men in the troop compartment)

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: min30

Emplacement Time: min30

Airborne Capable: Yes

Parachute System: PRSM-916 parachute system, or the PRSM-925 for combat deployments

Airdrop Height: m500-1,500

Note: The BMD-1 can be distinguished from all other BMD variants firstly by the large gun that is its main armament, and secondly by its road wheels that have a star-shaped centre and dual rims.

Dimensions

Length: m5.1

Width: m2.53

Height: m1.97

Weight, Combat: tons7.5

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: V-6, water cooled, Diesel Engine

Engine Power: hp240

Cruising Range: km320

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.6

Fording Depth: mAmphibious

Communications

Type: R-173

Main Gun

↳*System*

Name: 2A28 Grom 73mm smooth bore semi-automatic gun

Type: mm73

Manufacturer: KBP

Length, Barrel: mm1,195

Height: mm322

Weight: kg115

Width: mm218

Electric Motor: Yes, with a manual mechanical backup

Magazine Type: forty-round mechanized conveyor double-row magazine

Max Rate of Fire: rds/min8-10

Loader Type: M3 electromechanical autoloader with ammunition conveyor

Max Elevation: deg+33

Min Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Note: The BMD-1 can also fire ATGM launcher (three 9M14M or 9M113 or 9M111M ATGMs)[4][9]

↳*Ammunition (Option 1)*

Type: OG-15V HE-Frag

Caliber: mm73

Muzzle Velocity: m/s290

Basic Load: 16 Total OG-15V HE-Frag Projectiles

Weight: kg4.57

Shell: kgOG-9 shell with a 0.73 kg (1 lb 10 oz) TNT bursting charge

↳*Ammunition (Option 2)*

Type: PG-15V (HEAT)

Caliber: mm73

Muzzle Velocity: m/s400

Stabilizer Type: fixed fin-stabilized rocket-assisted round.

Basic Load: 24 Total PG-15V Projectiles

Weight: kg3.47

Shell: kg2.6

Explosive Type: mmRDX explosive charge in the warhead

Explosive Weight: kg0.322

Penetration: mm280-350

Note: Once the projectile has travelled 10–20 m (33–66 ft), the rocket motor starts and accelerates it to 700 m/s (2,300 ft/s).

Anti-Tank Guided Weapons (ATGW)

Name: Kolomna Malyutka (Baby) 9M14

Type: wire-guided ATGW

Minimum Range: m500

Maximum Range: m3,000

Maximum Speed (throughout the Flight): m/s130

Flight Time: sec25

Warhead Type: HEAT Warhead

Penetration: mm400

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Muzzle Velocity: m/s825
Basic Load: ea1,500
Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes, with three day vision devices
Thermal Sight Gunner: Yes, dual-mode 1PN22M1 monocular periscopic sight mounted on the left side of the turret roof.
Driver Sight: TNPO-170 periscope
Main Gun Stabilization: INA
Indirect Fire: Yes
Direct Fire: INA
Land Navigation: Yes
Searchlight: IR searchlight

Protection

Armor Type: Welded aluminium alloy
Gun Mantlet: mm33
Turret Armor: 23 mm at 42° turret front 19 mm at 36° turret side 13 mm at 30° turret rear 6 mm turret top
Hull Armor: 15 mm at 50° lower hull front, 10 mm rest of the hull
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: Available
NBC Protection: PAZ NBC system
Smoke Equipment: INA
Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The BMD-1 is an airborne infantry tracked armoured vehicle, which entered in the service to the Russian army airborne units in 1969 and was first show to the public during a parade held in Moscow in November 1973. The vehicle was called the M1970 before its Russian designation became known. Development started in 1965 and limited production began in 1968 and ended in 1969. After operational trials it was deployed in limited numbers by 1969 and the serial production started in 1970, although the vehicle weight 500 kg more than what the requirements stated (7.5 tonnes and 13.3 tonnes when loaded with equipment).

In late 1970s a new modernized vehicle received a designation BMD-1P following adoption of the new 9P135M-1 ATGM launcher instead of 9S428 ATGM launcher, firing the 9M113 "Konkurs" (AT-5 Spandrel). In 1983, based on the combat experience in Afghanistan a decision was made to produce a new variant of the BMD with a weapon capable of engaging targets such as those faced by the airborne troops in that conflict. This resulted in "Ob'yekt 916" which later became BMD-2. A lengthened chassis of BMD-1 served as a basis for the BTR-D airborne multi-purpose tracked APC which itself served as a basis for many specialized airborne vehicles. The BMD-1 is always currently used by the Russian airborne troops. BMD-1 and BMD-1PK IFVs are used by Russian airborne units of KFOR. BMD-1 IFVs were used by Russian airborne units of SFOR.

VN-10 (ZBD-03) Chinese Airborne Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **ZLC-2000:** Designation for ZBD-03 prototype.
- **ZBD-03:** Standard variant.
- **ZBD-03 Command Post:** The command and control version features a higher rear hull to accommodate staffs.
- **ZBD-03 ATGM Carrier:** Armed with the HJ-8 ATGM anti-tank guided missile.

System

Alternative Designation: VN-10 (ZBD-03) , ZBD-2000; ZLC-2000; VN10 (export designation)
Type: Airborne Infantry Fighting Vehicle (IFV)
Crew: ea3
Troop Compartment Capacity: 5
Maximum Effective Range: km500
Amphibious: Yes
Airborne Capable: Yes
Number of Parachutes: four large parachutes and four smaller parachutes.
Parachute Location: parachute system is installed on the roof of the vehicle behind the turret
Total Area, Parachute System: 760 m2
Weight, Parachute System: kg100

Dimensions

Length: m6
Width: m2.35
Height (to Turret Roof): m2.2
Weight: kg8,000
Ground Clearance: m0.40

Automotive

Engine Name: INA

Engine Type: Air-cooled Diesel

Engine Power: hp350

Power to Weight Ratio: 43.75 hp/tonne

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed, Maximum Swim: km/h6

Fording Depth: m

Gradient: %60

Side Slope: %30

Vertical Obstacle (Forwards): m0.65

Trench: m1.6

Suspension: Hydro-pneumatic

"Squat" enabled: Yes, (hull lowered fully) or "kneel" (front/rear of the hull lowered).

Running Gear: Tracked

Air Conditioning: Yes

Communications

Digital Communication System: Yes

Blue Force Tracking: Yes

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation:

Manufacturer: Tulamashzavod

Date of Introduction: 1980

Rate of Fire (Low): fds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity (at 21°) (nominal): m/s1,275

Basic Load: 125

Maximum Effective Range: m2,800

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: sec2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mills0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: mm30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: m5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: HJ-73 Red Arrow Anti-Tank Missile System

Type: Anti-Tank Missile System

Length, Total: mm1,005

Length, Barrel: mm860

Rate of Fire: rds/min4

Sights: Integrated Optics

Ammunition (ATGM)

Name: HJ-73 Arrow-73 (Base Series Name; Manual Command-to-Line-Of-Sight. MCLOS)

Type: Anti-Tank Missile System

Date of Introduction: 1979

Caliber: 125mm

Muzzle Velocity: m/s130

Basic Load: INA

Max Effective Range: m3,001

Min Range: INA

Armor Penetration: Yes

Guidance System: SACLOS

TV Goniometer: Yes

Variant 1: Red Arrow 73B: Armed with a tandem-HEAT warhead, this missile has a maximum range of 2,800 m, a hit probability of 90%, and a penetration probability of 80%. At maximum range the 73B takes around 20 seconds to reach the target at a speed of 120 m/s, and if a hit is achieved is capable of penetrating 200 mm of RHA set at 68° and protected by ERA.

Variant 2: Red Arrow 73D: This missile is much the same as the 73B, however it is slightly longer and capable of penetrating 280 mm of RHA set at 68° and protected by ERA. The flight speed of the missile is increased to 130 m/s.

Variant 3: Red Arrow 73E: The 73E is a further improvement of the above systems. The range is extended to 3,000 m and the RHA penetration increased to 300 mm.

Variant 4: Red Arrow 73F: The 73F is described as a bunker buster. It has a maximum range of 2,800 m and has the same accuracy statistics of the 73B. It is fitted with a fuel air explosive warhead, designed to defeat bunkers and fortifications through overpressure effects.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes, dual-channel sight

Driver Periscopes: ea3

Main Gun Stabilization: Yes

Range, Day Sight: mINA

Range, Night Sight: mINA

Navigation System: Yes, BeiDou Satellite Navigation system

Accuracy: to within several meters

Blue Force Tracking: Yes

Protection

Armor Type: Welded steel protects against small arms and shell splinters.

Hull Armor: 12.7mm Projectiles

Side Armor: mm7.62mm Projectiles

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection Armor: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: yes

Smoke Equipment: Yes, The vehicle also carries six smoke grenade launchers that can be used to launch aerosol grenades to obscure the vehicle from targeting lasers, or fragmentation projectiles for close range defense from infantry.

Note: The protection is limited by the need for the ZBD-03 to be deployed by parachute; as such it is thought to be focused on countering small arms fire and shell fragments.

Notes:

The VN-10 (ZBD-03) (industrial designation WZ506) is a Chinese airborne infantry fighting vehicle. It features a light-weight chassis and hydro pneumatic suspension for airborne operations. The ZBD-03 bears some external resemblance to the BMD-3, particularly with regards to its main armament. However, the chassis and internal subsystems possess a different layout. The VN-10 (ZBD-03) retains the Russian parachute system for landing from an Il-76 transport aircraft. The VN-10 (ZBD-03) has a crew of three (a commander, a driver, and a gunner) and is able to carry five infantry passengers in a troop compartment.

BMD-1P Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Parent:

BMD-1 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMD:** First production model.
- **BMD-1K:** (K stands for komandirskaya – command) – Command variant fitted with R-126 and R-107 transceivers, two Clothes Rail antennas and a generator box. It's sometimes called BMD-K
- **BMD-1P:** BMD-1 modernization with its 9S428 ATGM launcher replaced by pintle-mounted 9P135M-1 ATGM launcher capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. Entered service in 1977.
- **2S9 NONA Russian 120mm Self-Propelled Mortar (SPM):** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1 Russian 120mm Self-Propelled Mortar (SPM):**
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.
- **BMD-1PK:** (K stands for komandirskaya – command) – Command variant of BMD-1P. It is fitted with an additional R-123M radio set, a generator, the GPK-59 gyroscopic compass, the PRKhR radiation and chemical reconnaissance unit and two attachable tables. The machine gun mounted in the left corner of the bow of the hull has been eliminated as well as one of the seats. The crew consists of 6 men. The ammo load was reduced by one 9M113 "Konkurs" (AT-5 Spandrel) ATGM and 250 7.62 mm machine gun rounds
- **BMD-1M:** BMD-1 with smoke grenade launchers on the rear of the turret, improved ventilation and road wheels
- **BMD-2 (Ob'yekt 916):** BMD-1 variant with a new one-man turret armed with stabilized 30 mm 2A42 multi-purpose autocannon and 7.62 mm PKT coaxial tank machine gun (mounted on the right hand side of the main gun). The vehicle carries 300 rounds for the main gun (180 AP and 120 HE) and 2,940 rounds for the machine gun. The gun has a maximum elevation of 75° and can be used to fire at air targets. The turret is also armed with pintle-mounted 9P135M launcher, on the right hand side of the roof of the turret, with semi-automatic control capable of firing SACLOS guided 9M113 "Konkurs" (AT-5 Spandrel) and 9M113M "Konkurs-M" (AT-5B Spandrel B) ATGMs. The new turret seats the gunner on the left hand side of the main gun. On top of the turret there's one single piece circular hatch opening to the front. Located in front of the said hatch is the gunner's sight which is the same one as the one used in BMP-2. Another gunner's sight is located on the left hand side of the main gun and moves in vertical planes along with it. It is a high angle of fire sight used when the gunner is aiming at air targets. The vehicle also has additional periscopes that provide it with vision on the sides. A white searchlight is mounted in front of the turret. The amount of bow mounted tank machine guns decreased from two to one. The right hand side bow mounted machine gun was preserved. NATO gave it the designation BMD M1981/1
- **BTR-D (Ob'yekt 925):** Lengthened variant (with 6 rather than 5 road wheels), slightly up-armoured at the front. The BTR-D has no turret, but is armed with two bow-mounted machine guns PKB and can be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Entered service in 1974 and can carry 10 passengers. Combat weight: 8.5 tons.

System

Alternative Designation: BMD-1P Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)

Date of Introduction: 1969

Proliferation: Angola –INA Armenia – 10 Azerbaijan – 41 Belarus – 124 in 1995, 154 in 2000, 2003 and 2005. Iran – 200 in service as of 1998. India - INA Moldova – 44 BMD-1 9 BTR-D and also 9 2S9. Russia – About 105 in active service and more than 2,400 in storage. Ukraine – 61 in 1995, 2000 and 2005. Uzbekistan – 110 in 1995, 120 in 2000 and 2005

In Service: 1969-Present

Manufacturer: Volgograd Tractor Plant

Type: Airborne Amphibious Infantry Fighting Vehicle (IFV)

Family: 2S923

Crew: ea2 (driver, gunner)

Passengers: six personnel including a section commander, and the vehicle is crewed by a driver and gunner.

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: min30

Emplacement Time: min30

Airborne Capable: Yes

Parachute System: PRSM-916 parachute system, or the PRSM-925 for combat deployments

Airdrop Height: m500-1,500

Note: The BMD-1 can be distinguished from all other BMD variants firstly by the large gun that is its main armament, and secondly by its road wheels that have a star-shaped centre and dual rims.

Dimensions

Length: m5.1

Width: m2.53

Height: m1.97

Weight, Combat: tons7.5

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: V-6, water cooled, Diesel Engine

Engine Power: hp240

Cruising Range: km320

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.6

Fording Depth: mAmphibious

Communications

Type: R-173

Main Gun

↳*System*

Name: 2A28 Grom 73mm smooth bore semi-automatic gun

Type: mm73

Manufacturer: KBP

Length, Barrel: mm1,195

Height: mm322

Weight: kg115

Width: mm218

Electric Motor: Yes, with a manual mechanical backup

Magazine Type: forty-round mechanized conveyor double-row magazine

Max Rate of Fire: rds/min8-10

Loader Type: M3 electromechanical autoloader with ammunition conveyor

Max Elevation: deg+33

Min Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Note: The BMD-1 can also fire ATGM launcher (three 9M14M or 9M113 or 9M111M ATGMs)[4][9]

↳*Ammunition (Option 1)*

Type: OG-15V HE-Frag

Caliber: mm73

Muzzle Velocity: m/s290

Basic Load: 50 Total of any 72mm combination projectiles

Weight: kg4.57

Shell: kgOG-9 shell with a 0.73 kg (1 lb 10 oz) TNT bursting charge

↳*Ammunition (Option 2)*

Type: PG-15V (HEAT)

Caliber: mm73

Muzzle Velocity: m/s400

Stabilizer Type: fixed fin-stabilized rocket-assisted round.

Basic Load: 50 Total of any 72mm combination projectiles

Weight: kg3.47

Shell: kg2.6

Explosive Type: mmRDX explosive charge in the warhead

Explosive Weight: kg0.322

Penetration: mm280-350

Note: Once the projectile has travelled 10–20 m (33–66 ft), the rocket motor starts and accelerates it to 700 m/s (2,300 ft/s).

Anti-Tank Guided Weapons (ATGW)

Name: 9M111 Fagot missile

Type: SACLOS wire-guided missile

Minimum Range: m70

Maximum Range: m2,000

Time for Missile to Reach an altitude of 2,000 meters: sec10.8

Rate of Fire: rds/min3

Warhead Type: HEAT

Penetration: mm400

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,500

Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, with three day vision devices

Thermal Sight Gunner: Yes, dual-mode 1PN22M1 monocular periscopic sight mounted on the left side of the turret roof.

Driver Sight: TNPO-170 periscope

Main Gun Stabilization: INA

Indirect Fire: Yes

Direct Fire: INA

Land Navigation: Yes

Searchlight: IR searchlight

Protection

Armor Type: Welded aluminium alloy

Gun Mantlet: mm33

Turret Armor: 23 mm at 42° turret front 19 mm at 36° turret side 13 mm at 30° turret rear 6 mm turret top

Hull Armor: 15 mm at 50° lower hull front, 10 mm rest of the hull

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: Available

NBC Protection: PAZ NBC system

Smoke Equipment: INA

Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The BMD-1P is a variant of the BMD-1 designed for combat-heavy operations. It is armed very similarly to the BMD-1 but carries additional ammunition and an improved missile. The BMD-1P is a tier 4 Armored Fighting Vehicle originating from the Soviet Union and is sold by Marat Shishkin. It can be unlocked from the BMD-1, and leads to the BMD-2.

BMD-3 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMD-3K:** The commander variant of the BMD-3 adopted by the Russian Army in 1996. Mass production of this vehicle was never initiated.
- **2S25 Sprut-SD (Object 952):** A self-propelled anti-tank gun that entered service in 2005. This vehicle has the chassis of the BMD-3 and is operated by a crew of three. The main armament is the 125 mm 2A75 smoothbore gun which is a variant of the 2A46 smoothbore gun series used by Soviet main battle tanks since the T-64. It can fire the ammunition of the 2A46 including the 9M119 Svir. The chassis has seven road wheels on each side instead of five and the engine is now the 2V-06-2S with a power of 510 hp.
- **BTR-MD “Rakushka” (Object 955):** A multi-role transport vehicle with bigger hull and no turret. This type can be used to transport troops, fuel, ammunition and wounded personnel. It also serves as the basis for a new range of specialised vehicles for the Russian airborne forces, including a mortar platform and an ambulance.
- **BTR-MDM:** A modernized version with the same improvements as the BMD-4M.
- **RKhM-5 (Object 958):** A chemical reconnaissance vehicle introduced in 2011 and is fitted with the same specialized equipment as the BTR-80 version known as the RKhM-4. The turret has been removed; the RKhM-5 has a fixed superstructure with a machine gun turret. The hull is larger allowing it to transport troops, fuel, ammunition and wounded personnel
- **BMD-4 (Object 960):** Originally designated as the BMD-3M, this vehicle has a modified chassis with new turret known as the "Bakhcha-U". The weaponry bears greater similarity to the BMP-3. This new armament consists of: a 100 mm 2A70 rifled main gun, a 30mm 2A72 autocannon, a 7.62 mm coaxial machine gun, and new "Ramka" fire control system. The bow-mounted AGS-17 has been removed and is replaced with an AGS-30. BMD-4s are newly built or upgraded BMD-3s. The BMD-4 is no longer being purchased for the Russian troops, in favor of the BMD-4M.
- **BMD-4M:** The upgraded variant with a new chassis and the 500 hp UTD-29 engine of the BMP-3. This version will be produced by Kurganmashzavod (KTZ) instead of VgTZ. The vehicle was presented to the VDV in March 2008. According to KTZ, series production could have started in 2009. The BMD-4M was evaluated by the VDV
- **BMM-D:** A command post vehicle and a recovery vehicle. Some variants will have a longer chassis with seven road wheels and probably the same 510 hp engine as the 2S25.

System

Alternative Designation: BMD-3
Manufacturer: Volgograd tractor factory
Type: Airborne Infantry Fighting Vehicle

Family: BMD-3

Crew: ea2

Passenger Capacity: ea8

Amphibious: Yes, The BMD-3 is amphibious and propelled in the water by two water-jets mounted on both sides at the rear of the vehicle

Buoyancy Reserve: More than 30% of its own displacement

Dimensions

Length: m6.36

Width: m3.11

Height: m2.45

Weight, Combat: tons12.9-13.2

Ground Pressure: INA

Automotive

Engine Name: 2V-06 (Some models have been replaced with the BMD-4M Engine)

Engine Type: Diesel

Engine Power: hp450

Cruising Range: km500

Speed, Maximum Road: km/h71

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.8

Fording Depth: Amphibious

Communications

Primary Radio: R-173

Secondary Radio: Digital R-168

Main Gun

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: 30mm

Manufacturer: Tulamashzavod

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.02

Barrel Length: m2.4

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load:

Projectile Weight: g389

Bursting Charge: g49

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,260

Basic Load: ea

Projectile Weight: g235

Bursting Charge: None

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator.

Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Projectile Weight: g304

Bursting Charge: None

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Grenade Launcher

↳*System*

Name: AGS-17 Plamya, 30mm Automatic Grenade Launcher

Type: Automatic Grenade Launcher

Manufacturer: Molot plant

In Service: 1970-Present

Proliferation: Widely Proliferated

Weight: kg31

Length: mm840

Rate of Fire: rds/min400

Effective Firing Range: m8,00 - 1,700

Maximum Effective Range: m1,700

Action: Blowback

Feed system: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

Variants: AG-17A helicopter-mounted version

↳*Ammunition (Option 1)*

Name: VOG-17M

Type: 30mm Grenade

Cartridge: 30×29mm grenade

Muzzle velocity: m/s185

Warhead: High explosive fragmentation warhead.

Effective Firing Range: 8,00 - 1,700

Basic Load: ea40

↳*Ammunition (Option 2)*

Name: VOG-30

Type: 30mm Grenade

Cartidge: 30×29mm grenade

Muzzle velocity: m/s185

Effective Firing Range: 8,00 - 1,700

Basic Load: ea40

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: km7.62×54mm

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳***Ammunition (Option 2)***

Name: 7N13 (AP)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳***Ammunition (Option 3)***

Name: 7BZ3 (API)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s834

Basic Load: ea2,500

Accuracy of fire at 300 m: mm150

Tank Commander's Weapon System

↳***System***

Name: RPK-74 (AK-47) 5.45mm Machine Gun

Type: mm5.45

Manufacturer: Vyatskiye Polyany Machine-Building Plant

In Service: 1974-Present

Proliferation=: Widely Proliferated

Max Rate of Fire: rds/min600

Weight (RPK): kg4.7

Weight (RPKS): kg5.1

Length: mm1,060

Barrel Length: mm590

Action: Gas operated, rotating bolt; closed bolt

Effective Firing Range (with sight adjustments): m100-1,000

Maximum Firing Range: m3,150

Feed system: 30-, 45-round box magazine, 100-round plastic drum magazine, belt ammunition (with side mounted belt

feed device)

Sights: Iron sights: semi-shrouded front post and rear sliding tangent with an adjustable notch Sight radius: 555 mm (21.9 in)

↳***Ammunition***

Type: Rifle

Caliber: mm5.45

Cartridge: 5.45×39mm M74

Muzzle Velocity: m/s960

Basic Load: ea2,500

Anti-Tank Guided Weapon (ATGW)

Name: 9M113 Konkurs (AT-5 Spandrel)

Type: Soviet SACLOS wire-guided anti-tank missile.

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Varaints: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contact

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes, 1PZ-3 with a TNP-165A designator

Thermal Sight Gunner: Yes, BPK-1-42 with a TNPT-1 designator and a TKN-3B binocular sight

Main Gun Stabilization: Yes, 2E36-5

Periscopes: TNPO-170A periscopes and the TNPO-350B night vision periscope.

Protection

Hull Armor: Protection to stop up to 12.7mm rounds fired at the hull and 7.72mm rounds fired at the sides

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, three 81 mm electrically-operated smoke grenade dischargers firing forwards,

IR Signature: INA

Fire Suppression System: Yes

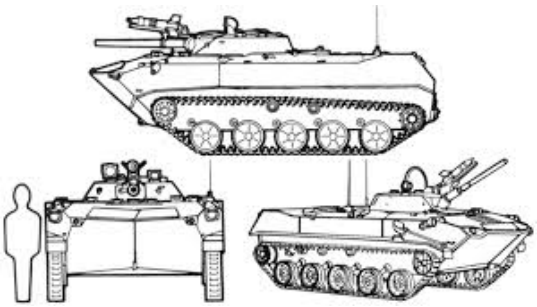
Notes:

The BMD-3 (Boyevaya Mashina Desanta, Russian "Боевая Машина Десанта", literally "Combat Vehicle of the Airborne") is an infantry fighting vehicle (IFV) originating from the former Soviet Union. This armored fighting vehicle is one of the lightest in its class and is intended to be a fire support platform for use by airborne and air assault units. The primary armament is a 30 mm 2A42 autocannon capable of firing different types of ammunition which include high-explosive and armor-piecing. The BMD-3 possesses multiple secondary weapons such as the 9M113 Konkurs missile and the AGS-17 grenade launcher to defeat a wide range of targets from enemy infantry to other armored fighting vehicles. The development of this 3rd generation airborne combat vehicle was initiated during the same time frame of the development of the BMP-3. However, the results of the development showed that the mass of the BMP-3 with landing facilities will significantly exceed 20 tonnes limiting an Il-76 to transporting one vehicle. In the early 1980s, the creation of an airborne combat vehicle was initiated. During the design, two options were considered for the BMD-3. The first one included a chassis weighing over 18 tonnes with a 100 mm 2A70 rifled gun and a coaxial 30 mm 2A72 autocannon. The second option was to use the combat module with a 30 mm 2A42 autocannon. Thus, an IL-76 could be loaded either with two airborne combat vehicles weighing 18 tonnes, or three airborne combat vehicles weighing 12.5 tonnes. Research showed that the latter version of the new BMD-3 ran much more efficiently. On the basis of the experience gained and the results of the research, the Council of Ministers of the USSR and the CPSU number 451-159 officially opened the ROC under the code "Bakhcha" on 20 May 1983. Work included the development of an airborne combat vehicle weighing 12.5 tonnes with the Volgograd tractor factory appointed as the head developer. One month later, an agreement was made for the tactical and technical requirements for the new BMD as well as a complete technical design stage. When developing the new BMD, the experience gained in the course of work on the BMD-1 and "Object 934" light tank was used. By 1985, the acceptance testing of three new BMD prototypes was completed. The test results revealed that all the samples exceeded the permissible mass by 190–290 kg and that the running vehicle gave numerous failures. The design bureau VgTZ fixed most of the shortcomings and were eliminated. By May 1986, the refined BMD prototypes completed preliminary tests with three more prototypes developed by the Volgograd tractor factory. These were sent to the state test for another evaluation. New samples exceeded the permissible mass by 400 kg, as they were made subject to measures of improving the reliability of the running transmission gears. The BMD state tests took place between 27 October 1986 and 27 October 1987.

According to test results, two to three vehicles were completed and sent to the control tests in different climatic zones conducted from 10 July to 19 November 1988. The conclusion for the "Bakhcha" was assessed as positive with the vehicle fulfilling the tactical and technical requirements set by the airborne troops. On 10 February 1990, the USSR adopted the "Object 950" IFV into service under the designation BMD-3. The serial production of the BMD-3 was then initiated and continued until 1997. Excluding six prototypes produced before 1990, 137 BMD-3s were produced from the year of its adoption to the end of its serial production.

BMD-1K Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMD:** First production model.
- **BMD-1:** Final production model. It has a dome-shaped NBC filter intake on the right hand side of the center of the hull roof.
- **BMD-1P:** BMD-1 modernization with its 9S428 ATGM launcher replaced by pintle-mounted 9P135M-1 ATGM launcher capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. Entered service in 1977.
- **2S9 NONA Russian 120mm Self-Propelled Mortar (SPM):** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1 Russian 120mm Self-Propelled Mortar (SPM):**
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.
- **BMD-1PK:** (K stands for komandirskaya – command) – Command variant of BMD-1P. It is fitted with an additional R-123M radio set, a generator, the GPK-59 gyroscopic compass, the PRKhR radiation and chemical reconnaissance unit and two attachable tables. The machine gun mounted in the left corner of the bow of the hull has been eliminated as well as one of the seats. The crew consists of 6 men. The ammo load was reduced by one 9M113 "Konkurs" (AT-5 Spandrel) ATGM and 250 7.62 mm machine gun rounds
- **BMD-1M:** BMD-1 with smoke grenade launchers on the rear of the turret, improved ventilation and road wheels
- **BMD-2 (Ob'yekt 916):** BMD-1 variant with a new one-man turret armed with stabilized 30 mm 2A42 multi-purpose autocannon and 7.62 mm PKT coaxial tank machine gun (mounted on the right hand side of the main gun). The vehicle carries 300 rounds for the main gun (180 AP and 120 HE) and 2,940 rounds for the machine gun. The gun has a maximum elevation of 75° and can be used to fire at air targets. The turret is also armed with pintle-mounted 9P135M launcher, on the right hand side of the roof of the turret, with semi-automatic control capable of firing SACLOS guided 9M113 "Konkurs" (AT-5 Spandrel) and 9M113M "Konkurs-M" (AT-5B Spandrel B) ATGMs. The new turret seats the gunner on the left hand side of the main gun. On top of the turret there's one single piece circular hatch opening to the front. Located in front of the said hatch is the gunner's sight which is the same one as the one used in BMP-2. Another gunner's sight is located on the left hand side of the main gun and moves in vertical planes along with it. It is a high angle of fire sight used when the gunner is aiming at air targets. The vehicle also has additional periscopes that provide it with vision on the sides. A white searchlight is mounted in front of the turret. The amount of bow mounted tank machine guns decreased from two to one. The right hand side bow mounted machine gun was preserved. NATO gave it the designation BMD M1981/1
- **BTR-D (Ob'yekt 925):** Lengthened variant (with 6 rather than 5 road wheels), slightly up-armoured at the front. The BTR-D has no turret, but is armed with two bow-mounted machine guns PKB and can be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Entered service in 1974 and can carry 10 passengers. Combat weight: 8.5 tons.

System

Alternative Designation: BMD-1K Russian Airborne Amphibious Infantry Fighting Vehicle (IFV), Sometimes called the BMD-K

Date of Introduction: 1971

Proliferation: Angola –INA Armenia – 10 Azerbaijan – 41 Belarus – 124 in 1995, 154 in 2000, 2003 and 2005. Iran – 200 in service as of 1998. India - INA Moldova – 44 BMD-1 9 BTR-D and also 9 2S9. Russia – About 105 in active service and more than 2,400 in storage. Ukraine – 61 in 1995, 2000 and 2005. Uzbekistan – 110 in 1995, 120 in 2000 and 2005

In Service: 1969-Present

Manufacturer: Volgograd Tractor Plant

Type: Airborne Amphibious Infantry Fighting Vehicle (IFV)

Family: 2S923

Crew: eaThe total crew is thought to be six personnel, including the driver and gunner.

Passengers: INA. Radio Equipment Installed

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: min30

Emplacement Time: min30

Airborne Capable: Yes

Parachute System: PRSM-916 parachute system, or the PRSM-925 for combat deployments

Airdrop Height: m500-1,500

Note: The BMD-1K can be recognized from the BMD-1 by the two clothes rail antennas and a generator box located at the read of the vehicle

Dimensions

Length: m5.1

Width: m2.53

Height: m1.97

Weight, Combat: tons7.5

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: V-6, water cooled, Diesel Engine

Engine Power: hp240

Cruising Range: km320

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.6

Fording Depth: mAmphibious

Communications

Primary Radio: R-126

Secondary Radio: R-107

Addiitiona Radios: R-173 and/or R-168

Note: This is a C2 vehicle for platoon and company level Commanders

Main Gun

↳*System*

Name: 2A28 Grom 73mm smooth bore semi-automatic gun

Type: mm73

Manufacturer: KBP

Length, Barrel: mm1,195

Height: mm322

Weight: kg115

Width: mm218

Electric Motor: Yes, with a manual mechanical backup

Magazine Type: forty-round mechanized conveyor double-row magazine

Max Rate of Fire: rds/min8-10

Loader Type: M3 electromechanical autoloader with ammunition conveyor

Max Elevation: deg+33

Min Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Note: The BMD-1 can also fire ATGM launcher (three 9M14M or 9M113 or 9M111M ATGMs)[4][9]

↳*Ammunition (Option 1)*

Type: OG-15V HE-Frag

Caliber: mm73

Muzzle Velocity: m/s290

Basic Load: 16 Total OG-15V HE-Frag Projectiles

Weight: kg4.57

Shell: kgOG-9 shell with a 0.73 kg (1 lb 10 oz) TNT bursting charge

↳*Ammunition (Option 2)*

Type: PG-15V (HEAT)

Caliber: mm73

Muzzle Velocity: m/s400

Stabilizer Type: fixed fin-stabilized rocket-assisted round.

Basic Load: 24 Total PG-15V Projectiles

Weight: kg3.47

Shell: kg2.6

Explosive Type: mmRDX explosive charge in the warhead

Explosive Weight: kg0.322

Penetration: mm280-350

Note: Once the projectile has travelled 10–20 m (33–66 ft), the rocket motor starts and accelerates it to 700 m/s (2,300 ft/s).

Anti-Tank Guided Weapons (ATGW)

Name: Kolomna Malyutka (Baby) 9M14

Type: wire-guided ATGW

Minimum Range: m500

Maximum Range: m3,000

Maximum Speed (throughout the Flight): m/s130

Flight Time: sec25

Warhead Type: HEAT Warhead

Penetration: mm400

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,500

Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, with three day vision devices

Thermal Sight Gunner: Yes, dual-mode 1PN22M1 monocular periscopic sight mounted on the left side of the turret roof.

Driver Sight: TNPO-170 periscope

Main Gun Stabilization: INA

Indirect Fire: Yes

Direct Fire: INA

Land Navigation: Yes

Searchlight: IR searchlight

Protection

Armor Type: Welded aluminium alloy

Gun Mantlet: mm33

Turret Armor: 23 mm at 42° turret front 19 mm at 36° turret side 13 mm at 30° turret rear 6 mm turret top

Hull Armor: 15 mm at 50° lower hull front, 10 mm rest of the hull

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: Available

NBC Protection: PAZ NBC system

Smoke Equipment: INA

Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

BMD-1K (K stands for komandirskaya – command) – Command variant fitted with R-126 and R-107 transceivers, two Clothes

Rail antennas and a generator box. It's sometimes called BMD-K. The BMD-1 is a Soviet airborne amphibious tracked infantry fighting vehicle, which was introduced in 1969 and first seen by the West in 1970. BMD stands for Boyevaya Mashina Desanta (Боевая Машина Десанта, which literally translates to "Combat Vehicle of the Airborne"). It can be dropped by parachute and although it resembles the BMP-1 it is in fact much smaller. The BMD-1 was used as an IFV by the Soviet Army's airborne divisions. An improved variant of the BMD-1 was developed, the BMD-2. The BMD-1 also provided a basis for the BTR-D airborne multi-purpose tracked APC.

BMD-4 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMD-4K:** The commander variant featuring an additional radio station.
- **BMD-4M:** A variant with a modular unification with the BMP-3.
- **BMD-4M Sinitsa:** A variant with further modular unification with the BMP-3 and Sinitsa turret.
- **BTR-MDM Rakushka:** A armored personnel carrier based on BMD-4M. It can carry 3 crews and 12 troops.
- **2S25 Sprut-SD-:** A new order for 2S25 replacement 125 mm tracked self-propelled guns were made in 2013. These tank destroyers are planned to be made using the chassis of the BMD-4 with the turret being replaced by the 2A46M-5 125 mm gun; the same smoothbore gun used on the T-90
- **2S42 Lotus:** A self-propelled 120 mm mortar based on BMD-4M
- **Ptitselov:** A self-propelled airdroppable SAM system with twelve 9M337 missiles based on BMD-4M
- **BMD-4M:** The BMD-4M was unveiled by Kurganmashzavod in 2008. This vehicle retains the Bakhcha-U turret with a number of other innovations. Overall bulletproof crew protection is ensured. Special lightweight and durable alloys make this possible without the vehicle losing its ability to swim or be airdropped. The more powerful and compact engine of the BMP-3 is integrated into the BMD-4M; providing 500 hp.In general, the unification of units, plants, and systems of the modernized BMD-4 chassis with the same units, plants and systems of BMP-3 is 80%. This decreases the expenses of the airborne assault vehicle servicing in the army allowing a significant reduction of service maintenance of airborne combat vehicles in the army.
- **BMD-4M Sinitsa:** The BMD-4M Sinitsa was unveiled in 2017. This vehicle has the Sinitsa turret combat module fitted with a top-mounted panoramic sight with a thermal imaging channel and housing a 100 mm 2A70 tank gun/ATGM launcher, 30 mm 2A72 autocannon and a 7.62mm PKMS medium machine gun. The original power unit and transmission system are changed to the parts used in the BMP-3 to standardise production and spare parts supply.
- **Kornet-D1:** In January 2019, the Russian MoD announced it would begin state trials of the 9P163 Kornet-D1 anti-tank missile system, a version of the BMD-4M chassis modified to fire Kornet ATGMs.

System

Alternative Designation: BMD-4; BMD-4M
Manufacturer: Volgograd tractor factory
Estimated Service Life: years40
Type: Airborne Infantry Fighting Vehicle
Family: BMD-4
Crew: ea2
Passenger Capacity: ea6
Amphibious: Yes, The BMD-4 is amphibious and propelled in the water by two water-jets mounted on both sides at the rear of the vehicle
Note: It is reported that the BMD-4 can cause mission system damage to a MBT sized target at 1,500 meters while afloat.

Dimensions

Length (Gun Forward): m6.4

Lenght (Hull): m6.1

Width: m3.1

Height: m2.5

Weight, Combat: tons13.5

Ground Pressure: 0.45 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: Diesel

Engine Power: hp500

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Gradient: deg70

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.8

Fording Depth: mAmphibious

Note: The engine remains effective in elevations up to 3,000 m above sea level.

Communications

Primary Radio: R-168-25UE-2 (Digital Radio)

R-168-25UE-2 Freauency: 30-107,975 MHz range

R-168-25UE-2 Range: km17-35

Data Transmit: 1, 2 or 16 Kbits/s

Antenna: either the R-168TWBA or R-168BBMA antenna

Main Gun Weapon System # 1

Note: The Turret System includes: Bakhcha-U turret with 100 mm 2A70 rifled tank gun, 30 mm 2A72 autocannon, and 7.62 mm PKT coaxial machine gun

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: m5,000

Maximum Effective Range (Day): m4,000

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

↳*Ammunition (Option 1)*

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Cartridge: 3UBK23-3 cartridge

Muzzle Velocity: m/s330

Basic Load: ea34 total rounds of any Russian 100mm Projectiles

Soft Launch: Yes

Warhead Type: HEAT

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 700 mm of RHA without ERA

Maximum Effective Range: m4,000

Note: The gunner can issue corrections whilst the missile is in flight.

↳*Ammunition (Option 2)*

Name: 3OUF19-1

Type: mm100

Muzzle Velocity: m/sINA

Basic Load: ea34 total rounds of any Russian 100mm Projectiles

Penetration: INA

Fuze Type: proximity fuse, designed to detonate the shell 3 meters above ground

Lethal Area: 600 m2 against soft targets.

Note: This type of projectile is used against entrenched infantry and aircraft, but not heavly protected vehicles.

↳*Ammunition (Option 3)*

Name: 3UOF19 Vishnia HE
Type: mm100
Muzzle Velocity: m/s340
Basic Load: ea34 total rounds of any Russian 100mm Projectiles
Penetration: INA
Fragments: The projectile produces over 3,000 fragments in a butterfly pattern
Lethal Area: 360 m2 lethal area.

Main Gun Weapon System # 2

↳*System*

Name: Shipunov 2A72, 30mm Autocannon
Type: mm30mm
Manufacturer: Tulamashzavod
Max Rate of Fire (Low): rds/min200-300
Max Rate of Fire (High): rds/min550-800
Weight: kg115
Length (Total): m3.027
Barrel Length: mm2,416
Barrels: ea1
Action: Gas-operated
Effective Firing Range: m2,000
Maximum Firing Range: m4,000
Feed System: Twin Feed
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180
Maximum Elevation: deg+75
Minumum Elevation: deg-5

↳*Ammunition (Option 1)*

Name: 3UOF8
Type: HEI
Caliber: mm30
Cartridge: 30 × 165
Muzzle Velocity: m/s960

Basic Load: ea

Projectile Weight: g389

Bursting Charge: g49

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,260

Basic Load: ea

Projectile Weight: g235

Bursting Charge: None

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: ea

Projectile Weight: g304

Bursting Charge: None

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: km7.62×54mmR

Muzzle Velocity: m/s855

Muzzle Energy: J3,509

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳*Ammunition (Option 2)*

Name: 7N13 (AP)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s855

Muzzle Energy: J3,436

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳*Ammunition (Option 3)*

Name: 7BZ3 (API)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s834

Muzzle Energy: J3,613

Basic Load: ea2,500

Accuracy of fire at 300 m: mm150

Anti-Tank Guided Weapon (ATGW)

Name: 9M113 Konkurs (AT-5 Spandrel)

Type: Soviet SACLOS wire-guided anti-tank missile.

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Varaints: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contract

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Basic Load: INA

Fire Control

Name: 1V539M FCS

Computerized FCS: Yes

Battle Management System: Yes

Thermal Sight Vehicle Commander: Yes, 1PZ-3 with a TNP-165A designator

Thermal Sight Gunner: Yes, BPK-1-42 with a TNPT-1 designator and a TKN-3B binocular sight

Driver Sight: TVNE-1B periscope for night driving

Main Gun Stabilization: 2E52 electro-mechanical stabiliser.

Main Gun Stabilization Modes: Three modes of operation: utomatic; semi-automatic; and guidance.

Periscopes: TNPO-170A periscopes and the TNPO-350B night vision periscope.

Laser Rangfinder: 1D16-3 LRF

GLONASS System: Yes

Gyrocompass: GPK-59 gyrocompass

Note: The 1V539M FCS can process five ballistic setterings and calculate fire solutions at a mazimum distance of 5,000 meters.

Protection

Hull Armor: Hull: Welded Aluminum Alloy with Ceramic plates. Protection to stop up to 12.7mm rounds fired at the hull and 7.72mm rounds fired at the sides

Turret Armor: Turret: welded aluminium Protection to stop up to 12.7mm rounds fired at the hull and 7.72mm rounds fired at the sides

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, 902 toucha smoke grenade launchers

IR Signature: INA

Fire Suppression System: Yes

Notes:

The BMD-4 (Russian: "Боевая Машина Десанта-4"; Boyevaya Mashina Desanta-4 literally "Combat Vehicle of the Airborne") is an amphibious infantry fighting vehicle (IFV) originating from post-Cold War Russia. Originally designated as the BMD-3M, the chassis of the BMD-4 is the same as that of the BMD-3, because it was developed on the same basis. This armored fighting vehicle is one of the lightest and one of the most heavily armed in its class, possessing a substantial amount of firepower in comparison to its counterparts. The vehicle was designed to transport Russian Airborne Troops (VDV); increasing its mobility, armament, and protection on the battlefield. Many components of the vehicle, such as the ergonomics and positioning of the passengers, remain relatively unchanged. Primary differences between the BMD-4 and its predecessors lie in its armament. The vehicle is fitted with the Bakhcha-U turret, which consists of: a 100 mm 2A70 low-pressure rifled gun, a 30 mm 2A72 coaxial autocannon, and a 7.62 mm PKT coaxial machine gun. The 2A70 rifled cannon is capable of firing high explosive fragmentation rounds and laser guided anti-tank missiles. It also features secondary weapons designed to engage and destroy enemy infantry and armored fighting vehicles. The automated fire control system of the vehicle is advanced with new features that simplify the

use of the vehicle's armament by the gunner and commander. The vehicle is designed by the Volgograd tractor factory and the armament was developed by the KBP Instrument Design Bureau unitary enterprise located in Tula. Kurganmashzavod is the official manufacturer of the vehicle. The only operator of the BMD-4 is Russia, where it entered service in late 2004 and has been produced ever since then. In 2008, a modernized version, designated as the BMD-4M, was introduced with significant contributions from Kurganmashzavod; the designer of the BMP.

→Armored Personnel Carriers (APCs)

→→Armored Personnel Carrier (APC)

Tiger Type (Tiger 2065) Chinese Heavy 4x4 Armored Personnel Carrier (APC)




Tiers:



Variants:

- **Open Topped:** Open-topped special operations patrol vehicle
- **Full-enclosed APC:** Enclosed type APC

System

Alternative Designation: Tiger TYpe; TIger 2065
Estimated out of Service Date: 2036 and beyond
Manufacturer: Shaanxi Baoji Special Vehicles
Type: 4x4 Armored Personnel Carrier (APC)
Family: INA
Crew: ea2
Passenger Capacity: ea9
Cargo Maximum Payload (Open Top Configuation): kg1,100
Cargo Maximum Payload (Fully-Enclosed Configuation): kg1,700
Add on Parts: Yes, Searchlights, Radios, and Winch
Maximum Effective Range: km600
Status: In Service, Production upon request

Dimensions

Length: m5.36
Width: m2.32
Height: m2.3
Weight, Standard: ons4.8
Weight, Combat: tons6.5

Ground Clearance: m0.35

Wheelbase: m3.31

Automotive

Engine Name: Cummins Model ISDE 200-30

Engine Type: turbocharged common rail diesel engine

Engine Power: hp200

Transmission: Manual

Cruising Range: km600

Speed, Maximum Road: km/h115

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth (With Preperation): cm80

Fording Depth (Without Prepearation): cm120

Gradient: %60

Vertical Obstacle: cm35

Power to Weight Ratio: hp/tonne30.76

Amphibious: No

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun (Option 1)

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.62mm Heavy Machine Gun

Manufacturer: Norinco

Date of Introduction: 1985

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas-operated, open bolt

Max Rate of Fire: rds/min700-800

Sustain Rate of Fire: rds/min500-600

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: mm7.62×54mmR mm

Muzzle Velocity: m/s840

Basic Load: INA, Belts in 100/200/250 round boxes

Effective Range: m100-1,500 (With Sight Adjustments) m

Min Range: m100

Armor Penetration: Available

Main Gun (Option 2)

↳*System*

Name: QJZ-89

Type: 12.7mm Heavy Machine Gun

Manufacturer: NORINCO

Cartridge: mm12.7x108

Weight, Gun Only: kg17.5

Weight, Tripod: kg8.5

Length, Total: mm2,119

Length, Barrel: mm1,003

Action: Gas/Recoil

Rate of Fire: rds/min450-600

Feed System: Belt

Sights: Iron/Optical

↳***Ammunition***

Type: Heavy Machine Gun

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: INA

Max Range: km1,600

Min Range: kmINA

Armor Penetration: Yes

Fire Control

Name: No

Computerized FCS: No

Thermal Sight Vehicle Commander: Optional

Thermal Sight Gunner: Optional

Main Gun Stabilization: No

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

Protection

Hull Armor: All-Welded Steel hull that the company claims can resist 7.72mm armour-piercing steel-core ammunition

Turret Armor: All-Welded Steel

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Optional

Smoke Equipment: Optional

EO/IR Signature: Available

Ballistic Glass: Yes, front and side

Firing Ports: serveral on each side

Vision Blocks: Installed

Notes:

The Tiger Type 2065 is the heaviest 4x4 armoured vehicle offered by the Chinese private company Shaanxi Baoji Special

Vehicles. Available in both open-topped and closed configurations, the Tiger can be adapted for a wide range of roles, such as APC, patrol, police vehicle, ambulance, command post and weapons carrier. Since its introduction at the 2012 Eurosatory exhibition, the Tiger has been sold to several militaries including those of the Bahamas, Bolivia, Somalia and Tajikistan.

Rakhsh Iranian 4x4 Armored Personnel Carrier (APC)







Tiers:

1 2 3 4

System

Alternative Designation: Raakhsh

Type: 4x4 Armored Personnel Carrier (APC)

Crew: ea2 (commander, driver)

Passenger Capacity: 8

Dimensions

Length: 6.07 m

Width: 2.41 m

Height: 2.43 m

Wheelbase: 2.91 m

Track: 1.90 m

Weight, Standard: 6,500 kg

Weight, Combat: 7,500 kg

Automotive

Engine Name: 1 x DO 824LFL09

Engine Type: water-cooled, 4-cylinder diesel

Engine Power: 155 hp at 2,400 rpm

Power-to-Weight Ratio: 20.66 hp/ton

Transmission: ZF 6S 850 with one reverse gear

Steering: ZF 8095 hydraulic

Suspension: parabolic leaf springs with hydraulic shock absorbers

Speed: 59 mph (95 kph)

Angle of Approach: 42 deg

Angle of Departure: 31 deg

Fording: 2 ft 7 in (0.80 m)

Gradient: 65 percent

Turning Radius: 24 ft 7 in (7.50 m)

Main Gun

Note: The Rakhsh has been seen with the following weapons: 12.7 mm DShK 1938/46 heavy machine gun, 30 mm cannon or a twin 23 mm anti air cannon.

↳*System*

Name: DShK 1938

Type: Heavy Machine Gun

Caliber: 12.7

Length: 1,625 mm

Barrel Length: 1,070 mm

Weight: 34 kg (74.96 lb) (gun only) 157 kg (346.13 lb) on wheeled mounting

Action: Gas-operated, flapper locking

Rate of Fire: 600 rounds/min

Muzzle Velocity: 850 m/s

Maximum Firing Range: 2,500 m

Effective Firing Range: 2,000 m

Feed System: 50 round belt

Sights: Iron/optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: 3,000 Rounds

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: The all-welded steel armor hull provides protection against 7.62-mm rounds. The commander and driver are seated at the front, with bullet-proof windows provided to the front and sides.

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

Rakhsh is a lightweight Iranian 4x4 cross-country APC developed and produced by DIO's Shahid Kolah Dooz Industrial Complex and named after Rakhsh, the mythical horse of Rostam in Shahnama. It is probably based on a proven 4 × 4 cross-country chassis present in Iran before and is in service of Iranian Police, Iranian Army, IRGC and Sudan. Characterized by high speed on road and excellent off-road mobility, the Rakhsh can transport 10 men. The vehicle is fitted with a 12.7 mm Automatic Gun and can be fitted with different cupolas for various types of armaments, Such as 7.62 mm machine gun and water spraying gun for civil defense. The crew can see and fire through 10 vision blocks and firing ports and can be quickly embarked or deployed through one rear door and two side doors. The Rakhsh 4x4 light armored personnel carrier is intended more for law enforcement forces than for full-fledged combat operations. It is in service with the Iranian police and the Islamic Revolution Guard Corps (IRGC). This armored personnel carrier is extremely similar to the North Korean BTR M-1992 The Rakhsh BTR comes in two versions: the first experimental model, which, apparently, is still being manufactured, and a later export version, which, due to the sanctions imposed on Iran, is also produced for local police and military. First display in 2006, Rakhsh was probably developed by the Iranian Defense Industries Organization (DIO) Shahid Kolah Dooz Industrial Complex. Rakhsh is based on a proven 4 × 4 cross-country chassis, produced in Iran for a variety of civil and military applications. In 2003 the Russian company Kamaz started cooperation with the company Rakhsh Khodro Diesel by the instrumentality of the RT Ministry of Trade. In addition to being used by Iran, a quantity of these vehicles have been supplied to Sudan. Production of the Rakhsh is undertaken by the DIO on an as required basis and may have been followed in development by a more advanced 4 × 4 or 6 × 6 APC. The Rakhsh hull is of all-welded steel armor providing protection from 7.62 mm small arms fire. The commander and driver are seated at the front of the vehicle being provided with front and side bulletproof windows. In addition to its crew of two, Rakhsh can carry eight fully equipped troops seated in the rear troop compartment. These occupants also have small bulletproof windows and 10 associated firing ports that allow them to fire their weapons from within the vehicle with some level of protection. The crew can rapidly enter and leave the vehicle via a door in either side of the hull and twin doors in the hull rear. The baseline version of the Rakhsh APC is fitted with a roof-mounted protective mount armed with a locally manufactured 12.7 mm Machine Gun (MG). This mount appears to be almost identical to that installed on the locally developed Boraq full-tracked APC that is already in service with Iran. This is very similar to 12.7 mm MG cupolas installed on Chinese tracked APCs. This manually operated mount provides side and rear protection to the gunner. Most often, the first option is a 14.5-mm machine gun in the turret, while a later version can only be seen with a 12.7-mm machine gun in the turret. Although there are no obvious reasons why you can not install other weapons. Although some models installed anti-aircraft installation ZU-23-2. In the early models, the side doors were hinged, while the later model had single door side doors. Other differences between the two options are minor, mostly “aesthetic”, most likely reflecting changes in production technology than any significant improvements. These include the alignment of the roof of the engine compartment, the elimination of certain angles and the movement of air intakes. The hull is welded from sheets of armor steel and has very characteristic massive angular contours. With spaced armor, it provides protection against 7.62-mm bullets. It can also be bolted to fasten armor plates, designed for other combat vehicles. Other features of the machine include a centralized pumping system for wheels, wheels with armor resistant inserts, a winch, an air conditioning system, optional smoke grenade launchers, and a system of protection against weapons of mass destruction. Standard equipment for the Rakhsh includes a central tyre inflation system that allows the driver to adjust the tire pressure to suit the terrain being crossed, tires fitted with run-flats, differential locks and a powered winch. As it will be deployed in high ambient temperatures an air conditioning system is fitted as standard. Rakhsh BTR cannot overcome too complex obstacles, destroy other armored vehicles, or protect the crew and troops from large-caliber ammunition, but it is worth recalling that it is not intended for such things and does not intend to replace Boragh or BMP-2. It is well suited to work as a police car or light armored personnel carrier, but no more.

Hafeet Emirate (UAE) 6x6 Armored Personnel Carrier (APC)







Tiers:



Variants:

- **HAFEET 620:**
- **HAFEET 620A:** Logistics and Utility Vehicle
- **HAFEET 640A:** Artillery Support Vehicle (Observation and Command & Control configurations)
- **HAFEET APC:** INA
- **HAFEET Ambulance:** INA

System

Alternative Designation: Nimr Hafeet APC
Date of Introduction: 2005
Description: 6x6 Armored Personnel Carrier
Proliferation: Algeria, Egypt, Jordan, Lebanon, Libya, Tunisia, UAE. In 2017 UAE ordered 150 Hafeet vehicles. Deliveries are expected to begin in 2018.
Cab Seating: ea2
Passengers: ea8
Airlift Capable: INA
Number of Stetchers: INA

↳*Dimensions*

Length: m6.9
Width: m2.3
Height: m2.1
Weight, Empty: kg15,000

Payload Capacity: tons2.4-5

Automotive

Engine Name: Cummins ISBe 300

Engine Type: Diesel

Engine Power: hp286-360hp

Maximum Road Speed: km/h110

Maximum Range: km600

Gradient: %43

Side Slope: %30

Vertical Step: m0.4

Trench: m0.5

Fording: m1

Note #1: This military vehicle can also tow trailers and light artillery pieces.

Note #2: Vehicle is fitted with a central tyre inflation system and run-flat tyres as standard. Also there is a recovery winch, which also comes as standard.

Main Weapon System

Note: This armored vehicle has a roof hatch and can be fitted with a roof-mounted 7.62 mm or 12.7 mm machine gun machine gun, or 40-mm grenade launcher. Sometimes the Nimr II is even fitted with a heavy machine gun. Depending on customer requirements this vehicle can be fitted with remotely controlled weapon station. Some vehicles are fitted with smoke grenade dischargers.

↳*System*

Name: Caracal Assault Rifle 817

Alternative Designation: CAR 817

Date of Introduction: 2016

Country: United Arab Emirates

Manufactuer: Caracal International company

Caliber: mm7.62

Length, Stock Extended: mm884

Length, Stock Retracted: mm802

Barrel Length: mm406

Weight, Without Magazine: kg3.3

Muzzle Velocity: m/s750

Cyclic Rate of Fire: rds/min650-750

Practical Rate of Fire: rds/min30-90

Magazine Capacity: 10, 20, 25 rounds

Range of Effective Fire: m600

Sight: Iron

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62x51 mm

Protection

Armor: The Hafeet Class features variants with a high degree of protection to enhance survivability of the crew to attack from roadside IEDs, under-vehicle mines and ballistic threats. The Hafeet Class vehicles can be armored with different level of ballistic and blast protection depending on the variant and customer needs. The vehicles can receive standard ballistic protection up to STANAG level IV and standard blast protection up to STANAG level III (a,b).

Applique Armor: Available, There are numerous versions of the Nimr Hafeet. Due to its modular nature the vehicle can be configured to suit various battlefield roles.

Explosive Reactive Armor: No

Active Protection System: INA

NBC Protection: Optional

Smoke Equipment: Available, smoke grenade dischargers

Fire Suppression System: Yes

Protective Net: Protective net against anti-tank rocket launchers

Battle Field Management System: Available

Heat Signature System: Available

RPF Protection System: Available

Notes:

The Hafeet is a family of 6 x 6 armored vehicles developed by Nimr Automotive in the United Arab Emirates to meet a variety of military requirements. The vehicles have a capacity of 28,660 lb (13,000 kg) and can perform missions from utility and transport to armored patrol, according to the manufacturer. Each variant uses the same 6 x 6 chassis to minimize logistics, training and spare-parts management. All Hafeet vehicles can be fitted with armor. The base platform is powered by six-cylinder, in-line diesel engine producing 300 hp. A more powerful 360-hp engine is available as an option. A fully automatic power shift transmission is connected to a two-speed dropbox and provides drive to the vehicle's fully independent double-wishbone portal axles with coil springs and hydraulic dampers. The suspension provides high ground clearance and, coupled with full differential locking and a central tire-inflation system, ensures excellent tactical mobility. The Hafeet is equipped with a generic vehicle compliant electronic architecture that supports intelligent power management; battlefield management systems; and capacity for integration with a variety of communication, battlefield and weapon systems. The vehicle can be fully integrated with a customer's preferred command, control, communications, computers, intelligence, surveillance, target acquisition and reconnaissance (C4ISTAR) systems and advanced weapon systems. Standard equipment includes a power-management system; run-flat tires; central tire-inflation system; and a winch. The Hafeet is powered by a Cummins ISBe 360 6.7-liter diesel engine developing from 286 to 360 hp coupled to an Allison 3200SP six-speed automatic transmission. All variants are equipped with air over hydraulic actuated disc brakes and hydraulic power-assisted steering. Option systems include various levels of ballistic (NATO Standard Agreement Level 1 to Level 4) and blast (Level 1 to Level 3a/b) protection; infrared-signature management; rocket-propelled grenade protection system; and nuclear, biological and chemical (NBC) warfare protection. A variety of camera systems can be equipped, including day and night cameras; a situational awareness system; and a display monitor. A GPS and/or inertial navigation system may also be fitted. A range of armament can be fitted, including 5.56-mm and 7.62-mm machine guns; 12.7-mm heavy machine guns; 40-mm automatic grenade launcher; and 20-mm to 30-mm cannons.

XA-188 Danish 6x6 Armored Personnel Carrier (APC)



Tiers:



Variants:

- **XA-180:** Original six wheeler, carries crew of 2 and 16 troops. Empty weight ca 12 tonnes.
- **XA-185:** Upgraded version, carries crew of 2 and 18 troops. Has a more powerful engine and improved power transmission. Used as an ambulance in the Norwegian Army.
- **XA-186:** Upgraded armour. Armoured and equipped with machine-assisted gun turret (.50 BMG). Cannot swim because of the heavy armour. Empty weight ca 19 tonnes. Engine and transmission same as XA-185.
- **XA-188:** Used by the Netherlands Army.
- **XA-200:** The 200 series looks a little different from older variants due to increased armour. It lacks amphibious capabilities but can wade through water that is up to 1.5 m deep. The improved armour protects the passengers against up to 14.5 mm small arms fire. It is also equipped with modern optical aids like periscopes and night vision. The armor upgrade was initiated after the realisation that the previous armor was inadequate, even modern armor-piercing 7.62 mm ammunition could pierce the older XA-180 and XA-185 models in certain areas. The XA-202 was originally developed for Communications and Command. The XA-203 was made as a temporary replacement for XA-185, and is intended to be replaced by Patria AMVs in Finnish service. The Patria AMV (Armored Modular Vehicle) is an 8×8 multi-role military vehicle produced by the Finnish defence company Patria.

System

Alternative Designation: XA-188
Type: 6x6 Armored Personnel Carrier (APC)
Manufacturer: Patria Vehicles Oy, Hameenlinna, Finland
Family: XA Series
Crew: 2 (commander, driver)
Passenger Capacity: 10 Troops
Note: This is the Dutch/Danish version that has been developed for peacekeeping operations.

Dimensions

Length: 7.35 m
Width: 2.90 m
Height: 2.30 m
Distance between a Axles, 1st to 2nd: 1.90 m
Distance between a Axles, 2nd to 3rd: 1.90 m
Tire Size: 356 x 508 mm

Ground Clearance: 0.40 m

Combat Weight: 15,000 kg

Unloaded Weight: 12,000 kg

Payload Weight, Road: 6,500 kg

Payload Weight, Cross-Country or Swimming: 3,000 kg

Automotive

Engine Name: 1 x Valmet 611

Engine Type: Diesel

Engine Power: 236 hp

Power-to-Weight Ratio: 16.0 hp/metric ton

Transmission: Allison transmission MD 3560PR electronically controlled automatic gearbox with torque converter and retarder.

Suspension: 6 x 6 (6 wheels driving, 4 wheels steering); beam axles, leaf springs and shock absorbers on each wheel station

Maximum Road Speed: 95 kph

Range: 500 km

Main Gun

Turret: A one-man turret

Note: It can be armed with a 7.62-mm or 12.7-mm machine gun mounted on the roof of the vehicle.

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective FIring Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: INA

Protection

Hull Armor: All-welded steel hull provides splinter protection. The basic armor is 0.5-in (12-mm) thick. The hull bottom offers improved mine protection.

Applique Armor: Available, Add-on armor is available as an option, which can protect against threats up to 14.5-mm armor-piercing rounds.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: Yes, five smoke dischargers on each side

Fire Suppression System: Yes

Notes:

XA-188 This is the Dutch/Danish version that has been developed for peacekeeping operations. It can be armed with a 7.62-mm or 12.7-mm machine gun mounted on the roof of the vehicle. The basic armor is 0.5-in (12-mm) thick. The hull bottom offers improved mine protection. Add-on armor is available as an option, which can protect against threats up to 14.5-mm armor-piercing rounds. The Patria Pasi (earlier known as the Sisu Pasi) is a Finnish-made six-wheeled armoured personnel carrier (APC) originally designed for Finnish Defence Forces. The first version was produced in 1983 and serial production began in 1984. It was designed to operate with ease of use, simple structure and low-cost maintenance. The basic appearance and configuration of Patria Pasi is similar to most wheeled APCs. The XA-180 and XA-185 versions are fully amphibious while the XA-203 is not. In 1980, Sisu produced an XA-180 prototype for Finnish Army tests. It competed against two other prototypes, but was declared the winner of the trials in 1983. On 22 December 1983 the Finnish Army ordered a first batch of fifty XA-180s, of which nine were reserved for UN duties. The vehicle proved quite successful and more orders were soon to follow. The XA-180 was originally manufactured and marketed by the Finnish company Sisu Auto but later variants were marketed by the Finnish defence company Patria and are known as Patria XA series.[1] The Vehicle's widely known nickname "Pasi" (also a common given name of Finnish men) stems from the Finnish name "panssari-Sisu" (English: armoured Sisu). The main superstructure is mainly manufactured from 6 to 12 mm of armour steel and the bottom is mine-strengthened, and the front windows are bullet-resistant and equipped with protective hatches. The vehicle has continuous six wheel drive and good capabilities for off-road driving. It can take inclines up to a maximum of 60°. The XA series has no standard armament, but is equipped with a rotating turret structure for installation of light/heavy machine guns or autocannons. It also has 8 BMP style firing ports on the sides and rear. Therefore, passengers, usually a squad of infantry, can fire their weapons from the cover of the armor. The XA series is popular in peacekeeping missions due to its mobility, non-aggressive appearance, and good protection against mines and improvised explosive devices (IED). The vehicle also offers a good combination of armament, comfort, mine protection, protection against shrapnel and small calibre fire, road speed, short time of learning how to drive, and an acceptable terrain mobility. It also offers more internal space compared to other similar vehicles like the Fuchs or BTR-80.

Shorland S55 British 4x4 Armored Personnel Carrier (APC)





Tiers:

1 2 3 4

Variants:

- **Mk 1:** 67 bhp (50 kW) engine
- **Mk 2:** 77 bhp (57 kW) engine
- **Mk 3:** Introduced in 1972 91 bhp (68 kW) engine Thicker armour than Mk 1, Mk 2
- **Mk 4:** Production started in 1980 3.5 litre Rover V8 petrol engine Improved armour over Mk 3
- **Series 5:** Based on the Defender 110 chassis 3.5 litre Rover V8 petrol engine or 2.5 litre Rover Tdi Turbo diesel engine Welded armour fully enclosed body. Versions S5 - Prototype Armoured Patrol Car S51 - Armoured Patrol Car S52 - Armoured Patrol Car S53 - Air Defence Vehicle S54 - Anti-hijack Vehicle S55 - Armoured Personnel Carrier (APC)

System

Alternative Designation: Shorland S55
Type: Armoured Patrol Car
Family: S55 Series
Crew: ea2
Passenger Capacity: ea6
Manufacturer: Short Brothers and Harland

Dimensions

Length: m4.25
Width: m1.8
Height: m2.28
Weight, Combat: kg3,600
Ground Pressure: INA

Automotive

Engine Name: Land Rover 3.5-liter petrol
Engine Type: Petrol
Engine Power: hp134
Cruising Range: km630

Speed, Maximum Road: km/h120

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.23

Trench: m0.4

Fording Depth: m0.8

Communications

Radio: INA

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: No

Protection

Hull Armor: protection against 7.62 mm armor-piercing rounds while the glass-reinforced underside was proof against anti-personnel mines and grenade blasts.

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Available

Windscreens: All windscreens and side windows were bullet resistant while the six occupants in the rear were provided with small vision blocks and firing ports.

Firing Ports: Yes

Notes:

The Shorland is an armoured patrol car that was designed specifically for the Royal Ulster Constabulary by Frederick Butler. The first design meeting took place in November 1961. The third and final prototype was completed in 1964 and the first RUC Shorlands were delivered in 1966. They were reallocated to the Ulster Defence Regiment in 1970. The Royal Ulster Constabulary soon replaced the Shorland with an armoured Land Rover with more conventional profile and no machine gun turret. The vehicles were built by Short Brothers and Harland of Belfast using the chassis from the Series IIA Land Rover. By the nineties, the Land Rover Tangi, designed and built by the Royal Ulster Constabulary's own vehicle engineering team, was by far the most common model of armoured Land Rover. Shorts and Harland continued to develop the original Shorland from an

armoured patrol car with a crew of three to an armoured personnel vehicle, capable of carrying two up front and six in the rear; a small number of these were used on the streets in Northern Ireland as late as 1998.

BTR-152 Russian 6x6 Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-152:** Basic version with open top & no winch that has been converted to other uses such as fire support vehicles, gun trucks, ambulances, or engineer vehicles
- **BTR-152A:** Anti-aircraft variant with twin 14.5-mm MGs mounted in a turret
- **BTR-152D/BTR-152E:** Anti-aircraft version with 4 14.45-mm machine guns
- **BTR-152I:** BTR-152V converted to use as an artillery command vehicle
- **BTR-152 (Model D):** Similar to the BTR-152V3, but with an overhead armor & 2 roof hatches
- **BTR-152V:** Open top with central tire-pressure regulation system (CTPRS)
- **BTR-152V1 (Model B):** BTR-152V with 5000 KG front winch
- **BTR-152V2:** BTR-152V without the winch
- **BTR-152V3 (Model C):** BTR-152V with winch, internal CTPRS air lines & infrared driving lights
- **BTR-152U:** Command vehicle features a high rear structure & CTPRS
- **BTR-152 with ZU-23 Mount (Lebanon):** 2 23-mm anti-aircraft machine guns mounted in troop compartment
- **BTR-152 with Czech M53 (Egypt):** 4 12.7-mm DShKM anti-aircraft MGs mounted in troop compartment
- **Type 56 (China):** Chinese BTR-152 with a different engine

System

Alternative Designations: BTR 150 Type 56 APC (China) BTR-40

Description: Outdated 6 X 6 wheeled APC with rear exit doors, but many variants feature an open roof & very limited armored protection; passenger space for 17 soldiers; 3 firing ports on each side with 2 in rear doors

Manufacturer: Automotive Factory No. 2 Zavod imeni Stalina (until 1956) Automotive Factory No. 2 Zavod imeni Likhacheva (from 1956 to 1962)

Crew: ea2 (driver, commander)

Passengers: ea18

Dimensions

Chassis Length Overall: m6.55

Width: m2.32

Height: m2.40

Weight: kg8,600

Automotive

Engine Name: ZIS-123 6-cylinder in-line water-cooled petrol (for variants based on ZiS-151)

Engine Type: Water-cooled, in-line, 6-cylinder gasoline

Engine Power: hp110

Cruising Range: kg600-650

Speed (Max Road): km/h75

Speed (Max Off-Road): INA

Speed (Max Swim): Not Amphibious

Fording Depths: m0.80

Communications

Radio: 10RT-12 or R-123

Main Weapon System

Note #1: The 12.7 mm DShK 1938/46 heavy machine gun (500 rounds) can be used instead)

Note #2: Secondary Armament would consist of 2×7.62mm SGMB light machine guns (1,250–1,750 rounds) on side pintel mounts (optional)

↳*System*

Name: SG-43 Goryunov

Type: 7.62mm Medium Machine Gun

Manufacturer: P.M. Goryunov

In Service: 1943-Present

Length: mm1,150

Barrel Length: mm720

Action: Gas-Operated

Rate of Fire: rds/min500-700

Effective Firing Range: m1100

Maximum firing range: m1,500

Feed System: 200 or 250 round belts

Sights: Iron Sights

Variants: SG-43, SGM, SGMT, SGMB

↳*Ammunition*

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s800

Basic Load: ea1,000

Protection

Armor Type: Welded Steel

Armor, Front: mm15

Armor, Sides and Rear: mm9

Armor, Roof: mm10

Armor, Bottom: mm4

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection System: Yes

Self-entrenching Blade: No

Smoke Equipment: INA

Survivability Equipment: No

Notes:

The BTR-152 (also known as BTR-140) was a six-wheeled Soviet armored personnel carrier built on the chassis and drive train of a ZiS-151 utility truck. It entered service with a number of Warsaw Pact member states beginning in 1950, and formed the mainstay of Soviet motor rifle battalions until the advent of the amphibious BTR-60 series during the 1960s. BTR-152s were available in several marks, and were manufactured in large numbers for the Soviet military and export. Late production models utilized automotive components from the more reliable ZIL-157 truck. Three primary variants of the BTR-152 appeared between 1950 and 1959: the base armored personnel carrier with a single pintle-mounted 7.62mm or 12.7mm machine gun, an unarmed command vehicle with a higher roofline, and an anti-aircraft variant armed with a ZPU-2 mount. BTR-152s could carry a single infantry squad each, or specialist weapons teams along with their mortars and anti-tank equipment. In Soviet service, a number were also deployed as artillery tractors. The BTR-152 is a modified truck chassis with an armored hull and an open-topped troop compartment. The sides and rear of the troop compartment are vertical, with corners sloping inwards to deflect shell fragments. There are firing ports on each side of the troop compartment and two rear doors for rapid debarking. Infantrymen can fire their individual weapons from the relative protection of the vehicle, and exit through these doors or by jumping over the sides. The crew consists of a driver and a single passenger, who operates the radios. Two types of seating arrangements were available: the first consists of wooden benches on either side of the troop compartment facing inwards; the second consisted of three rows of seats facing forward. Both the driver and the radio operator seated to his right are provided with individual windscreens and, when in combat, these are covered by twin armored shutters with integral vision blocks. Crew members exit the vehicle through side doors, the tops of which are hinged and fold down for observation purposes. The BTR-152's armor plate is fabricated of welded steel and ranges from 4 mm (0.16 in) to 13.5 mm (0.53 in) in thickness. This protects the crew and passengers from small arms fire, shell fragments, grenades, and anti-personnel mines, but is ineffective against larger shell fragments or even heavy machine gun fire. Late production hulls may have been manufactured from steel plate with a thickness of up to 15 mm (0.59 in). The vehicle is sometimes fitted with a winch that has a maximum capacity of 5 tonnes and a 70m cable. Depending on the variant, BTR-152s can tow field artillery, transport 1.9 tonnes of cargo, or carry a half platoon of infantry. Most Soviet BTR-152s were powered by a six-cylinder ZiL-123 in-line water-cooled petrol engine developing 110 hp at 2,900 rpm. Those based on the chassis and components of the ZiL-157 utility truck utilized a slightly different ZiL-137K engine. There are several engine louvers on the front of the hull to prevent overheating; these could be safely closed for short intervals during combat, as long as the driver reduced speed and avoided overtaxing the vehicle. A BTR-152's gearbox comprised five forward gears and one reverse gear with a two-speed transfer box. Fifth gear had an overdrive. The suspension consisted of conventional leaf springs with hydraulic shock absorbers. In the late 1950s, a little over 200 BTR-152s were produced with enclosed hulls, as opposed to the traditionally open-topped design; these were designated

BTR-152K and BTR-152K1. They were also known unofficially as "BTR-152 Model D" or "BTR-152 M1961" by some Warsaw Pact armies. The enclosed hull reduced situational awareness but allowed for the installation of central heating and an NBC overpressure system. Two hatches opening to the right were installed on the new roofline. The BTR-152 was originally armed with a single pintle-mounted 7.62mm SG-43 Goryunov (SGMB) medium machine gun, fed by 1,250 rounds of stored on-board ammunition. This was mounted behind the driving position. Additional 7.62mm general-purpose machine guns could be mounted on either side of the hull top as needed. The SGMB machine gun could traverse 45 degrees and elevate between -6 and +24 degrees. Some of the BTRs were fitted with single 12.7mm DShK or 14.5mm KPV heavy machine guns in place of the SGMB. Vehicles designated BTR-152A were ground support vehicles with limited air defense capability. BTR-152As carried twin KPVs in a ZPU-2 anti-aircraft mount. Variations included an Egyptian model with a Czechoslovak M53 Quad mounting for four DShKs, which were normally towed on a two-wheeled trailer, and some modified by the Palestine Liberation Organization to accept 23mm ZU-23-2 anti-aircraft guns. Because the original BTR-152 utilized the chassis and engine of the ZiS-151, it shared that truck's maintenance problems and poor cross-country mobility. Later variants, using ZiL-157 components, had more power and larger, single tires that reduced the vehicle's shortcomings but did not entirely eliminate them. Serviceability and reliability remained low.

XA-200 Finish Armored Personnel Carrier (APC)





Tiers:



Variants:

- **XA-202/XA-202S:** This is a command vehicle based on the XA-200 chassis. The hull is divided into four sections: auxiliary power unit (APU) room, engine room, driver/commander compartment and operator room. A ring mount for a 12.7-mm machine gun is fitted above the commander.
- **XA-203/XA-203S:** This is an armored personnel carrier variant with a combat weight of 23 tons, including a payload of 7 tons.
- **XA-220:** This is the latest variant, which was revealed by Patria in mid-2016. The vehicle offers more comfort, mine protection, armor protection, speed, all-terrain mobility and internal space compared to similar platforms, according to the manufacturer.

System

Alternative Designation: XA-200

Type: Armored Personnel Carrier (APC)

Manufacturer: Patria Vehicles, Hameenlinna, Finland

Family: XA Series

Crew: ea2

Passenger Capacity: ea10

Dimensions

Length: 7.45 m

Width: 2.95 m

Height: 2.60 m

Ground Clearance: 0.40 m

Weight, Combat: 22,000 kg

Automotive

Engine Name: Valmet 612DWIBIC (Euro 2)

Engine Type: turbocharged intercooled six-cylinder inline Diesel

Engine Power: 295 hp at 2,000 rpm

Power-to-Weight Ratio: 13.4 hp/ton

Fuel Capacity: 300 liters

Transmission: Allison MD 3560PR automatic w/torque converter(6 forward gears, 1 reverse in high range)

Axles: Sisu

Steering: hydraulic, power steering, first two axles

Brakes: dual circuit pneumatic

Suspensions: parabolic leaf springs with hydraulic shock absorbers

Maximum Speed on Road: 95 kph

Range: 600 km

Gradient: 60 percent

Side Slope: 60 percent

Fording: 1.5 m

Main Gun

Note: 7.62-mm machine gun; or 20-mm AKAN m47D cannon (12 rounds)

Protection

Hull Armor: High hardness welded armored steel

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Available

Smoke Equipment: INA

Notes:

The XA-200 series armoured 6×6 wheeled vehicle is an updated production version of the XA series, of which over 700 vehicles have been produced. The series is manufactured by Patria Vehicles of Hameenlinna, Finland, formerly Sisu Vehicles. The vehicle is in service with the Finnish Army (104 XA-200 armoured personnel carriers), the Swedish Army (86 XA-203S basic vehicles and 18 XA-202S command vehicles) and the Norwegian Army (32 XA-200 armoured personnel carriers). The AMOS advanced mortar system has been integrated on the XA-200 chassis and trialled and evaluated by the Finnish Army. 24 AMOS systems (developed by Patria Hagglunds) were ordered by Finland for integration on the Patria 8×8 armoured modular vehicle.

Supacat 400 British 4x4 Armored Personnel Carrier (APC)



Tiers:



Variants:

- **SPV-600:** This is a 6 x 6 variant planned by Supacat with increased volume and payload.

System

Alternative Designation: Supacat 400; SPV-400
Type: Armored Personnel Carrier (APC)
Manufacturer: Supacat Ltd., Honiton, U.K.
Family: Supacat
Crew: ea2
Passenger Capacity: ea4

Dimensions

Length: 5.36 m
Width: 2.06 m
Height: 2.57 m
Track: 1.62 m
Wheelbase to 2nd axle: 3.15 m
Front Overhang: 1.08 m
Rear Overhang: 1.14 m
Maximum Ground Clearance: 0.38 m
Minimum Ground Clearance: 0.08 m
Gross Weight: 2,000 kg
Payload Weight: 2,000 kg

Automotive

Engine Name: 1 x Cummins
Engine Type: 4.5-liter, 4-cyl diesel

Engine Power: 180 hp

Cruising Range: 600 km

Speed, Maximum Road: km/h120

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 0.75 m

Gradient: 60 percent

Side Slope: 34 percent

Turning Circle, Curb-to-Weight: 11.70 m

Turning Circle, Wall-to-Wall: 12.7 m

Approach Angle: 40 deg

Departure Angle: 38 deg

Ramp over Angle: 155 deg

Protection

Hull Armor: Protection from small arms fire and shell splinters

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Supacat Protected Vehicle 400 (SPV 400) is a further evolution of Supacat's long pedigree of developing relevant and effective military vehicles. Giving soldiers what they need for 21st century operations: superior mobility and protection. Building on previous experience and integrating direct feedback from the operational use of our existing fleet, the SPV 400 takes the performance levels of lightweight protected mobility platforms beyond that currently on offer around the globe. "Fully integrated protection" is the key to the SPV formula which, combined with a cutting edge bespoke automotive solution, offers exceedingly high levels of protection yet remains sufficiently packaged to access the tightest of terrain. The SPV 400 mirrors the "go anywhere" ethos of other Supacat products and provides supreme cross-country performance as well as providing the protection required to operate in an urban environment. The operator's needs and the integration of modern battlefield systems have been considered from the outset so the SPV 400 is a highly attractive and 'useable' solution for 21st Century operations. The SPV 400 patrol variant can be adapted for use by fitting alternative and interchangeable mission pods that include ambulance, logistic, command and open top weapon mounted variants.

FV103 Spartan British Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV103 Spartan
Date of Introduction: 1978
Proliferation: +967 Botswana Iraq 100 vehicles in service Jordan Latvia Nigeria – Unknown number of vehicles in service Oman United Kingdom – In service with the British Army and the Royal Air Force Regiment (1980-1995)

Type: Armored Personnel Carrier (APC)

Manufacturer: Alvis Vehicles, Coventry, England

Family: CVR(T), family

In Service: 1978-1985 (Great Britain) 1978-Present (see proliferation)

Crew: ea3

Troops: ea4

Note: Since the British Army has reorganized, many Spartans have become available from their former employment so are now widely issued as general purpose liaison and patrol vehicles

Dimensions

Length: m5.12

Width: m2.13

Height: m2.26

Weight: tons8.17

Ground Pressure: 0.36 kg/cm sq

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: 195 hp

Cruising Range: 483

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg35

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Main Weapon System

Note: The machine gun can be aimed and fired from within the vehicle

Cupola: No. 16 cupola

↳*System*

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun
Type: 7.62mm General Purpose Machine Gun
Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance
Proliferation: + 1 Million
Max Rate of Fire: rds/min650-1,000
Length, Total: mm1,263
Length, Barrel: mm630
Width: mm118.7
Height: mm263
Weight: 11.8 kg
Action: Gas-operated long-stroke piston, open bolt
Effective Firing Range (Bipod): 800 m
Effective Firing Range (Tripod): 1,800 m
Maximum firing range: 3,500 m
Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt
Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Name: INA
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Muzzle Velocity: m/s840
Basic Load: ea3,000

Fire Control

Name: INA
Computerized FCS: INA
Commander Periscopes: eaeight day periscopes and a monocular sight with a magnification of 1x or 10x
Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.
Gunner Periscopes: ea2
Navigation System: Yes
Night Vision: Rank Precision Industries passive night sight
Note: Some vehicles are fitted with the ZB 298 battlefield surveillance radar

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: Available

Explosive reactive armor: INA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Survivability Equipment: Enhanced mine protection available

Spall Liners: INA

Counter Explosive Device: counter-improvised explosive device (C-IED) systems

Note #1: The rear door has an integral vision block

Note #2: There are no firing ports

Notes:

FV103 Spartan is a tracked armoured personnel carrier of the British Army. It was developed as the APC variant of the Combat Vehicle Reconnaissance (Tracked) family. The vehicle can carry up to seven personnel, including three crew members. Armed with a single machine gun, it is almost indistinguishable from the FV102 Striker in external appearance. Rather than a general personnel carrier for infantry, the Spartan has been used for moving specialist teams, such as anti-aircraft missile teams. An anti-tank variant of the Spartan has been produced, named FV120 Spartan MCT; this is armed with MILAN anti-tank missiles. Nearly 500 Spartans have served with the British armed forces since entering service in 1978; they are now being replaced by newer vehicles. The FV103 Spartan was developed during the 1970s as the Armoured Personnel Carrier (APC) version of the British Army's Combat Vehicle Reconnaissance (Tracked) (CVR(T)) family of armoured fighting vehicles, designed by Alvis plc. The vehicle entered service with the British military in 1978. The Spartan is similar in appearance to the FV102 Striker, except for the missile launcher on the Striker. The Spartan was powered by a 4.2 xk jaguar petrol engine. The vehicle is 5.16 metres (16.9 ft) in length and 2.48 metres (8 ft 2 in) in width. With a ground clearance of 0.33 metres (1 ft 1 in), it has a height of 2.63 metres (8 ft 8 in). As the APC variant of the CVR(T) family, the FV103 has been used by small specialized groups such as mortar fire controller teams, anti aircraft teams and also reconnaissance teams. The vehicle can carry seven personnel, in a combination of three crew members and four passengers or two crew members and five passengers.[6] It is armed with one 7.62 mm L37A1 machine gun, and can have four smoke dischargers on each side. In addition to the APC role, it has also been used as a resupply vehicle for the FV102 Striker, carrying extra Swingfire missiles. The FV103 has combat weight of 10,670 kilograms (23,520 lb). It can achieve a maximum speed of 96 kilometres per hour (60 mph) and has a range of 510 kilometres (320 mi). It is capable of negotiating up to 60% gradients

M113 American Armored Personnel Carrier (APC)





Tiers:



Variants:

- **M113:** Original gasoline version
- **M113A1:** Diesel production model
- **M113A1 Armored Cavalry Assault Vehicle (ACAV):** Armor around the commander's position & 2 extra M-60 MGs
- **M113A2:** Improved engine cooling, better rear fuel cells, & new suspension system
- **M113A2 ARV:** Armored Recovery Vehicle with a 1361 kg auxiliary crane
- **Stretched M113A2:** Prototype with an extra road wheel
- **M113A3:** Bigger engine, yoke steering, Kevlar spall liner, applique liner, external fuel cells
- **M113A3 M/R:** Maintenance/Recovery vehicle with 9000 kg winch & 1360 kg crane
- **M58 Wolf Smoker Generator Carrier:** Vehicle dedicated to produce smoke
- **M106:** M113 with M30 (107-mm) mortar in back with 88-93 rounds
- **M125:** M113 with M29 (81-mm) mortar in back with 114 rounds
- **M163:** M113A1 with turret with M61A1 Vulcan 20-mm 6-barrel Gatling cannon
- **M548:** Unarmored cargo carrier
- **M577:** Command post carrier with built-up rear area & telescopic antenna
- **M577A3:** M113A3 engine with extended hull & 6 road wheels
- **M901:** Improved TOW Vehicle with an Emerson ITV turret with 2 TOW tubes with an additional 10 missiles
- **M981:** Fire Support Vehicle (FSV) with laser designator & improved commo gear
- **M1059 Lynx:** M113A2 with M157 smoke generator system
- **M1064A3:** M113A3 with Soltan (120-mm) mortar with 60 rounds
- **M1068A3:** Modified M113 into the Standard Integrated Command Post (SICP)
- **M113 Ambulance:** Various versions available
- **M113 with Dozer Blade:** M113s with trim vane removed to be fitted with a bulldozer kit
- **M113 HAZMAT:** Stretched M113A3 for spills

System

Alternative Designations: M113 APC. This APC has many different Variants

Description: Tracked APC with rear ramp (door also) for 11 soldiers to dismount. Soldiers must expose themselves through the roof of the vehicle to fire their weapons. No firing ports.

Manufacturer: INA

Crew: ea2 (driver, commander)

Passengers: ea11

Note #1: The M113 and variants are the most widely produced and utilized APC of the Western World.

Note #2: There were 4,947 M113 APC's produced for the U.S. Army and 9,839 under the Foreign Military Sales (FMS) program

Dimesions

Length: 5.3

Width: m3

Height: m1.85

Weight: tons14

Automotive

Engine Name: Chrysler 75M petrol

Engine Type: Detroit Diesel water-cooled, 2-stroke, V-6

Engine Power: hp209

Cruising Range: km483

Speed (Max Road): km/h66

Speed (Max Off-Road): km/h35

Speed (Average cross-country): INA

Speed (Max Swim): km/h5.8

Ground pressure (kg/cm2): 0.55

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1.7

Fording Depths (m): Amphibious

Gearbox: General Motors TX-200 manual gearbox

Note: On water it is propelled by spinning its tracks

Communications

Primary: Varies depending on model

Main Weapon System

Note: 12.7 mm machine gun mounted over commander's hatch

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7mm

In Service: 1933-Present

Proliferation: Over 3 Million

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod: 58 kg

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Action: Short recoil-operated

Effective Range: 1,800-2,000 m

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Fire Control

FCS Name: INA

Computerized FCS: No

Protection

Armor (turret front): Protection of the M113 was rather limited. All-round protection is against 7.62 mm ball rounds and artillery shell splinters. At close range the M113 would be penetrated by 12.7 mm heavy machine gun rounds

Applique Armor: Yes, on the bottom of the APC

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: Available

NBC Protection System: Yes

Smoke Equipment: No

Survivability Equipment: Anti-mine armor on bottom

Note: Up to 40% of vehicle components are manufactured from light alloys

Notes:

The M113 armoured personnel carrier was developed by the FMC (Food Machinery Corp.) based on M59 and M75 armoured personnel carriers from the 1950s. The first prototype of M113 was produced in 1957. The US Army adopted the vehicle in 1960. Kaiser Aluminum and Chemical produced the aluminium required for the development of M113. FMC transferred the production of M113 vehicles to its new subsidiary, the United Defense in 1994. United Defense was acquired by BAE in 2005. As of November 2011, more than 80,000 M113 vehicles were produced in different variants. The vehicle is operational in more than 44 countries. The M113 is a fully tracked armored personnel carrier (APC) that was developed and produced by the Food Machinery Corp (FMC). The M113 was sent to USAREUR to replace the mechanized infantry's M59 APCs in the 1961/62 time frame. The M113 was first tried out in combat in April 1962 after the United States provided the South Vietnamese Army (ARVN) with heavy weaponry such as the M113, under the Military Assistance Command, Vietnam (MACV) program. Eventually, the M113 was the most widely used armored vehicle of the U.S. Army in the Vietnam War, earning the nickname 'Green Dragon'[dubious – discuss][citation needed] by the Viet Cong as it was used to break through heavy thickets in the midst of the

jungle to attack and overrun enemy positions. It was largely known as an "APC" or an "ACAV" (armored cavalry assault vehicle) by the allied forces. The M113 was the first aluminum hull combat vehicle to be put into mass production, it introduced new aluminum armor that made the vehicle much lighter than earlier vehicles; it was thick enough to protect the crew and passengers against small arms fire but light enough that the vehicle was air transportable and moderately amphibious. In the U.S. Army, the M113 series have long been replaced as front-line combat vehicles by the M2 and M3 Bradleys, but large numbers are still used in support roles such as armored ambulance, mortar carrier, engineer vehicle, and command vehicle. The U.S. Army's heavy brigade combat teams are equipped with approximately 6,000 M113s and 4,000 Bradleys. The M113's versatility spawned a wide variety of adaptations that live on worldwide, and in U.S. service. These variants together currently represent about half of U.S. Army armored vehicles. To date, it is estimated that over 80,000 M113s of all types have been produced and used by over 50 countries worldwide, making it one of the most widely used armored fighting vehicles of all time. The Military Channel's Top Ten series named the M113 the most significant infantry vehicle in history. The U.S. Army planned to retire the M113 family of vehicles by 2018, seeking replacement with the GCV Infantry Fighting Vehicle program, but now replacement of the M113 has fallen to the Armored Multi-Purpose Vehicle (AMPV) program. Thousands of M113s continue to see combat service in the Israel Defense Forces, although as of 2014 the IDF was seeking to gradually replace many of its 6,000 M113s, with Namer APCs.

SBA-60K2 Bulat Russian Armored Personnel Carrier (APC)



Tiers:

1 2 3 4

System

Alternative Designation: SBA-60K2 Bulat

Type: Armored Personnel Carrier

Crew: ea2

Passenger Capacity: ea8

Dimensions

Length: 8 m

Width: 2.5 m

Height: 2.6 m

Weight, Combat: 15.9–19.5 t

Ground Pressure: INA

Automotive

Engine Name: KamAZ-740.31-240

Engine Type: Diesel

Engine Power: hp240

Range: km800

Speed, Maximum Road: km/h90

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Weapon System

Note: The SBA-60K2 Bulat can be equipped with either 1 × 7.62-mm or 12.7-mm Machine Guns

Fire Control

Name: INA

Computerized FCS: No

Protection

Hull Armor: The armour on the Bulat can withstand direct hits from 7.62 mm calibre weapons.[4] The vehicle features prominent, high-angled plated armour meant to deflect small-arms' rounds and artillery shell shrapnel, and features a V-shaped hull to increase protection against mine and IED blasts, with the bottom of the hull being resistant to explosions equivalent to 1 kg of TNT. The Bulat is also fitted with mine-resistant seats.

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The SBA-60K2 Bulat armored personnel carrier (APC) was developed jointly by Kamaz and Zaschita corporation as a private venture. Development of this vehicle commenced in 2010 and was completed by 2013. It is a further development of the earlier BPM-97 6x6 wheeled mine-resistant, ambush protected (MRAP) vehicle. Russia currently employs 15 Bulat vehicles received in late 2014, and ordered a new batch of further 50 vehicles from the Russian manufacturer Zashcita. The layout of the Bulat SBA-60-K2 is very similar to the old Soviet-built BTR-152, with the engine being placed at the front, the commander and driver are seated behind the engine, and the troop compartment placed at the rear. The Bulat APC consists on a KamAZ-5350 6x6 wheeled utility truck chassis fitted with a fully enclosed armored hull, and can be employed in many roles, including: transportation of soldiers and equipment, patrol and convoy escort duties, and Mine & IED clearance. The troop compartment has room for 8 fully equipped soldiers plus 2 crew members. The soldiers enter and exit the vehicle through the twin doors placed at the rear of the hull which open outwards, and each door is fitted with one single bulletproof glass window and one firing port. The roof of the crew compartment is fitted with 6 hatches, and both sides of the hull can be fitted with three to four bulletproof glass windows with a single firing port beneath each window. The Bulat APC is powered by a KamAZ-740.31-240 turbocharged diesel engine developing 240 hp, which is mated with a 10-speed manual transmission. Although built on a wheeled 6x6 configuration, it has a limited cross-country capability, being fitted with a central tyre inflation system and a self-recovery winch. Standard equipment includes air conditioning, an engine fire suppression system, and special racks for rifles and other personal weapons. There are a number of other available options, including a satellite-based land navigation system, cameras for 360-degree situational awareness, and additional heating. The armour on the Bulat can withstand direct hits from 7.62 mm calibre weapons. The vehicle features prominent, high-angled plated armour meant to deflect small-arms' rounds and artillery shell shrapnel, and features a V-shaped hull to increase protection against mine and IED blasts, with the bottom of the hull being resistant to explosions equivalent to 1 kg of TNT. The Bulat is also fitted with mine-resistant seats.

M113A1 American Armored Personnel Carrier (APC)





Tiers:

1 2 3 4

Variants:

- **M113:** Original gasoline version
- **M113A1:** Diesel production model
- **M113A1 Armored Cavalry Assault Vehicle (ACAV):** Armor around the commander's position & 2 extra M-60 MGs
- **M113A2:** Improved engine cooling, better rear fuel cells, & new suspension system
- **M113A2 ARV:** Armored Recovery Vehicle with a 1361 kg auxiliary crane
- **Stretched M113A2:** Prototype with an extra road wheel
- **M113A3:** Bigger engine, yoke steering, Kevlar spall liner, applique liner, external fuel cells
- **M113A3 M/R:** Maintenance/Recovery vehicle with 9000 kg winch & 1360 kg crane
- **M58 Wolf Smoker Generator Carrier:** Vehicle dedicated to produce smoke
- **M106:** M113 with M30 (107-mm) mortar in back with 88-93 rounds
- **M125:** M113 with M29 (81-mm) mortar in back with 114 rounds
- **M163:** M113A1 with turret with M61A1 Vulcan 20-mm 6-barrel Gatling cannon
- **M548:** Unarmored cargo carrier
- **M577:** Command post carrier with built-up rear area & telescopic antenna
- **M577A3:** M113A3 engine with extended hull & 6 road wheels
- **M901:** Improved TOW Vehicle with an Emerson ITV turret with 2 TOW tubes with an additional 10 missiles
- **M981:** Fire Support Vehicle (FSV) with laser designator & improved commo gear
- **M1059 Lynx:** M113A2 with M157 smoke generator system
- **M1064A3:** M113A3 with Soltan (120-mm) mortar with 60 rounds
- **M1068A3:** Modified M113 into the Standard Integrated Command Post (SICP)
- **M113 Ambulance:** Various versions available
- **M113 with Dozer Blade:** M113s with trim vane removed to be fitted with a bulldozer kit
- **M113 HAZMAT:** Stretched M113A3 for spills

System

Alternative Designations: M113A1 APC. This APC has many different Variants

Proliferation: 80,000 (all variants) Albania [N/A] Afghanistan [173] (M113A2) Argentina [408] Australia [598 + 119 in storage] Bahrain [110] (M113A2) Belgium [N/A] Benin [12] Bolivia [60] Bosnia-Herzegovina [80 (M113A2) Brazil [584] Cambodia [N/A] Canada [235] (M113A2/M113A3(+)) Chile [252] (M113A1/A2) [N/A] M113C/R Democratic Republic of the Congo [N/A] Denmark [433] (M113G3 (172 in storage, awaiting disposal) Ecuador [15] Egypt [2,600] (M113A1/M113A2) Germany [816] Greece [1,685] (M113A1/M113A2) Guatemala [10] (M113 APC (+5 in storage) Iran [200] (M113A1) Iraq

[1,026+] (M113A1/A2/A3) Israel [6,131] (M113A1/A2 Zelda) Italy [396] (M113A1/M113A2) Jordan [1,391] (M113A1/A2) Kuwait [230] (M113A2) Lebanon [1,164] (M113A1/M113A2) Libya [35] (M113A1) Lithuania [26] (M577V2) Morocco [400] (M113A1) Norway [500] Pakistan [1,100] (M113A1) Peru [120] (M113A1B3) Philippines [80] Portugal [214] (M113A1/A2) Saudi Arabia [1,650] Singapore [750] (M113A1/2) Somalia [N/A] South Korea [420] Spain [1,313] Sudan [36] Switzerland [N/A] (being scrapped) Taiwan [650] (M113) [225] (CM21 [M113 APC w/20-mm cannon]) Thailand [430] (M113A1/A2/A3) Tunisia [40] (M113A1/A2) Turkey [2,813] (M113A1/M113A2) Ukraine [N/A] Uruguay [24] USA [3,943] (M113A2/A3) Vietnam [200] Yemen [76] (M113/M113A1)

Description: Tracked APC with rear ramp (door also) for 11 soldiers to dismount. Soldiers must expose themselves through the roof of the vehicle to fire their weapons. No firing ports.

Manufacturer: INA

In Service: 1964-Present

Crew: ea2 (driver, commander)

Passengers: ea11

Note #1: The M113 and its variants are the most widely produced and utilized APC of the Western World.

Note #2: There were over 16,000 M113A1's produced for the U.S. Army and more than 7,000 for FMS.

Dimesions

Length: 5.3

Width: m3

Height: m1.85

Weight: tons14

Automotive

Engine Name: General Motors 6V53T

Engine Type: V6 diesel engine

Engine Power: hp275

Cruising Range: km483

Speed (Max Road): km/h66

Speed (Max Off-Road): km/h35

Speed (Average cross-country): INA

Speed (Max Swim): km/h5.8

Ground pressure (kg/cm2): 0.55

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1.7

Fording Depths (m): Amphibious

Gearbox: Automatic gearbox.

Note: On water it is propelled by spinning its tracks

Communications

Primary: Varies depending on model and country

Main Weapon System

Note: 12.7 mm machine gun mounted over commander's hatch

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7mm

In Service: 1933-Present

Proliferation: Over 3 Million

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod: 58 kg

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Action: Short recoil-operated

Effective Range: 1,800-2,000 m

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Fire Control

FCS Name: INA

Computerized FCS: No

Protection

Armor (turret front): Protection of the M113A1 was rather limited. All-round protection is against 7.62 mm ball rounds and artillery shell splinters. At close range the M113 would be penetrated by 12.7 mm heavy machine gun rounds

Applique Armor: Yes, on the bottom of the APC

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: Available

NBC Protection System: Yes

Smoke Equipment: No

Survivability Equipment: Anti-mine armor on bottom

Note: Up to 40% of vehicle components are manufactured from light alloys

Notes:

The M113A1, informally known as the Gavin, is a lightly armoured full tracked air transportable personnel carrier designed to carry personnel and certain types of cargo. The M113-family was developed from M59 and M75 by Ford and Kaiser Aluminium and Chemical Co. in the late 1950´s. The vehicle is capable of: amphibious operations in streams and lakes; extended cross country travel over rough terrain; and high speed operation on improved roads and highways. The M113 Family includes approximately 12 variants of light armored tracked vehicles used in a variety of combat and combat support roles. Total density exceeds 28,000. Today's M113 Family of Vehicles is composed of a mix of derivative systems consisting of the A1, A2, and A3 configurations. The current fleet includes: M113A2; M113A3; M106A2; M1064; M1064A3; M548A1; M548A3; M577A2; M577A3; M730A2; M901A1; M981; M1068; M1068A3; M1059; and M1059A3. Over the next 10-15 years, the majority of these systems will be converted to the A3 configuration. Since their initial introduction in 1960, M113-based systems have entered service in more than 50 countries. The systems have been modified into more than 40 identified specific variants, with many times that number of minor field modifications. Many of these modifications have been developed by foreign governments to meet their specific national requirements. While some older M113 derivatives are being retired and removed from selected inventories, other FOV members are being upgraded, reconfigured, and introduced as entirely new systems. More than 80,000 M113 Family of Vehicle (FOV) systems have been produced. New M113 FOV systems are being built while existing chassis are being upgraded to modern configurations. The M113 APC was the first modern "battle taxi"; developed to transport infantry forces on the mechanized battlefield. It is fitted with a 2 stroke six cylinder Detroit diesel providing power through a 3 speed automatic gearbox and steering differential. The main armament is a single .50 Cal heavy barrel machine gun, and the secondary armament is a single .30 Cal machine gun. The M113 is built of aircraft quality aluminum which allows it to possess some of the same strengths as steel at a much lighter weight. This distinct weight advantage allows the M113 to utilize a relatively small engine to power the vehicle, as well as carry a large payload cross-country. The vehicle is capable of "swimming" bodies of water. The vehicle is not mission capable if any one track shoe is damaged. If the M113 loses a track, breaks a track shoe or the vehicle throws a track, extreme caution must be exercised in maintaining control. The driver must immediately release the accelerator and let the vehicle coast to a stop. Applying braking action, i.e. brake pedal, laterals, pivot or any type of steering controls causes the vehicle to pull to the active or good track and could result in a roll-over. If it is absolutely necessary, the driver may apply braking action only, and only if the vehicle is approaching a ravine, a cliff, or if other catastrophic outcome, probably resulting in fatalities. When roll-over is imminent; it is safer to stay in the vehicle than to try to get out while the vehicle is still moving. Crew members may receive slight injuries from being thrown against metal parts, but if they try to leave the vehicle, it may roll over and crush them. Once the vehicle stops moving, the crew should get out as fast as possible because spilled fuel and oil may catch on fire. The first thing the driver should do in such an emergency is shut off the engine and turn off the master switch to minimize the fire hazard.

M113A3 American Armored Personnel Carrier (APC)







Tiers:

1 2 **3** 4

Variants:

- **M113:** Original gasoline version
- **M113A1:** Diesel production model
- **M113A1 Armored Cavalry Assault Vehicle (ACAV):** Armor around the commander's position & 2 extra M-60 MGs
- **M113A2:** Improved engine cooling, better rear fuel cells, & new suspension system
- **M113A2 ARV:** Armored Recovery Vehicle with a 1361 kg auxiliary crane
- **Stretched M113A2:** Prototype with an extra road wheel
- **M113A3:** Bigger engine, yoke steering, Kevlar spall liner, applique liner, external fuel cells
- **M113A3 M/R:** Maintenance/Recovery vehicle with 9000 kg winch & 1360 kg crane
- **M58 Wolf Smoker Generator Carrier:** Vehicle dedicated to produce smoke
- **M106:** M113 with M30 (107-mm) mortar in back with 88-93 rounds
- **M125:** M113 with M29 (81-mm) mortar in back with 114 rounds
- **M163:** M113A1 with turret with M61A1 Vulcan 20-mm 6-barrel Gatling cannon
- **M548:** Unarmored cargo carrier
- **M577:** Command post carrier with built-up rear area & telescopic antenna
- **M577A3:** M113A3 engine with extended hull & 6 road wheels
- **M901:** Improved TOW Vehicle with an Emerson ITV turret with 2 TOW tubes with an additional 10 missiles
- **M981:** Fire Support Vehicle (FSV) with laser designator & improved commo gear
- **M1059 Lynx:** M113A2 with M157 smoke generator system
- **M1064A3:** M113A3 with Soltan (120-mm) mortar with 60 rounds
- **M1068A3:** Modified M113 into the Standard Integrated Command Post (SICP)
- **M113 Ambulance:** Various versions available
- **M113 with Dozer Blade:** M113s with trim vane removed to be fitted with a bulldozer kit
- **M113 HAZMAT:** Stretched M113A3 for spills

System

Alternative Designations: M113A3 APC. The M113 Series APC has many different Variants

Date of Introduction: 1987

Proliferation: 80,000 (all variants) Albania [N/A] Afghanistan [173] (M113A2) Argentina [408] Australia [598 + 119 in storage] Bahrain [110] (M113A2) Belgium [N/A] Benin [12] Bolivia [60] Bosnia-Herzegovina [80 (M113A2) Brazil [584] Cambodia [N/A] Canada [235] (M113A2/M113A3(+)) Chile [252] (M113A1/A2) [N/A] M113C/R Democratic Republic of the

Congo [N/A] Denmark [433] (M113G3 (172 in storage, awaiting disposal) Ecuador [15] Egypt [2,600] (M113A1/M113A2) Germany [816] Greece [1,685] (M113A1/M113A2) Guatemala [10] (M113 APC (+5 in storage) Iran [200] (M113A1) Iraq [1,026+] (M113A1/A2/A3) Israel [6,131] (M113A1/A2 Zelda) Italy [396] (M113A1/M113A2) Jordan [1,391] (M113A1/A2) Kuwait [230] (M113A2) Lebanon [1,164] (M113A1/M113A2) Libya [35] (M113A1) Lithuania [26] (M577V2) Morocco [400] (M113A1) Norway [500] Pakistan [1,100] (M113A1) Peru [120] (M113A1B3) Philippines [80] Portugal [214] (M113A1/A2) Saudi Arabia [1,650] Singapore [750] (M113A1/2) Somalia [N/A] South Korea [420] Spain [1,313] Sudan [36] Switzerland [N/A] (being scrapped) Taiwan [650] (M113) [225] (CM21 [M113 APC w/20-mm cannon]) Thailand [430] (M113A1/A2/A3) Tunisia [40] (M113A1/A2) Turkey [2,813] (M113A1/M113A2) Ukraine [N/A] Uruguay [24] USA [3,943] (M113A2/A3) Vietnam [200] Yemen [76] (M113/M113A1)

Description: Tracked APC with rear ramp (door also) for 11 soldiers to dismount. Soldiers must expose themselves through the roof of the vehicle to fire their weapons. No firing ports.

Manufacturer: INA

In Service: 1987-Present

Crew: ea2 (driver, commander)

Passengers: ea11

Payload: 10 tonnes (in addition to the vehicle's own weight)

Note #1: The M113 and its variants are the most widely produced and utilized APC of the Western World.

Dimesions

Length: 5.29

Width: m2.68

Height: m2.52

Weight: tons12.3

Ground Pressure: 0.6 kg/cm²

Automotive

Engine Name: General Motors 6V53T Diesel

Engine Type: V6 Diesel Engine

Engine Power: hp275

Transmission: Allison X-200-4 or X-200-4A automatic transmission

Cruising Range: km480

Speed (Max Road): km/h72

Speed (Max Off-Road): km/h35

Speed (Average cross-country): INA

Speed (Max Swim): km/h5.0

Gradient: deg60

Ground pressure (kg/cm2): 0.55

Side Slope: deg30

Vertical Step: m0.6

Trench: m1.7

Fording Depths (m): Amphibious

Gearbox: Automatic gearbox, upgraded from the M113A2

External Fuel Cells: Yes

Shock-Absorbent Seats: Yes

Suspension: Torsion bar suspension

Fuel Capacity: 360 Liters

Note: On water it is propelled by spinning its tracks

Communications

Primary: Varies depending on model and country

Note: The Radio equipment is a upgrade over the M113A2

Main Weapon System

Note #1: At the middle-front-center of the roof is the commander's cupola, which has a skate mount for a machine gun, and 5 vision block periscopes

Note #2: The M113A3's skate mount can be fitted with a variety of different weapons, including a 7.62 mm M240 machine gun, a 12.7 mm M2HB heavy machine gun, or a 40 mm Mk.19 automatic grenade launcher.

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7mm

In Service: 1933-Present

Proliferation: Over 3 Million

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod: 58 kg

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Action: Short recoil-operated

Effective Range: 1,800-2,000 m

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Fire Control

FCS Name: INA

Computerized FCS: No

Night Vision: image intensification night vision equipment as standard features

Protection

Armor Type: 5083 aluminum alloy

Armor, Frontal Arc: 44mm thick

Armor, Sides, Rear and Roof: 38mm thick

Armor, Belly: 28mm thick

Applique Armor: Yes, not only on the bottom of the APC, but throughout the hull

Spall Liners: Yes

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: Available

NBC Protection System: Yes

Smoke Equipment: No

Survivability Equipment: Anti-mine armor on bottom

Bar Armor Cage: Avaialble

Note: Up to 40% of vehicle components are manufactured from light alloys

Notes:

The A3 generation of the M113 family of vehicles is a major, comprehensive upgrade for the entire range of M113 variants. The intent of this upgrade was to increase the overall performance of the US Army's M113 fleet, which was the workhorse of its armored forces in the 1980s (over 20 000 M113s and its variants were in US service then). While previous M113 models were considered to have adequate firepower for an Armored Personnel Carrier (APC), their protection was considered lacking, and their mobility attributes outdated. With 209 hp and a top speed of 64 km/h, the earlier M113A2 would lag behind the 72 km/h M1 Abrams MBT and M2 Bradley IFV. Fully replacing the M113 family of vehicles with Bradley variants had already proven technically, logistically, and fiscally impossible, which necessitated upgrading the M113s instead of replacing them. The decision to proceed with this upgrade was made in 1984. Collectively known as the RISE upgrade (Reliability Improvements for Selected Equipment), the vehicle that would become the M113A3 was planned to be fitted with spall liners, a more powerful engine and transmission, new controls in the driver's station, external fuel cells, shock-absorbent seats, new brakes, and provisions for appliqué armor. Starting in 1987, all new-built M113s were made to 'A3 standard, and all upgrades have been to 'A3 since 1989.

Type 63 (YW531) Chinese Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Type 531 (1963):** Basic version with Type 56 7.62 mm machine gun, not mass-produced
- **ype A531 or Type 63 (1968):** Production variant with 12.7 mm machine gun Type 54, uprated engine and different transmission. Also known as Type 531A.
- **VTT-323:** North Korean version of the Type A531
- **Type B531 or Type 63-I (1981:** Improved version with stronger suspension, additional firing ports and two additional roof hatches.
- **Type 63C:** PLA version of the YW531C
- **Type 63CA:** PLA version of the YW531E
- **Type WZ701:** Command version of the Type A531 with higher troop compartment and fitted with up to five radios (Type 889, Type 892, Type 70-2B) and a generator. Armament consists of a Type 56-1 machine gun of 7.62 mm.
- **Type WZ721:** Communications relay vehicle with higher roof line and ZZT1 set.
- **Type WZ750:** Armoured ambulance with higher roof line, unarmed.
- **Type WZ302 or Type 54-1/Type 63-1 SPH:** Self-propelled artillery version of the Type B531 mounting a 122 mm Type 54-I howitzer. An improved version, the Type 70 [zh], has a longer chassis. Both vehicles also mount a Type 67 machine gun.
- **Type WZ303 or Type 70 MRL:** Rocket artillery version of the Type A531 with 19-tube 130 mm multiple rocket launcher (similar to the BM-14 MRL)
- **Type YD801:** Fire fighting vehicle
- **ZZM88:** Cryptography vehicle. Program begun in July 1984 and entered service in August 1992. Used to provide cryptographic codes for other vehicles.
- **Type WZ534:** (Type 89)
- **Type YW531C (1982):** Export version of the 531 series with German Deutz engine KHD BF8L of 320 hp (240 kW). The machine gunner's position front right was deleted
- **Type YW531D:** Modified version with only 1 instead of 2 firing ports on the left side
- **Type YW531E:** As per YW531D but with one additional radio Type 892
- **Type YW701:** Export version of the Type WZ701 command post vehicle. Based on the Type YW531C and equipped with a commander's cupola with Type 54 machine gun. Improved version Type YW701A
- **Type YW750:** Export version of the Type WZ750 armoured ambulance. Based on the Type YW531C and equipped with a commander's cupola with Type 54 machine gun.
- **Type YW304:** Self-propelled 82 mm mortar with 120 rounds, based on the Type YW531C/Type 531H.
- **Type YW381:** Self-propelled 120 mm mortar with 50 rounds, based on the Type YW531C
- **Type YW531H:** (Type 85)

System

Alternative Designation: YW-531, Type 63
Manufacturer: NORINCO
Type: Armored Personnel Carrier (APC)
Family: Type 63

Crew: ea2

Passenger Capacity: ea13

Dimensions

Length: m5.476

Width: m2.978

Height: m2.58

Weight, Combat: tons12.6

Ground Pressure: kg/mINA

Automotive

Engine Name: KHD BF8L 413F

Engine Type: 8-cylinder air-cooled, turbo-charged Diesel

Engine Power: hp320

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Maximum Off-Road: km/h46

Speed Maximum Swim: km/hINA

Suspension: torsion bar

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Communications

↳***TBR-121***

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Type 54 (DShKM)

Type: 12.7mm Type 54 Heavy Machine Gun

Proliferation: over 1 Million

Max Rate of Fire: rds/min600

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Traverse Range: deg360

Maximum Elevation: deg+90

Minimum Elevation: degINA

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: ea2,400

Maximum Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes, the Commander has a periscope at the top surface that can rotate 360 deg

Thermal Sight Gunner: Yes, two day periscopes which cover the front and right of the vehicle. One of the drivers periscopes can be replaced by a night vision device.

Main Gun Stabilization: INA

Protection

Hull Armor: 14mm maximum, welded steel

Turret Armor: 14mm maximum, welded steel

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Notes:

The Type 63 (industrial designation YW531) is a Chinese armoured personnel carrier that entered service in the late 1960s. It was the first armoured vehicle designed in China without Soviet assistance. The design is simple and is comparable to other APCs of its time such as the M113. Approximately 8,000 all types and variants were produced by Norinco. It also equips several armies around the world and has seen action in different conflicts including the Vietnam War, the Sino-Vietnamese War, the Iran–Iraq War, and the Gulf War. The hull is made of welded steel, and provides protection against small arms fire. The vehicle carries a maximum of 15 including crew, which depending on the particular configuration may be two or four, the rest of the passengers are infantry who sit in a compartment at the rear of the vehicle. The driver sits in the front left of the hull, and has a single piece hatch, which opens to the left. The driver is provided with two day periscopes which cover the front and right of the vehicle. One of the drivers periscopes can be replaced by a night vision device. The commander sits on the front right of the hull, and has a single piece hatch which opens to the right. The commander hatch has a periscope on the top surface that may be rotated through 360 degrees. Export variants of the vehicle with BF8L engine did away with the commander's position in the front right of the hull. Behind the driver, on the left side of the hull is a third crew position, which is provided with a hatch that opens to the left, and like the commander's position has a 360-degree rotating periscope. The engine sits to the right rear of the driver. It has a large intake located in the top of the hull, with an exhaust on the right hand side. The engine is either a Type 6150L 260 hp diesel engine or, on export versions, an 8-cylinder air-cooled, turbocharged diesel engine KHD BF8L 413F which develops 320 horsepower at 2,500 rpm. The engine feeds a manual transmission with five forward gears and one reverse gear. Track is driven at the front by a drive sprocket, and passes over four rubber-typed road wheels, then loops over an idler at the rear, before returning to the front again. No return rollers are fitted, the track rests on the top of the road wheels. Suspension is of the torsion bar type. The vehicle has a fuel capacity of 450 litres, which gives it a road range of around 500 kilometers. A 12.7 millimetre calibre machine gun is located in an open mount at the front of a small hatch in the center of the hull which opens into the troop compartment. The gun can traverse through 360 degrees and can be elevated to an angle of 90 degrees. Two roof hatches and a large rear door provide access to the troop compartment. The vehicle is amphibious, a folding trim board stowed at the front of the hull needs to be raised, and the vehicle can then propel itself in the water using its tracks.

M113A2 American Armored Personnel Carrier (APC)





Tiers:



Variants:

- **M113:** Original gasoline version
- **M113A1:** Diesel production model
- **M113A1 Armored Cavalry Assault Vehicle (ACAV):** Armor around the commander's position & 2 extra M-60 MGs
- **M113A2:** Improved engine cooling, better rear fuel cells, & new suspension system
- **M113A2 ARV:** Armored Recovery Vehicle with a 1361 kg auxiliary crane
- **Stretched M113A2:** Prototype with an extra road wheel
- **M113A3:** Bigger engine, yoke steering, Kevlar spall liner, applique liner, external fuel cells
- **M113A3 M/R:** Maintenance/Recovery vehicle with 9000 kg winch & 1360 kg crane
- **M58 Wolf Smoker Generator Carrier:** Vehicle dedicated to produce smoke
- **M106:** M113 with M30 (107-mm) mortar in back with 88-93 rounds
- **M125:** M113 with M29 (81-mm) mortar in back with 114 rounds
- **M163:** M113A1 with turret with M61A1 Vulcan 20-mm 6-barrel Gatling cannon
- **M548:** Unarmored cargo carrier
- **M577:** Command post carrier with built-up rear area & telescopic antenna
- **M577A3:** M113A3 engine with extended hull & 6 road wheels
- **M901:** Improved TOW Vehicle with an Emerson ITV turret with 2 TOW tubes with an additional 10 missiles
- **M981:** Fire Support Vehicle (FSV) with laser designator & improved commo gear
- **M1059 Lynx:** M113A2 with M157 smoke generator system
- **M1064A3:** M113A3 with Soltan (120-mm) mortar with 60 rounds
- **M1068A3:** Modified M113 into the Standard Integrated Command Post (SICP)
- **M113 Ambulance:** Various versions available
- **M113 with Dozer Blade:** M113s with trim vane removed to be fitted with a bulldozer kit
- **M113 HAZMAT:** Stretched M113A3 for spills

System

Alternative Designations: M113A2 APC. This APC has many different Variants
Description: Tracked APC with rear ramp (door also) for 11 soldiers to dismount. Soldiers must expose themselves through the roof of the vehicle to fire their weapons. No firing ports.
Manufacturer: INA
Crew: ea2 (driver, commander)
Passengers: ea11
Note #1: The M113 and its variants are the most widely produced and utilized APC of the Western World.
Note #2: Additionally, there is a M113A2 Armored Recovery Vehicle and a Stretched M113A2

Dimesions

Length: 5.3

Width: m3

Height: m1.85

Weight: tons14.2

Automotive

Engine Name: General Motors 6V53T

Engine Type: V6 diesel engine

Engine Power: hp275

Cruising Range: km483

Speed (Max Road): km/h66

Speed (Max Off-Road): km/h35

Speed (Average cross-country): INA

Speed (Max Swim): km/h5.8

Ground pressure (kg/cm2): 0.55

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1.7

Fording Depths (m): Amphibious

Gearbox: Automatic gearbox.

Suspension: Reinforced suspension

Torsion Bars: Higher-strength torsion bars increased ground clearance

Shock Absorbers: Yes, reducing the effects of ground strikes

Fuel Capacity: 360 Liters

Note: On water it is propelled by spinning its tracks

Communications

Primary: Varies depending on model and country

Main Weapon System

Note: 12.7 mm machine gun mounted over commander's hatch

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7mm

In Service: 1933-Present

Proliferation: Over 3 Million

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod: 58 kg

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Action: Short recoil-operated

Effective Range: 1,800-2,000 m

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Fire Control

FCS Name: INA

Computerized FCS: No

Protection

Armor (turret front): Protection of the M113A1 was rather limited. All-round protection is against 7.62 mm ball rounds and artillery shell splinters. At close range the M113 would be penetrated by 12.7 mm heavy machine gun rounds

Applique Armor: Yes, on the bottom of the APC

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: Available

NBC Protection System: Yes

Smoke Equipment: No

Survivability Equipment: Anti-mine armor on bottom

Armored Fuel Tank: Yes

Note: Up to 40% of vehicle components are manufactured from light alloys

Notes:

The U.S. M113 armored personnel carrier (APC) and its variants are the most widely used of all non-Russian APCs. The M113A2 replaced the M113A1 in production since 1979. It has improved engine cooling equipment and reinforced suspension. A total of

5 300 M113 and 12 700 M113A1 APCs were upgraded to the A2 standard in the USA. In 1979, further upgrades were introduced. Engine cooling was improved by switching the locations of the fan and radiator. Higher-strength torsion bars increased ground clearance, and shock absorbers reduced the effects of ground strikes. Armored fuel tanks were added externally on both sides of the rear ramp, freeing up 0.45 cubic metres (16 cu ft) of internal space. The weight of the M113A2 was increased to 11,740 kilograms (25,880 lb). Because the added weight affected its freeboard when afloat, it was no longer required to be amphibious. Four-tube smoke grenade launchers were also added. The suffix A2 is used on all variants to denote upgrade to A2 standard.

M113AS4 Australian Armored Personnel Carrier (APC)



Tiers:

1 **2** 3 4

Variants:

- **M113AS4 AF:** armored fitted, fitted with a Hiab crane. A total of 38 of these vehicles will be delivered.
- **M113AS4 ARVL:** armored recovery vehicle, fitted with a 13 t capacity winch. A total of 12 of these vehicles will be delivered.
- **M113AS4 AA:** armored ambulance. A total of 15 of these vehicles will be delivered.
- **M113AS4 ACV:** armored command vehicle. A total of 43 of these vehicles will be delivered.
- **M113AS4 ALV:** armored logistics vehicle. It can take all types of combat supplies and carry them under armor. A total of 50 of these vehicles will be delivered.

System

Alternative Designation: M113AS4
Type: Armored Personnel Carrier (APC)
Manufacturer: Australia. Company: INA
Crew: ea2
Passenger Capacity: ea10

Dimensions

Length: 6 m
Width: 2.62 m
Height: 2.6 m
Weight, Combat: 18 tons

Automotive

Engine Name: MTU 6V199TE
Engine Type: Diesel
Engine Power: hp350
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.8 ~ 1.9

Fording Depth: m1.6

Main Gun

Turret: The M113AS4 is fitted with a new one-man turret

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: mm12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Vehicle's hull provides protection against up to 14.5 mm rounds.

Turret Armor: INA

Applique Armor: Protection of the upgraded APC was enhanced by add-on ceramic armor tiles. Hull was reinforced for additional protection against landmines and IED blasts. Interior was fitted with spall liner.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M113AS4 is an Australian-made upgrade of the old M113AS1 and M113AS3 which are based on the American M113A1 tracked armoured personnel carrier (APC), one of the most popular light tracked APC in the world. The project of Australian M113 upgrade was leaded by BAE Systems. The decade long project to upgrade 433 M113 vehicles began in 2002, with the first completed vehicle delivered to the customer in January 2007. While the upgraded Australian M113s look similar to how they would have in the 1970’s, they are ‘a generational leap ahead’ with improved firepower, protection and habitability from the original M113 A1 vehicle. The finished vehicles are also more reliable and faster following the upgrade. The Australian Army operates a fleet of some 800 members of the M113 series of full-tracked armoured personnel carriers in different variants including ambulance, fire support, command post, mortar carrier, recovery and load carrier vehicles. The M113AS4 is currently the standard tracked APC of Australian armed forces. The M113 Armoured Personnel Carrier (APC) is an all-terrain vehicle designed to protect and transport its crew and up to ten Infantry personnel. In September 1996, the Australian Department of Defence selected the now Tenix Defence Systems Pty Ltd, Australia to upgrade 364 of the Australian Army's fleet of M113A1 series of full-tracked Armoured Personnel Carriers (APCs) to extend their operational life through to the year 2010.

BOV-M Slovenian 4x4 Armored Personnel Carrier (APC)







Tiers:



Variants:

- **BOV-M (Slovenia):** Some built with 12.7-mm MGs
- **BOV-VP:** Security version with swing out gates to direct crowds
- **BOV-1/Polo M-83:** Sans troop compartment with 2 ATGM launcher pods with 3 AT-3 launchers each with machine gun mounted before the two AT-3s
- **BOV-3:** 3 turret-mounted 20-mm cannons for air defense
- **BOV-30:** 2 turret-mounted 30-mm cannons for air defense
- **LOV (Croatia):** No raised compartment, increased hull protection, but with a 12.7-mm machine gun
- **BOV-SN:** Ambulance
- **Yugo import BOV variants:** Serbia has a variants that include SP AA vehicles with the Igla or Stinger missiles or the ZU-23; AT vehicles with the AT-5 Spandrel; or an armored reconnaissance vehicle with a 20-mm M55 cannon, 7.62-mm PKT machine gun with twin AT-3 Sagger AT launchers or a single Spandrel system

System

Alternative Designations: See Variants
Description: 4 X 4 APC built originally by Yugoslavia with space for 8 soldiers to exit through side doors: 3 firing ports on each side & an additional one to the right of the commander’s vision block
Manufacturer: TAM Complex Battle System factory in Velika Plana, Serbia
Crew: ea2 (driver, commander)
Passengers: ea8

Dimensions

Length: m5.79
Width: m2.53
Height, Hull Roof: m2.34

Height, Hull Top: m1.99

Ground Clearance: m0.33

Track: m1.90

Wheelbase: m2.75

Automotive

Engine Name: 1 x German Deutz F 6L 413 F 6-cylinder diesel

Engine Type: Diesel

Engine Power: 150

Transmission: 1 reverse gear, 5 forward gears

Cruising Range (km): km500

Speed (Max Road) (km/h): km/h95

Speed (Max Off-Road) (km/h): km/hINA

Speed (Average cross-country) (km/h): km/h40

Speed (Max Swim): INA

Fuel Capacity: 220 liters

Gradient: deg55

Side Slope: deg30

Vertical Obstacle: m0.54

Trench: m0.64

Fording Depths: m1.10

Turning Radius: m10.0

Brakes: air-hydraulic with a hand-operated parking brake

Suspension: front and rear suspension consists of leaf-type springs with telescopic shock-absorbers

Communications

Radio: INA

Intercom: INA

Main Weapon System

↳*System*

Name: NSV Heavy Machine Gun

Type: Heavy Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

In Service: 1971-Present

Length: mm1,560

Weight, Gun Only: kg25

Weight, On Tripod: kg41

Weight, 50 round belt: kg11

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Effective Firing Range, vs. Air Targets: m1,500

Effective Firing Range, vs. Ground Targets: m2,000

Feed System: 50-round belt

Sights: Iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea2,000

Fire Control

Fire Control System: No

Periscope: ingle forward-facing day periscope in the roof

Passive Periscope: Yes

Searchlight: Yes

Firing Ports: three on each side

Night Vision: Yes

Protection

Armor (turret front) (mm): 6-10-mm (defeats 7.l62-mm AP at 300 m)

Applique Armor (mm): Available on sides for variants

Explosive Reactive Armor (mm): No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: Grill armor over windows

Central Tire Inflation System: Yes

Notes:

The BOV (Serbian: Борбено оклопно возило (БОВ) / Borbeno oklopno vozilo, literally "Combat Armored Vehicle"), is an all-wheel drive armoured vehicle manufactured in the former Yugoslavia and today in Serbia.Currently in development is second generation BOV. The BOV has a capacity of 10, including a driver, gunner and eight infantrymen. The vehicle has a four-wheel

drive and is powered by the Deutz type F 6L 413 F six-cylinder diesel engine developing 150 hp (110 kW) at 2650 rpm

Pandur I Austrian 6x6 Armored Personnel Carrier (APC)







Tiers:



Variants:

- **Pandur 1:** Basic version as in the description
- **Belgian Pandur:** Belgian SMAS radio, NBC protection, armed with 12.7-mm & 7.62-mm machine guns
- **Amphibious Pandur:** Electric bilge pumps, closed air intakes-capable of 11 km/h in water
- **Pandur II:** Pandur II
- **Pandur Anti-Aircraft:** Twin 20-mm cannon or SANTAL SAM in turret
- **Pandur ATGM Carrier:** HOT AT missile in a Euromissile UTM 800 launcher or a TOW AT missile in a Kvaerner-Eurkea turret; additional missiles stored in the hull
- **Pandur Armored Recon/Fire Support Vehicle (FSV):** 2-man LCTS turret with a Cockerill 90-mm Mk 8 gun or a Giat TS-90 turret with a 90-mm CN90F4 gun or Cockerill CSE90 turret with an Mk III 90-mm gun
- **Pandur Mechanized Infantry Combat Vehicle (MICV):** MGTS with a choice of armaments: 12.7-mm M2 & 7.62-mm MGs; 30-mm M230 chain gun & 7.62-mm MG; or 40-mm AGL & 12.7-mm MG
- **Pandur Mortar Carrier:** In the passenger compartment, there is an 81-mm or 120-mm mortar mounted on a turnatable
- **Command & Control Vehicle:** For C2 operations
- **Armored Recovery/Repair Vehicle:** For vehicle recovery operations

System

Alternative Designations: NA
Manufacturer: Steyr-Daimler-Puch
Crew: ea2 (driver, commander)
Passengers: ea8

Dimensions

Length: m5.70
Width: m2.50
Height: m1.82

Ground clearance: m0.43

Wheels, First Axle: m2.15

Wheels, Second Axle: m2.15

Wheels, Third Axle: m2.16

Weight, Unloaded: kg10,300

Weight, Combat: kg13,500

Weight, Maximum Payload: kg3,200

Automotive

Engine Name: 1 x Steyr WD 612.95

Engine Type: 6-cylinder turbocharged water-cooled diesel with air-intake cooling

Engine Power: 260 hp at 2,400 rpm

Power-to-Weight Ratio: 19.25 hp/metric ton at maximum weight

Transmission: Allison MT-653 DR, five speeds, torque converter, lock-up clutch

Cruising Range: km700

Speed (Max Road): km/h100

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim) (km/h): N/A

Grading: deg70

Side Slope: deg40

Vertical Step: m0.5

Trench: m1.1

Fording: m1.2

Fuel Capacity: 275 liters

Suspension: 6 x 6 independent

Turning Radius: m8.50

Communications

Main Weapon System

↳***System***

Name: NSV 12.7mm Heavy Machine Gun

Type: 12.7mm Heavy Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

In Service: 1971-Present

Proliferation: Widely Proliferated

Length: mm1,560

Weight, Gun Only: kg25

Weight, Gun and Tripod: kg41

Weight, 50 Round Belt: kg11

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Effective Firing Range vs Air Targets: m1,500

Effective Firing Range vs Ground Targets: 2,000

Feed System: 50-round belt

Sights: Iron sights

↳*Ammunition*

Type: Rifle

Caliber: 12.7mm

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea1,200

Fire Control

Fire Control System: No

FCS Name: INA

Night Vision: Optional

Navigation: Optional

Protection

Armor (turret front) (mm): Protects against 7.62-mm AP rounds at 30 m

Applique Armor (mm): INA

Explosive Reactive Armor (mm): INA

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: No

Notes:

The Pandur I is an APC developed and produced by the Austrian company Steyr-Daimler-Puch Spezialfahrzeuge (SSF). It was developed during the 1980s as a private venture, based on the Pegaso BMR-600 design.[1] In 2003, General Dynamics took over Steyr-Daimler-Puch which is now part of General Dynamics European Land Systems (GD ELS), which is also the parent company of MOWAG, Santa Bárbara Sistemas and GD ELS – Germany. The baseline vehicle is armed with a 12.7 mm (.50 cal) heavy machine gun. Its modular design allows it to be fitted with a variety of weapon systems, including a 20 mm autocannon

and an armored two-man 90 mm gun turret.

BTR-40 Russian 4x4 Armored Personnel Carrier (APC)





Tiers:

1 2 3 4

Variants:

- **BTR-40A:** 5 person crew fires 2 14.5-mm KPV heavy MGs (2400 rounds) from a ZPTU-2 turret
- **BTR-40B:** Only 6 dismounted soldiers can fit into this vehicle with overhead armor with 4 roof hatches
- **BTR-40Kh:** NBC decontamination vehicle with poles to mark cleared lanes
- **BTR-40 with AT-3 Sagger:** East Germany converted some BTR-40s to ATGM vehicles with a triple launcher under overhead cover
- **BTR-40zhd:** This vehicle uses a metal wheel suspension to travel on railroad lines on scouting missions
- **Type 55 (China):** Chinese BTR-40 with different engine
- **Walid (Egypt):** Variants besides the APC include a smoke rocket launcher or a minelayer vehicle

System

Alternative Designations: Type 55 (China)
Description: 4 X 4 wheeled APC based on the GAZ-63 truck with an open top & a single rear exit door; passenger space for 8 soldiers; 3 firing ports on each side & 2 in the rear door
Manufacturer: Gorkovsky Avtomobilny Zavod unknown Chinese manufacturer
Crew: ea2 (commander, driver)
Passengers: ea8

Dimensions

Length, Hull: m5.0
Width: m1.90
Height: m1.75
Wheelbase: m2.70
Ground Clearance: m0.28
Tire Size: m248 x 457 mm
Weight, Combat: kg5,300

Automotive

Engine Name: GAZ-40
Engine Type: Water-cooled, in-line, 6-cylinder gasoline

Engine Power: 80 hp at 3,400 rpm

Cruising Range: km285

Speed (Max Road): km/h80

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): Not Amphibious

Power-to-Weight Ratio: 5.09 hp/metric ton

Suspension: 4 x 4 (4-wheel drive, 2-wheel steering) longitudinal semi-elliptic springs hydraulic shock absorbers on front, check springs on rear

Gradient: deg60

Vertical Obstacle: m0.47

Trench: 0.70m with ramps

Fording Depths: m0.80

Main Weapon System

Note: There are pintle mounts for 2 machine additional Machine Guns, three firing ports on each side of the hull and 3 firing ports in the rear

↳*System*

Name: SG-43 Goryunov

Type: Medium Machine Gun

Caliber: 7.62mm

Manufacturer: P.M. Goryunov

In Service: 1940-Present

Length: mm1,150

Barrel Length: mm720

Weight, Gun Body: kg13.8

Weight, on Wheeled Mount: kg41

Action: Gas-operated

Rate of Fire: 500–700 rounds/min

Effective Firing Range: m1,100

Maximum Firing Range: m1,500

Feed System: 200 or 250 round belts

Sights: Iron Sights

Maximum Elevation: deg+23.5

Minimum Elevation: deg-6

Traverse Range: def90

Traverse Left: deg45

Traverse Right: deg45

↳***Ammunition***

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s800

Basic Load: ea1,200

Protection

Armor (turret front): mm8 mm

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Survivability Equipment: No

Firing Ports: There are pintle mounts for 2 machine additional Machine Guns, three firing ports on each side of the hull and 3 firing ports in the rear

Notes:

The BTR-40 is a Soviet non-amphibious, wheeled armoured personnel carrier and reconnaissance vehicle. It is often referred to as the Sorokovka in Soviet service. It is also the first mass-produced Soviet APC. It was eventually replaced in the APC role by the BTR-152 and in the scout car role by the BRDM-1. The BTR-40's design was based on the GAZ-63 four wheel drive truck which went into production in 1946. The design featured a self-bearing body which was a new feature in Soviet vehicles. The hull has two side doors for the commander and driver and a back door. The vehicle can transport up to eight fully equipped soldiers or 1 tonne of cargo. The BTR-40's development began in early 1947 at the design bureau of the Gorkovsky Avtomobilny Zavod (Gorkovsky Automobile Factory) under the leadership of V. A. Dedkov. The concept was a successor to the BA-64B armoured car which went out of production in 1946. The design team also included L. W. Kostikin and P.I. Muziukin. Two prototypes designated BTR-141 were completed in 1947. The first was armed with two coaxial 14.5 mm KPVT heavy machine guns on a rotatable mount which was protected by armour plate at the front and sides. The second had no fixed armament. Neither one was accepted for service. In 1950 two new prototypes were produced. Those had a different shape of armour including an upright rear armour. Again one prototype had no fixed armament and the second was armed with two coaxial 14.5 mm KPVT heavy machine guns. These were accepted into service as BTR-40 and BTR-40A respectively. The vehicle's drawbacks, such as its poor cross-country performance and problems with crossing water obstacles, compelled the design team to produce, in late 1954, what was planned to be an amphibious variant of the BTR-40. It received the designation BTR-40P (with the 'P' standing for plavayushchiy – "floating"). During the design process, the vehicle moved away from the APC concept and became an amphibious armoured scout car. It received a new designation, BRDM. The BTR-40's design was based on the GAZ-63 four wheel drive truck which went into production in 1946. The design featured a self-bearing body which was a new feature in Soviet vehicles. The hull has two side doors for the commander and driver and a back door. The vehicle can transport up to eight fully equipped soldiers or 1 tonne of cargo. The BTR-40's armour is from 6 mm to 8 mm thick which gives it protection from small arms fire and the shell splinters of its time, but does not protect it against modern artillery fragments and .50-calibre machine gun fire. The BTR-40-series tyres are not protected by armour. They are particularly vulnerable to puncture from fire of all kinds. The vehicle has no roof and is normally covered with a tarpaulin to protect the crew, transported cargo or troops from rain and snow. However this makes it unable to mount any of the SGMB machine guns. The APC variant has no permanent armament but it has pintle mounts for three 7.62 mm SGMB medium machine guns, one at the front of the troop compartment and the other two at the sides. The vehicle also has two firing ports on both sides of the hull which allow up to four soldiers to use their weapons while being protected by the APC's armour. Like the GAZ-63 truck on which it is based on,

the BTR-40 has a four-wheel drive. The chassis, however, is shorter compared to the GAZ-63. The only other thing that distinguishes the chassis of the BTR-40 from that of the GAZ-63 are additional shock absorbers. The BTR-40 also has a more powerful engine. The turning angle is 7.5 m. The vehicle has the 10RT-12 receiving and airing radio which has a range of 20–25 km and a winch at the front, with a maximum capacity of 4.5 tonnes and 70 m of cable. It has no protection against nuclear, biological and chemical (NBC) weapons. It also has no night vision equipment.

BTR-T Russian Heavy Armored Personnel Carrier (APC)







Tiers:

1 **2** 3 4

System

Alternative Designation: NA
Type: Heavy Infantry Combat Vehicle,
Family: BTR
Manufacturer: Omsktransmash
Crew: ea2
Personnel Capacity: ea5

Dimensions

Length: m6.2
Width: m3.27
Height: m2.5
Weight, Combat: tons38.5
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: hp520
Cruising Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.8

Trench: m2.7

Fording Depth: m1.4

Communications

Radio: INA

Main Gun

Turret Type: low profile turret

Turret Traverse Range: deg360

Turret Traverse Right: deg180

Turret Traverse Left: deg180

Note: At customer's request the following armament complexes are available*: 1. 2A42 automatic gun (caliber 30 mm); Launcher of Konkurs ATGM (caliber 135 mm ; quantity 2 pcs); 2. 2A42 automatic gun (caliber 30 mm); AGS-17 automatic grenade launcher (caliber 30 mm); 3. 2A38 twin-barrel submachine gun (caliber 135 mm ; quantity 2 pcs); 4. NSV anti-air-machine gun (caliber 12.7 mm); Launcher of Konkurs ATGM (caliber 135 mm ; quantity 2 pcs); 5. NSV anti-air machine gun (caliber 12.7 mm); AGS-17 automatic grenade launcher (caliber 30 mm).

↳*System*

Name: Shipunov 2A42

Type: 30mm autocannon.

Manufacturer: Tulamashzavod

In Service: 1980-Present

Length: m3.027

Barrel Length: mm2,416

Weight: kg115

Barrels: ea1

Action: Gas-operated

Rate of Fire, Low: 200-300

Rate of Fire, High: 550-800

Effective Firing Range: 2,000 metres (2,200 yd) (AP-T)

Maximum Firing Range: 4,000 metres (4,400 yd) (HEI)

Feed System: Twin feed

↳ ***Ammunition***

Type: Rifle
Caliber: mm30
Cartridge: mm30 × 165
Muzzle Velocity: m/s960
Basic Load: ea900

Anti-Tank Guided Missile (ATGM)

↳ ***System***

Name: 9M113 Konkurs (AT-5 Spandrel)
Type: Soviet SACLOS wire-guided anti-tank missile.
Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod
Proliferation: Widely Proliferated throughout Asia and the Middle East
In Service: 1970-Present
Length, with Gas Generator: mm1,150
Length, Without Gas Generator: mm875
Diameter: mm135
Wingspan: mm468
Weight, Missile: kg14.6
Weight, 9P135 Launching Post: kg22.5
Wahread Type: 9N131 HEAT
Warhead Weight: kg2.7
Detonation Mechanism: Contact
Engine: Solid-fuel rocket
Operarational Range: 70 m - 4 km
Speed: mm/s208
Guidance system: Wire-guided SACLOS
Steering System: Two control surfaces

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes

Protection

Hull Armor: 600mm
Turret Armor: INA
Applique Armor: Available
Explosive Reactive Armor: Yes
Active Protection System: INA
Mine Clearing: Yes, with additional anti-mine protection plates
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: Yes, smoke grenade dischargers placed in the rear part of the hull
IR Signature: INA
Automatic Fire Suppression Equipment: Yes

Notes:

The BTR-T ‘Armoured Transporter–Heavy’) is a Russian heavy infantry combat vehicle, designed by the Design Bureau of Transport Machine-Building (Omsk Transmash) state-run production association. It is based on the hull of the T-55 tank and answers the need for a heavy, well protected and well armed vehicle adapted to urban combat. The need for a heavy IFV appeared after the First Chechen War during which APCs such as the BTR-80 and BMP-2 suffered heavy losses in urban areas at the hands of Chechen rebels using RPG shoulder-launched anti-tank weapons. As a result, the design incorporates thicker armour, with built-in reactive armour. It also has heavier armament with sufficient elevation to engage targets in multi-story buildings. The choice of the T-55 hull rather than that of a more modern tank was decided as a cost-cutting measure and also probably in order to validate a conversion solution for the many T-55s in use around the world. It was influenced by Israel's IDF Achzarit that created virtually the same modifications in the 1980s. However, no export contracts have been signed.

XA-186 Finish 6x6 Armored Personnel Carrier (APC)







Tiers:



Variants:

- **XA-180:** Original six wheeler, carries crew of 2 and 16 troops. Empty weight ca 12 tonnes.
- **XA-185:** Upgraded version, carries crew of 2 and 18 troops. Has a more powerful engine and improved power transmission. Used as an ambulance in the Norwegian Army.
- **XA-186:** Upgraded armour. Armoured and equipped with machine-assisted gun turret (.50 BMG). Cannot swim because of the heavy armour. Empty weight ca 19 tonnes. Engine and transmission same as XA-185.
- **XA-188:** Used by the Netherlands Army.
- **XA-200:** The 200 series looks a little different from older variants due to increased armour. It lacks amphibious capabilities but can wade through water that is up to 1.5 m deep. The improved armour protects the passengers against up to 14.5 mm small arms fire. It is also equipped with modern optical aids like periscopes and night vision. The armor upgrade was initiated after the realisation that the previous armor was inadequate, even modern armor-piercing 7.62 mm ammunition could pierce the older XA-180 and XA-185 models in certain areas. The XA-202 was originally developed for Communications and Command. The XA-203 was made as a temporary replacement for XA-185, and is intended to be replaced by Patria AMVs in Finnish service. The Patria AMV (Armored Modular Vehicle) is an 8×8 multi-role military vehicle produced by the Finnish defence company Patria.

System

Alternative Designation: XA-186
Type: 6x6 Armored Personnel Carrier (APC)
Manufacturer: Patria Vehicles Oy, Hameenlinna, Finland
Family: XA Series
Crew: 2 (commander, driver)
Passenger Capacity: 10 Troops

Dimensions

Length: 7.35 m

Width: 2.90 m

Height: 2.30 m

Distance between a Axles, 1st to 2nd: 1.90 m

Distance between a Axles, 2nd to 3rd: 1.90 m

Tire Size: 356 x 508 mm

Ground Clearance: 0.40 m

Combat Weight: 15,000 kg

Unloaded Weight: 12,000 kg

Payload Weight, Road: 6,500 kg

Payload Weight, Cross-Country or Swimming: 3,000 kg

Automotive

Engine Name: 1 x Valmet 612 DWI

Engine Type: 451-cu in (7.4-l) liquid-cooled, turbocharged, 4-stroke, 6-cyl inline diesel

Engine Power: 271 hp (202 kW) at 2,500 rpm

Power-to-Weight Ratio: 16.0 hp/metric ton

Transmission: Allison automatic MD 3560P

Suspension: 6 x 6 (6 wheels driving, 4 wheels steering); beam axles, leaf springs and shock absorbers on each wheel station

Maximum Road Speed: 100 kph

Range: 800 km

Main Gun

Turret: A one-man turret

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective FIring Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle
Caliber: 12.7mm
Cartridge: .50 BMG (12.7×99mm NATO)
Basic Load: INA

Protection

Hull Armor: All-welded steel hull provides splinter protection
Applique Armor: Available
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
NBC Protection: Yes
Smoke Equipment: Yes, five smoke dischargers on each side
Fire Suppression System: Yes

Notes:

XA-186 This is an up-armored variant of the XA-185 developed for U.N. peacekeeping missions. The vehicle is fitted with additional passive armor; a one-man turret mounting an M-2HB .50-caliber machine gun with a bank of five smoke dischargers on each side; wire-cutting device on the front of the hull; and additional roof-mounted periscopes. The Patria Pasi (earlier known as the Sisu Pasi) is a Finnish-made six-wheeled armoured personnel carrier (APC) originally designed for Finnish Defence Forces. The first version was produced in 1983 and serial production began in 1984. It was designed to operate with ease of use, simple structure and low-cost maintenance. The basic appearance and configuration of Patria Pasi is similar to most wheeled APCs. The XA-180 and XA-185 versions are fully amphibious while the XA-203 is not. In 1980, Sisu produced an XA-180 prototype for Finnish Army tests. It competed against two other prototypes, but was declared the winner of the trials in 1983. On 22 December 1983 the Finnish Army ordered a first batch of fifty XA-180s, of which nine were reserved for UN duties. The vehicle proved quite successful and more orders were soon to follow. The XA-180 was originally manufactured and marketed by the Finnish company Sisu Auto but later variants were marketed by the Finnish defence company Patria and are known as Patria XA series.[1] The Vehicle's widely known nickname "Pasi" (also a common given name of Finnish men) stems from the Finnish name "panssari-Sisu" (English: armoured Sisu). The main superstructure is mainly manufactured from 6 to 12 mm of armour steel and the bottom is mine-strengthened, and the front windows are bullet-resistant and equipped with protective hatches. The vehicle has continuous six wheel drive and good capabilities for off-road driving. It can take inclines up to a maximum of 60°. The XA series has no standard armament, but is equipped with a rotating turret structure for installation of light/heavy machine guns or autocannons. It also has 8 BMP style firing ports on the sides and rear. Therefore, passengers, usually a squad of infantry, can fire their weapons from the cover of the armor. The XA series is popular in peacekeeping missions due to its mobility, non-aggressive appearance, and good protection against mines and improvised explosive devices (IED). The vehicle also offers a good combination of armament, comfort, mine protection, protection against shrapnel and small calibre fire, road speed, short time of learning how to drive, and an acceptable terrain mobility. It also offers more internal space compared to other similar vehicles like the Fuchs or BTR-80.

→→Amphibious Armored Personnel Carrier (APC)

BTR-80A Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun

- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control
- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: BTR-80A

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Crew: ea3

Personnel: ea7

Note: Vehicle has a crew of 3 and can carry 7 dismounts. Soldiers enter and leave the vehicle through side doors or roof hatches. Passengers can fire their individual weapons from inside the armored hull. Each passenger is provided with firing port and periscope for aiming.

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons14.5

Automotive

Engine Name: YaMZ-238M2

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp240

Range, Cruising: km600

Speed, Maximum Road: km/h90

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Note: Vehicle can be fitted with run-flat tyres. Once fitted with these tyres this APC can travel several thousand kilometers with multiple tyre shots and absence of pressure in the tyres. Furthermore this APC can travel with any two if its wheels missing. Mobility of this armored vehicle allows to operate alongside tanks, though it looses in terms of off-road performance to tracked armored personnel carriers.

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: 2A72, 30mm Automatic Cannon

Caliber: mm30

Maximum Elevation: deg+70

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Fire on the Move: Yes

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30mm × 165mm

Muzzle Velocity: m/s1,120

Basic Load: ea500

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: Six 81 mm smoke grenade dischargers are fitted to the turret.

Notes:

The BTR-80 has evolved into the BTR-80A. In 1993, the Tula design bureau finished development of a new turret similar to that on the German Marder APC, mounting a 30-mm 2A42 (BMP-2) automatic gun, coax 7.62-mm MG, and TNP-3 day/night sights. This vehicle is in prototype and offered for export. The drop-in gun/turret package (Modular Weapon System) is offered for export, to upgrade a wide variety of vehicles to BTR-80A standard. BTR-80A can mount K1-126 bullet-resistant tires. On the BTR-80A and BTR-80S, the standard BTR-80 turret is replaced with a modular armaments system. The BTR-80A is fitted with a 30 mm 2A72 automatic gun and 7.62 mm PKT coaxial machine gun.

BTR-82 Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment

- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control
- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: BTR-82

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Crew: ea3

Personnel: ea7

Dimensions

Length: m7.7

Width: m2.95

Height: m2.8

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ 740.14-300

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp300

Range, Cruising: km600

Speed, Maximum Road: km/h100

Speed, Maximum Off-Road: km/h65

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Note: With full tanks of fuel this APC has endurance on water of 12 hours.

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳*Ammunition*

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Automatic Fire Suppression System:

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Note #1: Interior of this armored vehicle is lined with spall liner.

Note #2: This APC has a double hull floor for improved protection against landmines and improvised explosive devices.

Notes:

The BTR-82 armored personnel carrier is a latest version of the BTR-80 family. It is an improved version of the BTR-80A/S, which entered service back in 1994. It was developed largely as a complement (and a stop-gap) for a BTR-90, whose development has been long, troubled and expensive. The BTR-82 is similar to the BTR-80A/S but has some minor improvements. It was publicly revealed in 2009. In 2010 it successfully passed trials and production commenced during the same year. The original BTR-82 entered service with the Russian Army in 2011. However the original BTR-82 was not produced in large numbers as production soon switched to upgunned BTR-82A, which is used by the Russian military in large numbers. Since 2010 Russian Army stopped purchasing the older BTR-80 APCs. Currently the BTR-82 is being obtained as a temporarily measure, until a new-generation Bumerang armored personnel carrier is available. The BTR-82 and its variants has been exported to Azerbaijan, Kazakhstan, Syria, Turkmenistan, and possibly, some other countries.

WZ551 (Type 92) Chinese 6x6 Wheeled Armored Personnel Carrier (APC)





Tiers:



Variants:

- **WZ 551A/ZSL-92:** This variant is fitted with a one-man turret equipped with a 25-mm cannon with ammunition carried in a large upended drum to the left of the weapon and a coaxial 7.62-mm machine gun with 1,000 rounds. The cannon fires armor-piercing incendiary (API) and high-explosive (HE) rounds at a selectable rate of 100, 300 or 500 rounds per minute. There are 200 ready-use 25-mm rounds plus another 200 carried in reserve. The turret can traverse through 360 degrees. The 25-mm cannon has an elevation of -8 degrees to 55 degrees. Smoke grenade launchers are mounted on each side of the turret. The gunner is equipped with a single-piece hatch cover, two day periscopes and a day/low-light level night sight, which is mounted on the forward part of the turret. The vehicle has a crew of two. An improved diesel engine is equipped. The infantry fighting vehicle variant has been in Chinese army service since 1995. The ZSL-92A armored personnel carrier version entered service in 1997. It has also reportedly been exported to Pakistan and Sri Lanka. The WZ 551A has also been referred to as the Type 82, Type 90 and Type 92. Type 92A
- **Type 92B (WZ-551B):** This was an upgraded amphibious armored personnel carrier with improved firepower, maneuverability, and reliability.
- **Type 90:** Original Prototype
- **NVG-1:** Original prototype with a French GIAT 25-mm autocannon equipped.
- **WZ-550:** 4x4 mass production version.
- **WZ-550 AT:** Four HJ-9 launchers, laser designator and thermal-tracking sight are mounted on top of the WZ-550.
- **PTL-02 / Type 02 / WMA 301 Assaulter 105-mm tank destroyer:** This is a WZ 551B chassis armed with a three-man turret fitted with a 105-mm low-recoil gun. The gun a slotted muzzle brake, fume extractor and thermal sleeve. A total of 30 105-mm rounds are carried. A 7.62-mm machine gun is mounted coaxially and a 12.7-mm machine gun on top of the turret. In addition to NATO-standard tank ammunition, it can fire NORINCO GP2 gun-launched guided projectiles with a range of 5,500 yd (5,000 m). The munition has a tandem HEAT warhead that is said to be able to penetrate 26 in (650 mm) of rolled homogenous armor protected by explosive reactive armor. The WMA 301 has a gross vehicle weight of 41,900 lb (19,00 kg). The weight prevents the vehicle from being amphibious. This variant is in service with the Chinese army, where it is designated the PTL-02. It is armed with a smaller 100-mm gun. The PTL-02 was first shown publicly in late 2009. The WMA 301 Assaulter is NORINCO's export designation for the vehicle. Ref: Military Periscope October 2017
- **PLL-05:** Debut in 2001. PLL-05 is a self-propelled 120mm gun-mortar based on the WZ-551
- **Type 92 Yitian:** Air defense upgrade with TY-90 anti-air missile launchers. Equipped with radar and thermal-tracking sight. Chinese equivalent of American AN/TWQ-1 Avenger.
- **VN2:** EXPORT VERSION. Upgraded export variant with 30mm cannon. The VN2C is a mine-resistant variant equipped with an UW4 30 mm remote weapons station
- **CS/VN9:** EXPORT VERSION. 6x6 armored personnel carrier with a remotely-operated 30 mm autocannon.
- **WMA301 Assaulter:** EXPORT VERSION. derivative of the PTL-02 with a 105 mm NATO-compatible gun

Systems

Alternative Designation: ZSL92 or Type 90 and Type 92 APC, WZ551, ZSL-92
Type: Armored Personnel Carrier
Crew: ea3

Troop Comparment Capacity: ea9

Maximum Effective Range: km800

Night Vision: Yes

Amphibious: Yes

Anti-Aircraft: Yes

Firing Ports: 6 Available on each side

Roof hatches: Four (Front an Rear)

Commander Periscopes: ea3

Gunner Periscopes: ea4

Dimensions

Length: m6.63

Width: m2.80

Height: m2.80

Weight, Combat: kg12,500

Ground Pressure: kg/mINA

Automotive

Engine Name: BF8L413F 4-stroke, 8-cylinder, turbo-charged, air-cooled diesel

Engine Type: Diesel

Engine Power: hp320

Gearbox: 5fwd/1rvs 5S-111GPA mechanical gearbox with assisted steering

Cruising Range: km600

Speed, Maximum Road: km/h85

Speed, Maximum Cross: km/h80

Speed, Maximum Swim: km/h11

Tench Cross: 1.2 m wide

Gradient: percent60

Stable, Side Slope: percent30

Platform: automotive platform is a modified Chinese-made Tiema XC2030 6X6 truck, which is based on the conventional Mercedes-Benz 2026 truck.

Suspension: Independent Coil Spring Suspensions

Brakes: Hydraulic Disk Brakes

Tires: Run Flat (capable of 30 kph even if all are damaged).

Fuel Tank: liters90

Communication

Radio: RC-83

Telephone: VIC-83

Main Gun

↳*System*

Name: Giat M811, or ZPT90

Type: Nexter Systems M811 Autocannon

Length: mm2,630

Width: mm345

Diameter: INA

Weight: kg113

Cannon Firing: Single or Duel-Fed

Fire Modes: Single Shot, Limited Bursts, or Continuous Bursts

Pre-Selectable Cyclic Rate of Fire: rds/m125-400

Life of Gun (Rounds): ea16,000

Elevation: degree45

Depresion: degree-8

↳*Ammunition*

Type: C137 Armour Piercing, Fin Stabilized,

Caliber: mm25x137

Muzzle Velocity: m/s1,310

Number of Rounds: INA

Max Range: m2,000

Min Range: INA

Armor Penetration: Available

Note: Current natures available from Nexter Munitions includes the following; High Explosive Incendiary Tracer (HEI-T), Target Practice (TP), Target Practice Tracer (TP-T), Armour-Piercing Discarding-Sabot Tracer (APDS-T) and Armour-Piercing Fin-Stabilised Discarding-Sabot Tracer (APFSDS-T).

Auxiliary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Heavy Machine Gun

Length: mm1,560

Diameter: mm

Mass (Gun Only): kg25

Mass (on Tripod): kg41

Mass (50 Round Belt): kg11

Feed System: ea50 Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Number of Rounds: 50 Round Belt

Effective Fire Range (vs. Air Maximum): m1,500

Effective Fire Range (vs. Ground Targets)): m2,000

Armor Penetration: Available

Notes: The 12.7×108mm can be used to engage a wide variety of targets on the battlefield, and will destroy unarmored vehicles, penetrate lightly armored vehicles and damage external ancillary equipment (i.e.: searchlights, radar, transmitters, vision blocks, engine compartment covers) on heavily armored vehicles such as tanks

Coaxial Weapon System

↳*System*

Name: Degtyaryov Machine Gun (DP-27)

Type: 7.62mm Coaxial Machine Gun

Proliferation: 795,00

Length: mm1,270

Barrel Length: mm604

Mass (Unloaded): kg9.12

Mass (Loaded): kg11.5

Action: Gas-Operated, Flapper Locking

Rate of Fire: rpm550

Feed System: 47-Round Pan

Sights: Empty Circle

Variants: DP, DPT, DPM, DPA, DTM-4, RP-46, Type 53

↳*Ammunition*

Type: Rimmed Rifle Cartridge

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Number of Rounds: 47-Round Pan

Effective Firing Range: m800

Armor Penetration: Available
Variants: 57-N-323S, 7N13, 7T2, 7BZ3, 7N1

Fire Control

Name: INA
Computerized FCS: INA
Thermal Tank Commander: Yes
Thermal Gunner: Yes
Main Gun Stabilization: Yes
Range, Day Sight: INA
Range, Night Sight: INA
IFF: INA
Automatic Fire Suppression System: Yes

Protection

Hull Armor Type: Welded Steel
Turret Armor: mm10 (Against 12.7 mm Rounds)
Applique Armor: No
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: INA
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Protection: 6 Smoke Grenade launchers
Survivability: Obstacle-Clearing Blade Available

Notes:

The WZ551 is an amphibious 6x6 armored personnel carrier (APC) capable of transporting up to 11 passengers. Produced in multiple variants, the WZ551 has served as a basis for several specialized vehicles, including mortar carriers, self-propelled artillery and tank destroyers such as the WMA301 Assaulter. Known as the Type 92 in Chinese Service, the WZ551 has also been exported to numerous foreign militaries, particularly in Africa and Asia, where the WZ551 represents a cost-effective solution to requirements for APCs.

VAB French 4x4 Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **VCAC Milan:** Trial 4 X 4 with 2 Milan ATGMs
- **VAB Echelon Repair Vehicle:** 4 X 4 or 6 X 6 variants for battlefield repairs with a 7.5- mm or 7.62-mm machine gun
- **VAB PC Command Vehicle:** Crew of 6 with additional radios & mapboards; FDC & FO versions also available
- **VAB Bromure Electronic Warfare Vehicle:** Crew of 3 operate Thomson- CSF VHF tactical jammer
- **VAB ATILA:** Artillery fire & command
- **VAB Reco:** NBC reconnaissance vehicle
- **VAB Genie Engineer Vehicle:** Crew of 9 with roof-mounted raft
- **VTM 120-mm Mortar Towing Vehicle:** Tows Thompson Brandt 120- mm Mortar with 70 rounds
- **VPM 81:** 81-mm mortar fires through roof opening
- **VAB TOW:** Basic VAB with TOW ATGM launcher with 16 reloads
- **VAB TOW-ALT:** Thune-Eureka 2-tube TOW turret with 16 reload missiles
- **VAB VDAA Albi SAM System:** Prototype 4 X 4 or 6 X 6 with turret with 2 MATRA SAM launchers & 6 extra missiles
- **VAB with UTM 800 Anti-Tank Launcher:** 4 non-retractable HOT tube launchers with 8 reloads
- **VCAC HOT Mephisto Anti-Tank Vehicle:** 4 retractable HOT tube launchers with SACLOS missiles & 8 additional rounds
- **VMO:** Internal Security Vehicle
- **VMO with TOI:** Standard VMO with cupola, 7.62-mm MG & AGL
- **VAB AZURE:** Urban warfare with bulldozer blade & panoramic periscopes
- **VAB Atlas:** Improved ATILA Artillery C2
- **VAB Mark III:** Latest upgrade from 2014; 6 X 6 with advanced protection & mobility
- **VAB New Generation/Improved VAB:** 1996 Upgrade with most variants available
- **VCI:** More heavily armed than the basic VAB with many variants
- **VAB RASIT:** Recon vehicle with radar
- **VAB RATAC:** Artillery target acquisition
- **VAB Sanitaire Ambulance:** Carries 4 litter, 10 sitting, or 2 litter/5 seated patients
- **VAB VDAA Santal SAM System:** 6 X 6 VAB with 2-man turret with 6 MATRA Mistral SAMs with 6 extra rounds in vehicle
- **VAB with ESD:** TA-20 turret mounted anti- aircraft system

System

Alternative Designation: Vehicule de l’Avant Blinde

Description: 4 X 4 wheeled APC with 2 rear exit doors & roof hatches for 10 soldiers; 3 firing ports on each side & a port in each rear door

Manufacturer: Renault Trucks Defense MACK Defense

In Service: 1976-Present

Crew : ea2.0

Passengers: ea10

Payload: This armored personnel carrier can carry up to 2 000 kg of payload in place of the troops

↳*Dimensions*

Length, Chassis Overall : m5.98

Width, Overall : m2.5

Height, Overall : m2.06

Weight: tons13

Automotive

Engine Name: Renault VI MIDS 06.20.45

Engine Type: Renault water-cooled, turbo- charged in-line, 6-cyclinder diesel

Range, Cruising : km1000.0

Speed , Average Cross-Country: km/h15.0

Speed, Maximum Off-Road: km/h40.0

Speed, Maximum Road : km/h92.0

Speed, Maximum Swim : km/h7.0

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5-0.6

Trench: m1

Fording Depth : mAmphibious

Communications

↳*Radio*

Name: Thales PR4G VS2 VHF

↳*BMS*

Name: SIT VI

Main Weapons System

System

Name: AA-52, 7.62mm Machine Gun
Type: 7.62 mm
Manufacturer: Manufacture d'armes de Saint-Étienne (MAS)
Length: 1,080 mm
Barrel Length: 600 mm
Weight: 9,970 kg
Action: Lever-delayed blowback
Max Rate of Fire: 900 rds/min
Effective Firing Range: 600 m
Maximum Firing Range: 3,200 m
Feed System: Belt
Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳*Ammunition*

Type: Rifle
Caliber: 7.62
Cartridge: 7.5×54mm French, 7.62×51mm NATO
Muzzle Velocity: m/s830
Basic Load: ea900

Protection

Armor: Vehicle armor protects the crew and dismounts from 7.62 mm rounds, artillery shell splinters and anti-personnel mines
Anti IED Armor, Applique : cage, ballistic blanket
Armor, Explosive Reactive : mmNo
Armor, Turret Front : mm12.7
NBC Protection: Yes
Self-Entrenching Blade: Bulldozer blade available
Smoke Equipment: 4 Smoke grenade launchers
Survivability Equipment: V-shaped hull

Notes:

The Véhicule de l'avant blindé or VAB ("Armoured vanguard vehicle" in French) is an armoured personnel carrier and support vehicle designed by Renault of France. It entered service in 1976; around 5,000 were produced. As of 2019, it is the standard APC of the French Army and has also been exported to more than 15 countries. It saw combat in various conflicts in Africa, Asia and Europe. VAB means “Véhicule de l’Avant Blindé”, literally “Vanguard Armoured Vehicle” which does not tells that it was an armored personnel carrier and the most prolific of the French Army by far. 5000+ indeed has been built since its introduction in 1976, both in 4×4 and 6×6 configuration, declined into 35 variants and exported to 15 countries over time. With 3,900 vehicles the French Army is the largest operator of the type, and now most vehicles are modernized while there is a second generation VAB (called Mk.II) currently developed for escort.

WZ551 (Type 92) Chinese 6x6 Wheeled Armored Personnel Carrier (APC)



Tiers:



Systems

Alternative Designation: Type 92A APC, Type 92 IFV
Type: Armored Personnel Carrier
Crew: ea3
Troop Comparment Capacity: ea9
Maximum Effective Range: km800
Night Vision: Yes
Amphibious: Yes
Anti-Aircraft: Yes
Firing Ports: 6 Available on each side
Roof hatches: Four (Front an Rear)
Commander Periscopes: ea3
Gunner Periscopes: ea4

Dimensions

Length: m6.63
Width: m2.80
Height: m2.80
Weight, Combat: kg12,500
Ground Pressure: kg/mINA

Automotive

Engine Name: BF8L413F 4-stroke, 8-cylinder, turbo-charged, air-cooled diesel
Engine Type: Diesel
Engine Power: hp320
Gearbox: 5fwd/1rvs 5S-111GPA mechanical gearbox with assisted steering

Cruising Range: km600

Speed, Maximum Road: km/h85

Speed, Maximum Cross: km/h80

Speed, Maximum Swim: km/h11

Tench Cross: 1.2 m wide

Gradient: percent60

Stable, Side Slope: percent30

Platform: automotive platform is a modified Chinese-made Tiema XC2030 6X6 truck, which is based on the conventional Mercedes-Benz 2026 truck.

Suspension: Independent Coil Spring Suspensions

Brakes: Hydraulic Disk Brakes

Tires: Run Flat (capable of 30 kph even if all are damaged).

Fuel Tank: liters90

Communication

Radio: RC-83

Telephone: VIC-83

Main Gun

↳*System*

Name: Giat M811, or ZPT90

Type: Nexter Systems M811 Autocannon

Length: mm2,630

Width: mm345

Diameter: INA

Weight: kg113

Cannon Firing: Single or Duel-Fed

Fire Modes: Single Shot, Limited Bursts, or Continuous Bursts

Pre-Selectable Cyclic Rate of Fire: rds/m125-400

Life of Gun (Rounds): ea16,000

Elevation: degree45

Depresion: degree-8

↳*Ammunition*

Type: C137 Armour Piercing, Fin Stabilized,

Caliber: mm25x137

Muzzle Velocity: m/s1,310

Number of Rounds: INA

Max Range: m2,000

Min Range: INA

Armor Penetration: Available

Note: Current natures available from Nexter Munitions includes the following; High Explosive Incendiary Tracer (HEI-T), Target Practice (TP), Target Practice Tracer (TP-T), Armour-Piercing Discarding-Sabot Tracer (APDS-T) and Armour-Piercing Fin-Stabilised Discarding-Sabot Tracer (APFSDS-T).

Auxiliary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Heavy Machine Gun

Length: mm1,560

Diameter: mm

Mass (Gun Only): kg25

Mass (on Tripod): kg41

Mass (50 Round Belt): kg11

Feed System: ea50 Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Number of Rounds: 50 Round Belt

Effective Fire Range (vs. Air Maximum): m1,500

Effective Fire Range (vs. Ground Targets)): m2,000

Armor Penetration: Available

Notes: The 12.7×108mm can be used to engage a wide variety of targets on the battlefield, and will destroy unarmored vehicles, penetrate lightly armored vehicles and damage external ancillary equipment (i.e.: searchlights, radar, transmitters, vision blocks, engine compartment covers) on heavily armored vehicles such as tanks

Coaxial Weapon System

↳*System*

Name: Degtyaryov Machine Gun (DP-27)

Type: 7.62mm Coaxial Machine Gun

Proliferation: 795,00

Length: mm1,270

Barrel Length: mm604

Mass (Unloaded): kg9.12

Mass (Loaded): kg11.5

Action: Gas-Operated, Flapper Locking

Rate of Fire: rpm550

Feed System: 47-Round Pan

Sights: Empty Circle

Variants: DP, DPT, DPM, DPA, DTM-4, RP-46, Type 53

↳*Ammunition*

Type: Rimmed Rifle Cartridge

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Number of Rounds: 47-Round Pan

Effective Firing Range: m800

Armor Penetration: Available

Variants: 57-N-323S, 7N13, 7T2, 7BZ3, 7N1

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: INA

Range, Night Sight: INA

IFF: INA

Automatic Fire Suppression System: Yes

Protection

Hull Armor Type: Welded Steel

Turret Armor: mm10 (Against 12.7 mm Rounds)

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Protection: 6 Smoke Grenade launchers

Survivability: Obstacle-Clearing Blade Available

Notes:

This variant is fitted with a one-man turret equipped with a 25-mm cannon with ammunition carried in a large upended drum to the left of the weapon and a coaxial 7.62-mm machine gun with 1,000 rounds. The cannon fires armor-piercing incendiary (API) and high-explosive (HE) rounds at a selectable rate of 100, 300 or 500 rounds per minute. There are 200 ready-use 25-mm rounds plus another 200 carried in reserve. The turret can traverse through 360 degrees. The 25-mm cannon has an elevation of -8 degrees to 55 degrees. Smoke grenade launchers are mounted on each side of the turret. The gunner is equipped with a single-piece hatch cover, two day periscopes and a day/low-light level night sight, which is mounted on the forward part of the turret. The vehicle has a crew of two. An improved diesel engine is equipped. The infantry fighting vehicle variant has been in Chinese army service since 1995. The ZSL-92A armored personnel carrier version entered service in 1997. It has also reportedly been exported to Pakistan and Sri Lanka. The WZ 551A has also been referred to as the Type 82, Type 90 and Type 92

ZBL-09 (Type 09) Chinese 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **PLL-09 (Type 09) Modular Self-propelled Howitzer system:** Based on IFV variant. Can be armed with either a 122mm or 155mm howitzer, to provide indirect fire support for infantry.
- **ZTL-11:** The ZTL-11 is the direct fire support version of the Type 09 family. It is equipped with a 105 mm direct fire gun and is capable of defeating heavily armoured targets if engaged from opportune ranges or in an ambush. The vehicle is designed to provide a combined arms brigade with enough organic firepower to defeat the majority of opposition encountered. The ZTL designation stands for armoured (Z), assault gun (T) and wheeled (L).
- **ZZH-09 C2:** This variant of the Type 09 family is equipped with the equipment required to conduct C2 at a brigade level. Like many of the support platforms based on this family it is designed to have matching mobility and protection so that it can work with the formation on the battlefield. The platform is known to be in service and may have the designation ZZH-09, which stands for Armoured, Combat Service Support, and Command respectively.
- **ZBL-09 ARV:** The ARV of the Type 09 family is designed to support, repair, and recover damaged or incapacitated Type 09 vehicles in combat. It is armoured to the same level so that it can accompany a mechanised formation wherever it is required.
- **ZBL-09 bridging platform:**
- **ZBL-09 combat engineering platform:**
- **ZBL-09 SHORAD:**
- **VN1 anti-tank missile carrier:**
- **ZBL-09 35mm air-defense platform:**
- **ZBL-09 ambulance:**
- **ZBL-09 EW platform:**
- **ZBL-09 reconnaissance platform:**
- **VN1C, Armor Day, 2017:**
- **Type 09, assault gun:** It was revealed in 2009 that the PLA was fielding a new assault gun equipped with a 105-mm cannon. The first unit equipped was the 162nd Light Mechanized Infantry Division, 54th Group Army in the Jinan Military Region. The vehicle features a new all-welded steel hull that is believed to share some components with the ZBD-09. The ZBL-09 can fire the GP2 105-mm laser-guided projectile.
- **ZTL-09 105-mm gun variant:** This variant of the VN-1 is fitted with the 105-mm gun turret first seen on the ZTD-05 tracked amphibious combat vehicle.
- **VN1A APC:** This is a development of the baseline VN1. A raised roof line begins behind the driver and commander positions, and above the second road wheel station, for additional volume. The raised roof allows the vehicle to be used for other roles, such as ambulance and command post. The all-welded steel hull is fitted with applique passive armor, with firing ports and associated vision devices provided in the sides and rear of the troop compartment. The VN1A typically has a crew of three (commander, driver, gunner) and can accommodate up to 12 troops. The latter are seated six down each side facing inward on seats that are attached to the sides of the hull for improved survivability. The seats can be folded upward to make room for cargo. The vehicle is armed with a protected weapon station equipped with a 12.7-mm machine gun that can be traversed through 360 degrees, with an elevation of -2 degrees to 65 degrees. A total of 1,000 rounds of 12.7-mm ammunition is carried. Alternative weapon stations might also be fitted. The VN1A has a gross vehicle weight of 20 metric tons and a power-to-weight ratio of 22.15 hp/metric ton. An independent suspension is fitted for improved cross-country mobility. Steering is power-assisted on the front four wheels. A central tire-inflation system and run-flat tires are fitted. Standard equipment includes an air-conditioning system, nuclear, biological and chemical warfare system and a fire-detection and fire-suppression system. The vehicle is fully amphibious with two propellers mounted on either side at the rear. May be referred to as the Type 09A

System

Alternative Designation: Type 09; ZBL-09; VN1

Manufacturer: NORINCO

Estimated out of Service Date: 2039

Family: Snow Leopard

Cost: $1.8 Million

Type: 8x8 Armored Fighting Vehicle

Crew: ea3

Troop Compartment Capacity: ea7

Maximum Effective Range: km800

Dimensions

Length: m8.0

Width: m3.0

Height: m2.1

Weight, Combat: kg21,000

Ground Pressure: kg/mINA

Automotive

Engine Name: DEUTZ BF6M1015 CP

Engine Type: Water-cooled Diesel

Engine Power: 440hp at 2,100 rpm

Power to Weight Ratio: kW/t16.5

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed, Average Cross: km/h50

Speed, Maximum Swim: km/h8

Propellers: ea2

Transmission: Manual

Suspension System: Independent

Axels: Differential Lock Enabling

Slope: deg30

Vertical Obstacle: m0.55

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.55

Fording Depth: mAmphibious

Trench: m1.8

Communcations

Blue Force Tracker: Yes

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

Turret Type: Two Man Turret

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Cage Cooling Sleeve: Yes

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

Cage Cooling Sleeve: Yes

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity: m/s1,275

Basic Load: rds125

Maximum Effective Range: m2,800

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: 2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mils0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: 30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: 5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Anti-Tank Guided Missiles (ATGM)

↳*HJ-73 or Red Arrow 73 Missiles (Option 1)*

Name: Red Arrow 73B

Type: Anti-Tank Missile System

Muzzle Velocity: m/s120

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 200 mm of RHA set at 68° and protected by ERA

↳***HJ-73 or Red Arrow 73 Missiles (Option 2)***

Name: Red Arrow 73D

Type: Anti-Tank Missile System

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 280 mm of RHA set at 68° and protected by ERA

↳***HJ-73 or Red Arrow 73 Missiles (Option 3)***

Name: Red Arrow 73E

Type: Anti-Tank Missile System

Muzzle Velocity: m/s135

Maximum Range: m3,000

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

↳***HJ-73 or Red Arrow 73 Missiles (Option 4)***

Name: Red Arrow 73F

Type: Anti-Tank Missile System (Bunker Buster)

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Fuel Air Explosive Warhead

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

Auxiliary Weapon System

↳***System***

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Fire Control

Name: BDS System

Computerized FCS: Yes

Thermal Tank Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: INA

Firing Ports: Yes

IFF: INA

GPS: Yes

Winch: Available

Satellite Navigation System: BeiDou System

:

Protection

Hull and Turret Armor: High hardness armor steel, which provide a protection against 12.7mm armour-piercing incendiary (API) strikes frontally at 100m,

Side Armor: 7.62mm API on the sides at 100m

Rear Armor: 7.62mm ball at the rear.

Applizue Armor: Available, he ZBD-09 can also be fitted with add-on armour package enables the vehicle to survive 25 mm API frontally at 1,000m and 12.7mm API on the sides at 100m.

Explosive Reactive Armor: INA

Active Protection System: yes

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 12 Smoke Grenade Launchers (6 on each side)

Central Tire Inflation System: Yes, The tires are fitted with a CTIS and RFIs, which means that the tyres will continue to support the vehicle once punctured for 100 km at a speed of 40 km/h.

Automatic Fire Extinguishing System: Yes

Air Conditionning System,: Yes

Notes:

The Type 09 family (commonly referred to as ZBL-09) is the latest wheeled platform series to enter service with the People's Liberation Army (PLA) of China. The family was designed by China North Industries Corporation (NORINCO) and is expected to replace obsolete wheeled vehicles in service with the PLA. The family bears some resemblance to the US Stryker Brigade Combat Team concept, and may reflect recent shifts in China's doctrine to mimic the rapidly deployable and mobile formations used by the US and Russia. The ZBL-09 is the most numerous variant of the Type 09 family, which as a result it is often the designation used to describe the entire genus of Type 09 variants. It is designed as an IFV, armed and protected to provide an equipped infantry section with the necessary fire support and shelter needed to effectively influence a battle.

BTR-70 Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Pandur 1:** Basic version as in the description
- **Belgian Pandur:** Belgian SMAS radio, NBC protection, armed with 12.7-mm & 7.62-mm machine guns
- **Amphibious Pandur:** Electric bilge pumps, closed air intakes-capable of 11 km/h in water
- **Pandur Ambulance:** 3-man crew for 4 stretcher, 2 seated & 2 stretcher, or 2 seated patients
- **Pandur Anti-Aircraft:** Twin 20-mm cannon or SANTAL SAM in turret
- **Pandur ATGM Carrier:** HOT AT missile in a Euromissile UTM 800 launcher or a TOW AT missile in a Kvaerner-Eurkea turret; additional missiles stored in the hull
- **Pandur Armored Recon/Fire Support Vehicle (FSV):** 2-man LCTS turret with a Cockerill 90-mm Mk 8 gun or a Giat TS-90 turret with a 90-mm CN90F4 gun or Cockerill CSE90 turret with an Mk III 90-mm gun
- **Pandur Mechanized Infantry Combat Vehicle (MICV):** MGTS with a choice of armaments: 12.7-mm M2 & 7.62-mm MGs; 30-mm M230 chain gun & 7.62-mm MG; or 40-mm AGL & 12.7-mm MG
- **Pandur Mortar Carrier:** In the passenger compartment, there is an 81-mm or 120-mm mortar mounted on a turnatable
- **Command & Control Vehicle:** For C2 operations
- **Armored Recovery/Repair Vehicle:** For vehicle recovery operations

System

Alternative Designations: BTR-70

Description: 8 X 8 wheeled APC with 2 exit doors in the rear & 2 roof hatches; 2 firing ports on both sides with a capacity for 8 dismounted soldiers

Manufacturer: Soviet Union

Crew: ea3

Passengers: ea7

Dimensions

Length: m5.70

Width: m2.79

Height: m2.24

Weight: tons12

Automotive

Engine Name: 2 x GAZ-66 petrol engines

Engine Type: 6-cylinder, turbo-charged water-cooled Steyr diesel

Engine Power: 120 hp per engine

Maximum Range: km600

Speed (Max Road): km/h80

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): km/h9

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depths: Amphibious

Communications

Radio: INA

Main Weapon System

Note: The BTR-70 armored personnel carrier is fitted with a complete one-man turret of the previous BTR-60PB

↳*System*

Name: KPV-14.5 Heavy Machine Gun

Type: Heavy Machine Gun

Caliber: mm14.5

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Length: mm1,980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Weight: kg49

Action: Short recoil operation

Rate of Fire: 600 rpm

Effective firing range: m3,000

Maximum firing range: m4,000

Feed System: 40-round belt

Sights: iron or optical

Ammunition

Type: Rifle
Caliber: mm14.5
Cartridge: 14.5×114 mm
Muzzle Velocity: m/s1,005
Basic Load: ea500
Armor Penetration: penetrates a 32 mm armored plate at a range of 500 m

Coaxial Weapon System

↳*System*

Name: PKT (Kalashnikov's Machine Gun) 7.62mm Machine Gun
Type: 7.62mm Machine Gun
Manufacturer: Degtyaryov plant
In Service: 1961-Present
Length: mm1,203
Barrel Length: mm605
Weight: kg9
Action: Gas-operated, open bolt
Rate of Fire: rds/min650
Effective Firing Range: m1,000
Maximum Firing Range: m3,800
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle velocity: m/s825
Basic Load: ea2,000

Protection

Armor (turret front): mmProtects against 7.62-mm AP rounds at 30 m
Applique Armor: mmINA
Explosive Reactive Armor: mmINA
↳ **Active Protection System:** INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: No

Central Tire Inflation System: Yes

Self-Recovery Winch: Yes, standard

Notes:

The BTR-70 is a Russian-made 8x8 armoured vehicle personnel carrier which was shown for the first time to the public in November 1980 during a military parade in Moscow. The vehicle was originally developed during the late 1960s under the industrial designator GAZ-4905. The BTR-70 enters in service with the Russian army in August 1972. The BTR-70 was widely used during the Soviet war in Afghanistan and many smaller conflicts in Eastern Europe. After the Cold War these AFV saw service with the UN in the Balkans with high success.

K-16 Bumerang Russian 8x8 Amphibious Armored Personnel Carrier (APC)



Tiers:



Variants:

- **Armored Transport:** Variant proposed by the Russian army but not developed yet.
- **Armored Ambulance:** Variant proposed by the Russian army but not developed yet.
- **Command Post Vehicle:** Variant proposed by the Russian army but not developed yet.
- **Reconnaissance Vehicle:** Variant proposed by the Russian army but not developed yet.
- **Anti-tank Missile Carrier:** Variant proposed by the Russian army but not developed yet.
- **Air Defense Missile Launcher:** Variant proposed by the Russian army but not developed yet.
- **Fire Support Vehicle:** Variant proposed by the Russian army but not developed yet.
- **Mortar Vehicle:** Variant proposed by the Russian army but not developed yet.
- **Light Tank:** Variant proposed by the Russian army but not developed yet.
- **57mm Auto-cannon:** Variant proposed by the Russian army but not developed yet.
- **125mm Gun:** Variant proposed by the Russian army but not developed yet.
- **Self-propelled Gun:** Variant proposed by the Russian army but not developed yet.

System

Alternative Designation: Boomerang, VPK-7829 Bumerang

Crew: ea3

Passenger Capacity: 9

Maximum Effective Range: m2,000

Dimensions

Length: m8

Width: m3

Height: m3

Weight, Combat: kg20,000

Automotive

Engine Name: UTD-32TR

Engine Type: Diesel

Engine Power: hp510

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed, Cross Country: km/h50

Speed Maximum Swim: km/h12

Fording Depth: NA, amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2

Main Gun

↳*System*

Name: Kord Russian 12.7mm

Type: Heavy Machine Gun

Max Rate of Fire: rpm650

Sustain Rate of Fire: rpm600

Range Finder Type: Laser

↳*Ammunition Option 1*

Type: AP-I

Caliber: mm12.7

Muzzle Velocity: m/s860

Basic Load: ~500 (160 armor piercing / 340 HE-Frag) rounds

Max Effective Range: km2

Min Range: km0

Armor Penetration: INA

Bursting Charge: g49

Projectile Weight: g389

Fire Control

Name: INA

Turret: Remote Control Turret

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: INA

Range, Thermal Sight: INA

Protection

Hull Armor: V-Shaped, ceramic hull provides protection agains 14.5mm and artillery shrapnel
Turret Armor: Unmanned Turret
Applique Armor: Yes, Ceramic
Explosive Reactive Armor: Optional
Active Protection System: Has sensors but no countermeasures
Mine Clearing: No
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: Yes
360 degree field of view for crew: Yes

Notes:

In the early 1990s, the BTR-90 was developed as a replacement for the BTR-80 in the Russian Army. While it was a moderate improvement in armament, protection, mobility, and internal space over its predecessor, it all came at the cost of greatly increased unit price. It wasn't accepted into service (except in small numbers) as the modest increase in performance wasn't seen as enough justification for its cost and complexity. Purchases of the BTR-80 stopped in 2010 and the improved BTR-82 was obtained as a stop-gap measure. In mid-2011, the Russian Ministry of Defense issued a requirement for a new modular wheeled family of armored vehicles instead of buying the BTR-90. Development of a new wheeled APC is being done alongside the new and similarly armed and armored but tracked Kurganets-25 infantry fighting vehicle, the Kurganets-25 armored personnel carrier, and heavy T-15 Armata IFV. The Boomerang vehicle is based on Armata Universal Combat Platform. It is amphibious and is able to negotiate and overcome water obstacles using two waterjets. In a departure with the previous BTR (Like BTR-70) series of vehicles, the engine will be located in the front instead of the rear. Engine location was a significant drawback of BTR vehicles, where soldiers had to exit the vehicles through cramped side doors. The Boomerang has rear doors and roof hatches for troop entry and exit. It has a crew of three consisting of the driver, gunner, and commander and holds eight troops. Protection comes from ceramic armor and technologies to prevent shell splinters. Like BTRs, the Boomerang is an 8×8 wheeled vehicle, and is equipped with a 750 hp turbocharged diesel engine. Several components and subsystems will be interchangeable between the Boomerang and Kurganets-25 APC, and it is hoped that both vehicles will be powered by the same engine though that is not the case to date. The K-16 Boomerang armored personnel carrier (APC), is lightly armed with a remote controlled turret and a 12.7mm heavy machine gun. In November 2011, media reports said the new project had been approved. In February 2012, a high ranking Russian general officer said that the Russian Army would be taking the first deliveries of the Boomerang prototype in 2013. Large-scale deliveries were to begun in 2015. At least 2,000 Boomerang vehicles are to replace the BTR-80 and BTR-82/A in Russian service.

MT-LB Russian Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **MT-LBM (izdeliye 6M):** MT-LB modernization developed by Muromteplovoz in the 1990s. It can be fitted with several different turrets.
- **MT-LBM (izdeliye 6MA):** MT-LBM fitted with a turret from BTR-80, with a KPVT 14.5mm machine gun and co-axial PKT 7.62mm machine gun.
- **MT-LBM (izdeliye 6MA1):** MA armed with additional AGS-17 30 mm automatic grenade launcher.
- **MT-LBM (izdeliye 6MA4):** MA1 armed with KPVB 23x115 mm instead of KPVT 14.5 mm heavy machine gun.
- **MT-LBM (izdeliye 6MA2):** MA armed with KPVB 23x115 mm instead of KPVT 14.5 mm heavy machine gun.
- **MT-LBM (izdeliye 6MA3):** MT-LBM armed with four 9M133 Kornet ATGM launchers, 7.62 mm PKTM tank machine gun and an AGS-30 30 mm automatic grenade launcher.
- **MT-LBM (izdeliye 6 MB):** MT-LBM fitted with a turret from BTR-80A, using a 2A72 30 mm autocannon and co-axial PKT 7.62mm machine gun.
- **MT-LBM (izdeliye 6MB2):** MB armed with AGS-17 30 mm.
- **MT-LBM (izdeliye 6MB3):** MT-LBM armed with GSh-23V 23 mm, AGS-30 30 mm and "Kord" 12.7 mm.
- **MT-LBM (izdeliye 6MB4):** MT-LBM armed with GSh-30K 30 mm, AGS-30 30 mm and "Kord" 12.7 mm.
- **MT-LBM (izdeliye 6MB5):** MT-LBM armed with twin gun 23 or 30 mm, "Igla" SAM and equipped with improved sights.
- **MT-LBM1 (izdeliye 6M1):** MT-LBM fitted with 300-310 hp engine.
- **MT-LBM2:** MT-LBM upgrade package developed by Kurganmashzavod with new engine and transmission, improved suspension, BMP style side skirts etc. Prototype.
- **2S24:** Mortar carrier with 2B24 (or 2B14 "Podnos") 82 mm mortar and 83 rounds. The system designator for the carrier vehicle, mortar, and ammunition is 2K32 "Deva". The 2S24 was designed by TsNII "Burevestnik" and has a crew of five. In service with RF Interior Ministry.
- **MT-LBVMK:** A modification of MT-LBVM with "Kord" 12.7 mm machine gun instead of NSVT 12.7 mm.
- **Toros:** Arctic adapted vehicle developed by Muromteplovoz based on the MT-LB chassis armed with a 30mm autocannon 2A42, PKMT 7.62mm machine gun, and 30mm AGS-17D grenade launcher, and equipped with a snowplow. Toros is able to operate in -45°C.
- **Note::** There are more than 50 additional variants to the MT-LB. The variants above were chosen because they are linked to the Russian Federation and will likely be the most modern / upgraded.

System

Alternative Designation: See Variants

Date of Introduction: 1964

Proliferation: Current Operators: Armenia, Azerbaijan – 336, Angola – 8, Bangladesh – 134, Bulgaria – 100, Belarus – 70, Congo, Kinshasa – 6, Eritrea – 10, Finland – 389 MT-LB/v, 50 MT-LBU, Georgia – 66 in Service, Iraq – About 400 in Service, Kazakhstan – 150, Lithuanian army MT-LB on exhibition, Lithuania – 10, Macedonia – 10, Moldova – 60, Myanmar – 26, Nigeria – 67, Poland – 15, Russia – 3,300 in active service. Currently being modernized in the version MLBSh for the Marines with more powerful engines KAMAZ-740.50 of 360 hp, new tracks and new weaponry. Ukraine – 2,090, Uruguay – 5, United States – used by military in OPFOR missions. Former operators: Czechoslovak Socialist Republic Czechoslovak Socialist Republic – Passed on to the Czech Republic. East Germany – 721 Bulgarian-made MT-LBs, 32 SNAR-10 and 36 Strela-10M. It is assessed that after unification, all MT-LBs were taken from the GDR’s Army, scrapped, or sold. Hungary – Strela-10 and SNAR-10. Soviet Union – Passed on to successor states. Sweden – 460 (Called Pbv 401, former East German, bought 1993;

reduced by 147 before the end of 2011, sold to Finland, Croatia, and Yugoslavia.)

Family: Armored Personnel Carrier

Crew: ea2

Passenger Capacity: 11

Dimensions

Length: m6.45

Width: m2.86

Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Communications

↳***R-173***

Frequency Range: 30.00 - 75.99 MHz

HF Output: W30

Mudulation: FM

Display: Digital

Entry of Frequency: Touchpad

Preset Channels: 10

Digital Transmission: INA

Sensitivity: 1.5 uV

Range: K50

Operational Voltage: 27+-2v

Weight: kg43

Dimensions: mm428 × 222 × 238

Primary Weapon System on Most Variants

↳*System*

Name: PKT
Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T
Caliber: mm7.62
Muzzle Velocity: m/sINA
Basic Load: rounds1,500
Max Effective Range (Day): m1,000
Max Effective Range (On the move): m500
Maximum Aimed Range: m1,500
Min Range: kmINA
Armor Penetration: 8mm of RHA at 500m
Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: PP-61AM, 2.6x
Computerized FCS: N/A
Thermal Sight Vehicle Commander: N/A
Thermal Sight Gunner: N/A
Main Gun Stabilization: N/A
Range, Day Sight: m1,500
Range, Thermal Sight: N/A
Field of View: degrees23

Protection

Hull Armor: mm14
Turret Armor: mm14
Applique Armor: No
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: Optional
NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The MT-LB (Russian: Многоцелевой Тягач Легкий Бронированный, Mnogotselevoy Tyagach Legky Bronirovanny / Multi-Purpose Towing Vehicle Light Armoured) is a Soviet multi-purpose fully amphibious auxiliary armored tracked vehicle, which was first introduced in the 1950s. It is also produced in Poland, where (starting mid-1990s) its YaMZ engine was replaced by a Polish one. In the 1950s, the Soviet Central Auto and Tractor Directorate began a development program to replace the AT-P series of artillery tractors (which were based on the ASU-57 airborne self-propelled gun) with a new generation of vehicles. The MT-L was developed to meet this requirement based on the PT-76 amphibious light tank chassis. The MT-LB is the armored variant of the MT-L. Entering production in the early 1970s, it was cheap to build, being based on many existing components, e.g. the engine, which was originally developed for trucks. It is built at the Kharkiv Tractor Plant and under license in Poland by Huta Stalowa Wola and Bulgaria. The crew, a driver and a commander/gunner sit in a compartment at the front of the vehicle, with the engine behind them. A compartment at the rear enables up to 11 infantry to be carried or a cargo of up to 2,000 kg. A load of 6,500 kg can be towed. The vehicle is fully amphibious, being propelled by its tracks in the water. A small turret at the front of the vehicle fits a 7.62 mm PKT machine gun with 360-degree manual traverse and an elevation of −5 to +30 degrees. The vehicle is lightly armored against small arms and shell splinters with a thickness of 3 to 10 mm of steel with a maximum of 14 mm for the turret front. The infantry compartment has two hatches over the top, which open forwards. There are four firing ports—one on either side of the hull, the other two in the rear twin doors of the infantry compartment. The driver is provided with a TVN-2 infra-red periscope, which in combination with the OU-3GK infra-red/white light searchlight provides a range of about 40 m. All vehicles include an NBC system.

WZ-523 (Type 93) Chinese 6x6 Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **Type 91 (ZFB-91):** This internal security vehicle variant was developed in 1991. It is fitted with a one-man turret, 35-mm automatic grenade launcher with tear gas grenades, coaxial 7.62-mm machine gun, flash lights, searchlight and siren. An obstacle-clearing blade is mounted at the front of the hull.
- **Type 93 (ZSL-93):** This was a finalized version of the WZ 523 proposed for the PLA. It was not accepted into service.
- **Type 05P:** This is an upgraded variant being marketed by Beijing-headquartered PolyTechnologies. It has been shown armed with a one-man turret equipped with a 12.7-mm machine gun.

System

Alternative Designation: NATO Reporting Name M1984
Type: Armored Personnel Carrier (APC)
Crew: ea2
Troop Compartment Capacity: ea10
Maximum Effective Range: km600
Water Jets: ea2
Undercarriage: Six tires with a two-tire axle at the front below the driver's compartment and a group of four tires at the rear below the troop bay.
Front-Mounted Trim Vane: Yes

Dimensions

Length: m6.02
Width: m2.55
Height: m2.73

Weight, Combat: gm11,700

Automotive

Engine Name: Water-Cooled YC6A240-10 Diesel Engine

Engine Type: Diesel

Engine Power: hp214

Power to Weight Ration: hp/ton18.29

Fuel Capacity: liters255

Cruising Range: km600

Speed, Maximum Road: km/h90

Speed, Average Cross: 80

Speed, Maximum Swim: km/h4

Fording: Amphibious

Suspension: Wheeled 6x6

Gradient: %60

Side Slope: %30

Vertical step: m0.5

Trench: m0.6

Communications

Primary Radio: A220

Secondary Radio: VRC 83

Intercom System: Type 803

Main Gun

↳*System*

Name: Type 54 (DShKM)

Type: 12.7 mm Type 54 Heavy Machine Gun

Proliferation: over 1 Million

Length: mm1,625

Barrel Length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Rate of Fire: rds/m600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

Turret: Single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

↳*Ammunition*

Type: Heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Number of Rounds: ea1,200

Max Range: m2,500

Effective Firing Range: m2,000

Armor Penetration: API: 21mm at 500 m & 13mm at 1000 m (RHA)

Fire Control

Computerized FCS: INA

Thermal Driver: Yes

Thermal Tank Commander: Yes

Thermal Gunner: Yes

Main Fun Stabilization: INA

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Periscope: Image-Intensification

Protection

Armor Type: Welded Steel

Hull Armor (Front): mm20

Hull Armor (Sides): mm14

Hull Armor (Rear): mm6

Front Hull Type: Bulldozer Blade

Explosive Reactive Armor: No

Applique Armor: mmINA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 3 each side

Hinged Armoured Shutters: Yes

Notes:

The WZ-523 (NATO reporting name M1984) is a six-wheeled Chinese armored personnel carrier designed to be amphibious. Built on the chassis of the Hanyang HY472 truck, it can carry a crew of three and seat up to eight additional passengers. Two primary models were produced—one with a roof-mounted 12.7mm heavy machine gun, and the other with a small turret armed with a 35mm grenade launcher and a 7.62mm co-axial general purpose machine gun. An export model that entered service in 2008 as a fire support vehicle was also marketed successfully to the Namibian Army; this is armed with a 73mm 2A28 Grom smoothbore cannon in exactly the same turret as used on the Soviet BMP-1 infantry fighting vehicle. The WZ-523 was unveiled at a military parade in Beijing in October 1984, gaining the NATO designation M1984, although it was destined for export and did not enter large scale service with the People's Liberation Army (PLA). An internal security vehicle based on the WZ-523, the ZFB-91, which has a turret armed with a 35 mm grenade launcher and a 7.62 mm machine gun replacing the roof mounted 12.7 mm anti-aircraft machine gun of the WZ-523, is in service with PLA units in Hong Kong and Macau. When the WZ-523 was first exhibited publicly, there were many observations by international defence analysts regarding its design origins. Although the hull design resembled that of the South African Sandock-Austral Ratel infantry fighting vehicle, subsequent studies have found that while there may have been some South African influence the WZ-523 has many unique characteristics in overall dimensions and technical features. For example, its driving compartment is somewhat reminiscent of the BTR-60, with a single passenger seated next to the driver.The location of the turret ring is also similar that of the BTR-60 series rather than the Ratel, being located near the hull center. The People's Liberation Army has deployed the WZ-523 primarily for reconnaissance purposes, and for specialized tasks involving artillery and combat support units. Despite being designed as an armored personnel carrier, it was not adopted by Chinese mechanized or motorized infantry forces. Outside of China, Sudan's Military Industry Corporation also produces the WZ-523 under license.

Cobra II Turkish 4x4 Amphibious Armored Personnel Carrier (APC)





Tiers:

1 2 3 4

Parent:

Cobra Turkish 4x4 Amphibious Armored Personnel Carrier (APC)

Variants:

- **APC:** Basic variant; carries 8-12 troops & 12.7-mm MG; open or turret-mounted 40-mm AGL, 25-mm cannon, or 30-mm cannon.
- **Armored Reconnaissance Vehicle:** Crew of 4 in vehicle with a 25mm cannon and FLIR.
- **Armored C2 Vehicle:** Command and control vehicle with a crew of 6 armed 7.62mm machine guns.
- **Armored Ambulance:** Evacuates 4 litter or 6 ambulatory patients and medical gear.
- **TOW Missile Carrier:** Crew of 5 with a TOW ATGM with a range of 3750m or Rafael overhead weapons system with Spike AT missiles.
- **Cobra EOD Vehicle:** Designed for explosive ordnance disposal with controlled blade on front of vehicle operated by driver.
- **Cobra Reconnaissance / Surveillance Vehicle:** Target acquisition for higher unit commands.
- **Cobra Twin-Turret:** Rotating turret with 40mm AGL and 12.7mm machine gun.
- **Cobra Amphibious Vehicle:** Allows vehicle to enter water without any preparation.
- **NBC Reconnaissance Vehicle:** Equipped with NBC sensors.
- **Cobra II:** First unveiled at IDEF 2013, the Cobra II is a more heavily armoured successor to the Cobra. The Cobra II has a combat weight that is roughly double that of its predecessor and is slightly wider, longer and taller.
- **Cobra II amphibious:** There is an amphibious and slightly larger variant of the Cobra II with a more powerful 6.7 L, 360Hp, V6 turbocharged engine that is capable of crossing lakes and smaller bodies of water

System

Alternative Designation: Cobra II; Otokar Cobra II
Description: 4x4 light; 10 troops besides the crew; 4 side doors, rear door, and 2 roof hatches; 3 firing ports on each side of vehicle and 1 in rear door.
Function: Its various functions are security and peacekeeping operations and border protection
Manufacturer: Otokar
Crew: ea2
Passengers: ea7
Rear View Camera: Yes
Therma Front Camera: Yes
Air Conditioning System: Yes

Black Out Lighting System: Yes

Towing Eye: Yes

Recovery Winch: Avaialble

Navigation System: Yes

Auxilary Power Unit: Yes

Dimensions

Length: m5.6

Width: m2.5

Height: m2.2

Wheelbase: m3.30

Ground Clearance: m0.33

Weight: kg12,000

Automotive

Engine Name: 1 x 6.7L, six-cylinder, water cooled, turbo charged, common rail, diesel engine

Engine Type: Turbo Diesel

Power-to-Weight Ratio: 30 hp/metric ton

Engine Power: hp281

Range, Cruising: km700

Speed, Maximum Road: km/h110

Speed, Maximum Swim: km/h8

Speed, Average Cross: INA

Speed, Maximum Off: INA

Fuel: 155 liters, compatible with F-34 and F-54 fuel

Transmision: Automatic, six forward and one reverse

Suspension: fully independent suspension is fitted with spring and shock absorber

Gradient: deg70

Side Slope: deg40

Vertical Step: m0.32

Tench: m900

Fording Depth: mAmphibious

Acceleration: 0-60 km/h in 14 seconds

Turning Radius: m7.86

Angle of Departure: deg48

Angle of Approach: deg60

Brakes: air-over hydraulic service brakes are equipped with anti-locking brake system (ABS)

Central Tire Inflation System (CTIS): Yes

Tires: Run Flat

Electrical System: onboard power is provided by 24V electrical system integrating 400A alternator and 120Ah batteries

Communications

Radio: Radio varies on customer needs

Intercom: Yes

Main Weapon System

Note: The Cobra II can be optionally equipped with a remote controlled weapon system (RCWS) of 25 mm machine gun or with a low altitude air defense missile system of HISAR-A and with a grenade launcher.

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Manufacturer: Current: General Dynamics, Fabrique Nationale (FNH / FNA / FNH UK), Ohio Ordnance Works Inc.

In Service: 1918-Present

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod and T&E: 58 kg

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Effective Firing Range: m1,800

Maximum Firing Range: m7,400

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s890

Basic Load: ea1,000

Fire Control

Fire Control System: No

Main Gun Stabilization: INA

Night Vision: INA

Protection

Armor Type: All-welded steel hull

Armor, Applique: mmAvailable

Armor, Turret Front: mmThe armoured hull of Cobra II offers protection against 7.62mm rounds and artillery shell splinters

Armor, Explosive Reactive: mmAvailable

Active Protection System: No

NBC Protection: A CBRN defense filtration kit is optional

Self-Entrenching Blade: No

Smoke Equipment: Yes

Survivability Equipment: Electrical self-recovery winch; fire suppression system.

Automation Fire Extinguishing System: Yes

Note: The bottom of the crew compartment is fitted with a removable parabolic-shaped plate for deflection of blast

Notes:

First unveiled at IDEF 2013, the Cobra II is a more heavily armoured successor to the Cobra. The Cobra II has a combat weight that is roughly double that of its predecessor and is slightly wider, longer and taller. Standard equipment includes rear view camera, thermal front camera, air conditioning system, blackout lighting system, multi-point seat belts, radio provisions, and a towing eye. It can be optionally equipped with a self-recovery winch, nuclear, biological and chemical filtration kit, automation fire extinguishing system, intercom system, navigation system and an auxiliary power unit. In an APC configuration, the vehicle can carry nine personnel and can be armed with a number of different weapons, including crew-operated machine guns and remote weapon stations armed with short-range surface-to-air missiles and grenade launchers. Powered by a 6.7 L, six-cylinder, water cooled, turbo charged, common rail diesel engine that produces 281 hp, its maximum road speed is 110 km/h on roads and has a maximum cruising range of 700 km with an operating temperature from -10 up to 45 degree C. Otokar has received orders for the Cobra II both from an undisclosed customer and from the Turkish Armed Forces. In late 2015, the Turkish Armed Forces ordered 82 Cobra II vehicles plus related systems, maintenance and support worth $52 million. In June 2016, the Turkish Armed Forces ordered an undisclosed number of Cobra II vehicles plus related systems, maintenance and support worth $120.8 million. Assuming the same value to vehicle ratio as the 2015 order, this would imply an order of about 180 vehicles. Cobra II amphibious There is an amphibious and slightly larger variant of the Cobra II with a more powerful 6.7 L, 360Hp, V6 turbocharged engine that is capable of crossing lakes and smaller bodies of water

BTR-60 Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-60P:** Initial model with open top, pintle-mounted 7.62-mm machine gun
- **BTR-60PA/BTR-60PK (12 passengers only):** Covered top, NBC protection, pintle-mounted 7.62-mm MG, still exit over top
- **BTR-60PB (space for 8 soldiers for dismounted operations).:** Most common variant with BRDM-2 MG turret with a 14.5-mm MG & coaxial 7.62-mm; troops exit over top
- **Modernized BTR-60PB:** BM2 Turret with 30-mm 2A42 Cannon & 7.62-mm PKTM MG; 30-mm AGS-17 AGL on left side
- **BTR-60U:** Command vehicle with additional radios
- **BTR-60 PU-12/12M:** Anti-Aircraft units' command vehicle
- **BTR-60 MS:** Radio vehicle with High Ball antenna
- **BTR-60 VVS:** Sans turret with additional radios
- **BTR-60 PBK:** BTR-60PB with 3 radios
- **BTR-60 1V18:** Artillery observation vehicle
- **BTR-60 1V19:** BTR-60 1V18 for FDC operations
- **BTR-60 R-145BM:** Communications vehicle with 5 radios
- **BTR-60 R-975:** Forward air-control vehicle with turret
- **BTR-60-Z-351BR:** Power production vehicle with generator
- **BTR-60-P-238BT:** Switchboard vehicle for communications
- **BTR-60-P-240BT:** Integrates radio & wire communications- R-123M radio & R-241 switchboard
- **BTR-60-P241BT:** Equipped with P-241 telephone system
- **BTR-60-R-137B:** Communications vehicle with turret
- **BTR-60 ACRV:** Artillery Battery C2 & recon vehicle
- **BTR-60-R-145:** Additional radio, but no turret
- **BTR-60-R-156BTR:** C2 vehicle with additional radios
- **BTR-60-R-409BM:** Relay vehicle-R-409 & R-123M radios
- **BTR-60PAU (Bulgaria):** Artillery command vehicle
- **BTR-60PB-MD (Bulgaria):** Upgraded engine, radios, & NBC equipment
- **BTR-60P Maintenance Assistance (MTR-2):** Maintenance vehicle with tarp over troop compartment
- **BTR-60 SPAAG (Cuba):** Twin 30-mm anti-aircraft cannons
- **BTR-60 Djibouti (Djibouti):** AML-90 turret on BTR-60
- **BTR-60BD:** Speed increased to 100 km/h & range to 800 km
- **MTP-2:** Armored Recovery Vehicle
- **BTR-60PZ:** Final production model with 1PZ-2 roof-mounted periscope
- **BTR-60-R-140BM:** C2 vehicle with turret
- **MEP:** Infantry command post
- **BTR-60PB FAC:** Turreted FAC vehicle without the gun

System

Alternative Designations: BTR-60; BTR-60PB
Manufacturer: Gorkovsky Avtomobilny Zavod (Soviet Union) Ratmil Regie Autonoma (Romania, TAB-71)
Description: 8 X 8 wheeled APC designed to replace the BTR-152; original design (BTR-60) had an open top & 14 soldiers

had to exit over the sides; 3 firing ports on each side of vehicle

Crew: ea3

Passengers: ea14

Dimensions

Length: m7.56

Width: m2.83

Height: m2.31

Weight, Combat: tons10.3

Automotive

Engine Name: Two(2) x GAZ-40P

Engine Type: 6-cylinder gasoline

Engine Power: 90 hp each, 180 hp combined

Range, Crusing: km500

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Fuel Capacity: INA

Note: The BTR-60 is fully amphibious, propelled in the water by a jet centrally mounted at the rear of the hull

Communications

Primary: R-123

Secondary: R-113

Main Weapon System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferation: Widely Proliferated

Weight: kg49

Total Length: mm1,980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

↳*Ammunition*

Name: INA

Type: API-T

Cailber: mm14.5mm

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: General Purpose Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: + 1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Vehicle Commander: TKN-1

Thermal Gunner: PP-61A optical sight

Main Gun Stabilization: INA

Turret Type: BPU-1 turret

Infrared Light: OU-3 infrared light

Protection

Armor Material: Welded steel

Armor Hull: 7 mm at 86° hull upper front 9 mm at 47° hull lower front 7 mm hull sides 5 mm hull upper rear 7 mm hull lower rear 5 mm hull floor 7 mm hull roof

Armor (turret front): mm10 mm turret front 7 mm turret sides 7 mm turret sear 7 mm turret roof

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Collective (closed vehicles)

Smoke Equipment: No

Survivability Equipment: No

Notes:

The BTR-60 is the first vehicle in a series of Soviet eight-wheeled armoured personnel carriers (APCs). It was developed in the late 1950s as a replacement for the BTR-152 and was seen in public for the first time in 1961. BTR stands for Bronetransporter (БТР, Бронетранспортер, literally "armoured transporter") BTR-60 was a revolutionary design for its time. It had a non-standard layout for an APC; the crew compartment was in the front, the troop compartment in the middle and the engine compartment in the rear. This meant that, while the BTR-60 did not share some of the weaknesses that other APCs had, it had several disadvantages of its own. In the BTR-60, the crew compartment is located in the front of the vehicle and had a roof - unlike the troop compartment, which first received one with the introduction of the BTR-60PA. In the BTR-60P and BTR-60PA, the crew consists of a driver and a commander. The driver's seat is on the left and commander's seat is on the right. In the BTR-60PAI, BTR-60PB and BTR-60PZ, the crew consists of a driver, a commander and a gunner. The position of the driver and commander stations remained unchanged in later models. The gunner operates the BPU-1 turret, using the PP-61A optical sight. In the BTR-60P, both the driver and commander manned their positions by entering the vehicle through the sides. The BTR-60PA introduced two hatches over their stations and crew members had to climb on top of the vehicle to use them. The entry method did not change in later production models. The BTR-60B introduced a side door for the gunner on the right side, and firing ports for both the driver and commander, and two for the gunner, one on each side. (For more information on the BTR-60's firing port see the troop compartment section). Both the driver and the commander have forward views through bulletproof windshields, onto which steel covers can be lowered. In the BTR-60P and BTR-60PA, the covers had vision slots, and additional slots on both sides of the crew compartment. These were removed in the BTR-60PB in favor of two periscopes on each side.[clarification needed] In early models of the BTR-60P and BTR-60PA, only the driver had a periscope, while the commander had a removable OU-3 infrared searchlight. In the BTR-60PB, both the driver and the commander have three periscopes in the front (the commander's center periscope can be hard to see as it's just below the OU-3 infrared light). The vehicle was usually equipped with an R-113 radio; however, some models used the R-123. The initial BTR-60P production model lacked night-vision and had only four headlights (two infrared, two white, one of each kind per side, these remained in all BTR-60 models). Late BTR-60P models were fitted with night-vision; the TKN-1 connected with the OU-3 infrared searchlight for the commander and the TWN-2 for the driver. This remained unchanged in later models. The troop compartment is behind the crew compartment and in front of the engine compartment. The BTR-60P can transport up to 16 fully equipped soldiers. This number reduced to 14 in BTR-60PB. As the BTR-60P didn't have a roof, it was covered with a tarpaulin when traveling in bad weather conditions. It was also covered with bows and canvas. Also, all BTR-60 models had three firing ports on each upper side of the hull through which the infantry being transported could fire at the enemy with their personal weapons. The difference between models was in the position of these three firing ports. The BTR-60P and BTR-60PA had the firing ports positioned in a row between the middle and the front part of the troop compartment. In the BTR-60PB, the firing ports were relocated; one was next to the driver and commander, one next to the gunner and one in the side of the troop compartment. Because of the engine placement (in the rear of the vehicle), transported infantry must mount and dismount through the sides in the BTR-60P or through the roof hatches in the roofed BTR-60PA, BTR-60PB, and BTR-60PZ variants. To help the infantry to mount and dismount the vehicle, the BTR-60P had two steps on each side of the hull, one between the first and second pair of road wheels and the other between the third and fourth pair of wheels. It also had two vertical hand rails on each side of the troop compartment, as well as an angled horizontal one on the left-hand side of the hull next to the engine compartment. The BTR-60PA introduced yet another step on each side of the hull between the second and third pair of wheels, as well as six horizontal hand rails on each side of the vehicle, three on the lower side and three on the upper side. The vertical ones were removed, while yet another angled horizontal one was added on the right-hand side of the hull next to the engine compartment. In the BTR-60PB, the number of hand rails decreased from six to five on each side of the hull; the rear upper hand rail was removed from he right side, whereas the center upper one was removed from the left side. The BTR-60P has two doors on each side of the troop compartment (one in the front and one in the rear), but infantry still had to dismount through the sides. The side doors were removed in the BTR-60PA. They were used mostly as emergency exits and as auxiliary firing ports. In the BTR-60PB, a side door was added on the front left of the troop compartment.

ZZH-09 (Type 09) Chinese 8x8 Amphibious Armor Personnel Carrier (APC)





Tiers:



Parent:

ZBL-09 (Type 09) Chinese 8x8 Armor Personnel Carrier (APC)

Variants:

- **PLL-09 (Type 09) Modular Self-propelled Howitzer system:** Based on IFV variant. Can be armed with either a 122mm or 155mm howitzer, to provide indirect fire support for infantry.
- **ZTL-11:** The ZTL-11 is the direct fire support version of the Type 09 family. It is equipped with a 105 mm direct fire gun and is capable of defeating heavily armoured targets if engaged from opportune ranges or in an ambush. The vehicle is designed to provide a combined arms brigade with enough organic firepower to defeat the majority of opposition encountered. The ZTL designation stands for armoured (Z), assault gun (T) and wheeled (L).
- **ZZH-09 C2:** This variant of the Type 09 family is equipped with the equipment required to conduct C2 at a brigade level. Like many of the support platforms based on this family it is designed to have matching mobility and protection so that it can work with the formation on the battlefield. The platform is known to be in service and may have the designation ZZH-09, which stands for Armoured, Combat Service Support, and Command respectively.
- **ZBL-09 ARV:** The ARV of the Type 09 family is designed to support, repair, and recover damaged or incapacitated Type 09 vehicles in combat. It is armoured to the same level so that it can accompany a mechanised formation wherever it is required.
- **ZBL-09 bridging platform:**
- **ZBL-09 combat engineering platform:**
- **ZBL-09 SHORAD:**
- **VN1 anti-tank missile carrier:**
- **ZBL-09 35 mm air-defence platform:**
- **ZBL-09 ambulance:**
- **ZBL-09 EW platform:**
- **ZBL-09 reconnaissance platform:**
- **VN1C, Armour Day, 2017:**
- **Type 09, assault gun:**

System

Alternative Designation: ZZH-09 C2
Manufacturer: NORINCO
Estimated out of Service Date: 2043
Family: Snow Leopard
Cost: $1.8 Million
Type: 8x8 Armored Fighting Vehicle
Crew: ea3

Troop Compartment Capacity: ea7

Maximum Effective Range: km800

Dimensions

Length: m8.0

Width: m3.0

Height: m2.1

Weight, Combat: kg21,000

Ground Pressure: kg/mINA

Automotive

Engine Name: DEUTZ BF6M1015 CP

Engine Type: Water-cooled Diesel

Engine Power: 440hp at 2,100 rpm

Power to Weight Ratio: kW/t16.5

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed, Average Cross: km/h50

Speed, Maximum Swim: km/h8

Propellers: ea2

Transmission: Manual

Suspension System: Independent

Axels: Differential Lock Enabling

Slope: deg30

Vertical Obstacle: m0.55

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.55

Fording Depth: mAmphibious

Trench: m1.8

Communcations

Blue Force Tracker: Yes

HF Radio: Yes, Type INA

Digital Radio Set: Yes, Type INA

Navigation System: Yes, BeiDou satellite navigation system

TBR-121 VHF Radio

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

Turret Type: Two Man Turret

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Cage Cooling Sleeve: Yes

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

Cage Cooling Sleeve: Yes

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity: m/s1,275

Basic Load: rds125

Maximum Effective Range: m2,800

↳

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: 2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mils0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: 30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: 5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Anti-Tank Guided Missiles (ATGM)

↳*HJ-73 or Red Arrow 73 Missiles (Option 1)*

Name: Red Arrow 73B

Type: Anti-Tank Missile System

Muzzle Velocity: m/s120

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 200 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 2)*

Name: Red Arrow 73D

Type: Anti-Tank Missile System

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 280 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 3)*

Name: Red Arrow 73E

Type: Anti-Tank Missile System

Muzzle Velocity: m/s135

Maximum Range: m3,000

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 4)*

Name: Red Arrow 73F

Type: Anti-Tank Missile System (Bunker Buster)

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Fuel Air Explosive Warhead

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

Auxiliary Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Fire Control

Name: BDS System

Computerized FCS: Yes

Thermal Tank Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: INA

Firing Ports: Yes

IFF: INA

GPS: Yes

Winch: Available

Satellite Navigation System: BeiDou System

IR Thermal Optic: Installed

IR Thermal Optic Detection Maximum Range: m8,000

IR Thermal Optic Identification Maximum Range: m3,500

High Definition Color Video Camera: Yes

High Definition Color Video Camera Detection Maximum Range: m12,000

High Definition Color Video Camera Detection Maximum Range: 77,000

Range Finder (Laser) Maximum Range: km10

Radar Type: Ku-band battlefield radar

Radar Maximum Target Detection Range: km12

Radar Minumum Target Detection Range: m200

Protection

Hull and Turret Armor: High hardness armor steel, which provide a protection against 12.7mm armour-piercing incendiary (API) strikes frontally at 100m,

Side Armor: 7.62mm API on the sides at 100m

Rear Armor: 7.62mm ball at the rear.

Applizue Armor: Available, he ZBD-09 can also be fitted with add-on armour package enables the vehicle to survive 25 mm API frontally at 1,000m and 12.7mm API on the sides at 100m.

Explosive Reactive Armor: INA

Active Protection System: yes

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 12 Smoke Grenade Launchers (6 on each side)

Central Tire Inflation System: Yes, The tires are fitted with a CTIS and RFIs, which means that the tyres will continue to support the vehicle once punctured for 100 km at a speed of 40 km/h.

Automatic Fire Extinguishing System: Yes

Air Conditionning System,: Yes

Notes:

This variant of the Type 09 family is equipped with the equipment required to conduct C2 at a brigade level. Like many of the support platforms based on this family it is designed to have matching mobility and protection so that it can work with the formation on the battlefield. The platform is known to be in service and may have the designation ZZH-09, which stands for Armoured, Combat Service Support, and Command respectively.

VTT-323 (M1973 Sinhung) North Korean Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Type 85/YW 531H:** Domestic/export base model
- **YW703H:** Command variant
- **Type 85 Armored Command Vehicle:** 2-man crew, 6 staff, additional communications equipment, & fewer ammunition rounds; used at regimental or division level
- **Type 85 Recovery Vehicle:** 1000 KG crane with 5-man crew
- **Type 85 Maintenance Engineering Vehicle:** Similar to the WZ 751 (ambulance), but for support
- **Type 85 Mortar Carriers:** 82-mm & 120-mm variants similar to the YW 531
- **WZ 751 Armored Ambulance:** 2-man crew with space for 4 litter or 8 seat patients; 12.7-mm MG
- **Type 85 SP Howitzer (Type 70-1/YW 302):** Type 54-1 122-mm howitzer on Type 85 chassis
- **Type 85 ATGM Launcher Vehicle:** Railed hull with 4-rail Red Arrow-8 SACLOS wire-guided ATGM
- **YW 307 IFV:** Type 89 with a 25-mm cannon similar to the Bushmaster & the 7.62-mm coaxial MG
- **YW 309 Infantry Combat Vehicle (ICV):** 3-man crew, 73-mm low pressure main gun, 7.62-mm coaxial MG & Red Arrow 3 ATGM
- **HJ-8 Anti-Tank Vehicle:** AT traversable launcher with 4 HJ-8 ATGMs & 4 loads in storage in the hull
- **NVH-1:** Joint Chinese/British variant with 25-mm gun
- **Type 90:** Updated design with reduced height, improved hull shape, & better transmission
- **Thai versions:** Similar to the Chinese variants, but armed with a M-2HB MG
- **Artillery Command Post Vehicle:** YW 531H modified with a raised rear superstructure
- **YW 306:** 130-mm MRL platform
- **Type 89 (YW 534/WZ 534):** Improved power pack & night vision equipment for domestic use & export with longer & wider chassis, improved engine, & mobility

System

Alternative Designations: VTT-323; M1973 Sinhung

Type: Armoured Personnel Carrier

Manufactuer: State Factories North Korea

Crew: ea4

Troop Compartment Capacity: ea10

Fire on the Move: Yes

Note: This is nowadays North Korea’s main frontline APC.

Dimesions

Length: m5.48

Width: m2.8

Height: m2.6

Weight, Combat: tons15

Automotive

Engine Name: Deutz BF8L413F

Engine Type: Diesel

Engine Power: hp320

Maximum Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed, Maximum Swim: km/h6

Fording Depth: mAmphibious

Transmission: Manual

Gears: ea5 Forward, 1 Reverse

Slope: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2

Note: The VTT-323 is fully amphibious, propelled by its tracks when swimming.

Armament and Ammunition

↳*Main Gun*

Name: Type 54 (DShKM copy)

Type: Anti-Aircraft Machine Gun

Caliber/length: mm12.7

Number of Rounds: ea1,200

Muzzle Velocity: m/s850

Max Range: m2,000

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Ammo: 1120 Rounds: APDS (Tungsten Core); API, API-T,

Armored Sheilds: Yes

Traverse: deg360

Elevation: deg90

Anti-Tank Guidded Missile

Name: 9M14 Malyutka (NATO: AT-3 Sagger)

Type: Anti-Tank Guided Missile

Length: mm860

Width: mm393

Diameter: mm125

Weight, Total: kg10.9

Warhead Weight: kg2.6

Speed: m/s115

Effective Firing Range: m500-3,000

Guidance System: MCLOS, SACLOS

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: INA

Thermal Gunner: INA

Main Gun Stablization: Yes

IFF: INA

Protection

Armor Type: Welded Steel Hull

Hull Armor: mm12.7

Armor (turret front): mm14 (front glacis)

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Notes:

The Sinhung VTT-323 armored personnel carrier (APC) is a North Korean license-built version of the Chinese Type 63 APC (see separate record). However, it has several alterations from its original that effectively make it a different vehicle. It is designated the M1973 by the U.S. Army and nicknamed the "Vet." It uses the same chassis found in the PT-85 light tank and several other vehicles in North Korean service. The welded steel hull is boxy in shape, with the turret placed behind the center-line of the vehicle. The driver sits in the front left of the vehicle, a single-piece hatch opening to the left above him, fitted with two day periscopes to the front. The commander sits to the driver's right with a single 360-degree view periscope and a single-piece hatch opening to the right. The engine compartment is behind the commander, with the third crew member, the loader, seated behind the driver. The engine has air inlets and outlets on the roof and exhausts to the right side of the roof. A one-man turret holds the gunner and mounts either a 14.5-mm machine gun and a 7.62-mm MG, or twin 14.5-mm guns. Another version carries a Susong-Po anti-tank guided-missile (ATGM) launcher (a variant of the Russian AT-3 Sagger ATGM) and SA-7/SA-16 man-portable surface-to-air missiles (SAMs). The turret is probably manually operated. The vehicle can carry 10 fully equipped infantry and is the standard APC in North Korean service, organic to the motorized infantry battalions of tank and motorized infantry brigades. Infantry enter and exit the vehicle through a two-hinged door on the back of the hull. There are at least two

firing ports provided on each side of the hull. Fully amphibious, the vehicle must have a trim board affixed to the front of the hull, though this can be accomplished by the driver without leaving his seat. It is propelled through the water by its tracks.

BTR-80 Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment

- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control
- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: BTR-80

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Crew: ea3

Personnel: ea7

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

The BTR-80 is an 8×8 wheeled amphibious armoured personnel carrier (APC) designed in the USSR. The BTR-80 is a modern, lightly armored vehicle with a diesel power plant. It is manufactured at the Gorkiy Automobile Factory in Nizhniy Novgorod and has been in service since the early 1980s. The BTR-80 is a lightly armored amphibious vehicle with a collective chemical-biological-radiological (CBR) protective system. Operated by a crew of three, the vehicle can carry a squad of seven infantry troops. The BTR-80 8 x 8 armored personnel carrier is intended to carry personnel on the battlefield and provide close fire

support. It can also carry out reconnaissance, combat support and patrol missions. It entered service with the Russian army in the late 1980's and has since been used in a number of military conflicts, including UN peacekeeping operations. The vehicle is in production and in service with the Russian army and with a number of other countries.The BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Although the armament is same as BTR-60 and BTR-70, except for added smoke grenade dispensers on the back of the turret, the conical turret has been improved and the gun can elevate higher. The Soviets-based the BTR-80 on the BTR-70 APC. It has a single 260-hp, V-8 turbocharged, water-cooled, diesel engine, an improvement over the twin gasoline engines installed in the BTR-60 and BTR-70 vehicles. The reconfigured rear portion of the hull accommodates the new, single engine. The Soviets removed the roof chamfers of the modified BTR-70, raised the rear, and squared off the rearward-sloping engine compartment. Standard equipment includes TNPO vision blocks, TNP-B and TKN-3 optical devices for the driver and commander, an OU-3GA2M infrared search light, six 81 mm smoke grenade launchers 902V "Tucha", a radioset (R-173 or R-163-50U), an intercom, and hydrojets for amphibious propulsion. The Soviets modified the truncated cone turret used on the BTR-70 for the BTR-80 by redesigning the mantlet. This allows the 14.5 mm (0.57 in) KPVT and coaxial 7.62 mm (0.3 in) PKT machine guns to be elevated to a maximum of 60 degrees. This high angle of fire is useful in engaging targets on steep slopes, in urban fighting, and for engaging low slow flying air targets.[5] The Soviets had also modified the design and positioning of the firing ports; the ports are now round, rather than tear-shaped, and have ball mounts similar to those used on the BMP-1. The forward firing ports now sit in angled recesses, which allows infantry to fire to the front of the vehicle. The redesigned side doors are split horizontally. The upper portion opens forward; this gives dismounting troops some protection against small arms fire from the front of the vehicle. The lower portion opens down, forming a step. Six smoke grenade projectors are mounted on the rear of the turret. The BTR-80 can climb a slope with up to 60% gradient and climb a vertical step of 0.5 m.

Type 77-II Chinese Amphibious Armored Personnel Carrier





Tiers:

1 2 3 4

System

Alternative Designation: WZ511

Crew: ea2

Passenger Capacity: 16

Dimensions

Length: m7.40

Width: m3.20

Height: m2.44

Weight, Combat: 15,500 kg

Ground Pressure: INA

Payload: 3,000 kg

Ground Clearance: m0.40

Automotive

Engine Name: Model 12150L-2A

Engine Type: Water-cooled, 4-cycle, direct-injection diesel engine

Engine Power: 400 hp at 2,000 rpm

Cruising Range: km370

Range, Swimming: km120

Speed, Maximum Road: 60 kph

Speed, Average Cross: INA

Speed Maximum Swim: km/h12

Fording Depth: Amphibious

Vertical Obstacle: m0.87

Trench Obstacle: m2.90

Gradient: %60

Side Slope: %40

Armament

↳*12.7mm Anti-Aircraft Machine Gun*

Name: Type 54

Type: Heavy Machine Gun

Max Rate of Fire: INA

Sustain Rate of Fire: rpm600

Feed System: 50 round belt

Sights: Iron / Optical

↳*Ammunition*

Type: AP

Caliber: 12.7×108mm

Muzzle Velocity: m/s850m/s

Basic Load: INA

Effective Range: 2,000m

Range Finder Type: NA

Armor Penetration: 25mm

Maximum Firing Range: 2,500m

Protection

Hull Armor: 6-10mm

Notes:

The Type 77 armored personnel carrier (APC) is a development of the former Soviet BTR-50PK and the Chinese Type 63 amphibious tank (see separate records). The vehicle is very similar in appearance to the BTR-50PK, although the Type 77 is heavier and has a more powerful engine. An all-welded steel hull surrounded the troop compartment. The commander is located at the front right side in what resembles an armored conning tower that has three small vision blocks. The driver sits at the front left side and the 12.7-mm anti-aircraft gun is located at the commander's station. As is the case with the BTR-50PK, troops enter and exit through two rectangular roof hatches in the built-up superstructure. Unlike that onetime Soviet vehicle, the Type 77 has an additional forward opening door in the right-hand side. The Type 77 has reportedly been fitted with a new more powerful and more efficient diesel engine. There are no details available on the engine type or its characteristics. At least 200 are in service with the Chinese People's Liberation Army Navy (PLAN) for use in amphibious warfare, used mainly by Chinese marines for front-line transport. Development of the APC began in April 1965, though the design certificate was not awarded until 1977. Initial production took place in the mid-1970s; it was first observed by the West in 1974. Total production has been estimated at 900 units. One report has suggested that Albania may have obtained a small number of Type 77 APCs from China; that report has not been confirmed as of this update. The Type 77-II is a basic APC used to transport marines from a landing ship to the beach and to evacuate casualties. It can be modified to serve as an ambulance, command post or fuel resupply 4 x 4 vehicle.

Piranha III Swiss 6x6 Amphibious Armored Personnel Carrier (APC)







Tiers:

1 2 **3** 4

Variants:

- **Piranha (6 x 6):** INA
- **Piranha III (8 x 8):** INA
- **Piranha IV:** This variant ioncludes an upgraded MTU 544-hp powerplant with an increased power-to-weight ratio and maximum speed of 62 mph (100 km/hr) and 465.7-mi (750-km) road range.

System

Alternative Designation: Piranha III
Type: 6x6 Amphibious Armored Personnel Carrier (APC)
Manufacturer: MOWAG
Family: Piranha
Crew: ea1
Passenger Capacity: 13

Dimensions

Length: 5.97 m
Width: 2.50 m
Height: 1.85 m
Distance Between Axles, 1st to 2nd: 2.04 m
Distance Between Axles, 2nd to 3rd: 1.04 m
Ground Clearance: 500 mm
Combat Weight: 10,500 kg

Unloaded Weight: 8,000 kg

Automotive

Engine Name: 1 x Detroit 6V-53T

Engine Type: 318-cu in (5.21-liter) liquid-cooled, 2-stroke, V6 diesel

Engine Power: 300 hp at 2,800 rpm

Fuel Capacity: 250 liters

Suspension: 6 x 6 (6-wheel drive, 2-wheel steering) coil spring on front axle and torsion bars on 2 rear axles, hydraulic shock absorbers at all wheel stations (12.5 in/0.32 m travel)

Range: 600 km

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h11

Vertical Obstacle: 0.50 m

Fording: Amphibious

Gradient: 70 %

Main Gun

Note: various armament options available including:12.7-mm machine gun turret; Oerlikon 20-mm GAD-AOA turret; 25-mm and 30-mm cannon turrets; 2-person turret armed with 90-mm Cockerill or Mecar, Thune-Eureka turret w/2 BGM-71 TOW anti-tank missile launchers; 81-mm mortar

Protection

Hull Armor: Quick-mount selection, including defense against RPG, IED, NBC

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Piranha 6 x 6 armored personnel carrier (APC) is one of four models in the Piranha family (the others being the 4 x 4 and 8 x 8 versions), all of which share similar components such as hull sections and wheels, as well as door and hatch configurations.

Type 85 (Type YW-531H) Chinese Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **Type 85/YW 531H:** Domestic/export base model
- **YW703H:** Command variant
- **Type 85 Armored Command Vehicle:** 2-man crew, 6 staff, additional communications equipment, & fewer ammunition rounds; used at regimental or division level
- **Type 85 Recovery Vehicle:** 1000 KG crane with 5-man crew
- **Type 85 Maintenance Engineering Vehicle:** Similar to the WZ 751 (ambulance), but for support
- **Type 85 Mortar Carriers:** 82-mm & 120-mm variants similar to the YW 531
- **WZ 751 Armored Ambulance:** 2-man crew with space for 4 litter or 8 seat patients; 12.7-mm MG
- **Type 85 SP Howitzer (Type 70-1/YW 302):** Type 54-1 122-mm howitzer on Type 85 chassis
- **Type 85 ATGM Launcher Vehicle:** Railed hull with 4-rail Red Arrow-8 SACLOS wire-guided ATGM
- **YW 307 IFV:** Type 89 with a 25-mm cannon similar to the Bushmaster & the 7.62-mm coaxial MG
- **YW 309 Infantry Combat Vehicle (ICV):** 3-man crew, 73-mm low pressure main gun, 7.62-mm coaxial MG & Red Arrow 3 ATGM
- **HJ-8 Anti-Tank Vehicle:** AT traversable launcher with 4 HJ-8 ATGMs & 4 loads in storage in the hull
- **NVH-1:** Joint Chinese/British variant with 25-mm gun
- **Type 90:** Updated design with reduced height, improved hull shape, & better transmission
- **Thai versions:** Similar to the Chinese variants, but armed with a M-2HB MG
- **Artillery Command Post Vehicle:** YW 531H modified with a raised rear superstructure
- **YW 306:** 130-mm MRL platform
- **Type 89 (YW 534/WZ 534):** Improved power pack & night vision equipment for domestic use & export with longer & wider chassis, improved engine, & mobility

System

Alternative Designations: YW 531H; see variants
Proliferation: 1030+ (China, Bangladesh, Burma, Sri Lanka, Thailand, Zimbabwe)
Type: Armoured Personnel Carrier
Crew: ea2 (driver, commander)
Troop Compartment Capacity: ea13

Maximum Effective Range: km500

Description: Improved Type 69 APC with rear exit door& emergency roof hatches with space for 13 soldiers who can dismount; firing ports vary depending on variant

Driver Day Periscope: ea2

Driver Night Periscope: ea1

Dimesions

Length: m6.13

Width: m3.06

Height: m2.59

Weight, Combat: kg12,337.71

Ground Pressure: kg0.546

Automotive

Engine Name: BF8L 413F

Engine Type: Turbocharged, air-cooled, V-8 diesel

Engine Power: hp320

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h35

Speed, Maximum Swim: km/h6

Fording Depth: mAmphibious

Transmission: Manual

Gears: ea5 Forward, 1 Reverse

Communications

Primary Radio: Type 889

Secondary Radio: VRC 83

Intercom System: Type 803

Protection

Armor Type: Welded Steel Hull

Hull Armor: mm12.7

Armor (turret front): mm14 (front glacis)

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Mine Clearing: No

Self-entrenching Blade: No

NBC Protection System: Yes

Survivability Equipment: INA

Smoke Equipment: 8 Smoke Grenade Launchers (4 on each side)

Waveguide Blade: Yes

Armament and Ammunition

↳*Main Gun*

Name: Type 54 (DShKM copy)

Type: Anti-Aircraft Machine Gun

Caliber/length: mm12.7

Number of Rounds: ea1,200

Muzzle Velocity: m/s850

Max Range: m2,000

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Ammo: 1120 Rounds: APDS (Tungsten Core); API, API-T,

Armored Sheilds: Yes

Traverse: deg360

Elevation: deg90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: INA

Thermal Gunner: INA

Main Gun Stablization: Yes

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Notes:

According to Military Periscope, dated: April 2013, the Type 85 armored personnel carrier (APC) is an enlarged successor to the Type 69 that has spawned a family of variants including infantry fighting, command, mortar carriers, weapons carriers and ambulance vehicles. It was developed in parallel with the 6 x 6 Type 86 and shares the engine and most of the armament options. The Type 85 is also designated the YW 531H. Another version, designated the Type 89 by China, but called the YW 534 in the People's Liberation Army (PLA), is very similar, but is 74mm wider and has 150 mm more length of track on ground. All vehicles in the line share a common hull. The hull has a shallow glacis, angular sides and top, track skirts over the three return rollers per side and five wheel stations per side versus the four of the earlier Type 69. The driver sits in the left front of the hull with the compartment for the license-built Deutz diesel engine to his right. Behind him is the commander. Some variants have turrets, which are located over the troop compartment. The basic APCs have a shielded 12.7mm machine gun. Other main guns include 25- and 73mm cannon. Troops enter and leave by a rear door that opens to the right; emergency roof hatches are also

provided. The number of vision blocks and firing ports varies, having three to four periscopes and firing ports on the right-hand side, two to three on the left side. (Thai YWH 534s have three on each side and one in the rear door.)

ASLAV-PC Australian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armored Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilized M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
- **ASLAV Type II:** The ASLAV Type II has no turret and greater internal capacity and is derived from the Canadian Bison Armored Personnel Carrier. The ASLAV Type II has a crew of two (commander and driver) and is armed with a pintle mounted M2 12.7 mm machine gun. In a number of vehicles, the standard machine gun pintle mount was replaced by a Kongsberg Protector remote weapon station (RWS), which can accommodate either a 12.7 mm machine gun or a Mk 19 40mm automatic grenade launcher. Using a common hull design installed with interchangeable Mission Role Installation Kits (MRIKs), it can be converted into any one of four variants.
- **ASLAV-PC (Personnel Carrier):** Is an Armored Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance
- **ASLAV-C (Command):** Is an Armored Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialized seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.
- **ASLAV-S (Surveillance):** Is a specialized surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** Is an Armored Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilizing two specialist MRIKs.
- **ASLAV-F (Fitter):** Is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** Is an Armored Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-PC

Type: Armored Reconnaissance Vehicle

Family: ASLAV

In Service: In the Australian Army, the ASLAV equips the Cavalry Squadrons of the Royal Australian Armoured Corps. A Cavalry Squadron comprises a headquarters element, an echelon and three sabre troops of six ASLAVs, each troop is further broken down into two patrols each comprising two ASLAV-25s and one ASLAV-PC. The ASLAV equips two squadrons from each of the Australian Army's Armoured Cavalry Regiments, the 1st Armoured Regiment in Adelaide, the 2nd Cavalry Regiment in Townsville, and the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane, as well as the School of Armour at Puckapunyal.

Crew: ea2

Passenger Capacity: ea7

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.5

Trench: m2

Fording Depth: mAmphibious

Note: The ASLAV-PC is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Main Gun

Note #1: Vehicle has no turret, but a raised superstructure over the troops compartment.

Note #2: The main armament is a pintle-mounted 12.7 mm machine gun. Currently most of the vehicles are retrofitted with remotely controlled weapon stations fitted with either a 12.7 mm machine gun, 7.62 mm machine gun or 40 mm automatic grenade launcher. It can be operated remotely from behind armor protection.

↳*System*

Name: M242 25mm Bushranger Chain Gun
Type: 25mm Chain Gun
Caliber: 25mm
Manufacturer: Hughes Helicopters (1981–1985) McDonnell Douglas Helicopters (1985–2002) Alliant Techsystems (2002–2015) Orbital ATK (2015–2018) Northrop Grumman Innovation Systems (2018–present)
In Service: 1981-Present
Proliferation: >11,000
Length: 2,672mm
Barrel Length: 2,175mm
Width: 318mm
Height: 373mm
Weight: 119 kg
Barrels: Single barrel (progressive RH parabolic twist)
Action: Open bolt
Rate of Fire: • Cyclic: 200rpm with 1hp or 500rpm with 8hp
Muzzle Velocity: 1,100 metres per second (3,600 ft/s)
Maximum Firing Range: 6,800 m
Effective Firing Range: 3,000 m
Sights: INA

↳*Ammunition*

Type: Rifle
Caliber: mm25
Shell: 25×137 mm
Basic Load: 720
Notes: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. The ammunition used in the M242 may also be used in a variety of weapons such as the GAU-12 Equalizer, the French Giat M811, or the Swiss Oerlikon KBA weapon system. It has the capability to fire U.S. manufactured ammunition as well as the NATO equivalents thereof. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun
Alternative Designation: Mark 48, or Mk 48, or Maximi
Type: Light Machine Gun
Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (STANAG 2310)

Basic Load: 1,200

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-PC provides protection against small-arms fire, mine-blasts and artillery fragments.

Applique Armor: Protection of the ASLAV-PC can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

ASLAV-PC (Personnel Carrier) – is an Armored Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance. The Australian Light Armored Vehicle (ASLAV) is an eight-wheeled amphibious armored reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armored fighting vehicles. The ASLAV is a highly mobile, eight-wheel drive, amphibious armored fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tires through the use of solid-core run-flat tires. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

VN-1 (ZBD-09) Chinese 8x8 Amphibious Armored Personnel Carrier (APC)



Tiers:



Variants:

- **PLL-09 (Type 09) Modular Self-propelled Howitzer system:** Based on IFV variant. Can be armed with either a 122mm or 155mm howitzer, to provide indirect fire support for infantry.
- **ZTL-11:** The ZTL-11 is the direct fire support version of the Type 09 family. It is equipped with a 105 mm direct fire gun and is capable of defeating heavily armoured targets if engaged from opportune ranges or in an ambush. The vehicle is designed to provide a combined arms brigade with enough organic firepower to defeat the majority of opposition encountered. The ZTL designation stands for armoured (Z), assault gun (T) and wheeled (L).
- **ZZH-09 C2:** This variant of the Type 09 family is equipped with the equipment required to conduct C2 at a brigade level. Like many of the support platforms based on this family it is designed to have matching mobility and protection so that it can work with the formation on the battlefield. The platform is known to be in service and may have the designation ZZH-09, which stands for Armoured, Combat Service Support, and Command respectively.
- **ZBL-09 ARV:** The ARV of the Type 09 family is designed to support, repair, and recover damaged or incapacitated Type 09 vehicles in combat. It is armoured to the same level so that it can accompany a mechanised formation wherever it is required.
- **ZBL-09 bridging platform:**
- **ZBL-09 combat engineering platform:**
- **ZBL-09 SHORAD:**
- **VN1 anti-tank missile carrier:**
- **ZBL-09 35 mm air-defence platform:**
- **ZBL-09 ambulance:**
- **ZBL-09 EW platform:**
- **ZBL-09 reconnaissance platform:**
- **VN1C, Armour Day, 2017:**
- **Type 09, assault gun:**

System

Alternative Designation: Type 09; ZBL-09; VN1
Manufacturer: NORINCO
Family: Snow Leopard
Cost: $1.8 Million
Type: 8x8 Armored Fighting Vehicle
Crew: ea3
Troop Compartment Capacity: ea7
Maximum Effective Range: km800

Dimensions

Length: m8.0

Width: m3.0

Height: m2.1

Weight, Combat: kg21,000

Ground Pressure: kg/mINA

Automotive

Engine Name: DEUTZ BF6M1015 CP

Engine Type: Water-cooled Diesel

Engine Power: 440hp at 2,100 rpm

Power to Weight Ratio: kW/t16.5

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed, Average Cross: km/h50

Speed, Maximum Swim: km/h8

Propellers: ea2

Transmission: Manual

Suspension System: Independent

Axels: Differential Lock Enabling

Slope: deg30

Vertical Obstacle: m0.55

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.55

Fording Depth: mAmphibious

Trench: m1.8

Communcations

Blue Force Tracker: Yes

↳***TBR-121 VHF Radio***

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

Turret Type: Two Man Turret

↳*System*

Name: 30 mm 2A72 (Shipunov 2A42)

Type: 30mm Auto-cannon

Alternate Designation: Shipunov 2A42

Date of Introduction: 1980

Rate of Fire (Low): rds/min200-300

Rate of Fire (High): rds/min550-800

Barrels: ea1

Feed System: Twin Feed

Action: Gas Operated

Cage Cooling Sleeve: Yes

Traverse: deg360

Weight: kg115

Length, Total: m3.027

Length, Barrel: mm2,416

Cage Cooling Sleeve: Yes

↳*Ammunition (Option 1)*

Type: Armour Piercing Fin Stabilized Discarding Sabot with Tracer(APFSDS-T)

Caliber: mm30

Muzzle Velocity: m/s1,275

Basic Load: rds125

Maximum Effective Range: m2,800

Min Range: mINA

Armor Penetration: Yes

Round Mass (Nominal): g675

Projectile Mass (Nominal): g220

Round Length: mm280

Tracer: 2.5

Cartridge Case: Steel

Primer: Percussion cap

Penetration at 1,000: >45mm RHA steel at 60° obliquity

Dispersion: Mils0.45

Operational temperature: -32°C to +62°C

↳*Ammunition (Option 2)*

Type: High Explosive Incendiary

USSR Designation: UOF-84

Caliber: 30mm

Description: Shell filled with 48,5g HEI, with A-670M fuze

Muzzle Velocity: m/s960

Basic Load: ea225

Max Range: 5,000

Min Range: INA

Armor Penetration: Yes

Weight, Bullet: kg0.39

Anti-Tank Guided Missiles (ATGM)

↳*HJ-73 or Red Arrow 73 Missiles (Option 1)*

Name: Red Arrow 73B

Type: Anti-Tank Missile System

Muzzle Velocity: m/s120

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 200 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 2)*

Name: Red Arrow 73D

Type: Anti-Tank Missile System

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 280 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 3)*

Name: Red Arrow 73E
Type: Anti-Tank Missile System
Muzzle Velocity: m/s135
Maximum Range: m3,000
Warhead Type: Tandem-HEAT
Hit Probability: %90
Penetration Probability: %80
Penetration: 300 mm of RHA set at 68° and protected by ERA

↳*HJ-73 or Red Arrow 73 Missiles (Option 4)*

Name: Red Arrow 73F
Type: Anti-Tank Missile System (Bunker Buster)
Muzzle Velocity: m/s130
Maximum Range: m2,800
Warhead Type: Fuel Air Explosive Warhead
Hit Probability: %90
Penetration Probability: %80
Penetration: 300 mm of RHA set at 68° and protected by ERA

Auxiliary Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun
Manufacturer: Norinco
Type: 7.62mm Heavy Machine Gun
Length, Total: mm1,192
Length, Barrel: mm658
Diameter: INA
Action: Gas Operated
Rate of Fire: rds/min700-800
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR
Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Min Range: m100

Armor Penetration: INA

Fire Control

Name: BDS System

Computerized FCS: Yes

Thermal Tank Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: INA

Firing Ports: Yes

IFF: INA

GPS: Yes

Winch: Available

Satellite Navigation System: BeiDou System

:

Protection

Hull and Turret Armor: High hardness armor steel, which provide a protection against 12.7mm armour-piercing incendiary (API) strikes frontally at 100m,

Side Armor: 7.62mm API on the sides at 100m

Rear Armor: 7.62mm ball at the rear.

Applizue Armor: Available, he ZBD-09 can also be fitted with add-on armour package enables the vehicle to survive 25 mm API frontally at 1,000m and 12.7mm API on the sides at 100m.

Explosive Reactive Armor: INA

Active Protection System: yes

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 12 Smoke Grenade Launchers (6 on each side)

Central Tire Inflation System: Yes, The tires are fitted with a CTIS and RFIs, which means that the tyres will continue to support the vehicle once punctured for 100 km at a speed of 40 km/h.

Automatic Fire Extinguishing System: Yes

Air Conditionning System,: Yes

Notes:

The VN-1 is part of the Type 09 family (commonly referred to as ZBL-09) is the latest wheeled platform series to enter service

with the People's Liberation Army (PLA) of China. The family was designed by China North Industries Corporation (NORINCO) and is expected to replace obsolete wheeled vehicles in service with the PLA. The family bears some resemblance to the US Stryker Brigade Combat Team concept, and may reflect recent shifts in China's doctrine to mimic the rapidly deployable and mobile formations used by the US and Russia. The ZBL-09 is the most numerous variant of the Type 09 family, which as a result it is often the designation used to describe the entire genus of Type 09 variants. It is designed as an IFV, armed and protected to provide an equipped infantry section with the necessary fire support and shelter needed to effectively influence a battle.

BTR-60PB Russian 8x8 Amphibious Armored Personnel Carrier (APC)






Tiers:



Variants:

- **BTR-60P:** Initial model with open top, pintle-mounted 7.62-mm machine gun
- **BTR-60PA/BTR-60PK (12 passengers only):** Covered top, NBC protection, pintle-mounted 7.62-mm MG, still exit over top
- **BTR-60PB (space for 8 soldiers for dismounted operations).:** Most common variant with BRDM-2 MG turret with a 14.5-mm MG & coaxial 7.62-mm; troops exit over top
- **Modernized BTR-60PB:** BM2 Turret with 30-mm 2A42 Cannon & 7.62-mm PKTM MG; 30-mm AGS-17 AGL on left side
- **BTR-60U:** Command vehicle with additional radios
- **BTR-60 PU-12/12M:** Anti-Aircraft units' command vehicle
- **BTR-60 MS:** Radio vehicle with High Ball antenna
- **BTR-60 VVS:** Sans turret with additional radios
- **BTR-60 PBK:** BTR-60PB with 3 radios
- **BTR-60 1V18:** Artillery observation vehicle
- **BTR-60 1V19:** BTR-60 1V18 for FDC operations
- **BTR-60 R-145BM:** Communications vehicle with 5 radios
- **BTR-60 R-975:** Forward air-control vehicle with turret
- **BTR-60-Z-351BR:** Power production vehicle with generator
- **BTR-60-P-238BT:** Switchboard vehicle for communications
- **BTR-60-P-240BT:** Integrates radio & wire communications- R-123M radio & R-241 switchboard
- **BTR-60-P241BT:** Equipped with P-241 telephone system
- **BTR-60-R-137B:** Communications vehicle with turret
- **BTR-60 ACRV:** Artillery Battery C2 & recon vehicle
- **BTR-60-R-145:** Additional radio, but no turret
- **BTR-60-R-156BTR:** C2 vehicle with additional radios
- **BTR-60-R-409BM:** Relay vehicle-R-409 & R-123M radios
- **BTR-60PAU (Bulgaria):** Artillery command vehicle
- **BTR-60PB-MD (Bulgaria):** Upgraded engine, radios, & NBC equipment
- **BTR-60P Maintenance Assistance (MTR-2):** Maintenance vehicle with tarp over troop compartment
- **BTR-60 SPAAG (Cuba):** Twin 30-mm anti-aircraft cannons
- **BTR-60 Djibouti (Djibouti):** AML-90 turret on BTR-60
- **BTR-60BD:** Speed increased to 100 km/h & range to 800 km
- **MTP-2:** Armored Recovery Vehicle
- **BTR-60PZ:** Final production model with 1PZ-2 roof-mounted periscope
- **BTR-60-R-140BM:** C2 vehicle with turret

- **MEP:** Infantry command post
- **BTR-60PB FAC:** Turreted FAC vehicle without the gun

System

Alternative Designations: BTR-60PB

Manufacturer: Gorkovsky Avtomobilny Zavod (Soviet Union) Ratmil Regie Autonoma (Romania, TAB-71)

Description: 8 X 8 wheeled APC designed to replace the BTR-152; original design (BTR-60) had an open top & 14 soldiers had to exit over the sides; 3 firing ports on each side of vehicle

Crew: ea3

Passengers: ea14

Dimensions

Length: m7.56

Width: m2.83

Height: m2.31

Weight, Combat: tons10.3

Automotive

Engine Name: INA

Engine Type: Ukrainian-made UTD-20 diesel engine

Engine Power: 90 hp each, 180 hp combined

Range, Crusing: km600

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Fuel Capacity: INA

Note: The new engine provides a 20 percent decrease in fuel consumption;

Communications

Primary: R-123

Secondary: R-113

Main Weapon System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferation: Widely Proliferated

Weight: kg49

Total Length: mm1,980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

↳***Ammunition***

Name: INA

Type: API-T

Cailber: mm14.5mm

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: General Purpose Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: + 1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳ ***Ammunition***

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Vehicle Commander: TKN-1

Thermal Gunner: PP-61A optical sight

Main Gun Stabilization: INA

Turret Type: BPU-1 turret

Infrared Light: OU-3 infrared light

Protection

Armor Material: Welded steel

Armor Hull: 7 mm at 86° hull upper front 9 mm at 47° hull lower front 7 mm hull sides 5 mm hull upper rear 7 mm hull lower rear 5 mm hull floor 7 mm hull roof

Armor (turret front): mm10 mm turret front 7 mm turret sides 7 mm turret sear 7 mm turret roof

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Collective (closed vehicles)

Smoke Equipment: No

Survivability Equipment: No

Notes:

The BTR-60PB armored personnel carrier is a further development of the previous BTR-60PA. This APC was produced in large numbers. Its production commenced in 1966 and ceased in 1976. For a long period of time the BTR-60PB was used to transport Soviet motorized infantry troops. It has also been exported to a number of countries. Despite its age, the BTR-60PB is still in service with at least 30 operators worldwide. The BTR-60 PB has a main entry that differs from the PA in the adoption of the BRDM-2's machine-gun turret holding machine guns of two different calibers, a 14.5-mm machine gun, with a 7.62-mm machine gun mounted co-axially. Some later variants have similar sighting equipment to the BTR-70; there i s a small periscopic sight on the turret roof. It has well-sloped armor on the sides and overhead armor cover. The hull is of all-welded steel construction, with the driver and commander seated at the front, a personnel compartment in the mid-section, on top of which is a one-man turret, with the engine compartment at the rear of the hull. Troops enter from a top hatch. The BTR-60PB performs well going cross-country in conditions that favor wheels. On land or water, the vehicle is steered by the front two sets of wheels, which have power steering. The boat-shaped hull with sloped sides provides good swimming capability and helps deflect hostile fire. The BTR-60PB has a searchlight and IR equipment, allowing it conduct night operations. The Kharkiv Morozov Machine Building Design Bureau (KMDB) offers a version of the BTR-60PB with a new powerpack. The upgrade replaces the original Russian-made GAZ-49B carburetor-type engines with a Ukrainian-made UTD-20 diesel engine. The new engine provides a 20 percent decrease in fuel consumption; an increase in cruising range from 310 mi (500 km) to 373 mi (600 km); and a better power-to-weight ratio.

Piranha III Swiss 4x4 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Piranha (6 x 6):** INA
- **Piranha III (8 x 8):** INA
- **Piranha IV:** This variant ioncludes an upgraded MTU 544-hp powerplant with an increased power-to-weight ratio and maximum speed of 62 mph (100 km/hr) and 465.7-mi (750-km) road range.

System

Alternative Designation: Piranha III
Type: 4x4 Amphibious Armored Personnel Carrier (APC)
Manufacturer: MOWAG
Family: Piranha
Crew: ea1
Passenger Capacity: 9

Dimensions

Length: 5.32 m
Width: 2.50 m
Height: 1.85 m
Wheel Base: 2.42 m
Ground Clearance: 500 mm
Combat Weight: 7,800 kg
Unloaded Weight: 6,700 kg

Automotive

Engine Name: 1 x Detroit 6V-53
Engine Type: 318-cu in (5.21-liter) liquid-cooled, 2-stroke, V6 diesel
Engine Power: 216 hp at 2,800 rpm
Suspension: 4 x 4 (4-wheel drive, 2-wheel steering) coil spring on front axle and torsion bar on rear,hydraulic shock

absorbers at all wheel stations

Range: 700 km

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Vertical Obstacle: 0.50 m

Fording: Amphibious

Gradient: 70 %

Main Gun

Note: various armament options including: remote-control 7.62-mm machine guns; Oerlikon 20-mm GAD-AOA turret 12.7-mm M2 HB machine gun

Protection

Hull Armor: Quick-mount selection, including defense against RPG, IED, NBC

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Piranha 4 x 4 armored personnel carrier (APC) is one of four models in the Piranha family, all of which share similar components such as hull sections and wheels, as well as door and hatch configurations.

Pandur I-AM Austrian 6x6 Amphibious Armored Personnel Carrier (APC)



Tiers:



Variants:

- **Pandur 1:** Basic version as in the description
- **Belgian Pandur:** Belgian SMAS radio, NBC protection, armed with 12.7-mm & 7.62-mm machine guns
- **Amphibious Pandur:** Electric bilge pumps, closed air intakes-capable of 11 km/h in water
- **Pandur II:** Pandur II
- **Pandur Anti-Aircraft:** Twin 20-mm cannon or SANTAL SAM in turret
- **Pandur ATGM Carrier:** HOT AT missile in a Euromissile UTM 800 launcher or a TOW AT missile in a Kvaerner-Eurkea turret; additional missiles stored in the hull
- **Pandur Armored Recon/Fire Support Vehicle (FSV):** 2-man LCTS turret with a Cockerill 90-mm Mk 8 gun or a Giat TS-90 turret with a 90-mm CN90F4 gun or Cockerill CSE90 turret with an Mk III 90-mm gun
- **Pandur Mechanized Infantry Combat Vehicle (MICV):** MGTS with a choice of armaments: 12.7-mm M2 & 7.62-mm MGs; 30-mm M230 chain gun & 7.62-mm MG; or 40-mm AGL & 12.7-mm MG
- **Pandur Mortar Carrier:** In the passenger compartment, there is an 81-mm or 120-mm mortar mounted on a turnatable
- **Command & Control Vehicle:** For C2 operations
- **Armored Recovery/Repair Vehicle:** For vehicle recovery operations

System

Alternative Designations: Pandur I-AM
Description: 8 X 8 wheeled APC with 2 exit doors in the rear & 2 roof hatches; 2 firing ports on both sides with a capacity for 8 dismounted soldiers
Manufacturer: Steyr-Daimler-Puch
Crew: ea2 (driver, commander)
Passengers: ea10
GPS Navigation: Yes
Electric Bilge Pump: Yes

Dimensions

Length: m6.30
Width: m2.60
Height: m1.82
Ground clearance: m0.43
Wheels, First Axle: m2.25

Wheels, Second Axle: m2.15

Wheels, Third Axle: m2.30

Weight, Unloaded: kg10,800

Weight, Combat: kg14,000

Weight, Maximum Payload: kg3,200

Automotive

Engine Name: 1 x Steyr WD 612.95

Engine Type: 6-cylinder turbocharged water-cooled diesel with air-intake cooling

Engine Power: 260 hp at 2,400 rpm

Power-to-Weight Ratio: 20.3 hp/metric ton

Transmission: Allison MT-653 DR, five speeds, torque converter, lock-up clutch

Cruising Range: km700

Speed (Max Road): km/h100

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): km/h11

Grading: deg70

Side Slope: deg40

Vertical Step: m0.5

Trench: m1.1

Fording: Amphibious

Fuel Capacity: 300 liters

Suspension: 6 x 6 independent

Turning Radius: m8.50

Automatic Drivetrain Management (ADM) System: Yes

Water-to-Water Cooling and Closed Air Intakes: Yes

Waterjet: Yes, Intergrated Waterjet

Trim Vane: Hydraulic Front Trim Vane

Communications

Radio: Belgian SMAS radios

Main Weapon System

Note: Additionally, the Pandur I-AM can be equipped with a additional 7.62mm Machine Gun

↳*System*

Name: NSV 12.7mm Heavy Machine Gun

Type: 12.7mm Heavy Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

In Service: 1971-Present

Proliferation: Widely Proliferated

Length: mm1,560

Weight, Gun Only: kg25

Weight, Gun and Tripod: kg41

Weight, 50 Round Belt: kg11

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Effective Firing Range vs Air Targets: m1,500

Effective Firing Range vs Ground Targets: 2,000

Feed System: 50-round belt

Sights: Iron sights

↳***Ammunition***

Type: Rifle

Caliber: 12.7mm

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea1,200

Fire Control

Fire Control System: No

FCS Name: INA

Night Vision: Optional

Navigation: Optional

Protection

Armor (turret front) (mm): Protects against 7.62-mm AP rounds at 30 m

Applique Armor (mm): INA

Explosive Reactive Armor (mm): INA

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: No

Notes:

The Pandur I is an APC developed and produced by the Austrian company Steyr-Daimler-Puch Spezialfahrzeuge (SSF). It was developed during the 1980s as a private venture, based on the Pegaso BMR-600 design. In 2003, General Dynamics took over Steyr-Daimler-Puch which is now part of General Dynamics European Land Systems (GD ELS), which is also the parent company of MOWAG, Santa Bárbara Sistemas and GD ELS – Germany. The baseline vehicle is armed with a 12.7 mm (.50 cal) heavy machine gun. Its modular design allows it to be fitted with a variety of weapon systems, including a 20 mm autocannon and an armored two-man 90 mm gun turret. The amphibious conversion is available for all other variants. It adds electric bilge pumps, water-to-water cooling and closed air intakes. An integrated waterjet is mounted on either side of the rear hull. The driver pushes a button to activate the amphibious systems, including the deployment of a hydraulic front trim vane. The amphibious Pandur has the same characteristics as the base model, above, except as follows:

XA-180 Finish 6x6 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **XA-180:** Original six wheeler, carries crew of 2 and 16 troops. Empty weight ca 12 tonnes.
- **XA-185:** Upgraded version, carries crew of 2 and 18 troops. Has a more powerful engine and improved power transmission. Used as an ambulance in the Norwegian Army.
- **XA-186:** Upgraded armour. Armoured and equipped with machine-assisted gun turret (.50 BMG). Cannot swim because of the heavy armour. Empty weight ca 19 tonnes. Engine and transmission same as XA-185.
- **XA-188:** Used by the Netherlands Army.
- **XA-200:** The 200 series looks a little different from older variants due to increased armour. It lacks amphibious capabilities but can wade through water that is up to 1.5 m deep. The improved armour protects the passengers against up to 14.5 mm small arms fire. It is also equipped with modern optical aids like periscopes and night vision. The armor upgrade was initiated after the realisation that the previous armor was inadequate, even modern armor-piercing 7.62 mm ammunition could pierce the older XA-180 and XA-185 models in certain areas. The XA-202 was originally developed for Communications and Command. The XA-203 was made as a temporary replacement for XA-185, and is intended to be replaced by Patria AMVs in Finnish service. The Patria AMV (Armored Modular Vehicle) is an 8×8 multi-role military vehicle produced by the Finnish defence company Patria.

System

Alternative Designation: XA-180
Type: 6x6 Amphibious Armored Personnel Carrier (APC)
Manufacturer: Patria Vehicles Oy, Hameenlinna, Finland
Family: XA Series
Crew: 2 (commander, driver)
Passenger Capacity: 10 Troops

Dimensions

Length: 7.35 m
Width: 2.90 m
Height: 2.30 m
Distance between a Axles, 1st to 2nd: 1.90 m
Distance between a Axles, 2nd to 3rd: 1.90 m
Tire Size: 356 x 508 mm
Ground Clearance: 0.40 m

Combat Weight: 15,000 kg

Unloaded Weight: 12,000 kg

Payload Weight, Road: 6,500 kg

Payload Weight, Cross-Country or Swimming: 3,000 kg

Automotive

Engine Name: 1 x Valmet 611 DSBJ

Engine Type: 403-cu in (6.6-l) liquid- cooled, turbocharged, 4-stroke, 6-cyl inline diesel

Engine Power: 240 hp (180 kW) at 2,500 rpm

Power-to-Weight Ratio: 16.0 hp/metric ton

Transmission: INA

Suspension: x 6 (6 wheels driving, 4 wheels steering); beam axles, leaf springs and shock absorbers on each wheel station

Maximum Road Speed: 100 kph

Maximum Swim Speed: 10 kph w/2 shrouded propellers

Range: 800 km

Fording: Amphibious

Main Gun

Note: Basic vehicle is unarmed except for 3 firing ports and vision blocks in each hull side

Protection

Hull Armor: All-welded steel hull provides splinter protection

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Fire Suppression System: Yes

Notes:

XA-180 The Patria Pasi (earlier known as the Sisu Pasi) is a Finnish-made six-wheeled armoured personnel carrier (APC) originally designed for Finnish Defence Forces. The first version was produced in 1983 and serial production began in 1984. It was designed to operate with ease of use, simple structure and low-cost maintenance. The basic appearance and configuration of Patria Pasi is similar to most wheeled APCs. The XA-180 and XA-185 versions are fully amphibious while the XA-203 is not. In 1980, Sisu produced an XA-180 prototype for Finnish Army tests. It competed against two other prototypes, but was declared the winner of the trials in 1983. On 22 December 1983 the Finnish Army ordered a first batch of fifty XA-180s, of which nine were reserved for UN duties. The vehicle proved quite successful and more orders were soon to follow. The XA-180 was originally manufactured and marketed by the Finnish company Sisu Auto but later variants were marketed by the Finnish defence company Patria and are known as Patria XA series.[1] The Vehicle's widely known nickname "Pasi" (also a common given name of Finnish men) stems from the Finnish name "panssari-Sisu" (English: armoured Sisu). The main superstructure is mainly manufactured from 6 to 12 mm of armour steel and the bottom is mine-strengthened, and the front windows are bullet-resistant and equipped with protective hatches. The vehicle has continuous six wheel drive and good capabilities for off-road

driving. It can take inclines up to a maximum of 60°. The XA series has no standard armament, but is equipped with a rotating turret structure for installation of light/heavy machine guns or autocannons. It also has 8 BMP style firing ports on the sides and rear. Therefore, passengers, usually a squad of infantry, can fire their weapons from the cover of the armor. The XA series is popular in peacekeeping missions due to its mobility, non-aggressive appearance, and good protection against mines and improvised explosive devices (IED). The vehicle also offers a good combination of armament, comfort, mine protection, protection against shrapnel and small calibre fire, road speed, short time of learning how to drive, and an acceptable terrain mobility. It also offers more internal space compared to other similar vehicles like the Fuchs or BTR-80.

Piranha III Swiss 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Piranha (6 x 6):** INA
- **Piranha III (8 x 8):** INA
- **Piranha IV:** This variant ioncludes an upgraded MTU 544-hp powerplant with an increased power-to-weight ratio and maximum speed of 62 mph (100 km/hr) and 465.7-mi (750-km) road range.

System

Alternative Designation: Piranha III
Type: 8x8 Amphibious Armored Personnel Carrier (APC)
Manufacturer: MOWAG
Family: Piranha
Crew: ea1-2
Passenger Capacity: 10

Dimensions

Length: 6.93 m
Width: 2.66 m
Height: 2.15 m
Ground Clearance: 0.60 m
Combat Weight: 18,500 kg
Operation Weight: 13,000 kg
Payload: 5,500 kg

Automotive

Engine Name: 1 x MTU 6V183TE22
Engine Type: V6 turbocharged
Engine Power: 400 hp at 2,200 rpm
Fuel Capacity: 300 liters

Transmission: ZF 7HP600 automatic gearbox with 7 forward gears, 1 reverse gear

Range: 600 km

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Vertical Obstacle: 0.50 m

Fording: Amphibious

Gradient: 60%

Slope: 30%

Main Gun

Turret: Turret 1 x CTC 2-person stabilized turret for fire on the go

↳*System*

Name: 1 x 25-mm M242

Type: Chain Gun

Caliber: mm25

Quantity: 1 x 25-mm M242

Length: 2.58 m

Width: 318 mm

Height: 373 mm

Weight: 119 kg

Range: 2,000 m

Muzzle Velocity: 1,345 mps

Rate of Fire: 100, 200, or 500 rpm, cyclic

↳*Ammunition*

Type: Rifle

Caliber: mm25

Cartridge: INA

Basic Load: 240 Rounds

Auxiliary Weapon System

↳*System*

Name: 1 x 7.62-mm co-axial M240 machine gun

Type: General-Purpose Machine Gun

Caliber: mm7.62

Length: 1,260 mm

Barrel Length: 630 mm

Width: 120 mm

Height: 260 mm

Weight: 12.5 kg

Action: Gas-operated long-stroke piston, open bolt

Rate of Fire: 650–750 RPM

Muzzle Velocity: 853 m/s

Maximum Firing Range: 3,725 m

Effective Firing Range: 1,100 m

Feed System: Belt-fed using M13 disintegrating links

Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 400 Rounds

Fire Control

FCS Name: INA

Computer FCS: INA

Protection

Hull Armor: Quick-mount selection, including defense against RPG, IED, NBC

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: Yes, 8 x 76-mm smoke/fragmentation grenade launchers

Notes:

The Piranha III 8 x 8 has a lightweight hull design, greater variable ballistic protection, more space inside and a higher payload capacity than other versions of the Piranha family of APCs (see "Variants," below). Certain features of the 8 x 8 version are identical with other vehicles in the series, including a power pack on the front right-hand side, central driveline system, independent wheel suspension, amphibious capability and room in the rear of the vehicle for weapon stations, equipment and troops.

BTR-60PA (BTR-60PK) Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **BTR-60P:** Initial model with open top, pintle-mounted 7.62-mm machine gun
- **BTR-60PA/BTR-60PK (12 passengers only):** Covered top, NBC protection, pintle-mounted 7.62-mm MG, still exit over top
- **BTR-60PB (space for 8 soldiers for dismounted operations).:** Most common variant with BRDM-2 MG turret with a 14.5-mm MG & coaxial 7.62-mm; troops exit over top
- **Modernized BTR-60PB:** BM2 Turret with 30-mm 2A42 Cannon & 7.62-mm PKTM MG; 30-mm AGS-17 AGL on left side
- **BTR-60U:** Command vehicle with additional radios
- **BTR-60 PU-12/12M:** Anti-Aircraft units' command vehicle
- **BTR-60 MS:** Radio vehicle with High Ball antenna
- **BTR-60 VVS:** Sans turret with additional radios
- **BTR-60 PBK:** BTR-60PB with 3 radios
- **BTR-60 1V18:** Artillery observation vehicle
- **BTR-60 1V19:** BTR-60 1V18 for FDC operations
- **BTR-60 R-145BM:** Communications vehicle with 5 radios
- **BTR-60 R-975:** Forward air-control vehicle with turret
- **BTR-60-Z-351BR:** Power production vehicle with generator
- **BTR-60-P-238BT:** Switchboard vehicle for communications
- **BTR-60-P-240BT:** Integrates radio & wire communications- R-123M radio & R-241 switchboard
- **BTR-60-P241BT:** Equipped with P-241 telephone system
- **BTR-60-R-137B:** Communications vehicle with turret
- **BTR-60 ACRV:** Artillery Battery C2 & recon vehicle
- **BTR-60-R-145:** Additional radio, but no turret
- **BTR-60-R-156BTR:** C2 vehicle with additional radios
- **BTR-60-R-409BM:** Relay vehicle-R-409 & R-123M radios
- **BTR-60PAU (Bulgaria):** Artillery command vehicle
- **BTR-60PB-MD (Bulgaria):** Upgraded engine, radios, & NBC equipment
- **BTR-60P Maintenance Assistance (MTR-2):** Maintenance vehicle with tarp over troop compartment
- **BTR-60 SPAAG (Cuba):** Twin 30-mm anti-aircraft cannons
- **BTR-60 Djibouti (Djibouti):** AML-90 turret on BTR-60
- **BTR-60BD:** Speed increased to 100 km/h & range to 800 km
- **MTP-2:** Armored Recovery Vehicle
- **BTR-60PZ:** Final production model with 1PZ-2 roof-mounted periscope
- **BTR-60-R-140BM:** C2 vehicle with turret
- **MEP:** Infantry command post
- **BTR-60PB FAC:** Turreted FAC vehicle without the gun

System

Alternative Designations: BTR-60PA
Manufacturer: Gorkovsky Avtomobilny Zavod (Soviet Union) Ratmil Regie Autonoma (Romania, TAB-71)
Description: 8 X 8 wheeled APC designed to replace the BTR-152; original design (BTR-60) had an open top & 14 soldiers

had to exit over the sides; 3 firing ports on each side of vehicle

Crew: ea3

Passengers: ea14

Dimensions

Length: m7.56

Width: m2.83

Height: m2.31

Weight, Combat: tons10.3

Automotive

Engine Name: Two(2) x GAZ-40P

Engine Type: 6-cylinder gasoline

Engine Power: 90 hp each, 180 hp combined

Range, Crusing: km500

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Fuel Capacity: INA

Note: The BTR-60 is fully amphibious, propelled in the water by a jet centrally mounted at the rear of the hull

Communications

Primary: R-123

Secondary: R-113

Main Weapon System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferation: Widely Proliferated

Weight: kg49

Total Length: mm1,980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

↳*Ammunition*

Name: INA

Type: API-T

Cailber: mm14.5mm

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: General Purpose Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: + 1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Vehicle Commander: TKN-1

Thermal Gunner: PP-61A optical sight

Main Gun Stabilization: INA

Turret Type: BPU-1 turret

Infrared Light: OU-3 infrared light

Protection

Armor Material: Welded steel

Armor Hull: 7 mm at 86° hull upper front 9 mm at 47° hull lower front 7 mm hull sides 5 mm hull upper rear 7 mm hull lower rear 5 mm hull floor 7 mm hull roof

Armor (turret front): mm10 mm turret front 7 mm turret sides 7 mm turret sear 7 mm turret roof

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Collective (closed vehicles)

Smoke Equipment: No

Survivability Equipment: No

Notes:

BTR-60PA (1963) – This version has an armoured roof over the troop compartment. It is fitted with improved 'closed-down' vision devices for the crew. Behind the commander's and driver's hatches is a single rear-opening rectangular hatch in front of which is a single mount for the DShK 1938/46 12.7 mm heavy machine gun between the two circular crew hatches at the front of the personnel compartment and two optional mounts for 7.62 mm machine guns (either the PKT, the SGMB or the PKB tank/medium/general-purpose machine guns) on each side of the roof of the personnel compartment. Early production BTR-60PAs only had a single mount for the 7.62 mm machine gun between the two circular crew hatches at the front of the personnel compartment. The small doors on each side of the hull that were present in the BTR-60P were removed. The BTR-60PA introduced collective NBC protection system to the series. It has six handrails on the each side, in rows of three. The personnel compartment has two rectangular hatches. The fact that the roof has been added makes passengers more vulnerable to enemy fire while they're exiting the vehicle through the top hatches. Also, the gunner must be at least shoulder high out of the vehicle to operate the weapons. The vehicle carries 500 rounds for the DShK 1938/46 12.7 mm heavy machine gun and 3,000 rounds for 7.62 mm machine guns. The weight of the vehicle increased from 9.8 tonnes to 10.2 tonnes. It was also known under the designation BTR-60PK, where K stands for krisha – "roof" and GAZ-49A.

Bv206S Swedish Amphibious Tracked Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Bv 206A:** Ambulance version, which is capable of carrying stretchers in the rear compartment.
- **Bv 206F:** Firefighting vehicle
- **RaBv 2061:** Swedish Army communications/command version, fitted with radio equipment and workplaces for staff members.
- **PvBv 2062:** Swedish Army anti-tank vehicle, an open top version of the Bv 206 armed with a 90 mm Pvpj 1110 recoilless anti-tank gun.
- **PvBv 2063:** Swedish Army anti-tank vehicle, similar to PvBv 2062, but fitted with the launch system for an ATGM, either the TOW (Rbs 55) or the Bofors BILL (Rbs 56).
- **Bv 206S:** The Bv206S is an armored personnel carrier variant of the Bv 206, which provides protection from small arms fire for the occupants. It is in service with the armed forces of France, Germany (379 Bv 206D/S ordered), Spain, Netherlands, Italy (189 units), Sweden (50 units), Greece (Bv 208) and Singapore (300 units), which has replaced it with the Bronco All Terrain Tracked Carrier. Using a Steyr M1-"Monoblock" engine (6-cylinder, 130 kW), the vehicle can carry the driver and 12 combat-equipped troops — four in the front compartment and eight in the rear. The Bv 206S can be slingloaded by Boeing CH-47 Chinook and Sikorsky CH-53E Super Stallion helicopters or carried in the C130 Hercules.

System

Alternative Designation: Small Unit Support Vehicle (SUSV)
Description: Amphibious Armored Personnel Carrier
Bodies: Fiberglass reinforced with PVC foam insulation
Crew: ea1
Passengers: ea11
Forward Car: The forward car accommodates the driver and three combat troops.
Rear Car: The rear car carries eight fully equipped troops.
Airlift Capable: Yes, The unladen Bv206S can be underslung and air lifted by a Boeing Chinook CH-47 and a Sikorsky Super Stallion CH-53 helicopters. The vehicle is air transportable in the C-5A Galaxy (ten vehicles), C-17A Globemaster (six vehicles), C-130 Hercules (one or two vehicles), C-160 Transall (one vehicle), A400M (two vehicles), CH-47 helicopter (one vehicle) and CH-53 helicopter (one vehicle).
Note: The vehicle provides high mobility and ballistic protection and is available as an armoured personnel carrier, cargo carrier, battlefield ambulance, mortar carrier, command post vehicle and recovery vehicle.

↳*Dimensions*

Height, Overall: m2.4

Length, Overall: m6.9

Width, Overall: m1.87

Cargo Space, Front: m32.5

Cargo Space, Rear: m35.5

Track Width: mm620

Ground Pressure: 11.6/13.6 kPa (1.68/1.97 PSI)

Curb Weight: mt4.5

Gross Vehicle Weight: mt6.58

Payload: 2.24mt (630 kg in front compartment and 1610 kg in rear compartment)

Trailer Load: mt2.5

Automotive

Engine Name: Steyr M16

Engine Type: Steyr M16 six-cylinder in-line, 3,200cc, direct injection diesel engine provides 130kW power at 4,000rpm and 350Nm torque at 2,300rpm. The power to weight ratio is 19.42hp/t.

Engine Power: hp115

Transmission: Mercedes Benz W5A-580 automatic transmission has five forward and one reverse gear.

Range, Cruising: km300

Speed, Maximum Road: km/h52

Speed, Maximum Swim: km/h4.7

Fording Depth: mAmphibious

Temperature Range: degreesThe vehicle operates in temperatures from -32°C to +46°C, from Arctic to desert and jungle conditions.

Grade, hard surface: %60

Grade, Deep Snow: %30

Turning Radius: m8

Main Weapon System

Note: The Bv206S can be equipped with a ring mount for a 7.62mm or a 12.7mm machine gun. Missiles and other weapon systems can be carried in the vehicle. A mortar carrier variant of the vehicle is available.

Protection

Armor: The vehicle is fitted with all-welded steel armour and the windows of the vehicle provide the same level of protection against direct fire 7.62mm ball ammunition and artillery shrapnel.

Armor, Applique: mmAvailable

Armor, Explosive Reactive: mmNo

Active Protection System: No

NBC Protection: Yes

Smoke Equipment: Yes

Automated Fire Detection and Extinguishing System.: Yes

Notes:

The Bv206S is an armored personnel carrier version of the tracked articulated all-terrain vehicle, Bv206, of which 11,000 have been produced and are operational in over 40 countries worldwide. The vehicle can carry 12 combat-equipped soldiers through difficult terrain and extreme weather conditions. The vehicle operates in temperatures from -32°C to +46°C, from Arctic to desert and jungle conditions. The vehicle provides high mobility and ballistic protection and is available as an armored personnel carrier, cargo carrier, battlefield ambulance, mortar carrier, command post vehicle and recovery vehicle. The Bv206S vehicle was developed jointly by Alvis Hagglunds (now BAE Systems Land Systems Hagglunds) and the Swedish Army Materiel Command, initially for use by the Swedish armed forces. It is in service with the armed forces of France, Germany, Spain, Italy and Sweden. The Bv206S is also under evaluation by other armies. Orders have been received for 479 Bv206S vehicles.

Kurganets-25 Russian Amphibious Armored Personnel Carrier (APC)




Tiers:

1 2 3 4

Variants:

- **Armored Recovery Vehicle:** Equipped with a crane, a winch, and armed with a 12.7mm heavy machine gun
- **Armored Ambulance:** Proposed addition to the Russian army
- **82mm Vasilek Mortar Carrier:** Proposed addition to the Russian army
- **Anti-tank Vehicle:** Proposed addition to the Russian army
- **Reconnaissance Vehicle:** Proposed addition to the Russian army
- **Command Vehicle:** Proposed addition to the Russian army
- **Armored Engineering Vehicle:** Proposed addition to the Russian army
- **Self Propelled Anti-Aircraft Gun (SPAAG):** Proposed addition to the Russian army
- **Self Propelled Gun (125mm):** Proposed addition to the Russian army

System

Alternative Designation: Kurganets-25 BTR
Crew: ea3
Passenger Capacity: 8
Maximum Effective Range: m2,000

Dimensions

Length: m7.2
Width: m4
Height: m3.2
Weight, Combat: kgINA

Automotive

Engine Name: YaMZ-780 inline engine with two turbochargers
Engine Type: Diesel
Engine Power: hp750
Cruising Range: km500
Speed, Maximum Road: km/h80
Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Fording Depth: mAmphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.7

Trench: m1.8

Main Gun

↳*System*

Name: Kord Russian 12.7mm

Type: Heavy Machine Gun

Max Rate of Fire: rpm650

Sustain Rate of Fire: 600

Range Finder Type: Laser

↳*Ammunition Option 1*

Type: AP-I

Caliber: mm12.7

Muzzle Velocity: m/s860

Basic Load: rounds~500

Max Effective Range: m2,000

Max Range: km4

Min Range: km0

Armor Penetration: INA

Projectile Weight: g389

Bursting Charge: g49

Fire Control

Name: INA

Turret: Remote Controlled

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: INA

Range, Thermal Sight: INA

Protection

Hull Armor: Aluminum Alloy
Turret Armor: Unmanned
Applique Armor: Optional
Explosive Reactive Armor: Optional
Active Protection System: Has sensors but no counter measures
Self-Entrenching Blade: Yes
NBC Protection: Yes
Smoke Equipment: INA

Notes:

The Kurganets-25 APC is a lightly armed armored personnel carrier that can move 8 infantrymen to the battle with the support of one 12.7mm machine gun. The machine gun is in a remotely controlled turret. As part of the Russian army’s efforts to modularize their combat systems, the Kurganets-25 IFV and APC will evolve into various models, gradually replacing BMP, BMD, MT-LB and other types of tracked Soviet armored platforms. The Kurganets-25 will have modular armor that can be upgraded for specific threats. The Kurganets-25 IFV and APC variants were first seen in public during rehearsals for the 2015 Moscow Victory Day Parade. The Kurganets-25 is designed to bring the Russian tracked troop carrier fleet up to standard with Western designs like the American M2 Bradley and British Warrior, which outclassed their Soviet Cold War BMP-series counterparts. Kurganets-25 is based on Armata Universal Combat Platform while being lighter than the T-15 Armata "heavy IFV" based on the same and similar to wheeled VPK-7829 Bumerang. The APC carries 8 troops. Other variants proposed for the Kurganets include an armored ambulance, an 82 mm Vasilek mortar carrier, anti-tank vehicle, armored recovery vehicle, a reconnaissance vehicle, a command vehicle, and an armored engineering vehicle. The vehicle represents a departure from traditional Russian low profile designs, having a higher floor more suited for mounted combat rather than troop carrying, which also provides better IED and mine protection. While the T-15 is expected to be deployed with T-14 tanks in armored formations, Kurganets-25 platforms will equip mechanized units.

BTR-50 Russian Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **BTR-50P:** Original with open troop compartment without NBC protection; 57-mm or 85-mm anti-tank (AT) gun could be mounted on the rear deck
- **Belgian Pandur:** Belgian SMAS radio, NBC protection, armed with 12.7-mm & 7.62-mm machine guns
- **BTR-50PA:** No AT gun ramp mount; sometimes featured a 14.5-mm KPVT heavy MG
- **BTR-50PK:** Primary model with covered troop compartment, 4 firing ports & NBC protection system
- **BTR-50PU:** Command vehicle with additional radios, 4 antennae, & auxiliary power supply
- **Pandur ATGM Carrier:** HOT AT missile in a Euromissile UTM 800 launcher or a TOW AT missile in a Kvaerner-Eurkea turret; additional missiles stored in the hull
- **BTR-50PK(B):** Amphibious armored recovery vehicle designed for river crossings
- **MTP:** BTR-50PK converted into a rolling workshop with 15000 crane, 8000 tow bar, & block/tackle system to raise capacity
- **MTK (UR-67):** Mine-clearing rocket launcher system
- **MTR-1:** BTR-50 designed for repairing equipment
- **OT-62 (Slovakia & Poland):** Originally the Czech produced BTR-50
- **Type 77 (China):** Chinese produced BTR-50P
- **Nimda BTR-50PK (Israel):** Improved engine, electrical system, & fuel system
- **Schuetzenpanzer 50PK (North Vietnam):** BTR-50PK produced by North Vietnam
- **Upgraded BTR-50 (Ukraine):** Improved performance vehicle with 60 km/hr speed on land, 10 km/hr in water, & with a heavier payload
- **Civilian BTR-50:** BTR-50P converted for civilian use such as topographic reconnaissance

System

Alternative Designations: BTR-50, BTR-50P
Description: The only BTR APC that uses tracks instead of wheels. There are no exit doors forcing the 18 soldiers to dismount over the sides; 2 firing ports on each side of the vehicle
Manufacturer: INA
Crew: ea2 (commander, driver)
Passengers: ea18
Payload: INA

Dimensions

Length, Hull: m7.08

Length of Track on the Ground: m4.08

Width: m3.14

Height: m1.97

Track Width: m0.36

Ground pressure: 0.51

Ground Clearance: 0.37

Communications

Primary Radio: The Radio Equipment varies depending on the variant and country the vehicle is operating in.

Automotive

Engine Name: 1 x Model V-6 water-cooled in-line 6-cyl diesel

Engine Type: Diesel

Engine Power: hp240

Power-to-Weight Ratio: 16.9 hp/metric ton

Cruising Range: km400

Speed (Max Road): km/h44

Speed (Max Off-Road): km/hINA

Speed (Average cross-country): km/hINA

Speed (Max Swim): km/h7

Gradient: deg70

Side Slope: deg35

Vertical Step: 1.1

Trench: m2.8

Fording Depths: mAmphibious

Suspension: torsion bar, 6 road wheels, rear drive, front idler, 2 shock absorbers, no return rollers

Main Weapon System

↳***System***

Name: SG-43 Goryunov

Caliber/length: 7.62mm

Type: Medium Machine Gun

Length: 1,150 mm

Barrel Length: 720 mm

Weight: kg13.8

Maximum Effective Range: 1000 m (Day); INA (Night); 1000 m (Anti-Aircraft)

Muzzle Velocity: m/s800

Basic Load: 1250 Rounds (250 in box, 1000 Ready): Light Ball, Ball-T, API

Action: Gas-operated

Rate of Fire: rds/min500-700

Maximum Firing Range: 1,500 meters

Feed System: 200 or 250 round belts

Sights: Iron Sights

↳*Ammunition*

Name: INA

Type: 7.62mm

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s800

Fire Control

FCS Name: INA

Computerized FCS: No

Infrared Driving Light: Yes

IR Searchlight: Yes, on the right front hull

Protection

Armor Type: Homogeneous, cold rolled, welded steel

Armor, Front: mm13

Armor, Side and Top: mm10

Armor, Rear: mm7

Applique Armor: No

Smoke Equipment: No

Explosive Reactive Armor: mmNo

Active Protection System: IMine

Self-entrenching Blade: No

NBC Protection System: Collective

Survivability Equipment: Automatic engine fire-extinguishing system on closed vehicles; mine-clearing system available

Firing Ports: 2 x firing ports in each side of hull

Automatic Engine Fire-Extinguisher: Yes

Notes:

The BTR-50 (BTR stands for Bronetransporter (БТР, Бронетранспортер), literally "armored transporter") is a Soviet amphibious

armored personnel carrier (APC) based on the PT-76 light tank. The BTR-50 is tracked, unlike most in the BTR series, which are wheeled. The BTR-50 shares many similarities with two other APCs, the OT-62 TOPAS and the Type 77. While the OT-62 is an improved copy of the BTR-50 developed jointly by Czechoslovakia and Poland, the Type 77, based on the Type 63 amphibious light tank developed by the People's Republic of China (PRC), is not a copy of the BTR-50. Like the PT-76, the BTR-50 has a flat, boat-shaped hull. Unlike the PT-76, it has a new superstructure added to the front of the vehicle. The hull of the BTR-50 is made of all-welded steel with the crew compartment in the front, the troop compartment in the center and the engine compartment at the rear. It has the ability to transport up to 20 fully equipped infantrymen, who sit on benches that run across the full width of the troop compartment. They mount and dismount the APC by climbing over the sides of the hull. The driver sits in the center of the front of the hull and has three vision blocks and periscopes located at the top of the sloping glacis plate. During night operations, the center periscope can be swapped for the TVN-28 night vision device, which gives the driver clear vision up to 60 meters. The driver also has a small hatch that opens upwards—while it cannot be used to leave the vehicle, it can be opened in relatively safe areas for extra vision. In combat, the hatch is closed and the driver can use a vision block. There is an emergency hatch under the driver's seat. The commander, who sits on the left side of the vehicle at the front, has three vision blocks and periscopes in a projecting bay. On top of this bay is a cupola that opens forward and can be locked vertically; it has a vision block facing forward. The vehicle can operate in temperatures from −40 °C to +40 °C. The torsion bar suspension consists of six evenly spaced large rubber-tired road wheels with a drive sprocket at the rear and an idler at the front. The road wheels are hollow to assist its amphibious capabilities. These wheels increase the APC's buoyancy by 30%. There are no track-return rollers. The first and last road wheels have a hydraulic shock absorber, the steel tracks have a single pin and 96 links each when new. There is a small, thin, horizontal skirt over each track. The BTR-50 is powered by a V-6 6-cylinder 4-stroke in line water-cooled diesel engine developing 240 hp (179 kW) at 1800 rpm. This gives it a road speed of 44 km/h with a cruising range of 400 km. The vehicle can negotiate 30° side slopes, ascend 60° gradients, cross 1.1 m high vertical obstacles and 2.8 m wide trenches. The engine has a cooling system and a pre-heater (intended for ignition when the air temperature is −20 °C or below). The APC has a five gear manual shaft-type transmission system similar to that in the T-34/85 medium tank. The gearbox has four forward and one reverse gear. The vehicle has a side clutch that enables it to make turns, mechanical transmission and a bandbrake. The vehicle has three fuel tanks, two on the right at the front of the engine compartment and one at the rear. The total fuel capacity is 400 liters. The vehicle has four mounts for additional external fuel tanks located on the rear of the hull; the two on the hull corners are for a flat external tanks, whereas the two in the center are for a drum-type of tank. The BTR-50 is amphibious thanks to its flat, boat-shaped hull, which is hermetically sealed and ensures minimal resistance when the APC is afloat. It can swim after switching on the two electric bilge pumps; erecting the trim vane which improves the stability and displacement of the vehicle in the water and prevents water from flooding over the bow of the APC. Swapping the driver's periscope for a swimming periscope enables the driver to see over the trim vane. There is also a manual bilge pump for emergency use. In the water, it is propelled by two hydrojets, one on each side of the hull, the inlets are under the hull, the outlets are at the rear. There are also additional assistant water-jet inlets on both sides of the hull over the last road wheels. The rear outlets have lids that can be fully or partially closed, redirecting the water stream to the forward-directed outlets at the sides of the hull, thus enabling the vehicle to turn. This system was designed by N. Konowalow. It is the same system as the one used in the PT-76. The vehicle's low freeboard of 15 to 20 cm and lack of a snorkel means that it can only swim in the calmest waters. Its armor is composed of homogeneous, cold rolled, welded steel—it is very thin by modern standards, 13 mm at the front, 10 mm on the sides and top and 7 mm at the rear. While its maximum armor protects it fully against small arms fire and small artillery shell fragments, it cannot protect it against large shell fragments and .50-caliber machine gun bullets. Although its front armor might protect it against 7.62 mm small arms fire, that same fire can sometimes penetrate the sides. The vehicle is equipped with an IR driving light and an IR searchlight. It lags behind other Soviet armored fighting vehicles as it has no fire protection systems and, with the exception of the BTR-50PK variant, it has no nuclear, biological or chemical (NBC) protection systems, which significantly reduces its effectiveness.

Cobra Turkish 4x4 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **APC:** Basic variant; carries 8-12 troops & 12.7-mm MG; open or turret-mounted 40-mm AGL, 25-mm cannon, or 30-mm cannon.
- **Armored Reconnaissance Vehicle:** Crew of 4 in vehicle with a 25mm cannon and FLIR.
- **Armored C2 Vehicle:** Command and control vehicle with a crew of 6 armed 7.62mm machine guns.
- **Armored Ambulance:** Evacuates 4 litter or 6 ambulatory patients and medical gear.
- **TOW Missile Carrier:** Crew of 5 with a TOW ATGM with a range of 3750m or Rafael overhead weapons system with Spike AT missiles.
- **Cobra EOD Vehicle:** Designed for explosive ordnance disposal with controlled blade on front of vehicle operated by driver.
- **Cobra Reconnaissance / Surveillance Vehicle:** Target acquisition for higher unit commands.
- **Cobra Twin-Turret:** Rotating turret with 40mm AGL and 12.7mm machine gun.
- **Cobra Amphibious Vehicle:** Allows vehicle to enter water without any preparation.
- **NBC Reconnaissance Vehicle:** Equipped with NBC sensors.
- **Cobra II:** First unveiled at IDEF 2013, the Cobra II is a more heavily armoured successor to the Cobra. The Cobra II has a combat weight that is roughly double that of its predecessor and is slightly wider, longer and taller.
- **Cobra II amphibious:** There is an amphibious and slightly larger variant of the Cobra II with a more powerful 6.7 L, 360Hp, V6 turbocharged engine that is capable of crossing lakes and smaller bodies of water

System

Alternative Designation: Cobra; Otokar Cobra
Description: 4x4 light; 10 troops besides the crew; 4 side doors, rear door, and 2 roof hatches; 3 firing ports on each side of vehicle and 1 in rear door.
Manufacturer: Otokar
Crew: ea2
Passengers: ea7

Dimensions

Length, With Winch: m5.48
Length, Without Winch: m5.22
Width: m2.10
Height: m2.21
Wheelbase: m3.30

Ground Clearance: m0.33

Weight, without Weapon Station: kg5,200

Weight, with Weapon Station: kg6,300

Automotive

Engine Name: 1 x General Motors V-8 (6.5 liter) water-cooled turbocharged diesel

Engine Type: Diesel

Power-to-Weight Ratio: 30 hp/metric ton

Engine Power: hp190

Range, Cruising: km725

Speed, Maximum Road: km/h115

Speed, Maximum Swim: km/h8

Speed, Average Cross: INA

Speed, Maximum Off: INA

Fuel: 155 liters

Transmision: Automatic, 4 forward/2 reverse gears

Suspension: Helical coil, independent double A-frame, hypoid differentials

Gradient: deg70

Side Slope: deg40

Vertical Step: m0.32

Tench: m0.5

Fording Depth: mAmphibious

Acceleration: 0-60 km/h in 14 seconds

Turning Radius: m7.86

Angle of Departure: deg56

Angle of Approach: deg57

Communications

↳***Radio varies on customer needs***

Main Weapon System

Note: A wide range of weapons can be mounted on the roof, including remotely operated 7.62 mm or 12.7 mm machine guns, 40 mm grenade launchers or cannons up to 30 mm caliber

↳***System***

Name: M2 Browning

Type: Heavy Machine Gun

Manufacturer: Current: General Dynamics, Fabrique Nationale (FNH / FNA / FNH UK), Ohio Ordnance Works Inc.

In Service: 1918-Present

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun with Tripod and T&E: 58 kg

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Effective Firing Range: m1,800

Maximum Firing Range: m7,400

Feed System: Belt-fed (M2 or M9 links)

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s890

Basic Load: ea1,000

Protection

Armor Type: All-welded steel hull

Armor, Applique: mmAvailable

Armor, Turret Front: mmThe monocoque steel v-hull provides protection against small arms fire, artillery shell shrapnel, and to a certain degree against anti-personnel and tank mines, and IEDs. Front wheel arches are designed to be blown away to free blast pockets

Armor, Explosive Reactive: mmAvailable

Active Protection System: No

NBC Protection: Optional

Self-Entrenching Blade: No

Smoke Equipment: Yes

Survivability Equipment: Electrical self-recovery winch; fire suppression system.

Notes:

The Cobra Wheeled Armored Vehicle has been developed by Otokar's research and development team to provide the best solution for the need of the armed forced for wheeled armored vehicles. Cobra attracts interest with its superior maneuvering capability and its high level of ballistic protection as well as its feature of adjustability of the same platform for diverse functions. It provides great facilities in maintenance and service as it is designed on the same framework and infrastructure and it can be manufactured in many models and types. The fact that the infrastructure remains the same even in diverse Cobras manufactured for different realms, which, in turn, saves from maintenance and repair works and spare parts, makes Cobra an armored vehicle preferred by many armies. Rubber tire-wheeled 4 x 4 Cobra Armored Vehicle capable of carrying 1+8 personnel is manufactured with the following types. Moreover, it has an amphibious version as well. The Cobra vehicle forms a common platform which can be adapted for various roles and mission requirements including: armoured personnel carrier, anti-

tank vehicle, reconnaissance vehicle, ground surveillance radar vehicle, forward observation vehicle, armoured ambulance, armoured command post, turreted vehicle for 12.7mm machine gun (turret produced by the Israeli firm Rafael), 20mm cannon, anti-tank missiles such as the TOW missile and Spike missiles or surface-to-air missiles.

BTR-82A Russian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Parent:

BTR-80 Russian 8x8 Amphibious Armored Personnel Carrier (APC)

Variants:

- **BTR-82A1:** Fitted with unmanned turret. Weapons are operated by either the gunner or vehicle commander.
- **Taifun-M:** reconnaissance vehicle developed for the Russian strategic missile command. Includes radar, FLIR and optical sensors. Systems includes on board UAV and mine detector.

System

Alternative Designation: BTR-82A
Type: 8x8 Amphibious Armored Personnel Carrier (APC)
Manufacturer: Military Industrial Company of Russia
Crew: ea3
Passengers: ea7

Dimensions

Length: m7.65
Width: m2.90
Height: m2.35
Ground Clearance: m0.48

Automotive

Engine Name: KamAZ 340

Engine Type: Turbo V8 Diesel

Engine Power: hp300

Range, Cruising: km700

Range, Unpaved: km200 - 500

Speed, Maximum Road: km/h100

Speed, Maximum Off: 40

Speed , Average Cross: 40

Speed, Maximum Swim: km/h10

Auxilary Power Unit Output: kW5

Winch: Yes

Air Conditioning: Yes

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2

Fording: Amphibious

Communications and Navigation

↳*Radio*

Transceiver Name: R-168-50U

Tranceiver Range VHF: km30

Tranceiver Range HF: km350

↳*Navigation System*

Name: Trona-1

Main Weapon System

↳*Main Armament*

Name: Shipunov 2A42 30mm Autocannon

Caliber: mm30

Type: Automatic Gun

Combat Load: rds150

Length: m3.027

Barrel Length: mm2,416

Weight: kg115

Range, Maximum Effective: m3,600

Range, Maximum Effective, Night: m1,100

Range, Maximum Effective, Antiair: m2,500

Muzzle Velocity: m/s960

Fire on the Move: Yes

Barrels: ea1

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min

Effective Firing Range (AP-T): m2,000

Maximum FIring Range (HEI): m4,000

Feed System: Twin Feed

↳*Ammunition*

Type: Rfile

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: ea1,000

Armor Penetration at 1000m: mm55

Armor Penetration at 2000m: mm45

Types of Ammunition: HEI, HE-T, APBC-T, APDS, APFSDS-T

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Manufacturer: Degtyaryov plant

In Service: 1961-present

Length: mm1,203

Barrel Length: mm605

Weight, Gun Only: kg9

Weight, Tripod Only: kg7.7

Max Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea1,200

Fire Control (FCS)

↳*Main Gun FCS*

Main Gun Stabilization: 2 - plane

Range Finder: INA

Day Sight Name: 1P3-9 1.2x/4x

Field of View: degrees49/14

Night Sight Name: TPN3-42 II/IR

Acquisition Range: m800-1200

Protection

Armor, Applique: mmYes

Armor, Explosive Reactive: mmYes

Armor, Turret Front Caliber Defeat: mm12.7

Active Protection System: INA

NBC Protection: Yes

Smoke Grenade Launchers 81mm: ea6

Notes:

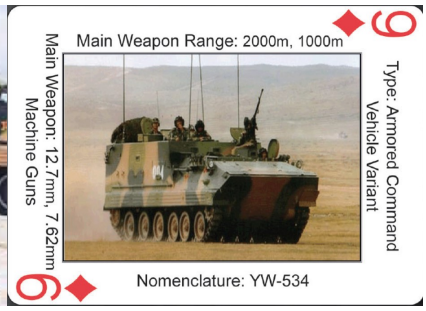
The BTR-82A is one of Russia’s latest 8x8 wheeled infantry fighting vehicles; its silhouette is the reminder of its predecessor, the BTR-80A. The development and production of BTR-82A is engaged in "military-industrial company", which also produces a new generation of armored vehicles, "Boomerang". Hailed by defense specialists as a full-fledged combat vehicle, the BTR-82A created a big stir in late-2010 with its 2A72 30 mm chain gun, coaxial 7.62mm MG and advanced observation gear, making it ideal for regular combat and counterterrorism operations alike. The BTR-82A is an upgraded version of the BTR-80 wheeled armored vehicles that were put into service in 1980. BTR-82A has a high survivability, equipped with a unified fighting module, air conditioning, modern communication and orientation systems. Designers modernized more than 1,000 elements in the BTR-82A.Thanks to its advanced characteristics, the BTR-82A’s firing effectiveness increased two-fold as compared to its previous version. Securing the machine is increased by the use of a new armored personnel carrier Ballistic protection of multilayer synthetic material such as Kevlar on the inner surfaces of the body. To reduce the negative effects of explosions under the wheels or body carpeted floor mats in mine, is a multilayer rubber coating, which layers have different properties. Such mats partially dampen the impact of the blast wave. In addition, the seat of the crew and landing are made at the special

suspension, which reduces the impact of the explosion energy.

Type 89 (YW-534) Chinese Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **Type WZ534 - Type 89 Tracked Armoured Personnel Carrier.:** Basic version, as described. Military designator: ZSD-89.
- **Type YW307 - Type 89 Infantry Fighting Vehicle:** Fitted with a one-man turret with 25 mm automatic gun (400 rounds) and 7.62 mm coaxial machine gun (1,000 rounds). Crew: 3+7. Military designator: ZSD-89-II.
- **Type 89 Armoured Command Vehicle:** Fitted with a higher roofline and with a longer chassis with 6 double road wheels either side. Armament consists of a 12.7 mm HMG on the commander's station behind the driver.
- **Type WZ752 - Type 89 Tracked Armoured Ambulance:** Unarmed ambulance with a higher roofline and with a longer chassis with 6 double road wheels either side.
- **Type 89 Refuelling Vehicle:** Transport vehicle for fuel and lubricants, fitted with a higher troop compartment. Offered for export as the Amphibious Armoured Refuelling Vehicle.
- **ZJX-93 - Type 89 Recovery Vehicle:** Maintenance and recovery variant, fitted with a light crane on the left side of the hull roof, and a machine gun cupola in the roof center.
- **ZHB-94 - Type 89 Supply Vehicle:** Similar to the recovery variant and also equipped with a light crane, but the commander's cupola with HMG is located behind the driver's position.
- **Type WZ731 - Type 89 Reconnaissance Vehicle:** Variant for artillery forward observers, equipped with an unarmed turret with observation devices. Military designator: ZZC-01.
- **Type 89 Recce Radar Carrier:** Equipped with a battlefield surveillance radar on a telescopic arm. Military designator: ZZC-02.
- **Type 89 Tank Destroyer (missile):** ATGM carrier vehicle with double launch system for wire-guided HJ-8 missiles. A total of 12 missiles is carried on board. Military designator: ZDF-1.
- **Type 89 Mine-Laying Vehicle:** Has a modified rear hull that mounts a scatterable mine system, consisting of 6 launchers. Each launcher has 36 tubes of 122 mm with each tube containing 5 SATM mines, 15 SAPM mines, 45 SAPEM mines or a mix of SAPM and SAPEM mines.
- **Type 89 Obstacle-Removing Vehicle:** Crowd-control variant for the PAP, equipped with an obstacle clearing blade.
- **Type 90 AFV or Type YW535:** No Information
- **YW306:** 30-tube 130mm self-propelled multiple rocket launcher (MRL) for export market
- **YW309:** infantry fighting vehicle, with a BMP-1-style 73mm low-pressure smoothbore gun and a HJ-73 anti-tank guided missile launcher. Prototype only.
- **YW323:** D30 122mm self-propelled howitzer. Prototype only
- **YW382:** 120mm self-propelled mortar for export market
- **YW383:** 82mm self-propelled mortar for export market
- **YW534:** HJ-8 anti-tank guided missile launch vehicle
- **YW703H:** Armoured command vehicle for export market

System

Alternative Designation: ZSD-89, Type 89, YW-534
Type: Armoured Personnel Carrier (APC)
Crew: ea2

Troop Compartment Capacity: ea13

Maximum Effective Range: km500

Industrial Index: WZ543

Periscope: 3 x day Periscopes

Night Vision: Yes

Amphibious: Yes

Infrared Device: Yes

Firing Ports (Left Side): ea3

Firing Ports (Right Side): ea4

Trim Vane: Available

Dimensions

Length: m6.15

Width: m3.13

Height: m2.59

Weight, Combat: kg12,972

Ground Pressure: kg/m0.546

Automotive

Engine Name: machine gun Engine Deutz BF8L 413F 4-cycle air-Cooled Diesel

Engine Type: Diesel

Engine Power: hp320

Cruising Range: km500

Speed, Maximum Road: km/h66

Speed, Average Cross: INA

Speed, Maximum Swim: km/h6

Fording Depth: INA

Suspension: Torsion Bar

Transmission: manual

Gradient: %60

Side Slope: %30

Vertical Step: m0.7

Trench: m1.8

Communications

Primary Radio: Type 889

Secondary Radio: CWT-167

Primary Intercom System: Type 803

Secondary Intercom System: CYY-168

Armament & Ammunition

↳*Main Gun*

Type: Anti-Aircraft Machine Gun

Name: QJC88

Caliber/Length: mm12.7 x 108

Number of Rounds: ea1000 (50 Round Belts)

Muzzle Velocity: m/s850

Max Range: km2.5

Armor Penetration: Yes

Rate of Fire: rd/m550-600

Feed System: Belt

Sights: Iron/Optical

Type Round: Type 54 Round

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation Angle: deg90

Note: There is no overhead protection for the Gunner.

↳*Anti-Tank Guided Missile (ATGM)*

Type: HJ-8

Function: Wire-Guided Anti-Tank Missile System

Caliber/Length: mm1,566

Diameter: mm120

Number of Rounds: ea8

Muzzle Velocity: m/s200

Operational Range: m3,000-4,000

Guidance System: SACLOS Wire Guidance

Armor Penetration: Yes

Fuel Capacity: liters4501

Gears: 5 Forward and 1 Reverse

Hysraulic Shock Absorbers:

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: Yes

Thermal Gunner: No

Main Gun Stabilization: INA

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Protection

Hull Armor: mm12.7

Armor Type: Welded steel hull

NBC Protection: Yes

Applique Armor: No

Turret Armor: Yes

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Wave Blade: Yes

Smoke Grenade: ea8

Smoke Grenade Calibur: mm76

Fire Trap: ea3

Shield Plate: Upper part of the Undercarriage

Notes:

The Type 89, also known as ZSD 89 or YW 534, is a tracked armored personnel carrier. It is a successor of the Type 63 armored personnel carrier. The Type 89 has many design details in common with the Type 63, however the it is slightly larger overall. It was manufactured by NORINCO and powered by a German Deutz diesel. The Type 89 is in service with the Chinese Army. The base model of the Type 89 is fully amphibious with propulsion once in the water being provided by the tracks. Troops enter the vehicle via a single door in the hull rear. Once inside there are several ball-and-socket firing ports for the occupants, one being in the entry door, and periscopes are provided to allow observation of the battlefield for the occupants.

VP-10 Chinese 8x8 Amphibious Armored Personnel Carrier (APC)







Tiers:



Variants:

- **VP10 8x8 APC with Remotely-Controlled Weapon Station (12.7mm Machine Gune):** Armored personnel carrier is fitted with a remotely-controlled weapon station, armed with a 12.7 mm machine gun.
- **VP10 8x8 APC with UW4A Remotely-Controlled Weapon Station (30mm Cannon):** Armored personnel carrier, fitted with a UW4A remotely-controlled weapon station, armed with a 30 mm dual-feed cannon and coaxial 7.62 mm machine gun. It can effectively engage lightly armored vehicles. It can also target low-flying helicopters.
- **VP10 8x8 APC with Fire Support (105mm Rifled Gun):** Fire support vehicle, armed with a 105 mm rifled gun. It was first publicly revealed in 2016. This combat vehicle was designed to provide direct fire against hostile armored vehicles, buildings and field fortifications. It also has a coaxial 7.62 mm machine gun. It looks that this armored vehicle can carry some dismounts in its troop compartment, as there were some firing ports with associated vision blocks at the rear part of the hull. Despite heavier turret it looks like this armored vehicle retains its amphibious capability.

System

Alternative Designation: INA

Manufacturer: Norinco

Type: Armored Personnel Carrier (APC)

Crew: ea2

Troop Compartment Capacity: 12 ea, dismounts seated on inward facing, blast-attenuating seats in the rear compartment, which is entered via a large power-operated ramp.

Cargo Capacity: kg5,443

Maximum Effective Range: km800

Dimensions

Length: m6.9

Width: m2.7

Height: m2.1

Weight, Combat: kg11,340

Gound Pressure: kg/mINA

Gradient: %60

Side Slope: %40

Vertical Step: m0.48

Trench: m1.8

Fording: Amphibious

Automotive

Engine Name: INA

Engine Type: Turbocharged diesel engine,Diesel

Engine Power: hp362

Cruising Range: km800

Speed, Maximum Road: km/h105

Speed, Average Cross: INA, Limited

Speed, Maximum Swim: km/h8

Fording Depth: mINA

Transmission: Automatic

Central Tire Inflation System: Yes

Communications

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System (Option 1)*

Name: Type 54 (DShKM)

Type: Remotely-Controlled Heavy Machine Gun. 12.7 mm Type 54 Heavy Machine Gun.

Proliferation: over 1 Million

Length: mm1,625

Barrel Length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Rate of Fire: rds/m600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

↳*Ammunition (Option 1)*

Type: Heavy Machine Gun and Anti-Materiel Rifle Cartridge

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Number of Rounds: ea1,200

Max Range: m2,500

Effective Firing Range: m2,000

Armor Penetration: kmAPI: 21 at 500 m & 13 at 1000 m (RHA)

↳*System (Option 2)*

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62 Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: mmINA

Action: Gas Operated

Rate of Fire: reds/m700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition (Option 2)*

Type: 7.62×54mmR

Caliber: 7.62

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Armor Penetration: INA

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Tank Commander: Yes

Thermal Gunner: INA

Main Gun Stabilization: INA

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Protection

Hull Armor (Front): mm12.7 (Round)

Hull Armor (Side and Back): mm7.62 (Round)

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: INA

NBC Protection: INA

Smoke Equipment: INA

Note: The VP10 is very lightly armored. Compared to other APC's the VP10 has poor protection.

Notes:

The VP10 is a Chinese armored personnel carrier with 8x8 configuration. It was developed mainly for export. Externally it resembles a successful Finnish Patria AMV armored personnel carrier, however it is a different design. It was first observed in 2014. Development of this armored vehicle was completed in around 2015. The VP10 is being proposed for various export customers. China's army uses a broadly similar ZBL-09 armored personnel carrier, which is proposed for export as the VN1.

BTR-87 Russian 8x8 Amphibious Armored Personnel Carrier (APC)







Tiers:



System

Alternative Designation: BTR-87

Date of Introduction: 2017

Proliferation: Not Widely Proliferated

Description: Armored Personnel Carrier with front mounted engine.

Manufacturer: Russia`s Military-Industrial Company (VPK)

In Service: 2017-Present

Crew: ea2

Passengers: ea8

Note: Troops enter and leave the vehicle via rear entry doors rather than awkward side doors of the BTR-80 series vehicles

Dimensions

Length: m7.56

Width: m2.99

Height: m3.02

Weight: 16 - 16.5 t (depending on the turret)

Automotive

Engine Name: YaMZ-53602

Engine Type: 6 Cylinder

Engine Mount Location: Front

Engine Power: hp312

Range, Cruising: km600

Speed, Maximum Road: km/h90

Speed, Maximum Off Road: INA

Speed , Average Cross: INA

Speed, Maximum Swim: km/h10

Fuel Tank Capacity: l300 liters

Gradient: deg60

Side Slope: deg30

Trench: mm2000

Vertical Obstacle: mm500

Fording Depth: Amphibious

Communications

↳*Radio*

Name: R-173

Main Weapon System

32V01 Remote Controlled Weapon Station (RCWS): Yes

Note #1: Additionally, the BTR-87 has a coaxial 7.62 mm machine gun

Note # 2: This armored vehicle has a universal turret mount and depending on customer requirements can be equipped with other turrets and remotely-controlled weapon stations

↳*System*

Name: Shipunov 2A42

Cailber/Length: mm30

Type: Autocannon

Manufacturer: Tulamashzavod

In Service: 1980-Present

Length: m3.027

Barrel Length: mm2,416

Diameter: INA

Weight: kg115

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min

Effective Firing Range: 2,000 metres (2,200 yd) (AP-T)

Maximum Firing Range: 4,000 metres (4,400 yd) (HEI)

Feed System: Twin Feed

↳***Ammunition***

Type: Rifle

Cailber/Length: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: ea500

Anti-Tank Guided Missile (ATGM)

Name: 9M133 Kornet (AT-14 Spriggan)

Type: man-portable anti-tank guided missile (ATGM)

Manufacturer: Degtyarev plant

In Service: 1994-Present

Proliferation: +35,000

Length: mm1,200

Diameter: mm152

Wingspan: mm460

Weight, with Launch Tube: kg27

Weight, with Tripod and Firing Unit: kg63.7

Warhead: 1,000–1,200 (9K135), 1,200 (E), 1,300 (D) mm RHA penetration after ERA with Tandem HEAT, Thermobaric

Warhead Type: HEAT

Warhead Weight: kg4.6

Detonation Mechanism: Impact Fuze

Propellant: Solid-fuel rocket

Operational Range, Kornet: m100-5,500

Operational Range, Kornet-EM: 8,000 m (anti-tank), 10,000 m (thermobaric)

Guidance System: SACLOS laser beam riding

Steering System: Two control surfaces

Accuracy: <5 m

Basic Load: ea4

Fire Control

Protection

Active Protection System: Hard Kill

Armor, Front Arc: Withstands hits from 23 mm cannon
Armor, Sides: Withstand 12.7 mm rounds
Armor, All Around: protection is likely to be against 7.62 mm bullets and artillery shell splinters
Applique Armor: Yes
Armor, Explosive Reactive: Yes
NBC Protection: Yes
Smoke Equipment: Yes
Firing Ports: Yes
Self-Recovery Winch: Yes
Central Tire Pressure System: Yes

Notes:

BTR-87 is designed by VPK with assemblies and units of BTR-82A APC. The vehicle was developed in 2015, and for the first time it was publicly demonstrated at the International Military-Technical Forum "Army-2017". The specifications of the BTR-87 is full analog of the BTR-82A. The differences is in the rear doors or ramp, which simplifies the landing of troops. To enable placement of the rear exit, the vehicle layout has changed - the engine is placed in front of the hull. Vehicles ballistic armour protects the crew against small arms and shell splinters. The BTR-87 is additionally equipped with NBC protection system.

Pandur II Austrian 8x8 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **Pandur 1:** Basic version as in the description
- **Belgian Pandur:** Belgian SMAS radio, NBC protection, armed with 12.7-mm & 7.62-mm machine guns
- **Amphibious Pandur:** Electric bilge pumps, closed air intakes-capable of 11 km/h in water
- **Pandur II:** Pandur II
- **Pandur Anti-Aircraft:** Twin 20-mm cannon or SANTAL SAM in turret
- **Pandur ATGM Carrier:** HOT AT missile in a Euromissile UTM 800 launcher or a TOW AT missile in a Kvaerner-Eurkea turret; additional missiles stored in the hull
- **Pandur Armored Recon/Fire Support Vehicle (FSV):** 2-man LCTS turret with a Cockerill 90-mm Mk 8 gun or a Giat TS-90 turret with a 90-mm CN90F4 gun or Cockerill CSE90 turret with an Mk III 90-mm gun
- **Pandur Mechanized Infantry Combat Vehicle (MICV):** MGTS with a choice of armaments: 12.7-mm M2 & 7.62-mm MGs; 30-mm M230 chain gun & 7.62-mm MG; or 40-mm AGL & 12.7-mm MG
- **Pandur Mortar Carrier:** In the passenger compartment, there is an 81-mm or 120-mm mortar mounted on a turnatable
- **Command & Control Vehicle:** For C2 operations
- **Armored Recovery/Repair Vehicle:** For vehicle recovery operations

System

Alternative Designations: Pandur II

Type: Armored Personnel Carrier

Manufacturer: Steyr-Daimler-Puch

Crew: ea2 (driver, commander)

Passengers: ea12

Note: Possible vehicle configurations for the Pandur II will include an anti-tank guided-weapon carrier, battlefield ambulance, company or battalion command vehicle, driver training vehicle, forward observer vehicle, fully amphibious armored vehicle and a platoon command vehicle

Dimensions

Length: m6.58

Width: m2.67

Height: m2.06

Ground Clearance: m0.43

Wheels, Track: m2.29

Weight, Unloaded: kg12,000

Weight, Combat: kg15,000

Weight, Maximum Payload: kg3,000

Automotive

Engine Name: 1 x Cummins ISC 350 diesel

Engine Type: 6-cylinder turbocharged water-cooled diesel with air-intake cooling

Engine Power: 260 hp

Power-to-Weight Ratio: INA

Transmission: ZF 6HP 602C fully automatic

Cruising Range: km600

Speed (Max Road): km/h100

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): km/h10

Grading: deg70

Side Slope: deg40

Vertical Step: m0.5

Trench: m1.4

Fording: m1.5

Fording with Preparation: Amphibious

Fuel Capacity: 275 liters

Suspension: INA

Turning Radius: m10.0

Communications

Radio: INA

Main Weapon System

Note: A optional add on is the General Dynamics Land Systems 105-mm Low-Profile Turret System

↳*System*

Name: NSV 12.7mm Heavy Machine Gun

Type: 12.7mm Heavy Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

In Service: 1971-Present

Proliferation: Widely Proliferated

Length: mm1,560

Weight, Gun Only: kg25

Weight, Gun and Tripod: kg41

Weight, 50 Round Belt: kg11

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Effective Firing Range vs Air Targets: m1,500

Effective Firing Range vs Ground Targets: 2,000

Feed System: 50-round belt

Sights: Iron sights

↳***Ammunition***

Type: Rifle

Caliber: 12.7mm

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea1,200

Anti-Tank Guided Missile (ATGM) System

Name: Spike ER

Type: Israeli fire-and-forget anti-tank guided missile

Manufacturer: Rafael Advanced Defense Systems Diehl Defence (Now part of Rheinmetall Defence Electronics)

In Service: 1997-Present

Length: mm1.670

Diameter: mm170

Weight, Missile in Canister: kg34

Weight, Launcher: kg55

Weight, Launcher and 4 Missiles: kg187

Rate of Fire: Ready to launch in 30 seconds, reload in 15 seconds

Effective Firing Range: 50–1,500 metres

Sights: 10× optical sight

Warhead: Tandem-charge HEAT

Detonation Mechansim: Piezoelectric trigger

Engine: Solid-propellant rocket

Guidance System: Infrared homing – Electro Optical (CCD, Imaging Infrared (IIR) or Dual CCD/IIR), Passive CCD or dual CCD/IIR seeker

Fire Control

Fire Control System: No

FCS Name: INA

Night Vision: Optional

Navigation: Optional

Main Gun Stabilized: Yes

Protection

Armor (turret front): Protects against 7.62-mm AP rounds at 30 m

Applique Armor: Available, An optional level of protection can increase the protection level to shield against 14.5-mm AP projectiles fired from a distance of 100 meters

Spall Liners: Avaialble on the inside of the vehicle

Mine-Protection Mats: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: No

Notes:

The Pandur II 8x8 is an improved modular all-wheel-drive version of the Pandur 6x6 APC wheeled armoured vehicle. It was developed as a private venture by the Austrian company Steyr-Daimler-Puch Spezialfahrzeuge and is currently in production for the Portuguese Armed Forces. Steyr-Daimler-Puch Spezialfahrzeuge is part of General Dynamics European Land Combat Systems, which is also the parent company of MOWAG of Switzerland and Santa Bárbara Sistemas of Spain. The most significant change is the introduction of an 8x8 configuration with more interior space. The construction is an all-welded steel hull with optional armour upgrades. The basic armour package is designed to protect against 7.62 to 14.5 mm (0.300 to 0.571 in) armour-piercing rounds (customers may select a choice of armour thickness). The vehicle is designed to be transportable in a Lockheed Martin C-130 Hercules transport aircraft. The driver is seated on the left at the front and the engine is to the right. The driver is provided with a single piece hatch cover as well as three day periscopes, one of which can be replaced by a passive periscope for night missions. The vehicle is fitted with a two-stage synchronized distribution gear box for both road and cross country use. Improved suspension will be fitted for optimum cross country mobility. The vehicle is designed to take a number of turret systems (such as the SP 30 turret also mounted on the ASCOD AFV of the Spanish and Austrian Armies), or it can be used as a standard APC with a mounted machine gun. With the turret the vehicle can carry 6 infantry. Without the turret, it can carry 12. The Pandur 8x8 APC is manufactured in Austria while export versions are also built in the Czech Republic and licensed versions in Barreiro, Portugal. The Czech company Excalibur Army has offered their Pandur 8x8 wheeled armored vehicle for the Philippine Army's Wheeled APC acquisition project under the Horizon 2 phase. EA mentioned that the PA has requested for options of either a manned or unmanned 25mm or 30mm turret, or an RCWS with 50cal. heavy machine gun. EA is also participating in the Philippine Army's M113 Firepower Upgrade project, offering either 25mm or 30mm manned turret with co-axial 7.62mm machine gun, or RCWS system depending on PA requirements. Apparently for this project the PA prefer a manned turret solution.

BTR-90 (GAZ-5923) Russian 8x8 Amphibious Armored Personnel Carrier (APC)






Tiers:



Variants:

- **BTR-90M/BTR-90 Rostock:** BMP-3 turret with 100-mm 2A70 gun, 30-mm 2A72 cannon, & 7.6-2mm PKT machine gun
- **Arzamas Upgrade:** 30-mm automatic gun, 7.-62-mm coaxial MG, 30-mm AGL, & ATGM range to 4000 m
- **Krymsk Hybrid-Electric APC:** Prototype operates on a battery-driven electric motor & can be controlled remotely with a top speed of 97 km/h

System

Alternative Designations: NA
Description: 8 X 8 wheeled APC as an upgrade to the BTR-80 with side exit doors; 4 firing ports on the right side & 3 firing ports on the left
Manufacturer: Arzamas Machine Building Plant (AMZ), a subsidiary of the Military Industrial Company.
Crew: ea3 (driver, commander, gunner)
Passengers: ea7
Cargo Capacity: can carry loads up to 7 000 kg in place of the troops.

Dimensions

Length: m8.15
Width: m3.1
Height: m3
Weight: tons20.9
Cargo Capacity: can carry loads up to 7 000 kg in place of the troops.

Automotive

Engine Name: Unspecified turbocharged diesel

Engine Type: Turbo-charged diesel (multi-fuel)

Engine Power: hp520

Cruising Range: km800

Speed (Max Road): km/h100

Speed (Max Off-Road): km/h50

Speed (Average cross-country): km/hClaimed to be equal to tracked vehicles

Speed (Max Swim): km/h9

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2

Fording Depths: mAmphibious

Note: On water it is propelled by two waterjets, located at the rear

Communications

Radio: R-163-50U VHF

Receiver: R-163-UP receiver

Intercom: R-174 intercom

Main Weapons System

Turret Type: Turret is similar to that, fitted on the BMP-2 infantry fighting vehicle.

↳*System*

Name: AGS-17 Plamya

Type: 30mm Automatic Grenade Launcher

Proliferation: Widely Proliferated

Manufacturer: Molot plant

In Service: 1967-Present

Length: mm840

Diameter: INA

Weight: kg31

Action: Blowback

Rate of Fire: 400 round/min

Effective Firing Range: 800 to 1,700 m

Feed System: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

Maximum Elevation: deg+75

Minumum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Variants: AG-17A helicopter-mounted version

↳ ***Ammunition***

Type: Grenade

Caliber: mm30

Cartridge: 30×29mm grenade

Muzzle Velocity: m/s185

Basic Load: ea400

Coaxial Weapon System

Note: The BTR-90 also has a Coaxial 7.62 mm PKT machine gun

Basic Load: ea2,000

Anti-Tank Guided Missile (ATGM)

Name: 9M113 Konkurs (AT-5 Spandrel)

Type: SACLOS wire-guided anti-tank missile

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Widely Proliferated

Launcher Type: 9P135 launching post

Length, With Gas Generator: mm1,150

Length, Without Gas Generator: mm875

Diameter: mm135

Wingspan: mm468

Missile Weight: kg14.6

Launcher Weight: kg22.5

Warhead Type: 9N131 HEAT

Warhead Weight: kg2.7

Detonation Mechanism: Contact

Engine: Solid-fuel rocket

Operational Range: 70 m - 40 km

Speed: m/s208

Guidance System: Wire-guided SACLOS

Steering System: Two control surfaces

Launch Platforms: Individual, vehicle

Basic Load: ea4

Fire Control

Protection

Armor (turret front): mmINA (defeat 12.7 to 20-mm rounds with applique armor)

Applique Armor: mmAvailable

Explosive Reactive Armor: mmAvailable, Special Tifon explosive reactive armor was developed for this APC

Active Protection System: Available

Self-entrenching Blade: No

NBC Protection System: Collective

Smoke Equipment: 6 81-mm smoke grenade launchers

Survivability Equipment: Mine protected hull

Automatic Fire Suppression Systems: Yes

Firing Ports: There are a some firing ports in the vehicle hull

Notes:

BTR-90 (GAZ-5923) (Russian: бронетранспортер, romanized: Bronetransporter, lit. 'Armoured Transporter') is an 8×8 wheeled armored personnel carrier developed in Russia, designed in 1993 and first shown publicly in 1994. It is a larger version of the BTR-80 vehicle, fitted with a BMP-2 turret. Armour protection is improved compared with the BTR-80, giving protection from 14.5 mm projectiles over the frontal arc. It is armed with a 2A42 30 mm auto cannon, a coaxial 7.62 mm PKT machine gun, an AT-5 Spandrel ATGM, as well as an AGS-17D 30 mm automatic grenade launcher. Limited numbers have been produced and are in service with Russian Internal Troops. In October 2011, the Ministry of Defence refused to buy the BTR-90 and did not include them in the list of the state program of armament until 2020, and waived exports for the BTR-90. The BTR-90 has a pointed nose, somewhat similar to that of the LAV-25. The hull is made of welded steel armour plate, and is slightly larger and higher than the BTR-80, from which it is developed. A turbo charged, liquid cooled, multi-fuel diesel engine is used, which can develop 510 bhp. The vehicle has eight-wheel drive and has an automatic reversible hydro mechanical transmission, which is capable of providing different speeds to each side of the vehicle. Duplicated electrical and compressed air engine start systems are also used. The wheels are utilized with independent torsion-bar suspension and the traverse arms have high capacity telescopic hydraulic shock absorbers. Communication equipment installed in the BTR-90 include an R-163-50U radio set for external communications, an R-163UP receiver, and an R-174 intercom device for communication between the crew members. The layout and positioning of equipment and parts in the BTR-90 is similar to those of the BTR-80 and BTR-80A. The commander and gunner are accommodated in a fighting compartment in the turret. This compartment also houses a BPK-3-42 gunner's day/night sight and a 1P-13 commander's optical sight.Optionally, a BPK-M thermal imaging sight can be fitted in this compartment as the gunner's sight. The driver is located somewhat to the middle of the hull, just in front of the turret. The troop compartment is located behind the driver's position and the turret. The engine compartment is at the rear of the hull. Hatches are provided on the top of the turret and hull, and side doors are available on the middle of the vehicle. These are designed to allow quick dismounting and boarding of troops even while the vehicle is on the move. The eight wheels are located as two sets, with two pairs at the front of the hull and two pairs at the rear. Split side doors are located between these two sets of wheels. The two forward pairs of wheels are utilized with power steering. The BTR-90 is capable of achieving a maximum speed of 100 km/h, and has cross-country driving ability comparable to that of tracked vehicles, with an average speed of 50 km/h. The vehicle is fully amphibious and can negotiate water obstacles without any preparation. Two water jet propellers power the vehicle in water, and it can achieve a maximum speed of 9 km/h. It can enter and be deployed from amphibious assault ships from the water. The BTR-90 can be deployed by truck, rail and also by water and air transportation means. Its hydro mechanical transmission helps to increase its maneuverability by providing different speeds to each side of the vehicle. This allows the BTR-90 to have a low turning radius of 6 m. When turning with only the front four wheels, it has a

turning radius of 14 m. It can cross up to 2.1 m wide trenches and can negotiate 60% gradients, 30% side slopes and 0.8 m vertical steps. The vehicle has an inner capacity of 12 cubic meters, and can carry a load of 7,000 kg. An air conditioning system can be added optionally. The commander has the ability to carry out all-round surveillance and can take full control of the weapons from the gunner. An onboard information control system (OICS) enables automatic control over the transmission, engine and other important parts of the BTR-90, and it is the first armoured personnel carrier to have such a system. A centralized tire pressure control system is also available, and allows the vehicle to move even if four of its wheels are destroyed.

XA-185 Finish 6x6 Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **XA-180:** Original six wheeler, carries crew of 2 and 16 troops. Empty weight ca 12 tonnes.
- **XA-185:** Upgraded version, carries crew of 2 and 18 troops. Has a more powerful engine and improved power transmission. Used as an ambulance in the Norwegian Army.
- **XA-186:** Upgraded armour. Armoured and equipped with machine-assisted gun turret (.50 BMG). Cannot swim because of the heavy armour. Empty weight ca 19 tonnes. Engine and transmission same as XA-185.
- **XA-188:** Used by the Netherlands Army.
- **XA-200:** The 200 series looks a little different from older variants due to increased armour. It lacks amphibious capabilities but can wade through water that is up to 1.5 m deep. The improved armour protects the passengers against up to 14.5 mm small arms fire. It is also equipped with modern optical aids like periscopes and night vision. The armor upgrade was initiated after the realisation that the previous armor was inadequate, even modern armor-piercing 7.62 mm ammunition could pierce the older XA-180 and XA-185 models in certain areas. The XA-202 was originally developed for Communications and Command. The XA-203 was made as a temporary replacement for XA-185, and is intended to be replaced by Patria AMVs in Finnish service. The Patria AMV (Armored Modular Vehicle) is an 8×8 multi-role military vehicle produced by the Finnish defence company Patria.

System

Alternative Designation: XA-185
Type: 6x6 Amphibious Armored Personnel Carrier (APC)
Manufacturer: Patria Vehicles Oy, Hameenlinna, Finland
Family: XA Series
Crew: 2 (commander, driver)
Passenger Capacity: 10 Troops

Dimensions

Length: 7.35 m
Width: 2.90 m
Height: 2.30 m
Distance between a Axles, 1st to 2nd: 1.90 m
Distance between a Axles, 2nd to 3rd: 1.90 m
Tire Size: 356 x 508 mm
Ground Clearance: 0.40 m

Combat Weight: 15,000 kg

Unloaded Weight: 12,000 kg

Payload Weight, Road: 6,500 kg

Payload Weight, Cross-Country or Swimming: 3,000 kg

Automotive

Engine Name: 1 x Valmet 612 DWI

Engine Type: 451-cu in (7.4-l) liquid-cooled, turbocharged, 4-stroke, 6-cyl inline diesel

Engine Power: 271 hp (202 kW) at 2,500 rpm

Power-to-Weight Ratio: 16.0 hp/metric ton

Transmission: Allison automatic MD 3560P

Suspension: 6 x 6 (6 wheels driving, 4 wheels steering); beam axles, leaf springs and shock absorbers on each wheel station

Maximum Road Speed: 100 kph

Maximum Swim Speed: 10 kph w/2 shrouded propellers

Range: 800 km

Fording: Amphibious

Main Gun

Note: Basic vehicle is unarmed except for 3 firing ports and vision blocks in each hull side

Protection

Hull Armor: All-welded steel hull provides splinter protection

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Fire Suppression System: Yes

Notes:

XA-185 This is an improved version of the XA-180 fitted with a more powerful diesel engine and stronger axles. The Patria Pasi (earlier known as the Sisu Pasi) is a Finnish-made six-wheeled armoured personnel carrier (APC) originally designed for Finnish Defence Forces. The first version was produced in 1983 and serial production began in 1984. It was designed to operate with ease of use, simple structure and low-cost maintenance. The basic appearance and configuration of Patria Pasi is similar to most wheeled APCs. The XA-180 and XA-185 versions are fully amphibious while the XA-203 is not. In 1980, Sisu produced an XA-180 prototype for Finnish Army tests. It competed against two other prototypes, but was declared the winner of the trials in 1983. On 22 December 1983 the Finnish Army ordered a first batch of fifty XA-180s, of which nine were reserved for UN duties. The vehicle proved quite successful and more orders were soon to follow. The XA-180 was originally manufactured and marketed by the Finnish company Sisu Auto but later variants were marketed by the Finnish defence company Patria and are known as Patria XA series.[1] The Vehicle's widely known nickname "Pasi" (also a common given name of Finnish men) stems from the Finnish name "panssari-Sisu" (English: armoured Sisu). The main superstructure is mainly manufactured from 6 to 12

mm of armour steel and the bottom is mine-strengthened, and the front windows are bullet-resistant and equipped with protective hatches. The vehicle has continuous six wheel drive and good capabilities for off-road driving. It can take inclines up to a maximum of 60°. The XA series has no standard armament, but is equipped with a rotating turret structure for installation of light/heavy machine guns or autocannons. It also has 8 BMP style firing ports on the sides and rear. Therefore, passengers, usually a squad of infantry, can fire their weapons from the cover of the armor. The XA series is popular in peacekeeping missions due to its mobility, non-aggressive appearance, and good protection against mines and improvised explosive devices (IED). The vehicle also offers a good combination of armament, comfort, mine protection, protection against shrapnel and small calibre fire, road speed, short time of learning how to drive, and an acceptable terrain mobility. It also offers more internal space compared to other similar vehicles like the Fuchs or BTR-80.

→→Airborne Armored Personnel Carrier (APC)

BvS 10 (Viking) Swedish Amphibious Armored Personnel Carrier (APC)





Tiers:



Variants:

- **UK Variants:** The UK currently operates four variants of the vehicle: The Troop Carrying Variant (TCV) capable of carrying 2 crew plus 10 passengers; the Command Variant (CV), which carries 2 crew plus up to 8 passengers with the rear cab being designed as an enhanced digital communications platform, the Repair and Recovery Variant (RRV), carrying 4 specialist maintenance vehicle mechanic crewmen and the Ambulance Variant (AV). The rear cab of the RRV carries a HIAB crane, a fully mobile workshop, an air compressor and a 9 tonne capacity capstan winch, together with hydraulic anchors. All three variants are fully air-portable under a CH-47 Chinook helicopter, either complete or in two separate front and rear component parts and are also fully amphibious; being capable of swimming in varying sea-states with a full load of passengers and stores. UK Viking vehicle variants are used as amphibious armoured all-terrain vehicles for troop transport and as vehicle repair recovery vehicles.

System

Alternative Designation: BvS 10; Viking
Description: Armored Personnel Carrier (APC)
Manufacturer: BAE Systems Land Systems Hägglunds of Sweden and under license by FNSS of Turkey.
Crew: ea2
Passengers: 10
Airportable: Yes, by the C-130 Hercules and C-17 Globemaster III. It can be carried underslung by the CH-47 Chinook or split in two sections and carried by the Merlin helicopter.

↳*Dimensions*

Length: m7.6
Width: m2.34
Height, Front Car: m2.2
Height, Rear Car: m2.1
Weight, Front Car: tons5
Weight, Rear Car: tons3.5
Payload Capacity, Front Car: kg800
Payload Capacity, Rear Car: kg3,000

Maximum Tow Weight: tons3

Automotive

Engine Name: Cummins 5.9 litre in-line six-cylinder turbocharged diesel

Engine Type: Diesel

Engine Power: hp275

Range, Cruising: km300

Speed, Maximum Road: km/h65

Speed, Maximum Swim: km/h5

Gradient: %100

Side Slope: %30

Vertical Step: m1

Trench: m2

Fording, without Preparation: m1.5

Fording, with Preparation: mAmphibious

Fully Amphibious Time: less than 2 min

Operating Temperatures: - 46°C to + 49°C.

Main Weapon System

Note: The BvS 10 Vehicle can be armed with 12.7 mm or 7.62 mm machine gun, mounted on top of the forward unit. The rear unit can be configured to carry various weapon systems. However in its normal deployment this vehicle remains out of contact with hostile troops.

Protection

Armor: The BvS 10 provides all-round protection against 7.62 mm ball rounds.

Armor, Applique: mmAvailable, Optional add-on armor makes it invulnerable to the 7.62 mm armor-piercing rounds.

Armor, Explosive Reactive: mmNo

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: smoke grenade launchers (front), mortars (back)

Notes:

The BvS 10 is an All Terrain Armoured Vehicle produced by BAE Systems Land Systems Hägglunds of Sweden and under license by FNSS of Turkey. This vehicle, referred to as the All Terrain Vehicle (protected) - ATV(P) or Viking by the UK forces, was originally developed as a collaboration between industry - Hägglunds Vehicle AB - and the UK Ministry of Defence (MoD) on behalf of the Royal Marines. The BvS 10 is similar to, but distinct from, the Bv 206 or Bv 206S. It is a much larger and fully amphibious armoured vehicle based upon the characteristic twin-cab, articulated steering system typical of Hägglunds all-terrain vehicles. The main differences from the older Bv206s are a more powerful Cummins 5.9 litre diesel engine, improved ground clearance, and newly developed chassis, power train and steering units that give the vehicle considerably enhanced speed (from previous 51.5 km/h on road) and comfort on road and in terrain, as well as greater load-carrying capability (up to 5 tons), and the ability to add various modular sub-systems such as add-on armour, weapon mounts, a load-changer and cargo platforms. French Order On 18 December 2009, the French Armed Forces placed an initial order for 53 BvS 10 Vikings, with the total order for 129 of the vehicles. Including servicing, the contract is estimated to be worth £220 million, and the vehicles will

be assembled at the BAE factory in Sweden. This is a historic order, as it is the first French order for military equipment from the United Kingdom in decades. In placing the order, France broke with their tradition of supporting domestic products, in this case the Bronco All Terrain Tracked Carrier, built jointly by ST Kinetics and Thales. Swedish Order On 5 January 2012, it was announced that the Swedish Armed Forces decided to procure 48 units of the model BvS10 MkIIB, to be delivered starting in the autumn of 2012, and deployed to the Swedish contingent in Afghanistan in the spring of 2013. The contract is worth approximately 700 million SEK, and also includes support and training equipment. There are also options to order an additional 127 vehicles divided in three different batches in the future. On 25 September 2013, Sweden agreed to buy 100 additional BvS10 vehicles for over $160 million, as part of the options agreed upon in the first order. On 19 December 2013, Sweden officially ordered 102 BvS10 vehicles for $120 million. The vehicles include troop carrier, command, ambulance, and logistic carrier variants and will be delivered from 2014 to 2015. Austrian Order On 30 June 2016, it was announced on Baesystems homepage that the Austrian Army decided to procure 32 units of the model BvS10, to be delivered from 2017 to 2018. The BvS10 will also play a role in Austria's mission in the European Union Mountain Training Warfare Initiative (EU MTI). According to the Austrian military magazine "Truppendienst", the Austrian Army will receive the first build BvS10's MkIIB with CBRN protection and all vehicles equipped with WS4 PANTHER remote controlled weapon station. A possible additional BvS10 MkIIB order could be signed after 2018 delivery. The Austrians received the first of BvS10 vehicles in February 2019.

BTR-MD Rakushka Russian Amphibious/Airborne Armored Personnel Carrier (APC)







Tiers:



Variants:

- **Note:** A whole host of BTR-MD variants is currently planned or under development. These include signals vehicle, anti-tank missile carrier with Kornet missiles, MRU-D air defense radar carrier, Poliot-K unmanned aerial vehicle control vehicle, Poliot-K UAV command post vehicle, Obzhimka reconnaissance and fire control post. Other versions, such as Lastochka-2 special signals vehicle and BMM-D Travmatizm armored ambulance were trialed by the Russian airborne forces.

System

Alternative Designation: BTR-MD Rakushka
Type: Airborne/Amphibious Armored Personnel Carrier
Family: BTR Series
Crew: ea2
Passenger Capacity: 13
Payload Capacity: 2,000 kg
Paradropped: The BTR-MD can be carried by and paradropped from most medium cargo aircraft with the crew of three inside. The Il-76 can carry two of these airborne APCs. A single vehicle can be carried underslung by the Mi-26 heavy cargo helicopter.
Note: This APC can also carry at least three stretchers, ammunition or fuel in stead of the troops.

Dimensions

Length: 6.1 m
Width: 3.1 m
Height: 2.5 m

Weight, Combat: 13.2 t

Automotive

Engine Name: 2V-06-2

Engine Type: Diesel

Engine Power: hp450

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Sea State: It can operate up to a Sea State 3.

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m1.8

Fording Depth: Amphibious

Main Weapon System

Note: This armored personnel carrier is armed with a remotely-controlled 7.62 mm machine gun for self-defense. The machine gun is operated by the vehicle commander.

↳*System*

Name: PKTM

Type: General-Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Degtyaryov plant

Length: mm1098

Width: mm195

Height: mm170

Weight: 10.5 kg

Rate of Fire: 700-800 Rounds per minute

Muzzle Velocity: 850 ms

Maximum Firing Range: 4,000 m

Effective Firing Range: 1,500 m

Belt Capacity: 250 Rounds

Sights: Tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7,62x54R

Basic Load: INA

Auxiliary Weapon System

↳*System*

Name: AGS-17

Type: Automatic Grenade Launcher

Caliber: 30 mm

Length: 840 mm

Width: INA

Height: INA

Weight: 31 kg

Action: Blowback

Rate of Fire: 400 round/min

Muzzle Velocity: 185 m/s

Effective Firing Range: 800 to 1,700 m

Feed System: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

↳*Ammunition*

Type: Grenade

Caliber: 30mm

Cartridge: 30×29mm grenade

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Protection of this vehicle is very light due to weight limitations. Hull of the BTR-MD is welded from aluminum armor. It provides protection only from small arms fire and artillery shell splinters. Vehicle is fitted with NBC protection and

automatic fire suppression systems.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

Russia’s airborne forces, whose numbers will be doubled by 2020, are set to take possession of two new vehicles: the BMD-4M airborne combat vehicle and the BTR-MD Rakushka (“shell”) universal armored personnel carrier. The vehicles will be ready to enter service with the armed forces by spring 2015, when dozens of them will drive through Red Square for the Victory Day parade on May 9, 2015. In the next 10 years the army will buy 1,500 units of the former and 2,500 units of the latter. The Rakushka will become the workhorse of the Russian Airborne Forces, replacing the BTR-Ds that were acquired 40 years ago. The paratroopers have been waiting a long time for the vehicle. BTR-MD "Rakushka" (Ob'yekt 955) is a multi-role transport vehicle variant of the the BMD-3 "Bakhcha" with a bigger hull and no turret. This type can be used to transport troops, fuel, ammunition and wounded personnel. It also serves as the basis for a new range of specialised vehicles for the Russian airborne forces, including a mortar platform, an ambulance BMM-D, a command post vehicle and a recovery vehicle. Some of the variants will have a longer chassis with 7 road wheels and probably the same 510hp engine as the 2S25.

BTR-D Russian Airborne Armored Personnel Carrier (APC)







Tiers:



Variants:

- **BTR-DG (Ob'yekt 925G):** Cargo variant without bow machine guns, firing ports and periscopes. The troop compartment was modified to serve as a cargo compartment.
- **BTR-DG:** converted into an airborne SPAAG fitted with a specially built three-legged ZU-23-2 twin anti-aircraft autocannon mount over the roof of the cargo compartment.
- **BTR-D San:** BTR-D converted into an airborne armoured ambulance.
- **BREM-D:** (BREM-D stands for bronirovannaya remonto-evakuatsionnaya mashina desanta – armoured maintenance-recovery vehicle of the airborne) (Ob'yekt 932) – BTR-D converted into an airborne ARV. It carries specialized equipment for the repair and recovery of BMD-1 type vehicles. This equipment includes a light collapsible crane stored on the roof of the personnel compartment, which can be traversed through 180°, a recovery winch, a combination spade and dozer blade, a generator, towing equipment, electric welding system, tools and ready use spares. One of the 7.62 mm bow PKT tank machine guns was eliminated. This entered service in 1989 in very small numbers
- **BTR-RD "Robot":** BTR-D converted into an airborne ATGM team carrier with two 9P135M-1 ATGM launchers capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. They can be used by the dismounted ATGM squad or fitted on a pintle mount on the right side of the hull. This is basically a BTR-D with a pintle mount added and with missile racks inside the troop compartment
- **BTR-ZD "Skrezhet":** (ZD stands for zenitnaya ustanovka) – BTR-D converted into an airborne air defense vehicle for carrying two MANPAD teams. The vehicle is fitted with racks for spare MANPAD missiles. It also is fitted with external stowage rails for a MANPAD on the right hand side of the roof of the troop compartment. It can also carry a complete ZU-23-2 twin anti-aircraft autocannon mount on the roof of the troop compartment.
- **NPDU "Sterkh":** (NPDU stands for nazemnyj punkt distantsionnogo upravleniya) – BTR-D converted into an airborne unmanned aerial vehicle carrier and launch vehicle of the "Stroy-P" set. It is used to launch Yak-061 "Pchela-1T" UAV for reconnaissance or jamming at ranges up to 60 km. The single-rail launcher is mounted on left hand side of the roof of the hull. It has large three-piece tube on forward right hand side of the roof of the hull. It entered service in 1990
- **BMD-1KSh "Soroka" (Ob'yekt 926):** (KSh stands for komandno-shtabnaya – command and staff) – airborne command post equipped with the R-123M, R-111 and R-130M or R-134 radio sets, as well as an AB1 portable 1 kW generator, the TNA-3 navigation system, folding CLOTHES HORSE type antennae around the superstructure and two slim antenna masts. Bow mounted machine guns and firing ports were removed. The commander's hatch is offset to the left and does not project forward. It's sometimes called BMD-KSh or KShM-D
- **BMD-1R "Sinitsa":** (R stands for radiostantsiya – signals vehicle) – Division-level command and signals vehicle equipped with R-161A2M radio set, one heavy telescopic antenna mast stowed along the left hand side of the roof of the hull and one slim elevatable antenna mast on the rear right hand side of the roof of the personnel compartment. Only a small number was delivered.

- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **1V119 "Reostat":** BTR-D converted into an airborne artillery battalion fire direction vehicle. The vehicle is fitted with a turret equipped with NNP-21 and V-7 observation devices, three R-173 and R-159 radiosets, PAB-2AM aiming circle, three antennae mounts, DSP-30 and DAK-2 rangefinders. The turret was also equipped with PSNR-5K (1RL-133-1) "Tall Mike" ground surveillance radar mounted on the roof of the turret. Located over the turret front sights were the visors hinged in the center
- **2S9 Nona-S (Ob'yekt 925S) –:** Airborne self-propelled mortar, armed with a 120 mm 2A60 mortar. Entered service 1981.

System

Alternative Designation: BTR-D, BMD 1979

Type: Airborne APC

Family: BTR

Manufacturer: Volgograd Tractor Factory

Crew: ea1

Passenger Capacity: ea12

Dimensions

Length: m5.88

Width: m2.63

Height: m2

Weight, Combat: tons8

Ground Pressure: INA

Automotive

Engine Name: 5D20 V6 Diesel

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h62

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: mAmphibious

Note: The BTR-D is amphibious and is propelled on water by two waterjets

Communications

Primary: INA

Main Gun

Note: The only armament carried are two 7.62 mm machine guns, mounted in front of the hull and are operated by the troops. 2 000 rounds for these machine guns are stowed inside

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +1 Million

Length: mm1,203

Barrel Length: mm605

Weight, Gun Only: kg9

Weight, Tripod Only: kg7.7

Max Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Protection

Hull Armor: Protection of this vehicle is very light. Hull of the BTR-D is welded from aluminum armor in attempt to save weight, however it protects the occupants only from small arms fire and artillery shell splinter

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Firing Ports: all-round firing ports

Notes:

The BTR-D is a amphibious and airborne APC. The BTR-D is a Soviet airborne multi-purpose tracked armoured personnel carrier which was introduced in 1974 and first seen by the West in 1979 during the Soviet–Afghan War. BTR-D stands for Bronetransportyor Desanta (БТР, Бронетранспортер Десанта, literally "armoured transporter of the Airborne"). It is based on the BMD-1 airborne IFV. NATO gave it the designation BMD M1979. While the BTR-D is based on the BMD-1, it is 60 mm longer and lacks a turret; instead, it has a small flat superstructure with a hatch on top. Crew The crew consists of the driver, the commander and the left bow mounted machine gun gunner, all of whom are in the same positions and have the same equipment as in the BMD-1. Armament Although the turret with all of the main armament was removed, the two bow mounted machine guns have been retained. However, the original PKT tank machine guns have been replaced by PKB general purpose machine guns. The vehicle can also be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Maneuverability The BTR-D is powered by the same engine as the BMD-1, however, its suspension is longer because the entire vehicle has been lengthened by 60 mm. Because of this, the vehicle has six road wheels on each side instead of five. It also has five return rollers on each side unlike the BMD-1, which has four. Armour protection The armour protection is slightly better on the BTR-D than on the BMD-1. That's because the upper front armour has a dual slanted angle. Troop compartment Because the turret has been removed, the troop compartment has been enlarged and can carry up to ten fully equipped soldiers. It's also linked with the crew compartment in the front. Also, there are two firing ports in the sides and one in the rear, two of which are for RPK-74 light machine guns. Equipment The BTR-D has all the same equipment as the BMD-1, but also has towing equipment for ZU-23-2 twin AA autocannon.

→→Mine-Resistant Ambush Protected (MRAP)

VP-3 (CS/VP3) Chinese 4x4 Mine-Resistant Ambush Protected (MRAP)





Tiers:



System

Alternative Designation: BIGFOOT

Expected Out of Service Date: 2034

Status: In service with various police and military forces, production as required

Manufacturer: China Poly Group

Type: 4x4 MRAP APC

Crew: 2

Troop Compartment Capacity: 10

Payload Capacity: kg2,000

Firing Ports: There are a total of nine firing ports on the vehicle, one in each of the four windows that are fitted to the side of the vehicle and one in the window at the rear of the vehicle.

Mazimum Effective Range: m800

Dimesions

Length: m7.58

Width: m2.45

Height: m3.25

Weight, Standard: kg13,000

Weight, Combat: kg15,000

Ground Clearance: m0.38

Automotive

Engine Name: Unspecified

Engine Type: Diesel Engine

Engine Power: hp315

Maximum Torgue: Nm1,100

Crusiing Range: km800

Speed, Maximum Road: km/h110

Speed, Average Cross: km/h

Amphibious: No

Fording (Without Preparation): m1.2

Towing equipment: Optional, 2 towing points at rear, pintle at rear

Self Recovery Winch: Optional, Hydraulic winch on the rear and front side of the vehicle or electric winch on the front as an option

Mounting Provisions for Air-Drop: Lift points at the top of the hull

Personnel Emergency Exits: Three side doors and a rear mounted ramp (with an emergency door in it)

Run Flat Tires: Standard

Bullet Proof Tires: Available

Climbing Gradient: %60

Side Slope: %30

Vertical Obstacle: m0.6

Air-Conditioning: Yes

Turning Radius: m9.5

Tires: 14.00R2

Communications

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widelty

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun (Turret #1)

Number of Turrets: 2 (One in the front and one in the rear)

Options: Each Turret can be mounted with two 7.62mm Machine Guns, two 12.7mm Machine Guns, or one 7.62mm and one 12.7mm Machine Gun

Note: For this example we will mount one 12.7mm machine gun on turret 1 and one 7.62mm machine gun on turret 2.

↳***System***

Name: QJG89
Manufacturer: INA
Type: Heavy Machine Gun
Length: mm2,119
Barrel Length: mm1,003
Diameter: mmINA
Weight (Gun Only): kg18.5
Weight (Tripod): kg17.5
Action: Gas
Rate of Fire: rpm450-600
Feed System: Belt
Sights: Iron/Optical
Fire Selector: 0-F
Stock: Fixed

↳***Ammunition***

Type: Ball
Caliber: mm12.7x108mm
Muzzle Velocity: m/s825
Basic Load: INA
Magazine: Belt fed, 50 rounds
Operation: Hybrid direct impingement and short recoil
Effective Firing Range (vs. Air): m1,500
Effective Firing Range (vs. Ground): m2,000
Armor Penetration: INA

Auxiliary Weapon System (Turret #2)

↳***System***

Name: Type 80 Chinese Heavy Machine Gun
Manufacturer: Norinco
Type: 7.62 Machine Gun
Length: 1,192
Barrel Length: 658
Diameter: mmINA
Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas Operated

Rate of Fire: rds/m700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses

↳*Ammunition*

Type: 7.62×54mmR

Caiber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500 (With Sight Adjustments)

Min Range: m100

Armor Penetration: Available

Fire Control

Name: INA

Computerized FCS: No

Thermal Tank Commander: INA

Thermal Gunner: INA

Main Gun Stabilization: INA

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Protection

Hull Armor: Yes, Passive armour protection (ballistic still and ballistic glasses).

Turret Armor: Armor Platting

Window Armor: The windows are believed to be protected to the same level as the armoured hull

Applique Armor: Yes

Ballistic Protection Level: BR-3 to BR-7 upon request, for windows and steel structure

Mine Protection Level: Optional, add on anti-personnel mine protection and explosive up to 4 kg mine under belly and 7 kg under wheel

Exhaust Gas Signature Reduction: Exhaust pipes are protected to limit IR signature

Countermeasure Systems:: Smoke grenade launchers are available, as well as smoke screen system, as an option.

Active Protection System: INA

Explosive Reactive Armor: Yes,

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Equipment: No

Smoke Equipment: INA

Fire-Extinguishing System: Yes

Notes:

The CS/VP3 is an armoured 4 × 4 vehicle developed and produced by Poly Technologies from China. It is believed to be an export vehicle built with the intention to provide customers with a brand new armoured platform at a lower cost than Western producers are able to achieve. It is in service with several African countries and Saudi Arabia. It is believed to be based on the Caprivi Mk 1 armoured vehicle designed by Mobile Land Systems of South Africa.

Cougar H American 4x4 Mine-Resistant Ambush Protected (MRAP) Vehicle



Tiers:



Variants:

- **Cougar HEV (Hardened engineer vehicle):** 4×4 and 6×6 vehicles ordered in 2004 by the USMC.
- **Badger ILAV (Iraqi Light Armored Vehicle):** Based on the Cougar and manufactured by FPII and BAE Systems for the Iraqi Army. The ILAV is based on the Cougar, which can carry ten passengers (the six-wheel version can carry 16). The Cougar/ILAV vehicle uses a capsule design to protect the passengers and key vehicle components from mines and roadside bombs. The larger Cougar costs about $730,000 each, fully equipped. The Cougars have been very popular with American troops, and with Iraqis who have worked with them. 865 ILAVs were ordered by Iraq and 18 by Yemen. The ILAV gives the Iraqis the same degree of protection that most Coalition troops have.
- **Cougar JERRV (Joint EOD rapid response vehicle):** 4×4 and 6×6 variants for the US Army, USAF, and USMC. Approx. 200 ordered in 2005 and 2006, with another 200 ordered in late 2006 but now called MRAPs to take account of the new US military/political initiative to be seen to be responding to public concerns about casualties.
- **Cougar ISS:** Based on the Cougar 4×4, the ISS is fitted with an integrated independent suspension system that gives the vehicle increased cross-country mobility.
- **Ridgeback PPV (Protected Patrol Vehicle):** British version of the Cougar 4x4 from FPII base vehicles with a British armor package and electronics, including installation of Enforcer remote weapon stations on some vehicles. In 2015, Salisbury coroner David Ridley raised several "points of concern" relating to the vehicle when recording a narrative verdict on the deaths of four soldiers who drowned in Helmand, Afghanistan in June 2010.
- **Mastiff PPV (Protected Patrol Vehicle):** British version of the Cougar 6×6 which arrived in Afghanistan during December 2006, with FPII providing the base vehicle and NP Aerospace in the UK integrating electronics and the British armour package. The Mastiff 2 is an improved version with a capacity of 2 + 8 which arrived in Afghanistan during June 2009. The Mastiff is armed with a 7.62 mm GPMG, 12.7 mm Heavy Machine Gun or 40 mm Grenade Machine Gun.
- **Mastiff 2 'Protected Eyes':** A version of the British Mastiff specially designed for the Talisman Counter-IED program. It is fitted with an M151 Protector remote weapon station, mine plow, optical camera and a Micro Air Vehicle (MAV) with screens in the back to display its camera feed.
- **Wolfhound (Heavy Tactical Support Vehicle):** British modification of the Cougar 6×6, with FPII providing the base vehicle and NP Aerospace in the UK integrating electronics and the British armor package. The first Wolfhounds entered service in Afghanistan in October 2010. 130 have been ordered for gun tractor and logistical roles.
- **Timberwolf:** Cougar variant that was being marketed by Malley Industries of Dieppe, NB Canada for the replacement of the RG-31 and LAV for the Canadian Forces; Malley Industries lost the contract to Textron TAPV.
- **Fire Support Cougar:** Cougar 4x4 chassis fitted with the complete turret and main gun assembly of the Panhard AML-90 armored car. In service with the Djiboutian Army.
- **Recovery of Airbase Denied by Ordnance (RADBO):** Category I Cougar equipped with a U.S. Air Force-designed directed energy weapon, interrogator arm, console, and other features to clear unexploded ordnance from airfields.

System

Alternative Designation: Cougar H

Type: MRAP

Manufacturer: Force Protection, Inc.

Family: Cougar

Crew: ea2

Passenger Capacity: ea4

Dimensions

Length: m5.91

Width: m2.74

Height: m2.64

Weight, Curb: tons14.5

Weight, Gross Max: tons17.2

Payload Capacity: tons2.72

Automotive

Engine Name: Caterpillar C-7 Diesel I6

Engine Type: Diesel

Engine Power: hp330

Cruising Range: km670

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m1

Communications

Note: Varies on which country is operating the Cougar

Main Gun

↳*System*

Name: M153 CROWS II

Type: Common Remotely Operated Weapon Station (CROWS)

Proliferation: More than a thousand M153 CROWS II systems are in use. It has been employed on M1 Abrams main battle tanks, various versions of the Humvee, Buffalo MRVs, RG-31 Nyalas, RG-33s, the Army's M1126 Stryker APC, and was soon integrated into the Oshkosh M-ATV, JERRV, Caiman, and MaxxPro.

Manufacturer: (Kongsberg Gruppen

Maximum Elevation: deg+60

Minimum Elevation: deg-20

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Available Weapons to Mount to the M153 Crows II: The CROWS system provides an operator with the ability to acquire and engage targets while inside a vehicle, protected by its armor. It is designed to mount on a variety of vehicle platforms and supports the Mk 19 grenade launcher, M2 .50 Caliber Machine Gun, M240B Machine Gun, and M249 Squad Automatic Weapon.

Gyro-stabilized: Yes

Daylight Video Camera: Yes

Thermal Camera: Yes

Laser Rangefinder: Yes

Computerized FCS: Yes

Weight: kg172

Note: Its camera systems can identify targets out to 1,500 meters away, and the mount's absorption of about 85% of weapon recoil delivers an estimated 95% accuracy rate, as well as the ability to track targets moving 25 mph (40 km/h).

↳*Ammunition*

Note #1: The CROWS system provides an operator with the ability to acquire and engage targets while inside a vehicle, protected by its armor. It is designed to mount on a variety of vehicle platforms and supports the Mk 19 grenade launcher, M2 .50 Caliber Machine Gun, M240B Machine Gun, and M249 Squad Automatic Weapon.

Note #2: Large ammunition boxes enable for sustained firing periods, carrying 96 rounds for the Mk 19, 400 rounds for the M2, 1,000 rounds for the M240B, and 1,600 rounds for the M249. Each CROWS costs $190,000.

Protection

Armor: Allround protected from .50 cal

Applique Armor: Available

Active Protection System: INA

Mine Clearing: Available

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Note: Official data states that the Cougar is able to withstand a blast of at least 14 kg TNT (30.86 lb) under a wheel and 7 kg TNT (15.43 lb) under a belly.

Notes:

The Cougar is an MRAP and infantry mobility vehicle structured to be resistant to landmines and improvised munitions. The Cougar comes in two main configurations, a 4×4 and 6×6. It is designed for the transport and protection of troops and equipment, especially against mines or IEDs. The two main configurations come in specific variants. It is a family of armored vehicles produced by Force Protection Inc, which manufactures ballistic and mine-protected vehicles. The vehicles are integrated by Spartan Motors.[3] These vehicles are protected against small arms, land mines and improvised explosive devices (IEDs) using a combination of design features and materials to protect both the crew and engine compartment against a wide range of attacks.[7] A Monocoque type, V-shaped hull extends to the engine bay and serves to direct the blast away from under the vehicle. The dual air-conditioners help keep heavily dressed troops from overheating in temperatures over 100 °F (38 °C) in Iraq. Force Protection, Inc. was formed in 2002 when Sonic Jet purchased Technical Solutions Group, using the name Sonic Jet until 2004. Technical Solutions Group had been a defense company in the US that was involved in a range of

products, including mine-resistant vehicles based on South African designs. A few vehicles were sold to the US Army for evaluation, and a small fleet of heavily protected vehicles were sold to the British Army in 2001. In 2004, the new Cougar was designed by a small British-led team in the US at Force Protection, Inc., in response to an urgent requirement by the US Marine Corps. This was a new design, developed in the US, based on an evolution of vehicle mine-protection technology used by the South African Army and Rhodesian Security Forces since the 1970s. The very first sketches of the new vehicle were made in late March 2004 in response to those initial USMC inquiries. The rapid development and production that followed was based upon the USMC request that the first vehicle be delivered within 6 months of an order – which was subsequently placed in mid-April 2004 for 27 units. The new design was called Cougar to provide a degree of continuity with the older designs, but had little in common with them. The former vehicles were almost entirely non-compliant with NATO standards for protection, human factors and safety, which made those designs obsolete. The Cougar was effectively a totally new vehicle which incorporated the latest US-made automotives, a new hull design and structure, as well as built-in growth potential, including dimensions that allowed for the addition of the latest armor and protection systems. After being built, the first vehicle was only trialed by doing some circuits of the company campus and trundling over a few rocks and beams set up by the designer to provide a degree of shake-down testing as well as a demonstration course. Urgent operational requirements dictated that the first unit be shipped to theatre as fast as possible and those involved in the project decided that the risk of doing so was outweighed by the advantages of having the vehicle available. The Cougar was fully trialed when it became part of the MRAP program. The first Cougars were called HEV (hardened engineer vehicle), which became JERRV when the Army joined the program, and then MRAP for political reasons when the requirement for many thousands of units was issued. Some 4,000 of these vehicles were fielded under the US military's MRAP (Mine Resistant Ambush Protected) and other vehicle programs. US Defense secretary Robert Gates demanded that the vehicles be ordered in larger numbers after the Marines reported in 2004 that no troops had died in more than 300 IED attacks on Cougars. Since then, Cougar vehicles have been hit by improvised explosive devices (IEDs) many times in Iraq with few fatalities. Britain chose the Cougar over the RG-31 Nyala for their "Mastiff" APV. As of December 2011, the Pentagon planned to add the Crows II remote weapon station and the Frag Kit 6 anti-EFP armor. Official data states that the Cougar is able to withstand a blast of at least 14 kg TNT (30.86 lb) under a wheel and 7 kg TNT (15.43 lb) under a belly.

Cougar HE American 6x6 Mine-Resistant Ambush Protected (MRAP) Vehicle





Tiers:



Variants:

- **Cougar HEV (Hardened engineer vehicle):** 4×4 and 6×6 vehicles ordered in 2004 by the USMC.
- **Badger ILAV (Iraqi Light Armored Vehicle):** Based on the Cougar and manufactured by FPII and BAE Systems for the Iraqi Army. The ILAV is based on the Cougar, which can carry ten passengers (the six-wheel version can carry 16). The Cougar/ILAV vehicle uses a capsule design to protect the passengers and key vehicle components from mines and roadside bombs. The larger Cougar costs about $730,000 each, fully equipped. The Cougars have been very popular with American troops, and with Iraqis who have worked with them. 865 ILAVs were ordered by Iraq and 18 by Yemen. The ILAV gives the Iraqis the same degree of protection that most Coalition troops have.
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- **Recovery of Airbase Denied by Ordnance (RADBO):** Category I Cougar equipped with a U.S. Air Force-designed directed energy weapon, interrogator arm, console, and other features to clear unexploded ordnance from airfields.

System

Alternative Designation: Cougar HE
Type: MRAP
Manufacturer: General Dynamics Land Systems
Mission: When it comes to reliability, even after a hit the Cougar can return to the field in a matter of hours and perform a number of tasks such as Command and Control, EOD, Patrol, Convoy Support, Forward Observation, Reconnaissance, Med-

Evac and more.

Family: MRAP

Crew: ea2

Passenger Capacity: ea10

Note: These vehicles were designed to have good road speeds and endurance (to allow for the long distances traveled, as well as reduced maintenance requirements because of their wheeled design) and were specifically designed to maximize passenger survivability against small arms ambushes and conventionally laid mines.

Dimensions

Length: m7.08

Width: m2.74

Height: m2.64

Weight, Curb: tons17.2

Weight, Gross Max: tons22.2

Payload Capacity: tons5.90

Automotive

Engine Name: Caterpillar C-7 Diesel I6

Engine Type: Diesel

Engine Power: hp330

Cruising Range: km600

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m1

Communications

Note: Varies on which country is operating the Cougar

Main Gun

↳*System*

Name: M153 CROWS II

Type: Common Remotely Operated Weapon Station (CROWS)

Proliferation: More than a thousand M153 CROWS II systems are in use. It has been employed on M1 Abrams main battle tanks, various versions of the Humvee, Buffalo MRVs, RG-31 Nyalas, RG-33s, the Army's M1126 Stryker APC, and

was soon integrated into the Oshkosh M-ATV, JERRV, Caiman, and MaxxPro.

Manufacturer: (Kongsberg Gruppen

Maximum Elevation: deg+60

Minimum Elevation: deg-20

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Available Weapons to Mount to the M153 Crows II: The CROWS system provides an operator with the ability to acquire and engage targets while inside a vehicle, protected by its armor. It is designed to mount on a variety of vehicle platforms and supports the Mk 19 grenade launcher, M2 .50 Caliber Machine Gun, M240B Machine Gun, and M249 Squad Automatic Weapon.

Gyro-stabilized: Yes

Daylight Video Camera: Yes

Thermal Camera: Yes

Laser Rangefinder: Yes

Computerized FCS: Yes

Weight: kg172

Note: Its camera systems can identify targets out to 1,500 meters away, and the mount's absorption of about 85% of weapon recoil delivers an estimated 95% accuracy rate, as well as the ability to track targets moving 25 mph (40 km/h).

↳***Ammunition***

Note #1: The CROWS system provides an operator with the ability to acquire and engage targets while inside a vehicle, protected by its armor. It is designed to mount on a variety of vehicle platforms and supports the Mk 19 grenade launcher, M2 .50 Caliber Machine Gun, M240B Machine Gun, and M249 Squad Automatic Weapon.

Note #2: Large ammunition boxes enable for sustained firing periods, carrying 96 rounds for the Mk 19, 400 rounds for the M2, 1,000 rounds for the M240B, and 1,600 rounds for the M249. Each CROWS costs $190,000.

Protection

Armor: Allround protected from .50 cal

Applique Armor: Available

Active Protection System: INA

Mine Clearing: Available

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Note: Official data states that the Cougar is able to withstand a blast of at least 14 kg TNT (30.86 lb) under a wheel and 7 kg TNT (15.43 lb) under a belly.

Notes:

The Cougar is a MRAP and infantry mobility vehicle structured to be resistant to landmines and improvised munitions. The Cougar comes in two main configurations, a 4×4 and 6×6. It is designed for the transport and protection of troops and equipment, especially against mines or IEDs. The two main configurations come in specific variants. It is a family of armored

vehicles produced by Force Protection Inc, which manufactures ballistic and mine-protected vehicles. The vehicles are integrated by Spartan Motors.[3] These vehicles are protected against small arms, land mines and improvised explosive devices (IEDs) using a combination of design features and materials to protect both the crew and engine compartment against a wide range of attacks.[7] A Monocoque type, V-shaped hull extends to the engine bay and serves to direct the blast away from under the vehicle. The dual air-conditioners help keep heavily dressed troops from overheating in temperatures over 100 °F (38 °C) in Iraq. Force Protection, Inc. was formed in 2002 when Sonic Jet purchased Technical Solutions Group, using the name Sonic Jet until 2004. Technical Solutions Group had been a defense company in the US that was involved in a range of products, including mine-resistant vehicles based on South African designs. A few vehicles were sold to the US Army for evaluation, and a small fleet of heavily protected vehicles were sold to the British Army in 2001. In 2004, the new Cougar was designed by a small British-led team in the US at Force Protection, Inc., in response to an urgent requirement by the US Marine Corps. This was a new design, developed in the US, based on an evolution of vehicle mine-protection technology used by the South African Army and Rhodesian Security Forces since the 1970s. The very first sketches of the new vehicle were made in late March 2004 in response to those initial USMC inquiries. The rapid development and production that followed was based upon the USMC request that the first vehicle be delivered within 6 months of an order – which was subsequently placed in mid-April 2004 for 27 units. The new design was called Cougar to provide a degree of continuity with the older designs, but had little in common with them. The former vehicles were almost entirely non-compliant with NATO standards for protection, human factors and safety, which made those designs obsolete. The Cougar was effectively a totally new vehicle which incorporated the latest US-made automotives, a new hull design and structure, as well as built-in growth potential, including dimensions that allowed for the addition of the latest armor and protection systems. After being built, the first vehicle was only trialed by doing some circuits of the company campus and trundling over a few rocks and beams set up by the designer to provide a degree of shake-down testing as well as a demonstration course. Urgent operational requirements dictated that the first unit be shipped to theater as fast as possible and those involved in the project decided that the risk of doing so was outweighed by the advantages of having the vehicle available. The Cougar was fully trialed when it became part of the MRAP program. The first Cougars were called HEV (hardened engineer vehicle), which became JERRV when the Army joined the program, and then MRAP for political reasons when the requirement for many thousands of units was issued. Some 4,000 of these vehicles were fielded under the US military's MRAP (Mine Resistant Ambush Protected) and other vehicle programs. US Defense secretary Robert Gates demanded that the vehicles be ordered in larger numbers after the Marines reported in 2004 that no troops had died in more than 300 IED attacks on Cougars. Since then, Cougar vehicles have been hit by improvised explosive devices (IEDs) many times in Iraq with few fatalities. Britain chose the Cougar over the RG-31 Nyala for their "Mastiff" APV. As of December 2011, the Pentagon planned to add the Crows II remote weapon station and the Frag Kit 6 anti-EFP armor. Official data states that the Cougar is able to withstand a blast of at least 14 kg TNT (30.86 lb) under a wheel and 7 kg TNT (15.43 lb) under a belly.

RG-31 Nyala South African 4x4 Mine-Resistant Ambush Protected (MRAP)



Tiers:



Variants:

- **RG-31 Mk 3:**
- **2.57:**
- **5.74:**
- **2.2:**
- **8.4:**
- **RG-31 Quick Intervention Vehicle (Scorpion):**
- **RG-31 Mk 3 Ambulance:**
- **RG-31 Mk 5EHM:**
- **2.8:**
- **7.0:**
- **2.5:**
- **8.4 (RG-31 Mk 3), 14.2 (RG-31 Mk 5), 18.6 (RG-31 Mk 5EHM):**
- **RG-31 Mk 5:**
- **2.72:**
- **6.6:**
- **2.48:**
- **14.2:**
- **RG-31 Mk 6:**

System

Alternative Designation: Nyala, Charger
Crew : ea2
Description: 4 X 4 armored vehicle can carry up to 8 troops that protects the occupants from small-arms fire & mines/explosives
Ground Pressure : kg/cm2INA
Weight, Combat : mt8.4

↳*Dimensions*

Height, Overall : m2.57
Length, Chassis Overall : m5.74
Width, Overall : m2.2

Automotive

Engine Name: Mk 3

Engine Type: HR 694 Hi3, water-cooled, 6-cylinder, in-line diesel

Fording Depth : m0.91 (RG-31 Mk 5) w/o prep

Range, Cruising : km805 (RG-31 Mk 5)

Speed , Average Cross-Country: km/hINA

Speed, Maximum Off-Road: km/hINA

Speed, Maximum Road : km/h120 (RG-31 Mk 3)

Communications

↳*Radio*

Name: LANDSEC VTR 3020

Protection

Active Protection System: Available (EMS)

Armor, Applique : mmAvailable (RG-31 Mk 6)

Armor, Explosive Reactive : mmNo

Armor, Turret Front : mmAgainst 5.56-mm rounds

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

Survivability Equipment: Hull can withstand a double TM57 level mine explosion (14 kg of TNT) under any wheel or a single detonation (7 kg of TNT) under the central vehicle

Notes:

The RG-31 Nyala is a 4×4 multi-purpose mine-resistant ambush protected infantry mobility vehicle manufactured in South Africa by Land Systems OMC (the division of Denel SOC LTD, located in Benoni, South Africa) and in Turkey by FNSS Defence Systems. It is based on the Mamba APC of TFM Industries. The RG-31 is built from a V-shaped all-steel welded armor monocoque hull and high suspension, typical of South African mine protected vehicles, providing excellent small-arms and mine blast protection. The vehicle is designed to resist a blast equivalent to two TM-57 anti-tank mines detonating simultaneously. The RG-31 is classified by the United States Department of Defense as a category 1 Mine Resistant Ambush Protected (MRAP) vehicle. The vehicle accommodates a crew of 8 or 10, including the driver, depending on model. Dismounting is provided via a large rear door and two front doors. The RG-31 has become the multi-purpose vehicle of choice of the UN and other peacekeeping and security forces. It is finding favour with non-governmental organisations requiring a vehicle with a non-aggressive appearance to protect their personnel against land mines. In July 2016, the Letterkenny Army Depot in Pennsylvania rolled out the latest variant of the RG31, with improvements including an engine upgrade from 275 to 300 hp, a transmission upgrade from 2,500 to a 3,000 series, independent suspension, 360-degree spotlights for night visibility, and an armored gunner's hatch. The depot is scheduled to produce 929 these RG31s through 2020.

→Light Armored Vehicles

→→Wheeled Light Armored Vehicles

Cadillac Gage Commando American 4x4 Light Armored Vehicle





Tiers:



Variants:

- **LAV-150 Commando V-100:** Original model with gasoline engine with top speed of 100 km/h. Variants included APCs, 81-mm mortar carriers, command vehicles, Dragon missile carrier, TOW missile carrier, police & fire variants, & turreted versions with various weapons
- **LAV-150 Command V-150:** Diesel engine with top speed of 89 km/h
- **LAV-150 Command V-150S:** Stretched by an additional 0.46 m, improved cross-country performance, & higher payload capacity
- **LAV-150 Command V-150ST:** Stretched variant with a turbo-charged engine with bottom of side hatch forming a step to dismount
- **LAV-150 Commando V-200 (Singapore):** Chrysler gasoline engine with different variants (20-mm turret, 90-mm turret, RBS-70 SAM system for air defense, recovery vehicle, & 120-mm mortar carrier)
- **LAV-150 V-300:** 6 X 6 variant with 9-10 troops, 3 crew, 105 km/h speed, & amphibious
- **DN-III/V Caballo (Mexico):** DN-88 has 7.62-mm MG in turret; DN-V has 12.7-mm MG; both have mount for RM-12 light MG in rear
- **Malaysian Upgraded V-150:** Proposed version to covert Malaysian army V-150s from gasoline to diesel engines
- **M1117 ASV/ASV-150:** Bridges the gap between the HMMWV & APC with a turret featuring a MK-19 40-mm AGL & a 14.7 (.50 caliber) machine gun
- **M707 Armored Knight:** Artillery support vehicle
- **Mobile Strike Force Vehicle (MSFV) (Afghanistan):** 3 variants (APC with gunner protective kit, APC with turret, & ambulance) additional protection using off-the-shelf parts
- **Tactical Armored Patrol Vehicle (Canada):** When fielded, it will use the Kongsberg Protector remotely operation weapons station
- **Commando Advanced APC:** Extended vehicle to increase troop capacity with V-shaped hull to deflect mine blasts

System

Alternative Designations: LAV-150 Commando
Description: 4 X 4 light armored vehicle with an exit door on both sides of the vehicle for 2 soldiers with no firing ports
Manufacturer: Cadillac Gage
Crew: 3 (driver, commander, gunner)

Dimensions

Chassis Length Overall: 5.69 m (18 ft 8 in) (V-100/V-150) 6.12 m (20 ft 1 in) (V-200)

Width Overall: 2.26 m (7 ft 5 in) (V-100/V-150) 2.43 m (8 ft 0 in) (V-200)

Height Overall: 2.4 m (7 ft 10 in) (V-100/V-200) 2.5 m (8 ft 2 in) (V-150)

Combat Weight: 7.37 tonnes (8.12 short tons; 7.25 long tons) (V-100) 9.8 tonnes (10.8 short tons; 9.6 long tons) (V-150) 12.73 tonnes (14.03 short tons; 12.53 long tons) (V-200)

Automotive

Engine Name: Chrysler 361

Engine Type: Eight-cylinder petro

Engine Power: 210

Cruising Range (km): km644

Speed (Max Road): km/h100

Speed (Max Off-Road): INA

Speed (Max Swim): km/h5

Fording Depth: M1117: 1.5 (all others amphibious)

Armament

↳***FN MAG***

Caliber/length: 7.62-mm

Type: Cupola Machine Gun

Ammo: 3200 Rounds: Ball-T, Match, API, API-T

Maximum Effective Range: m1500 (day); INA (night)

Armor Penetration: INA

Muzzle Velocity: m/s840

Protection

Armor (turret front): Against 7.62-mm ball

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: Available

Survivability Equipment: V-shaped hull available

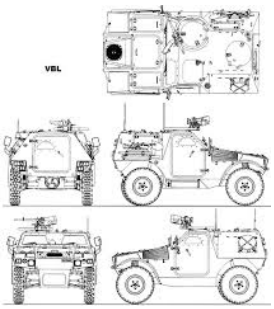
Notes:

The Cadillac Gage Commando, frequently denoted as the M706 in US military service, is an American armored car designed to be amphibious. It was engineered by Cadillac Gage specifically for the United States Military Police Corps during the Vietnam War as an armed convoy escort vehicle. The Commando was one of the first vehicles to combine the traditionally separate roles of an armored personnel carrier and a conventional armored car, much like the Soviet BTR-40. Its notable height, amphibious capability, and waterproofed engine allowed American crews to fight effectively in the jungles of Vietnam by observing their

opponents over thick vegetation and fording the country's deep rivers. The Commando was eventually produced in three distinct marks: the V-100, V-150, and V-200, all of which were modified for a number of diverse battlefield roles. An unlicensed variant of the Commando series, the Bravia Chaimite, was also manufactured in Portugal. After the American military disengagement from Vietnam, the Commando series was gradually retired from active US service. It was superseded in the Military Police Corps by the derivative M1117 Armored Security Vehicle during the 1990s. The V-100 series of vehicles was developed in the early 1960s by the Terra-Space division of the Cadillac Gage company of Warren, Michigan. By 1962 a patent was filed and received by Terra-Space for a vehicle then only known as the Commando. The first prototype emerged in 1963, and the production variants entered service in 1964. The vehicle is equipped with four-wheel drive and uses axles similar to the ones used in the M34 series of trucks. The engine is a gasoline-powered 360-cubic-inch Chrysler V8, same as in the early gas models of the M113 armored personnel carriers. Its 5-speed manual transmission allows it to traverse relatively rough terrain. The M706 has a road speed of 62 mph (100 km/h), and can travel across water at 3 mph (4.8 km/h). A Commando's armor consists of high hardness alloy steel called Cadaloy, which protects against projectiles up to 7.62×51mm. Partly because of its armor, the M706 has an unloaded mass of over 7 tons. As a result, a common problem with the vehicle is rear axle failure caused by the extreme weight. However, because the armor also provides the monocoque structural framework, it can be lighter than a soft vehicle to which armor has been added, and the angle of the armor also helps protect against hits and mine blasts. The V-100 was available in turret and open-top models. Factory prototype turret options included the T-60, T-70, and T-90. The T-60 featured a combination of either two .50 caliber machine guns, two .30 caliber machine guns, or one of each, and had manual traverse. The specific .30 caliber machine gun options were extremely varied, with from factory configurations including the M1919A4E1, M37, M73, M219, and MG42. Later the M60 and FN MAG were also added to the list of options. The Cadillac Gage company also intended to use the solenoid trigger equipped fixed machine gun version of the Stoner 63 weapon system, but this was dropped after tests showed the smaller caliber cartridge to be unsuited to this role. The T-90 featured a single 20 mm cannon with power traverse. The T-70, developed for police use, featured 4 tear gas launchers, vision blocks all around the turret for 360-degree vision, and no other weapons. The T-70 and T-90 were not put into mass production with a modified T-60, with the guns mounted together in the center, instead of on the outer edges, becoming the standard. A variant of this turret featuring the 7.62 mm General Electric Minigun was also developed. In addition an open-topped variant with a central parapet was developed. The intended usage of this variant was to be a mortar portee, but a total of five machine gun mounts could also be fitted. There were 2 in front, one in the rear all three M2 Browning or Mk 19 capable and one folding pintle point on each side capable of mounting any .30 caliber machine gun such as the M1919 Browning machine gun, M60 or any other machine gun of that class. An enclosed raised superstructure "pod" was also developed for converting the V-100 into either a command vehicle or for police use. The variants for police work featured special elongated firing ports for better angles of fire for tear gas grenade launchers. Relatively large-gunned variants of the V-100 began appearing in 1964, when Cadillac Gage marketed the Commando against the Alvis Saladin and Panhard AML-90 for a Royal Saudi Army requirement specifying a wheeled armoured vehicle equipped with a large semi-automatic cannon. A number of V-150s were later successfully tested and offered with a Mecar low-pressure 90mm smoothbore gun. With the new turret and gun, the V-150 was manned by a crew of three, although it retained enough space for eight additional passengers if no additional shell racks were added. At maximum capacity its hull could store up to thirty-nine rounds of 90mm ammunition and still seat four additional passengers. Subsequent V-150 models incorporated a slightly larger turret armed with a much more powerful Cockerill Mk.III 90mm gun, the same as that carried by the EE-9 Cascavel. A third fire support option involved the retrofitting of the Commando chassis with the complete turret and 76mm L23A1 gun of the FV101 Scorpion light tank.

Panhard VBL French 4x4 Light Armored Car





Tiers:



Variants:

- **VBL AT4CS:** A54CS 84-mm ATGM carrier with range only to 250 m with ring-mounted 7.62-mm machine gun
- **VBL SOURCE:** Upgraded optics
- **VBL Information:** Improved target designation
- **VAP Deep Penetration Vehicle:** Long wheel-base for deep reconnaissance missions
- **ULTRAV M11:** Stretched for NBC detection
- **Wasp Milan ER:** Remote weapon station with a 1-tube ATGM launcher & 7.62-mm machine gun
- **VBL Canon:** 20-mm remote turret
- **VBL Ingwe (South Africa):** Armed Long Range Reconnaissance Turret with 4 Ingwe ATGM launchers
- **MPCV (Multi-purpose Combat Vehicle):** VBR chassis with 4 rail missile launcher turret with 8 missiles & 12.7-mm machine gun
- **VBL Tourelle Fermee:** Remote turret that can fire a 12.7-mm MG, 7.62-mm MG, or 40-mm AGL
- **VBR:** Stretch variant can carry 5 soldiers; remote weapon station with M2HB MG & smoke grenade launchers
- **VBL Eryx:** Short-range (600 m) AT carrier with secondary 7.62-mm machine gun
- **VB2L Poste de Commandement:** Command version with extra radios, map board, & 7.62-mm MG for self-protection
- **VBL TOW (Greece):** Single tube with 4 rounds with range to 3,750 m
- **VBL Milan:** 1 Milan firing unit with 6 missiles with range to 2 km
- **VBL Samantha:** Griffon surveillance radar to designate SAM missile & AA artillery targets
- **VBL Anti-Tank:** Equipped with the HOT or TOW turret, but also can be integrated with Kornet or Ingwe missile systems
- **VBL Albi:** Fires Mistral/Mistral 2 SAMs
- **VBL with PL127 Turret:** 12.7-mm MG or 40-mm AGL

System

Alternative Designation: The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL
Description: 4 X 4 armored vehicle carrier serves in a variety of roles. Some variants can carry more than the crew.
Proliferation: France, Abu Dhabi, United Arab Emirates, Kuwait, Russia
Crew : ea3.0

↳*Dimensions*

Height, Overall : m1.70 (2.14 to top of MG)
Length, Chassis Overall : m3.7
Width, Overall : m2.02
Weight: 3.5 to 4 tonnes

Automotive

Engine Name: XD 3T
Engine Type: Peugeot liquid-cooled, turbo- charged, in-line, 4-cylinder diesel
Fording Depth : mAmphibious
Range, Cruising : km600 (max fuel variant to 800, 1000 with external tanks
Speed, Maximum Road : km/h95.0
Speed , Average Cross-Country: km/hINA
Speed , Maximum Off-Road: km/hINA

Main Weapon System

Note: Depends on the version

↳*System*

Name: AA-52 machine gun
Type: General-purpose machine gun
Caliber: 7.5mm or 7.62mm
Cartridge: 7.5×54mm French 7.62×51mm NATO
Action: Lever-delayed blowback
Rate of Fire: rds/min900
Muzzle Velocity: m/s830
Maximum Effective Firing Range: m600
Effective Firing Range: m3,200
Feed System: 50-round non-disintegrating belt
Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳*Ammunition*

Type:
Caliber: 7.5mm or 7.62mm
Cartridge: 7.5×54mm French 7.62×51mm NATO

Anti-Tank Weapon System

Name: ERYX

Type: short-range portable SACLOS-based wire-guided anti-tank missile (ATGM)

Manufacturer: MBDA, MKEK (under license)

Produced: 1993

Length: m0.905

Diameter: m0.136

Warhead Type: Tandem HEAT

Warhead Weight: kg3.8 kg Tandem HEAT

Weight, Total: 13.0 kg missile and container; firing post 4.5 kg

Penetration: 900 mm RHA behind reactive armour, or 2.5 m through concrete)

Operational Range: 50–600 m

Speed: 18 m/s (65 km/h) at launch to 245 m/s (880 km/h) at 600 m

Guidance System: SACLOS wire

Launch Platform: Individual, Vehicle

Protection

Armor: STANAG level 1 (protection against 7.62×51 NATO rounds and shrapnel)

Active Protection System: No

Armor, Applique : mmNo

Armor, Explosive Reactive : mmNo

Armor, Turret Front : mm5-11.5

NBC Protection: Collective

Self-Entrenching Blade: No

Smoke Equipment: Yes

Survivability Equipment: Increased mine protection, Kevlar blankets

Notes:

The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL, is a French wheeled 4x4 all-terrain vehicle built by Panhard. The vehicle is offered in various configurations, and was designed to combine the agility of the Peugeot VLTT liaison vehicle with adequate protection against small arms fire, artillery fragments, mines and NBC weapons. Produced between 1985 and 2010, the vehicle has been used by the French Army and other European, African and Central American armies in various conflicts since the 1980s. The French VBL programme started in 1978. The French Army was looking for a light reconnaissance vehicle, intended to work with the AMX-10 RC, the Hotchkiss M201 being obsolete when compared with the Soviet BRDM-2s. The new vehicle needed to be armed with a single machine gun for reconnaissance (recce) or with the MILAN missile for anti-tank combat, while being protected from NBC hazards and small arms fire. Both Renault and Panhard proposed a prototype, the trials beginning in 1982. Before its selection by the French armed forces in 1985, the Panhard model was ordered by the Mexican Army in 1984. In 1985, a pre production of 15 vehicles for the French Army was launched while the VBL started its active operational service in the French Army in 1990. The French Army ordered 569 VBLs in 1990, 330 between 1994 and 1997, and 700 VB2L (lengthened variant) before 2004. The VBL, sold abroad as the ULTRAV M-11 has been produced at Marolles-en-Hurepoix, around 10 vehicles being produced each month in 2004. The 1,500th VBL was produced in 2001 and the last VBL of the 2,600 VBLs left the plant in 2010. The VBL has two compartments: a motor bay, placed forward to protect the second compartment, which is for the crew. Its compact internal dimensions led to the design of a lengthened version of the VBL. The crew of the VBL is protected against NBC weapons. The recce versions have two crew members while the anti-tank versions have a crew of three. The French Army version of the VBL is equipped with a Peugeot XD3T turbo-diesel engine. This engine is used on many civilian cars, such as the Peugeot 505,

Peugeot 605 and Talbot Tagora and the VBL used many other standard civilian components. Its 95 hp (71 kW) power and 29.5 hp/t (22.0 kW/t) power ratio enable the VBL to speed at 95 km/h (59 mph). It has a fuel consumption of 16 litres (3.5 imp gal; 4.2 US gal) per 100 km (62 mi). Its range of 600 km (370 mi) can be extended to 800 km (500 mi) by two external fuel tanks. Designed to be lighter than 3.5 t (3.4 long tons; 3.9 short tons), the mass of the VBL has increased to 4 t (3.9 long tons; 4.4 short tons). The VBL is fully amphibious and drives at 5.4 km/h (3.4 mph) in water; it is also air transportable by C-130, C-160, Il-76 and A400M. It can be transported underslung by larger helicopters, such as the AS332 Super Puma, and may also be para-dropped.

Nimr II Emirati 4x4 Light Armored Vehicle





Tiers:

1 2 3 4

Variants:

- **Note:** NIMR II vehicles serve as cargo/troop carrier, automatic weapon platform, ambulance, missile carrier, communication/shelter carriers amongst many other roles.
- **NIMRAD (Nimr Air Defense):** NIMRAD (Nimr Air Defense) is an air defense vehicle, based on the Nimr 4x4 armored chassis. The Bin Jabr Group teamed up with MBDA of France and Rheinmetall Defense Electronics of Germany to develop this air defense vehicle. The NIMRAR has a small turret and is armed with four Mistral 2 man-portable surface-to-air missiles. The NIMRAD was first demonstrated in 2007.
- **NIMRAT (Nimr Anti-Tank):** NIMRAT (Nimr Anti-Tank) is an anti-tank vehicle, based on the Nimr 4x4 armored chassis. It was developed to meet Iraqi Army requirement. As well as the NIMRAD, this anti-tank vehicle was also jointly developed by Bin Jabr Group, MBDA and Rheinmetall Defense Electronics. It has a similar turret as the NIMRAD air defense vehicle, but instead is armed with MILAN and MILAN ER anti-tank guided missiles. The NIMRAT can engage armored vehicles, tanks, buildings and field fortifications. Developers claim that within 12 hours a standard NIMRAD can be converted to NIMRAT, or vice versa.
- **6x6 armored personnel carrier:** 6x6 armored personnel carrier. It has a 2-doors for the driver and co-driver, as well as rear door for entry and exit. There are some observation windows, as well as associated firing ports provided for the troops to fire their individual weapons. It was replaced in production by an improved Nimr Hafeet vehicle with 6x6 configuration.

System

Alternative Designation: Nimr II
Description: The Nimr II (Arabic for tiger II) is an armored version of the Nimr tactical vehicle.
Crew: ea1
Passengers: ea3/7
Airlift Capable: Yes, The Nimr can be airlifted by a C-130 Hercules military transport aircraft. The 4x4 version can be also airlifted underslung by a CH-53 helicopter.
Note #1: The Nimr II can also tow trailers and light artillery pieces.

↳*Dimensions*

Length,: m5.19
Width: m2.3
Height: m2.21
Weight: tons6.7
Payload Capacity: tons2.5

Automotive

Engine Name: MTU

Engine Type: Diesel

Engine Power: hp350

Maximum Road Speed: km/h135

Maximum Range: km800

Gradient: %60

Side Slope: %40

Vertical Step: m0.5

Trench: m0.5

Fording: m1.2

Note: Vehicle has a permanent all-wheel drive. The Nimr II comes as standard with a central tyre inflation system. It improves mobility over difficult terrain, such as sand. It is also fitted as standard with run-flat tyres. This protected vehicle is fitted with a front-mounted winch.

Main Weapon System

Note: This armored vehicle has a roof hatch and can be fitted with a roof-mounted 7.62 mm or 12.7 mm machine gun machine gun, or 40-mm grenade launcher. Sometimes the Nimr II is even fitted with a heavy machine gun. Depending on customer requirements this vehicle can be fitted with remotely controlled weapon station. Some vehicles are fitted with smoke grenade dischargers.

↳*System*

Name: Caracal Assault Rifle 817

Alternative Designation: CAR 817

Date of Introduction: 2016

Country: United Arab Emirates

Manufactuer: Caracal International company

Caliber: mm7.62

Length, Stock Extended: mm884

Length, Stock Retracted: mm802

Barrel Length: mm406

Weight, Without Magazine: kg3.3

Muzzle Velocity: m/s750

Cyclic Rate of Fire: rds/min650-750

Practical Rate of Fire: rds/min30-90

Magazine Capacity: 10, 20, 25 rounds

Range of Effective Fire: m600

Sight: Iron

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62x51 mm

Protection

Armor: The Nimr II offers protection for the passengers against small arms fire and some level of protection against mine blasts and improvised explosive devices. The basic armor provides ballistic protection against 7.62x51 mm NATO ball rounds. Mine protection is against 6 kg of TNT under any wheels.
Applique Armor: Available, Protection level can be tailored to suit the threat by installing add-on composite armor. With add-on armor kit fitted maximum level of ballistic protection is against 7.62x51 mm NATO armor-piercing rounds. Maximum level of blast protection is against 6 kg of TNT anywhere under the hull. So with maximum armor the Nimr II is better protected than the US M1114 up armored HMMWV. An NBC protection system was proposed as an option.
Explosive Reactive Armor: No
Active Protection System: INA
NBC Protection: Optional
Smoke Equipment: Available

Notes:

The NIMR II High Mobility Tactical Vehicle (HMTV) was developed and manufactured by a joint venture between Jordan's King Abdullah II Design and Development Bureau (KADDB) and Bin Jabr Enterprises of the United Arab Emirates (UAE). The original vehicles have been designed to meet the United Arab Emirates Armed Forces stringent requirements and are in series production. There are a number of the NIMR HMTV in production utilising both 4x4 and 6x6 technologies. These high mobility robust vehicles have been designed to out perform other vehicles in their class providing greater power and load-carrying capability whilst being reliable and multi-mission capable. The Nimr II vehicle has been designed to carry out military, police and peacekeeping missions in the Middle East area thanks to a cooling system that allows the vehicle to withstand the desert climate with temperatures ranging from -25 to 55 Celsius. In February 2099, Libyan government has signed an agreement with Bin Jabr Group for 120 NIMRs. Bin Jabr Group will manufacture and deliver 120 NIMR 4x4 multi mission combat platforms to the Libyan Armed Forces, according to local news. A Pro-Gadhafi Libyan Army NIMR II Armored Vehicle was seen in Zawiyah, March 17, 2011, during news of the national Libyan television, which confirms the delivery of NIMR II to the Libyan armed forces. This military vehicle is available both with 4x4 and 6x6 configurations.

→→Tracked Light Armored Vehicles

Sayyad Iranian Multi-Purpose Armored Vehicle




Tiers:



System

Alternative Designation: Sayyad, Sayyad AFV
Type: Quick Reaction Armored Vehicle
Family: Sayyad
Manufacturer: Defense Industries Organization
Crew: ea3
Note #1: The Sayyad AFV is an Iranian light, multi-purpose, tracked armored vehicle, sometimes described as a "quick reaction tank"
Note #2: There is very little unclassified information about the Sayyad

Dimensions

Length: m4.9
Width: m2.2
Height: m2.1
Weight, Combat: INA
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: hpINA
Cruising Range: INA
Speed, Maximum Road: km/hINA
Speed, Average Cross: INA
Speed Maximum Swim: INA

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Note: The overall design is similar to that of the British FV102 Striker, and it is often mistaken for the Tosan tank.

Communications

Primary: INA

Main Gun

Note #1: There are two variants of the Sayyad. One with either a single or a double Toophan anti-tank missile launcher, with six reload missiles in storage baskets. The other is a multiple rocket launcher variant with two 23 tube launchers for 77mm rockets.

Note#2: The Toophan comes in at least 11 variants, many of which are poorly documented, including variants with laser guidance, thermobaric warheads, and tandem-warheads with increased penetration

↳*System (Option 1) - Single/Double Toophan Anti-Tank Missile Launcher*

Name: Single Toophan

Type: Single Toophan Anti-Tank Missile Launcher

Numbe of Tubes: Single: 1, Double: 2

Basic Load: ea6

Maximum Firing Range: m3,500–3,750 m

Guidance System: Wire-guidance. Laser guidance for some variants

↳*System (Option 2) - Multiple Toophan Anti-Tank Missile Launcher*

Name: Double Toophan

Type: Double Toophan Anti-Tank Missile Launcher

Number of Tubes: 2 x 23 Tubes, 46 Tubes in Total

Basic Load: ea46

Maximum Firing Range: m3,500–3,750

Guidance System: Wire-guidance. Laser guidance for some variants

↳*Ammunition*

Name: Toophan 1

Type: 77mm Anti-Tank Missile

Caliber: mm77

Length: cm116

Weight: kg18.5

Muzzle Velocity: m/s310

Guidance System: Wire-guidance. Laser guidance for some variants

Maximum Effective Range: m3,500-3,750

Penetration: mm550

Warhead Types: HE, HEAT, or thermobaric

Note: oophan missiles can often be identified by their turquoise bands installed by Iran's Defense Industries Organization[36] or by a faint black band on the rear end of the launcher.

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Protection

Hull Armor: Steel, protection from small arms fire and projectile splinters

Turret Armor: Steel, protection from small arms fire and projectile splinters

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Sayyad AFV is an Iranian light, multi-purpose, tracked armored vehicle, sometimes described as a "quick reaction tank". The overall design is similar to that of the British FV102 Striker, and it is often mistaken for the Tosan tank. However, there are some major differences between the Sayyad and the Striker. The Sayyad is shorter in length than the Striker, and it has one less road wheel. The hull is slightly redesigned and storage baskets have also been added. There are two variants of the Sayyad. One with either a single or a double Toophan anti-tank missile launcher, with six reload missiles in storage baskets. The other is a multiple rocket launcher variant with two 23 tube launchers for 77mm rockets. The vehicle is intended to be used to provide a fast platform for anti-tank missiles and small artillery rockets. It entered service in 2010.

→Heavy Armored Vehicles

→→Tracked Heavy Armored Vehicles

BMPT Terminator Russian Heavy Fire Support Combat Vehicle





Tiers:



Variants:

- **BMPT-72 (Terminator-2):** BMPT on a T-72 chassis. The BMPT-72 is a little smaller than the BMPT and weights 6 tonnes less. The crew is 3, 2 less than its parent. The BMPT-72 can have one of two different engines, either the 840 horsepower V-84MS or the 1,000 horsepower V-92S2. The -72 version has a 50km shorter range at 500km and does not have the grenade launchers. This support combat vehicle was first revealed at the Russian Arms Expo (RAE) at Nizhny Tagil, Russia in 2013. The Terminator 2 is being sold as an armor upgrade package, rather than an actual tank, with two engines available. The two engines are the V-84MS (840 hp, 2000 rpm, V12, 4-stroke, multi-fuel, liquid cooling, and gear driven centrifugal type supercharger) and the V-92S2 (1000 hp, 2000 rpm, V12, 4-stroke, multi-fuel, liquid cooling, and turbocharger). These upgrades removed the two frontal 30mm grenade launchers; this reduced the crew from five to three, but also lightened the load from 48 tonnes to 44 tonnes. The armament of the BMPT-72 Terminator 2 is the same (except for the removal of the two 30mm grenade launchers), however, the armament is better protected and the structural support of the four ATGMs is enhanced and positioned horizontally instead of vertically. The FCS has also gotten an upgrade with a new multi-channel gunner's sight that is equipped with a thermal channel, night vision, laser range finder, laser guidance system for missiles, and independent 2-plane stabilization of field of view with a sighting range of 5000 meters. The BMPT-72 received a new digital ballistic computer with weather and topographical support and the armament is stabilized on two axes with electromechanical traversing and elevating drives. Lastly, improved NBC protection is provided for the crew.
- **BMPT-72 (Terminator-3):** Will be based on the Armata Universal Combat Platform and ave an automatic gun turret and in the future may have integrated air defense systems and my be fully unmanned.

System

Alternative Designation: NA
Proliferation: Algeria, Kazakhstan, and Russian Federation
Crew: ea5
Passenger Capacity: NA

Dimensions

Length: m7.2
Width: m3.8
Height: m3.44

Weight, Combat: tonnes48

Automotive

Engine Name: V-92S2

Engine Type: V12 multi-fuel

Engine Power: hp1,000

Horse Power / Tonne: hp/t20

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: km/hNA

Fording Depth: m1.2 meters without prep, 1.8 meters with

Obstacle Height Clearance: .85m at 30 degrees

Can Clear Trenches (Width): m2.8

Primary Weapon System

↳*System*

Name: 9M120 Ataka-T

Type: ATGM

Max Rate of Fire: INA

Range Finder Type: Laser

Maximum Elevation: degrees+25

Maximum Depression: degrees-5

Guidance: Laser riding SACLOS

↳*Ammunition*

Caliber: mm130

Velocity: m/s550

Basic Load: rounds4

Max Range: km6

Min Range: kmINA

Armor Penetration: 950mm of RHA behind ERA

Warhead: Tandem

Secondary Weapon System

↳*System*

Name: 2A42

Type: Twin 30mm Cannon

Max Rate of Fire: 600 rounds per minute combined

Sustain Rate of Fire: Gunner can select 200rpm or 300rpm

Range Finder Type: Laser

Maximum Elevation: degrees+45

Maximum Depression: degrees-5

Maximum Effective Range: m4,000

↳***Ammunition***

Type: One cannon fires armor piercing rounds while the other fires anti-personnel rounds. Rounds available are HE-T, APDS, HE-Frag, and AP-T

Caliber: mm30

Muzzle Velocity: m/s960

Basic Load: rounds850

Additional Weapon System

↳***System***

Name: PKTM

Type: Machine Gun

Max Rate of Fire: rpm800

Sustain Rate of Fire: rpm150

Range Finder Type: Laser

↳***Ammunition***

Type: Machine Gun

Caliber: mm7.62

Muzzle Velocity: m/s850

Basic Load: rounds2,000

Effective Range: m1,500

Armor Penetration: INA

Auxiliary Weapon System

↳***System***

Name: AG-17D or AGS-30 (one mounted on each side of the BMPT)

Type: Grenade Launcher

Max Rate of Fire: rpm400

Sustain Rate of Fire: INA

↳***Ammunition***

Type: Anti-personnel

Caliber: mm30

Muzzle Velocity: m/s185

Basic Load: rounds600 total (300 for each launcher)

Effective Range: m1,700

Armor Penetration: NA

Fire Control

Name: VIAM.461112.001

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: km5

Range, Thermal Sight: km7

Note:: The commander's B07-K1 panoramic sight is located at the top of the BMPT and has a 360° field of view. This panoramic sight has optical, low-level laser rangefinder and television channels. The B07-K2 standard gunner's sight consists of optical and thermal channels and a laser rangefinder. The vehicle also has hunter-killer capabilities with its separate commander's panoramic sight and gunner's sight which can detect both ground and aerial targets. The gunner is able to use the commander's sight to engage targets if his own sight is disabled or destroyed. The commander of the vehicle also has the ability to override the command to take control of the turret and guns from the gunner. The navigation system used by the BMPT is a combined GPS/GLONASS module.

Protection

Hull Armor: Has additional armor without adding weight because turret is lightly armored

Turret Armor: Unmanned

Applique Armor: Yes

Explosive Reactive Armor: Yes, Relikt

Active Protection System: No

Mine Clearing: Can be added

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes

Notes:

The BMPT "Terminator" is a post-Cold war Armored Fighting Vehicle (AFV), designed and manufactured by the Russian company Uralvagonzavod. This vehicle was designed for supporting tanks and other AFVs in urban areas. The BMPT is

unofficially named the "Terminator" by the manufacturers. It is heavily armed and armored to survive in urban combat. This AFV is armed with Ataka-T Guided Weapon System armed with four 9M120 Ataka missile launchers, two 30 mm 2A42 auto-cannons, two AG-17D grenade launchers, and one coaxial 7.62 mm PKTM machine gun. The BMPT is built on the chassis of theT-72 main battle tank which is used in large numbers by the Russian Army and has been manufactured under license by many other countries. The BMPT was designed based on combat experience gained during the Soviet–Afghan War and the First Chechen War. Multiple prototypes of a tank support combat vehicle were created prior to the design of the current BMPT. The Object 199 "Ramka" was the prototype later to be known as the modern BMPT with the official producer being Uralvagonzavod. As of late 2013, the only operator of the BMPT was Kazakhstan. A small number were delivered to the Russian Ground Forces for evaluation beginning in 2005. The Russian Defense Ministry finally ordered the BMPT in August 2017. Deliveries of more than 10 vehicles began in early 2018. The version, unofficially referred to as the "Terminator-3," incorporates the chassis, hulls, and components of the T-90A tank. A small number were delivered to the Russian Ground Forces for evaluation beginning in 2005. The Russian Defence Ministry finally ordered the BMPT in August 2017.[4] Deliveries of more than 10 vehicles were begun in early 2018. The version, unofficially referred to as the "Terminator-3," incorporates the chassis, hulls, and components of the T-90A tank.

BMPT-72 Terminator 2 Russian Tank Support Armored Fighting Vehicle






Tiers:



Variants:

- **BMPT "Terminator":** The BMPT "Terminator" (Tank Support Fighting Vehicle)[2] is an armored fighting vehicle (AFV), designed and manufactured by the Russian company Uralvagonzavod. This vehicle was designed for supporting tanks and other AFVs in urban areas. The BMPT is unofficially named the "Terminator" by the manufacturers. It is heavily armed and armored to survive in urban combat. This AFV is armed with Ataka-T Guided Weapon System armed with four 9M120 Ataka missile launchers, two 30 mm 2A42 autocannons, two AG-17D grenade launchers, and one coaxial 7.62 mm PKTM machine gun.
- **BMPT-72 Terminator 3:** BMPT-72 Terminator 3 will be based on Armata Universal Combat Platform and have an automatic gun turret and in the future may have integrated air defense systems and may be fully unmanned.

System

Alternative Designation: BMPT-72 (Terminator 2)
Type: Tank Support Armoured Fighting Vehicle
Manufacturer: UralVagonZavod Corporation
Crew: eaThree (commander, gunner, driver)
Chassis: The multipurpose tank support combat vehicle BMPT-72 is built on the chassis of T-72 battle tank.

Dimensions

Length: 7.2 m
Width: 3.59 m
Height: INA
Weight, Combat: 44 tons
Ground Pressure: INA

Automotive

Engine Name: The BMPT-72 (Terminator 2) can be motorized with two types of engine, the original 850 hp B84MC or the new 1000 hp.
Engine Type: B92C2 power plants, both are 12 cylinder V type multi fuel, liquid cooled Diesel engines. The B92C2 is a turbo supercharger which offers higher power and efficiency.
Engine Power: hp800-1,000

Transmission: hydraulically assisted transmission with 7 forward and 1 reverse gears.

Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Suspension: The torsion bar suspension each side consists of six roadwheels with the idler at the front, drive sprocket at the rear and three return rollers supporting the inside of the track only. Shock-absorbers are fitted at the first, second and sixth roadwheel stations. The upper part of the suspension is protected by armour plates at the front and slat armour at the rear

Vertical Step: 850 mm

Trench: 2.8 m

Fording Depth: fording depth of 1.2m without preparation (1.8 m after 15 min of preparation).

Note: The BMPT-72 uses also an auxiliary power unit to extend mission endurance and running all systems on silent watch.

Main Gun

Turret: The BMPT-72 or Terminator 2 is fitted with a new unmanned redesigned fully stabilized electromechanical turret, with lower profile and better protection.

Turret Elevation: The turret can be rotated on 360 ° with elevation from -5° to +25° for the anti-tank missile and from -5° to +45° for the guns and coaxial machine gun.

Turret Traverse: 360 °

↳*System*

Name: Shipunov 2A42

Type: Autocannon

Caliber: 30 mm

Length: 3.027 m

Barrel Length: 2,416 mm

Weight: 115 kg

Barrels: 1

Action: Gas-operated

Rate of Fire: 200 to 300 rds/min (low) 550-800 rds/min (high)

Muzzle Velocity: 960 metres per second

Maximum Firing Range: 4,000 metres (4,400 yd) (HEI)

Effective Firing Range: 2,000 metres (2,200 yd) (AP-T)

Feed System: Twin Feed

↳*Ammunition*

Type: Rifle

Caliber: mm30

Cartridge: 30 × 165mm

Basic Load: 850 Rounds

Note: The guns can fire a wide range of ammunitions as APERS-T (Anti-Personnel ammunitions), HEF-I (High-explosive Fragmentation Incendiary), AP-T (Armour Piercing)., and KE (Kinetic Energy).

Coaxial Weapon System

↳*System*

Name: PKMT

Type: General-Purpose Machine Gun

Caliber: mm7.62

Length: 1,192 mm

Barrel Length: 605 mm

Weight: 10.5 kg

Action: Gas-operated, open bolt

Rate of Fire: 700–800 rounds/min

Muzzle Velocity: 825 m/s

Maximum Firing Range: 4,000 m

Effective Firing Range: 1,500 m

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 2,100 Rounds

Anti-Tank Guided Missile (ATGM) System

↳*System*

Name: Ataka-T Launcher

Type: Anti-Tank Guided Missile Launcher

Quantity: 2 x Ataka-T launchers

Location: Two anti-tank guided missile Ataka-T launcher units are mounted to each side of the turret.

↳*Ammunition*

Name: 9M1201 Missile

Type: Anti-Tank Guided Missile

Length: INA

Diameter: INA

Weight: INA

Warheads: The missile 9M1201 can be equipped with two types of warheads, hollow-charge and high-explosive concrete-piercing.

Basic Load: 4 x 9M1201 Missile

Maximum Range: 6,000 m

Fire Control

Name: INA

Computerized FCS: Yes, Advanced automatic fire control system. The BMPT-72 or Terminator 2 is fitted with advanced automatic fire control system which can be used for terrain observation, target location and detection on the move at day and night

Day and Night Vision: Yes

Panoramic Sight: Yes

Main Gun Stabilization: INA

Thermal Camera: Yes

Laser Range Finder: Yes

Ballistic Computer: Yes

Note #1: The commander and the gunner of the BMPT-72 are equipped with control panel and LCD screen. The gunner is equipped with multichannel device with sighting and thermal channels, laser range finder, GM laser control channel and independent FoV (Field of View) stabilized in azimuth and elevation. The commander panoramic sight is fitted with video and thermal channels, laser range finder and independent FoV stabilized in azimuth and elevation. Gunner and commander are able to detect a target at a distance of 5,000 m with sighting channel and 3,500 m with the thermal channel.

Note #2: The BMPT-72 can be fitted with a snorkel to cross a river with a depth of 5 m maximum.

Protection

Hull Armor: Basic steel armour, explosive reactive armour ERA at front and glacis, slat armour at the rear.

Turret Armor: Compared with the BMPT predecessor, the BMPT-72 has an improved fire control system and better turret weapon station protection. The turret protection includes armored shields for the missiles, protecting the missiles from splinters and firing of small arms.

Applique Armor: The rear parts of the turret and the chassis are fitted with slat armour to increase protection against anti-tank rocket-propelled grenade (RPG) attacks. The anti-tank launch units include armored shields for the missiles, protecting the missiles from splinters and small arms fire.

Explosive Reactive Armor: The BMPT-72 hull and turret are made of steel armour and integrates latest protection systems with explosive reactive armour (ERA) to the front of the turret, a detachable ERA module on the glacis plate and applique ERA on the sides of the hull and turret.

Active Protection System: INA

Mine Clearing: INA

Dozer Blade: A dozer blade mounted under the nose of the tank is used for clearing obstacles and preparing fire positions and, like most other Russian tanks. The dozer blade can be brought into the operating position in 1 or 2 minutes and enables the BMTT-72 tank to prepare its own defilade position without calling on engineer support.

NBC Protection: Yes

Smoke Equipment: Six smoke-grenade launchers are fitted on the turret.

Notes:

Boyevaya Mashina Podderzhki Tankov-72 (BMPT-72), also known as Terminator 2, is a new version of the BMPT tank support combat vehicle developed by UralVagonZavod Corporation, Russia. The BMPT-72 was launched at the Russian Arms Expo (RAE) exhibition in Nizhny Tagil, Russia, in September 2013. The new vehicle, fitted with guided weapon system, is capable of destroying infantry vehicles, enemy tanks and other armoured objects. The multipurpose tank support combat vehicle BMPT-72 is built on the chassis of T-72 battle tank. The BMPT-72 can survive in different climatic zones, including urban areas, and in any light conditions. The new variant follows the earlier BMPT tank support combat vehicle developed by Uralvagonzavod and Ural Transport Machine Building Design Bureau. The crew size of the BMPT-72 has been reduced to three, by removing two grenade launching positions aboard the BMPT. The driver sits in the centre of the forward hull, while the gunner and commander positions are at the rear. The new vehicle offers improved gun power, protection and command and control system over the BMPT. The combat weight is also reduced from 47t to 44t. The length and width of the vehicle are 7.2m and 3.59m respectively. The BMPT-72 infantry fire support vehicle is armed with two 30mm 2A42 automatic cannons that can load ammunition of 850 rounds, four laser-guided Ataka-T anti-tank missile systems and one PKTM coaxial machine gun with remote reloading mechanism. The tank features sighting and thermal channels, a laser range finder, integrated laser control channel for missile guidance and independent stabilisation of field of vision in azimuth and elevation planes, to enable the multispectral gunner’s sight. The commander is provided with panoramic sight and the gunner’s position is fitted with day periscopes. The sighting channel allows the gunner and commander to detect targets at 5,000m distance during day time. The BMPT-72 is provided with an increased fire control system for terrain observation and target location in all weather and any light conditions. The vehicle is equipped with a ballistic computer with a set of weather and topographical sending units. The vehicle also includes a two-axis stabilised weapon unit with electromechanical traversing and elevating drives.

→→Wheeled Heavy Armored Vehicles

Bushmaster Australian 4x4 Protected Mobility Vehicle





Tiers:



Variants:

- **Planned Variants:** ADI (now Thales Australia) planned at least six variants. These included an armored ambulance; command vehicle; mortar carrier with internally mounted 81-mm or 120-mm weapon; fire support vehicle with 12.7-mm machine gun and 40-mm automatic grenade launcher; engineering vehicle; and firefighting vehicle.
- **Bushmaster ambulance:** This variant can transport two stretchered patients, or one stretchered and four seated patients at one time. They are equipped with the latest medical equipment and provide protection against blasts and ballistic threats.
- **Bushmaster EOD:** The Bushmaster explosive ordinance disposal (EOD) variant is fitted with a 27 ft 11 in (8.5 m) interrogator arm with a 225-degree arc of operation around the front of the vehicle. The arm can be installed onto any existing Bushmaster vehicle to modify it into an EOD variant. The two-piece articulated arm can include the following attachments: interrogation tool with clasp claw; work light; camera; detection equipment; and proximity detector. The vehicle can also be fitted with a roller clearance system that is hydraulically operated, steerable and easily attached and released. An EOD robot can also be stored internally .
- **Bushmaster combat support vehicle:** Thales Australia privately developed a prototype Bushmaster combat support vehicle in 2005. It was previously known as the Copperhead . This 4 x 4 vehicle features the Bushmaster cab at the front, with a flat-bed cargo area at the rear, which can carry up to 11,000 lb (5,000 kg) of cargo. The cargo area measures 101 sq ft (9.4 sq m). Upgradeable ballistic protection options are available for the crew cabin. The vehicle has a top speed of 60 mph (100 km/h) and a maximum range of 500 mi (800 km). It also offers high clearance for obstacles, tight turning circle and the ability to travel off-road in all conditions, according to the manufacturer. A dual-cab variant, offered for the British operational utility vehicle system (OUVS) program, featured a larger interior cabin with room for two crew and up to six passengers with four side-opening passenger doors and a flatbed area of 54 sq ft (5 sq m) and a 6,600-lb (3,000-kg) payload.
- **Bushmaster 6 x 6:** Thales Australia has conducted studies of a 6 x 6 version of the Bushmaster, which would have a gross vehicle weight of up to 25.6 tons.

System

Alternative Designation: Bushmaster

Type: Protected Mobility Vehicle

Crew: ea2 (commander, driver)

Passenger Capacity: 8 troops

Dimensions

Length, Overall: 6.60 m

Length, Hull: 7.09 m

Height: 2.65 m

Width: 2.50 m

Cabin Volume: 11.2 cubic m

Ground Clearance, Hull: 0.43 m

Ground Clearance, Axle Housings: 0.40 m

Wheel Track: 2.10 m

Wheel Base: 3.90 m

Weight, Unloaded: 12,500 kg

Weight, Combat: 15,000 kg

Weight, Payload: 2,500 kg

Automotive

Engine Name: 1 x Caterpillar 3126 ATAAC

Engine Type: 6-cylinder turbocharged air-to-air after-cooled diesel

Engine Power: 300 hp at 2,400 rpm with 25 percent torque rise

Transmission: ZF 7HP502 full automatic with front-end retarder for controlled slope descent

Tires: 395/85 R20 with bead locks or optional run-flat inserts

Inflation System: optional dual-channel with dash-mounted push button control, providing 4 settings highway, sand, mud/snow and emergency

Brakes: dual circuit Meritor air-operated disc brakes assisted by a hydraulic retarder

Suspension: AxleTech 4000 series coil spring with short-long-arm wishbone and double-acting hydraulic shock-absorbers, bump-stop rubbers

Axles: Arvin Meritor/Timoney 4000 series independent suspension axle system, 7,700-kg capacity with diff locks front, center and rear

Speed, Road: 100 km/h

Range: 800 km

Vertical Obstacle: 0.50 m

Fording: 1.20 m w/out preparation

Gradient: %60

Side Slope: %40

Approach Angle: deg40

Departure Angle: deg38

Turning Circle: 18.6 m

Fuel Capacity: 319 Liters

Main Gun

Note: Remote weapon station up to 12.7mm HMG or 40mm AGM launcher, or manned open turret up to 12.7mm HMG or 40mm AGM launcher

↳*System*

Name: M2 Browning
Type: Heavy Machine Gun
Caliber: 12.7 mm
Length: 1,654 mm
Barrel Length: 1,143 mm
Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)
Action: Short recoil-operated
Rate of Fire: 450–600 rounds/min
Muzzle Velocity: 890 m/s
Maximum Firing Range: 7,400 m
Effective Firing Range: 1,800 m
Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: .50 BMG (12.7×99mm NATO)
Basic Load: 1,200

Auxiliary Weapon System

Note: Manned swing mounts up to 7.62mm (one front and two rear)

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: INA
Thermal Sight Gunner: INA

Protection

Hull Armor: all-welded steel to withstand 5.56-mm and 7.62-mm ball ammunition
Turret Armor: INA
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: 8 x grenade launchers (bank of 4 on each side of vehicle hull)

Notes:

The Bushmaster Protected Mobility Vehicle or Infantry Mobility Vehicle is an Australian-built four-wheel drive armoured vehicle. The Bushmaster was primarily designed by the then government-owned Australian Defence Industries (ADI), and is currently produced by Thales Australia with a support contract provided by Oshkosh Truck following the acquisition of ADI. The Bushmaster is currently in service with the Australian Army, Royal Australian Air Force, Royal Netherlands Army, British Army, Japan Ground Self Defense Force, Fiji Infantry Regiment, Jamaica Defence Force and the New Zealand Army. The role of the Bushmaster is to provide protected mobility transport (or protected troop lift capability), with infantry dismounting from the vehicle before going into action. As the Bushmaster is only lightly armoured, the term Infantry Mobility Vehicle (IMV) was initially adopted to distinguish it from a heavier wheeled or tracked armoured personnel carrier, such as the ASLAV and M113 also in Australian service. Later the Bushmaster's designation was changed to Protected Mobility Vehicle (PMV). The Bushmaster is optimised for operations in northern Australia, and is capable of carrying up to 9 soldiers and their equipment, fuel and supplies for 3 days, depending on the type of variant. The vehicle is fitted with air conditioning and was once planned to have a cool water drinking system, but was omitted upon production due to cost constraints. After operational complaints the drinking water cooling system is being reconsidered for installation. It has a road cruise speed of 100 km/h and an operational range of 800 km. The Bushmaster is a mine protected vehicle and provides a high degree of protection against land mines, using its v-hull monocoque to deflect the blast away from the vehicle and its occupants. The vehicle's armour provides protection against small arms of up to 7.62 mm ball ammunition, 81mm mortar fragments, Claymore mines, and with additional applique armour, protection for armour-piercing ammunition of up to 7.62mm. The fuel and hydraulic tanks of the vehicle are located outside the crew compartment, while it also has an automatic fire suppression system. The troop carrier variant of the Bushmaster is fitted with one gun ring. The forward gun ring can be fitted with a 5.56 mm or 7.62 mm machine gun. The two rear hatches each have a mounting boss to allow the attachment of a swing mount capable of holding a 7.62 mm machine gun. The Bushmaster is air transportable by C-130 Hercules, C-17 Globemaster III and Mil Mi-26 aircraft. It is the first armoured vehicle to be designed and completely manufactured in Australia since the Sentinel tank during World War II.

Kamaz-53949 Typhoon-K Russian 4x4 Armored Mine-Resistant Ambush Protected (MRAP)






Tiers:



Variants:

- **Linza Armored Ambulance:** Armored Ambulance
- **Logistic Support Vessel:** INA
- **Command Post Vehicle:** INA

System

Alternative Designation: Kamaz-53949 Typhoon-K
Type: 4x4 Armoured Vehicle
Manufacturer: Remdiesel
Crew: ea2
Passenger Capacity: ea8
Payload Capacity: 2,000kg

Dimensions

Length: 6.7m
Width: 2.5m
Height: 2.8m
Curb Weight: 13,700kg
Ground Clearance: The ground clearance of the vehicle can be automatically adjusted in line with the speed, surface and person-specific driving style.

Automotive

Engine Name: Cummins 6ISBe 350 P-6

Engine Type: Diesel

Engine Power: The engine generates a maximum power of 350hp at a maximum torque of 1,090Nm.

Power-to-Weight Ratio: The power-to-weight ratio of the vehicle is 20.2hp/t.

Transmission: six-speed automatic transmission system.

Range: km1,000

Speed, Maximum Road: 100km/h

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Suspension: The Typhoon-K is equipped with a hydro-pneumatic independent suspension system with ride height adjustment according to the requirements of the users.

Central Tire Inflation System: Yes

Vertical Step: 0.6m

Trench: 0.5m

Fording: 1.5m without preparation

Main Weapon System

Note: The Kamaz-53949 is fitted with a stabilised remotely controlled weapon station (RCWS). The RCWS can be armed with medium-to-heavy machine guns, including a 7.62mm medium machine gun (MMG) or a 12.7mm / 14.5mm heavy machine gun (HMG).

↳*System*

Name: NSV

Type: Heavy Machine Gun

Caliber: 12.7

Length: 1,560 mm

Barrel Length: INA

Weight: 25 kg (55.12 lb) (gun only) 41 kg (90.39 lb) on tripod 11 kg (24.25 lb) (50-round belt)

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Muzzle Velocity: 845 m/s

Effective Firing Range: 1500 m vs. air (maximum) 2000 m vs. ground targets

Feed System: 50-round belt

Sights: Iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: 2,000 Rounds

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: No

Protection

Hull Armor: The vehicle protects the occupants from 14.5mm-calibre ammunition, armour-piercing rounds and incendiary rounds. It can withstand the impact of 8kg TNT explosion under the floor and 10kg TNT explosion under the wheels. The vehicle offers STANAG 4569 level III protection against anti-personnel and anti-tank mines, as well as improvised explosive devices (IEDs). The V-shaped hull reduces the blast impact by deflecting the kinetic objects away from the hull in the event of TNT device explosion anywhere under the bottom of the vehicle. The hull is hinged with sandwich armour, comprising conventional internal steel armour and new-generation external ceramic armour.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Kamaz-53949 Typhoon-K is a 4×4 mine-protected armoured vehicle manufactured by Remdiesel, a subsidiary of KAMAZ, to meet the requirements of armed forces and special units worldwide. The vehicle was recently displayed at the International Military-Technical Forum ARMY-2017 held in Moscow, Russia, in August. Russian state-owned arms exporter Rosoboronexport and Remdiesel signed an agreement to promote the vehicle in export markets across the North Africa, Middle East, Central and South East Asia, Latin America and Commonwealth of Independent States (CIS) regions. The Typhoon-K is primarily used to safely transport troops and military cargoes in mine-inflated zones. It can also be configured as a command post vehicle, ambulance and logistics support vehicle. Kamaz-53949 design The Typhoon-K is based on the common chassis utilised by the Kamaz family of all-wheel drive medium and heavy-duty vehicles. The vehicle also shares most of the components and assemblies with the other platforms in the family. The vehicle accommodates two crew members and eight fully equipped troops. The hull features four side doors and a rear door. The roof is fitted with two hatches for observation, firing and emergency exit purposes. The Kamaz-53949 vehicle measures 6.7m-long, 2.5m-wide and 2.8m-high. It has a curb weight of 13,700kg and can carry a payload of 2,000kg. The vehicle also features a signature reduction package, an all-around video surveillance system and an automatic fire-extinguishing unit. Armament of Kamaz-53949 Typhoon-K The Kamaz-53949 is fitted with a stabilised remotely controlled weapon station (RCWS). The RCWS can be armed with medium-to-heavy machine guns, including a 7.62mm medium machine gun (MMG) or a 12.7mm / 14.5mm heavy machine gun (HMG).

→All-Terrain Vehicles

→→Wheeled All-Terrain Vehicles

Supacat British 6x6 Amphibious All-Terrain Vehicle





Tiers:



Variants:

- **ATMP:**
- **Mortar Carrier:**
- **Howitzer Tow Vehicle:**
- **Engineer Vehicle:**
- **FLPT:**
- **SLLPT:**
- **Fuel Cat:**
- **Mounted Crane:**
- **Aircraft Crash Recovery Vehicle:**
- **Radio Rebroadcast Stations:**
- **Casualty Evacuation:**
- **AGTM Launcher:**

System

Alternative Designation: All-Terrain Mobile Platform (ATMP)
Description: 6 X 6 rough terrain vehicle can carry 2 to personnel with gear or 4 personnel with less gear; vehicle is open & provides no protection to its occupants
Ground Pressure : kg/cm2INA
Crew: 2

↳***Dimensions***

Height, Overall : m1.9
Length, Chassis Overall : m3.44 (with winch)
Width, Overall : m2.0
Weight, Combat: kg2,000

Automotive

Engine Name: VW ADE

Engine Type: Turbo-charged diesel

Fording Depth : mAmphibious

Range, Cruising : INA

Speed, Maximum Road : km/h64.0

Speed , Average Cross-Country: INA

Speed , Maximum Off-Road: INA

Speed, Maximum Swim : km/hless than 5

Communications

↳*Radio*

Name: Vehicle/Man pack (to meet customer's need)

Armament

↳*Weapon 1*

Name: PKT

Type: PKT machine gun

Cailber/Length : mm7.62

Ammunition

↳*Ammunition*

Type: Light Ball, Ball-T; Heavy Ball, API, API-T, Incendiary

Combat Load : rds800.0

Muzzle Velocity : m/s825.0

Range, Maximum Effective, Day : m1000.0

Range, Maximum Effective, On the Move : m450.0

Armor Penetration : mm8 (RHA) at 500 m

Protection

Active Protection System: No

Armor, Applique : mmNo

Armor, Explosive Reactive : mmNo

Armor, Turret Front : mmAgainst 76.2-mm rounds, but most of vehicle is open

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: INA

Survivability Equipment: INA

Notes:

The Supacat is amphibious and has a low ground pressure, enabling it to traverse rough terrain whilst carrying up to eight troops (and two crew), a standard NATO pallet or other stores (ammunition etc.). A GPMG may also be fitted to create an effective mobile fire support platform. It has permanent six wheel drive (6x6) with the front four wheels (two axles) steered conventionally by using a rotating handlebar arrangement. These handlebars also operate the steering brakes, which act independently on each side of the vehicle giving brake steering. The Supacat is built around a steel rectangular hollow section chassis frame, which forms the entire shape of the vehicle and to which all components and attachments are fitted. The 'body' of the Supacat forms a hull that enables the vehicle to float and protects the majority of mechanical components. The vehicle can be configured for a number of roles: *Basic ATMP *FLPT (Fork Lift Pallet Trailer) to lift, handle and carry pallets up to 1.6 tonnes. *SLLPT (Self Loading Lightweight Pallet Trailer) *'Fuel Cat', which is able to carry and pump up to 1000 litres of aviation fuel. It also carries an engine start system for aircraft and is able to tow an APFC (Air Portable Fuel Container). *Mounted crane *Aircraft crash recovery *Radio rebroadcast stations *Casualty evacuation *The Supacats were initially taken into service by the United Kingdom in 1988 and have been heavily used in active service. A modified Supacat 6X6 MK III was used in the movie Brazil. Supacat re-branded to SC Group in September, 2015, the Supacat brand retained for the group's core defence business.

Panhard VBL French 4x4 All-Terrain Vehicle





Tiers:

1 2 **3** 4

Variants:

- **VBL AT4CS:** A54CS 84-mm ATGM carrier with range only to 250 m with ring-mounted 7.62-mm machine gun
- **VBL SOURCE:** Upgraded optics
- **VBL Information:** Improved target designation
- **VAP Deep Penetration Vehicle:** Long wheel-base for deep reconnaissance missions
- **ULTRAV M11:** Stretched for NBC detection
- **Wasp Milan ER:** Remote weapon station with a 1-tube ATGM launcher & 7.62-mm machine gun
- **VBL Canon:** 20-mm remote turret
- **VBL Ingwe (South Africa):** Armed Long Range Reconnaissance Turret with 4 Ingwe ATGM launchers
- **MPCV (Multi-purpose Combat Vehicle):** VBR chassis with 4 rail missile launcher turret with 8 missiles & 12.7-mm machine gun
- **VBL Tourelle Fermee:** Remote turret that can fire a 12.7-mm MG, 7.62-mm MG, or 40-mm AGL
- **VBR:** Stretch variant can carry 5 soldiers; remote weapon station with M2HB MG & smoke grenade launchers
- **VBL Eryx:** Short-range (600 m) AT carrier with secondary 7.62-mm machine gun
- **VB2L Poste de Commandement:** Command version with extra radios, map board, & 7.62-mm MG for self-protection
- **VBL TOW (Greece):** Single tube with 4 rounds with range to 3,750 m
- **VBL Milan:** 1 Milan firing unit with 6 missiles with range to 2 km
- **VBL Samantha:** Griffon surveillance radar to designate SAM missile & AA artillery targets
- **VBL Anti-Tank:** Equipped with the HOT or TOW turret, but also can be integrated with Kornet or Ingwe missile systems
- **VBL Albi:** Fires Mistral/Mistral 2 SAMs
- **VBL with PL127 Turret:** 12.7-mm MG or 40-mm AGL

System

Alternative Designation: The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL
Date of Introduction: 195
Description: 4 X 4 armored vehicle carrier serves in a variety of roles. Some variants can carry more than the crew.
Proliferation: France, Abu Dhabi, United Arab Emirates, Kuwait, Russia
Crew : ea3.0

↳*Dimensions*

Height, Overall : m1.70 (2.14 to top of MG)
Length, Chassis Overall : m3.7
Width, Overall : m2.02
Weight: 3.5 to 4 tonnes

Automotive

Engine Name: XD 3T

Engine Type: Peugeot liquid-cooled, turbo- charged, in-line, 4-cylinder diesel

Fording Depth : mAmphibious

Range, Cruising : km600 (max fuel variant to 800, 1000 with external tanks

Speed, Maximum Road : km/h95.0

Speed , Average Cross-Country: km/hINA

Speed , Maximum Off-Road: km/hINA

Main Weapon System

Note: Depends on the version

↳*System*

Name: AA-52 machine gun

Type: General-purpose machine gun

Caliber: 7.5mm or 7.62mm

Cartridge: 7.5×54mm French 7.62×51mm NATO

Action: Lever-delayed blowback

Rate of Fire: rds/min900

Muzzle Velocity: m/s830

Maximum Effective Firing Range: m600

Effective Firing Range: m3,200

Feed System: 50-round non-disintegrating belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳*Ammunition*

Type:

Caliber: 7.5mm or 7.62mm

Cartridge: 7.5×54mm French 7.62×51mm NATO

Anti-Tank Weapon System

Name: ERYX

Type: short-range portable SACLOS-based wire-guided anti-tank missile (ATGM)

Manufacturer: MBDA, MKEK (under license)

Produced: 1993

Length: m0.905

Diameter: m0.136

Warhead Type: Tandem HEAT

Warhead Weight: kg3.8 kg Tandem HEAT

Weight, Total: 13.0 kg missile and container; firing post 4.5 kg

Penetration: 900 mm RHA behind reactive armour, or 2.5 m through concrete)

Operational Range: 50–600 m

Speed: 18 m/s (65 km/h) at launch to 245 m/s (880 km/h) at 600 m

Guidance System: SACLOS wire

Launch Platform: Individual, Vehicle

Protection

Armor: STANAG level 1 (protection against 7.62×51 NATO rounds and shrapnel)

Active Protection System: No

Armor, Applique : mmNo

Armor, Explosive Reactive : mmNo

Armor, Turret Front : mm5-11.5

NBC Protection: Collective

Self-Entrenching Blade: No

Smoke Equipment: Yes

Survivability Equipment: Increased mine protection, Kevlar blankets

Notes:

The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL, is a French wheeled 4x4 all-terrain vehicle built by Panhard. The vehicle is offered in various configurations, and was designed to combine the agility of the Peugeot VLTT liaison vehicle with adequate protection against small arms fire, artillery fragments, mines and NBC weapons. Produced between 1985 and 2010, the vehicle has been used by the French Army and other European, African and Central American armies in various conflicts since the 1980s. The French VBL programme started in 1978. The French Army was looking for a light reconnaissance vehicle, intended to work with the AMX-10 RC, the Hotchkiss M201 being obsolete when compared with the Soviet BRDM-2s. The new vehicle needed to be armed with a single machine gun for reconnaissance (recce) or with the MILAN missile for anti-tank combat, while being protected from NBC hazards and small arms fire. Both Renault and Panhard proposed a prototype, the trials beginning in 1982. Before its selection by the French armed forces in 1985, the Panhard model was ordered by the Mexican Army in 1984. In 1985, a pre production of 15 vehicles for the French Army was launched while the VBL started its active operational service in the French Army in 1990. The French Army ordered 569 VBLs in 1990, 330 between 1994 and 1997, and 700 VB2L (lengthened variant) before 2004. The VBL, sold abroad as the ULTRAV M-11 has been produced at Marolles-en-Hurepoix, around 10 vehicles being produced each month in 2004. The 1,500th VBL was produced in 2001 and the last VBL of the 2,600 VBLs left the plant in 2010. The VBL has two compartments: a motor bay, placed forward to protect the second compartment, which is for the crew. Its compact internal dimensions led to the design of a lengthened version of the VBL. The crew of the VBL is protected against NBC weapons. The recce versions have two crew members while the anti-tank versions have a crew of three. The French Army version of the VBL is equipped with a Peugeot XD3T turbo-diesel engine. This engine is used on many civilian cars, such as the Peugeot 505, Peugeot 605 and Talbot Tagora and the VBL used many other standard civilian components. Its 95 hp (71 kW) power and 29.5 hp/t (22.0 kW/t) power ratio enable the VBL to speed at 95 km/h (59 mph). It has a fuel consumption of 16 litres (3.5 imp gal; 4.2 US gal) per 100 km (62 mi). Its range of 600 km (370 mi) can be extended to 800 km (500 mi) by two external fuel tanks. Designed to be lighter than 3.5 t (3.4 long tons; 3.9 short tons), the mass of the VBL has increased to 4 t (3.9 long tons; 4.4 short tons). The VBL is fully amphibious and drives at 5.4 km/h (3.4 mph) in water; it is also air transportable by C-130, C-160, Il-76 and A400M. It can be transported underslung by larger helicopters, such as the AS332 Super Puma, and may also be para-dropped.

→→Tracked All-Terrain Vehicles

GAZ-3344 Russian Articulated All-Terrain Tracked Carrier





Tiers:

1 2 3 4

System

Alternative Designation: GAZ-3344
Description: The GAZ-3344 is a Russian articulated all-terrain tracked carrier.
Crew: ea1
Passengers: ea19
Note #1: The GAZ-3344 can carry passengers, cargo and various equipment in remote areas in Siberia and Northern regions of Russia. This vehicle has good cross-country mobility and can go over mud, sand, snow and marshlands. Also it is fully amphibious.
Note #2: Russian armed forces plan to procure this vehicle with 5 different rear mission modules, including a troop carrier, logistics vehicle, weapon carrier, ambulance and firefighting vehicle.

↳Dimensions

Length, Chassis Overall: m9.93
Width, Overall: m2.38
Height, Overall: m2.63
Payload Capacity: t3
Weight, Curb: t8.7

Automotive

Engine Name: YaMZ-53402-10

Engine Type: Diesel

Engine Power: hp182

Range, Cruising: km800

Speed, Maximum Road: km/h60

Speed, Maximum Swim: km/h5

Fording Depth: Amphibious

Protection

Active Protection System: No

Armor, Applique: No

Armor, Explosive Reactive: No

NBC Protection: Yes

Smoke Equipment: INA

Survivability Equipment: INA

Notes:

GAZ-3344 is capable to move through harder obstacles, by virtue of torque transmission to both units' tracks, low specific ground pressure, unit-folding at the same traction force and speed, and the forced vertical unit-folding system. Modular structure of the second unit enables installation of any equipment within the capacity limits. Various versions available.

Bv206 Swedish Articulated All-Terrain Tracked Carrier





Tiers:



Variants:

- **Bv 206A:** Ambulance version, which is capable of carrying stretchers in the rear compartment.
- **Bv 206F:** Firefighting vehicle
- **RaBv 2061:** Swedish Army communications/command version, fitted with radio equipment and workplaces for staff members.
- **PvBv 2062:** Swedish Army anti-tank vehicle, an open top version of the Bv 206 armed with a 90 mm Pvpj 1110 recoilless anti-tank gun.
- **PvBv 2063:** Swedish Army anti-tank vehicle, similar to PvBv 2062, but fitted with the launch system for an ATGM, either the TOW (Rbs 55) or the Bofors BILL (Rbs 56).
- **Bv 206S:** The Bv206S is an armored personnel carrier variant of the Bv 206, which provides protection from small arms fire for the occupants. It is in service with the armed forces of France, Germany (379 Bv 206D/S ordered), Spain, Netherlands, Italy (189 units), Sweden (50 units), Greece (Bv 208) and Singapore (300 units), which has replaced it with the Bronco All Terrain Tracked Carrier. Using a Steyr M1-"Monoblock" engine (6-cylinder, 130 kW), the vehicle can carry the driver and 12 combat-equipped troops — four in the front compartment and eight in the rear. The Bv 206S can be slingloaded by Boeing CH-47 Chinook and Sikorsky CH-53E Super Stallion helicopters or carried in the C130 Hercules.

System

Alternative Designation: Small Unit Support Vehicle (SUSV)
Description: Amphibious, all-terrain, articulated tracked carrier
Bodies: Fiberglass reinforced with PVC foam insulation
Crew: ea2

↳*Dimensions*

Height, Overall: m2.4
Length, Overall: m6.9
Width, Overall: m1.87
Cargo Space, Front: m32.5
Cargo Space, Rear: m35.5
Track Width: mm620
Ground Pressure: 11.6/13.6 kPa (1.68/1.97 PSI)
Curb Weight: mt4.5
Gross Vehicle Weight: mt6.58

Payload: 2.24mt (630 kg in front compartment and 1610 kg in rear compartment)

Trailer Load: mt2.5

Automotive

Engine Name: Ford Cologne V6 gasoline, or Mercedes Benz turbodiesel

Engine Power: hp115

Range, Cruising: km300

Speed, Maximum Road: km/h55

Speed, Maximum Swim: km/h3

Fording Depth: Amphibious

Temperature Range: degreesCold starting to -52C

Grade, hard surface: %60

Grade, Deep Snow: %30

Turning Radius: m8

Main Weapon System

Note: Variants of the basic Bv 206 abound. It is used as alight artillery tractor, an ambulance, a communication or command post, to carry various anti-tank weapons such as the Bofors BILL or TOW, for ground-to-air missile systems such as Bofors RBS 90, and even to carry radar systems.

Protection

Armor: Depends on Variant. Armored variant of the Bv 206 is the Bv 206S. It has modified cabs and armor plating on all its bodywork. Recent member of the Bv 206 family is the BvS 10 improved armored version. It is new larger vehicle, with improved load capacity. The BvS 10 has the same superior mobility in difficult terrain, combined with the same speed on road.

Armor, Applique: Available

Armor, Explosive Reactive: No

Active Protection System: No

NBC Protection: Yes

Smoke Equipment: Yes

Notes:

Development of the Bv 206 articulated all-terrain tracked carrier began in 1974. Three batches of trial vehicles were delivered between 1976 and 1978 and the first production examples were were delivered to the Swedish Defense Administration in 1980. Since then the Bandvagn 206 has been produced in thousands by Hagglunds and is in service all around the world. It is a family of multi-purpose amphibious tracked vehicles. The Bv 206 is widely used, especially by the Swedish armed forces, the US Army (who have developed a desert version), the British Armed Forces, and the German Army (who use only diesel-engined versions). The type has been license-produced in Chile. The Bv 206 in its basic carrier form is a twin-unit articulated tracked vehicle that can carry up to 17 troops or 2 250 kg of supplies (6 troops or 630 kg in the front unit, 11 troops or 1 620 kg in the rear unit). Normally both front and rear units are fully enclosed but for some applications the rear unit can vary considerably and in some cases is left fully opened, such as the mortar carrier or can accommodate a variety of bodies. From the earliest stage the Bv 206 was designed to be versatile and it has been proven so in service. The engine originally a Ford V6 petrol unit but later a Mercedes-Benz diesel, is in the front unit together with the automatic transmission. Connection to the rear unit is made via an articulated joint which is also used for steering. It gives great flexibility in all axles and extremely good maneuverability. The simplicity in the handling of the vehicle involves a minimum of driver training. Most bodies make extensive use of light plastic-based materials but the chassis uses light alloys. Power is driving on all four of the tracks, which

exert a ground pressure of less than half of the man's foot. The Bv 206 can negotiate such obstacles as soft snow, drifting sand and marshlands. It can climb considerable gradients, swim without preparation and and work in arctic cold or in tropical heath. The vehicle can be airdropped and transported by a variety of aircraft and helicopters. Variants of the basic Bv 206 abound. It is used as alight artillery tractor, an ambulance, a communication or command post, to carry various anti-tank weapons such as the Bofors BILL or TOW, for ground-to-air missile systems such as Bofors RBS 90, and even to carry radar systems. Armored variant of the Bv 206 is the Bv 206S. It has modified cabs and armor plating on all its bodywork. Recent member of the Bv 206 family is the BvS 10 improved armored version. It is new larger vehicle, with improved load capacity. The BvS 10 has the same superior mobility in difficult terrain, combined with the same speed on road. In 2015 BAE Systems Hagglunds revealed a new BvS 10 Beowulf. It is proposed as a replacement of the Bv 206. The new vehicle can carry more than 3 times more payload.

→Tactical Utility Vehicles

URO VAMTAC Spanish 4x4 High-Mobility Tactical Utility Vehicle






Tiers:

1 **2** 3 4

Variants:

- **VAMTAC I3:** 166-hp Steyr diesel engine
- **VAMTAC S3:** 188-hp Steyr diesel engine, reinforced suspension with greater payload capacity
- **FAMTAC BN3:** Up-armored version with 220-hp Steyer M16TCA-3 6-cylinder engine with a top speed of 135 k/hr
- **Ambulance:** 2 stretcher or 4 seated patients in rear compartment
- **ATGM Carrier:** For GBM-71 TOW or MILAN ATGM systems
- **Anti-Aircraft Vehicle:** Mistral Surface-to-air missiles
- **Command & Control Vehicle:** Separate rear compartment for communications gear
- **PYSOP Vehicle:** Equipped with loudspeaker

System

Alternative Designations: Vehiculo de Alta Movilidad Tactico (VAMTAC)

Proliferation: Total: +4,500 (All VAMTAC Versions and Variants) Angola [24] Belgium [N/A] Dominican Republic [80] Ghana [30] Malaysia [103] Morocco [1,200] Portugal [139] Romania [100+] Saudi Arabia [30] Singapore [N/A] Spain Army [2,000+] Venezuela [N/A]

Description: 4 X 4 HMMWV like vehicle with 2-door or 4-door modesl available; used in a variety of configurations including recon; normal passenger capacity is

Manufacturer: UROVESA

Crew: ea1

Passengers: ea3

Dimensions

Length (Depending on Versions and Variants): 4.85 m to 5.55 m

Width: m2.18

Height: m1.90

Weight, Curb: 3,000 kg to 3,500 kg

Weight, Payload: 2,000 kg to 2,500 kg

Towing Capacity: 3,000 kg

Automotive

Automotive Performance: 1 x Steyr turbocharged 4-cyl diesel; 166 hp; or 1 x Steyr turbocharged 6-cyl diesel; 188 hp

Engine Type: Turbo-charged 4-cylinder or – cylinder diesel

Engine Powerr: hp166-188

Fuel Capacity: liters110

Transmission: 5 speed automatic

Maximum Range: km600

Speed: 126 km/h to 135 km/h

Gradient: %75

Side Slope: %40

Vertical Step: m0.5

Trench: m0.5

Fording, without Preperation: m0.75

Fording, with Preperation: m1.5

Suspension: 4-wheel independent (double wishbones with coil-springs)

Communications

Radio: Customer Dependent

Protection

Armor (turret front): INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: INA

Notes:

The URO VAMTAC (Vehículo de Alta Movilidad Táctico, "High Mobility Tactical Vehicle") is a Spanish four-wheel drive military vehicle manufactured by the UROVESA. Externally it is similar in appearance and design to the Humvee of the United States Military due to similar requirements. More than 2,000 of the vehicles have been delivered to the Spanish Armed Forces. Several other countries operate the VAMTAC as well, and it has seen service most recently in Afghanistan and Syria. The vehicle comes in two models, named I3, S3 and ST5, and has several configurations. The VAMTAC is available in a number of variants with different body types. The main forms are pick-up, command/control and chassis-cab. Pick-up and chassis-cab variants are available with two-door, four-door or reduced size four-door version. The chassis-cab variant is used to mount a vide variety of

shelters, or cargo bodies. The command/control variant has four-doors and cargo area, covered with soft, or sloping hard top. Open top models are available. The URO VAMTAC was developed by the Spanish company URO, Vehiculos Especiales S.A. so that it would meet the requirements of the Spanish military for a multipurpose, air-portable, high mobility off-road vehicle with good payload capacity. Just as the HMMWV entered production in 1984 the Spanish army started to think of purchasing their own multirole vehicle that would replace Land Rovers. VAMTAC concept did not materialize until 1995 when a competition was held for a next-generation tactical vehicle. The American HMMWV was also a natural candidate for several reasons. UROVESA decided to design a vehicle that could exceed the US design. After the vehicle was tested by the Spanish Ministry of Defence, UROVESA received a five-year contract and the URO VAMTAC was produced from 1998 to 2003. In October 2005, the Ministry of Defence awarded a new five-year contract for the URO VAMTAC after a three-month trial period. This also introduced some changes, and the two models of the vehicle which were named T3 and T5, were re-designated as I3 and S3 respectively. The URO VAMTAC is similar in appearance and design to the U.S. Military's Humvee, because both vehicles were designed to meet similar requirements and specifications.

URO VAMTAC ST5 BN3 Spanish 4x4 High-Mobility Tactical Utility Vehicle





Tiers:

1 2 3 4

Parent:

URO VAMTAC Spanish 4x4 High-Mobility Tactical Vehicle

Variants:

- **VAMTAC I3:** 166-hp Steyr diesel engine
- **VAMTAC S3:** 188-hp Steyr diesel engine, reinforced suspension with greater payload capacity
- **FAMTAC BN3:** Up-armored version with 220-hp Steyer M16TCA-3 6-cylinder engine with a top speed of 135 k/hr
- **Ambulance:** 2 stretcher or 4 seated patients in rear compartment
- **ATGM Carrier:** For GBM-71 TOW or MILAN ATGM systems
- **Anti-Aircraft Vehicle:** Mistral Surface-to-air missiles
- **Command & Control Vehicle:** Separate rear compartment for communications gear
- **PYSOP Vehicle:** Equipped with loudspeaker

System

Alternative Designations: URO VAMTAC ST5 BN3
Description: 4 X 4 HMMWV like vehicle with 2-door or 4-door modesl available; used in a variety of configurations including recon; normal passenger capacity is
Manufacturer: UROVESA
Crew: ea1
Passengers: ea3

Dimensions

Length (Depending on Versions and Variants): 4.85 m to 5.55 m
Width: m2.18
Height: m1.90
Weight, Curb: kg8,000
Weight, Payload: 2,000 kg to 2,500 kg
Towing Capacity: 3,000 kg

Automotive

Automotive Performance: 1 x Steyr M16TCA-3 six-cylinder engine

Engine Type: Turbo-charged six-cylinder Diesel Engine

Engine Powerr: hp220

Fuel Capacity: liters110

Transmission: Allison S1000 seven-speed (six forward, one reverse) automatic transmission

Maximum Range: km500

Speed: km/h115

Gradient: %75

Side Slope: %40

Vertical Step: m0.5

Trench: m0.5

Fording, without Preperation: m0.75

Fording, with Preperation: m1.5

Suspension: 4-wheel independent (double wishbones with coil-springs)

Central Tire-Inflation System (CTIS): Yes

Run Flat Tires: Available

Front Electric Winch: Available

Communications

Radio: Customer Dependent

Main Weapon System

Weapons avaialble: The VAMTAC can be armed with wide ranges of weapons systems such as 7.62mm machine gun and 12.7mm gun, 40mm grenade launchers, anti-tank guided missiles, 81mm mortar, 106mm recoilless rifle or air defence missile systems.

Remotely Operated Weapon Station: Available

Protection

Armor: The BN3's armored cell, developed with Composhield of Denmark, provides NATO Standard Agreement (STANAG) 4569 Level 2 mine protection; Level 3 against bullets; and Level 4 against 155-mm artillery fragments

Applique aArmor: Yes, The vehicle can also be fitted with a net armor system to increase its protection against RPG-7 rockets

Explosive Reactive Armor: No

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: INA

Climate Control: Available

Ballistic Protection for Cargo and Engine Areas: Available

Fire-Suppression System: Available
Front Windshield Firing Port: Available
Weapon Ring: Available
Note: The VAMTAC BN3 is the up-armored version of the VATAC S3

Notes:

This is an up-armored version of the VAMTAC S3. he vehicle is specifically designed to operate in any environment, including desert and is fitted with a reinforced armour over previous versions. The Uro VAMTAC is available in a wide range of versions with different body types. Notable variants include an ambulance vehicle, anti-tank vehicle equipped with TOW or MILAN anti-tank guided missiles and an anti-aircraft vehicle armed with Mistral surface-to-air missiles.

Hawkei PMV Australian 4x4 Protected Mobility Vehicle





Tiers:



Variants:

- **Command:** Dual cab manned by a crew of four to six, weapons system options including up to 12.7mm guns or 40mm grenade systems in various mounts with a remote operated option.
- **Border Protection:** Dual cab manned by a crew of four to six, various equipment options including force protection radar, surveillance and communications systems.
- **Special Operations Vehicle:** Dual cab manned by a crew of four to six with up to three weapon systems:[14] Front co-driver swing mount; Roof mounted manual gunring or remote weapon station; and/or Rear-facing swing mount.
- **Utility:** Single-extended cab with a flat-bed cargo area measuring; L: 2,000 mm (79 in) x W: 2,400 mm (94 in). The vehicle is manned by a crew of 2-3 and has a kerb weight of 6,800 kg (14,991 lb) with a rated cargo load of 3,000 kg (6,614 lb). The load bed is designed to accommodate four 1000mm × 1200mm (40" x 48") NATO standard military pallets or a single tricon (one-third ISO 20 ft) container.

System

Alternative Designation: Hawkei PMV

Type: Protected Mobility Vehicle

Manufacturer: Thales Australia

Crew: eaGenerally 4 to 6

Passenger Capacity: INA

Dimensions

Length: 5,780mm

Width: 2,396mm

Height: 2,300mm

Weight, Combat: 7,000 kg (15,432 lb) (kerb), 10,000 kg (22,046 lb) (GVM)

Automotive

Engine Name: Steyr M16

Engine Type: six-cylinder turbocharged diesel engine.

Engine Power: 200 kW (268 hp) @ 4,000rpm 610 N·m (450 lb·ft) @ 2,000rpm

Range: km600

Speed, Maximum Road: 130km/h (max) 100km/h (governed)

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Steering System: Power rack and pinion

Suspension: AxleTech 3000, fully independent suspension, coil and double wishbone

Transmission: List of ZF transmissions#8-speed auto, eight-speed automatic

Main Weapon System

Note: A remotely controlled weapon station (RCWS) is installed in the Hawkei vehicle. It is an automated control weapon station principally used for light and medium-calibre weapons. The RCWS can accommodate remote control weapons encompassing 5.56mm, 7.62mm, and 12.7mm machine guns, 40mm automatic grenade launchers, anti-tank missiles and observation pods. The RCWS can accommodate weapons up to 12.7mm machine guns and is manufactured by Samson Technologies Corporation, US.

Protection

Armor: Greater than STANAG 4569, Level 1. Additional Applique armour provided by Plasan composite and V-shaped monocoque hull

Applique Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Hawkei PMV is a light Four-wheel drive protected mobility vehicle originally designed to meet an Australian Defence Force (ADF) requirement for a light armoured patrol vehicle to replace some of its Land Rover Perentie variants. The Hawkei is a highly mobile, highly protected, 7-tonne vehicle, with in-built systems to allow it to be used as a fighting platform. It has been developed with Vehicle Electronic Architecture to be mission system ready. Prime contractors include: Thales Australia, Boeing Australia, Plasan (Israel) and PAC Group. In October 2015, the Australian Government announced the purchase of 1,100 Hawkeis from Thales Australia. As part of a wider project to replace the ADF's fleet of operational support vehicles, Project Land 121 Phase 4 – Protected Mobility Vehicle (Light) or PMV-L, is a requirement for up to 1,300 specialised light armoured vehicles replace some of the in-service Land Rovers. Key criteria for the project included: off-road mobility, integrated vehicle electronic architecture, substantial payloads, high levels of protection against land mines, improvised explosive devices and ballistic weapons while being light enough to be air transported by military helicopters. The three options considered as part of the project were: Option 1, Joint Light Tactical Vehicle (JLTV) Program - align the PMV-L requirement to the United States JLTV program to replace its fleet of High Mobility Multipurpose Wheeled Vehicle or 'Humvee' (awarded 25 August 2015 to Oshkosh offering L-ATV); Option 2, Manufactured and Supported in Australia (MSA); and Option 3, Market available – pursuit of this option is subject to Australian Government decisions on Options 1 and 2. Competitors for the MSA option included the combat proven MOWAG Eagle IV from General Dynamics Land Systems; the British military then selected Ocelot from Force Protection; and the Hawkei offering from Thales Australia. The JTLV option included entries from BAE Systems/Navistar, AM General/General Dynamics and Lockheed Martin. In December 2011 the Australian Department of Defence announced Hawkei as the preferred vehicle for further development and testing under the MSA option. In October 2015, Prime Minister Malcolm Turnbull and Minister for Defence Marise Payne announced the purchase of 1,100 Hawkeis and 1,000 trailers at a cost of $1.3 billion. In November 2017 it was reported that the Hawkei was being considered by Poland as part of a modernisation of the country's military. This could result in an initial purchase of 50 vehicles, and as many as 700 over the long term. In September 2018 the Australian National Audit Office released a report which criticised aspects of the Hawkei project. The report judged that Australia should have remained in the JLTV program to provide competition for the Hawkei procurement and that the Department of Defence had not kept ministers fully informed about the Hawkei program. This included not providing ministers with a study which found that there were few benefits from building the vehicles in Australia. The ANAO was unable to publish some elements of the audit after Attorney General Christian Porter ruled that publishing it would compromise national security.

Thales had taken legal action earlier in the year seeking to have material removed from the report. As of December 2018, the Hawkei is facing reliability issues following a demonstration test conducted on 19 November 2018, delaying full-rate production.

M998 HMMWV American 4x4 High Mobility Multipurpose Wheeled Vehicle







Tiers:



System

Alternative Designation: M998 HMMWV
Type: 4x4 High Mobility Multipurpose Wheeled Vehicle
Manufacturer: AM General
Family: HMMWV
In Service: 1984-Present
Crew: ea1
Passenger Capacity: 8 maximum (can also carry casualties)

Dimensions

Length: 4.84 m
Width: 2.16 m
Height: 1.83 m
Wheelbase: 3.30 m
Ground Clearance: 0.41 m
Weight, Combat: 4,672 kg
Payload: 1,996 kg

Automotive

Engine Name: 1 x General Motors V8

Engine Type: 6.5L turbo-charged, diesel fuel injection

Engine Power: 160 hp at 3,400 rpm

Transmission: automatic w/4 forward gears, 1 reverse gear

Fuel Capacity: 94 liters

Range: 483 km

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.56

Fording Depth: m1.52

Suspension: independent double A-arm with coil spring on all wheels, with front stabilizer bar

Main Weapon System

Note: basic vehicle does not have weapons fitted; armament carrier can be fitted with a 7.62-mm or 12.7-mm machine guns or a 40-mm grenade launcher; TOW carrier has launcher

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The High Mobility Multi-purpose Wheeled Vehicle (HMMWV) is the replacement vehicle for the M151 series jeeps. The HMMWV's mission is to provide a light tactical vehicle for command and control, special purpose shelter carriers, and special purpose weapons platforms throughout all areas of the modern battlefield. It is supported using the current logistics and maintenance structure established for Army wheeled vehicles. The HMMWV is equipped with a high performance diesel engine, automatic transmission and four wheel drive that is air transportable and droppable from a variety of aircraft. The HMMWV can be equipped with a self-recovery winch capable of up to 6000 pound 1:1 ratio line pull capacity and can support payloads from 2,500 - 4,400 pounds depending on the model. The HMMWV is produced in several configurations to support weapons systems; command and control systems; field ambulances; and ammunition, troop and general cargo transport. The M998, M998A1, M1038 and M1038A1 HMMWVs are cargo/troop carrier configurations of the HMMWV family. The vehicles are equipped with basic armor and used to transport equipment, materials, and/or personnel. The cargo carrier configuration is capable of transporting a payload (including crew) of 2,500 pounds and the troop carrier is capable of transporting a two man crew and eight passengers. Both use a troop seat kit for troop transport operations. The cargo/troop carrier can also be configured in a four man crew configuration. The vehicles can climb 60% slopes and traverse a side slope of up to 40% fully loaded. The vehicles can ford hard bottom water crossing up to 30 inches without a deep water fording kit and up to 60 inches with the kit. The M1038, M1038A1 are equipped with the self-recovery winch which can also be used to recover like systems. The M998A1 and M1038A1 models have the latest modifications applied to the vehicles.

Mercedes-Benz G-Class German 4x4 Light Utility Vehicle





Tiers:

1 2 **3** 4

System

Alternative Designation: Mercedes-Benz G-Class

Type: Light Utility Vehicle

Manufacturer: Mercedes-Benz

Crew: ea1

Passenger Capacity: ea3

Dimensions

Length: 4.2 ~ 4.6 m

Width: 1.7 m

Height: 1.9 m

Maximum Load: 0.5 ~ 1.5 t

Weight, Empty: 1.75 t

Automotive

Engine Name: Mercedes-Benz OM 615

Engine Type: 2.9-liter diesel

Engine Power: hp156

Range: km600

Speed, Maximum Road: km/h120

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %70

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.5

Note: Since its introduction a number of petrol and diesel engines have been fitted to this vehicle. Both manual and automatic gearboxes were available. Older vehicles have selectable four-wheel drive. Modern G-class utility vehicles have a full-time all-wheel drive. This military vehicle made its reputation for reliability and ruggedness.

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Mercedes-Benz G-Class, sometimes called G-Wagen (short for Geländewagen, "terrain vehicle"), is a mid-size four-wheel drive luxury SUV manufactured by Magna Steyr (formerly Steyr-Daimler-Puch) in Austria and sold by Mercedes-Benz. In certain markets, it has been sold under the Puch name as Puch G. The G-Wagen is characterised by its boxy styling and body-on-frame construction. It uses three fully locking differentials, one of the few vehicles to have such a feature. Despite the introduction of an intended replacement, the unibody SUV Mercedes-Benz GL-Class in 2006, the G-Class is still in production and is one of the longest produced vehicles in Daimler's history, with a span of 40 years. Only the Unimog surpasses it.

Dongfeng EQ2101 (Warrior) Chinese 6x6 Tactical Utility Vehicle





Tiers:



Variants:

- **Dongfeng EQ2101EB:** Dongfeng EQ2101EB is a cargo version with a 2-door cabin with a large cargo area at the rear. It has capacity for driver plus 3 passengers and has a payload capacity of 2 000 kg
- **Dongfeng EQ2101MCTB:** is a light vehicle protected with the 6x6 configuration. This vehicle has 4 doors. One of them is a type door with shell. The upper part opens upwards, while the lower part opens downwards. This vehicle accommodates driver, more up to 11 passengers.
- **Dongfeng EQ2101:** The Dongfeng EQ2101 was designed to provide troops with logistical and utilitarian support
- **Dongfeng EQ2016E Chinese 4x4 Truck:**

System

Alternative Designation: At the time of its introduction this vehicle was also called the Mengshi (Chinese for brave soldier).
Manufacturer: Dongfeng Off-road Vehicles Co.
Type: 6x6 support vehicle for infantry fire teams
Crew: ea2
Troop Compartment Capacity: ea11
Cargo Capacity: Can carry equipment such as ‘artillery, anti-tank missiles, antiaircraft missiles and assault bridges
Maximum Effective Range: km500
Gradient: %40
Lateral Slope: %30
Vertical Step: m0.45
Ditch: m0.70
Wading: m0.75
Wading (With Preparation): m1.20
Note: The EQ2101 is a larger version of Dongfeng CSK141 with an added axle.

Dimensions

Length: m6.45
Width: m2.38

Height: m2.065

Weight, Combat: kg9,072

Payload Capacity: kg2,000-2,500

Automotive

Engine Name: 177kW Dongfeng YC6DV Diesel Engine

Engine Type: Diesel Engine,

Engine Power: hp237

Cruising Range: km500

Speed, Maximum Road: km/h120

Speed, Average Cross: 100

Speed, Maximum Swim: km/hINA

Fording Depth: mINA

Central Tire Inflation System: Yes

Communications

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

Note: This armored vehicle can be armed with a roof-mounted 12.7 mm machine gun, or alternatively, a 35 mm automatic grenade launcher. Also it can be fitted with remotely controlled weapon station or various other weapons.

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Heavy Machine Gun

Length: mm1,560

Diameter: INA

Weight (Gun Only): kg25

Weight (Tripod): kg41

Weight (With 50 Round Belt): kg11

Feed System: ea50 Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Number of Rounds: ea50 Round Belt

Max Range: m1,500

Min Range: m2,000

Armor Penetration: Available

Note: The 12.7×108mm can be used to engage a wide variety of targets on the battlefield, and will destroy unarmored vehicles, penetrate lightly armored vehicles and damage external ancillary equipment (i.e.: searchlights, radar, transmitters, vision blocks, engine compartment covers) on heavily armored vehicles such as tanks

Fire Control

Name: INA

Computerized FCS: INA

Thermal Vehicle Commander: INA

Thermal Gunner: INA

Main Gun Stabilization: No

Range, Day Sight: Yes

Tange, Thermal Sight: KNA

Protection

Hull Armor: 7.62mm bullet resistant back and side armour

Turret Armor: INA

Applique Armor: Available Option, 7.62mm Wo-109 armour-piercing fire bomb resistant armour that can be added to the front of the vehicle.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Dongfeng Warrior EQ2101 MCTB provides tactical support for infantry teams, equipment transportation and provides platforms for light-duty artillery, maintenance and medical rescue tasks. Unveiled at Zhuhai in 2016 was the two-member

Dongfeng EQ2101 Warrior family. The EQ2101 MCTB is a 6x6 support vehicle for infantry fire teams. Powered by a 177kW Dongfeng YC6DV diesel engine, the 10t vehicle can move four soldiers around the battlefield at speeds of up to 120km/h. It is 6.45m long, 2.38m wide and 2.065m high.

UAZ Patriot Russian 4x4 Light Utility Vehicle




Tiers:



Variants:

- **2-door version:** Pick-up truck
- **4-door version:** Pick-up truck
- **5-door version:** Fully enclosed
- **Extended version:** 1 Driver + 8 passengers
- **Mortar carrier:** Transport system for an 82mm mortar.

System

Crew: ea1
Alternative Designation: UAZ-3163
Description: Military pick-up truck
Proliferation: Russia, Armenia, Syria, Ukraine
Curb Weight: mt2.67
Ground Clearance: mm210
Number of Axles: ea2
Payload on/off Highway: kg525-800 depending on configuration
Side Slope: deg
Troop Capacity: ea1 driver + 4 passengers
Vertical Step: m0.5
Wheels Central Tire Pressure Regulation System: No
Wheels Size: in225/75R16 or 245/70R16

↳*Dimensions*

Height, Overall: m2
Length, Chassis Overall: m4.647
Width, Overall: m2.08

Automotive

Engine Power: hp128

Range, Cruising: km600

Speed, Maximum Road: km/h150

Fording Depth: m0.5

Engine Name: ZMZ-409.10

Engine Type: In-line four cylinder, Gasoline

Cooling: Water

Fuel Capacity: liters87

Gradient, Loaded: %60

Transmission: Manual, 5-speed

Side Slope: %30

Vertical Step: m0.5 (approximate)

Trench: m0.5 (approximate)

Brakes, Front: ventilated disk-type with two cylinders and floating caliper

Brakes, Rear: drum-type, with one cylinder, with automatic adjustment of the clearance between the lining and the drum

Fuel: A-92

Armament

↳*Weapon 1*

Cailber/Length: mm12.7

Name: Kord

Type: Heavy machine-gun

↳*Weapon 2*

Cailber/Length: mm30

Name: AGS-17

Type: Automatic grenade launcher

↳*Weapon 3*

Caliber: mm82

Name: 2B14 Podnos

Type: Mortar

↳*Weapon 4*

Name: Konkurs or Kornet

Type: Anti-tank missiles

Notes:

The UAZ Patriot is a Russian light utility vehicle. It was introduced in 2005. An updated version is produced since 2015. Originally it was developed as a civilian vehicle. This utilitarian vehicle with good cross-country capability, is also used by the military. It uses 4x2 (front wheel drive) on hard surface roads and 4X4 is engaged only when travelling over tough terrain. The UAZ patriot has been exported to Armenia, and possibly some other countries. A baseline vehicle has a fully-enclosed body with 5-doors. It accommodates driver plus 4 passengers and can carry 200 kg of cargo. There is a version, that accommodates driver and up to 8 passengers. Also there are 2-door and 4-door pickup versions. Full payload capacity is 525 to 800 kg, depending on the version. The firepower in the back of the vehicles will enable their operators to suppress enemy fire in a radius of up to 2 km. The weapons can be mounted aboard a rotary turret, allowing the user to instantaneously change his arc of fire. Additionally, the vehicle can be equipped with Konkurs or Kornet anti-tank missiles, capable of hitting enemy targets at distances of up to 5 km. It can also be fitted with a 120 mm mortar with an effective range of 9 km.

Nimr Emirati 4x4 Light Utility Vehicle





Tiers:



Variants:

- **Armored personnel carrier:** Fully enclosed 10-seat armored body.
- **Armored ambulance:**
- **Hafeet 620A:** Armor protected version. Length: 6.92m Width: 2.35m Height: 2.33m Wheelbase: 3.92m Gross weight: 15mt Range: 600km Crew: 2 Operating temps: -19C-+49C Turning radius: 20m
- **Hafeet 620A Water Tank Vehicle:** A WEW 2.3m3 water tank with its own pumping and UV radiation module. Introduced in 2017.
- **Hafeet 630A:** An armored version configured as artillery support vehicles in both observation and command and control configuration.
- **Hafeet 640A:** Armored version with a double cab
- **Hafeet Air Defense Vehicle (ADV):** Based on the Hafeet 640A. Rear chassis is fitted with the MBDA Multi Purpose Combat System (MPCS), the turret of which comprises a gyro-stabilized day/thermal sensor suite with integrated laser rangefinder and four IR Mistral missiles. Introduced in 2015.

System

Alternative Designation: Hafeet 620
Description: cargo/troop carriers, automatic weapon platforms, ambulances, missile carriers, communication/shelter carriers and other roles.
Proliferation: Algeria, Egypt, Jordan, Lebanon, Libya, Tunisia, UAE
Crew: ea1
Passengers: ea3
Note #1: The Nimr can also tow trailers and light artillery pieces.
Note #2: There is a version that accommodates driver plus 7 passengers.

↳*Dimensions*

Length,: m5.5

Width: m2.2

Height: m2.5

Weight, empty: tons6.25

Payload Capacity: tons2.75

Automotive

Engine Name: Cummins ISBe 250

Engine Type: Diesel

Engine Power: hp250

Maximum Road Speed: km/h135

Maximum Range: km700

Gradient: %60

Side Slope: %40

Vertical Step: m0.5

Trench: m0.5

Fording: m1.2

Main Weapon System

Note: The Nimr can carry various weapon. Some versions have a universal gun mount ring on top of the roof and can be armed with a 7.62 mm, or 12.7 mm machine gun, or 40 mm automatic grenade launcher.

↳*System*

Name: Caracal Assault Rifle 817

Alternative Designation: CAR 817

Date of Introduction: 2016

Country: United Arab Emirates

Manufactuer: Caracal International company

Caliber: mm7.62

Length, Stock Extended: mm884

Length, Stock Retracted: mm802

Barrel Length: mm406

Weight, Without Magazine: kg3.3

Muzzle Velocity: m/s750

Cyclic Rate of Fire: rds/min650-750

Practical Rate of Fire: rds/min30-90

Magazine Capacity: 10, 20, 25 rounds

Range of Effective Fire: m600

Sight: Iron

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62x51 mm

Protection

Armor: protection for the crew against small arms fire, artillery shell splinters and explosions.

Applique Armor: Option

Explosive Reactive Armor: No

Active Protection System: INA

NBC Protection: Optional

Smoke Equipment: Available

Notes:

The Nimr (Arabic: نمر; meaning Tiger) is a family of all-terrain military armored personnel carrier (APC) vehicles, co-developed with GAZ and produced by Nimr LLC in the United Arab Emirates. The Nimr is designed specifically for military operations in the harsh desert climates found in the Middle East. Currently the Nimr is produced in the UAE by Nimr Automotive, and can be considered as an Emirati vehicle. The company is currently a leading manufacturer of tactical military vehicles in the Middle East and North Africa. In 2012 UAE and Algeria signed an agreement for production of armored version of the Nimr in Algeria. Since 2015 the Nimr Automotive is a part of Emirates Defense Industries Company (EDIC), which incorporates a number of UAE's defense manufacturers. In concept the Nimr is similar to the US HMMWV, though there are some differences between the two. Currently newer version of this vehicle are produced. The Nimr is a purpose designed military vehicle with good cross-country mobility. In terms of size and payload capacity the Nimr fits the gap between jeeps and light trucks. It can carry loads of up to 2 750 kg, depending on the version. The Nimr can also tow trailers and light artillery pieces. The baseline Nimr accommodates driver plus 3 passengers. It has got a cargo area are at the rear. However there are numerous versions of this military vehicle with different cabs, different body types and seating configurations. There is a version that accommodates driver plus 7 passengers. In 2005 a 6x6 version of this tactical vehicle was revealed. There are armored versions of the Nimr. These vehicles provide protection for the crew against small arms fire, artillery shell splinters and explosions. An NBC protection system was proposed as an option. The Nimr can carry various weapon. Some versions have a universal gun mount ring on top of the roof and can be armed with a 7.62 mm, or 12.7 mm machine gun, or 40 mm automatic grenade launcher. The Nimr is powered by a 5.9-liter Cummins ISBe 250 turbocharged diesel engine, developing 250 hp. Vehicle has a permanent all-wheel drive. The Nimr comes as standard with a central tyre inflation system. It improves mobility over difficult terrain, such as sand. It is also fitted as standard with run-flat tyres. Winch was proposed as an option. The Nimr can be airlifted by a C-130 Hercules military transport aircraft. The 4x4 version can be also airlifted underslung by a CH-53 helicopter.

GAZ-2975 Tigr Russian Combat Support Vehicle / Light Utility Vehicle





Tiers:



Parent:

GAZ-2330 Tigr Russian Light Utility Vehicle

Variants:

- **GAZ-2975:** GAZ-2975-A prototype unarmored three-door station wagon sport utility vehicle. GAZ-29751 - 3 door wagon, GAZ 29752 - 5-door wagon designed to carry four people and from 500 to 1000 kilograms of cargo, GAZ-297533 - two door with tilt covered load platform.
- **GAZ-2330:** Standard unarmoured production variant
- **GAZ - 29651 "Punisher":** A simplified version of GAZ - 2975. The result of the project " Punisher ", concludes in the creation of a family of cars with carrying capacity from 1 to 2.5 tons, allegedly became the armored vehicle Wolf.[
- **Tigr-2:** GAZ-3121 "Tiger-2" - an experimental rebodied civilian style SUV, presented for the first time in September 2006 at the Moscow Motor Show in the exhibition "Russian cars". Released a small series from 2008, mainstream sales at dealers were planned to start in 2009.
- **SP46:** In 2007, a ceremonial parade variant was designed, the СП46 (SP 46) ceremonial Tigr is a two-door convertible with a removable rigid roof. It features two seats in the front and one in the back, and is finished with modern luxury car appointments. This Tigr is equipped with an automatic Allison 1000 series transmission and Cummins B205 turbo diesel. Vehicle weight was reduced to 4,750 kg (10,470 lb), as this version is unarmoured.
- **STS:** The CTC (English:STS) GAZ-233014 "Tiger" - a special vehicle -The Russian Army's armored version. Winged sheathed hull of anti-splinter coating AOD based aramid fiber. 4-stroke diesel engine Cummins B 205 turbo provides a specific power of at least 205 hp. STS GAZ-233014 was accepted for the supply of units State of the General Staff of the Russian Federation Order of the Minister of Defense of the Russian Federation March 6, 2007. The STS took part in 2014, the Crimean operation.[
- **SPM-1:** GAZ-233034 Tigr is used by the Russian Interior Ministry OMON in counter-terrorism operations and territorial defense. It is armoured, with IEC 50963-96 Class 3 side/rear protection and Class 5 frontal protection (GOST P 50963-96, level 1 corresponds to the STANAG 4569).
- **SPM-1 AAV:** The SPM-1 Aircraft Assault Vehicle is an SPM-1 fitted with a large remote-control hydraulic ladder system. It is designed to provide access to the second or third floors of buildings and aircraft.
- **SPM-2 "Tigr-Alpha-BB":** (Special Police Vehicle SPM-2) ГАЗ-233036 Tigr-Alfa-BB (Tiger-Alpha-VV) is an SPM-1 with GOST 50963-965 level 5 ballistic protection all around (instead of a mixture of level 3 and 5).
- **R-145BMA:** This variant is designed as a command center for special events and crises. It is a SPM-2 fitted with extensive communications equipment.
- **Kornet-D:** In 2011, the Tula Instrument Design Bureau demonstrated an upgraded Kornet-EM antitank missile system. Two such units were mounted on a modified chassis of the SPM-2 Tigr.
- **"Project 420":** In early 2010, an improved Tigr armored vehicle with a 420-horsepower 5.9 litres (360.0 cu in) Cummins ISB and a Chrysler 545RFE automatic transmission was created. This engine/transmission combination was originally designed for a Dodge Ram pickup. Externally, the vehicle featured an additional air intake on the bonnet and enlarged brakes. Acceleration time to 100 km/h (62 mph) was reduced from 35 to 23 seconds compared to the standard version, and the top speed increased from 140 km/h (87 mph) to 160 km/h (99 mph).
- **Tigr-M:** During the 2010 Interpolitex exhibition, the Multi-purpose Armored Vehicle (Ru:автомобиля многоцелевого назначения (АМН)) AMS 233 114 Tigr-M was presented by the Military Industrial Company. It featured a new YaMZ-534 diesel engine, a new armored hood, air filter installation, an increase in the number of rear passenger seats (from 8 to 9) and the replacement of the bicuspid rear hatch with a large square hatch.

- **Tigr-6A SPV:** The CTC GAZ-233014 "Tiger" SPV prototype vehicle was first shown at the Bronnitsi Armoured Vehicles Show on June 10, 2011. Based on the SPM-2, the SPV is designed for combat officer transport. It has a four-door station wagon body with increased GOST 6A armor protection (heavy mine protection and special shock-absorbing seats/footrests which are not attached to the floor). As of November 2012, tests are being conducted.
- **GAZ-29751:** 3 door wagon
- **GAZ-29752:** 5-door wagon designed to carry four people and from 500 to 1000 kilograms of cargo
- **GAZ-297533:** Two door with tilt covered load platform

System

Alternative Designation: GAZ-2975 Tigr

Type: 4X4 Russian Light Utility Vehicle

Family: GAZ Tigr

Crew: ea1

Passenger Capacity: ea10

Manufacturer: Arzamas Machinery Plant, GAZ, other plants across the country included ARZ plants (e.g. CARZ172) (Russia) Beijing Yanjing Motor Company (China) Minsk Wheel Tractors Plant (Belarus)

Note: The GAZ-2975 is a armored version

Dimensions

Length: m4.61

Width: m2.2

Height: m2

Weight, Combat: tons6

Maximum Load: tons1.5

Ground Clearance: mm400

Curb Weight: kg5,300

Turning Radius: m8.9

Automotive

Engine Name: GAZ-562

Engine Type: Diesel

Engine Power: hp197

Cruising Range: km900

Speed, Maximum Road: km/h140

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.4

Trench: m0.5

Fording Depth: m1.2

Transmission: GAZ JSC 5-speed manual

All Wheel Drive: Yes, Full Time

Tire Inflation System: Yes

Communications

Primary: R-173

Secondary: R-168 (VHF)

Main Gun

Note: The GAZ-2975 is equipped with a Remote Operated Weapon Station (ROWS), Shipunov 2A42, 30mm Autocannon and is mounted on a unmanned turret of the Uran-9 robotic system

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Manufacturer: Tulamashzavod

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): mm3.027

Barrel Length: mm2,416

Action: Gas Operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Gas Operated

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

↳*Ammunition*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30mm × 165mm

Muzzle Velocity: m/s960

Basic Load: ea200

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from

muzzle).

Auxiliary Weapon System

↳*System*

Name: PKP Pecheneg 7.62mm General Purpose Machine Gun

Type: General Purpose Machine Gun

Manufacturer: TsNIITochMash

In Service: 2001-Present

Weight (without Bipod): kg8.2

Weight (with Bipod): kg8.7

Weight (with an Infantry Tripod Mount): kg12.7

Length (Total): mm1,3200

Barrel Length: mm658

Action: Gas Operated

Rate of Fire: rds/min600-800

Effective Firing Range: m1,500

Feed System: Belt feed: 100-, 200-, 250-round

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s900

Basic Load: ea1,000

Fire Control

Laser Target Desinator: No

Protection

Armor: mm5

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Notes:

The "Tigr" ("Tiger"), which is often referred to as the "Russian Hummer", was developed by the GAZ Automobile Works for special-purpose militia units. The GAZ-2975 Tigr was officially taken into service at the end of 2006 and manufactured in 2007. The vehicle is intended to carry and protect personnel. It can accommodate up to 10 officers armed and in full gear. The vehicle has been field- and combat-tested before being sent to serve with OMON. Its armor can defeat 7.62-calibre ammunition and can withstand shell fragments. The vehicle was designed to transport troops and various equipment quickly on road and off-road. It has a chassis frame construction, with a traditional layout of front engine, middle crew compartment, and rear cargo area. Standard features include: power steering, independent all-wheel torsion suspension with hydraulic shock absorbers and stabilizer bars, a transfer case with a locking center differential, limited slip differentials, two-speed transfer case, automatic tire inflation, engine block heater, and electric winch. The GAZ-233001 has optional air conditioning, stereo, electric windows, and an anti-lock braking system. Armored versions of the Tigr feature 5 mm (0.20 in) (7 mm (0.28 in) for the SPM-2) heat-treated and stress-relieved armor plates. The Tigr can carry a half ton of cargo. The available engines are a Cummins 5.9 L (360 cu in) B180 turbodiesel with 180 hp (130 kW); a Cummins 5.9 L (360 cu in) B205 turbodiesel producing 180 hp (130 kW); a Cummins 5.9 L (360 cu in) B-214 turbodiesel making 215 hp (160 kW); or a GAZ-562 3.2 L (200 cu in) turbodiesel with 197 hp (147 kW). Designed for performance in mountain, arctic, and desert environments, the Tigr is capable of operating at ambient temperatures ranging from −14–50 °C (7–122 °F). Moreover, the vehicle has approach and departure angles of 52 degrees and a wading depth of 1.2 m (3.9 ft).

ACMAT ALTV French 4x4 Light Utility Vehicle







Tiers:



Variants:

- **Torpedo:** Open cab version. Missions include utility, fire support, reconnaissance and border surveillance, as well as recovery, cargo / troop / personnel transport, patrol, and ambulance. Anti-mine protection Level 1. he ALTV Torpedo can be fitted with 24-volt pre-equipment for radio communication systems. A self-recovery electric winch of 3,800 kg pulling force can be added at the front of the chassis.
- **ALTV SAN:** Field ambulance version. Crew: 2 in cab Rear: 2 seats with 12 stretcher, or 1 folding seat with 4 stretchers Length 5.47 m Width 1.90 m Height 2.50 m
- **ALT SW:** Enclosed station wagon version.
- **ALT SC:** Two door version.
- **ALTV DC:** Four door version.

System

Alternative Designation: Airtransportable Vehicule Tactique Leger
Description: Light tactical vehicle/military pickup truck with multiple configurations
Crew: ea1 driver
Brake system (front): Ventilated discs with ABS
Brake system (rear): Drums with ABS
Cooling: Water
Curb Weight: mt2.1
Number of Axles: ea2
Number of Tires: ea4
Payload: mt1.4
Troop Capacity: ea1 driver + 9 passengers
Weight, Gross Vehicle: mt3.5

Wheels Central Tire Pressure Regulation System: Optional

Wheels Size: in245/75R16

Drinking Water: liters78

Run Flat Tires: Optional

Winch: Optional

Electrical System: Volt24

↳***Dimensions***

Length, Chassis Overall: m5.3

Width, Overall: m1.9

Height, Overall: m1.77

Automotive

Engine Type: 2.5 liter, in-line 4, turbocharged, 4 stroke, diesel

Range, Cruising: km800 with main tanks, 1600 with auxiliary tanks

Engine Power: hp190

Fording Depth: m0.5 without preparation; 1.2m with preparation

Speed, Maximum Road: km/h170

Ground Clearance: mm260

Turning Radius: m6.65

Side Slope: degrees40

Vertical Step: m0.35

Gradient Loaded: %80

Climatic Range: degrees-12C to +55C

Cooling: Water

↳***Fuel***

Fuel Capacity Main Tank: liters80

Fuel capacity Auxiliary Tank: liters80

Mobility

Mobility, Air Lift: C-130 Hercules, TRANSALL C-160, Airbus A400

Mobility, Slingload: CH-47 Chinook helicopter

Moblity, Para-drop: Yes

Armament

Armament: The ACMAT ALTV can be outfitted with assorted weapons ring mounts, machine gun swivel mounts, or reconfigured as weapons carriers.

↳*Weapon 1*

Cailber/Length: mm7.62

Name: General purpose machine gun

Type: Ring mounted and/or swivel mounted

↳*Weapon 2*

Cailber/Length: mm12.7

Name: Heavy machine gun

Type: Ring mounted

↳*Weapon 3*

Type: mm40

Name: Automatic grenade launcher

↳*Weapon 4*

Name: Anti-tank guided missiles

↳*Weapon 5*

Name: Anti-aircraft missiles

Protection

Armor, Applique: mmOptional. NATO STANAG 4569 Level 1: Protection against 5.56- and 7.62-mm, hand grenade blasts and anti-personnel mine explosions under the hull.

Armor, Explosive Reactive: mmNo

Armor, Turret Front: mmNo

Active Protection System: No

NBC Protection: No

Smoke Equipment: No

Survivability Equipment: No

Communications

Radio systems: 24-volt pre-equipment for radio communication systems.

Notes:

The ALTV light tactical vehicle is available with two-door (ALTV SC) or four-door (ALTV DC) cab. An open-cab version (ALTV Torpedo) for special forces is also available. Vehicle has a payload capacity of 1.3 - 1.4 t, depending on the version. A cargo area in the rear can be used to carry troops, cargo, shelters, or standard ISO pallets. It is fitted with benches for the troop transportation. The ALTV can carry up to 10 men both in the cab and cargo area. Bars and canvas cover for the cargo area are optional. The ALTV can be armed with a ring-mounted 7.62-mm or 12.7-mm machine gun, or 40-mm automatic grenade launcher. Vehicle can be also used as a weapon carrier for anti-tank or anti-aircraft missiles. The engine compartment is equipped with a snorkel system for making shallow water crossings.

CSK-131 (Dongfeng CSK131) Chinese 4x4 Light Tactical Vehicle





Tiers:



Variants:

- **EQ2050:** First generation of Mengshi is a licence-built of Hummer H1. It has got a Cummins EQ150-20 engine. However, it doesn't receive an official designation and only seen limited service within PLA.
- **EQ2060:** Second generation of Mengshi. Improvements based on EQ2050. It has new engine and cabin design for comfort. It only seen limited service within PLA
- **CSK-141 (CS/VN11):** Dongfeng CSK141 is a Chinese light protected vehicle developed by Dongfeng Corporation. Although sharing a lot of similarities to the CSK-131, the chassis of CSK-141 has a much longer wheelbase with a longer crew cabin having space for 10 infantry. CSK141 shares similar electronics with CSK131 such as computer, satellite suite and night vision cameras. This vehicle features unusual clamshell doors on either side which the door divide into upper and lower part. It's one of the two principal light armored vehicle currently fielded by PLA.
- **EQ2111:** EQ2111 is the prototype for next generation MRAP light tactical vehicle.
- **CSK-181:** CSK-181 is the new generation of light tactical vehicle developed by Dongfeng for PLA. CSK-181 is based on CSK-141 with one driver, one weapon station operator as co-driver with eight infantry seats. The variant has improved satellite communication capability, longer range night-vision cameras and most importantly, Mine-Resistant Ambush Protection capability.
- **CSZ181/CTL181:** CSZ181 and CTL181 are light protected trucks modified on CSK-181.

System

Alternative Designation: Dongfeng CSK131, EQ2050
Driver: ea1
Passenger: ea5
Description: China's equivalent of up armored HMMWV.

↳*Dimensions*

Height, Overall: m2,000
Length, Chassis Overall: m5,100
Width, Overall: m2,400

Weight: kg4,900

Payload Capacity: kg1,400

Automotive

Engine Power: hp200 hp

Range, Cruising: km500

Speed, Maximum Road: km/h135

Engine Name: ISDe 200-41 Diesel

Engine Type: Cummins Diesel

Speed, Maximum Swim: km/hINA

Fording Depth: mINA

Speed , Average Cross:

Speed , Maximum Off:

Communications

↳*Radio*

Name:

Protection

Armor, Applique: mmAvailable

Armor, Explosive Reactive: mmAvailable

Armor, Turret Front: mmINA

Active Protection System: No

NBC Protection: Available

Self:

Smoke Equipment:

Survivability Equipment:

Armament

↳*Weapon 1*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: Heavy Machine Gun

Cailber/Length: mm12.7

Weight: kg25

Rate of Fire: per min.700-800 rounds

Effective Range: m1,500-2000

↳*Weapon 2*

Name: QLZ-87
Type: Automatic Grenade Launcher (AGL)
Cailber/Length: mm35
Weight (Light): kg12
Weight (Heavy): kg20
Length: mm970

Ammunition

↳*Weapon 1 Ammunition*

Type: Heavy Machine Gun
Cartridge: mm12.7 x 108
Range, Maximum Effective, Day: m2500
Range, Maximum Effective, Night: m2000
Range, Maximum Effective, On the Move: m1,500-2000
Muzzle Velocity: m/s850
Armor Penetration: mmINA
Combat Load: rds50

↳*Weapon 2 Ammunition*

Type: Grenade
Cartridge: mm35 x 32
Range, Maximum Effective: m600
Muzzle Velocity: m/s190
Armor Penetration: mmINA
Rate of Fire: rounds/min480
Combat Load: rds6-15 round drum magazine

Notes:

The Dongfeng CSK131 is Chinese light protected vehicle. It was developed by Dongfeng company as a private venture. It is an armored version of Donfeng EQ2050 tactical vehicle, which is widely used by the Chinese armed forces. At the time of its introduction this vehicle was also called the Mengshi (Chinese for brave soldier). The CSK131 is used by China's armed forces. It is also being proposed for export customers. The Dongfeng CSK131 is has got an armored hull and provides protection for the passengers against small arms fire and artillery shell splinters. This vehicle is sometimes seen with armored windscreen shutters. All-round protection is against 7.62x39 mm ball rounds from a 100 m range. Front arc withstands hits from 7.62x39 mm armor-piercing rounds. The Dongfeng CSK131 can be seen as China's equivalent of up armored HMMWV. The CSK131 accommodates driver and 5 passengers. Vehicle has a payload capacity of 2 000 kg and can carry various cargo and supplies instead of troops. It can also tow light trailers and artillery pieces. The Dongfeng CSK131 can mount various weapons on top of the roof. This vehicle can be fitted with shielded machine gun position or remotely-controlled weapon station. It was seen armed with a 12.7 mm heavy machine gun, and 35 mm automatic grenade launcher. Vehicle is powered by an ISDe 200-41 turbocharged diesel engine, developing 200 hp. It is a license-produced Cummins engine. Vehicle has a full-time all-wheel drive and is fitted with a central tyre inflation system. It improved mobility over difficult terrains, such as sand, mud and snow. Wide

track of this vehicle allows to drive in tracks left by the main battle tanks. Vehicle is equipped with a self-recovery winch.

LUAZ-967 Russian 4x4 Amphibious Vehicle





Tiers:



Variants:

- **LuAZ-967A:** 37-hp engine with top speed of 75 km/h that can tow trailers & light artillery up to 300 kg
- **LuAZ-967M:** Final production model until 1991 with same engine as the LuAZ-967A
- **Geolog:** 6 X 6 version never produced
- **Evacuation Role:** 2 stretcher & 2 seated

System

Alternative Designations: See Variants
Date of Introduction: 1961
Description: 4 X 4 off-road vehicle similar to the American Jeep
Crew: 1 (Driver) with space up to 4 additional soldiers

Dimensions

Length: mm3,682
Width: mm1,712
Height: mm4,520
Weight: kg950

Automotive

Engine Name: MeMZ-965
Engine Type: 27-hp gasoline
Ground pressure (kg/cm2): INA

Cruising Range: km285

Speed (Max Road): km/h65

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): km/h3

Fording Depths: Amphibious

Radio: INA

Armament

↳*AGS-17 (Weapons carrier only)*

Caliber/length: 30-mm

Type: Automatic Grenade Launcher (AGL)

Ammo: HE; HEDP 116 rounds (estimated)

Maximum Effective Range: m1700

Armor Penetration: INA

Muzzle Velocity: m/s185

Protection

Armor (turret front): INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Survivability Equipment: 200 kg winch available for self-recovery

Notes:

The LuAZ-967 (Ukrainian: ЛуАЗ-967) was the Transporter of the Front Line, a small Soviet four-wheel drive amphibious vehicle. Light enough to be air transportable, it had a 400 kg (880 lb) payload over most terrain. The design originated after the Korean War, when the Soviets saw a need for small off-road vehicles comparable to the American Jeep, to supplement the overly-large and -heavy GAZ-69s then in service. It was to be used by Russian Airborne Troops (VDV) for casualty evacuation, munition supply and the transport of light armaments. Developed at NAMI (the National Automobile Institute), the prototype, known as NAMI 049, was completed in 1958. Unlike the Jeep, it had a Fibreglass body, four-wheel torsion bar independent suspension, and permanent four-wheel drive with locking hubs. It had a wheelbase of 1,800 mm (71 in), a ground clearance of 280 mm (11 in), and was powered by a 22 hp (16 kW; 22 PS) MD-65 motorcycle engine (copied from an Orbita motorcycle). Trials proved it underpowered, and the body too fragile. A second prototype, the NAMI 049A, had a 746 cc (45.5 cu in) V4 MeMZ 965 engine (selected for use in the ZAZ-965), steel body, and rear wheel drive (with optional drive to the front wheels). The torsion bars were replaced with a coil spring setup. It weighed 1,350 kg (2,980 lb), with a 37 hp (28 kW; 38 PS) MeMZ 967A engine, and was able to pull a 300 kg (660 lb) trailer; it could cross a 58° gradient, and top speed was 47 mph (76 km/h). It was produced between 1961-1975 at Lutsk automobile plant - LuAZ. It was succeeded by the LuAZ-969B, LuAZ-969, LuAZ-969M and the LuAZ-1302. The LuAZ 967M had a MeMZ-967A 887 cc (54 cu in) gasoline engine from the ZAZ automobile. An air-cooled, carbureted ohv V4, it developed 37 hp (28 kW) at 2,250 rpm. A 4+1 speed transmission has separately engaged crawl gear.

Unlike many small military vehicles, it was a front wheel drive 4×2, the rear axle was selectively engaged only when 4×4 was needed. The watertight steel body had 4-wheel independent suspension with torsion bars and 285 mm (11 in) of ground clearance. The driving controls were on the truck's centerline, both the controls and the windshield could be folded down for a lower profile.

Peugeot P4 French 4x4 Light Utility Vehicle







Tiers:

1 2 **3** 4

Variants:

- **P4D:** In 1992, the Army converted their petrol P4s into diesel P4D (P4 Diesel) models. The conversion was executed by Panhard (1300 VLTT) and the Établissements régionaux du matériel. The engine, a 2.5-liter Peugeot four-cylinder, is the same as used in the original diesel P4.
- **P4P:** The P4 P (P4 Protégé, "protected P4") is an armoured version, with 80 units built in the 1990s. An armored version was made at the request of Peugeot by CBH Institutions (Constructions Blindées of Hardricourt). This version has been evaluated by the French Army and commissioned by the Navy for the Protection of sensitive sites. Five different versions were produced. P4 CBH AKIS 2400 P4 CBH SUPER AKIS 2850 P4 CBH 3120 The four digits at the end of the name signify the three wheelbases of 2,400, 2,850, or 3,120 mm (94.5, 112.2, or 122.8 in) that were available. Some P4 armored CBH have been manufactured for use in Lebanon. An operation Manufacturer and the GIGN was conducted in November 1988 for testing rolling over 24 hours. The P4 Shielded CBH AKIS blue police carried out the range of 1000 km to the average of 134.5 km per hour and the total distance of 3180 km in 24 hours is an average of 132.5 km / hour with 4 men on board. The engine was a 2.5-litre turbo exchanger amended by CBH, which had an output of 150 hp. This record was not approved at the request of the Gendarmerie.
- **P4 VPS:** Version of the P4 for the 1st Marine Infantry Paratroopers Regiment. They are equipped to have greater firepower and a higher degree of autonomy: A machine gun MIT50 (calibre 12.7 mm) coaxial A machine gun-type ANF1 (7.62 mm calibre) River crossing equipment

System

Alternative Designation: Peugeot P4
Type: Light Utility Vehicle
Manufacturer: INA
Crew: ea1
Passenger Capacity: ea3
Note: The P4 can be fitted with various adapters for mounting machine guns and other weapons. These were used by recon units. Some vehicles were fitted with MILAN ATGW launchers. These were used by motorized infantry units.

Dimensions

Length: 4.2 - 4.6 m

Width: 1.7 m

Height: 1.9 m

Maximum Load: 0.5 t

Weight, Empty: 1.75 t

Automotive

Engine Name: Peugeot XN8

Engine Type: Petrol

Engine Power: hp78

Range: km600

Speed, Maximum Road: km/h118

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %70

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.5

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The P4 is an unarmoured off-road vehicle used by the military of France. It was manufactured by Peugeot but is now manufactured by Panhard. It is to be replaced with the PVP by Panhard. The P4 is a derivative of the Mercedes Geländewagen military version built under license by Peugeot for the French military. Peugeot did not have a licence to export the vehicle anywhere else than to the countries bound to France by defence agreements. It's scheduled to be replaced by the ACMAT Light Tactical Vehicle Station Wagon. The Peugeot P4 is a light, unarmoured, four-wheel-drive vehicle manufactured by Peugeot, and used by the Military of France under the designation of "Véhicule léger tout-terrain" ("Light all-terrain vehicle"). It is based on the Mercedes-Benz G-Class and equipped with Peugeot engine and equipment. In the late 1960s, the French army decided that its 10,000 Jeeps needed to be replaced. The replacement vehicle would carry four men with radio equipment and would be small enough to be parachuted and transported by plane. After many technical issues, the new vehicle was designed in the 1970s. Agreement was reached between Peugeot and Mercedes to co-produce the vehicle on a 50:50 basis. Peugeot installed the engine of the Peugeot 504 and the transmission of the Peugeot 604 on the Mercedes-Benz G-Class; it also installed the

electrical systems, welded the exterior and painted the car. The rest was done by Mercedes. The plant in Sochaux did the final assembly. The first prototype was tested in 1978, beginning a long series of tests and trials, notably a rally in south Algeria with a petrol and a diesel P4. The French Army ordered 15,000 P4s, both petrol and diesel versions; in 1981, the order was reduced to 13,500 units with the downsizing of the Army. From 1985, production was transferred to Panhard in Marolles-en-Hurepoix, where 6,000 vehicles were produced. In 2016, P4s were donated to the Cameroonian military for its special forces units. A civilian version was made, but encountered little success because of the high price and a poor power-to-weight ratio.

UAZ-469 Russian 4x4 Light Utility Vehicle







Tiers:



Variants:

- **UAZ-469:** Initial model fielded in 1973 with 70 horsepower UMZ 451 MI engine with inferior road performance & crew features
- **UAZ-469B:** Export version with lower off-road performance capabilities. Increased ground clearance.
- **UAZ-3151 Upgrade:** Improved vehicle first produced in 1985
- **UAZ-3152:** Medical utility version. Space for driver, one medic, & 1 stretcher patient
- **BJ-212:** Chinese UAZ-469 variant
- **UAZ-3151 UMM Police Car:** Insulated five-door metal body and optional special equipment
- **UAZ-469RH:** Modified for nuclear, biological, and chemical (NBC) resistance

System

Alternative Designations: UAZ-3151 Upgrade Kozlik (Goat)
Description: 4 X 4 off-road vehicle can carry up to 6 passengers plus the driver
Layout: Front-engine, four-wheel drive
Crew: 1 (driver)

Dimensions

Length: 4,025 mm
Width: 1,785 mm
Height: 2,050 mm
Wheelbase: 2,380 mm
Curb Weight: 1,700 kg

Automotive

Engine Name: 1971–1985 – 4-cylinder UMZ 451 MI 2,450 cm3 (2.5 l) 53 kW (71.1 hp) 2010–2013 – 2,693 cm3 (2.7 l) 83.5 kW (112 hp)

Engine Type: Diesel

Engine Power: 71-112

Cruising Range: km482

Speed (Max Road): km/h110

Speed (Max Off-Road): INA

Speed (Average cross-country): INA

Speed (Max Swim): N/A

Fording Depths: m0.8

Armament

↳***None on basic model***

Caliber/length: N/A

Type: N/A

Ammo: N/A

Maximum Effective Range: N/A

Armor Penetration: N/A

Muzzle Velocity: N/A

Protection

Armor (turret front) (mm): INA

Applique Armor (mm): No

Explosive Reactive Armor (mm): No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Survivability Equipment: Optional winch

Notes:

The UAZ-469 is an off-road military light utility vehicle manufactured by UAZ. It was used by Soviet and other Warsaw Pact armed forces, as well as paramilitary units in Eastern Bloc countries. In the Soviet Union, it also saw widespread service in state organizations that needed a robust and durable off-road vehicle. Standard military versions included seating for seven personnel. Developed from the GAZ-69 , UAZ-471 and UAZ-460, the UAZ-469 was introduced in 1971 to replace the GAZ-69. It was powered by the same 75 hp (56 kW; 76 PS) 2,445 cc (149.2 cu in) UMZ 452MI inline-four engine as the UAZ-452 and was able to run on gasoline with an octane rating as low as 72 (although 76 was preferred). The UAZ-469 presented two great advantages: it was able to drive in virtually any terrain and it was very easy to repair. The vehicle was originally not available for purchase by the public, but many were sold as surplus to private owners. Modifications include a basic UAZ-469B with ground clearance of 220 mm (8.7 in), and a specialized military UAZ-469, with ground clearance increased to 300 mm (12 in).

After slight modernisation in 1985, due to new industry designation standards, they were renamed: the UAZ-469 became the UAZ-3151, while the UAZ-469B became the "UAZ-31512". Manufacture of the UAZ-31512 for the Russian Army continued until 2011, while manufacture for the civilian market was discontinued due to new emission standards. However, the currently manufactured UAZ Hunter is an updated version of the old UAZ-469B. The Hunter was originally sold in Germany and some Asian countries as the "UAZ Tigr" (Tiger), until General Motors complained that the name was too similar to the Opel Tigra, and in Germany, it was renamed "Baijah Taigah". The 469 was exported to eighty countries.

Mercedes-Benz G-Class German 6x6 Light Utility Vehicle





Tiers:

1 2 **3** 4

System

Alternative Designation: Mercedes-Benz G-Class

Type: Light Utility Vehicle

Manufacturer: Mercedes-Benz

Crew: ea1

Passenger Capacity: ea3

Dimensions

Length: 6.24 m

Width: 1.7 m

Height: 1.95 m

Maximum Load: 3 t

Weight, Empty: 3.5 t

Automotive

Engine Name: Mercedes-Benz, Engine Model: INA

Engine Type: 3-liter diesel

Engine Power: hp184

Range: km800

Speed, Maximum Road: km/h140

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: 0.6 - 1 m

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Mercedes-Benz G-Class, sometimes called G-Wagen (short for Geländewagen, "terrain vehicle"), is a mid-size four-wheel drive luxury SUV manufactured by Magna Steyr (formerly Steyr-Daimler-Puch) in Austria and sold by Mercedes-Benz. In certain markets, it has been sold under the Puch name as Puch G. The G-Wagen is characterised by its boxy styling and body-on-frame construction. It uses three fully locking differentials, one of the few vehicles to have such a feature. Despite the introduction of an intended replacement, the unibody SUV Mercedes-Benz GL-Class in 2006, the G-Class is still in production and is one of the longest produced vehicles in Daimler's history, with a span of 40 years. Only the Unimog surpasses it.

CSK-141 (Dongfeng CSK141) Chinese 4x4 Tactical Vehicle





Tiers:



Variants:

- **CS/VN11:** Export version. Publicly revealed in 2016. Has standard rear doors rather than clam shell doors. Has a remotely controlled weapon system.
- **Dongfeng EQ2101:** 6x6 with more powerful engine. Available in protected and unprotected versions. Shares automotive components with the CSK131 and CSK141 protected vehicles.

System

Alternative Designation: Mengshi

Type: Full Time 4x4

Crew: ea2

Troop Compartment Capacity: 9

Liter / Stretcher Capacity: INA

Dimensions

Length: m5.8

Width: m2.35

Height: m1.86

Weight, Combat: kg6,100

Payload Capacity: kg1,200

Automotive

Engine Name: Cummins ISDe 200-41

Engine Type: Turbocharged Diesel

Engine Power: hp200

Cruising Range: km500

Speed, Maximum Road: km/h135

Speed, Average Cross Country: INA

Speed, Maximum Swim: km/hINA

Fording Depth: m.75

Fording Depth With Preparation: m1.2

Gradient: %60

Side Slope: %30

Vertical Step: m~0.5

Trench: m~0.5

Communications

Radio: INA

Gunner's Weapon Station

↳*System*

Name: QJG89

Type: Machine Gun

Manufacturer: INA

Length: mm2,119

Barrel Length: mm1,003

Weight (gun only): kg18.5

Weight (tripod): kg17.5

Action: Gas

Rate of Fire: rpm450-600

Feed System: Belt

Sights: Iron / Optical

Stock: Fixed

↳*Ammunition*

Type: Ball

Caliber: 12.7x108mm

Muzzle Velocity: m/s825

Basic Load: INA

Effective Firing Range vs Air: m1,500

Effective Firing Range vs Ground: m2,000

Armor Penetration: INA

Magazine: Belt fed, 50 round belts

Grenade Launcher

↳*System*

Name: INA
Type: Grenade Launcher
Length: mm1,030
Weight: kg42
Action: Full-Automatic Fire, Belt-Fed, Blowback, Closed-Bolt
Sights: Iron backup with primary optics
Rate of Fire: rpm375

↳*Ammunition*

Type: HE: M383, M384; High Explosive Dual Purpose (HEDP): M430I High Velocity Canister Cartridge (HVCC): M1001 Practice: M385I, M918 Dummy: M922/M922A1 MK285
Caliber: mm40x53
Effective Range: m2,199
Single Belt: rounds30

ATGM

↳*System*

Name: Likely the HJ-8

Protection

Armor: Standard protection for the crew and passengers against small arms fire, up to 7.62x39, and artillery shell splinters. Frontal arc protection is against 7.62x39 mm armor-piercing rounds.
Applique Armor: INA
NBC Protection: Yes
Smoke Equipment: INA
Self-Recovery Wench: Yes

Notes:

Dongfeng CSK141 is a Chinese light protected vehicle developed by Dongfeng Corporation. Although sharing a lot of similarities to the CSK-131, the chassis of CSK-141 has a much longer wheelbase with a longer crew cabin having space for 10 infantry. CSK141 shares similar electronics with CSK131 such as computer, satellite suite and night vision cameras. This vehicle features unusual clamshell doors on either side which the door divide into upper and lower part. It's one of the two principal light armored vehicle currently fielded by PLA. All CSK-141 are equipped with a remote-controlled turret that can be mounted with machine guns, anti-tank missile and grenade launchers. The Dongfeng EQ2101 variants features a 6x6 configuration, and the CS/VN11 is the export version. First released in 2016, CS/VN11 has conventional side doors instead of clamshell type side doors.

Nimr Hafeet 620 Emirati 6x6 Light Utility Truck



Tiers:

1 2 3 4

Variants:

- **HAFEET 620:**
- **HAFEET 620A:** Logistics and Utility Vehicle
- **HAFEET 640A:** Artillery Support Vehicle (Observation and Command & Control configurations)
- **HAFEET APC:**
- **HAFEET Ambulance:**

System

Alternative Designation: Nimr Hafeet

Description: Light Utility Truck. The Nimr Haffet is essentially a new-generation version of the original Nimr 6x6, that appeared back in 2005.

Cab Seating: ea1 + 1/3 men

Airlift Capable: INA

Note: There are 2-, 3- or 4-door versions of the Hafeet. All versions can be armored.

↳*Dimensions*

Length: m6.9

Width: m2.3

Height: m2.1

Weight, Empty: tons8 - 11.5

Payload Capacity: tons2.4-5

Automotive

Engine Name: Cummins ISBe 300

Engine Type: Diesel

Engine Power: hp296

Maximum Road Speed: km/h110

Maximum Range: km650

Gradient: %43

Side Slope: %30

Vertical Step: m0.4

Trench: m0.5

Fording: m1

Note #1: This military vehicle can also tow trailers and light artillery pieces.

Note #2: Vehicle is fitted with a central tyre inflation system and run-flat tyres as standard. Also there is a recovery winch, which also comes as standard.

Main Weapon System

Note: This armored vehicle has a roof hatch and can be fitted with a roof-mounted 7.62 mm or 12.7 mm machine gun machine gun, or 40-mm grenade launcher. Sometimes the Nimr II is even fitted with a heavy machine gun. Depending on customer requirements this vehicle can be fitted with remotely controlled weapon station. Some vehicles are fitted with smoke grenade dischargers.

↳*System*

Name: Caracal Assault Rifle 817

Alternative Designation: CAR 817

Date of Introduction: 2016

Country: United Arab Emirates

Manufactuer: Caracal International company

Caliber: mm7.62

Length, Stock Extended: mm884

Length, Stock Retracted: mm802

Barrel Length: mm406

Weight, Without Magazine: kg3.3

Muzzle Velocity: m/s750

Cyclic Rate of Fire: rds/min650-750

Practical Rate of Fire: rds/min30-90

Magazine Capacity: 10, 20, 25 rounds

Range of Effective Fire: m600

Sight: Iron

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62x51 mm

Protection

Armor: The armored cab provides protection for the passengers against small arms fire and artillery shell splinters, mines and improvised explosive devices.
Applique Armor: Available, There are numerous versions of the Nimr Hafeet. Due to its modular nature the vehicle can be configured to suit various battlefield roles.
Explosive Reactive Armor: No
Active Protection System: INA
NBC Protection: Optional
Smoke Equipment: Available, smoke grenade dischargers
Fire Suppression System: Yes
Protective Net: Protective net against anti-tank rocket launchers
Battle Field Management System: Available

Notes:

The HAFEET Class of 6x6 vehicles provides a multipurpose platform for all military requirements at 13,000 kg capacity from utility vehicles to fully protected patrol vehicles. A universal 6x6 chassis is utilised for a common logistic basis. All vehicles in the HAFEET Class can be protected, and specific protected models are included for crew survivability with fully tested and certified cabins. The main role of the Hafeet is to provide troops with logistical and utility support. Also there are some specialized versions of this vehicle. It is a purpose-designed military vehicle, which can operate in demanding conditions. It has good cross-country mobility and can travel over difficult terrain. The Hafeet has a payload capacity and size of a light truck. However due to its military nature the Hafeet can withstand heavy use or even abuse, far exceeding that of militarized commercial vehicles, or those based on commercial drivelines. Most versions of the Hafeet can carry loads with a maximum weight of 2 400-5 000 kg. This military vehicle can also tow trailers and light artillery pieces. There are 2-, 3- or 4-door versions of the Hafeet. All versions can be armored. The armored cab provides protection for the passengers against small arms fire and artillery shell splinters, mines and improvised explosive devices.

Unimog 4023 German 4x4 Light Utility Vehicle




Tiers:

1 2 3 4

System

Alternative Designation: U4023

Crew: ea2

Gross Vehicle Weight: mt10.3

Payload: mt8

Axles: ea2

Wheels: ea4

Tire Size: 335/80R20, 425/75R20, or 405/70 R24

Central Tire Inflation System: Yes. “Tire Control Plus”. Preselect or manually select pre-programmed mode in the display. Operation via steering wheel buttons

Run Flat Tires: No

Towing Capability: mt19 on highway with no cargo payload

↳*Dimensions*

Height, Overall: m2.76 (cab)

Length, Chassis Overall: m6

Width, Overall: m2.48

Wheelbase: m3.85

↳*Cargo Space*

Height: m1.4

Length: m4.1

Width: m2.28

Cargo Bed Area: m26

Automotive

Engine Power: hp231
Speed, Maximum Road: km/h89
Fording Depth: m1.2
Engine Name: OM 934 LA
Engine Type: Turbodiesel
Ground Clearance: mm410
Turning Radius: m16.3
Engine Size: liters5.1
Fuel Capacity: liters160 main tank. 240 with auxiliary tank.
Angle of Approach: degrees41
Angle of Departure: degrees39

Notes:

Extremely maneuverable with 8 forward gears and 6 reverse gears with automatic transmission. The central tire pressure regulation system allows the driver to choose between three different tire pressure conditions: road, sand, and off-road. The OM 934 engine is Euro 6 emissions compliant. Cold engine start down to -15C. The Unimog U 4023/U 5023 makes its way. Advancement and safety, perfection and responsibility, power and innovation – those are just some of the values which Unimog customers rightfully connect with Mercedes-Benz and for which Unimog vouches. It combines great efficiency, state-of-the-art large-series production technology and outstanding off-road capability to form a truly successful overall concept that stands for Mercedes-Benz's decade-long experience in the development and production of highly off-road capable commercial vehicles. The off-road capability of the Unimog begins with its unique chassis concept: The torsionally flexible chassis with 3-point mounting of cab, engine and transmission as well as the axle suspension with thrust tube technology, wishbones and coil springs allow axle articulation of up to 30 degrees. All-wheel drive, single tyres, Tirecontrol plus central tyre inflation system and differential locks ensure maximum off-road traction. And the vehicle's low centre of gravity ensures stability even on extremely steep slopes. When off-road, the Unimog also benefits in particular from its ground clearance of up to half a metre.

ACMAT VLRA French 4x4 Light Utility Truck





Tiers:

1 **2** 3 4

Variants:

- **TPK 4.15 SM3:** 12 man transport
- **TPK 4.15 STL:** General purpose transport truck
- **TPK 4.15 FSP:** Long Range Patrol Vehicle
- **TPK 4.15 LRM:** Multiple rocket launcher carrier
- **TPK 4.15 ASPIC:** Weapons carrier
- **TPK 4.15 PACF:** Weapons carrier
- **TPK 4.20 BL:** Armored variant
- **TPK 4.20 SC:** 2500-liter tanker version
- **TPK 4.20 PCR:** Radio Command Post
- **TPK 4.20 SL7:** Light recovery duty vehicle
- **TPK 4.20 SM2:** Troop Carrier
- **TPK 4.20 SAM:** Ambulance
- **TPK 4.20 SM3:** 2.5 ton gun truck
- **TPK 4.20 VCT:** Command and transmission vehicle
- **TPK 4.20 VPL2:** Scout car
- **TPK 4.20M ALM:** Cargo truck
- **TPK 4.25 SAm:** Ambulance
- **TPK 4.25 Pamela:** Surface-to-Air Missile carrier
- **TPK 4.30 BUS:** 28 or 34 passenger bus. Available in command vehicle conversion
- **TPK 4.30 SAM:** Workshop truck
- **TPK 4.35 SCM:** Mechanical handling vehicle
- **TPK 4.35 SM:** Troop carrier
- **TPK 4.35 SM2:** General purpose utility truck
- **TPK 4.35 VPC:** Convoy protection vehicle/weapons carrier

System

Alternative Designation: Véhicules de liaison, de reconnaissance et d'appui
Crew: ea1 driver
Troop Capacity: ea2 in cab, 12 in troop compartment
Weight, Gross Vehicle: mtShort Chassis: 1.5 to 2.5 Long chassis: 2.5 to 3.5
Number of Axles: ea2
Number of Tires: ea4
Wheels Size: inMichelin XZL 335/80 R20
Wheels Central Tire Pressure Regulation System: Yes
Brake system (front): Oleopneumatic

Brake system (rear): Oleopneumatic

Trailer Payload On: mt1.7

Ground Clearance: mm500

Payload on/off Highway: kg1.7

Side Slope: deg30

Vertical Step: m0.5

Run Flat Tires: Optional

Winch: Optional 6.8t front electric winch

Drinking Water: Four 20 liter jerricans and 180 liter tank

Angle of Approach: degrees43

Angle of Departure: degrees41

Electrical System: Volts24

↳***Dimensions***

Height, Overall: m2.56

Length, Overall: m6.3

Width, Overall: m2.1

Automotive

Engine Type: 6-cylinder turbodiesel direct injection

Speed: km/h100

Range, Cruising: km1200

Ground Clearance: mm500

Fording Depth: m0.9 without preparation

Cooling: Water

Fuel Capacity: liters360

Fuel capacity, Left Tank: liters180

Fuel capacity, Right Tank: liters180

Gradient, Loaded: deg60

Power: hp145

Trench: m0.5

Engine Name: Perkins 6.354.4

Mobility

Mobility, Air Lift: C-130 Hercules and C-160 TRANSALL

Armament

Armament: Can be armed with a 7.62mm general purpose machine gun mounted on a swivel station and a 12.7mm heavy

machine gun mounted on 360° or 3/4 ring mount

Additional armament: Based on the mission requirements, the vehicle can carry a range of weapons such as medium and heavy machine guns, rocket-propelled and automatic grenade launchers, and shoulder-launched missile systems in the rear cargo area. Cabin and platform reinforcements are also available for weapons supports.

Protection

Applique Armor: Optional VFI systems can withstand the ballistic attack with 7.62mm NATO

Notes:

ACMAT (Ateliers De Construction Mécanique De L'atlantique, also known as ALM-ACMAT) since 22 May 2006 is a wholly owned subsidiary of Renault trucks. Known for their reliability, simplicity, ruggedness and their 80% (over 3,500) commonality of parts across the entire product line, these vehicles were originally targeted at African and Asian countries who could not afford more expensive vehicles. The ACMAT company built their vehicles based on standardization, commonality of parts and components, and on interchangeability; parts are interchangeable with vehicles built 30 years ago. Parts commonality includes cabs, structural components, engines and drive trains. ACMAT uses many of the same parts for all of its line of vehicles. The VLRA series of tactical military trucks has been developed especially for reconnaissance, escort and support duties. It is also used as a heavy patrol vehicle, equipped for long reconnaissance missions. All VLRA variants have full-time all-wheel drive and an integrated water tank that holds 200 liters of drinking water.

Light Strike Vehicle Singapore 4x4 Light Utility Vehicle







Tiers:

1 **2** 3 4

Variants:

- **SRAMS:** 120-mm Super Rapid Advanced Mortar System (SRAMS) with an auto-loader & 6 rounds on vehicle
- **Ammo Carrier:** Accompanies the SRAMS with additional crew member
- **Spider with Spike ATGM:** Anti-tank weapons carrier
- **Light Strike Vehicle Mark II:** The primary role of the LSV MK. II is against armoured threats. It is designed to be helicopter portable and manoeuvrable over cross-country terrain. The vehicle is equipped with enhanced networking capabilities to support the integration with other combat systems during operations.

System

Alternative Designations: The Light Strike Vehicle (LSV) was a US designed vehicle named the Flyer designated R-12D produced in Australia and later in Singapore.
Description: 4 X 4 dune buggy type vehicle with rollover frame can hold up to 6 passengers in addition to the crew.
Manufacturer: Singapore Technologies Kinetics Ltd (ST Kinetics) Australian Defence Industries
Crew: ea3
Passengers: ea6

Dimensions

Length: 4,250 mm
Width: 2,110 mm
Height: Top of roll cage: 1,900 mm
Curb Weight: 1,500 kg
Payload Capacity: kg1,000

Automotive

Engine Name: Peugeot

Engine Type: 2 litre turbocharged intercooled diesel

Engine Power: hp104

Operational Range: km350

Speed (Max Road): km/h110

Speed (Max Off-Road): km/h80

Speed (Average cross-country): INA

Speed (Max Swim): N/A

Fording Depths: m0.60

Transmission: semi-automatic transaxle, 3 forward and 1 reverse gears

Suspension: Independent all-round

Main Weapon System

Note: A typical weapon installation could be a 7.62mm machine gun forward plus a pedestal mount for a missile launcher or a 40 mm automatic grenade launcher such as the 40AGL. The STK 50 heavy machine gun can also be mounted. Some vehicles in service with the Singapore Army carry a rear-mounted pedestal for two Spike anti-tank guided weapons (ATGW), with stowage for five missiles. Others have been seen with a combined 40 mm AGL and 7.62 mm machine gun mounting supplemented by a pintle-mounted 7.62 mm machine gun, while others have been seen mounting the MILAN ATGW.[

↳*System*

Name: STK 40 AGL

Type: 40 mm automatic grenade launcher

In Service: 1991-Present

Manufacturer: Chartered Industries of Singapore (now ST Kinetics)

Proliferation: Bangladesh Cyprus: Cypriot Army announced purchase of CIS 40 AGLs in 2007. Indonesia: Made under license by PT Pindad for the Indonesian military as Pindad SPG-3 in 1994. Georgia: Used on Nurol Ejder and Otokar Cobra AFVs Papua New Guinea: Used by the Royal Papua New Guinea Constabulary. Philippines: Philippine Army, Philippine Marine Corps Singapore: Used as a main armament on the Bionix 40/50 IFVs.

Length: 966 mm

Barrel Length: 350 mm

Width: 376 mm

Weight: kg33

Action: Blowback operation

Rate of Fire: 350-500 rounds/min

Muzzle Velocity: m/s242

Maximum Firing Range: m2,200

Feed System: Linked belt

Sights: Folding leaf sight

↳ ***Ammunition***

Type: Grenade

Caliber: 40mm

Cartridge: 40x53mm grenade

Secondary Weapon System

Note: 1–2× FN MAG General-Purpose Machine Guns

Protection

Armor (turret front): None, relies on speed

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: INA

Survivability Equipment: Off-road mobility, speed, 360°crew fire, & quick dismount for protection

Notes:

The Light Strike Vehicle (LSV) is a light fast attack vehicle used by the Singapore Army. In 2013, the Singapore designed and made Light Strike Vehicle Mark II (LSV MK.II) entered service to replace the ageing Singapore and Australian made Light Strike Vehicle in service since 1998. The Light Strike Vehicle (LSV) was a US designed vehicle named the Flyer designated R-12D produced in Australia and later in Singapore. The Flyer R-12 high-speed mobility vehicle was originally designed by HSMV Corporation, subsequently purchased by the Flyer Group (now Flyer Defense, a Division of Marvin Group). The Flyer was based on the chassis of the R-1 Rescue All Terrain Transport (RATT). The vehicle is powered by a rear-mounted, 2-litre, 110HP water-cooled turbocharged diesel coupled to a three-speed semi-automatic transmission. The chassis is constructed of welded chrome-moly seamless tubing and a long travel progressive suspension. In 1995, the Flyer R-12D Light Strike Vehicle was a proposal for the cancelled Australian Army project “Mulgara” by Australian Defence Industries (ADI)/ Raceco-HSMV (US). Later, Flyer Defense LLC designed an upgraded Flyer designated the R-12D Flyer 1 which was produced in the US for the Greek Army special forces in left hand drive. A second generation Flyer designated the Flyer 21 was developed by Flyer Defense LLC (also referred to as the Flyer Internally Transportable Vehicle (ITV-1)). The ITV-1 did not enter full production. In 2003, ST Kinetics provided the United Arab Emirates (UAE) with prototype Flyers for a potential contract of between 60 and 90 light strike vehicles. At the Eurosatory 2004 in Paris, the Israeli company Rafael Armament Development Authority unveiled the Mantis high-mobility attack vehicle prototype based on the US produced Flyer ITV-1. The Mantis did not enter full production, however, several prototype Mantis Flyers were successfully deployed in counter smuggling operations along the Israel-Egypt border and tested by special forces. In 2004, the Malaysia government military company DEFTECH formed a partnership with Flyer Defense LLC to market the Flyer Advance Light Strike Vehicle (ALSV) GEN II (variant ITV-1) in the region, after ST Kinetics had commenced developing their own vehicle, the partnership continues today. In 2008, the Indian government military company Ordnance Factory Board (OFB) produced a Flyer ITV-1 prototype with Flyer Defense LLC for the Indian Army Light Support Vehicle (LSV) contract. The vehicle did not enter production.

→Anti-Tank Vehicles

→→Wheeled Anti-Tank Vehicles

9P148 Russian Anti-Tank Guided Missile Carrier





Tiers:



Variants:

- **9P137:** Original launcher vehicle with 5 AT-5 (only) launch rails

System

Alternative Designations: BRDM-2/AT-5
Crew: ea2
Combat Weight: mt7.0
Length: m5.73
Height: m2.31
Width: m2.26
Drive Formula: 4x4

Automotive

Engine Type: 140-hp Gasoline
Cruising Range: km750
Max On-Road: km/h100
Max Off-Road: km/hINA
Max Cross-Country: km/hINA
Max Swim: km/h10
Fording Depth, note: mAmphibious

Protection

Radio: R-123
Armor, Turret Front: mm30

Applique Armor: mmN/A

Reactive Armor: mmN/A

Mobility (mine clearing, self-entrenching): N/A /A

NBC Protection System: Collective

Smoke Equipment: N/A

Fire Control

FCS Name: INA

Beacon or Tracker Type: Incandescent, IR, 9S451M1

Rangefinder: N/A

IR Searchlight: N/A

ATGM Guidance: SACLOS

ATGM Command Link: Wire

↳*Day Sight*

Day Sight: 9Sh119M1

Acquisition Range: m4500

Armament

Type, Name: ATGM, 9P135M3

Rate of Fire (prac, cyclic): 3,4

Fire on Move: No

Ammunition

↳*Missile Type, Name*

Missile Type, Name: ATGM, AT-5/SPANDREL

Max Range: m4000

Minimum Range: m75

Penetration, KE/CE: mm650, CE

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg25.2

↳*Missile Type, Name*

Missile Type, Name: ATGM, AT-5B

Max Range: m4000

Minimum Range: m75

Penetration, KE/CE: mm925, CE

Warhead Type: Tandem Shaped Charge (HEAT)

Missile Weight: kg26.5

↳***Missile Type, Name***

Missile Type, Name: ATGM, AT-4/SPIGOT

Max Range: m4000

Minimum Range: m75

Penetration, KE/CE: mm480, CE

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg13.0

↳***Missile Type, Name***

Missile Type, Name: ATGM, AT-4B

Max Range: m2500

Minimum Range: m70

Penetration, KE/CE: mm550, CE

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg13.4

Notes:

The 9P148 is a Soviet anti-tank missile carrier. Unusually this anti-tank vehicle has got no proper name and is referred by its military index designation. It is based on a BRDM-2 armored scout car chassis and is fitted with Konkurs (Western designation AT-5 Spandrel) anti-tank guided missiles. It was a successor to the 9P122 anti-tank missile carrier, which was also based on the BRDM-2 chassis, but packed older and less capable Malyutka (AT-3 Sagger) missiles. The 9P148 was first seen in 1977. This missile carrier was exported to a number of Soviet allies. Despite its age the 9P148 is still used by the Russian military. It is also operational with some former Soviet republics and export operators, including Armenia, Bulgaria, Czech republic, Hungary, Moldova, Romania and Slovakia. The 9P148 vehicle has five Konkurs missiles in ready-to-launch position on the roof and carries 10 reload missiles internally. When not in use the whole launcher with missiles is retracted inside the hull. The launcher is reloaded under complete armor protection. The platform vehicle is a BRDM-2M/GAZ-41-08. A variety of ATGM mixes have been seen with 9P148, between AT-4 (Spigot) and AT-5-type (Spandrel) ATGMS. The primary benefit of adaptability is increased launcher load and adaptability to user countries' inventories of ATGMs. Most common ATGM is AT-5. As AT-5B is produced, it is likely to replace AT-5 in better-budgeted country inventories. Reload time for the launcher is 25 seconds. Russian firms have developed countermeasures, such as encoded-pulse beacons for ATGMs and counter-dazzler adjustments to the 9S451M1 guidance box. Filters can be mounted in front of reticles. The 1PN66 thermal sight is available for the ATGM launcher. Acquisition range is approximately 2,500 meters. Russian KBP offers a drop-in one-man turret, called Kliver, with a stabilized 2A72 30-mm gun, a 4 Kornet ATGM launcher, thermal sights, and improved fire control system.

ZTL-11 Chinese 105mm Anti-Tank Vehicle





Tiers:



Variants:

- **ZBL-09:** a wheeled infantry armoured fighting vehicle designed and manufactured by the Chinese Defense Company NORINCO China North Industries Corp. The ZBD-09 was presented for the first during the military parade in Beijing for the 60th anniversary of the Chinese army (PLA), the 01 October 2009. The ZBD-09 was based to the chassis of the VN1 8x8 wheeled chassis.
- **ZBL-08:** ZBL-08 is the designation for Infantry Fighting variant in the Type 08 vehicle family. The modular design claims to be able to field variety of different models including an APC model, assault gun, an Engineering model, a 122 mm self propelled howitzer model, a 155 mm self propelled howitzer model, an air defense model, a self-propelled mortar model, a reconnaissance model, a command vehicle model and much more.
- **Type 08 Armoured Personal Carrier:** Based on IFV variant but the modified crew cabin has a higher ceiling. The Armored Personnel Carrier can be armed either with a manual controlled, armor-plate protected 12.7 machine gun or a remote controlled weapon station
- **Type 08 Armored Reconnaissance Vehicle:** rmed with a 30 mm turret, the vehicle has a chassis that similar to the one used by IFV variant. The Armored Reconnaissance Vehicle will advanced before IFVs and assault guns for intelligence gathering. On-board high definition electro-optical cameras, thermal imaging system and laser designator can transmit battlefield and target information for other data-linked vehicles for target identification and designation. The Armored Reconnaissance Vehicle can provide better situational awareness for the infantry fighting squadron. The main radar and electric-optic sight is mounted on a retractable mast. There's also a version of the vehicle that doesn't have 30 mm turret. Instead, the chassis of APC variant is used. The secondary version of the Armored Reconnaissance Vehicle has more cameras onboard yet lack self-defense
- **PLL-05 Mortar Carrier:** Based on IFV variant. It's armed with a 120mm dual purpose mortar.
- **PLL-09 (Type 09) Modular Self-propelled Howitzer system:** Based on IFV variant. Can be armed with either a 122mm or 155mm howitzer, to provide indirect fire support for infantry
- **Type 09 Anti-Air Reconnaissance Vehicle:** Armed with a single barrel 35mm revolving auto cannon, the Air Defense variant has a unique chassis and is equipped with thermal-tracking sight, targeting and surveillance radars. The data collected by the radars can be data-linked back to command and armored reconnaissance vehicle.
- **VE32A:** Reconnaissance vehicle[
- **CS/AA5:** Specialized IFV variants with a remote-controlled 40mm turret. The chassis of CS/AA5 is based on Type 08 IFV.
- **VN-1:** Export variant based on Type 08 IFV. The VN-1C is armed with a 30 mm remote weapons station and a HJ-73 anti-tank missile.

System

Alternative Designation: ZLT11
Type: Armored Fighting Vehicle
Crew: ea4
Troop Compartment Capacity: ea7-10
Maximum Effective Range: km800
Amphibious: Yes

Gradient: %60

Side Step: %30

Vertical Step: m0.55

Trench: m1.8

Front Axes: Coil Spring & Shock Absorber

Rear Axes: Torsion Bar & Shock Absorber

Water Navigation: Yes

Screws: eaYes, 2

Tyre Inflation System: Yes

Dimensions

Length: m8

Width: m3

Height: m2.1

Weight, Combat: kg20,000

Automotive

Engine Type: BF6M1015FC 6-cylinder water cooled turbocharged diesel

Engine Power: hp440

Automatic Transmission: Yes

Cruising Range: km800

Speed, Maximum Road: km/h100

Speed, Average Cross: 80

Speed, Maximum Swim: km.h8

Communications

Radio: INA

Satellite Communications: Yes

Armament

↳*Main Gun*

Name: Royal Ordnance L7

Caliber/Length: mm105

Number of Rounds: ea36

Max Range: km5

Traverse Range: %360

Multi-Purpose Muzzle Break: Yes

Muzzle Velocity: m/s1,740

Armor Penetration: Yes

Elevation Range: %-6 to +18

Manual Load Time: rd/m6-8

↳*Coaxial Weapon System*

Name: Anti-Aircraft (AA) Heavy Machine Gun (HMG)

Caliber/Length: mm12.7

Number of Rounds: ea500

Rate of Fire: rd/m700-800

Muzzle Velocity: m/s845

Effective Range: m1500 (Air), 2000 (Ground)

Reed System: 50 Round Belt

Armor Penetration: Available

↳*Loader's Weapon System*

Caliber/Length: mm7.62

Number of Rounds: ea2,000

Muzzle Velocity: m/s730

Max Range: m700

Armor Penetration: Available

Fire Control

Name: INA

Computerized FCS: Yes

Thermal, Vehicle Commander: Yes

Thermal, Gunner: Yes

Laser Surveying Machine: Yes

Laser Range Finder: Yes

Liquid Crystal Digital Information Display: Yes

Ballistic Calculator: Yes

Main Gun Stabilization: Yes, Bi axial

IFF: Yes

Launch Speed: rpm6-8

Hokuto Satellite Position Measurement System: Yes

Protection

Armor Type: Rolled Welded Steel Plate

Hull Armor: mm12.7

Turret Armor: mm7.62

Applique Armor: mmYes

Explosive Armor: INA

Active System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, Optional

Smoke Equipment: Yes

Night Vision: Yes

Anti-Aircraft: Yes

Automatic Fire Extinguishing System: Yes

Notes:

ZTL-11 is the second wheeled armored fighting vehicle equipping China's army. The ZTL-11 is a derivative of the Type-08 infantry combat vehicle (ZBL-08), Compared with the previous PTL-02, except that the 105mm gun was used instead of the 100mm gun, and the chassis was changed from 6 to 8 wheels, the affiliation was transferred from the artillery to the armor, and the fire support became a fire assault. The ZLT-11 wheeled armored assault vehicle in China's active service is an 8X8 chassis equipped with a low-rear 105-line tank gun. It has a total weight of 23 tons, a length of 8 meters, a width of 3 meters and a height of 2.1 meters. The water can be used to float in the river. Has good mobility and strong firepower.

Type 92B Chinese 4x4 Anti-Tank Guided Missile Carrier



Tiers:

1 2 3 4

Variants:

- **Red Arrow-9A:** MMW-Homing Version - in development.
- **RED ARROW-9B:** Semi-Active laser homing - in development.
- **92B:** A recently shown 4-tube launcher mounts missiles in an armored box. A single tube launcher was developed for light vehicles. Initial version is on the NJ2046 4x4 light utility vehicle.
- **Single tube launcher:**
- **High explosive thermobaric.:**
- **The system is only vehicle-mounted. First fielded vehicle is type:**

System

Alternative Designation: WXLZ602B for vehicle. AKA RA-9, Hong Jian-9, and HJ-9
Chassis: WZ-550
Country of Origin: China
Crew : ea3
Drive Formula: 4x4
Ground Pressure : kg/cm2INA
Weight, Combat : mt12.5

↳*Dimensions*

Height : m2.8
Length : m6.63
Width : m2.8

Armament

↳*Weapon 1*

Cailber/Length : mm152.0
Elevation, Maximum : deg10.0
Elevation, Minimum : degneg 10

Fire on Move: No

Loader Type: Auto or Manual

Name: Red Arrow-92

Rate of Fire, Cyclic : rd/min4.0

Rate of Fire, Practical : rd/min3.0

Type: ATGM

Automotive

Engine Power : hp320.0

Engine Type: BF8L413F Diesel

Fording Depth : mAmphibious

Range, Cruising : km800.0

Speed , Maximum Road : km/h95.0

Speed, Maximum Cross-Country: km/hINA

Speed, Maximum Off-Road: km/hINA

Speed, Maximum Swim : km/h8.0

Communications

↳*Radio*

Name: INA

Fire Control System

↳*Day Sight*

Acquisition Range : km5000.0

Type: Low light level TV with auto- tracker, NFI

↳*FCS*

Name: ATM

↳*Main Gun Stabilization*

Available: INA

↳*Night Sight*

Acquisition Range : km4000.0

Name: Thermal Image System, INA

↳*Rangefinder*

Type: Laser rangefinder 10,000m

Munition

↳*Weapon 1 Munition 1*

Penetration : mm1200, KE

Range, Maximum : m100.0

Range, Maximum : m5000.0

Type: Tandem shaped Charge (HEAT)

Weight : kg37.0

Protection

Armor, Turret Front : mmINA

NBC Protection: No

Smoke Equipment: INA

Notes:

This is a WZ 551 4 x 4 vehicle fitted with small, traversable launcher holding four Red Arrow 8 ATGW; eight reloads are stowed in hull. Elevation is -7/+13 degrees (-124/+231 mils). Rate of fire is 2 rounds/min. The vehicle weighs 27,558 lb (12,500 kg) when combat loaded; it has a crew of four. This variant is in service with the Chinese army and has been reportedly supplied to Bosnia-Herzegovina. An alternative configuration is equipped with a 73-mm gun, 7.62-mm coaxial machine gun and the Red Arrow 73 anti-tank missile. The Type 92B is armed with the Red Arrow 9 heavy long-range anti-tank weapon system. This variant was shown publicly for the first time in 1999.

M1167 HMMWV American 4x4 Expanded Capacity TOW Armament Carrier





Tiers:



Variants:

- **Major HMMWV A0/A1/A2 versions:** *M56/M56A1 Coyote Smoke Generator Carrier (mounted on a HMMWV; not a Type Classified HMMWV) *M707 Knight (replaced, originally mounted on a M1025A2 HMMWV; not a Type Classified HMMWV) *M966/M966A1 TOW Missile Carrier, basic armor, without winch *M996 Mini-ambulance, two-litter, hard top (type classified but not produced) *M997/M977A1/M977A2 Maxi-ambulance, four-litter, basic armor *M998/M998A1 Cargo/Troop Carrier without winch *M998 HMMWV Avenger (mounted on a HMMWV; not a Type Classified HMMWV) *M1025/M1025A1 Armament Carrier, basic armor, without winch *M1025A2 Armament/TOW Missile Carrier, basic armor *M1026/M1026A1 Armament Carrier, basic armor, with winch *M1035/M1035A1/M1035A2 Soft top Ambulance, two-litter *M1036 TOW Missile Carrier, basic armor, with winch *M1037 Shelter Carrier, without winch *M1037 Shelter Carrier MSE *M1038/M1038A1 Cargo/troop Carrier with winch *M1042 Shelter Carrier, with winch *M1043/M1043A1 Armament Carrier, supplemental armor, without winch *M1043A2 Armament Carrier, supplemental armor *M1044/M1044A1 Armament Carrier, supplemental armor, with winch *M1045/M1045A1 TOW Missile Carrier, supplemental armor, without winch *M1045A2 TOW Missile Carrier, supplemental armor *M1046/M1046A1 TOW Missile Carrier, supplemental armor, with winch *M1069 Tractor for M119 105-mm Gun *M1097/M1097A1 Heavy Hummer Variant (HHV) *1097A2 base platform *M1097A2 Cargo/Troop Carrier/Prime Mover (replacing the M998A1) *M1097A2 Shelter Carrier *M1097 Heavy HMMWV Avenger (mounted on a HMMWV; not a Type Classified HMMWV) *Packhorse – Attachment to convert an M1097 to tractor version for semi-trailers *XM1109 Up-Armored Heavy Hummer Variant (UA-HHV) (replaced by M1114) *M1123 Troop/cargo (U.S. Marines specific M1097A2)

System

Alternative Designation: M1167 HMMWV

Type: 4x4 Expanded Capacity TOW Armament Carrier

Manufacturer: AM General

Family: HMMWV

In Service: 1987-Present

Crew: ea1

Passenger Capacity: 8 maximum (can also carry casualties)

Dimensions

Length: 4.84 m

Width: 2.16 m

TOW Height: 1.88 m

Wheelbase: 3.30 m

Ground Clearance: 0.41 m

Vehicle Weight, (TOW Basic Armor): 3,075 kg

Payload Weight, (TOW Basic Armor): 1,597 kg

Gross Weight, (TOW Basic Armor): 4,672 kg

Vehicle Weight, (TOW Extra Armor): 3,295 kg

Payload Weight, (TOW Extra Armor): 1,380 kg

Gross Weight, (TOW Extra Armor): 4,672 kg

Automotive

Engine Name: 1 x General Motors V8

Engine Type: 6.5L turbo-charged, diesel fuel injection

Engine Power: 160 hp at 3,400 rpm

Transmission: automatic w/4 forward gears, 1 reverse gear

Fuel Capacity: 94 liters

Range: 483 km

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.56

Fording Depth: m1.52

Suspension: independent double A-arm with coil spring on all wheels, with front stabilizer bar

Main Weapon System

Name: BGM-71

Type: TOW Anti-Tank Guided Missile

Length: 1.17 m

Diameter: 152 mm

Wingspan: 0.45 m

Engine: 2 x Hercules solid-fuel rocket motors; first motor has short burn to allow TOW to clear tube; second motor sustains TOW flight until impact; TOW 2 motor provides 30 percent greater impulse than the basic TOW

Total Weight: 18.9 kg

Warhead Weight: 3.9 kg

Elevation: INA

Traverse: This variant features a TOW missile launcher and a ring mount for various weapon systems with a 360-degree arc of fire.

Maximum Speed: 300 m/sec

Range: 3,000 m

Guidance System: semi-automatic command to line-of-sight (SACLOS) wire guidance

Infrared: automatic tracking of xenon or thermal beacon in tail

Basic Load: 6 x BGM-71 TOW Anti-Tank Guided Missiles

Auxiliary Weapon System

Note: basic vehicle does not have weapons fitted; armament carrier can be fitted with a 7.62-mm or 12.7-mm machine guns or a 40-mm grenade launcher; TOW carrier has launcher

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1167 was a TOW missile carrier configuration in the Expanded Capacity HMMWV series. The M1167 was equipped with an M41 Improved Target Acquisition system (ITAS) used to mount and operate the missile launcher system and featured armor ballistic protection for crew, missile stowage, secondary weapons mount for close range, and ammunition. These tactical vehicles were designed for use over all types of roads, as well as cross-country terrain, in all weather conditions. All vehicles were able to stow a minimum of 6 missiles mounted in the cargo area and are equipped with a pintle hook for towing, tiedowns, and lifting eyes for air, rail, or sea shipment. The optional front self-recovery winch permitted recovery operations of similar vehicles. Fully loaded M1167s could climb road grades as steep as 40 percent (22 degrees) and traverse a side slope of up to 30 percent (13.5 degrees). The vehicle could ford hard bottom water crossings up to 30 inches (76 centimeters) without a deep water fording kit and 60 inches (152 centimeters) with the kit. The primary difference between the M1167 and the M1115, was that the M1167 featured a slightly lower default armor package based on the Integrated Armor Protection package (or A-Kit) for the M1151A1/M1152A1/M1165A1 type vehicles, but was capable of mounting the supplemental armor (B-Kits). Frag Kits could also be installed. These vehicles reflected the US Army's Long Term Armor Strategy of developing vehicles with adaptable armor packages.

→→Tracked Anti-Tank Vehicles

M901 ITV American Anti-Tank Guided Missile Carrier



Tiers:

1 2 **3** 4

Variants:

- **M901:** employs the M220A1 TOW
- **M901A1:** employs the M220A2 TOW 2
- **M901A3:** employs the M220A2 TOW 2 and incorporates the RISE powerpack and improved driver controls of the M113A3.

System

Alternative Designation: ITV (Improved TOW Vehicle), ITOW
Chassis: M113A1
Country of Origin: USA
Crew : ea4.0
Weight, Combat : mt11.79

↳*Dimensions*

Height : m2.91
Length : m4.9
Width : m2.7

Armament

↳*Weapon 1*

Elevation, Maximum : deg34.0
Elevation, Minimum : degneg 30
Loader Type: Manual
Name: M27
Rate of Fire, Cyclic : rd/min2.0
Rate of Fire, Practical : rd/min2.0

Type: ATGM

↳*Weapon 2*

Cailber/Length : mm7.62

Name: INA

Type: Machine Gun

Automotive

Engine Power : hp212.0

Engine Type: 212-hp Diesel

Fording Depth : mAmphibious

Range, Cruising : km483.0

Speed , Maximum Road : km/h64.0

Speed, Maximum Cross-Country: km/hINA

Speed, Maximum Off-Road: km/hINA

Speed, Maximum Swim : km/h5.8

Communications

↳*Radio*

Type: Various, including intercom

Fire Control System

Beacon or Tracker Type: Xenon (Infrared), thermal on TOW-2 and after

↳*Day Sight*

Acquisition Range : kmINA

Field of View : deg5.5

Magnification: Day sight/tracker, 13x

↳*FCS*

Name: ATM

↳*Night Sight*

Acquisition Range : kmINA

Field of View : degINA

Name: AN/TAS-4 thermal sight

↳*Rangefinder*

Name: INA

Munition

↳*Weapon 1 Munition 1*

Name: BGM-71 (TOW)

Penetration : mm600.0

Range, Maximum : m65.0

Range, Maximum : m3750.0

Type: Shaped Charge (HEAT)

Weight : kg600, KE

↳*Weapon 1 Munition 2*

Name: BGM-71C (ITOW)

Penetration : mm800, KE

Range, Maximum : m3750.0

Range, Minimum : m65.0

Type: HEAT

Weight : kg25.7

↳*Weapon 1 Munition 3*

Name: BGM-71D (Tow2)

Penetration : mm900, KE

Range, Maximum : m3750.0

Range, Minimum : m65.0

Type: HEAT

Weight : kg28.0

↳*Weapon 1 Munition 4*

Name: BGM-71E

Penetration : mm900, KE

Range, Maximum : m3750.0

Range, Minimum : m65.0

Type: Tandem Shaped Charge (Large HEAT, long probe)

Weight : kg22.65

↳*Weapon 1 Munition 5*

Name: BGM-71F (TOW 2B)

Penetration : mm900, KE

Range, Maximum : m3750.0

Range, Minimum : m200.0

Type: Dual explosive-formed penetrators (EFP),top-attack

Weight : kg22.6

Protection

Armor, Turret Front : mmINA

NBC Protection: None

Smoke Equipment: 8 smoke grenade launchers

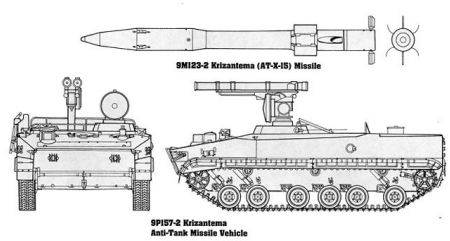
Notes:

The M901 ITV (Improved TOW Vehicle) is an American armored vehicle introduced into service in 1979, and designed to carry a dual M220 TOW launcher. It is based on the ubiquitous M113 Armored Personnel Carrier chassis. The M901 ITV is no longer in service with the United States Army, its primary user. The M901 ITV provides the crew and weapon system protection from small-arms fire and artillery fragments. The squad leader has a 270-degree range of view through the squad leader's periscope (SLP). The turret launcher has the capability for day and night acquisition and tracking of targets, and it provides firing coverages of 360 degrees in azimuth and +35 to −30 degrees in elevation. The ITV has stowage provisions for tripod-mounted TOW components configured so the ground system can be dismounted and set up in three to five minutes. In addition, the ITV is completely amphibious and is air transportable. It has the following characteristics: * A hydraulically and electrically powered "hammerhead" turret, attached to a modified M27 cupola, that can be operated manually. * A complete M220-series TOW weapon system stowed and strapped in fixed mounting brackets. The day sight tracker and night sight (AN/TAS-4 or AN/TAS-4a) are mounted in a ready state at the head of the turret. The missile guidance system is also connected at the base of the turret. * A dual M220 TOW launcher. * M243 smoke grenade launchers. * A 3x acquisition sight with a 25-degree field of view. * Remote actuators that allow day sight tracker and night sight adjustments. * A machine gun mounted on a traversing rail. The system is capable of firing two missiles without reloading and carries ten TOW rounds in the missile rack. Reloading is performed under armor protection and is accomplished by tilting the launching apparatus back so that the crew can reach the turret through the carrier's rear roof hatch. The missile launcher targeting head is at the end of a pivoting arm which raises the launcher assembly for firing. When stowed, the turret is aimed down and to the rear of the vehicle. A major limitation of the M901 is that it is practically unable to move while the turret is in firing position and unable to fire while it is in the stowed position. A common workaround is to move the vehicle while the turret is in the loading position, thereby reducing the amount of time to get the turret in a fire position as opposed to the stow position. Moving from the firing to the stowed position is a procedure that takes several seconds and some skill on the part of the operator.

9P157 Khrizantema-S Russian Anti-Tank Guided Missile System







Tiers:



Variants:

- **Krizantema-S launcher assembly:** can mount on ships and vehicles
- **Mi-28N/HAVOC helicopter:** The Tor gyro-stabilized EO pod can be mounted on aircraft for guiding the Krizantema-V air-launch variant.

System

Alternative Designations: Khrizantema AT-15
Crew: ea2
Combat Weight: mt14.1
Length: m6.73
Height: m1.77
Width: m3.15
Platform: BMP-3 hull with no turret

Automotive

Engine Type: 500-hp Diesel
Cruising Range: km600
Max On-Road: km/h70
Max Off-Road: km/h45
Max Cross-Country: km/h35
Max Swim: km/h10

Fording Depth, note: mAmphibious

Fire Control

FCS Name: 9K123

Rangefinder: Laser

Protection

Radio: R-173, R-173P

Armor, Turret Front: mmINA

Applique Armor: mmINA

Reactive Armor: mmINA

Mobility (mine clearing, self-entrenching): Entrenching blade

NBC Protection System: Collective

Smoke Equipment: N/A

Notes:

The 9P157 is a modern tank destroyer of Russian origin. It was developed as launch platform for the 9M123 Khrizantema missile. Although the 9P157 uses a BMP-3 chassis, newer missile and dual guidance mode its mission and design philosophy is similar to the older 9P149 Shturm-S tank destroyer. The 9P157 is based on the BMP-3 chassis but is not fitted with a turret. Instead the troop compartment is filled with a twin round retractable pedestal launcher which is connected to an automatic loader. The 9P157 has an optical sight with laser for SACLOS guidance of the laser guided version of the 9M123 missile. Additionally a retractable radar is mounted for detecting targets for the MMW radar version of the 9M123. The 9P157 carries 15 missiles of which two are ready to fire. The 9M123 missile is able to destroy even the most modern tanks and has a maximum range of 6 km. Reportedly the 9P157 may engage two targets at once, possibly only when using radar guided missiles. The two modes of guidance allows for operation in ECM environments. The 9P157 is operated under full armor protection, with missiles being reloaded automatically. The BMP-3 chassis with steel armor protects the crew from small arms fire and shell splinters. Over the frontal arc it may also resist heavy machine gun fire. An NBC system is fitted as standard. The low silhouette reduces the chance to be hit. The tracked BMP-3 chassis allows for a good all terrain mobility. The 500 hp diesel engine provides a maximum speed of 70 km/h. As with the orignal BMP-3 the 9P157 is fully amphibious.

SU-100 Russian Tank Destroyer







Tiers:

1 2 3 4

System

Alternative Designation: SU-100
Type: Tank Destroyer
Crew: ea4

Dimensions

Length: m9.45
Width: m3.00
Height: m2.25
Weight, Combat: Tons31.6
Ground Clearance: mm408

Automotive

Engine Name: Kharkiv Model V-2
Engine Type: V-12 diesel
Engine Power: hp500
Cruising Range: km299
Speed, Maximum Road: km/h56
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious

Suspension: Christie type with coil springs, 5 road wheels, rear drive, front idler, no return rollers

Gradient: %60

Vertical Obstacle: m0.69

Trench: m2.51

Fording: m0.88

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: D-10S Gun

Type: Rifled Anti-Tank Gun

Caliber: mm100

Length: 5.608 m

Barrel Length: 5.35 m

Weight: 1,438 kg

Breech: Horizontal sliding wedge (semi-automatic)

Recoil: Hydraulic buffer and hydropneumatic recuperator

Carriage: Vehicle mount

Maximum Elevation: deg+17

Minimum Elevation: deg-2

Traverse Range: deg34

Traverse Left: deg17

Traverse Right: deg17

Rate of Fire: 4 rounds/min avg 5–6 rounds/min max.

Muzzle Velocity: m/s1,000

Maximum Firing Range: 14,600 m (16,000 yds), or 16,000 m (17,500 yds)

↳*Ammunition*

Name: 3UBK10-1

Type: 9M117 Bastion

Caliber: mm100

Cartridge: Fixed QF 100 × 695 mm. R

Basic Load: 34

Armor Penetration: 600 mm at up to 4,000 m

Available Ammunition: * 3UBK10-1 (9M117 Bastion), penetrating 600 mm at up to 4,000 m * 3UBK10M-1 (9M117M Kan) tandem warhead, penetrating 650 mm at up to 4,000 m * 3UBK23-1 (9M117M1 Arkan) extended-range tandem warhead, penetrating 750 mm at up to 6,000 m * 3UBK23M-1 (9M117M2 Boltok) extended-range warhead penetrating 850 mm at up to 6,000 m

Secondary Weapon System

↳*System*

Name: Type 73

Type: Light Machine Gun

Caliber: mm7.36

Manufactuer: First Machine Industry Bureau

Proliferation: Widely Proliferated in North Korea

In Service: 2002-Present

Length: 1190 mm

Barrel Length: 608 mm

Weight: 10.6 kg

Action: Gas

Rate of Fire: 600–700 rpm

Feed System: Box magazine Belt

Sights: Iron

↳*Ammunition*

Type: Type 73

Caliber: mm7.63

Cartridge: 7.62×54mmR

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: mm46

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The SU-100 (Samokhodnaya Ustanovka 100) was a Soviet tank destroyer armed with a 100 mm anti-tank gun in a casemate superstructure. It was used extensively during the last year of World War II and saw service for many years afterwards with the armies of Soviet allies around the world. The SU-85 was developed from the chassis of the T-34 tank replacing the turret with a larger, fixed superstructure that allowed a larger gun to be fitted: the 85 mm D-5 gun, providing dramatically upgraded firepower compared to the T-34's 76.2 mm models. Introduced to service in 1943, the SU-85 was quickly rendered obsolete as a new tank design featured the same gun on the T-34-85. This prompted the design of a more advanced turretless tank destroyer with an even more powerful cannon. Development was conducted under supervision of L. I. Gorlitskiy, chief designer of all medium Soviet self-propelled guns. The work started in February 1944 and the first prototype of the SU-100, "Object 138", was delivered in March. After intensive testing with different models of 100 mm gun Soviet engineers approved the D-10S gun for mass production. This gun was developed in Constructors Bureau of Artillery Factory No. 9 under the guidance of F. F. Petrov. After the Second World War this gun was installed on T-54 and T-55 tanks; these vehicles and their derivatives were in service forty years after initial development. It was built at the UZTM (Russian abbreviature УЗТМ for Уральский Завод Тяжелого Машиностроения – Ural Heavy Machinery Factory, also called Uralmash) in Yekaterinburg. The SU-100 quickly proved itself to be able to penetrate around 125 mm (4.9 in) of vertical armor from a range of 2,000 m (1.2 mi) and the sloped 80 mm (3.1 in) front armor of the German Panther from 1,500 m (0.93 mi). The hull of the SU-100 had major improvements over the SU-85; the thickness of the front armour was increased from 45 to 75 mm (1.8 to 3.0 in), and the commander's workplace was made in a small sponson on the right side of the hull; combined with the commander's cupola this improved the commander's effectiveness. Its German Jagdpanzer-family counterparts — the Jagdpanzer IV, Jagdpanther and Jagdtiger, by comparison, lacked this key piece of observational equipment. On the other hand, the SU-100's optics were inferior. For better ventilation two ventilator units were installed, instead of only one as in the SU-85. Mass production began in September 1944.

FV102 Striker British Anti-Tank Missile Carrier







Tiers:



Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV102 Striker
Type: Anti-Tank Missile Carrier
Manufacturer: Alvis Vehicles, Coventry, England
Family: CVR(T) Family

In Service: 1975-1985 (Great Britain) Other nations still utilize this piece of equipment

Crew: ea3

Dimensions

Length: m4.80

Width: m2.4

Height: m22

Weight: tons8.13

Ground Pressure: 0.36 kg/cm sq

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: hp195 hp

Cruising Range: 640

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Main Weapon System

↳*Wire-Guided Anti-Tank Missile*

Name: Swingfire

Type: Wire-Guided Anti-Tank Missile

Engine: Solid rocket motor

Length: m1.07

Diameter: m0.17

Fin Span: m0.39

Weight: kg27

Warhead Type: HEAT

Warhead Weight: kg7

Basic Load: ea10

Maximum Elevation: degINA

Minimum Elevation: degINA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: m4,000

Minimum Firing Range: m150

Detonation Mechanism: Impact

Armor Penetration: mm800

Guidance System: Guidance of the Swingfire is by wire, with a Manual Command Line Of Site (MCLOS) interface. later replaced by a Semi-Automatic Command Line Of Sight (SACLOS) guidance system in some Swingfire launchers, as part of the "SWIG" (Swingfire With Improved Guidance) upgrade. The missile is controlled in flight using a simple joystick.

Steering System: Thrust Vector Control

Speed: m/s185

Note: The name of the missile comes from the ability to make a rapid turn of up to 90° after firing.

Auxilery Weapon System

↳*System*

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: + 1 Million

Max Rate of Fire: rds/min650-1,000

Length, Total: mm1,263

Length, Barrel: mm630

Width: mm118.7

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea3,000

Fire Control

Name: INA

Computerized FCS: INA

Commander Periscopes: ea7

Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.

Gunner Periscopes: ea2

Navigation System: Yes

Night Vision: Rank Precision Industries passive night sight

Note: A special optical sight with a 100 m cable allows the crew to engage enemy targets from a safe cover.

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: mmINA

Explosive reactive armor: mmINA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Survivability Equipment: Enhanced mine protection available

Notes:

FV102 Striker was the Swingfire wire-guided anti-tank missile carrying member of the CVR(T) family. The FV102 Striker was externally very similar to the FV103 Spartan but carried five missiles in a ready-to-fire bin at the back of the vehicle. Five reload missiles were carried in the vehicle. The bin was elevated to 35° (622mils) for firing. The targeting sight could be demounted and operated at a distance from the vehicle which could remain in cover, even completely screened as the missile can turn up to 90° after launch to come onto the target heading. The missiles were originally steered by joystick control using manual command to line of sight (MCLOS). This was later updated to the semi-automatic command to line of sight (SACLOS) system where the controller merely sights the target.[1] Secondary armament was a general purpose machine gun.

9K114 Shturm-S Russian Anti-Tank Guided Missile Carrier







Tiers:



Variants:

- **Variants:** 9M114 Kokon / AT-6 Spiral Entered service in 1976. 9M114V Shturm-V – Air to surface version for helicopters. 9M114 Shturm / AT-6A Spiral SACLOS 9M114M HEAT warhead. 9M114F Thermobaric warhead. 9M114M1 Shturm / AT-6B Spiral SACLOS, heavier 7.4 kg (16 lb) warhead penetrating 600–650 mm, longer 6 km (3.7 mi) range. 9M114M2 Shturm / AT-6C Spiral SACLOS, further increased 7 km (4.3 mi) range. 9M120 Shturm-VM / AT-9 Spiral-2 – see 9M120 Ataka-V

System

Alternative Designation: 9K114 Shturm
Country of Origin: Russia
Crew: ea2
Weight, Combat: mt12.3
Length: m6.35
Height: m1.8
Width: m2.85
Chassis: MT-LB

Automotive

Engine Type: Diesel
Engine Power: hp290
Range, Cruising: km500
Speed, Maximum On-Road: km/h65
Speed, Maximum Off: INA

Speed, Maximum Cross: INA

Speed, Maximum Swim: km/h4

Fording Depth: mAmphibious

Fire Control System

Beacon or Tracker Type: IR

↳*Rangefinder*

Type: Laser

↳*Infrared Searchlight*

Available: INA

↳*Day Sight*

Name: KPS-53AV

Acquisition Range: km6000

↳*Night Sight*

Name: Sanoet-1

Acquisition Range: km2600

↳*ATGM Command Link*

Type: Radio Frequency

Armament

↳*ATGM, 9P149A*

Rate of Fire, Practical: rd/min2

Rate of Fire, Cyclic: rd/min3

Fire on Move: No

Loader Type: Automated

Protection

Radio: R-123M or R173

Armor, Turret Front: mm14

Armor, Applique: mmNA

Armor, Reactive: mmNA

Mobility: Self-entrenching blade

NBC Protection: Collective

Smoke Equipment: NA

Ammunition

↳*ATGM, AT-9 / Ataka*

Range, Maximum: m6000

Range, Minimum: m400

Penetration (KE, CE): mm1100, CE

Warhead Type: Shaped Charge (HEAT)

Missile Weight: kg48.3

Notes:

The Shturm (Storm) self-propelled anti-tank guided-missile (ATGM) system consists of the 9K114 MT-LS multipurpose tracked armored vehicle mounting launchers for the 130-mm Shturm semi-automatic command to line-of-sight (SACLOS) AT-6 Spiral anti-tank guided missile (ATGM). The vehicle can also carry the AT-9 Ataka ATGM. A variety of night sights are available, such as the Kornet-T sight with 3500m range (4000 for detecting helicopters). In OPFOR Tier 1, the 9P149 night sight is 1PN79M3 2nd generation, and ranges to 5500m. A modular AT-6 ATGM launcher system with launcher / autoloader is available for installation on vehicles, fixed sites and boats. AT-9 (9M120F) and AT-6 (9M114F) thermobaric HE multi-purpose missiles range to 6000m 9A2200 (Ataka) anti-helicopter missile. It has a proximity fuze and a HE / Frangible rod warhead which assures a kill with a hit or a near miss. It can also be used against light armored vehicles. Other missile types: A version of Ataka, 9M120-1 now has RF plus laser beam rider guidance. It can be used on 9P149 and P-157, and some rotary wing aircraft. Upgrades AT-6B and AT-6C/Kokon-M (9M114M1, 2) can be launched from helicopters; but their length exceeds the 1832mm limit for the SHTURM-S autoloader, preventing ground use. The missile can be deployed on a variety of platforms, including the Mi-24V and from 1979-onwards the MT-LB based 9P149 tank destroyer. There is also a shipborne version of the missile, with the launcher holding six missiles. The missile is transported and launched from a glass-reinforced plastic tube. The missile uses a Soyuz NPO solid-rocket sustainer, with a small booster stage to launch the missile from its tube. The missile is SACLOS with a radio command link. The use of a radio link allows the missile to travel much faster and further than if it were wire guided. The radio link is a VHF system with five frequency bands and two codes to minimize the risk of jamming. The system comprises a KPS-53AV 8× daylight-only direct vision sight with an integrated laser rangefinder. After the missile is launched, the gunner has to keep the sight's crosshairs on the target until impact. Appropriate steering commands are transmitted to the missile via the radio link. The missile flies above the gunner's line of sight to the target. With the range of the target determined by the laser rangefinder, the missile descends onto the target just before impact. This is done primarily to clear obstacles, instead of achieving a top-attack, and can be switched off. It is possible to engage low and slow moving helicopters with the system; however, since the missile only has a contact fuze, a direct hit would be needed. Soviet sources report kill ratios of 75–85% during the Soviet invasion of Afghanistan. Also a Mil demonstration in Sweden in late 1995 using a Mi-28A firing Shturm and Ataka missiles also showed good results: from a hovering helicopter, a Shturm was fired at a target 900 m away; and from level flight at 200 km/h an Ataka was fired at a target 4,700 m away. Both missiles passed within 1 m of their aiming point. It is possible there were problems with early models of the missile; Soviet stocks of the missile were rebuilt to AT-6B and C standard by 1994. 30 June 2014 adopted by the Russian army modernized self-propelled antitank missile system 9M114 Shturm-S into 9K132 Shturm-SM having a sight with television and thermal channels as well as a new missile with a high-explosive fragmentation warhead and a proximity fuse.

9P162 Kornet-T Russian Anti-Tank Missile Carrier





Tiers:



Variants:

- **ATM Alternate Kornet turret:** A manned turret with an overhead weapon system (OWS). ATM can mount on a variety of vehicles. (see pg. 6-68) KPB offers the Kvartet/9P163-2 overhead weapons module to mount on a variety of vehicles (e.g., HMMWV and VBL, see pg 6-31). It has a dual twin (4-tube) launcher and central module with TV/FLIR sights.
- **KPB prototype overhead weapons module:** KPB displayed a prototype overhead weapons module to mount on a variety of vehicles (displayed on a HMMWV). It has dual twin (4-tube) launcher, and a central module with TV/FLIR sights and MG.

System

Alternative Designation: Kornet-T, BMP M1995
Chassis: BMP-3 hull with no turret
Country of Origin: Russia
Crew : ea2
Weight, Combat : mT14.1

↳*Dimensions*

Height : m1.77
Length : m6.73
Width : m3.15

Automotive

Engine Power : hp500.0
Engine Type: Diesel
Fording Depth : mAmphibious
Range, Cruising : km600
Speed , Maximum Road : km/h70
Speed, Maximum Cross-Country: km/h35
Speed, Maximum Off-Road: km/h45

Speed, Maximum Swim : km/h10

Armament

↳*Weapon 1*

Type: ATGM

Name: AT-14

Launch Method: Various

Fire Control System

Beacon or Tracker Type: IR

↳*Day Sight*

Name: 1PN80/Kornet-TP thermal

Acquisition Range : m5500

Field of View : deg5.41

↳*FCS*

Name: INA

↳*Infrared Searchlight*

Available: None

↳*Night Sight*

Name: Korent-T/1PN80 Thermal

Acquisition Range : m4000

Field of View : deg7.8

↳*Rangefinder*

Type: Laser

Communications

↳*Radio*

Name: R-173, R-173P

Munition

↳*Munition 1*

Name: Korent-LR

Type: Shaped Charge (HEAT)

Command Link: Laser beam guidance unit

Fire on Move: None

Guidane: Laser beam rider

Loader Type: Automated

Penetration : mm1200, CE

Range, Maximum : m5500

Range, Minimum : m100

Weight : kg27

↳***Munition 2***

Name: Korent-LR HE

Type: High Explosive - Thermobaric

Penetration : mmINA

Range, Maximum : m5500

Range, Minimum : m100

Weight : mt18

Protection

Armor, Applique : mmINA

Armor, Reactive : mmINA

Armor, Turret Front : mmINA

Mobility: Entrenching blade

NBC Protection: Collective

Notes:

The 9P162 Kornet-T is a new anti-tank missile carrier. It is armed with Kornet anti-tank guided missiles. It is intended to replace the ageing Shturm-S (based on the MT-LB tracked armored vehicle) and 9P148 (based on BRDM-2 armored scout car). First Kornet-T anti-tank missile carriers were delivered in 2003. A first batch of 20 production vehicles was delivered to the Russian Army in 2012. The Kornet-T is based on the BMP-3 infantry fighting vehicle chassis. It is similar to the Khrizantema, which is also based on the BMP-3 cassis. The Khrizantema entered service with the Russian Army back in 2004. It seems that the Kornet-T will be used by motorized units, while the Khrizantema by artillery units. The Kornet-T can engage tanks, fortifications and low-flying helicopters. This missile carrier can operate and fire in day/night conditions, in adverse weather conditions and when enemy uses countermeasures. This anti-tank missile carrier is fitted with an automatic loader. A total of 16 missiles are carried by the vehicle. 12 missiles are stored in the autoloader and 4 more are stored inside the hull. This missile carrier has two launchers. Both missiles can be launched against the same target. Vehicle can also engage two targets simultaneously. During travelling both launches are retracted inside the hull. Vehicle has a brief deployment time. The Kornet heavy anti-tank guided missile was adopted by the Russian Army back in 1994. From the start it was developed as a universal missile, which could be fired from various platforms. The Kornet is a fire-and-forget type anti-tank missile. This laser-guided missile has a range of 100 to 5 500 m. Maximum range at night is 3 500 m. Missiles are available with tandem HEAT and thermobaric warheads. A tandem HEAT warhead penetrates up to 1 200 m behind explosive reactive armor. It is sufficient to defeat even the latest main battle tanks. Furthermore the Kornet-T is capable of launching a salvo of 2 missiles less than a second apart either at a single target. This two-missile salvo is intended to overcome active protection systems. If launched at a single target the first missile triggers the active protection system of a tank, while the second missile hits the target. If the tank lacks active protection system this two-missile salvo improves a probability of the tank's destruction. The Kornet missiles were exported to a number of countries. Kornet-E is a downgraded export version of this missile. It is worth noting that Russia usually sell abroad

only downgraded versions of its weaponry. These missiles saw combat in the Middle East in 2003 during Invasion of Iraq, in 2006 during Lebanon War. It was also used several times by Hamas and Hezbollah fighters against Israeli targets. New Kornet-EM missiles with anti-tank warheads have a range of 8 000 m, while missiles with thermobaric warheads have a range of 10 000 m. New missiles can be launched from all previous Kornet launchers. Kornet Missiles are smaller comparing with those of the Khrizantema. This anti-tank missile carrier is operated by a crew of two, including gunner and driver. Vehicle has a welded aluminum alloy armor hull. Front arc is made of composite armor. Protection is similar to that of the BMP-3 infantry fighting vehicle. Front arc provides protection against 30-mm armor-piercing rounds. All-round protection is against 14.5-mm armor-piercing rounds. It seems that protection can be enhanced with add-on explosive reactive armor kit. The Kornet-T is fitted with NBC protection and automatic fire suppression systems. This anti-tank missile carrier is powered by an UTD-29 turbocharged diesel engine, developing 500 hp. This vehicle might be also fitted with a modern UTD-32T turbocharged diesel engine, developing 660 hp. This engine is used on improved BMP-3M IFV. This anti-tank missile carrier is fully amphibious. On water it is propelled by two waterjets. Vehicle can fire missiles even while afloat. Recently Russia adopted another new anti-tank missile carrier. This is Kornet-D, based on the Tigr light utility vehicle. This vehicle carries two banks with 4 launchers each.

→Reconnaissance Vehicles

→→Combat Reconnaissance Vehicles (CRV)

EE-9 Cascavel Mark 4 Brazilian 6x6 Armored Reconnaissance Vehicle



Tiers:



Variants:

- **Mark 2/Cascavel I/Cascavel Magro (Thin Rattlesnake):** 1st model with 37-mm gun removed from obsolete M3 Stuart tanks with Mercedes diesel engine
- **Mark 3/Cascavel II/Cascavel Gordo (Fat Rattlesnake):** 1st export model with Mercedes diesel engine, turret ring widen for Giat 90-mm gun, & 2 smoke dischargers
- **Mark 4/Cascavel III:** Engesa EC-90 90-mm gun, 7.62-mm coaxial MG, anti-aircraft MG (12.7-mm or 7.62-mm) on commanders cupola, & a Detroit diesel engine
- **Mark 5/Cascavel IV:** Mark 4 with central tire pressure regulation system, Mercedes OM352 diesel engine & disk brakes
- **Mark 6:** Mark 5 with a Mercedes OM352A engine

System

Alternative Designations: None
Description: 6 X 6 ARV developed in conjunction with the EE-11 Urutu APC as both share many of the same components; vehicle is for recon & route protection as no dismounted soldiers are available
Manufacturer: Engesa
In Service: 1975-Present
Crew: ea3 (driver, commander, gunner)

Dimensions

Length, Hull: m5.20
Length, Gun Foward: m6.20
Width Overall: m2.64
Height, Commander's Cupola: m2.68
Height, Turret Roof: m2.28
Height, Hull Top: m1.75
Combat Weight: tons13.4
Ground pressure: INA

Ground Clearance, Rear Axle: 0.34

Ground Clearance, Hull Center: 0.50

Track: 2.10

Wheelbase: 2.34 m + 1.41 m

Automotive

Engine Name: Detroit Diesel 6V-53N Diesel

Engine Type: Diesel

Engine Power: hp212

Power-to-Weight Ratio: 15.8 hp/metric ton

Maximum Road Speed: km/h100

Maximum Range: km880

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m1

Fording: m1

Fuel: 390 liters

Front Suspension: independent with coil springs and double-action shock absorbers

Rear Suspension: "boomerang" walking beam suspension with semi-elliptic springs and double-action shock absorbers

Communications

Primary: INA, dependent on country using the vehicle

Main Weapon System

↳*System*

Name: 90mm Engesa EC-90

Type: Anti-Aircraft Machine Gun

Turret Type: Engesa ET-90 turret

Caliber/length: 12.7-mm (.50 caliber)

Maximum Effective Range: 1500 m (Against High Hard Armor-HHA)

Armor Penetration: SLAP (Saboted Light Armor Penetrator); 34 mm HHA at 500 m

Muzzle Velocity: M33 Ball: 890 SLAPT (Tracer): 1215

Maximum Elevation: deg+15

Minimum Elevation: deg-8

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Ammo Type: 800 Rounds: Ball, Tracer, AP, API, API-T, AP Hardcore, Multipurpose, SLAP, SLAPT

↳*Ammunition*

Name: INA

Type: Rifled Gun

Caliber/length: 90-mm

Basic Load: 44 Rounds (12 in turret & remainder in the hull): APDS, HE Frag,

Maximum Effective Range (Day): APDS: 1200 m (Est) HE: 2000 m (Est)

Armor Penetration: INA

Muzzle Velocity: APDS: 1250 (Est) HE: 1050 (Est)

Auxiliary Weapon System

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7 mm

In Service: 1933-Present

Manufacturer: Current: General Dynamics, Fabrique Nationale

Proliferation: Over 3 Million

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Length, Total: 1,654 mm

Length, Barrel: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun and Tripod: 58 kg

Action: Short recoil-operated

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Effective Range: 1,800-2,000 m

Fire Control

Name: INA

Computerized FCS: INA

Rangfinder: Optional laser rangefinder mounted over main gun or integrated with gunner's sight

Protection

Armor (turret front): 16-mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: Available (up to 3 smoke dischargers on either side for a total of 6)

Survivability Equipment: Welded multi-layer armor

Notes:

The EE-9 Cascavel (Portuguese pronunciation: [kɐʃ.kɐ.ˈvɛɫ], translated to Rattlesnake) is a six-wheeled Brazilian armoured car developed primarily for reconnaissance. It was engineered by Engesa in 1970 as a replacement for Brazil's ageing fleet of M8 Greyhounds. The vehicle was first fitted with the Greyhound's 37mm main gun, and subsequently, a French turret adopted from the Panhard AML-90. Later models carry unique Engesa turrets with a Belgian 90mm Cockerill Mk.3 cannon produced under licence as the EC-90. The Cascavel shares many components with the EE-11 Urutu, its armoured personnel carrier counterpart; both entered production in 1974 and are now operated by over 20 nations in South America, Africa, and the Middle East. Rights to the design were also sold to the United States via the FMC Corporation. About 2,767 Cascavels and Urutus were manufactured before Engesa ceased operations in 1993.

BRM-1K Russian Amphibious Combat Reconnaissance Vehicle (CRV)





Tiers:



Variants:

- **BRM-1:** Baseline ARV (BMP M1976/1)
- **BRM-1K:** Smoke grenade launchers, additional communications (R-130, R-014D telegraph), PSNR-K Radar

System

Alternative Designations: BRM-1K; BMP M1976
Description: BMP-1 modified for recon with space for 2 passengers (see Chapter 3)
Manufacturer: Kurganmashzavod
In Service: 1976-Present
Crew: 6 (machine commander, pilot, transmitter, navigation system operator and two operators of reconnaissance systems)

Dimensions

Length Overall: m6.74
Width: m2.94
Height: m2.15
Combat Weight: mt13.3
Ground Pressure: kg/cm20.57

Automotive

Engine Name: UTD20
Engine Type: 300-hp, Water-cooled, V-6 diesel

Cruising Range: km600

Speed (Max Road): km/h65

Speed (Max Off-Road): km/h40-45

Speed (Max Swim): km/h7

Fording Depths: mAmphibious

Communications

Primary Radio: R-173

Secondary: R-130

Telegraph: 2x R-148 manportable, R-014D telegraph

Main Weapon System

Note: new two-seat turret unlike the single-seat turret of the BMP-1

↳*System*

Name: 2A28 Grom

Type: 73 mm low pressure smoothbore semi-automatic gun with a wedge breech block

Caliber: 73-mm

Manufacturer: KBP

In Service: 1966-Present

Length: mm1,195

Width: mm218

Height: mm322

Weight: kg115

Barrels: ea1

Maximum Elevation: deg+15

Minimum Elevation: deg-4

Traverse Range: deg40

Traverse Left: deg20

Traverse Right: deg20

Rate of Fire: rds/min8

Maximum Firing Range: m4,500

Sights: 1PN22M, 1PN22M2

↳*Ammunition*

Type: Projectile

Caliber: mm73

Muzzle Velocity: m/s700

Shell Types: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP

Maximum Effective Range (HEAT-FS) (Day): m1,300

Basic Load: 40 Rounds: HEAT-FS: 16 (Est), HE: 24 (Est)

Maximum Effective Range (HEAT-FS) (On Move): m600

Maximum Effective Range (HEAT-FS) (Night): m800-1,000

Maximum Effective Range (HEAT) (Day): m1,300

Maximum Effective Range (HEAT) (On Move): m600

Maximum Effective Range (HEAT) (Night): m800-1,000

Armor Penetration (HEAT-FS PG-15VNT): mm550-700

Armor Penetration (HEAT-FS PG-15): mm335

Coaxial Weapon System

↳*System*

Name: PK Machine Gun

Type: 7.62mm General Purpose Machine Gun

Length: mm1,203

Barrel length: mm605

Weight, Gun and Intergral Bipod: kg9

Weight, Tripod: kg7.7

Action: Gas-operated, open bolt

Rate of Fire: 650 rounds/min

Effective Firing Range: 100-1,500

Maximum Firing Range: m3,800

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Anti-Tank Guided Missile (ATGM)

Name: 9M14 Malyutka (AT-3 Sagger)

Type: manual command to line of sight (MCLOS) wire-guided anti-tank guided missile (ATGM) system

Manufacturer: Soviet Union, Russia as successor state and other countries under license and domestic versions

In Service: 1963-Present

Length: mm860

Width: mm393

Diameter: mm125

Weight, 9M14M: kg10.9

Weight, Launcher and Guidance System: kg30.5

Effective Firing Range: m500-3,000

Warhead Weight: kg2.6

Speed: m/s115

Guidance System: MCLOS, SACLOS (Later variants)

Fire Control

Radar: 1RL133-1 Terrestrial radar

Radar Deployment: automatically retractable into the compartment at the rear of the turret

Fire Control System: Yes

Target Coordinate System: Yes

Navigation System: TNA-4 navigation system

Laser Rangefinder: Yes, 1D8 laser rangefinder

NRBC Recognition Facilities: Yes

Night Sights: The Russian Alis or Sanoet thermal gunner's sight can be installed.

Additional Sights: 1PN22M2 sight

Protection

Armor (turret front): mm19-23

Applique armor: mmAvailable

Explosive reactive armor: mmAvailable

Active Protection System: No

Self-entrenching blade: No

NBC Protection System: Automatic overpressure system

Smoke equipment: VEESS, Smoke grenade launchers available

Notes:

The BRM-1K is a Russian armored reconnaissance vehicle. It was developed in the Soviet Union in the 1970s by KB TchTZ and produced by Kurganmashzavod. The BRM-1K entered service in 1972. The BRM-1K is for reconnaissance missions on the battlefield. It is developed from the BMP-1 Armored Infantry Fighting Vehicle. It has the same architecture as the BMP-1 with the engine on the front right and the cockpit on the front left. The BRM-1K received a new two-seat turret unlike the single-seat turret of the BMP-1. The armament consists of the 73mm Grom 2A28 gun, identical to the BMP-1. The BRM-1K is equipped with a 1RL133-1 terrestrial radar. On the first BRM-1 version the radar is deployed manually. On the BRM-1K version, the radar is automatically retractable into the compartment at the rear of the turret. The crew of the BRM-1K is composed of six men: machine commander, pilot, transmitter, navigation system operator and two operators of reconnaissance systems.

Eagle IV Swiss 4x4 Reconnaissance Vehicle



Tiers:



Variants:

- **Eagle I:** INA
- **Eagle II Reconnaissance Vehicle:** This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.
- **Eagle III Artillery Forward Observation Vehicle:** This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.
- **Eagle IV Military Tactical Vehicle:** The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility.
- **Eagle V:** This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common.
- **Eagle BAT ambulance:** This ambulance accommodates an emergency doctor, rescue assistant and a driver/paramedic. The vehicle permits patient transport and emergency treatment under protection.
- **Eagle V 6 x 6:** The is a 6 x6 compact off-road vehicle powered by a six-cylinder turbo-diesel engine coupled to a five-speed automatic transmission and a two-stage transfer case.
- **VERO robotics kit:** Developed by Ruag Defence in Switzerland, this is a robotics kit that can be retrofitted onto the Eagle IV, among other vehicles.

System

Alternative Designation: Eagle IV

Type: Reconnaissance Vehicle

Manufacturer: General Dynamics European Land Systems-Mowag, Kreuzlingen, Switzerland General Dynamics European land Systems-Germany, Kaiserslautern, Germany

Family: Eagle Series

Crew: 4 (driver, commander, signals operator, observer)

Passenger Capacity: INA

Dimensions

Length: 5.40 m

Width: 2.16 m

Height: 2.40 m

Weight, Combat: 7,400 kg

Weight, Empty: 5,000 kg

Weight, Gross: 8,500 kg

Payload: 2,200 kg

Automotive

Engine Name: 1 x Cummins ISBe

Engine Type: 5.9 liter (360 cu in) turbo common rail 4-stroke diesel

Engine Power: 250 hp (184 kW)

Fuel Capacity: 180 liters

Transmission: Allison 1000 5-speed automatic

Acceleration: 11 sec (0-50 kph, 0-31 mph)

Range: km480

Speed, Maximum Road: km/h120

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 0.8 m

Gradient: 60 percent

Side Slope: 40 percent

Vertical Step: 0.5 m

Trench: 0.5 m

Turning Diameter: 16.5 m

Main Gun

Note: 1 x 7.62-mm machine gun facing forward in turret. Name of 7.62mm Machine Gun: INA

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: No

Protection

Hull Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Turret Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Applique Armor: Available, The Eagle IV is armored with composite plates mounted to the inner face of aluminum plates to

provide a high-level of ballistic protection. A non-armored version is also available.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, Overpressure System

Smoke Equipment: Yes, 6 x smoke-grenade launchers facing rear from turret

Notes:

Eagle IV Military Tactical Vehicle The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility. The Eagle IV is also capable of carrying a high payload with a low gross vehicle weight. It can be equipped with an NBC overpressure system, central tire inflation system (CTIS), winch, mission-specific cargo module and an optional EURO IV engine. The vehicle can also be fitted with an overhead weapon station.

Eagle I Swiss 4x4 Reconnaissance Vehicle






Tiers:



Variants:

- **Eagle I:** INA
- **Eagle II Reconnaissance Vehicle:** This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.
- **Eagle III Artillery Forward Observation Vehicle:** This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.
- **Eagle IV Military Tactical Vehicle:** The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility.
- **Eagle V:** This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common.
- **Eagle BAT ambulance:** This ambulance accommodates an emergency doctor, rescue assistant and a driver/paramedic. The vehicle permits patient transport and emergency treatment under protection.
- **Eagle V 6 x 6:** The is a 6 x6 compact off-road vehicle powered by a six-cylinder turbo-diesel engine coupled to a five-speed automatic transmission and a two-stage transfer case.
- **VERO robotics kit:** Developed by Ruag Defence in Switzerland, this is a robotics kit that can be retrofitted onto the Eagle IV, among other vehicles.

System

Alternative Designation: Eagle I

Type: Reconnaissance Vehicle

Manufacturer: General Dynamics European Land Systems-Mowag, Kreuzlingen, Switzerland General Dynamics European land Systems-Germany, Kaiserslautern, Germany

Family: Eagle Series

Crew: 4 (driver, commander, signals operator, observer)

Passenger Capacity: INA

Dimensions

Length: 4.90 m

Width: 2.28 m

Height: 2.35 m

Weight, Combat: 5,000 kg

Automotive

Engine Name: 1 x GM LNA

Engine Type: 6.5 liter (397 cu in) liquid-cooled V8 diesel

Engine Power: 159 hp at 3,400 rpm

Fuel Capacity: 95 liters

Transmission: Hydramatic 4L80E automatic; 4 forward/1 reverse gears

Range: km300

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 0.76 m

Main Gun

Note: 1 x 7.62-mm machine gun facing forward in turret. Name of 7.62mm Machine Gun: INA

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: No

Protection

Hull Armor: protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Turret Armor: protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, Overpressure System

Smoke Equipment: INA

Notes:

The MOWAG Eagle is a wheeled armored vehicle designed by the Swiss MOWAG corporation. It has gone through several generations of development. The current vehicle, introduced in November 2003, is the Eagle IV, which is based on the Duro IIIP chassis. The original MOWAG Eagle used the chassis and running gear of the United States Humvee, while the Eagle II and Eagle III use the chassis and running gear of the Humvee ECV. A Prototype is now part of the Military Museum Full. The MOWAG

Eagle IV and V used the chassis and running gear of the Mowag Duro. A modular 6×6 variant that was developed for an Australian Army tender made its market debut at Eurostatory 2012.

FV101 Scorpion 90 British Amphibious Combat Reconnaissance Vehicle




Tiers:

1 2 **3** 4

Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV101 (See variants)

Date of Introduction: 1988

Proliferation: 1173+ vehicles/18 countries Botswana Army [31] (25 Scorpion, 6 Spartan) Britain Army [484] (145 Scimitar, 31 Scimitar Mk 2, 252 Spartan, 23 Spartan Mk 2, 28 Samson, 5 Samson Mk 2) Brunei Army [22] (20 Scorpion, 2 Samson) Chile Marines [15] (Scorpion) Honduras Army [16] (12 Scorpion, 3 Scimitar, 1 Sultan) Indonesia Army [60] (Scorpion 90) Iran Army [80] (Scorpion) Jordan Army [103] (Scimitar + 19 Scorpion in storage) Latvia Army [123] (Scimitar, Spartan, Samson, Sultan, Samaritan) Malaysia Army [21] (Scorpion 90) Nigeria Army [157] (Scorpion) Oman Army [59] (37 Scorpion, 13 Sultan, 6 Spartan, 3 Samson) Philippines Army [7+] (7 Scorpion, Samson) Tanzania Army [30] (Scorpion) Thailand Army [104] (Scorpion, 50 in storage) Togo Army [9] (Scorpion) United Arab Emirates Army [76] (Scorpion) Venezuela Army [78+] (78 Scorpion 90, Samson)

Description: Initially a light tank, it took on another of roles; passengers depends on the variant; specifications are for the Scorpion

Type: Armored reconnaissance vehicle

Manufacturer: Alvis Vehicles, Coventry, England

Family: e Combat Vehicle Reconnaissance (Tracked), CVR(T), family

In Service: 1988-Present (see proliferation)

Crew: ea3

Dimensions

Length, with Gun Foward: m5.29

Width: m2.23

Height: m2.0

Weight: tons9.61

Ground Pressure: 0.36 kg/cm sq

Track: m1.71

Track Width: m0.43

Ground Clearance: m0.36

Automotive

Engine Name: Perkins Diesel

Type: Diesel

Engine Power: hp195

Cruising Range: 756

Speed, Maximum Road: km/h72

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.5

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: David Brown Engineering TN15D transmission

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Propeller Kit: Available, which allows the Scorpion 90 to travel in the water at speeds of up to 9.5 km/h

Main Weapon System

Turret: AC 90 Turret

System

Name: 90mm Cockerill Mk III gun

Type: 90mm

Caliber: 48.5

Barrel Length: mm4,365

Width: INA

Height: INA

Basic Load: ea34

Maximum Elevation: deg+30

Minimum Elevation: deg-08

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: 8 km at 20 deg elevation

Rate of Fire: rds/min6

Recoil System: Rugged concentric recoil mechanism

Muzzle Type: Single stage muzzle brake

Ammunition Type: APFSDS-T - TPFSDS-T - HESH-T - HESH-TP-T - SMK-WP-T

↳*Ammunition*

Name: M3 HE

Type: 90mm Projectile

Cartridge: 90 mm × 950 mm

Shell Weight: kg19.02

Muzzle velocity: INA

Coaxial Weapon System

Note: A 7.62 mm machine gun is mounted Coaxially to the left of the main armament.

↳*System*

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: + 1 Million

Max Rate of Fire: rds/min650-1,000

Length, Total: mm1,263

↳

Length, Barrel: mm630

Width: mm118.7

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea3,000

Fire Control

Name: Thales fire-control system

Computerized FCS: Yes

Commander Periscopes: ea7, fully stabilised panoramic commander sight

Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.

Gunner Periscopes: ea2, Thales periscopes

Navigation System: Yes

Night Vision: Rank Precision Industries passive night sight

Thermal Sight: fully stabilised day/night (thermal) gunner sight

Laser Rangfinder: Yes

Ballistic Computer: Yes

Hunter-Killer Capability: Yes

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: mmINA

Explosive reactive armor: mmINA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers, 4 on each side of the turret

Survivability Equipment: Enhanced mine protection available

Notes:

The Scorpion 90 or Scorpion 2 was a version armed with the long-barrelled Cockerill Mk3 M-A1 90mm gun designed for the export market. The FV101 Scorpion is a British armoured reconnaissance vehicle. It was the lead vehicle and the fire support type in the Combat Vehicle Reconnaissance (Tracked), CVR(T), family of seven armoured vehicles. Manufactured by Alvis, it was introduced into service with the British Army in 1973 and was withdrawn in 1994. More than 3,000 were produced and used as a reconnaissance vehicle or a light tank. It holds the Guinness world record for the fastest production tank; recorded doing 82.23 km/h (51.10 mph) at the QinetiQ vehicle test track, Chertsey, Surrey, on 26 January 2002.

BOV M11 Serbian 4x4 Armored Reconnaissance Vehicle





Tiers:



Variants:

- **BOV-M (Slovenia):** Some built with 12.7-mm MGs
- **BOV-VP:** Security version with swing out gates to direct crowds
- **BOV-1/Polo M-83:** Sans troop compartment with 2 ATGM launcher pods with 3 AT-3 launchers each with machine gun mounted before the two AT-3s
- **BOV-3:** 3 turret-mounted 20-mm cannons for air defense
- **BOV-30:** 2 turret-mounted 30-mm cannons for air defense
- **LOV (Croatia):** No raised compartment, increased hull protection, but with a 12.7-mm machine gun
- **BOV-SN:** Ambulance
- **Yugo import BOV variants:** Serbia has a variants that include SP AA vehicles with the Igla or Stinger missiles or the ZU-23; AT vehicles with the AT-5 Spandrel; or an armored reconnaissance vehicle with a 20-mm M55 cannon, 7.62-mm PKT machine gun with twin AT-3 Sagger AT launchers or a single Spandrel system

System

Alternative Designations: BOV M11
Description: The BOV M11 has primary role as reconnaissance vehicle and command-reconnaissance vehicle.
Manufacturer: TAM Complex Battle System factory in Velika Plana, Serbia
Crew: eacrew of 3, including driver, commander and gunner
Passengers: ea4
Note: The BOV M11 has many special reconnaissance systems and artillery systems built in based on concrete mission role

Dimensions

Length: m5.79
Width: m2.53
Height, Hull Roof: m2.33
Ground Clearance: m0.33
Track: m1.90
Wheelbase: m2.75

Automotive

Engine Name: CUMMINGS 190KS Engine

Engine Type: Diesel

Engine Power: 190

Transmission: 1 reverse gear, 5 forward gears

Cruising Range (km): km600

Speed (Max Road) (km/h): km/h100

Speed (Max Off-Road) (km/h): km/hINA

Speed (Average cross-country) (km/h): km/h40

Speed (Max Swim): INA

Fuel Capacity: 220 liters

Gradient: deg55

Side Slope: deg30

Vertical Obstacle: m0.54

Trench: m0.64

Fording Depths: m1.10

Turning Radius: m10.0

Brakes: air-hydraulic with a hand-operated parking brake

Suspension: 4×4 wheeled, fully independent

All-Wheel Drive: Yes

Communications

Radio: INA

Intercom: INA

Upgraded Communications Equipment: Avaialble

Main Weapon System

Remote Controlled Weapon Station (RCWS): Yes, the 12.7mm NSV Heavy Machine Gun is on a unnamed RCWS System

Note #1: It is possible to integrate another RCWS with 7.62mm gun and for more recce combat role RCWS with 30 mm grenade launcher BGA-30 or M10 RCWS with 20mm gun and 7.62mm coaxial gun

↳*System*

Name: NSV Heavy Machine Gun

Type: Heavy Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

In Service: 1971-Present

Length: mm1,560

Weight, Gun Only: kg25

Weight, On Tripod: kg41

Weight, 50 round belt: kg11

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Effective Firing Range, vs. Air Targets: m1,500

Effective Firing Range, vs. Ground Targets: m2,000

Feed System: 50-round belt

Sights: Iron sights

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea2,000

Fire Control

Fire Control System: No

Periscope: ingle forward-facing day periscope in the roof

Passive Periscope: Yes

Searchlight: Yes

Firing Ports: three on each side

Driver Thermal Sight: Yes

Commander Thermal Sight: Yes

Gunner Thermal Sight: Yes

FIre on the Move: Yes

CCD TV: Yes, located at the rear of the vehcile

Artillery electronic direction finder (AEG): Avaialble for Aritllery Reconnaissance

Artillery Battery FCS Computer: Avaialble for Aritllery Reconnaissance

Protection

Armor, Front: STANAG 4569 Level III front

Armor, Sides and Rear: STANAG 4569 Level II sides and aft.

Windshield: Six ballistic protected windows and 6 loopholes

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: Grill armor over windows

Central Tire Inflation System: Yes

Notes:

The BOV M11 is part of the BOV family of light armored vehicles. The M11 is a 4x4 all-wheel drive vehicle specialized in reconnaissance. It is armored vehicle manufactured in SDPR "Complex Battle Systems" factory in Velika Plana, Serbia. The BOV M11 has primary role as reconnaissance vehicle and command-reconnaissance vehicle. If used by artillery units it could be remote observation post that observes enemy and guides firing. It has a crew of 3, including driver, commander and gunner. Has room for four more personnel that could include based on concrete mission scouts and artillery command platoon’s CO. The vehicle has a four-wheel drive and is powered by a diesel engine developing 190 hp. It has many special reconnaissance systems and artillery systems built in based on concrete mission role. Driver has thermal camera sight at front and CCD TV camera at rear.[3] It is armed with 12.7 mm remote-controlled weapon station for day and night combat and fire on move and stand. It is possible to integrate another RCWS with 7.62mm gun and for more recce combat role RCWS with 30 mm grenade launcher BGA-30 or M10 RCWS with 20mm gun and 7.62mm coaxial gun. Equipment for artillery reconnaissance vehicle include: 1. Artillery electronic direction finder (AEG) 2. Communications equipment 3. Artillery battery FCS computer

EE-9U Cascavel MX-8 Brazilian 6x6 Armored Reconnaissance Vehicle



Tiers:



Variants:

- **Mark 2/Cascavel I/Cascavel Magro (Thin Rattlesnake):** 1st model with 37-mm gun removed from obsolete M3 Stuart tanks with Mercedes diesel engine
- **Mark 3/Cascavel II/Cascavel Gordo (Fat Rattlesnake):** 1st export model with Mercedes diesel engine, turret ring widen for Giat 90-mm gun, & 2 smoke dischargers
- **Mark 4/Cascavel III:** Engesa EC-90 90-mm gun, 7.62-mm coaxial MG, anti-aircraft MG (12.7-mm or 7.62-mm) on commanders cupola, & a Detroit diesel engine
- **Mark 5/Cascavel IV:** Mark 4 with central tire pressure regulation system, Mercedes OM352 diesel engine & disk brakes
- **Mark 6:** Mark 5 with a Mercedes OM352A engine

System

Alternative Designations: EE-9U Cascavel MX-8
Description: 6 X 6 ARV developed in conjunction with the EE-11 Urutu APC as both share many of the same components; vehicle is for recon & route protection as no dismounted soldiers are available
Manufacturer: Engesa
Crew: ea3 (driver, commander, gunner)

Dimensions

Length, Hull: m5.20
Length, Gun Foward: m6.20
Width Overall: m2.64
Height, Commander's Cupola: m2.68
Height, Turret Roof: m2.28
Height, Hull Top: m1.75
Combat Weight: tons13.4
Ground pressure (kg/cm2): INA
Ground Clearance, Rear Axle: 0.34
Ground Clearance, Hull Center: 0.50
Track: 2.10
Wheelbase: 2.34 m + 1.41 m

Automotive

Engine Name: Rolls-Royce Power Systems MTU 6R926 engine

Engine Type: Diesel

Engine Power: hp320

Power-to-Weight Ratio: 15.8 hp/metric ton

Transmission: ZF Friedrichshafen 6HP504C automatic transmission

Maximum Road Speed: km/h100

Maximum Range: km880

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1

Fording: m1

Fuel: 390 liters

Front Suspension: independent with coil springs and double-action shock absorbers

Rear Suspension: "boomerang" walking beam suspension with semi-elliptic springs and double-action shock absorbers

Communications

Primary: Harris Falcon III Tactical Radio

Intercom: Thales SOTAS digital intercom

Main Weapon System

↳*System*

Name: 90mm Engesa EC-90

Type: Anti-Aircraft Machine Gun

Turret Type: Engesa ET-90 turret

Caliber/length: 12.7-mm (.50 caliber)

Maximum Effective Range (m): 1500 m (Against High Hard Armor-HHA)

Armor penetration (mm): SLAP (Saboted Light Armor Penetrator); 34 mm HHA at 500 m

Muzzle Velocity (m/s): M33 Ball: 890 SLAPT (Tracer): 1215

Maximum Elevation: deg+15

Minimum Elevation: deg-8

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Ammo Type: 800 Rounds: Ball, Tracer, AP, API, API-T, AP Hardcore, Multipurpose, SLAP, SLAPT

↳***Ammunition***

Name: INA
Type: Rifled Gun
Caliber/length: 90-mm
Basic Load: 44 Rounds (12 in turret & remainder in the hull): APDS, HE Frag,
Maximum Effective Range (Day) (m): APDS: 1200 m (Est) HE: 2000 m (Est)
Armor Penetration: INA
Muzzle Velocity (m/s): APDS: 1250 (Est) HE: 1050 (Est)

Auxiliary Weapon System

↳***System***

Name: M2 HB Anti-Aircraft Machine Gun
Type: 12.7 mm
In Service: 1933-Present
Manufacturer: Current: General Dynamics, Fabrique Nationale
Proliferation: Over 3 Million
Max Rate of Fire (M2HB Version): 450-600 rds/min
Max Rate of Fire (AN/M2 Version): 750-850 rds/min
Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min
Length, Total: 1,654 mm
Length, Barrel: 1,143 mm
Weight, Gun Only: 38 kg
Weight, Gun and Tripod: 58 kg
Action: Short recoil-operated

↳***Ammunition***

Name: INA
Type: Rifle
Caliber: 12.7mm
Cartridge: 0.50 BMG (12.7×99mm NATO)
Muzzle Velocity: 450-1,300 m/s
Basic Load: 2,000 ea
Effective Range: 1,800-2,000 m

Fire Control

Name: INA

Computerized FCS: INA

Rangfinder: Optional laser rangefinder mounted over main gun or integrated with gunner's sight

Multispectral Observation Sensor: Yes

Day and Night Cameras: Yes

Missile Laser Illuminator: Yes

Protection

Armor (turret front) (mm): 16-mm

Applique armor (mm): No

Explosive reactive armor(mm): No

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Available

Smoke Equipment: Available (up to 3 smoke dischargers on either side for a total of 6)

Survivability Equipment: Welded multi-layer armor

Notes:

The EE-9U Cascavel MX-8 Brazilian Armored Reconnaissance Vehicle is the modernized version of the original EE-9 Cascavel. EE-9U Cascavel MX-8: Version modernized by Equitron for the Brazilian Army and the other Cascavel users. It is equipped with a 300 hp (220 kW) MTU / Mercedes electronic engine with overcharging by turbocharger and intercooler. The boomerang suspension has received improvements in performance, the disc brake system is completely new and the engine exhaust drawing as well, expelling the air upwards and not backwards, thus reducing the thermal signature of the car. It also provides a highly praised air conditioning system for the crew. Integrates night vision for the driver and shooting systems. The tower received the electro-hydraulic system of rotation and tube elevation (back-up by manual system) similar to that used in the German KMW's Leopard tank, as well as receiving the laser, thermal and infrared rangefinder systems made by Orlaco, of Netherlands, selected by the commander and / or shooter through a joystick and associated keys, and increased ammunition capacity in the tower. On the outside, two anti-tank missile launchers (ATGM), which can be sized to receive both systems such as MSS-1.2 (integrating the laser rangefinder of the vehicle) and more sophisticated ones like the Russian Ataka and the Israeli Spike (with autonomous acquisition and targeting system)

BRDM-1 Russian 4x4 Amphibious Armored Scout Car







Tiers:



Variants:

- **BRDM-1 Model 1957:** Open-topped crew compartment
- **BRDM-1 Model 1958:** Closed-top crew compartment
- **BRDM-1 Model 1959:** 1 7.62-mm MG at front roof
- **BRDM-1 Model 1960:** 3 7.62-mm MGs at front & sides
- **BRDM-1U:** Command vehicle with 4 antennas
- **BRDM1-RKh:** NBC reconnaissance vehicle with lane-marking equipment
- **2P27 Tank Destroyer:** 2K16 launcher for 3 AT-1 Snapper ATGM missiles
- **2P32 Tank Destroyer:** 2K8 launcher for 4 AT-2 Swatter ATGM missiles
- **2P110 Tank Destroyer:** 9K14M launcher for 6 AT-3 Sagger ATGM missiles
- **SPW-4OP (East Germany):** Unarmed BRDM-1
- **SPW-40PA (East Germany):** Armed BRDM-1
- **9P111 (East Germany):** 9P110 Tank Destroyer
- **FUG (Hungary):** Hungarian designation for BRDM-1

System

Alternative Designations: BTR-4OP (4 X 4)

Description: Light fully amphibious 4 X 4 wheel drive armor scout car with 2 firing ports on each side of the hull & 2 large hatches in the forward part of the roof; 2 belly wheels can be lowered to improve cross-country performance & cross ditches with space for 3 other soldiers besides the crew; personnel must enter & exit the vehicle from the hatches on top of the vehicle.

In Service: Russia: 1957-1970s. Current Operators: Republic of the Congo Cuba: 50 Eritrea Guinea: 10 Kazakhstan Mozambique: 51; >28 operational in 2013. Sudan: 5 Transnistria Vietnam: 50 Zambia: 44

Crew: ea2 (driver, commander)

Dimensions

Length: m5.7

Width: m2.25

Height: m2.9

Weight: tons5.63

Automotive

Engine Name: GAZ-40PB

Engine Type: 6-cylinder in-line gasoline

Engine Power: hp90

Speed, Maximum Road: km/h90

Speed, Maximum Water: km/h9

Operational Range, Road: km75

Operational Range, Water: km120

Ground Clearance: mm340

Suspension: Leaf springs with hydraulic shock absorbers

Weapon System

↳*DShKM*

Caliber/length: 12.7-mm

Type: Machine Gun

Ammo: 1250 Rounds (250 in box, 1000 Ready): Light Ball, Ball-T, API

Maximum Effective Range: 2000 m (Day); INA (Night); 1500 m (Anti-aircraft-estimate)

Armor penetration: 8 at 500 m (Est)

Muzzle velocity: m/s800 (Est)

↳*SGMB (Rear roof)*

Caliber/length: 7.62-mm

Type: Medium Machine Gun

Ammo: 1250 Rounds (250 in box, 1000 Ready): Light Ball, Ball-T, API

Maximum Effective Range: 1000 m (Day); INA (Night); 1000 m (Anti-Aircraft)

Armor penetration: 8 at 500 m

Muzzle velocity: m/s800

Protection

Armor: Welded steel 10 mm maximum

Applique Armor: Available

Active Protection System: No

Explosive Reactive Armor: No

NBC Equipment: Yes

Smoke Equipment: INA

Notes:

The BRDM four-wheel-drive amphibious scout car first appeared in the spring of 1959 and rapidly became the standard light wheeled reconnaissance vehicle in most of the Warsaw Pact armies. It was replaced by the newer BRDM-2 and the Hungarian FUG scout cars. Resembling a cross between the GAZ-46 (MAY) amphibious jeep and the BTR-40 armored personnel carrier, the BRDM combines amphibious features with full armored cover. Cross-country ability is heightened by the use of a centralized tire pressure regulation system and through the use of two sets of small belly wheels which can be lowered to add flotation and assist in crossing gaps. The BRDM-1 reconnaissance 4X4 vehicle was built in a number of variants, including the BRDM-1Rkh NBC Reconnaissance Armoured car and the BRDM-1U wheeled armored command vehicle. Four versions of the BRDM are in existence: the basic BRDM reconnaissance vehicle; the BRDM-rkh radiological-chemical reconnaissance vehicle with marking-flag dispensing devices; the BRDM-U command vehicle distinguishable only by extra radio antennas; and three different antitank guided missile carriers for AT-1 SNAPPER, AT-2 SWATTER, and AT-3 SAGGER antitank missiles. All versions of the BRDM are propelled in the water by a single water jet. Recognition of the BRDM-rkh is facilitated by the presence of two canvas box-shaped devices mounted outboard on the rear deck. These are the marking-flag dispensers.

BRM-3K Rys Russian Amphibious Combat Reconnaissance Vehicle (CRV)







Tiers:



Variants:

- **BRM-3K / Kredo-1:** BRM-3K CRV with 2-3m mast with a Kredo-1 radar system. Catherine 2nd generation thermal sight night range to 5-7km. 1D22 LTD ranges to 7km.

System

Alternative Designation: Rys, Lynx, Model 501
Description: BMP-1 modified for reconnaissance with space for 3 passengers
Manufacturer: Russian UralVagonZavod company
Crew: 6 (commander, gunner, driver, navigator/computer operator, wireless operator and reconnaissance group commander)

Dimesions

Length: m7.0
Width: m3.15
Height: m2.37
Weight: tons18.7

Automotive

Engine Name: UTD-29 Diesel
Engine Type: Diesel
Engine Power: hp500
Cruising Range: km600

Maximum Road Speed: km/h70

Maximum Swim Speed: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.5

Fording: mAmphibious

Note: On water the BRM-3K is propelled by two waterjets

Communications

Radio UHF: R-163-50U UHF

Radio HF: R-163-50K HF; R-163-10U (dismounts)

Note: Communication aids ensure data and radio links at a maximum range of 350 km

Main Weapon System

Turret Type: A Remote Controled AU-220M Baikal Turret

Remote Controlled Weapon Station: AU-220M Remote Controlled Weapon Station

↳*System*

Type: BM-57, 57mm Automatic Cannon

Caliber: mm57

Length: mm5,820

Width: mm2,100

Height: mm1,300

Weight: kg3,200

Rate of Fire: rds/min120

Maximum Firing Range: km12

Maximum Elevation: deg+75

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Note: ammunition includes armor-piercing, high-explosive rounds and guided missiles

↳*Ammunition (Option 1)*

Name: 53-UBR-281U Armor-piercing Tracer Round

Cailber: mm57

Type: Projectile

Muzzle Velocity: m/s1,000

Basic Load: ea200

↳*Ammunition (Option 2)*

Name: 53-ERM-281U Fragmentation Tracer Round

Caliber: mm57

Type: Projectile

Muzzle Velocity: m/s1,000

Basic Load: ea200

Auxiliary Weapon System

↳*System*

Name: PK Machine Gun, "Kalashnikov's Machine Gun")

Type: mm7.62

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Length: mm1,203

Barrel Length: mm605

Weight, Gun and Integral Bipod: kg9

Weight, Tripod: kg7.7

Action: Gas-operated, open bolt

Rate of Fire: 650 rounds/min

Effective Firing Range: m100-1,500

Maximum Firing Range: m3,800

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Anti-Tank Guided Missile (ATGM)

Note: Provision is made for an ATGW launcher and four missiles. The ATGW system can be dismounted and fired remotely from the vehicle

Fire Control

FCS Name: INA

Computerized FCS: Yes, The FCS controls the operations of target detection and identification, gun laying and firing of the 57mm automatic gun and 7.62mm machine-gun when firing from a halt, on the move and on the float in any combat environment

Main Gun Stabilization: Yes, The fire control system with two-plane stabilization

Laser Range Finder: Yes

Fire on the Move: Yes

Fire on the Water: Yes

Radar Type: Mast-mounted-1RL-133-1 radar

Maximum Radar Range, Vehicles: km8-10

Maximum Radar Range, Person: km4

Radar Traverse Left: deg120

Radar Traverse Right: deg120

Navigation System: Yes

Note #1: The FCS is equipped with a sight unit, comprising a combined sight with thermal-imaging and TV channels, a laser-finder and independent dual-axis field of view stabilization

Note #2: A portable Reconnaissance equipment can be fitted to the vehicle to enable a remote connection with the vehicle up to 6km away

Protection

Front Arc Armor: Front arc - protection against 30mm bullets (~Level 5 acc. to STANAG 4569)

Hull Armor: All-around fire - protection against 7.62mm bullets (~Level 3 acc. to STANAG 4569)

Turret Armor: The turret is in the centre of the vehicle with the commander seated on the right and the gunner on the left

Applique Armor: Available

Explosive Reactive Armor: No

Smoke Equipment: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Notes:

The new version of russian BRM-3K combat reconnaissance vehicle is equipped with a new turret armed with a 57mm automatic cannon AU-220M. This new version is based on the chassis of BRM-3K Rys fitted with a new turret armed with a 57mm automatic cannon using gun mount module AU-220M “Baikal”. AU-220M Remote Controlled Weapon Station armed with BM-57 57mm automatic cannon, developed by CRI BUREVESTNIK and proposed by Uralvagonzavod. It has the capacity to be used against ground and aerial targets as helicopter and drones. The 57mm gun with the AP round has a penetration capability of 130mm of Steel at a range of 1.000m. A 7,62mm coaxial machine gun is mounted to right side of the main armament. A bank of four smoke grenade dischargers is mounted on each side of the turret. The BRM-3K Rys (lynx) was developed in the early 1990s. It was intended to supplement and replace the BRM-1K reconnaissance vehicle. It is based on the BMP-3 infantry fighting vehicle chassis. The hull and turret of the BRM-3K are of all-welded aluminium armour construction providing the crew with protection from small arms fire and shell splinters. The turret is in the centre of the vehicle with the commander seated on

the right and the gunner on the left. The vehicle can carry a total of 12 military personnel including driver, gunner and commander. The troop compartment is at the rear of the hull with entry via two doors in the hull rear opening left and right, with the left door having a firing port.

AMX-10RC French 6x6 Amphibious Armored Reconnaissance Vehicle (ARV)





Tiers:



Parent:

AMX-10P French Infantry Fighting Vehicle (IFV)

Variants:

- **AMX-10RC Renové:** The AMX-10RC Renové (AMX-10RCR) is the upgraded version of the AMX-10RC in service with France. Of the original 337 vehicles produced for the French Army, only 256 were upgraded and the upgraded vehicles were used operationally in Afghanistan, Côte d'Ivoire, and Mali.
- **AMX-10RC, T40M turret:**
- **AMX-10RC, DAS:** Development goal: Improve the protection of the AMX-10RC through active protection measures.

System

Alternative Designation: AMX-10 RC
Type: Armored Reconnaissance Vehicle (ARV)
Family: AMX-10 Family
Crew: ea4
Passenger Capacity: eaINA

Dimensions

Length (Gun Forward): m9.15
Length (Hull): m6.36
Width: m2.95
Height: m2.21
Weight, Combat: tons15.88

Automotive

Engine Name: Renault-built HS 115
Engine Type: Diesel
Engine Power: hp260
Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/h7

Gradient: deg50

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.65

Fording Depth: mAmphibious

Transmission: Semi-automatic transmission

Communications

Global Positioning System (GPS): Yes

Tactical Radio: Thales Model DIVT 13 LLLTV

Primary Weapon System

↳*System*

Name: F2 BK MECA L/47 Medium-Pressure Gun 105mm semi-automatic rifled gun

Type: mm105

Max Rate of Fire: m/s1,000

Thermal Sleeve: Yes

Muzzle Reference System: Yes

Muzzle Brake Type: Single Baffle Muzzle Brake

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+20

Minumum Elevation: deg-8

Barrel Length: 48 Caliber

Recoil Stoke: mm600

Recoil Force: tons13

Weight: kg720

Effective Firing Range: m1,250

Breech Block: Vertical Wedge

Note: The Rounds for the AMC-10RC are not the NATO Standard

↳*Ammunition (Option 1)*

Name: OFL 105 F3

Type: APFSDS-T

Caliber: mm105

Muzzle Velocity: m/s1,400

Basic Load: ea38 total of any combination of the ammo listed

Maximum Effective Range: m1,800

Penetrator: tungsten-alloy penetrator

Penetration: mm360

Accuracy: mils0.25

↳***Ammunition (Option 2)***

Name: OCC 105 F3B

Type: HEAT-T

Caliber: mm105

Muzzle Velocity: m/s1,200

Maximum Effective Range: 1,300

Penetration: mm100

Accuracy: mils0.4

↳***Ammunition (Option 3)***

Name: OE 105 F3B

Type: HE

Caliber: mm105

Muzzle Velocity: m/s1,200

Maximum Effective Range: m1,000

Penetration: INA

Accuracy: mils0.4

Lethal Radius: m15

Auxiliary Weapon System

↳***System***

Name: FN MAG, 7.62mm General Purpose Machine Gun

Type: mm7.62

Max Rate of Fire: rds/min650-1000

Weight: kg11.8

Length: mm1,263

Barrel Length: mm630

Width: mm118.7

Height: mm263

Effective Firing Range (Bipod): m800

Effective Firing Range (Tripod): m1,800

Maximum Firing Range: m3,500

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea4,000

Maximum Firing Range: m3,500

Fire Control

FCS Name: COTAC

Main Gun Stablization: Yes, electrohydraulic gun laying system with a manual back-up

GSR (Ground Surveillance Radar): INA

Battle Management System (BMS): No

IFF Capabile: No

Fire on the Move: No

Hunter-Killer Engagement Capability: INA

Periscopes (Commander): ea6

Commander's Thermal Image: Panoramic M389 day telescope and the Thales Castor thermal cameras

Periscopes (Gunner): ea3

Gunner's Thermal Image: M504 telescope and the Thales Castor thermal cameras

Fast Information, Navigation, Decision, and Reporting System: Yes

Map Database: Yes

Range Finder: M550 laser rangefinder

Boresight Unit: M553 boresight unit

Protection

Hull Armor: welded aluminum armor, Vehicle withstands hits from medium-caliber weapons and artillery shell splinters

Turret Armor: turret provides the crew with protection from small arms fire and shell splinters

Applique Armor: Yes, add on armor kit

Active Protection System: No

NBC Protection: Yes

IR Signature: INA

Jamming System: INA

IR Countermeasure System (LIRE): INA

Smoke: Yes, four Gallix grenade launchers

Notes:

The AMX-10RC was developed during the late 1970s. It entered service with the French Army in 1979. The French Army obtained a total of 284 of these vehicles. It was one of the first, if not the first production fire support vehicle, armed with a powerful 105 mm gun. The AMX-10RC is no longer produced. Between 2005 and 2010 a total of 256 of these armored vehicles were upgraded to the AMX-10RCR standard in order to keep them in operational service. In the near future these are due to be replaced by a new Jaguar armored reconnaissance and combat vehicle. French Army has a requirement for up to 250 new machines, that will replace in French Army service the AMX-10RCs, as well as some other armored vehicles. Deliveries of the Jaguar are scheduled to begin in 2020. The AMX-10RC has been exported to Morocco and Qatar. This tank destroyer has seen action during numerous military conflicts.

Eagle V Swiss 4x4 Reconnaissance Vehicle





Tiers:



Variants:

- **Eagle I:** INA
- **Eagle II Reconnaissance Vehicle:** This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.
- **Eagle III Artillery Forward Observation Vehicle:** This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.
- **Eagle IV Military Tactical Vehicle:** The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility.
- **Eagle V:** This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common.
- **Eagle BAT ambulance:** This ambulance accommodates an emergency doctor, rescue assistant and a driver/paramedic. The vehicle permits patient transport and emergency treatment under protection.
- **Eagle V 6 x 6:** The is a 6 x6 compact off-road vehicle powered by a six-cylinder turbo-diesel engine coupled to a five-speed automatic transmission and a two-stage transfer case.
- **VERO robotics kit:** Developed by Ruag Defence in Switzerland, this is a robotics kit that can be retrofitted onto the Eagle IV, among other vehicles.

System

Alternative Designation: Eagle V
Type: Reconnaissance Vehicle
Manufacturer: General Dynamics European Land Systems-Mowag, Kreuzlingen, Switzerland General Dynamics European land Systems-Germany, Kaiserslautern, Germany

Family: Eagle Series

Crew: 6 max

Passenger Capacity: INA

Dimensions

Length: 5.40 m

Width: 2.20 m

Height: 2.32 m

Weight, Combat: 7,400 kg

Ground Clearance: 0.40 m

Wheelbase: 3.53 m

Internal Protected Volume: 6 cu m

Gross Weight: 10,000 kg

Payload: 3,000 kg

Automotive

Engine Name: 1 x Cummins ISB 6.7E3245

Engine Type: Turbocharged Diesel

Engine Power: 245 hp (183 kW)

Fuel Capacity: 180 liters

Transmission: Allison 2500 SP 5-speed automatic

Range: km700

Speed, Maximum Road: km/h110

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 1.2 m

Gradient: 60 percent

Side Slope: 40 percent

Vertical Step: 0.4 m

Trench: 0.5 m

Turning Diameter: 15.0 m

Angle of Approach: 42 deg

Angle of Departure: 45 deg

Main Gun

Note: The vehicle can be armed with a remotely operated weapon station armed with weapons up to 12.7-mm machine guns.

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: No

Protection

Hull Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Turret Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Applique Armor: Available, The Eagle IV is armored with composite plates mounted to the inner face of aluminum plates to provide a high-level of ballistic protection. A non-armored version is also available.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, An NBC overpressure system is fitted.

Smoke Equipment: Yes, 6 x smoke-grenade launchers facing rear from turret

Notes:

Eagle V This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common. The 4 x 4 version accommodates a driver and three to five troops. A cargo version has a two-seat cab. Payload capacity is 7,275 lb (3,300 kg) to 7,940 lb (3,600 kg).

FV101 Scorpion British Combat Reconnaissance Vehicle






Tiers:



Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV101 (See variants)

Description: Initially a light tank, it took on another of roles; passengers depends on the variant; specifications are for the Scorpion

Type: Armored reconnaissance vehicle

Manufacturer: Alvis Vehicles, Coventry, England

Family: e Combat Vehicle Reconnaissance (Tracked), CVR(T), family

Crew: ea3

Note: For a long period of time it was the main vehicle in armored reconnaissance regiments. In 1994 this vehicle was withdrawn from active service with the Royal army, but it still operational with export customers.

Dimensions

Length: m4.79

Width: m2.2

Height: m2.10

Weight: tons7.93

Ground Pressure: 0.36 kg/cm sq

Track: m1.71

Track Width: m0.43

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: 195 hp

Cruising Range: 640

Speed, Maximum Road: km/h87

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Main Weapon System

↳*System*

Name: ROF L23A1, 76mm Rifled Gun

Type: 76mm

Length: mm2157

Width: mm146

Height: INA

Basic Load: ea40

Maximum Elevation: deg+35

Minimum Elevation: deg-10

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: m2,200

Rate of Fire: rds/min6

Recoil System: hydropneumatic

↳***Ammunition***

Name: M42A1 HE

Type: 76mm Projectile

Weight, Complete Round: kg10.03

Weight, Projectile: kg5.84

Weight, Filler/Core: kg0.39

Muzzle velocity: m/s820

Maximum Effective Range: m13,400

Auxilery Weapon System

↳***System***

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: + 1 Million

Max Rate of Fire: rds/min650-1,000

Length, Total: mm1,263

Length, Barrel: mm630

Width: mm118.7

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳ ***Ammunition***

Name: INA
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Muzzle Velocity: m/s840
Basic Load: ea3,000

Fire Control

Name: INA
Computerized FCS: INA
Commander Periscopes: ea7
Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.
Gunner Periscopes: ea2
Navigation System: Yes
Night Vision: Rank Precision Industries passive night sight

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)
Applique armor: mmINA
Explosive reactive armor: mmINA
Active Protection System: INA
Self-entrenching blade: No
NBC Protection System: Yes
Smoke Equipment: 8 Smoke dischargers
Survivability Equipment: Enhanced mine protection available

Notes:

The FV101 Scorpion is a British armoured reconnaissance vehicle. It was the lead vehicle and the fire support type in the Combat Vehicle Reconnaissance (Tracked), CVR(T), family of seven armoured vehicles. Manufactured by Alvis, it was introduced into service with the British Army in 1973 and was withdrawn in 1994. More than 3,000 were produced and used as a reconnaissance vehicle or a light tank. It holds the Guinness world record for the fastest production tank; recorded doing 82.23 km/h (51.10 mph) at the QinetiQ vehicle test track, Chertsey, Surrey, on 26 January 2002. The Scorpion was armed with the low velocity 76 mm L23A1 gun, which could fire high-explosive, HESH, smoke and canister rounds. Stowage was provided for 40 or 42 rounds. A 7.62 mm coaxial machine gun (3,000 rounds carried) was also fitted, as were two multi-barreled smoke grenade dischargers, one on each side of the turret. The main armament has an elevation of 35 degrees and a depression of 10 degrees; the turret has a full 360-degree traverse. The original engine was the Jaguar J60 Mk 100b 4.2-litre petrol engine, which was replaced by a Cummins or Perkins diesel engine. The maximum speed was about 50 miles per hour (80 km/h) and it could accelerate from nought to 30 miles per hour (48 km/h) in 16 seconds. The maximum speed on water (with the flotation screen deployed) was 3.6 mph (5.8 km/h). The Irish engineering company IED replaced the existing Jaguar engine in Irish Army Scorpions in a successful re-powering process with a Steyr M16 TCA HD engine (6-cylinder, 145 kW), making the Scorpion more powerful and more reliable in critical environments. The FV101 was a very light armoured vehicle, weighing in at a mere 8 tonnes. This meant some compromises had to be made on protection. The vehicle had 12.7 mm of sloped aluminium armour, giving an average effective thickness of 25 mm. The FV101 had all-around protection from shell fragments and 7.62 mm

rounds, and the heavily sloped frontal arc was designed to be resistant to 14.5 mm rounds fired from a 200 meter range. The initial manufacture of the aluminium armour resulted, after time and effects of the environment, in failure. This phenomenon was known as Stress Corrosion Cracking (SCC) and it seriously affected all early builds.

Eagle II Swiss 4x4 Reconnaissance Vehicle





Tiers:



Variants:

- **Eagle I:** INA
- **Eagle II Reconnaissance Vehicle:** This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.
- **Eagle III Artillery Forward Observation Vehicle:** This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.
- **Eagle IV Military Tactical Vehicle:** The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility.
- **Eagle V:** This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common.
- **Eagle BAT ambulance:** This ambulance accommodates an emergency doctor, rescue assistant and a driver/paramedic. The vehicle permits patient transport and emergency treatment under protection.
- **Eagle V 6 x 6:** The is a 6 x6 compact off-road vehicle powered by a six-cylinder turbo-diesel engine coupled to a five-speed automatic transmission and a two-stage transfer case.
- **VERO robotics kit:** Developed by Ruag Defence in Switzerland, this is a robotics kit that can be retrofitted onto the Eagle IV, among other vehicles.

System

Alternative Designation: Eagle II

Type: Reconnaissance Vehicle

Manufacturer: General Dynamics European Land Systems-Mowag, Kreuzlingen, Switzerland General Dynamics European land Systems-Germany, Kaiserslautern, Germany

Family: Eagle Series

Crew: 4 (driver, commander, signals operator, observer)

Passenger Capacity: INA

Dimensions

Length: 4.90 m

Width: 2.28 m

Height: 1.75 m

Weight, Combat: 5,500 kg

Weight, Empty: 4,100 kg

Weight, Maximum Axle Load Front: 2,600 kg

Weight, Maximum Axle Load Rear: 3,200 kg

Payload Weight: 1,400 kg

Automotive

Engine Name: 1 x GM LNA

Engine Type: 6.5 liter (397 cu in) turbo four-stroke V8 diesel

Engine Power: 190 hp at 3,400 rpm

Fuel Capacity: 95 liters

Transmission: Hydramatic 4L80E automatic; 4 forward/1 reverse gears

Range: km450

Speed, Maximum Road: km/h125

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 0.76 m

Gradient: 60 percent

Side Slope: 40 percent

Main Gun

Note: 1 x 7.62-mm machine gun facing forward in turret. Name of 7.62mm Machine Gun: INA

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: No

Protection

Hull Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Turret Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, Overpressure System

Smoke Equipment: INA

Notes:

Eagle II Reconnaissance Vehicle This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.

Eagle III Swiss 4x4 Artillery Forward Observation Vehicle





Tiers:



Variants:

- **Eagle I:** INA
- **Eagle II Reconnaissance Vehicle:** This variant is slightly heavier than the Eagle I with a better power-to-weight ratio. The chassis is based on the enhanced capability vehicle (ECV) Humvee. It is fitted with a metal and composite armor shell capable of withstanding NATO Standard Agreement (STANAG) Level II or III threats. A Mowag armored MBk2 observation cupola is fitted.
- **Eagle III Artillery Forward Observation Vehicle:** This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.
- **Eagle IV Military Tactical Vehicle:** The military tactical vehicle is suited as a platform for mission roles such as reconnaissance, surveillance, command or military police tasks. It is based on the advanced Mowag Duro 3 chassis technology with roll stabilizer and the De-Dion axle system. Along with the permanent all-wheel drive system, the roll stabilizer and axle system help give the vehicle high off- and on-road mobility.
- **Eagle V:** This is a further development of the Eagle IV with a larger payload capacity, internal volume and increased crew protection, while providing the same mobility. The vehicles can be optimized for different missions with the application of modular add-on kits. It is available in 4 x 4 and 6 x 6 variants. The former was made public in 2010 and the latter in 2012. The two variants are about 80 percent common.
- **Eagle BAT ambulance:** This ambulance accommodates an emergency doctor, rescue assistant and a driver/paramedic. The vehicle permits patient transport and emergency treatment under protection.
- **Eagle V 6 x 6:** The is a 6 x6 compact off-road vehicle powered by a six-cylinder turbo-diesel engine coupled to a five-speed automatic transmission and a two-stage transfer case.
- **VERO robotics kit:** Developed by Ruag Defence in Switzerland, this is a robotics kit that can be retrofitted onto the Eagle IV, among other vehicles.

System

Alternative Designation: Eagle III

Type: Reconnaissance Vehicle

Manufacturer: General Dynamics European Land Systems-Mowag, Kreuzlingen, Switzerland General Dynamics European land Systems-Germany, Kaiserslautern, Germany

Family: Eagle Series

Crew: 4 (driver, forward observer, surveyor, signals operator)

Passenger Capacity: INA

Dimensions

Length: 4.90 m

Width: 2.28 m

Height, Mast Retracted: 2.60 m

Height, Mast Extended: 3.20 m

Ground Clearance: 0.40 m

Wheelbase: 3.30 m

Weight, Empty: 5,100 kg

Weight, Combat: 5,800 kg

Payload Weight: 700 kg

Automotive

Engine Name: 1 x GM

Engine Type: 6.5 liter (397 cu in) turbo four-stroke V8 diesel

Engine Power: 190 hp at 3,400 rpm

Fuel Capacity: 95 liters

Transmission: Hydramatic 4L80E automatic; 4 forward/1 reverse gears

Range: km450

Speed, Maximum Road: km/h125

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 0.76 m

Gradient: 60 percent

Side Slope: 40 percent

Main Gun

Note: 1 x 7.62-mm machine gun facing forward in turret. Name of 7.62mm Machine Gun: INA

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: No

Protection

Hull Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Turret Armor: Protection against 5.56-mm and 7.62-mm ball ammo from 33 yds (30 m) and up; and protection against 7.62-mm steel jacket ammo from 109 yds (100 m) and up

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, Overpressure System

Smoke Equipment: INA

Notes:

Eagle III Artillery Forward Observation Vehicle This vehicle is used for target surveillance, acquisition, observation, reconnaissance and patrol missions. It carries a crew of four (driver, surveyor, forward observer and signals operator). Panoramic bulletproof windows ring the vehicle, which is fitted with a raised roof. It is protected by high-hardness armored steel and composite armor. Additional mine protection is available as an option.

FV107 Scimitar British Armored Reconnaissance Vehicle





Tiers:

1 2 **3** 4

Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV107 Scimitar

Type: Armored Reconnaissance Vehicle

Manufacturer: Alvis Vehicles, Coventry, England

Crew: ea3

Note: The new British reconnaissance vehicle is known as Ajax. It is planned to enter service in 2019 and will replace the Scimitars in service with the British Army.

Dimensions

Length: m4.98

Width: m2.24

Height: m2.24

Weight: tons7.8

Ground Pressure: 0.36 kg/cm sq

Track: m1.71

Track Width: m0.43

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: 195 hp

Cruising Range: 640

Speed, Maximum Road: km/h87

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg35

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Note: On Water the FV107 is propelled by its tracks

Communications

Primary: Bowman digital communications system

Main Weapon System

↳*System*

Name: Rarden L21 30mm Rifled Gun

Type: 30mm

Length: m3.15

Barrel Length: m2.44

Width: INA

Total Weight: kg110

Barrel Weight: kg24.5

Load Type: Manual with three round clips

Automatic Firing Mode: 6 Rounds

Basic Load: ea40

Maximum Elevation: deg+35

Minimum Elevation: deg-10

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Ammunition Types: Armour Piercing Secondary Effect (APSE), High Explosive Incendiary (HEI), Armour Piercing Discarding Sabot (APDS)

Maximum Effective Range: m2,000

Rate of Fire: 80 rds/min

↳***Ammunition***

Name: INA

Type: HE

Caliber: 30mm

Basic Load: ea165

Muzzle Velocity: 1,070

Maximum Effective Range: m2,000

Auxilery Weapon System

↳***System***

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: + 1 Million

Max Rate of Fire: rds/min650-1,000

Length, Total: mm1,263

Length, Barrel: mm630

Width: mm118.7

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea3,000

Fire Control

Name: AVIMO's SPIRE Sighting System

Computerized FCS: Yes

Sighting System: AVIMO's SPIRE sighting system

Laser Rangefinder: Yes

Thermal Imaging: HIRE thermal imaging module (from Hughes Electro-Optical Systems)

Battle Management System (BMS): Yes

:

Protection

Armor (turret front): The Scimitar has a thin aluminum armor hull. It provides protection only against small arms fire and artillery shell splinters.

Applique armor: INA

Explosive reactive armor: INA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Survivability Equipment: Enhanced mine protection available

Notes:

The FV107 Scimitar is an armoured reconnaissance vehcile (sometimes classed as a light tank) used by the British Army. It was manufactured by Alvis in Coventry. It is very similar to the FV101 Scorpion, but mounts a high velocity 30 mm L21 RARDEN cannon instead of a 76 mm gun. It was issued to Royal Armoured Corps armoured regiments in the reconnaissance role. Each regiment originally had a close reconnaissance squadron of five troops, each containing eight FV107 Scimitars. The FV107 Scimitar is one of the CVR(T) series of vehicles. It entered service in 1971. Initially, the engine was the Jaguar J60 4.2-litre 6-cylinder petrol engine, the same as used by several Jaguar cars. This has now been replaced by a Cummins BTA 5.9 diesel engine in British Army Scimitars, under the CVR(T) Life Extension Program (LEP). The Scimitar lifespan has once again (as of mid 2009) been extended to accommodate the shift in timeframe of the Future Rapid Effect System program, which would have seen new armoured vehicles introduced to replace the ageing CVR(T) range of vehicles. With new modifications, air

filtration units and gearbox upgrades (late 2009), as well as hull alterations (late 2009) and the creation of a CVR(T) Spartan & CVR(T) Scimitar hybrid the CVR(T) range (early 2010) is expected to continue well beyond 2017.

→→Amphibious Combat Reconnaissance Vehicles (CRV)

BRM-1 Russian Amphibious Combat Reconnaissance Vehicle (CRV)





Tiers:



Variants:

- **BRM-1:** Baseline ARV (BMP M1976/1)
- **BRM-1K:** Smoke grenade launchers, additional communications (R-130, R-014D telegraph), PSNR-K Radar

System

Alternative Designations: BRM-1; BMP M1976; BMP-R
Description: BMP-1 modified for recon with space for 2 passengers (see Chapter 3)
Manufacturer: Kurganmashzavod
Crew: 6 (machine commander, pilot, transmitter, navigation system operator and two operators of reconnaissance systems)

Dimensions

Length Overall: m6.74
Width: m2.94
Height: m2.15
Combat Weight: mt13.3
Ground Pressure: kg/cm20.57

Automotive

Engine Name: UTD20
Engine Type: 300-hp, Water-cooled, V-6 diesel

Cruising Range: km600

Speed (Max Road): km/h65

Speed (Max Off-Road): km/h40-45

Speed (Max Swim): km/h7

Fording Depths: mAmphibious

Communications

Primary Radio: R-173

Secondary: R-130

Telegraph: 2 x R-014D telegraphs

Main Weapon System

Turret: The same enlarged two-man turret as the M1975 but mounts the standard 73-mm main gun (without the SAGGER launcher)

↳*System*

Name: 2A28 Grom

Type: 73 mm low pressure smoothbore semi-automatic gun with a wedge breech block

Caliber: 73-mm

Manufacturer: KBP

In Service: 1966-Present

Length: mm1,195

Width: mm218

Height: mm322

Weight: kg115

Barrels: ea1

Maximum Elevation: deg+15

Minimum Elevation: deg-4

Traverse Range: deg40

Traverse Left: deg20

Traverse Right: deg20

Rate of Fire: rds/min8

Maximum Firing Range: m4,500

Sights: 1PN22M, 1PN22M2

↳*Ammunition*

Type: Projectile

Caliber: mm73

Muzzle Velocity: m/s700

Shell Types: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP

Maximum Effective Range (HEAT-FS) (Day): m1,300

Basic Load: 40 Rounds: HEAT-FS: 16 (Est), HE: 24 (Est)

Maximum Effective Range (HEAT-FS) (On Move): m600

Maximum Effective Range (HEAT-FS) (Night): m800-1,000

Maximum Effective Range (HEAT) (Day): m1,300

Maximum Effective Range (HEAT) (On Move): m600

Maximum Effective Range (HEAT) (Night): m800-1,000

Armor Penetration (HEAT-FS PG-15VNT): mm550-700

Armor Penetration (HEAT-FS PG-15): mm335

Coaxial Weapon System

↳*System*

Name: PK Machine Gun

Type: 7.62mm General Purpose Machine Gun

Length: mm1,203

Barrel length: mm605

Weight, Gun and Intergral Bipod: kg9

Weight, Tripod: kg7.7

Action: Gas-operated, open bolt

Rate of Fire: 650 rounds/min

Effective Firing Range: 100-1,500

Maximum Firing Range: m3,800

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Fire Control

Radar: 1RL133-1 Terrestrial radar

Radar Deployment: automatically retractable into the compartment at the rear of the turret

Fire Control System: Yes

Target Coordinate System: Yes

Navigation System: TNA-4 navigation system

Laser Rangefinder: Yes, 1D8 laser rangefinder

NRBC Recognition Facilities: Yes

Night Sights: The Russian Alis or Sanoet thermal gunner's sight can be installed.

Additional Sights: 1PN22M2 sight

Protection

Armor (turret front): mm19-23

Applique armor: mmAvailable

Explosive reactive armor: mmAvailable

Active Protection System: No

Self-entrenching blade: No

NBC Protection System: Automatic overpressure system

Smoke equipment: No

Notes:

The BRM-1 (BMP-R or BMP M1976) is an armored reconnaissance vehicle that is derived from the BMP Fighting Vehicle (BMP M1976/1) without smoke grenade launchers, added comms (R-130, R-014D telegraph), and Tall Mike radar but with four more passengers. The BMP Ml976 reconnaissance vehicle has the same enlarged two-man turret as the M1975 but mounts the standard 73-mm main gun (without the SAGGER launcher). The BMP M 1976(2) model has a small parabolic antenna on the roof. One of these vehicles is assigned, along with three BMP-1s, to the reconnaissance company of a motorized rifle or tank regiment, and three of them are assigned to the reconnaissance battalion of a motorized rifle or tank division.

PRP-4A Argus Russian Artillery Reconnaissance Vehicle





Tiers:



Variants:

- **PRP-4MU:** The PRP-4MU armoured reconnaissance vehicle is intended for reconnaissance of stationary and moving ground targets day and night, under any weather conditions, at ambient temperature ranging from - 40o C up to + 40o C, up to 3000 m above sea level.

System

Alternative Designation: PRP-4A Argus
Type: Artillery Reconnaissance Vehicle
Manufacturer: INA
Family: PRP Series
Crew: ea4
Passenger Capacity: INA
Chassis: The PRP-4A is based on the BMP-1 infantry fighting vehicle chassis.
Note: This reconnaissance vehicle has a number of sensors and can operate in day or night conditions.

Dimensions

Length: 6.74 m
Width: 2.94 m
Height: 2.15 m
Weight, Combat: 13.8 t
Ground Pressure: INA

Automotive

Engine Name: UTD-20S1
Engine Type: Diesel
Engine Power: hp300
Range: km550

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: km/h7

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.7 m

Trench: 2.2 m

Fording Depth: Amphibious

Main Gun

Note: The PRP-4A is armed only with a 7.62 mm machine gun for self-defense.

Radar

Name: IL120-1 Battlefield Surveillance Radar

Type: The Argus is fitted with a mast-mounted battlefield surveillance radar.

Targets: This radar detects mobile and stationary targets.

Detection Range, Person: 7km

Detection Range, Vehicles: 12-20 km. Once the hostile tank is stationary and its engine is turned off, detection range is reduced to 2 km.

Detection Range, Buildings: 25 km

Fire Control

Name: INA

Computerized FCS: No

Laser Rangefinder: Yes, 1D14-1 periscopic laser rangefinder

Thermal Camera: Yes

Optical Electronic Surveillance System Range: 20-40 meters

Dismounted Observation Post Maximum Distance from the Vehicle: 6 km

Protection

Hull Armor: The vehicle's armor is welded rolled steel varying in thickness between 6 millimetres (0.24 in) thick on the top of the hull. Armor of this reconnaissance vehicle provides all-round protection against 12.7 mm rounds. Front arc partially withstands 20 mm rounds.

Turret Armor: 33mm

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: Yes

Notes:

The PRP-4A Argus mobile reconnaissance post is the latest version of the PRP-4 Nard, which was adopted back in the early 1980s. The PRP-4A Argus has enhanced capabilities over its predecessor. Its main role is to carry out reconnaissance for artillery units, determine target coordinates and act as a general forward observation vehicle. It entered service with the Russian Army in 2009. It is being produced in small numbers for the Russian Army. This reconnaissance vehicle is also being offered for export. PRP-4A Argus is a new armoured vehicle designed to provide reconnaissance and observation for artillery units. The vehicle is produced by Rubtsovsk Machine Building Plant, a part of Russian company Uralvagonzavod. Rubtsovsk Affiliate presented the upgraded PRP-4A Argus reconnaissance vehicle at the Russia Arms Expo 2013. The PRP-4A entered service with the artillery brigade of the Central Military District in February 2015. Rubtsovsk delivered eight PRP-4A Argus vehicles under a three-year contract by late-2016.

ASLAV-S Australian 8x8 Amphibious Armored Surveillance Vehicle




Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armoured Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilised M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
- **ASLAV Type II:** The ASLAV Type II has no turret and greater internal capacity and is derived from the Canadian Bison Armoured Personnel Carrier. The ASLAV Type II has a crew of two (commander and driver) and is armed with a pintle mounted M2 12.7 mm machine gun. In a number of vehicles, the standard machine gun pintle mount was replaced by a Kongsberg Protector remote weapon station (RWS), which can accommodate either a 12.7 mm machine gun or a Mk 19 40mm automatic grenade launcher. Using a common hull design installed with interchangeable Mission Role Installation Kits (MRIKs), it can be converted into any one of four variants.
- **ASLAV-PC (Personnel Carrier):** is an Armoured Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance
- **ASLAV-C (Command):** is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialised seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.
- **ASLAV-S (Surveillance):** is a specialised surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilising two specialist MRIKs.
- **ASLAV-F (Fitter):** is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** is an Armoured Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-S
Type: Armored Surveillance Vehicle
Family: ASLAV
Crew: ea4

Passenger Capacity: ea2

Thermal Image Viewer: equipped with a hydraulically raised mast mounted thermal imager

Laser Range Finder: Yes

Day Vision Television Camera: Yes

Night Vision Television Camera: Yes

Surveillance Radar: Battlefield Surveillance Radar

Radar Frequency: I band

Radar Range: 40 km

Man-portable Surveillance and Target Acquisition Radar (MSTAR): Yes, the Man-portable Surveillance and Target Acquisition Radar (MSTAR) is a lightweight all-weather battlefield Doppler radar operating in the J band. It is usually used by artillery observers to acquire and engage targets in bad visibility or at night. It is capable of detecting, recognizing and tracking helicopters, slow moving fixed-wing aircraft, tracked and wheeled vehicles and troops, as well as observing and adjusting the fall of shot. The radar display is an electro-luminescent screen that can be overlaid with a map grid. It also shows the areas of ground visible to the radar and those that are masked by terrain. Target location can be presented as either map coordinates or bearing and distance (polar coordinates) from the radar. The complete radar weighs 30 kilograms (66 lb) It can detect targets out to 30 kilometres (19 mi), with a maximum range of 42 kilometres (26 mi). The radar head (antenna and electronics) are connected by remoting cable to the display. The rotating head can be mounted on either a tripod on the ground or an elevated mast, the latter fitted to the Warrior Artillery Observation Post vehicle (FV514), or the Coyote Reconnaissance Vehicle. When fitted to the mast power is taken from the vehicle supply and the display is inside the vehicle. For dismounted use the radar uses standard military rechargeable dry batteries and is man-carried in three loads. The radar can be set up in under three minutes.

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.5

Trench: m2

Fording Depth: Amphibious

Note: The ASLAV-S is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Main Gun

Note: The turret can be traversed and the main gun fired while vehicle is afloat.

↳*System*

Name: M242 25mm Bushranger Chain Gun

Type: 25mm Chain Gun

Caliber: 25mm

Manufacturer: Hughes Helicopters (1981–1985) McDonnell Douglas Helicopters (1985–2002) Alliant Techsystems (2002–2015) Orbital ATK (2015–2018) Northrop Grumman Innovation Systems (2018–present)

In Service: 1981-Present

Proliferation: >11,000

Length: 2,672mm

Barrel Length: 2,175mm

Width: 318mm

Height: 373mm

Weight: 119 kg

Barrels: Single barrel (progressive RH parabolic twist)

Action: Open bolt

Rate of Fire: • Cyclic: 200rpm with 1hp or 500rpm with 8hp

Muzzle Velocity: 1,100 metres per second (3,600 ft/s)

Maximum Firing Range: 6,800 m

Effective Firing Range: 3,000 m

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm25

Shell: 25×137 mm

Basic Load: 720

Notes: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. The ammunition used in the M242 may also be used in a variety of weapons such as the GAU-12 Equalizer, the French Giat M811, or the Swiss Oerlikon KBA weapon system. It has the capability to fire U.S. manufactured ammunition as well as the NATO equivalents thereof. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun

Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (STANAG 2310)

Basic Load: 1,200

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-S provides protection against small-arms fire, mine-blasts and artillery fragments.

Turret Armor: INA. The ASLAV-S is fitted with a two-man turret, similar to that of the LAV-25.

Applique Armor: Protection of this reconnaissance vehicle can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

ASLAV-S (Surveillance) – is a specialized surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops. The ASLAV-S uses the same hull as the ASLAV-PC and is converted with a mission kit. This includes the RASIT ground surveillance radar, thermal imager, laser rangefinder, daytime TV camera and other observation equipment. It has a crew of four. The Australian Light Armoured Vehicle (ASLAV) is an eight-wheeled amphibious armored reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armored fighting vehicles. In 2014, the Australian army took delivery of 14 upgraded ASLAV-S vehicles. These were equipped with a mast-mounted Multi-Spectral Surveillance Suite (MSSS) featuring stabilized infrared and high-resolution color day still and TV cameras; laser rangefinder; and the Australian version of the DRS Technology Man-portable Surveillance and Target Acquisition Radar (MSTAR). The system is mounted on a 30-ft (9-m) hydraulic mast installed through the rear roof of the vehicle. This enables long-range target detection and automatic alignment of the sensor package to the detected target location. The MSSS also provides secure voice and digital command, control and communications and precise, jam-resistant navigation via a GPS /inertial navigation system. All MSSS functions can be performed under armor. The ASLAV is a highly mobile, eight-wheel drive, amphibious armoured fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tires through the use of solid-core run-flat tires. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

BRM-3K Rys Russian Amphibious Armored Reconnaissance Vehicle






Tiers:



Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3M Ataka:** BMP-3M version with a two men turret armed with 30 mm 2A72 autocannon, and 9M120-1 Ataka ATGM
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3K:** Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BT-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
- **BRM-3K "Rys" (Ob.501):** Surveillance and reconnaissance variant with 1PN71 thermal sight (3.7x/11x, 3 km range), 1PN61 active-pulse night vision device (3 km range), 1RL-133-1 ("TALL MIKE") I-band surveillance radar (3 km man, 12 km vehicle), 1V520 computer and a TNA-4-6 navigation system. The armament consists of the stabilized 30 mm autocannon 2A72 (600 rounds) and a coaxial 7.62 mm machine gun (2,000 rounds) or AU-220M Baikal remote weapon station with 57 mm BM-57 autocannon and 7.62mm PKMT machine gun.
- **BMP-3 Dragoon:** New IFV version with an unmanned turret which can be armed with a variety of combat modules, including standard BMP-3's Bakhcha-U turret with a 2A70 100 mm cannon, a 2A72 30 mm autocannon and a PKTM 7.62 mm machine gun, the AU-220M Baikal remote weapon station module with a 57 mm BM-57 gun and a module with a 125 mm 2A82-1M tank gun, the new 816 h.p.
- **BREM-L "Beglianka" (Ob.691):** Armoured recovery vehicle with five-tonne crane and 20/40 metric tonne capacity winch.

- **BMP-3 "Khrizantema-S":** Self-propelled anti-tank version with 9M123 Khrizantema (AT-15) ATGM system with radar and laser guidance. The 9P157-2 carries two 9M123 missiles on launch rails, which are extended from a stowed position; the radar is also stowed during transit. The missiles are re-loaded automatically from an internal magazine with 15 rounds (missiles are stored and transported in sealed canisters) and can also accept munitions manually loaded from outside the vehicle.
- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).
- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype, further development led to the 2S31 Vena.
- **DZM "Vostorg-2":** Combat engineer vehicle with a dozer blade and excavating bucket. Prototype.
- **UR-07:** Mine clearing system. The UR-07 might replace the UR-77 "Meteorit". It has the same chassis as the BMP-3 but a bigger steel hull with two launch ramps in the rear. The ramps are used to fire rockets towing hose-type mine-clearing line charges to clear mine fields.
- **UNSh (Ob.699):** Basic chassis for specialised variants.
- **Hermes or TKB-841:** Air-defence vehicle with high-velocity missiles and radar system. Prototype.[68] 2S31 Vena – Self-propelled mortar carrier equipped with a 120 mm mortar based on BMP-3 chassis. It entered production in 1996 and service in 2010.
- **2S38 ZAK-57 Derivatsiya-PVO:** Self-propelled air defense vehicle based on BMP-3 chassis fitted with a 57 mm autocannon and passive reconnaissance and target tracking equipment.[72] It is designed to shoot down unmanned aerial vehicles (UAVs), cruise missiles, air-to-surface missiles, aircraft, helicopters, and MLRS rockets.
- **UDAR UGV:** Unmanned ground vehicle based on the tracked chassis of the BMP-3 with the center hull raised to fit the DUBM-30 Epoch armed with 2A42 autocannon, 7.62mm PKMT machine gun, and Kornet-M ATGM.
- **Vikhr UGV:** Unmanned ground vehicle based on BMD-3 equipped with a smaller turret armed with 2A72 autocannon, 7.62mm coaxial machine gun and six anti-tank guided missiles 9M133M Kornet-M, three on each side of the turret.
- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.

System

Alternative Designation: BRM-3K Rys

Manufacturer: Kurganmashzavod

Type: Armored Reconnaissance Vehicle

Family: BMP-3

Crew: ea3

Passenger Capacity: ea7

Fighting Module: 2K23 Fighting Module

Navigation: The BRM-3K is also fitted with the navigation device to enable it to determine its own position of the battlefield. Information would normally be collected and then transmitted to the next chain of command. Communication aids ensure data and radio links at a maximum range of 350 km.

Dimensions

Length (Hull): m7.2

Width: m3.23

Height: m2.45

Weight, Combat: tons18.7

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: 10 cylinder, 4 stroke, v-shaped, water colled diesel

Engine Power: hp500

Cruising Range: km600

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Communications

Primary Radio: R-173

Secondary Radio: R-173P

Radar System

Radar Name: Mast-mounted-1RL-133-1 radar

Radar Effective Range, Vehicles: 8-10 km

Radar Effective Range, People: up to 4 km away

Note: When active, this radar is elevated to a height of 1 m and can be traversed 120° either side regardless of the turret position. It is retracted into the vehicle when not in use. A portable reconnaissance equipment can be fitted to enable a remote connection with the vehicle up to 6 km away.

Main Weapon System

↳*System*

Name: 2A72, 30mm Automatic Cannon

Type: mm30

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: tungsten alloy sub-calibre penetrator

Penetration: can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE-type rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Anti-Tank Guided Missile (ATGM)

↳*System*

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

In Service: 1983-present

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea8

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: beam-riding laser guidance.

Steering System: laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Fire Control

Name: 1K13-2

Computerized FCS: Yes

Thermal Sight Vehicle Commander: optical sight 1PZ-10, a day/night vision device TKN-3MB

Thermal Sight Gunner: 1K13-2 II night channel, 5.5x

Gunner Day Sights: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

Protection

Armor Type: Welded of aluminum alloy armor

Hull Armor (Front): protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, Collective

Smoke Equipment: 6 VEESS

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Notes:

The Russian UralVagonZavod company has published a test firing video of a BMP-3 IFV equipped with an AU-220M Baikal turret that hosts a 57mm autocannon capable of engaging targets located at up to 14.5 kilometer distance. The remote-controlled turret is made by a company called Burevestnik which is a subsidiary of UralVagonZavod. By 2018 the Russian army was experimenting with different calibers for the module's cannon. In the past, all armored IFVs and APCs were equipped with either 30mm or 100mm guns – the former doesn't possess enough firepower to penetrate some modern armor, while the latter is generally too excessive and impairs the rate of fire and accuracy of the cannon. The new version of the Russian BRM-3K combat reconnaissance vehicle is equipped with a new turret armed with a 57mm automatic cannon AU-220M. This new version is based on the chassis of BRM-3K Rys fitted with a new turret armed with a 57mm automatic cannon using gun mount module AU-220M "Baikal". AU-220M Remote Controlled Weapon Station armed with BM-57 57mm automatic cannon, developed by CRI BUREVESTNIK and proposed by Uralvagonzavod. It has the capacity to be used against ground and aerial targets as helicopter and drones. The 57mm gun with the AP round has a penetration capability of 130mm of Steel at a range of 1.000m. A 7,62mm coaxial machine gun is mounted to right side of the main armament. A bank of four smoke grenade dischargers is mounted on each side of the turret. The BRM-3K Rys (lynx) was developed in the early 1990s. It was intended to supplement and replace the BRM-1K reconnaissance vehicle. It is based on the BMP-3 infantry fighting vehicle chassis. The hull and turret of the BRM-3K are of all-welded aluminium armour construction providing the crew with protection from small arms fire and shell splinters. The turret is in the centre of the vehicle with the commander seated on the right and the gunner on the left. The vehicle can carry a total of 12 military personnel including driver, gunner and commander. The troop compartment is at the rear of the hull with entry via two doors in the hull rear opening left and right, with the left door having a firing port.v The conventional BMP-3 main armament consists of a 100mm 2A70 cannon with a coaxial 30mm 2A72 autocannon. In this case, the original turret was removed and replaced by the AU-220M Baikal turret which hosts the 57mm autocannon chambered in 57x348mm SR and a PKTM machine gun chambered in 7.62x54mmR. The turret also contains 80 rounds of 57mm ammunition and 500 7.62x54mmR cartridges. With the AU-220M combat module the vehicle will be able to fire 80 rounds of artillery shells a minute, with a striking range of up to 12 km. AU-220M is designed for installation on future armored combat vehicles and modernization of currently deployed vehicles in order to increase fire power of motorized rifled and infantry units. AU-220M main armament can also be used to accomplish air defense missions thus expanding combat flexibility of armored combat vehicles. It is designed as a remote-controlled unmanned artillery module. The FCS controls the operations of target detection and identification, gun laying and firing of the 57mm automatic gun and 7.62mm machine-gun when firing from a halt, on the move and on the float in any combat enviroment. The FCS is equipped with a sight unit, comprising a combined sight with thermal-imaging and TV channels, a laser-finder and independent dual-axis field of view stabilization. The vehicle will be able to fire 10 projectiles fitted with remote fuzes at a target and, on command, detonate all the charges simultaneously. It will also be able to fire guided munitions – their flight trajectory to the target can be controlled. What's more, the upgraded BMP-3 combat module will be automatic and unmanned. During combat the crew will be inside the most heavily armored part of the vehicle, firing at targets using onboard computers. The operators will select different types of ammunition via a control panel in response to what's happening on the battlefield. The AU-220M's 57 mm projectile is unlikely to cut through the front armor of an Abrams or a Leopard MBT, but even against the heaviest of armor, engineers bet on the hail of high-explosive projectiles knocking out optics, destroying aerials, smashing caterpillar tracks and jamming turrets. Potentially, every Soviet-era BMP-3 model could be upgraded, amounting to thousands of vehicles both in Russia and those used by militaries abroad. As a result, the new BMP-3 will be able to fire from stationary positions, on the move, and even while floating on water. Weather conditions and time of day will make absolutely no difference to the vehicle – rain, snow, slush, or scorching heat are no problem.

ASLAV-25 Australian 8x8 Amphibious Armored Reconnaissance Vehicle





Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armoured Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilised M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
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- **ASLAV-S (Surveillance):** is a specialised surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilising two specialist MRIKs.
- **ASLAV-F (Fitter):** is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** is an Armoured Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-25
Type: Armored Reconnaissance Vehicle
Family: ASLAV
In Service: In the Australian Army, the ASLAV equips the Cavalry Squadrons of the Royal Australian Armoured Corps. A Cavalry Squadron comprises a headquarters element, an echelon and three sabre troops of six ASLAVs, each troop is further

broken down into two patrols each comprising two ASLAV-25s and one ASLAV-PC. The ASLAV equips two squadrons from each of the Australian Army's Armoured Cavalry Regiments, the 1st Armoured Regiment in Adelaide, the 2nd Cavalry Regiment in Townsville, and the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane, as well as the School of Armour at Puckapunyal.

Crew: ea3

Passenger Capacity: ea6

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.5

Trench: m2

Fording Depth: Amphibious

Note: The ASLAV-25 is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Main Gun

Note: The turret can be traversed and the main gun fired while vehicle is afloat.

↳*System*

Name: M242 25mm Bushranger Chain Gun

Type: 25mm Chain Gun

Caliber: 25mm

Manufacturer: Hughes Helicopters (1981–1985) McDonnell Douglas Helicopters (1985–2002) Alliant Techsystems (2002–2015) Orbital ATK (2015–2018) Northrop Grumman Innovation Systems (2018–present)

In Service: 1981-Present

Proliferation: >11,000

Length: 2,672mm

Barrel Length: 2,175mm

Width: 318mm

Height: 373mm

Weight: 119 kg

Barrels: Single barrel (progressive RH parabolic twist)

Action: Open bolt

Rate of Fire: • Cyclic: 200rpm with 1hp or 500rpm with 8hp

Muzzle Velocity: 1,100 metres per second (3,600 ft/s)

Maximum Firing Range: 6,800 m

Effective Firing Range: 3,000 m

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm25

Shell: 25×137 mm

Basic Load: 720

Notes: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. The ammunition used in the M242 may also be used in a variety of weapons such as the GAU-12 Equalizer, the French Giat M811, or the Swiss Oerlikon KBA weapon system. It has the capability to fire U.S. manufactured ammunition as well as the NATO equivalents thereof. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun

Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (STANAG 2310)

Basic Load: 1,200

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-25 provides protection against small-arms fire, mine-blasts and artillery fragments.

Turret Armor: INA. The ASLAV-25 is fitted with a two-man turret, similar to that of the LAV-25.

Applique Armor: Protection of this reconnaissance vehicle can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Australian Light Armoured Vehicle (ASLAV) is an eight-wheeled amphibious armoured reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armoured fighting vehicles. The ASLAV is a highly mobile, eight-wheel drive, amphibious armoured fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tyres through the use of solid-core run-flat tyres. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

→→Airborne Combat Reconnaissance Vehicles (CRV)

EE-9 Cascavel Mark 3 Brazilian 6x6 Armored Reconnaissance Vehicle




Tiers:



Variants:

- **Mark 2/Cascavel I/Cascavel Magro (Thin Rattlesnake):** 1st model with 37-mm gun removed from obsolete M3 Stuart tanks with Mercedes diesel engine
- **Mark 3/Cascavel II/Cascavel Gordo (Fat Rattlesnake):** 1st export model with Mercedes diesel engine, turret ring widen for Giat 90-mm gun, & 2 smoke dischargers
- **Mark 4/Cascavel III:** Engesa EC-90 90-mm gun, 7.62-mm coaxial MG, anti-aircraft MG (12.7-mm or 7.62-mm) on commanders cupola, & a Detroit diesel engine
- **Mark 5/Cascavel IV:** Mark 4 with central tire pressure regulation system, Mercedes OM352 diesel engine & disk brakes
- **Mark 6:** Mark 5 with a Mercedes OM352A engine

System

Alternative Designations: None
Description: 6 X 6 ARV developed in conjunction with the EE-11 Urutu APC as both share many of the same components; vehicle is for recon & route protection as no dismounted soldiers are available
Manufacturer: Engesa
In Service: 1975-Present
Crew: ea3 (driver, commander, gunner)

Dimensions

Length, Hull: m5.20
Length, Gun Foward: m6.20
Width Overall: m2.64
Height, Commander's Cupola: m2.68
Height, Turret Roof: m2.28
Height, Hull Top: m1.75
Combat Weight: tons13.4
Ground pressure: INA
Ground Clearance, Rear Axle: 0.34

Ground Clearance, Hull Center: 0.50

Track: 2.10

Wheelbase: 2.34 m + 1.41 m

Automotive

Engine Name: Mercedes-Benz OM 352A

Engine Type: Diesel

Engine Power: hp170

Power-to-Weight Ratio: 15.8 hp/metric ton

Transmission: Allison Transmission AT-540 automatic transmission

Maximum Road Speed: km/h100

Maximum Range: km880

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m1

Fording: m1

Fuel: 390 liters

Front Suspension: independent with coil springs and double-action shock absorbers

Rear Suspension: "boomerang" walking beam suspension with semi-elliptic springs and double-action shock absorbers

Tire Inflation System: Yes

Communications

Primary: INA, dependent on country using the vehicle

Main Weapon System

↳*System*

Name: Giat 90-mm Gun

Type: Anti-Aircraft Machine Gun

Turret Type: French Hispano-Suiza H 90 turret

Caliber/length: 12.7-mm (.50 caliber)

Maximum Effective Range: 1500 m (Against High Hard Armor-HHA)

Armor penetration: SLAP (Saboted Light Armor Penetrator); 34 mm HHA at 500 m

Muzzle Velocity: M33 Ball: 890 SLAPT (Tracer): 1215

Maximum Elevation: deg+15

Minimum Elevation: deg-8

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Ammo Type: 800 Rounds: Ball, Tracer, AP, API, API-T, AP Hardcore, Multipurpose, SLAP, SLAPT

↳*Ammunition*

Name: INA

Type: Rifled Gun

Caliber/length: 90-mm

Basic Load: 44 Rounds (12 in turret & remainder in the hull): APDS, HE Frag,

Maximum Effective Range (Day): APDS: 1200 m (Est) HE: 2000 m (Est)

Armor Penetration: INA

Muzzle Velocity: APDS: 1250 (Est) HE: 1050 (Est)

Auxiliary Weapon System

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: 12.7 mm

In Service: 1933-Present

Manufacturer: Current: General Dynamics, Fabrique Nationale

Proliferation: Over 3 Million

Max Rate of Fire (M2HB Version): 450-600 rds/min

Max Rate of Fire (AN/M2 Version): 750-850 rds/min

Max Rate of Fire (AN/M3 Version): 1,200-1,300 rds/min

Length, Total: 1,654 mm

Length, Barrel: 1,143 mm

Weight, Gun Only: 38 kg

Weight, Gun and Tripod: 58 kg

Action: Short recoil-operated

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: 450-1,300 m/s

Basic Load: 2,000 ea

Effective Range: 1,800-2,000 m

Fire Control

Name: INA

Computerized FCS: INA

Rangfinder: Optional laser rangefinder mounted over main gun or integrated with gunner's sight

Protection

Armor (turret front): 16-mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: Available (up to 2 smoke dischargers on either side for a total of 4)

Survivability Equipment: Welded multi-layer armor

Notes:

The EE-9 Cascavel Mark 3 was the first Cascavel built for export. Iran Imports a large ammount of their military weapons and vehciles from other countries. The Mark 3 was powered by a Mercedes-Benz OM 352A 170-hp diesel engine connected to an Allison Transmission AT-540 automatic transmission. A central tire inflation system was fitted. Mark 3 vehicles were equipped with a French Hispano-Suiza H 90 turret with a Giat 90-mm gun. The H 90 turret carries 20 rounds for the main gun and 2,000 rounds for the coaxial 7.62-mm machine gun. Elevation was -8/+15 degrees and 360 degrees of traverse. There were two smoke dischargers, one on ei ther side of turret rear.

→→Sensor Reconnaissance Vehicles (SRV)

→→Scout Cars

BRDM-2 Russian Amphibious Scout Car





Tiers:



Variants:

- **Note:** There is a wide range of BRDM-2 variants including anti-tank vehicle, NBC reconnaissance vehicle , command post vehicle, fire and rescue vehicle and more.

System

Alternative Designation: BRDM-2, BTR-40PB, BTR-40P-2 and GAZ 41-08
Manufacturer: mGorkovsky Avtomobilny Zavod (GAZ) in Nizhny Novgorod
Type: Amphibious scout car
Family: BRDM Series
Crew: ea4 ea (driver, commander, radio operator-observer, gunner)
Passenger Capacity: INA

Dimensions

Length: m5.75
Width: m2.35
Height: m2.31
Weight, Combat: tons7

Automotive

Engine Name: GAZ-41
Engine Type: Petrol
Engine Power: hp140
Cruising Range: km750
Speed, Maximum Road: km/h90

Speed, Average Cross: km/h45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.4

Trench: m1.25

Fording Depth: mAmphibious

Fuel Capacity: liters290

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Primary Weapon System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun

Caliber: mm14.5

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Weight: kg49

Total Length: mm1,980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Max Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

↳*Ammunition*

Type: INA

Caliber: mmAPI-T

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): mINA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: General Purpose Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-present

Proliferation: + 1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Basic Load: ea2,000

Muzzle Velocity: m/s855

Accuracy of fire at 300 m: mm90

Fire Control

Laser Target Desinator: INA

Computerized FCS: No

Main Gun Stabilization: INA

Rangefinder: INA

Infrared Searchlight: No

Gunner Day Sight: PP-61AM Sight with a field of view of 23 deg and a acquisition range of 2,000 meters

Commander Fires the Gun: No

Protection

Armor: mm10

Applique Armor: INA

Active Protection System: INA

NBC Protection: Yes, Collective

Smoke Equipment: INA

IR Signature: INA

Firing Ports: No

Notes:

The BRDM-2 (Boyevaya Razvedyvatelnaya Dozornaya Mashina, Боевая Разведывательная Дозорная Машина, literally "Combat Reconnaissance/Patrol Vehicle") is an amphibious armoured patrol car used by Russia and the former Soviet Union. It was also known under the designations BTR-40PB, BTR-40P-2 and GAZ 41-08. This vehicle, like many other Soviet designs, has been exported extensively and is in use in at least 38 countries. It was intended to replace the earlier BRDM-1, compared to which it had improved amphibious capabilities and better armament. The BRDM-2 has a crew of four: a driver, a co-driver, a commander, and a gunner. It has two pairs of chain-driven belly wheels lowered by the driver, which allow trench crossing just like its predecessor, and a centralized tire pressure regulation system, which can be used to adjust the tire pressure of all four tires or individual tires while the vehicle is in motion to suit to the ground conditions. Externally, it differs from the BRDM-1 by having a larger, box-like hull. It retains the boat-like bow of the BRDM-1. However, the crew compartment is now further forward and the new GAZ-41 gasoline V-8 engine is in the rear. Thanks to this, the engine is much better protected from enemy fire. The engine compartment is also separated from the crew compartment by an armoured barrier. The driver's and commander's stations are in the front of the vehicle, with the driver positioned on the left and commander on the right. Both of them sit in front of a bulletproof windscreen, which provides them with their primary view of the battlefield. When in combat, the windscreen can be additionally protected by twin armoured shutters. When the shutters are in their opened position, they protect the driver and commander from being blinded by the sunlight and ensure that the windscreen won't be blurred by rain or snow. The commander and driver have periscopes allowing both of them a more detailed view of the surrounding terrain. The commander has six TNP-A periscopes (five in the front and one on the side of the vehicle), a TPKU-2B day sight and a TKN-1 night sight(night-vision device). The driver has four TNP-A periscopes (all in the front), one of which can be replaced by a TWN-2B night-vision device. The gunner is in the turret during combat, but when traveling he is seated inside the hull. The crew mounts and dismounts the vehicle via two hatches over driver's and commander's stations. On either side of the hull adjacent to the crew position, there is a firing port. Immediately behind the firing port there are three TNP-A periscopes, which protrude from the outside of the hull, giving the crew some vision to the front and rear of the vehicle. The engine is larger than the BRDM's (it is a 140 hp V-8 instead of a 90 hp 6-cylinder). The BRDM-2 has an IR spotlight and four IR driving lights, as well as an over pressure collective NBC filter system. The IR spotlight is located on top of the commander's periscope. The vehicle also has an R-123 radio and an antenna on the right side of the hull next to the commander's hatch, for communication. There's also a winch mounted internally at the front hull that has a 30 m cable and a 4 tonne capacity. The winch is intended to be used, among others, for self-recovery when stuck in difficult terrain. A spare tire can be mounted on top of the turret. This was most often practiced by Polish crews. Like its predecessor, the BRDM-2 is amphibious. The GAZ-41 gasoline V-8 engine supplies power to the circular water-jet, equipped with a four-bladed propeller at the rear of the vehicle, which is covered with an armoured shutter while on land. This shutter must be removed before entering water. The water-jet allows amphibious travel with a speed of 10 km/h for 17 to 19 hours. A trim board, which is stowed under the nose of the hull when traveling, is erected at the front of the hull before entering the water to improve the vehicle's stability and displacement in the water and to prevent

the water from flooding the bow of the BRDM-2. While in its traveling position, it serves as additional armour. The armament is the same as the BTR-60PB armoured personnel carrier; a 14.5 mm KPVT heavy machine gun with a coaxial 7.62 mm PKT general-purpose machine gun as a secondary weapon, both in a small conical BPU-1 turret mounted on the hull in a central position above the belly wheels.[1] The 14.5 mm KPVT heavy machine gun has a practical rate of fire of 150 rounds per minute and a cyclic rate of fire of 600 rounds per minute. It has an effective range during daylight operations of 2,000 m. It can penetrate 20 mm of armour at a range of 1,000 m and 30 mm of armour at a range of 500 m. It can also fire at air targets, in which case the tactical range is 1,400 m. It uses the 14.5 mm API-T, 14.5 mm I-T, 14.5 mm HE-T, 14.5 mm and MDZ type ammunition. The 7.62 mm PKT coaxial general-purpose machine gun has an effective range during day time operations of 1,000 m while the vehicle is stationary and from 400 m to 500 m while the vehicle is on the move. It is fired in 2 to 10 round bursts and has a practical rate of fire of 250 rounds per minute and a cyclic rate of fire of 650 rounds per minute. During daylight operations, the gunner uses the PP-61AM sight, which has a field of view of 23 degrees and x2.6 magnification. The BPU-1 turret is unusual because it has no top hatch opening. Contrary to the popular belief, the BPU-1 turret was originally designed for the BRDM-2. The turret was later used in the Soviet BTR-60PB, the Polish SKOT-2A and the Czechoslovak OT-64A. The turret allows the armament to be elevated between −5 and +30 degrees. On the left side of the turret, there is an air inlet on the hull top. There are also two air-inlet louvers in the forward part of the engine compartment's roof and four smaller air-inlet louvers to the rear. Both sides have centrally placed vision blocks. The vehicle armor, which is composed of welded steel, protects it fully against small arms fire and small shell fragments; but doesn't protect it against big artillery fragments or .50-calibre machine gun fire, which can penetrate the BRDM-2's maximum armor of 14 mm. The BRDM-2-series tires are not protected by armour and are particularly vulnerable to puncture from fire of all kinds. There are three different production lots, which have different cooling vents on the engine deck. The late production version has mushroom-type vents. It also has slightly modified turret and can elevate its armament to +60 degrees. Final production BRDM-2s have additional turret periscopes and a TNA-2 navigation apparatus.

VN-3 Chinese 4x4 Armored Scout Car



Tiers:



Variants:

- **CS/VN3B:** This is an upgraded version of the CS/VN3 with add-on armour to increase ballistic and mine protection. The roof of the crew compartment is fitted with a remotely operated weapon station armed with a 7.62mm machine gun.
- **CS/VN3C::** he Armored Infantry Fighting Vehicle variant of the CS/VN3. The vehicle is fitted with a one man-turret armed with a 30mm automatic cannon.

System

Alternative Designation: May be referred to as CS/VN3
Manufacturer: Norinco
Status: In Production
Expected Out of Service Date: 2036
Type: 4x4 Chinese Reconnaissance Vehicle
Crew: 2
Troop Compartment: 3
Amphibious Capability: Optional
Night Vision: Optional
Navigation System: Optional
Global Positioning System: Optional
Maximum Range: km600

Dimensions

Length: m4.62
Width: m2.2
Height: m1.77
Weight, Combat: tons5.7
Ground Clearance: m0.41

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp165

Engine Location: Front

Transmission: Automatic

Cruising Range: km600

Speed, Maximum Road: km/h110

Speed, Average Cross: INA

Speed, Maximum Swim: km/hINA

Fording Depth: INA

Gradient: %60

Vertical Obstacle: cm40

Trench: cm70

Turning Radius: m8

Anti-Skid Braking System: Yes

Note: The monocoque hull is built from welded steel armour, and the engine and transmission are fitted directly to the hull rather than a chassis.

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Capability – Limited

Amplifier: Available

Physical Conditions: Terrain and Weather favorable

Primary Weapon System

Note: Other weapons, such as a remote weapon system or an anti-tank guided weapon launcher, can be mounted on the VN3. For this example we will use the standard configuration.

↳*System (Option 1)*

Name: QJG89
Type: 12.7mm Heavy Machine Gun
Manufacturer: INA
Turret Type: One Person
Length: mm2,119
Length, Barrel: mm1,003
Diameter: INA
Weight (Gun Only): kg18.5
Weight (Tripod): kg17.5
Action: Gas
Rate of Fire: reds/min450-600
Feed System: Belt
Sights: Iron/Optical
Fire Selector: 0-F
Stock: Fixed

↳*Ammunition*

Type: Ball
Caliber: mm12.7x108
Muzzle Velocity: m/s825
Basic Load: INA
Effective Firing Range (vs. Air): m1,500
Effective Firing Range (vs.Ground): m2,000
Magazine: Belt fed, 50 rounds
Operation: Hybrid direct impingement and short recoil
Armor Penetration: INA

↳*System (Option 2)*

Name: KPV-14.5 heavy machine gun
Type: 14.5mm Heavy Machine Gun
Manufacturer: V.A. Degtyarev Plant

Date of Introduction: 1949-present

Proliferation: Widely Proliferated

Weight: kg49

Length, Total: mm1,980

Length, Barrel: mm1,346

Width: mm162

Height: mm225

Action: Short Recoil Operation

Rate of Fire: rds/min600

Feed System: 40-round belt

Sights: Iron or Optical

↳*Ammunition*

Type: Anti-tank rifle, Heavy machine gun

Caliber: mm14.5

Cartridge: mm14.5x114

Muzzle Velocity: m/s1,005

Basic Load: INA

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Armor Penetration: Yes

Round Variant 1: BS: Armor-piercing incendiary original anti-tank round. The projectile weighs 64.4 grams and is 51 millimeters long with a 38.7 gram core of tungsten carbide with 1.8 grams of incendiary material in the tip. The overall round weighs approximately 200 grams and is 155 millimeters long. The projectile has a muzzle velocity of approximately 1,006 meters per second and can penetrate 30-32 millimeters of RHA steel at an incidence of 0 degrees at a range of 500 meters, or 40 millimeters at a range of 100 meters.

Round Variant 2: B-32: Armor-piercing incendiary full metal jacket round with a hardened steel core. Projectile weight is 64 g and muzzle velocity is 1006 m/s. Armour penetration at 500 m is 32 mm of RHA at 90 degrees.

Round Variant 3: BZT: Armor-piercing incendiary tracer full metal jacket round with a steel core. Projectile weight is 59.56 g and muzzle velocity is 1,006 m/s. Tracer burns to at least 2,000 m.

Round Variant 4: MDZ: High-explosive incendiary bullet of instant action. Projectile weight is 59.68 g.

Round Variant 5: ZP: Incendiary tracer round

Round Variant 6: DGJ02: APIDS-T cartridge uses a 45 g tungsten penetrator, wrapped in a discarding sabot (similar to the US military SLAP cartridges) with dual colour tracer to aid ranging. The sabot splits and leaves the penetrator between 150 and 200 m from the muzzle. It has a muzzle velocity of 1,250 m/s and is quoted as being able to penetrate 20 mm of armour plate set at an angle of 60° at 1000 m.

Round Variant 7: DGE02: APHEI cartridge weighs between 175 and 188 g. At 1000 m it is quoted as having a 90 percent chance of being able to penetrate 15 mm of armour plate set at 30°. At 300 m after penetrating a 2 mm soft steel plate (representing an aircraft skin) it can further penetrate a 1.2 mm thick steel plate producing 20 fragments. Upon explosion between 75 and 95 incendiary pieces are formed which have an 80% chance of igniting aviation fuel.

Auxiliary Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun
Type: 7.62mm Heavy Machine Gun
Manufacturer: Norinco
Date of Introduction: 1985
Length, Total: mm1,192
Length, Barrel: mm658
Diameter: mmINA
Weight (Gun Only): kg12.6
Weight (With Tripod): kg17.5
Action: Gas-operated, open bolt
Rate of Fire: rds/min700-800
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.
Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR
Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.
Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.
Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle
Caliber: mm7.62×54mmR
Muzzle Velocity: m/s840
Basic Load: INA, Belts in 100/200/250 round boxes
Effective Firing Range: m100-1,500 (With Sight Adjustments)
Min Range: m100
Armor Penetration: Available

Fire Control

Laser Target Designation: INA

Protection

Hull Armor: All-welded Steel, provides an unspecified level of protection from small arms fire, shell splinters and some types of mine.
Applique Armor: Available

NBC Protection: Yes

Ballistic Glass: Yes

Fire Detection and Suppression System: Yes

Smoke Equipment: Yes, Two banks of three smoke grenade launchers are mounted on the turret.

Firing Ports: Yes

Air Conditioning System: Yes

Notes:

The VN3 armored scout car had been developed in China. It resembles the French Panhard VBL or Swiss MOWAG Eagle III armored scout cars, but is slightly larger. This vehicle was revealed in 2007. It is understood that development of this light reconnaissance vehicle is now complete. Currently it is produced in small quantity for the Chinese Army. It is also being proposed for export customers as a light multi-purpose armored personnel carrier. It is worth mentioning that this armored vehicle costs far less, than comparable Western or Russian systems. The VN3 armored scout car has an all-welded steel hull. It provides protection from small arms fire, artillery shell splinters, as well as some types of mines. This armored scout car is fitted with a one-person turret, armed with a 12.7 mm or 14.5 mm heavy machine gun. The VN3 has a crew of five, including commander, gunner, driver and two scouts. Occupants enter and leave the vehicle through side or rear doors, or roof hatches. There are some firing ports and associated vision blocks provided for the occupants. Vehicle is powered by a front-mounted diesel engine. Alternatively the VN3 armored scout car could be configured as an armored personnel carrier, with the turret removed. In this case it has a crew of two and accommodates eight troops. Other variants of this scout car include a larger unidentified 4x4 armored vehicle, fitted with a 30 mm turret-mounted cannon. This vehicle uses turret similar to that of the ZLC 2000 airborne combat vehicle. Another variant is amphibious and can carry HJ-8 anti-tank missiles.

Panhard VBL French 4x4 Scout Car





Tiers:



Variants:

- **VBL AT4CS:** A54CS 84-mm ATGM carrier with range only to 250 m with ring-mounted 7.62-mm machine gun
- **VBL SOURCE:** Upgraded optics
- **VBL Information:** Improved target designation
- **VAP Deep Penetration Vehicle:** Long wheel-base for deep reconnaissance missions
- **ULTRAV M11:** Stretched for NBC detection
- **Wasp Milan ER:** Remote weapon station with a 1-tube ATGM launcher & 7.62-mm machine gun
- **VBL Canon:** 20-mm remote turret
- **VBL Ingwe (South Africa):** Armed Long Range Reconnaissance Turret with 4 Ingwe ATGM launchers
- **MPCV (Multi-purpose Combat Vehicle):** VBR chassis with 4 rail missile launcher turret with 8 missiles & 12.7-mm machine gun
- **VBL Tourelle Fermee:** Remote turret that can fire a 12.7-mm MG, 7.62-mm MG, or 40-mm AGL
- **VBR:** Stretch variant can carry 5 soldiers; remote weapon station with M2HB MG & smoke grenade launchers
- **VBL Eryx:** Short-range (600 m) AT carrier with secondary 7.62-mm machine gun
- **VB2L Poste de Commandement:** Command version with extra radios, map board, & 7.62-mm MG for self-protection
- **VBL TOW (Greece):** Single tube with 4 rounds with range to 3,750 m
- **VBL Milan:** 1 Milan firing unit with 6 missiles with range to 2 km
- **VBL Samantha:** Griffon surveillance radar to designate SAM missile & AA artillery targets
- **VBL Anti-Tank:** Equipped with the HOT or TOW turret, but also can be integrated with Kornet or Ingwe missile systems
- **VBL Albi:** Fires Mistral/Mistral 2 SAMs
- **VBL with PL127 Turret:** 12.7-mm MG or 40-mm AGL

System

Alternative Designation: The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL

Description: 4 X 4 armored vehicle carrier serves in a variety of roles. Some variants can carry more than the crew.

Crew : ea3.0

↳*Dimensions*

Height, Overall : m1.70 (2.14 to top of MG)

Length, Chassis Overall : m3.7

Width, Overall : m2.02

Weight: 3.5 to 4 tonnes

Automotive

Engine Name: XD 3T

Engine Type: Peugeot liquid-cooled, turbo- charged, in-line, 4-cylinder diesel

Fording Depth : mAmphibious

Range, Cruising : km600 (max fuel variant to 800, 1000 with external tanks

Speed, Maximum Road : km/h95.0

Speed , Average Cross-Country: km/hINA

Speed , Maximum Off-Road: km/hINA

Main Weapon System

Note: Depends on the version

↳*System*

Name: AA-52 machine gun

Type: General-purpose machine gun

Caliber: 7.5mm or 7.62mm

Cartridge: 7.5×54mm French 7.62×51mm NATO

Action: Lever-delayed blowback

Rate of Fire: rds/min900

Muzzle Velocity: m/s830

Maximum Effective Firing Range: m600

Effective Firing Range: m3,200

Feed System: 50-round non-disintegrating belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

↳*Ammunition*

Type:

Caliber: 7.5mm or 7.62mm

Cartridge: 7.5×54mm French 7.62×51mm NATO

Anti-Tank Weapon System

Name: ERYX

Type: short-range portable SACLOS-based wire-guided anti-tank missile (ATGM)

Manufacturer: MBDA, MKEK (under license)

Produced: 1993

Length: m0.905

Diameter: m0.136

Warhead Type: Tandem HEAT

Warhead Weight: kg3.8 kg Tandem HEAT

Weight, Total: 13.0 kg missile and container; firing post 4.5 kg

Penetration: 900 mm RHA behind reactive armour, or 2.5 m through concrete)

Operational Range: 50–600 m

Speed: 18 m/s (65 km/h) at launch to 245 m/s (880 km/h) at 600 m

Guidance System: SACLOS wire

Launch Platform: Individual, Vehicle

Protection

Armor: STANAG level 1 (protection against 7.62×51 NATO rounds and shrapnel)

Active Protection System: No

Armor, Applique : mmNo

Armor, Explosive Reactive : mmNo

Armor, Turret Front : mm5-11.5

NBC Protection: Collective

Self-Entrenching Blade: No

Smoke Equipment: Yes

Survivability Equipment: Increased mine protection, Kevlar blankets

Notes:

The Panhard Véhicule Blindé Léger ("Light armoured vehicle"), also known by its acronym Panhard VBL or simply VBL, is a French wheeled 4x4 all-terrain vehicle built by Panhard. The vehicle is offered in various configurations, and was designed to combine the agility of the Peugeot VLTT liaison vehicle with adequate protection against small arms fire, artillery fragments, mines and NBC weapons. Produced between 1985 and 2010, the vehicle has been used by the French Army and other European, African and Central American armies in various conflicts since the 1980s. The French VBL programme started in 1978. The French Army was looking for a light reconnaissance vehicle, intended to work with the AMX-10 RC, the Hotchkiss M201 being obsolete when compared with the Soviet BRDM-2s. The new vehicle needed to be armed with a single machine gun for reconnaissance (recce) or with the MILAN missile for anti-tank combat, while being protected from NBC hazards and small arms fire. Both Renault and Panhard proposed a prototype, the trials beginning in 1982. Before its selection by the French armed forces in 1985, the Panhard model was ordered by the Mexican Army in 1984. In 1985, a pre production of 15 vehicles for the French Army was launched while the VBL started its active operational service in the French Army in 1990. The French Army ordered 569 VBLs in 1990, 330 between 1994 and 1997, and 700 VB2L (lengthened variant) before 2004. The VBL, sold abroad as the ULTRAV M-11 has been produced at Marolles-en-Hurepoix, around 10 vehicles being produced each month in 2004. The 1,500th VBL was produced in 2001 and the last VBL of the 2,600 VBLs left the plant in 2010. The VBL has two compartments: a motor bay, placed forward to protect the second compartment, which is for the crew. Its compact internal dimensions led to the design of a lengthened version of the VBL. The crew of the VBL is protected against NBC weapons. The recce versions have two crew members while the anti-tank versions have a crew of three. The French Army version of the VBL is equipped with a Peugeot XD3T turbo-diesel engine. This engine is used on many civilian cars, such as the Peugeot 505, Peugeot 605 and Talbot Tagora and the VBL used many other standard civilian components. Its 95 hp (71 kW) power and 29.5 hp/t (22.0 kW/t) power ratio enable the VBL to speed at 95 km/h (59 mph). It has a fuel consumption of 16 litres (3.5 imp gal; 4.2 US gal) per 100 km (62 mi). Its range of 600 km (370 mi) can be extended to 800 km (500 mi) by two external fuel tanks. Designed to be lighter than 3.5 t (3.4 long tons; 3.9 short tons), the mass of the VBL has increased to 4 t (3.9 long tons; 4.4 short tons). The VBL is fully amphibious and drives at 5.4 km/h (3.4 mph) in water; it is also air transportable by C-130, C-160, Il-76 and A400M. It can be transported underslung by larger helicopters, such as the AS332 Super Puma, and may also be para-dropped.

HJ-62C (YW-531H) Chinese Amphibious Armored Scout Vehicle





Tiers:

1 2 3 4

Variants:

- **Type 85/YW 531H:** Domestic/export base model
- **YW703H:** Command variant
- **Type 85 Armored Command Vehicle:** 2-man crew, 6 staff, additional communications equipment, & fewer ammunition rounds; used at regimental or division level
- **Type 85 Recovery Vehicle:** 1000 KG crane with 5-man crew
- **Type 85 Maintenance Engineering Vehicle:** Similar to the WZ 751 (ambulance), but for support
- **Type 85 Mortar Carriers:** 82-mm & 120-mm variants similar to the YW 531
- **WZ 751 Armored Ambulance:** 2-man crew with space for 4 litter or 8 seat patients; 12.7-mm MG
- **Type 85 SP Howitzer (Type 70-1/YW 302):** Type 54-1 122-mm howitzer on Type 85 chassis
- **Type 85 ATGM Launcher Vehicle:** Railed hull with 4-rail Red Arrow-8 SACLOS wire-guided ATGM
- **YW 307 IFV:** Type 89 with a 25-mm cannon similar to the Bushmaster & the 7.62-mm coaxial MG
- **YW 309 Infantry Combat Vehicle (ICV):** 3-man crew, 73-mm low pressure main gun, 7.62-mm coaxial MG & Red Arrow 3 ATGM
- **HJ-8 Anti-Tank Vehicle:** AT traversable launcher with 4 HJ-8 ATGMs & 4 loads in storage in the hull
- **NVH-1:** Joint Chinese/British variant with 25-mm gun
- **Type 90:** Updated design with reduced height, improved hull shape, & better transmission
- **Thai versions:** Similar to the Chinese variants, but armed with a M-2HB MG
- **Artillery Command Post Vehicle:** YW 531H modified with a raised rear superstructure
- **YW 306:** 130-mm MRL platform
- **Type 89 (YW 534/WZ 534):** Improved power pack & night vision equipment for domestic use & export with longer & wider chassis, improved engine, & mobility

System

Alternative Designations: HJ-62C
Type: Armored Scout Vehicle
Crew: ea2 (driver, commander)
Medics: ea2
Stretchers: four stretcher patients, eight seated patients or two stretcher patients and four seated patients. In addition to

the stretchers, a medical kit, a splint box and an oxygen supply are carried and standard equipment includes an air conditioning system.

Maximum Effective Range: km500

Description: Improved Type 69 APC with rear exit door& emergency roof hatches with space for 13 soldiers who can dismount; firing ports vary depending on variant

Driver Day Periscope: ea2

Driver Night Periscope: ea1

Dimesions

Length: m6.13

Width: m3.06

Height: m2.59

Weight, Combat: kg13,800

Ground Pressure: kg0.546

Automotive

Engine Name: BF8L 413F

Engine Type: Turbocharged, air-cooled, V-8 diesel

Engine Power: hp320

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h35

Speed, Maximum Swim: km/h6

Fording Depth: mAmphibious

Transmission: Manual

Gears: ea5 Forward, 1 Reverse

Communications

Primary Radio: Type 889

Secondary Radio: VRC 83

Intercom System: Type 803

Armament and Ammunition

↳*Main Gun*

Name: Type 54 (DShKM copy)

Type: Anti-Aircraft Machine Gun

Caliber/length: mm12.7

Number of Rounds: ea1,200

Muzzle Velocity: m/s850

Max Range: m2,000

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Ammo: 1120 Rounds: APDS (Tungsten Core); API, API-T,

Armored Sheilds: Yes

Traverse: deg360

Elevation: deg90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: INA

Thermal Gunner: INA

Main Gun Stablization: Yes

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Radar System

Name: INA

Type: Battlefield Surveillance Radar

Detection Range, Vehicles: 25 km

Detection Range, Personnel: 10 km

Protection

Armor Type: Welded Steel Hull

Hull Armor: mm12.7

Armor (turret front): mm14 (front glacis)

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Mine Clearing: No

Self-entrenching Blade: No

NBC Protection System: Yes

Survivability Equipment: INA

Smoke Equipment: 8 Smoke Grenade Launchers (4 on each side)

Waveguide Blade: Yes

Notes:

The HJ-62C Chinese Armoured Scout Vehicle is a variant of the Type 85 (Type YW531H) Armoured Personnel Carrier. This has its turret removed and is fitted with an elevated arm on top of which is mounted a battlefield surveillance radar with a detection range of 25 km for vehicles and 10 km for personnel. The YW531H Type 85 Chinese Armored Personnel Carrier s a tracked armoured fighting vehicle produced by Chinese company Norinco (industrial index: Type YW531H). It is an improved version of the Type 63 armoured personnel carrier. The vehicle is bigger, has additional firing ports and periscopes, a longer chassis with an additional road wheel on each side, and is equipped with an NBC protection system. The Type 85 series was developed in 1985, exclusively for the export market; for the PLA, the very similar Type 89 AFV was designed. The main user of the Type 85 series are the Royal Thai Armed Forces who received their first vehicles in 1987. The hull is made of welded steel, and provides protection against small arms fire. The vehicle carries a maximum of 15 including crew. The driver sits in the front left of the hull, and has a single piece hatch, which opens to the left. The driver is provided with two day periscopes which cover the front and right of the vehicle. One of the drivers periscopes can be replaced by a night vision device. The commander sits behind the driver and has a single piece hatch. The air-cooled, turbocharged diesel engine sits to the right rear of the driver. It has a large intake located in the top of the hull, with an exhaust on the right hand side. The engine feeds a manual transmission with five forward gears and one reverse gear. Track is driven at the front by a drive sprocket, and passes over five dual rubber-typed road wheels and track-return rollers, then loops over an idler at the rear, before returning to the front again. A 12.7 millimetre calibre machine gun with armoured shields is located in an open mount at the front of a small hatch in the center of the hull which opens into the troop compartment. The gun can traverse through 360 degrees and can be elevated to an angle of 90 degrees. A total of 1,120 rounds is carried on board. Two oblong roof hatches and a large rear door provide access to the troop compartment. On either side of the forward hull, a cluster of four 76 mm smoke grenade dischargers is mounted. The vehicle is amphibious, a folding trim board stowed at the front of the hull needs to be raised, and the vehicle can then propel itself in the water using its tracks. Standard equipment includes an NBC system, a Type 889 or VRC-83 radio, and a Type 803 intercom system.

→Motorcycles

IMZ-8 Russian Motorcycle



Tiers:

1 2 3 4

System

Alternative Designation: IMZ-8
Type: Motorcycle
Manufacturer: URAL
Family: IMZ
Crew: ea1

Dimensions

Length: mm2403
Width: mm1582
Height: mm1356
Weight, Combat: kg322
Clearance: 125 mm

Automotive

Engine Name: INA
Engine Type: Gasoline
Engine Power: hp42
Fuel Capacity: 21 liters
Primary Drive: Drive Shaft
Fuel Economy Hightway: 6-7 liters per 100 km
Cruising Range: INA
Speed, Maximum Road: km/h112
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious

Notes:

Ural IMZ-8 The latest model of Ural motorcycles with different modifications. The various modifications of this model are also known as “Tourist”, “Solo”, “Gear-Up”, “Voyage”, “Cobra”, “Retro” and “Wolf”. The Wolf was the first chopper produced in russia. Its production started in 1999, but due to low demand on it the Wolf went out of production in 2011.

KTM 450 EXC Austrian Off-Road Motorcycle







Tiers:



Variants:

- **2000 - 2002:** The factory RFS (Racing Four Stroke) KTM 400 EXC won the 1999 World Enduro Championship. The 2000 RFS KTM 400 EXC had a right side kickstarter but also had the E-start button. KTM took a different approach to the configuration of the motor than most other manufacturers. While others used a 90mm-plus bore piston with a very short stroke of 60mm, the KTM RFS motor used an 89mm x 64mm boiconfiguration which provided more torque at the expense of higher RPM's
- **2003:** This was the first year of the 450 EXC model. It evolved from the earlier 400 EXC model, with an increased displacement via a longer stroke.
- **2005-2007:** These years saw a new frame. Improving the handling without major changes. Rear body work changed to the single piece design off the SX model. The 2006 450 EXC made 42 hp (31 kW) and 37.5 ft-lbs. torque.
- **2007:** This was the first year that the 450 EXC was offered in full factory 50-state street legal trim. The conversion of the previously available model required changes in gearing, exhaust, DOT approved tires and lights and the addition of turn signals, and a horn. Other than these changes the bike was virtually the same as the previously off-road only bike. The US off-road only version of the EXC was replaced by the XC (Close-ratio transmission) and XC-W (wide-ratio transmission) models. 2007 was also the last year of the RFS motor. The RFS is very torquey and is known to have very good reliability. In some cases, the fully stock engines last for more than 45k miles. The RFS bike is known to be a good dual sport and super motard bike. The wide ratio 6-speed transmission will run all day long on the highway. Due to their dual-sport ability, there are larger aftermarket fuel tanks available (11~26L).
- **2008 - 2009:** As of 2008 the US version of the 450 EXC continued to be sold in street legal trim but was replaced by the off-road only 450 XC or 450 XC-W in the US market. A new chassis was introduced in 2008 with improvements in suspension and handling. The RFS motor available in 250 cc, 400 cc, 450 cc and 510 cc models between 2000 and 2007 was replaced with the XC4 motor beginning with the 2008 model year. The XC4 450's have more power; with a 95 mm x 63.4 mm bore and stroke producing about 51 hp (38 kW). Reliability may have gone down; some people experience top-end issues with the new engine, while others run without incident. 2008 models had oil migration issues(fixed on 2009 models).
- **2010 - 2012:** Offered as the Champions Edition in 2010. New features include new front Brembo brake caliper, PDS needle design, frame welded to steering head 10mm lower, reinforced gearbox (1,2,5,6 idler gears), reworked chain adjuster & clamping rail, better tension on timing chain (noise reduction). Oil pump gears, shaft, cover and o-ring also updated on 2011 models.
- **2013 - 2015:** For 2013, new features include EFI Fuel-injection, a diaphragm spring clutch and a lighter battery. The XC(W) and XC(F) models both have a plug on the right side of the engine case where a kick start lever can be added.
- **2016 - Present:** For 2016, KTM redesigned the 450 from the ground up. A new chassis, motor, ergos, and WP XPlor 48MM forks and PDS shock. They achieved a weight reduction of 5 kg from 2016. The seat height was lowered by 10mm to 38 inches and the foot pegs raised by 6mm for better ground clearance.

System

Alternative Designation: KTM 450 EXC
Type: Off-Road Motorcycle
Manufacturer: KTM-Sportmotorcycle AG
Class: Enduro
Crew: ea1

Dimensions

Length: INA
Wheelbase: 1,482 mm
Seat height: 970 mm
Weight: 111 kg

Automotive

Engine Name: INA
Engine Type: Single-cylinder, liquid-cooled, 4 Valve/SOHC, Fuel Injected, 4-stroke
Engine Power: hp51
Bore/Stroke: 95 mm
Compression Ratio: 11.9:1
Ignition Type: Kokusan contactless, electronic, digital ignition timing adjustment
Transmission: 6 gears, wet clutch operated hydraulically, chain drive
Suspension: Front: WP USD 48mm; fully adjustable, 300 mm travel Rear: WP single shock; fully adjustable, 335 mm travel
Brakes: Front :260mm (10.24") Rear: 220mm (8.66")
Tires: 90/90-21"; 140/80-18"
Fuel Capacity: 9.5 ,liters

Notes:

The KTM 450 EXC is a 4-stroke enduro off-road motorcycle made by KTM. The models are the European road legal 400 EXC and 450 EXC, the US 450 (Close Ratio) XC and 450 (Wide Ratio) XC-W. The European EXC versions have a small headlight, speedometer, tail-light and somewhat softer linkless (PDS) rear suspension. The US EXC is 50-states street legal.

KLR 250 Japanese 249cc Motorcycle





Tiers:



System

Alternative Designation: KLR 250

Type: 249cc Motorcycle

Manufacturer: Kawasaki

In Service: INA

Crew: ea1

Dimensions

Length: mm2199.64

Width: mm820.42

Height: mm47.4 in

Wheelbase: mm1203.96

Seat Height: mm889

Weight: kg137.892

Automotive

Engine Name: INA

Engine Type: Four-stroke, DOHC, four-valve, single cylinder

Displacement: 249 cc

Bore and Stroke: 74.0 x 58.0 mm

Carburetor: Keihin CVK34

Power Output: 28 horsepower 1985–1989 23 horsepower 1990–2005 @ 9,000 rpm, (U.S. model due to change in cam profile)

Maximum Torque: 23 N-m (2.3 kg-m, 16.5 ft-lb) @ 8,000 rpm (U.S. model

Starting Method: Kick

Transmission: 6 Speed

Final Drive: Chain EK520 L-O 104 links
Front Brakes: Hydraulic disc
Rear Brakes: Drum
Front Suspension: Air-adjustable hydraulic telescopic fork
Rear Suspension: UNI-TRAK single-shock system
Fuel Capacity: 11.0 litres
Maximum Speed: INA

Protection

Armor: No
Applique Armor: No
Active Protection System: No
NBC Protection: No
Smoke Equipment: No

Notes:

The Kawasaki KLR250/KL250D was a motorcycle produced from 1984 to 2005 as the successor to the 1978 to 1983 KL250C, with only minor changes during the model run. This lightweight dual sport motorcycle was used for several years by the US military for a variety of tasks, including messenger duty and reconnaissance. It was produced by Kawasaki Heavy Industries in Japan and exported to many parts of the world, including the U.S. and Canada, Europe and Australia. The Chilean national police ("Carabineros de Chile") made extensive use of the KLR250. It is similar in appearance to the larger KLR650. The KLR250 shares many engine parts with an ATV sold by Kawasaki, the KSF250 "Mojave". In the USA the KLR250 was discontinued at the end of the 2005 model run and was replaced by the KLX250S in 2006. In other markets the KLX250 was introduced in 2001 and has been sold to the current day.

KLR 650 Japanese 651cc Motorcycle







Tiers:

1 2 3 4

System

Alternative Designation: KLR 650
Type: Motorcycle
Manufacturer: Kawasaki
Crew: ea1

Dimensions

Length: mm2296.16
Width: mm960.12
Height: mm1348.74
Seat Hight: mm889
Wheel base: mm1480.82
Ground Clearance: mm210.82
Weight: kg195.952

Automotive

Engine Name: INA
Engine Type: 4-stroke, 1-cylinder, DOHC, water-cooled
Engine Displacement: 651cc
Bore and Stroke: 100.0 x 83.0mm
Fuel System: Keihin CVK40
Ignition: Electric CDI
Transmission: 5-speed, return shift
Front Suspension: 41mm telescopic fork/7.9 in
Front Brakes: Single 280mm petal-type disc, 2-piston caliper
Rear Brakes: Single 240mm petal-type disc, 2-piston caliper

Rear Suspension: Rear Suspension / Wheel TravelUni-Trak® single-shock system with 5-way preload and stepless rebound damping/7.3 in

Fuel Capacity: 23.091 Liters

Maximum Speed: 173.8 km/h

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The rugged and tough Kawasaki KLR™650 motorcycle is built for adventure. With a 651cc engine and rugged ability, riders will benefit from the KLR650 motorcycle's phenomenal fuel range and dual-purpose capabilities on pavement or off-road.

Gear Up Russian 749cc Motorcycle with Sidecar







Tiers:



Variants:

- **CT:** INA

System

Alternative Designation: Gear Up
Type: Motorcycle with Side Car
Manufacturer: Ural
Family: Gear Up Series
Crew: ea1
Passenger: ea1

Dimensions

Length: 2,580 mm
Width: 1,700 mm
Height: 1,100 mm
Seat Height: 1,100 mm
Weight: 331.1 kg

Automotive

Engine Name: INA
Engine Type: Two cylinder boxer, four-stroke

Engine Power: 41.00 HP (29.9 kW)) @ 5500 RPM

Torque: 52.00 Nm (5.3 kgf-m or 38.4 ft.lbs) @ 4300 RPM

Top Speed: 112.7 km/h

Fuel System: Injection. Throttle body EFI

Cooling System: Air

Gearbox: 4-speed

Transmision Type: Shaft drive (cardan)

Clutch: Double-disc dry

Drive Train: 2WD, 4 gear with reverse. Engageable sidecar drive shaft.

Fuel Consumtion: 7.84 litres/100 km (12.8 km/l or 30.00 mpg)

Frame Type: Double loop steel tube

Front Suspension: IMZ leading link fork

Rear Suspension: Double sided swing-arm with two Sachs hydraulic spring shock absorbers, 5x adjustable

Front Brakes: Single disc. Brembo

Rear Brakes: Expanding brake (drum brake)

Wheels: Aluminum rims with steel spokes

Fuel Capacity: 19.00 litres

Reserve Fuel Capacity: 3.79 litres

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Our bikes are happy cruising between 65 and 75 mph. Our 749cc engine combined with powerful low end torque is the perfect size to compliment the steering dynamics of our all steel sidecar. In addition to a 4 speed transmission, every Ural comes with a mechanical reverse gear. Reverse can be engage by the foot pedal to the right of the rear brake. Every Ural comes standard with a lockable and water tight sidecar trunk. It's the perfect size for extra gear, supplies, and whatever else your adventures may need. Standard Accessories: • LED Sidecar Fog Lights (Gear Up) • Sidecar Power Outlet • Sidecar Tonneau Cover • Jerry Can (Gear Up) • Folding Utility Shovel (Gear Up) • Luggage Rack (Gear Up) • Universal Spare Wheel - Fits All 3 Positions

→Unmanned Ground Vehicles (UGV)

Dragon Runner 10 American Micro Unmanned Ground Robot







Tiers:



Variants:

- **Dragon Runner 20:** Dragon Runner 20 Small Unmanned Ground Robot Small and lightweight, yet rugged and feature-packed, the Dragon Runner 20 (DR-20) is a highly specialized and mobile robot designed to provide situational awareness, safety and support for reconnaissance, security, inspection and IED missions. The mission dictates exactly how the DR-20 will be used – making it the perfect choice for defense and security applications especially in congested urban settings. Whether it's at a security checkpoint, deep inside a sewer or drainpipe or tasked with an EOD mission, the DR-20 supports a wide range of scenarios. At 20 pounds, the DR-20 can be hand carried by one person and easily deployed.

System

Alternative Designation: Dragon Runner 10
Type: Micro Unmanned Ground Robot
Manufacturer: QinetiQ North America
Crew: eaUnmanned
Communications: Vehicle on-board microphone
Environmental: IP 65 rated
Cameras: (2) Front and rear, day and night
Controller: Dragon Runner 10 wearable controller
Payloads (optional): Manipulator arm, hazmat sensors

Dimensions

Length: 44 cm
Width: 33 cm
Height: 18 cm
Weight: 5 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Speed: 4.8 Km/h

Operational Range: Greater than 1,970 ft (600m) Line-of Sight when equipped with external antennas.

Endurance: 2-3 hours (mission dependent)

Protection

Hull Armor: INA

Applique Armor: INA

Notes:

The Dragon Runner 10 (DR-10) is a lightweight, expandable robot that offers protection and support to small unit, dismounted operations. Designed to provide situational awareness by ‘scouting out’ while the operator remains at safe distance, the DR-10 keeps military forces and first responders away from dangerous situations. At approximately 10 pounds the DR-10 can be hand carried or easily transported inside a rucksack—it can even be thrown! This compact and durable robot is operated with an easy-to-use remote controller. Its robust design allows it to perform in the most challenging environments and adverse weather conditions. Whether it’s under a car or deep inside a sewer or drainpipe, the DR-10 has the dexterity to go where personnel can’t. From unmanned, reconnaissance missions to delivering remote sensors and placing counter-IED charges, these micro robots protect people, assets and save lives. Features: *Provides real-time situational awareness *Small enough to fit inside an assault pack *Light enough to be hand carried *Tough enough to be thrown &Operates in adverse weather conditions

Titan American Unmanned Ground Vehicle (UGV)









Tiers:

1 2 3 4

System

Alternative Designation: Titan

Type: Unmanned Ground Vehicle

Manufacturer: Milrem and QinetiQ North America

Crew: Unmanned Ground Vehicle

Mission: The vehicle is intended to save the lives of soldiers as it performs critical and hazardous tasks currently handled by war fighters in the combat zone.

Platform: The platform includes two track modules connected by a payload frame. The open architecture of the Titan UGV allows for the integration of mission equipment and systems to support a range of operations.

Payload Types: The typical payload aboard the vehicle includes an earth-moving blade / bucket, casualty evacuation (CASEVAC) litter racks, logistics support basket and ruck mounts, anti-personnel obstacle breaching system (APOBS) mounts, counter-improvised explosive device (C-IED) roller rake mount, and C-IED sensing systems. The vehicle can also be interfaced with third party payloads such as remote weapon station (RWS), interrogation arms, reconnaissance, surveillance, and target acquisition (RSTA) systems to support combat, chemical, biological, radiological and nuclear (CBRN) defence, RSTA and route clearance missions.

Sling Load Capable: Yes, The UGV can be transported by helicopters internally or as slung load.

:

:

Note: The Titan UGV was preferred by the US Army for Phase 1 evaluation of the Squad Manoeuvre Equipment Transport (SMET) programme.

Dimensions

Length: m2.00

Width: m2.10

Height: m1.01

Weight, Combat: kg907.18

Payload Area Length: m1.82

Payload Area Width: m1.21

Maximum Payload Weight: kg680.38

Maximum Pull Force: kg907.18

Automotive

Engine Name: INA

Engine Type: Diesel-electric hybrid tracked drive modules

Engine Power: INA

Generator: 10kW JP8 generator

Batteries: Absorbent glass mat (AGM) lead acid or lithium-ion batteries.

Maximum Range, All-Electric Run-Silent Mode: km20

Endurance, All-Electric Run-Silent Mode: hours2

Maximum Range, Diesel and Electric Hybrid Mode: km100

Endurance, Diesel and Electric Hybrid Mode: hours72

Speed, Maximum Road: km/h24

Speed Maximum Swim: Not Amphibious

Trench: mm762

Main Weapon System

Note: The typical payload aboard the vehicle includes an earth-moving blade / bucket, casualty evacuation (CASEVAC) litter racks, logistics support basket and ruck mounts, anti-personnel obstacle breaching system (APOBS) mounts, counter-improvised explosive device (C-IED) roller rake mount, and C-IED sensing systems. The vehicle can also be interfaced with third party payloads such as remote weapon station (RWS), interrogation arms, reconnaissance, surveillance, and target acquisition (RSTA) systems to support combat, chemical, biological, radiological and nuclear (CBRN) defence, RSTA and route clearance missions.

Navigation and Control

Command and Control Unit: QinetiQ tactical robot controller (TRC) and robotic appliqué kit (RAK).

Tactical Robot Controller (TRC): The TRC is a single pocket system integrating a 6.5in monitor, button layout and auxiliary port. It can be easily attached to the communications pack of Titan to command and control the UGV’s operations.

Robotix Applique Kit (RAK): The RAK provides multiple optional autonomous features and allows the integration of night vision and thermal cameras, microphone and radio systems. The multiple crew-compliant radio options enable a line-of-sight (LOS) range of more than 800m.

Unmanned Mode Capable: Yes

Manned Mode Capable: Yes

Live Video Cameras: Available

Thermal Imaging Systems: Available

Protection

Armor: INA
Applique Armor: Avaialble
Active Protection System: INA
NBC Protection: No
Smoke Equipment: No

Notes:

Titan is a first-of-its-kind modular, hybrid, unmanned ground vehicle that provides soldier safety and support for small military dismounted operations. Titan is a large Unmanned Ground Vehicle (UGV) that provides “lighten-the-load” support for small dismounted military operations. Developed by QinetiQ North America and Milrem Robotics, Titan features a multi-mission, reconfigurable platform that increases unit effectiveness while increasing soldier safety. Unlike existing UGVs, Titan is a highly modular platform that allows different superstructures to be mounted and integrated onto the middle vehicular platform for complex missions such as rescue, transport and reconnaissance. The flexibility and versatile nature of the system not only increases efficiency, it also significantly reduces life cycle costs and soldier workload. Multi-mission modular payloads High mobility / all-terrain operations Multiple controller and camera options Operable in manned or unmanned modes Open architecture Wide variety of payloads and accessories for CBRN, route clearance and integration autonomy packages Diesel/Electric hybrid for run-silent mode and squad auxiliary power Power-off-load capability

MARS A-800 Russian Unmanned Ground Logistics Vehicle





Tiers:

1 **2** 3 4

System

Alternative Designation: Mars A-800

Manufacturer: KB Avrora LLC

Crew: Unmanned

Payload: 500 kg

↳*Dimensions*

Length: 3000 mm

Width: 2150 mm

Height: 1270 mm

Weight: 1450 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: 65 hp

Maximum Road Speed: 35 km/h

Maximum Water Speed: 5 km/h

Maximum Range: 200 km

Notes:

MARS A-800 (Mobile Autonomous Robotic System) is the tracked Unmanned Ground Vehicle. For the first time it was presented at the RAE-2015 exhibition within the framework of the stand organized by the Skolkovo Foundation. MARS A-800 is designed to support infantry, carry out transport and logistics and other missions. The system can carry up to 6 people, transport a different cargo, including ammunition. MARS A-800 can be equipped with various special equipment and weapons. Key scenarios: "Follow me". Operator MARS A-800 fixes on its equipment an active mark. The platform tracks the movement of the label and follows it. The settings select the nature of the movement and the distance to the master. During the movement, the system independently routes the route, circling the obstacles encountered. "Track". It is carried out by target designation on a map or by pre-stored points. In this mode, the MARS A-800 can autonomously deliver cargo (food, ammunition), evacuate the wounded, conduct reconnaissance. "Cyclic Incoming". Cyclical movement along a predetermined route, observation and

detection of targets, tracking of data from video cameras and radar. "Telecontrol". The platform can be remotely controlled by the operator from the console. This possibility is necessary in a number of situations, such as training, overcoming complex obstacles, loading/unloading, etc. MARS A-800 is created on the Russian manufactured tracked floating chassis. The platform has an engine capacity of up to 65 hp, which allows to reach speeds of up to 35 km/h and carry up to 500 kg of payload. Power reserve as standard - up to 200 km. If the fuel tank is equipped with an increased capacity, the power reserve may increase to 500 km. It is possible to drop the UGV with a parachute system. The built-in generator can be used to supply power to the camp or to recharge the batteries of special equipment.

Nerehta Russian Armed Unmanned Ground Vehicle (AUGV)





Tiers:



System

Alternative Designation: NA

Family: Unmanned, Armed Ground Vehicle

Crew: ea0

Passenger Capacity: Number of passengers has not been published however, it is advertised that the Nerekhta can carry passengers and litters

Maximum Effective Range: mDepends on weapon system

Range Between System and Operator: 20km; extendable with the addition of a mast

Dimensions

Length: m2.5

Width: m1.6

Height: cm900

Weight, Combat: kg1,700

Ground Pressure: kg/mINA

Automotive

Engine Name: INA

Engine Type: 1 x Electric motor arrangement with track-and-wheel configuration

Engine Power: hpINA

Cruising Range: km20

Speed, Maximum: km/h32

Fording Depth: mINA

Payload: 700kg

Armament Option 1

↳***System***

Name: Kord Heavy Machine Gun (HMG)

Type: Heavy Machine Gun

Max Rate of Fire: rpm650

Sustain Rate of Fire: rpm600

↳***Ammunition***

Type: AP-I

Caliber: mm12.7

Muzzle Velocity: m/s860

Basic Load: roundsEstimated: 300

Effective Range: m2,000

Armament Option 2

↳***System***

Name: Kalashnikov Medium Machine Gun (MMG)

Type: Medium Machine Gun

Max Rate of Fire: rpm650

Sustain Rate of Fire: rpm500

↳***Ammunition***

Type: Ball

Caliber: mm7.62mm

Muzzle Velocity: m/s825

Basic Load: Estimated 1,500 rounds

Effective Range: m1,500

Armament Option 3

↳***System***

Name: AG-30M

Type: Automatic Grenade Launcher (AGL))

Max Rate of Fire: rpm400

Sustain Rate of Fire: INA

↳***Ammunition***

Type: Anti-Personnel

Caliber: 30mm

Muzzle Velocity: m/s185

Basic Load: INA

Effective Range: m2,100

Fire Control

Note: INA

Protection

Note: None

Notes:

The "Nerehta" UGV / AUGV (Armed, Unmanned Ground Vehicle) is a remote-operator-driven, tracked battlefield infantry support vehicle. UGVs have been featured in recent Russian war games and many sources credit Russia with being in the lead in UGV technology in the world. The vehicle is manufactured by the Degtyarev Plant of Russia and was first demonstrated in 2016. Testing of the product ensued in 2017 by Russian ground forces. It was further demonstrated by the Army in 2018. The vehicle has a compact form with an overall length of 2.5 meters, a width of 1.6 meters and a height of 90 centimeters. Its weight reaches 1,700 kilograms while its payload capacity is set around 700 kilograms. There are four double-tired road wheels to a hull side with the drive fitted aft and the track idler at front. Two track return rollers are used. Over the center of the hull roof is a trainable, traversing, weapons mount which carries a single (optional) 12.7mm Kord Heavy Machine Gun (HMG), Kalashnikov 7.62mm Medium Machine Gun (MMG) or 30mm AG-30M Automatic Grenade Launcher (AGL). When used in the transport role, this fitting is removed to make space for externally-mounted cargo to include personnel. The Nerehta can also be used for CASEVAC. An operator is required for the proper battlefield function of this system and range of the remote-control is approximately 20,000 meters (extendable by way of mast assembly). Drive power is provided for by electric motors. The Nerehta has been developed to take on a multitude of modern battlefield roles including general reconnaissance, artillery spotting/support, cargo transportation, and basic infantry fire support. its compact size certainly makes a good fit for lighter-armed elements such as airborne units and will most likely be a part of Russian Airborne in the near-future. The UGV can also serve Army elements in urban fighting rather well.

Dragon Runner 20 American Small Unmanned Ground Robot



Tiers:



Variants:

- **Dragon Runner 10:** Dragon Runner 10 Micro Unmanned Ground Robot The Dragon Runner 10® (DR-10) is a lightweight, expandable robot that offers protection and support to small unit, dismounted operations. Designed to provide situational awareness by ‘scouting out’ while the operator remains at safe distance, the DR-10 keeps military forces and first responders away from dangerous situations. At approximately 10 pounds the DR-10 can be hand carried or easily transported inside a rucksack—it can even be thrown! This compact and durable robot is operated with an easy-to-use remote controller. Its robust design allows it to perform in the most challenging environments and adverse weather conditions. Whether it’s under a car or deep inside a sewer or drainpipe, the DR-10 has the dexterity to go where personnel can’t. From unmanned, reconnaissance missions to delivering remote sensors and placing counter-IED charges, these micro robots protect people, assets and save lives.

System

Alternative Designation: Dragon Runner 20
Type: Small Unmanned Ground Robot
Manufacturer: QinetiQ North America
Crew: eaUnmanned
Communications: On-board microphone
Environmental: IP 65 rated
Cameras: Four (4) front and rear (day and night capable); left and right (day only); quad video display
Controller: Dragon Runner 20 wearable controller, UC-LITE
Lift Capacity: 4.5 kg
Payloads (optional): Disruptors, manipulator arm, RSTA cameras, two-way audio, fiber control tether, Hazmat sensors

Dimensions

Length: 89 cm
Width: 40 cm
Height: 54 cm
Weight: 9-11.8 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Maximum Speed: 6 Km/h
Operational Range: 2,100 ft (650+m) Line-of-Sight
Endurance: 3-4 hrs (mission dependent)

Protection

Hull Armor: INA
Applique Armor: INA

Notes:

Dragon Runner 20 Small Unmanned Ground Robot Small and lightweight, yet rugged and feature-packed, the Dragon Runner 20 (DR-20) is a highly specialized and mobile robot designed to provide situational awareness, safety and support for reconnaissance, security, inspection and IED missions. The mission dictates exactly how the DR-20 will be used – making it the perfect choice for defense and security applications especially in congested urban settings. Whether it’s at a security checkpoint, deep inside a sewer or drainpipe or tasked with an EOD mission, the DR-20 supports a wide range of scenarios. At 20 pounds, the DR-20 can be hand carried by one person and easily deployed.

Ripsaw American Unmanned Light Tank





Tiers:



Variants:

- **Ripsaw UGV:** Ripsaw UGV (non-militarized) prototype could accelerate to 65 mph (105 km/h) in about 3.5 seconds, since it was lighter, but it wasn’t as strong/rugged.
- **Ripsaw MS1 tactical UGV:** Ripsaw MS1 tactical UGV utilizes a powerful oversized and customized 650-horsepower (660 PS; 480 kW) Duramax 6.6L V8 diesel engine that delivers 900 ft·lbf (1,200 N·m) of torque. The Ripsaw MS1 was a test platform made to test off-road capabilities. It was exclusively unmanned, cost $200,000 and could accelerate from 0–65 mph (0–105 km/h) in 3 seconds.
- **Ripsaw MS2 UGV:** Ripsaw MS2 UGV is made to be larger, faster, and more modular than the MS1. It weighs 4.5 short tons (4.1 t) and can carry a one-short-ton (0.91 t) payload. The lightweight tubular chassis design is powered by a 6.6 liter duramax diesel engine generating 600 horsepower (610 PS; 450 kW) and 1,000 ft·lbf (1,400 N·m) of torque. Fully loaded, the MS2 can accelerate from 0–50 mph (0–80 km/h) in 5.5 seconds and has a top speed of 60 mph (97 km/h). The vehicle can traverse 50 degree gradients and 45 degree slopes. It can be optionally manned or tele-operated from a nearby command vehicle. Armament can include an M240 machine gun or M2 .50-caliber machine gun, and it has been tested with the Javelin missile. If the Ripsaw is damaged or destroyed, parts can be "cannibalized" in the field and re-assembled quickly. An MS2 vehicle costs $750,000.
- **Ripsaw MS3 UGV:** Ripsaw MS3 UGV is being tested by United States Army Research, Development and Engineering Command under the Remote Armed Maneuver Platform (RAMP) initiative to integrate the M153 CROWS remote weapon system onto an unmanned vehicle. RAMP was demonstrated at Fort Benning, Georgia in October 2013 as part of the Army's Armed Unmanned Ground Vehicle (AUGV) program
- **Ripsaw EV2:** Ripsaw EV2 is a luxury version, with a fully enclosed body and two seats inside the cab. It can exceed speeds of over 60 mph (97 km/h) and has a range of approximately 300 miles (480 km). It is currently unknown if the EV2 can mount remotely-operated weapon systems or not. This model is designed for the civilian market but still costs $295,000 with customizable features.
- **Ripsaw M5:** Ripsaw M5 is fully autonomous, all electric tank with max speed up to 60 mph (96 km/h) with a modular design. This would make it as one of the fastest, most flexible production ready tank on the planet. Its speed and autonomous capability could enable the tank battle group to get out of a nuclear strike
- **Ripsaw EV2:** The coveted Ripsaw EV2 represents one of the world's most capable off-road vehicles ever developed. Offered to the public as a luxury high performance light weight go fast super tank in 2015, Ripsaw has become world class iconic and is one of the most sought after and highly valued extreme vehicles on the planet. Howe and Howe Tech is pleased to offer in 2018 the all new redesigned super advanced "suspended cockpit" single seater EV3F1, two seater EV3F2 and the four seater EV3F4 Ripsaws.
- **Ripsaw EV3F1:** Ripsaw EV3F1 are the most extreme and most terrain dominant Ripsaws ever developed. Designed with up to 1500hp and an astonishing .2 hp/lbs power to weight ratio, with over 112 inches of track on the ground, the Ripsaw EV3-F1 stands as one of the world's most exhilarating single seat off-road vehicles ever conceived. Wheel speed

is no longer necessary to traverse slopes of loose terrain such as mud, sand and snow. The Ripsaw SSR sets new benchmarks in terrestrial platform development and now stands as the pinnacle of extreme high speed off-road travel.

- **Ripsaw EV3 - F2:** Ripsaw EV3 - F2 (Extreme Vehicle - Floating Cockpit) series Ripsaws are a two seater version of the EV3-F1. Designed with up to 1500hp and an astonishing .2 hp/lbs power to weight ratio, with over 112 inches of track on the ground, the Ripsaw EV3-F2 stands as one of the world's most exhilarating two seater off-road vehicles ever conceived. Wheel speed is no longer necessary to traverse slopes of loose terrain such as mud, sand and snow. The Ripsaw EV3 series extreme vehicles set new benchmarks in terrestrial mobility and now stands as the pinnacle of extreme high speed off-road travel.
- **Ripsaw EV3 - F4:** Ripsaw EV3 - F4 (Extreme Vehicle - Floating Cockpit) series Ripsaws are a Four seater version of the EV3-F1. Designed with up to 1500hp and an astonishing power to weight ratio, with over 112 inches of track on the ground, the Ripsaw EV3-F4 stands as one of the world's most exhilarating four seater off-road vehicles ever conceived. Wheel speed is no longer necessary to traverse slopes of loose terrain such as mud, sand and snow. The Ripsaw EV3F4 sets new benchmarks in terrestrial platform development and now stands as the pinnacle of extreme high speed off-road travel.

System

Alternative Designation: Ripsaw

Type: Unmanned Light Tank

Family: Ripsaw

Crew: Unmanned

Dimensions

Length: INA

Width: INA

Height: cm180

Weight, Combat: kg4,100

Ground Clearance: mm610

Payload Capacity: kg910

Automotive

Engine Name: Duramax V8 engine

Engine Type: Diesel

Engine Power: hp750

Cruising Range: INA

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth: INA

Suspension: mm410

Primary Weapon System

Note: Armament can include an M240 machine gun or M2 .50-caliber machine gun, and it has been tested with the Javelin missile. Also, the Ripsaw MS3 UGV is being tested by United States Army Research, Development and Engineering Command under the Remote Armed Maneuver Platform (RAMP) initiative to integrate the M153 CROWS remote weapon system onto an unmanned vehicle.

Protection

Armor: None (aluminum frame)

Applique Armor: Available

Active Protection System: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Ripsaw is a developmental unmanned light tank designed and built by Howe & Howe Technologies for evaluation by the United States Army. The Howe brothers started the Ripsaw as a small family project in 2000. They introduced it at a Dallas vehicle show in 2001, where it caught the interest of the U.S. Army. Later that year the U.S. Military ordered a prototype MS-1 to be made and shipped to Iraq. The Ripsaw is intended to perform various missions including convoy protection, perimeter defense, surveillance, rescue, border patrol, crowd control, and explosive ordnance disposal. For perimeter defense or crowd control, a belt of M5 Modular Crowd Control Munitions (MCCM) can be mounted around the vehicle to break up crowds or non-lethally engage personnel with flash-bang effects and rubber bullets. Cameras provide 360-degree coverage for situational awareness for the operator. The Army has tested the Ripsaw while remote-controlled by a soldier in another armored vehicle up to 1 km (0.62 mi) away. Its weapon system is modified to fire remotely using the Advanced Remote Armament System (ARAS), a gun that loads its own ammunition and can swap out various types of ammunition, such as lethal and non-lethal, in just a few seconds. These capabilities allow manned vehicles to send the Ripsaw out in front of them and engage targets without exposing soldiers to threats. As of March 2017, the Army is still testing the vehicle as an unmanned platform to test remote weapons stations.

TAROS V2 Czechoslovakian 6x6 Unmanned Ground Logistics Vehicle



Tiers:

1 2 3 4

System

Alternative Designation: TAROS V2

Type: Unmanned ground vehicle (UGV)

Crew: Unmanned

Payload: INA

Accessories: The enlarged configurations can be fitted with a range of accessories, including weapon, robotic or sensor systems. The vehicle’s design offers low operating and logistics costs.

↳*Dimensions*

Length: 2.74m

Wide: 1.77m

Height: 2.04m high when the column is down and 2.54m when extended.

Weight: The gross weight in the standard 6×6 configuration is approximately 1,400kg.

Automotive

Engine Name: INA

Engine Type: The module can be recharged by the ND 6050D charger powered by a combustion engine housed in the 2x2E module.Each wheel of the UGV is equipped with 10kW electro-motor drive-train, transmission and suspension systems, as well as an electro-mechanical actuator for steering. The damaged wheels or electro motor of the vehicle can be easily be replaced by the soldiers using onboard tool kit.

Engine Power: INA

Note: The TAROS V2 is powered by electric/hybrid propulsion system. Each wheel is driven by an electric motor, which develops a power of 4.8kW.

Armament

Note: The TAROS V2 is armed with a remote controlled gun carriage developed by the Defence University in Brno. The gun carriage can accommodate personal weapons such as a CZ 805 BREN automatic assault rifle. The vehicle features a robotic weapon system to support fighting activities of the mechanised, reconnaissance and Special Forces operating in tough and complex conditions. The robotic weapon system mounted on the vehicle has a length of 4.4m, width of 2.5m and height of 2.8m without weapons. The robotic weapon system weighs 13kg and is powered by 36V electric system.

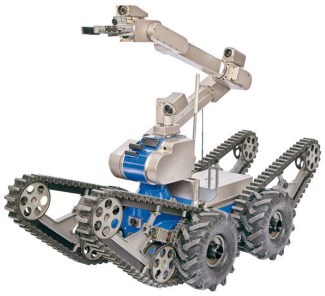
Notes:

TAROS V2 is a 6×6 wheeled, unmanned, all-terrain, modular and automated robotic ground vehicle unveiled in December 2014. The vehicle was developed by VOP CZ in collaboration with its subsidiary Centre for Advanced Field Robotics (CAFR), and Tactical Department of the Faculty of Military Leadership of the University of Defence in Brno. The TAROS V2 provides combat and logistic support in high-risk areas and complex environments. It was developed under the 21st century Soldier Programme for the army of the Czech Republic (ACR). The TAROS V2 is identical to the Lockheed Martin Squad Mission Support System (SMSS) in appearance and functionality. The vehicle is also available in a 4×4 configuration, which can be upgraded to 4×4, 6×6 and 8×8 remote-controlled configurations. The enlarged configurations can be fitted with a range of accessories, including weapon, robotic or sensor systems. The vehicle's design offers low operating and logistics costs. In all configurations, the vehicle is powered by accumulators of the 4×4 module. The module can be recharged by the ND 6050D charger powered by a combustion engine housed in the 2x2E module. The 4×4 module also houses command-and-control electronics and a modular sensor suite. An additional 2x2R module with a remote-controlled knuckle boom crane can expand the operating capabilities of the unmanned ground vehicle (UGVs) for remote-controlled operations in the high-risk environments. Each wheel of the UGV is equipped with 10kW electro-motor drive-train, transmission and suspension systems, as well as an electro-mechanical actuator for steering. The damaged wheels or electro motor of the vehicle can be easily be replaced by the soldiers using onboard tool kit. The vehicle measures 2.74m long, 1.77m wide and 2.04m high when the column is down and 2.54m when extended. The gross weight in the standard 6×6 configuration is approximately 1,400kg. The TAROS V2 is armed with a remote controlled gun carriage developed by the Defence University in Brno. The gun carriage can accommodate personal weapons such as a CZ 805 BREN automatic assault rifle. The vehicle features a robotic weapon system to support fighting activities of the mechanised, reconnaissance and Special Forces operating in tough and complex conditions. The robotic weapon system mounted on the vehicle has a length of 4.4m, width of 2.5m and height of 2.8m without weapons. The robotic weapon system weighs 13kg and is powered by 36V electric system.

→Remote-Controlled Robots

Telemax PRO German Remote-Controlled Robot





Tiers:



Variants:

- **Telemax 4x4:** elemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection.
- **Telemax PRO:** The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces.
- **Telemax HYBRID:** The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges.
- **Telemax PLUS:** The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications.
- **Telemax RECCE:** Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory.

System

Alternative Designation: Telemax PRO
Type: Remote-Controlled Robot
Manufacturer: Faulhaber
Crew: ea1
Payload Capacity: Lifting capacity up to 20 kg
Firing Port: 3

Dimensions

Length: 800 mm
Width: 400 mm
Height: 750 mm
Manipulator, Upward Reach: 2400 mm
Manipulator, Forward Reach: 1530 mm
Manipulator, Downward Reach: 935 mm
Weight: Standard speed version: 75 kg (165 lbs.) (standard configuration w/o battery) High speed version: 77 kg (169 lbs.)

(standard configuration w/o battery)

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Drive: Track

Maximum Speed: Standard speed version: max. 4 km/h (2.4 mph) High speed version: max. 10 km/h (6.2 mph)

Operational Range: INA

Mobility, Slopes: 45° (depending on surface)

Mobility, Stairs: 45° (depending on surface)

Mobility, Obstacle Height: 500 mm

Mobility, Gap Width: 600 mm

Fording Depth: 266-660 mm

Battery: NiMh battery (24 V, 15 Ah) or Li-ion battery (26 V, 40 Ah)

Endurance: NiMh battery (24 V, 15 Ah): approx. 2 h with 1 battery; approx. 4 h with 2 batteries Li-ion battery (26 V, 40 Ah): approx. 5 h with 1 battery; approx. 10 h with 2 batteries

Protection

Hull Armor: INA

Applique Armor: INA

Notes:

Telemax PRO The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces. Features: *Precision 7-axis manipulator with TCP control and automatic tool change *Telescopic joint allows for increased reach of manipulator *Lifting capacity up to 20 kg (44 lbs.) *Compact dimensions *4-track drive system with a top speed of up to 10 km/h (6.2 mph) *More than 30 pre-programmed automatic motion sequences for manipulator and flippers *Interchangeability of accessories within the telemax family, e.g. batteries, tools, cameras and sensors

Telemax 4x4 German Remote-Controlled Robot







Tiers:



Variants:

- **Telemax 4x4:** elemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection.
- **Telemax PRO:** The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces.
- **Telemax HYBRID:** The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges.
- **Telemax PLUS:** The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications.
- **Telemax RECCE:** Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory.

System

Alternative Designation: Telemax 4x4
Type: Remote-Controlled Robot
Manufacturer: Faulhaber
Crew: ea1
Payload Capacity: up to 20 kg
Note: More than 16 pre-programmed automatic manipulator motion sequences

Dimensions

Length: 1018 mm
Width: 603 mm
Height: 813 mm
Manipulator, Upward Reach: 2071 mm
Manipulator, Forward Reach: 1586 mm
Manipulator, Downward Reach: 1060 mm
Weight: Standard speed version: 66 kg (145 lbs.) High speed version: 68 kg (149 lbs.)
Firing Channel: 3

Payload: 35 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Drive: 4 wheels

Maximum Speed: Standard speed version: max. 4.5 km/h (2.7 mph) High speed version: max. 11.5 km/h (7 mph)

Operational Range: INA

Mobility, Slopes: 38° (standard speed version, depending on surface)

Mobility, Stairs: 17.5°

Mobility, Obstacle Height: 200 mm

Mobility, Gap Width: 330 mm

Fording Depth: 280 mm

Battery: NiMh battery (24 V, 15 Ah):

Endurance: NiMh battery (24 V, 15 Ah): approx. 3 h with 1 battery; approx. 6 h with 2 batteries Li-ion battery (26 V, 40 Ah): approx. 7.5 h with 1 battery; approx. 15 h with 2 batteries

Protection

Hull Armor: INA

Applique Armor: INA

Notes:

Telemax 4x4 telemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection. Features: *Precision 6-axis manipulator with TCP control and automatic tool change *Rugged four-wheel drive *Top speed of up to 11.5 km/h (7 mph) *Wide wheelbase with increased surface contact *Lifting capacity up to 20 kg (44 lbs.) *More than 16 pre-programmed automatic manipulator motion sequences *Interchangeability of accessories within the telemax family, e.g. batteries, tools, cameras and sensors

Telemax Hybrid German Remote-Controlled Robot



Tiers:



Variants:

- **Telemax 4x4:** elemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection.
- **Telemax PRO:** The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces.
- **Telemax HYBRID:** The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges.
- **Telemax PLUS:** The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications.
- **Telemax RECCE:** Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory.

System

Alternative Designation: Telemax Hybrid
Manufacturer: Faulhaber
Crew: ea1
Payload Capacity: Lifting capacity up to 37 kg
Firing Port: 3
Flipper Swiveling: -85° to +80°

Dimensions

Length: 810 mm
Width: 400 mm

Height: 780 mm

Manipulator, Upward Reach: 2505 mm

Manipulator, Forward Reach: 1615 mm

Manipulator, Downward Reach: 1130 mm

Weight: Standard speed version: 78 kg (172 lbs.) (standard configuration w/o battery) High speed version: 80 kg (176 lbs.) (standard configuration w/o battery)

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Drive: Track

Maximum Speed: Standard speed version: max. 4 km/h (2.4 mph) High speed version: max. 10 km/h (6.2 mph)

Operational Range: INA

Mobility, Slopes: 45° (depending on surface)

Mobility, Stairs: 45° (depending on surface)

Mobility, Obstacle Height: 500 mm

Mobility, Gap Width: 600 mm

Fording Depth: 266-660 mm

Battery: NiMh battery (24 V, 15 Ah) or Li-ion battery (26 V, 40 Ah

Endurance: NiMh battery (24 V, 15 Ah): approx. 2 h with 1 battery; approx. 4 h with 2 batteries Li-ion battery (26 V, 40 Ah): approx. 5 h with 1 battery; approx. 10 h with 2 batteries

Payload Range: 31 k

Protection

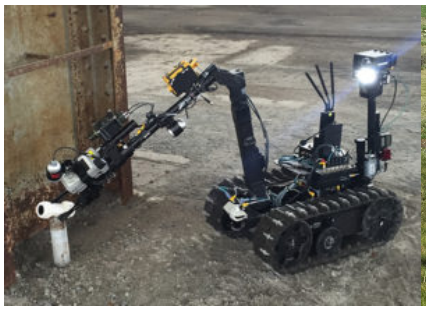
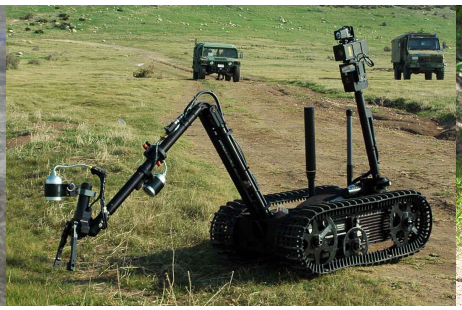
Hull Armor: INA

Applique Armor: INA

Notes:

Telemax HYBRID The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges. Features: *Strong precision 6-axis manipulator with TCP control and automatic tool change *Reinforced axes on lower arm and gripper *Lifting capacity up to 37 kg (82 lbs.) *Compact dimensions *4-track drive system with a top speed of up to 10 km/h (6.2 mph) *More than 30 pre-programmed automatic motion sequences for manipulator and flippers *Interchangeability of accessories within the telemax family, e.g. batteries, tools, cameras and sensors *Optional version for CBRN defense

Talon 5 American Medium-Sized Tactical Robot


Tiers:



Variants:

- **Talon 5:** TALON Medium-Sized Tactical Robot Since its introduction in 2000, QinetiQ North America's TALON® family of robots has earned a reputation for durability, flexibility, reliability and performance in keeping personnel, assets and civilians out of harm's way. In military, law enforcement and first responder applications, TALONs are widely deployed for improvised explosive device (IED) and explosive ordnance disposal (EOD), reconnaissance, communications, CBRN (Chemical, Biological, Radiological, Nuclear), HAZMAT, security, heavy lift, defense and rescue missions. Our TALON CBRN/Hazmat modular kit is available for TALON IV and V models. TALONs have been used worldwide, from Ground Zero after the 2001 World Trade Center attack, to IRAQ and Afghanistan, searching for the Boston Marathon bombing suspect and assisting with security during major sporting events. Now on its fifth generation, TALON 5 is the first Interoperability Profile (IOP) fielded robotic system that has successfully gone through Army Test and Evaluation Command testing.
- **TALON CBRN/Hazma:** TALON CBRN/Hazmat kit is equipped with a variety of sensors that provides ultimate protection in dangerous CBRN missions. Proven Protection For over 15 years, TALON robots have been used for EOD and CBRN operations. TALON's were first military robot deployed in Bosnia for moving and disposing of live explosives and the first to be used in active combat in Afghanistan and in Iraq. Deployed at Ground Zero after the Sept. 11 (9/11) attack on the World Trade Center in NYC, TALON robots were used extensively to support search and rescue and recovery efforts. Out of the two robot types used at Ground Zero, TALONs were the only robots to handle the difficult and dangerous mission without requiring a major repair. Even after repeated contamination, TALON remained operational. Flexible and Rugged Operation The CBRN kit is configurable for TALON IV and above models. TALON's optional, heavy-lift, multiple-degreeof freedom arm can be used to open doors and trunks making it a valuable additional to critical and dangerous missions.

System

Alternative Designation: Talon 5
Type: Medium-Sized Tactical Robot
Manufacturer: QineticQ North America
Crew: eaUnmanned
Maximum Payload Weight: 68 kg
Vertical Reach: 95 cm
Horizontal Reach: 157 cm
Gripper Force: 49.9 kg
Gripper Rotation: 360° (continuous)
Controller Options: Laptop Control Unit Tactical Robot Controller (TRC) UC-LITE (Universal Controller - Lightweight Interoperable Tactical Equipment)
Communications: External IP Radio (Persistent System's MPU5 Radio) Gigabit Ethernet Communications Backbone

Cameras: 4
Available I/O Ports: *2x IOP A connectors *1x IOP B connector *4x Gigabit Ethernet and 12VDC (24VDC opt.) *2x RS-232 ports *1x USB port **1x CAN bus 6x Interfaces for legacy TALON accessories

Dimensions

Length: 87 cm
Length, with Arm Extended: 110 cm
Width: 58 cm
Height: 83 cm
Weight: 81 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Maximum Speed: INA
Operational Range: Over 2,600 feet (800 m) Line-of-Sight
Endurance: 3-4 hours (mission dependent)
Stair Climbing: 45° slope
Turning Circle: (133 cm

Protection

Hull Armor: INA
Applique Armor: INA

Notes:

TALON Medium-Sized Tactical Robot Since its introduction in 2000, QinetiQ North America's TALON® family of robots has earned a reputation for durability, flexibility, reliability and performance in keeping personnel, assets and civilians out of harm's way. In military, law enforcement and first responder applications, TALONs are widely deployed for improvised explosive device (IED) and explosive ordnance disposal (EOD), reconnaissance, communications, CBRN (Chemical, Biological, Radiological, Nuclear), HAZMAT, security, heavy lift, defense and rescue missions. Our TALON CBRN/Hazmat modular kit is available for TALON IV and V models. TALONs have been used worldwide, from Ground Zero after the 2001 World Trade Center attack, to IRAQ and Afghanistan, searching for the Boston Marathon bombing suspect and assisting with security during major sporting events. Now on its fifth generation, TALON 5 is the first Interoperability Profile (IOP) fielded robotic system that has successfully gone through Army Test and Evaluation Command testing.

Telemax RECCE German Remote-Controlled Robot



Tiers:



Variants:

- **Telemax 4x4:** elemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection.
- **Telemax PRO:** The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces.
- **Telemax HYBRID:** The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges.
- **Telemax PLUS:** The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications.
- **Telemax RECCE:** Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory.

System

Alternative Designation: Telemax RECCE

Type: Remote-Controlled Robot

Manufacturer: Faulhaber

Crew: ea1

Universal Interface: 1

Payload Capacity: 60 kg

Dimensions

Length: 1020 mm

Width: 605 mm

Height: 815 mm

Weight: 51 kg

Automotive

Engine Name: INA

Engine Type: Rugged four-wheel drive, also available with independent tracks

Engine Power: INA

Drive: 4 wheels

Maximum Speed: 10 km/h

Operational Range: INA

Turning Circle: 1200 mm

Mobility, Slopes: 38° (depending on surface)

Mobility, Stairs: 17.5°

Mobility, Obstacle Height: 200 mm

Mobility, Gap Width: 330 mm

Fording depth: 280 mm

Endurance: Up to 8 h

Protection

Hull Armor: INA

Applique Armor: INA

Notes:

Telemax RECCE Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory. Features: *Rugged four-wheel drive, also available with independent tracks **Top speed of more than 10 km/h (6.2 mph) *Up to 8 hours of operation without recharging *Compact dimensions *Payload area for additional modules and an ideal platform for ROS based mapping and autonomy software *Interchangeability of accessories within the telemax family, e.g. cameras and batteries. Benefits: *Flexible adjustment of the system for specific tasks and different ambient conditions *Rapid reconnaissance *Gathering information from a safe distance in complex and time-consuming missions *Maximum mobility and easily transported *Simple integration of additional accessories such as autonomy and reconnaissance tools, e.g. automatically generate a 3D map while navigating through an environment *Excels in a wide variety of applications

Telemax Plus German Remote-Controlled Robot





Tiers:



Variants:

- **Telemax 4x4:** elemax with wheels: Versatile and cost-efficient! The starter version with a broad wheelbase and 4-wheel drive for rapid deployments on challenging terrains and delicate flooring requiring protection.
- **Telemax PRO:** The original telemax: Compact design and high reach! A truly versatile robot capable of handling significant gradients and obstacles, it boasts an impressive manipulator reach, both vertically and horizontally, combined with minimal dimensions. Perfect for deployments in built-up areas and confined spaces.
- **Telemax HYBRID:** The best of both worlds – Compact and strong! The combination of a powerful arm and compact dimensions for the toughest challenges.
- **Telemax PLUS:** The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications.
- **Telemax RECCE:** Fast solution for reconnaissance: Agile and smart! Compact and high performance reconnaissance system without a manipulator provides detailed information from the site, especially when equipped with our autonomy/3D mapping accessory.

System

Alternative Designation: Telemax Plus
Type: Remote-Controlled Robot
Manufacturer: Faulhaber
Crew: ea1
Payload Capacity: Lifting capacity up to 80 kg
Firing Port: 3
Flipper Swiveling: -85° to +80°

Dimensions

Length: 860 mm
Width: 680 mm
Height: 880 mm
Manipulator, Upward Reach: 2325 mm
Manipulator, Forward Reach: 1563 mm
Manipulator, Downward Reach: 1069 mm
Weight: 113 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Drive: Track
Maximum Speed: 5 km/h
Operational Range: INA
Mobility, Slopes: 45° (depending on surface)
Mobility, Stairs: 45° (depending on surface)
Mobility, Obstacle Height: 400 mm
Mobility, Gap Width: 500 mm
Fording Depth: 240-560 mm
Battery: NiMh battery (24 V, 15 Ah) or Li-ion battery (26 V, 40 Ah)
Endurance: NiMh battery (24 V, 15 Ah): approx. 2.5 h with 2 batteries; approx. 5 h with 4 batteries Li-ion battery (26 V, 40 Ah): approx. 3 h with 1 battery; approx. 6 h with 2 batteries; approx. 12 h with 4 batteries
Payload Range: INA

Protection

Hull Armor: INA
Applique Armor: INA

Notes:

Telemax PLUS The biggest and strongest telemax: Versatile and strong! Our largest and strongest telemax, its exceptional ability to handle gradients and terrains makes it ideal for a particularly broad range of applications. Features Exceptionally strong precision 6-axis manipulator with TCP control and automatic tool change Lifting capacity up to 80 kg (176 lbs.) Double payload area on the chassis 4-track drive system with a top speed of up to 5 km/h (3.1 mph) More than 30 pre-programmed automatic motion sequences for manipulator and flippers Interchangeability of accessories within the telemax family, e.g. batteries, tools, cameras and sensors

Tanks

→Main Battle Tanks

MBT-2000 (Type 90-II) Chinese Main Battle Tank (MBT)





Tiers:



Variants:

- **Al-Khalid:** The Al-Khalid is an MBT manufactured in Pakistan by Heavy Industries Taxila (HIT) and the MBT-2000 is an MBT marketed for export by China North Industries Corporation (NORINCO).
- **VT-1A:** Export Version of the MBT-2000. Bangladesh: 44, Morocco: 54, Myanmar: 50

System

Alternative Designation: MBT-2000, Type 90-11, Al-Khalid
Estimated out of Service Date: 2035-2050
Manufacturer: NORINCO
Type: Main Battle Tank
Status: In Production
Family: INA
Crew: ea3
Passenger Capacity: INA
Maximum Effective Range (Road): km500
Maximum Effective Range (Main Gun): m5,000
Add on Parts: Yes, Additional Armor

Dimensions

Length: m10.33
Width: m3.5
Height: m2.4
Weight, Combat: tons48
Ground Pressure: kg/mINA

Automotive

Engine Name: Ukrainian 1,200 hp 6TD-2 six cylinder turbocharged multi-fuel diesel engine.
Engine Type: Diesel
Engine Power: hp1,200
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: 55
Speed Maximum Swim: km/hINA
Gradient: deg60
Side Slope: deg40
Vertical Step: m0.85
Fording Depth: m1.4
Fording with Preparation: m5
Tench: m2.7
Suspension: Torsion Bar
Hydraulic Shock Absorbers: Yes

Communications

↳*TBR-121*

VHF Transceiver: Yes
VHF Range: km1 to 50
Proliferated: Widely
Digital Data: Yes, Full
Control: Self-Adaptive Control (Including Automatic Antenna Tuner)
Frequency Agile: Yes
Wireless Network Capabilities: Yes
Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: MBT-2000 Main Gun
Type: 125 mm smoothbore gun
Max Rate of Fire: rds/min6-8
Sustain Rate of Fire: INA
Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Laser

Loader Type: Autoloader

Thermal Jacket: Yes

Fume Extractor: Yes

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 39 in total any combination

Maximum Effective Range: m5,000

Minimum Effective Range: mINA

Armor Penetration: Yes

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Fragments: ea2,500

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 39 in total any combination

Maximum Effective Range: m3,000

Minimum Effective Range: mINA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Max Dispersion: INA

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*Ammunition (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot Tracer or APFSDS-T rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Basic Load: 39 in total any combination

Muzzle Velocity: m/s2,050

Muzzle Energy: MJ15-24

Maximum Effective Range: m3,000

Minimum Effective Range: mINA

Projectile Dimension: mm900

Penetration: mm1,000

Projectile Weight: kg11

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Tank Commander's Weapon System

↳*System*

Name: W-85

Type: 12.7mm Anti-Aircraft Machine Gun

Max Rate of Fire: rds/min550-600

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Iron/Optical

Feed System: Belt

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation Angle: deg90

↳*Ammunition*

Type: Type 54 Round

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea750 (50 Round Belts)

Effective Range: km2.5

Armor Penetration: Yes

Mounted: Co-axially with the 125mm Main Gun

Loader's Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.62 Coaxial Machine Gun

Manufacturer: NORINCO

Length, Total: 1,192

Length, Barrel: mm658

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Max Rate of Fire: rds/min700-800

Sustain Rate of Fire: rds/minINA

Time the Max Rate of Fire can be Sustained: secondsINA

Range Finder Type: Scope

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign to China): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: ea4,000

Effective Range: m100-1,500 (With Sight Adjustments)

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: Yes, Image Stablished FCS

Ballistic Computer: Yes

Thermal Sight Tank Commander: Yes

Two-Axis Panoramix Sight (Commander): Yes

Commander's sight Magnication: x6 with a 10 deg FOV

Thermal Sight Gunner: Yes

Two-Axis Stabilised Fixed Roof-Mounted Sight (Gunner): Yes

Gunner's Sight Magnification: x3 with a 20 percent FOV and x10 with a 6 deg FOV.

Main Gun Stabilization: Yes

Auto-Tracking Function: Yes

Image-Stabilized Gunner Sight: Yes

Fire Control Computer and Sensors: Yes

Laser Rangfinder: Yes

Automatic Target Tracker (ATT): Yes

Thermal Imager Module: Yes

Roof Mounted Crosswind/Angular Velocity Sensor: Yes

Protection

Hull Armor: all-welded steel, Protects from small arms fire and shell splintering

Turret Armor: all-welded steel, Protects from small arms fire and shell splintering

Applique Armor: Yes, Modular Armor

Explosive Reactive Armor: Yes, added to the Glacis Plate, Sides, forward roof, and Vehicle Nose

Active Protection System: Yes

Mine Clearing: No

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Available

IR Reflective Paint: yes

Anti-Neutron Liner: Yes

Notes:

The MBT-2000 was developed in China by NORINCO, where it was known as the Type 90-II and was later marketed for export as the MBT-2000. The MBT-2000 developed and offered for export by NORINCO is believed to have very similar specifications as the Al-Khalid and externally appears almost identical. The MBT-2000 has been exported by NORINCO to Bangladesh. The MBT-2000 has a crew of three, a 125 mm smoothbore gun as a main armament, and an all-welded steel construction with additional layer of composite armour over the frontal arc for protection.

M48A5 American Main Battle Tank (MBT)







Tiers:



Variants:

- **M48:** M48: Differed from the M47 in having yet another new turret design and a redesigned hull, doing away with the bow machine gun position, featuring the M41 90 mm gun. These turrets give the M48 its distinctive non-M26 style look. Originally, the gun featured a Y-shape muzzle brake, but this was changed to the more characteristic T-shape.
- **M48C:** M48C: Over a hundred original production hulls were found to be lacking correct ballistic protection and were relegated to training as the M48C.
- **M48A1:** M48A1: New driver hatch and M1 commander's cupola, allowing the M2HB .50 caliber machine gun to be operated and reloaded from within the vehicle.
- **M48A2:** M48A2: Improved powerpack and transmission, redesigned rear plate, and improved turret control.
- **M48A2C:** M48A2C: M48A2s with an improved rangefinder, M17, new ballistic drive and bore evacuator for the main gun, and the auxiliary tensioning wheels were deleted.
- **M48 AVLB:** M48 AVLB: M48A2 chassis, fitted with a scissors-type bridge. All later upgraded to A3 standard.
- **M48A3:** Refit of M48A1 through M48A2C models to diesel engines and a new fire control system. 1,019 converted.
- **M48A3 Mod. B:** M48A3 Mod. B: Additional armor on the exhausts and tail lights, and a raised commander's cupola.
- **M48A4:** M48A4: upgrade proposed 15 October 1966 by Chrysler Defense, mating the T95E5 turret of the original variant of the M60 series tank to the M48A3 hull. Used by Israel in some Magach 3 variants.
- **M48A5:** M48A5: Up-gunned with the 105 mm M68 gun. 2,069 converted.
- **M48A5E1:** M48A5E1: New laser rangefinder, digital fire-control system, improving night vision system.
- **M48A5PI:** M48A5PI: M1 cupola replaced by the Israeli Urdan model.
- **M67 "Zippo":** M67 "Zippo": M48 armed with a flamethrower inside a dummy model of the main gun with a fake muzzle brake. Named after a popular brand of cigarette lighter.
- **M247 Sergeant York::** M247 Sergeant York: This self-propelled anti-aircraft gun, cancelled in 1985 before it was deployed, used the M48A5 chassis.

System

Alternative Designation: M48A5
Date of Introduction: 1976
Type: Main Battle Tank
Proliferation: Greece: 390 M48A5 MOLF. Iran: 180 M48A5. South Korea: Around 300 M48A3K and 500 M48A5K1/K2 are in service. M48A3K are expected to be replaced by the K2 Black Panther in the distant future. Most of the M48A3K are used in

reserve, but the South Korean military continues to use a few tanks in active service. However, the South Korean M48A3Ks are being replaced with K-1 tanks. Lebanon: 104 M48A1 and M48A5. Morocco: 225 M48A5. Taiwan: 450 CM-11, 100 CM-12 Thailand: 105 M48A5PI. Turkey: 758 M48A5T2 in service. All other variants, 2,250 pieces including the 1,389 M48A5T1 are phased out of active service. West Germany: 20 Minenräumpanzer Keiler. Poland: 4 Minenräumpanzer Keiler, from Germany.

In Service: 1976-Present

Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 6.42 m

Length, Gun Forward: 9.31 m

Width: 3.63 m

Height: 3.09 m

Track, Length on Ground: 4.00 m

Track, Width: 0.71 m

Ground Clearance: 0.41 mm

Ground Pressure: 0.88 kg/cm sq

Weight, Combat: 48,987 kg

Weight, Unloaded: 46,287 kg

Automotive

Engine Name: 1 x Teledyne Continental AVDS-1790-2D 1,790-cu in (29.3-liter) air-cooled

Engine Type: V-12 Diesel

Engine Power: 750 hp at 2,400 rpm

Range: 499 km

Speed, Maximum Road: 48 kph

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 60%

Vertical Obstacle: 0.92 m

Trench: 2.59 m

Fording Depth, without Preparation: 1.22 m

Fording Depth, with Preparation: 2.44 m

Main Armament

↳*System*

Name: M68

Type: 105mm Rifled Gun

Caliber: 105mm

Length: 5,550 mm

Barrel Length: 50 Calibres

Weight: 1,128 kg

Fume Extractor: Yes

Elevation: -9 deg to 19 deg

Traverse: 360 deg

Maximum Firing Range: 4,000 m

Sights: INA

↳***Ammunition***

Type: Rifle

Caliber: mm105

Shell: INA

Shell Weight: INA

Basic Load: 54 Rounds

Coaxial Weapon System

↳***System***

Name: M73 Machine Gun

Type: Medium Machine Gun

Caliber: 7.62mm

Quantity: 2 x 7.62mm M73 machine gun

Manufacturer: United States

Proliferation: The M73 and M219 are 7.62 mm NATO caliber machine guns designed for tank use. NATO no longer uses them, but they were used on the M48 Patton and M60 Patton MBT series (including the M728 Combat Engineer Vehicle), and on the M551 Sheridan Armored Reconnaissance / Airborne Assault Vehicle (AR/AAV).

In Service: 1959-1990s

Length: 1,219.2 mm

Barrel Length: 609.6 mm

Weight: 14.1 kg

Rate of Fire: 500-625 round/min

Action: Recoil-operated/short-recoil operation with gas assist

Muzzle Velocity: 853.44 m/s

Maximum Firing Range: 3,657.6 m

Effective Firing Range: 899.8 m

Feed System: Belt Feed, left or right hand

Sight: INA

↳***Ammunition***

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 2,000 Rounds

Auxiliary Weapon System

↳***System***

Name: M60D
Type: 7.62mm
Caliber: General-Purpose Machine Gun
Quantity: 2 x 7.62mm M60D Machine Gun
Manufacturer: Saco Defense U.S. Ordnance
Proliferation: Widely Proliferated
In Service: 1957-Present
Length: 1,105 mm
Barrel Length: 560 mm
Weight: 10.5 kg
Action: Gas-operated, short-stroke gas piston, open bolt
Rate of Fire: 550–650 RPM
Muzzle Velocity: 853 m/s
Effective Firing Range: 1,100 m
Feed System: Disintegrating belt with M13 Links
Sights: Iron sights
Note: The M60D is a mounted variant of the standard M60. It can be mounted on boats, vehicles and as a pintle-mounted door gun in helicopters. When used in aircraft, it differs from the M60C in that it is not controlled by the pilot—rather, it is mounted in a door and operated by a member of the crew. Like the rest of the M60 family, it is an air-cooled, gas-operated, belt-fed weapon. Unlike other models, however, the M60D normally has spade grips and an aircraft ring-type sight or similar, as well as an improved ammunition feed system. A canvas bag is also affixed to the gun to capture ejected casings and links, preventing them from being sucked into the rotor blades or into an engine intake. The M60D was equipped on the UH-1B Huey (using the M23, XM29, M59, and the Sagami mounts), the CH-47 Chinook (using the M24 and M41 mounts) in both door and ramp locations, the ACH-47A "Guns-A-Go-Go" variant of the Chinook (using the XM32 and XM33 mounts), and on the UH-60 Black Hawk (using the M144 mount). The M60D is also used by the British on Royal Air Force Chinooks. In US service, the M60D has been primarily replaced by the M240H. The M60D is still manufactured by U.S. Ordnance and still used on the SH-60 Seahawk.

↳***Ammunition***

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO

Basic Load: 3,000 Rounds Each

Fire Control

Name: INA

Computerized FCS: Yes, The fire control system included a rangefinder, mechanical ballistic computer, ballistic drive, and gunner's periscope. Collectively, these mechanical devices resembled in miniature the fire control systems used in naval gunnery. Only after the Second World War did such systems become small enough for use in combat vehicles. These mechanical fire control systems permitted tanks to engage effectively at much longer ranges than in World War II, a critical consideration for the Army, expecting to enter the European battlefield outnumbered. Instead of a gunner's sight being slaved to the gun tube, the ballistic computer and drive computed the range and elevated the gun. The gunner's primary responsibility lay in keeping the sight on the target.

Thermal Sight Tank Commander: thermal sights (Taiwanese and Turkish M48s only)

Infrared: driving lights and searchlights

Main Gun Stabilization: INA

Rangefinders: There are two basic types of optical rangefinders, stereoscopic and coincidence. With a stereoscopic model range determination occurred by measuring the distance from the observer to a target using the observer's capability of binocular vision. The coincidence rangefinder uses a single eyepiece. Light from the target enters the rangefinder through two windows located at either end of the instrument. The ARCOVE emphasis upon increased long range accuracy led to the incorporation of a fire control system (FCS) in the M48.

Ballistic Computer: M13 electro-mechanical ballistic computer. The mechanical ballistic computer made a more accurate computation of range possible by mathematically accounting for such factors as vehicle cant and ammunition type. Many developmental range finders based on pulses of IR light, such as the OPTAR rangefinder of the T95 continued into 1957.

Protection

Hull Armor: hull front: 101/120 mm hull sides: 76 mm hull rear: 44 mm hull top: 57 mm

Turret Armor: turret front: 110 mm turret sides: 76 mm turret rear: 50 mm turret top: 25 mm

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: limited protection

Smoke Equipment: M339 smoke grenade dischargers; engine smoke-laying system

Notes:

M48A5 In the mid-1970s, the vehicle was modified to carry the heavier 105 mm gun. The original program designation was XM736. The designation was subsequently changed to M48A3E1 and was finally standardized as M48A5. As many components from the M60A1 were utilized as possible. Anniston Army Depot was issued a contract to convert 501 M48A3 tanks to the M48A5 standard and this was completed in December 1976. These early M48A5's were essentially M48A3 tanks with the 105mm gun added. They retained the M1 cupola armed with a .50 cal machine gun. Based on Israeli experience in upgrading M48 series tanks, further changes were included starting in August 1976. These included replacing the M1 cupola with a low-profile "Urdan" type cupola that mounted an M60D machine gun for use by the tank commander. A second M60D machine gun was mounted on the turret roof for use by the loader. Internal ammunition stowage for the 105mm main gun was also increased to 54 rounds. These tanks were initially given the designation M48A5API; but, after early conversions were brought up to the later standard, the API was removed and these tanks were known simply as M48A5. In addition to the conversion of M48A3 tanks, an additional conversion process for bringing M48A1 tanks to M48A5 standard was also developed. By March 1978, 708 M48A5 tanks had been converted from the M48A1 model. Work continued until December 1979, at which time 2069 M48A5's had been converted. The vast majority of M48A5 tanks in service with US Army units were assigned to National Guard

and Army Reserve Units. A notable exception was the 2nd Infantry Division in the Republic of Korea, who replaced their M60A1 tanks with M48A5's, which arrived in June and July 1978. On 2nd Infantry Division M48A5 tanks the commander's M60D was replaced with a .50 caliber M2 machine gun. By the mid-1990s, the M48s were phased out of U.S. service. Many other countries, however, continued to use these M48 models.

Challenger 2 (FV4034) British Main Battle Tank (MBT)



Tiers:



Variants:

- **Titan:** The Titan armoured bridge layer is based on aspects of the Challenger 2 running gear and replaced the Chieftain Armoured Vehicle Launched Bridge (ChAVLB). The Titan came into service in 2006 with the Royal Engineers, with 33 in service. Titan can carry a single 26-metre-long bridge or two 12-metre-long bridges. It can also be fitted with a bulldozer blade.
- **Trojan:** The Trojan Armoured Vehicle Royal Engineers is a combat engineering vehicle designed as a replacement for the Chieftain AVRE (ChAVRE). It uses the Challenger 2 chassis, and carries an articulated excavator arm, a dozer blade, and attachment rails for fascines. Entering service in 2007, 33 were produced
- **Challenger 2E:** The Challenger 2E is an export version of the tank. It has a new integrated weapon control and battlefield management system, which includes a gyrostabilised panoramic SAGEM MVS 580-day/thermal sight for the commander and SAGEM SAVAN 15 gyrostabilised day/thermal sight for the gunner, both with eyesafe laser rangefinder. This allows hunter/killer operations with a common engagement sequence. An optional servo-controlled overhead weapons platform can be slaved to the commander's sight to allow operation independent from the turret. The power pack has been replaced by a new 1,500 hp (1,100 kW) EuroPowerPack with a transversely mounted MTU MT883 diesel engine coupled to Renk HSWL 295TM automatic transmission. The increase in both vehicle performance and durability is significant. The smaller volume but more powerful Europowerpack power pack additionally incorporates as standard a cooling system and air-intake filtration system proved in desert use. The free space in the hull is available for ammunition stowage or for fuel, increasing the vehicle's range to 550 km (340 mi). This powerpack was previously installed on the French Leclerc tanks delivered to the UAE as well as the recovery tank version of the Leclerc in service with the French Army. Further developed versions of the Europowerpack have more recently been installed in the latest serial produced Korean K2 Black Panther tank as well as the new Turkish ALTAY tank. BAES announced in 2005 that development and export marketing of 2E would stop. This has been linked by the media to the failure of the 2E to be selected for the Hellenic Army in 2002, a competition won by the Leopard 2
- **CRARRV:** The Challenger Armoured Repair and Recovery Vehicle (CRARRV) is an armoured recovery vehicle based on the Challenger 1 hull (with the updated Challenger 2 powertrain) and designed to repair and recover damaged tanks on the battlefield. It has five seats but usually carries a crew of three soldiers from the Royal Electrical And Mechanical Engineers (REME), of the recovery mechanic and vehicle mechanic/technician trades. There is room in the cabin for two further passengers (e.g. crew members of the casualty vehicle) on a temporary basis. The size and performance are similar to the MBT, but instead of armament it is fitted with: A main winch with 50 tonnes-force pull in a 1:1 configuration or 98 tonnes-force pull using an included pulley in a 2:1 configuration and anchor point on the vehicle, plus a small auxiliary winch to aid in deploying the main winch rope. Atlas crane capable of lifting 6,500 kg (14,300 lb) at a distance of 4.9 m (16 ft) (this is sufficient to lift a Challenger 2 power pack). In order to improve flexibility and supplement the transportation of power packs around the battlefield, the British Army procured a quantity of dedicated CRARRV High Mobility Trailers (CRARRV HMT). Each CRARRV HMT enables a CRARRV to transport a single (Challenger, Titan or Trojan) power pack or two Warrior power packs, by altering the configuration of dedicated fixtures and attachment of fittings. Dozer blade to use as an earth anchor/stabiliser, or in obstacle clearance and fire position preparation. Large set of recovery and heavy repair tools including a man-portable ultrathermic cutting system with an underwater cutting capability and a man-portable welder. The design prototype is on display at The REME Museum at MoD Lyneham, Wiltshire.

System

Alternative Designation: Challenger 2, FV4034, CR2 and the retrospective designation CR2 Mk1

Date of Introduction: 1998

Manufacturer: Alvis plc, BAE Systems Land & Armaments

Proliferation: Great Britain: 446, Oman: 38

Type: Main Battle Tank

Status: 1993-2002

Family: 3rd Generation Main Battle Tank (MBT)

Crew: ea4 (commander, gunner, loader/operator, driver)

Passenger Capacity: INA

Maximum Effective Range (Road): km500

Note: The Challenger 2 main battle tank was developed as a private venture to replace the previous Chieftain MBT in service with British Army.

Dimensions

Length (Hull): m8.33

Length (With Gun Forward): m11.55

Width (Normal): m3.5

Width (With Applique Armor): m4.2

Height: m2.5

Weight, Combat: tons62.5

Ground Pressure: kg/m0.97

Automotive

Engine Name: Perkins CV12 TCA Diesel

Engine Type: Diesel

Engine Power: hp1,200

Speed, Maximum Road: km/h59

Cruising Range: km/h50

Speed, Maximum Off Road: km/h40

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.9

Trench: m2.34

Fording Depth: m1.07

Suspension: Hydropneumatic suspension

Communications

↳***There is no data on the type of Military Radio/Communications Equipment***

Main Gun

↳***System***

Name: L30A1 (LFF) Challenger Main Armament or CHARM 120 mm Rifled Gun
Type: mm120
Manufacturer: Royal Ordnance Factory
Barrel Length: m6.6
Barrel Material: Electroslag refined (ESR) steel.
Max Rate of Fire: rds/min10
Reload Time (1 Round): seconds6
Barrel Life: 400 effective full charges
Breach Mechanism: Split sliding-block breech
Maximum Effective Range: m3,000
Range Finder Type: Laser
Loader Type: Manual, with two-piece ammunition comprising a fully combustible bag charge and projectile.
Maximum Elevation: deg-10
Minimum Elevation: deg+20
Fire on the Move: Yes
Thermal Jacket: Yes
Muzzle Reference System: Yes
Central Bore Evacuator: Yes
Barrel Lining: Chrome, which extends the life of the barrel
Fume Extractor: Yes
Breach Machanism: split-block sliding breech, with an elastomeric obturating pad made necessary by the combustible case charges.
Note 1: The Challenger 2 gun claims the longest-distance tank kill in history. During Gulf War it defeated an Iraqi tank at a range of 4 km.
Note 2: The Challenger 2 is one of the few MBTs in the world to carry a 120 mm rifled main gun

↳***Ammunition (Option 1)***

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS) L23
Caliber: mm120
Muzzle Velocity: m/s1,534
Diameter: mm120
Height: mm500
Basic Load: 50 total rounds of any combination of 120mm Projectiles

Armor Penetration: INA

Effective Range: m3,000

Penetrator: Monobloc tungsten alloy rod

Case Charge: L8 combustible case charge

Note: Average Projectile Load would consists of the following: 33 L26 APFSDS rounds, 13 L31A7 HESH, and 3 white L34 phosphorous smoke rounds.

↳*Ammunition (Option 2)*

Type: APFSDS L26 (CHARM 1)

Caliber: mm120

Muzzle Velocity: INA

Effective Range: m2,100

Penetrator: Monobloc tungsten nickel copper long rod

Case Charge: L14A1 or L14A2

Basic Load: 50 total rounds of any combination of 120mm Projectiles

Variant: APFSDS L27A1 (CHARM 3).

↳*Ammunition (Option 3)*

Type: HESH L31

Caliber: 120

Muzzle Velocity: m/s670

Basic Load: 50 total rounds of any combination of 120mm Projectiles

Effective Range: 2,000

Coaxial Weapon System

↳*System*

Name: L94A1, Hughes EX-34

Type: mm7.62mm Chain Gun

Manufacturer: Heckler & Koch

Produced: 1980 to early 1990s, 1996-1998

Max Rate of Fire: rds/min500-600

Range Finder Type: INA

Weight: kg17.86

Length (Total): m1.25

Length (Barrel): mm703

Action: Electrically driven

Feed System: disintegrating link belt

Variants: EX-31, L95A1 (short barreled version)

↳*Ammunition*

Type: Chain Gun Ammunition

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (linked)

Muzzle Velocity: m/s862

Basic Load: INA

Effective Range: m200-3,000

Armor Penetration: No, Low penetration makes it ineffective against armor

Loader's Weapon System (Operator/Loader's hatch)

↳*System*

Name: L37A2 Machine Gun

Type: 7.62 mm

In Service: 1963-present

Length (Overall): mm1,232

Length (Barrel): mm630

Weight: kg10.90

Max Rate of Fire: rds/min750

Effective Range: m800

Range Finder Type: INA

Action: Gas-Operated

↳*Ammunition*

Type: Rifle

Caliber: 7.62x51mm NATO

Muzzle Velocity: m/s840

Basic Load: INA

Effective Range: m800

Armor Penetration: No

Fire Control

Name: Mk5, IFCS Mk 11/12

Computerized FCS: Yes

Thermal Sight Tank Commander: SAGEM VS 580-10 gyro stabilised sight

Thermal Sight Gunner: Yes, Thales Gunner's Primary Sight

Main Gun Stabilization: Yes, 2-plane

Range Finder: Laser

Infrared: Searchlight

Battle Management System: Yes, similar to that used in the M1A1 Abrams Tank

Gun Control Equipment (GCE): MIL-STD-1553 databus

:

Protection

Hull Armor: Chobham / Dorchester Level 2 (classified)

Turret Armor: Chobham / Dorchester Level 2 (classified)

Applique Armor: Available, The sides of the vehicle are protected by short armoured skirts, which stretch the full length of the vehicle.

Explosive Reactive Armor: Available

Active Protection System: Yes, Dorchester level 2 armour

Mine Clearing: Plow Variant

Self-Entrenching Blade: Yes, Pearson Engineering Combat Dozer Blade

NBC Protection: Yes, MDH Defence Vehicle NBC filtration system

Smoke Equipment: Yes, VIRSSS (Visual and Infra-Red Smoke Screening System).

IR Signature: INA

Automatic Fire Suppression Systems: Yes

Meteorological Sensor: Available

Note: It is one of the most protected tanks in the world. This main battle tank provides a very high level of protection against direct fire weapons.

Notes:

The FV4034 Challenger 2 (MOD designation "CR2") is a third generation British main battle tank (MBT) in service with the armies of the United Kingdom and Oman. It was designed and built by the British company Vickers Defence Systems (now known as BAE Systems Land & Armaments). Vickers Defence Systems began to develop a successor to Challenger 1 as a private venture in 1986. A £90 million deal for a demonstrator vehicle was finalised in January 1989. In June 1991, the Ministry of Defence placed a £520 million order for 140 vehicles, with a further 268 ordered in 1994. Production began in 1993 and the unit's tanks were delivered in July 1994, replacing the Challenger 1. The tank entered service with the British Army in 1998, with the last delivered in 2002. It is expected to remain in service until 2035. The Royal Army of Oman ordered 18 Challenger 2s in 1993 and a further 20 tanks in November 1997. The Challenger 2 is an extensive redesign of the Challenger 1. Although the hull and automotive components seem similar, they are of a newer design and build than those of the Challenger 1 and only around 3% of components are interchangeable.A visual recognition feature is the armoured housing for the TOGS thermal gunsight; the Challenger 2 has this above the gun barrel, the Challenger 1 has it at the right hand side of the turret. The tank's drive system provides a 550 km range, with a maximum road speed of 59 km/h. The Challenger 2 main battle tank was developed as a private venture to replace the previous Chieftain MBT in service with British Army.

Type 88B / A Chinese Main Battle Tank (MBT)





Tiers:

1 2 **3** 4

Variants:

- **Type 88A:** Despite the nomenclature, this is a variant of the Type 88B. It uses a modified Type 83-I 105mm rifled gun with a longer tube. It is fitted with FY series double explosive reactive armor capable of resisting HEAT-FRAG and APFSDS rounds. Some known differences: Combat Weight: 39,500kg, Dimensions: Length with gun forward: 10.65m; Speed: 57kph; Range: 430km; Range with external tanks: 600km; Main Gun: 105mm Type 83-I rifled gun fitted with a thermal shroud and fume extractor; Fire Control: JSFCS-212; Rangefinder: Internal Laser.

System

Type: Main Battle Tank

Crew: ea4

Dimensions

Hull Length: 6.33 m

Length, Gun Forward: 9.33 m

Width: 3.35 m

Height: 2.29 m

Weight, Combat: kg38,500

Ground Pressure: INA

Automotive

Engine Name: 12150L-7BW

Engine Type: Diesel

Engine Power: hp730

Range: km430

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording without Preparation: m1.4

Fording with Preparation: INA

Main Gun

↳*System*

Name: L7/M68 .

Type: 105mm Rifled Gun

Caliber: 105mm

Length: 5.89 m

Barrel Length: 52 calibres (5.46 m or 17.9 ft)

Weight: 1,282 kg

Rate of Fire: 10 rounds per minute (maximum)

Maximum Firing Range: 4000 m

Maximum Elevation: deg+18

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳*Ammunition (Option 1)*

Name: L28

Type: Armour-piercing discarding sabot

Caliber: 105mm

Muzzle Velocity: 1478 m/s

Penetrator: Tungsten carbide

RHA Penetration: 120 mm @ 60° at 914 m

Basic Load: INA

↳*Ammunition (Option 2)*

Name: M110 HE-MP-T

Type: High-Explosive (HE)

Caliber: 105mm

Muzzle Velocity: 800

Penetrator: INA

RHA Penetration: INA

Basic Load: INA

↳*Ammunition (Option 3)*

Name: M456 HEAT-T

Type: Shaped-charge shells

Caliber: 105mm

Muzzle Velocity: 1173

Penetrator: INA

RHA Penetration: 375-400mm

Basic Load: INA

↳*ATGM*

Name: AT-10 Stabber

Coaxial Weapon System

↳*System*

Name: Type 80

Type: General-Purpose Machine Gun

Caliber: 7.62mm

In Service: 1983-Present

Manufacturer: Norinco

Proliferationn: Bangladesh: BD-14 variant made in Bangladesh in service with Bangladesh Army and President Guard Regiment. China: Currently in service in small numbers with Chinese special forces. Croatia: In service with Croatian police units during the country's war of independence. Malta: Armed Forces of Malta Niger South Sudan South Sudan Democratic Movement: Mokhtar South Sudan Defence Forces: Type 80 Sudan: Manufactured locally as Mokhtar. Also Chinese-made Type 80s Sri Lanka: In service with the Sri Lanka Army. Around 200 Type 80 GPMGs were supplied by Norinco as part of several defense agreements between China and Sri Lanka

Length: 1,192 mm

Barrel Length: 658 mm

Weight: 12.6 kg

Action: Gas-operated, open bolt

Rate of Fire: 700–800 round/min

Muzzle Velocity: 840 m/s

Effective Firing Range: 100—1,500 m sight adjustments

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Ammunition

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500 rds

Auxiliary Weapon System

↳*System*

Name: Type 77

Type: Heavy Machine Gun

Manufacturer: Norinco

Proliferation: Widely Proliferated Afghanistan Cambodia Djibouti Islamic State Mali: People's Movement for the Liberation of Azawad People's Republic of China South Sudan Sudan Syria Free Syrian Army and Turkish-backed Free Syrian Army Iraq Iraqi security forces: Used by Unmanned ground vehicle "Alrobot". Also used by the Popular Mobilization Forces

Length: 2,150 mm

Barrel Length: 1,016 mm

Weight: 28 kg (61.73 lb) (gun only) 28.3 kg (62.39 lb) (tripod)

Action: Gas

Rate of Fire: 650-700 rounds/min

Muzzle Velocity: 825 m/s

Feed System: belt 60 rounds

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: INA

Fire Control

Name: JSFCSA-212

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: Yes, some

Main Gun Stabilization: INA

↳

Protection

Hull Armor: Cast Steel
Turret Armor: Cast Steel
Applique Armor: Available
Explosive Reactive Armor: Yes
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: INA

Notes:

The Type 88B has a modified gun loading system that has been changed to accept new types of 105mm ammunition. The weight is increased to 38,500kg. It may be fitted with a semi-automatic transmission and have a VRC-83 instead of a YRC-83.

T-64BV Model 2017 Ukrainian Main Battle Tank (MBT)




Tiers:



Variants:

- **T-64A:** Production version of base tank. Tank has a history of reliability problems, and lacks the high armor protection, track skirts, a fcs and atgm launch capability for t-64b.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64B:** T-64B or 447A (1976) – Fitted with redesigned armour, 1A33 fire control system, 9K112-1 "Kobra" ATGM system (NATO code "AT-8 Songster"), TPN-1-49-23 sight, 2A46-2 gun, 2E26M stabiliser and 6ETs40 loader. Later B/BV models have more modern systems 1A33-1, TPN-3-49, 2E42 and a 2A46M-1 gun. From 1985 the T-64B was fitted with stronger glacis armour; older tanks were upgraded with a 16-mm armour plate. Tanks, equipped with the 1,000 hp 6DT engine are known as T-64BM.
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64BV Model 2017
Type: Main Battle Tank
Family: T-64 Family
Crew: ea3
Passenger Capacity: INA, IT"S A TANK
Maximum Effective Range: km600
Navigation System: SN-4215 networked satellite navigation unit
Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23
Length (Hull): m6.54
Width: m3.41
Height: m2.17

Weight, Combat: tons42

Ground Pressure: kg/mINA

Automotive

Engine Name: 5TDF Diesel

Engine Type: Diesel

Power to Weight Ratio: hp/ton16.6

Engine Power: hp700

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.72

Fording Depth (Without Preparation): m1.4

Fording Depth (With Preparation): m5

Communication

Type: Lybid K-2RB digital radio

Maximum Range: km70

Main Gun

↳*System*

Name: D-81T (aka 2A46)125 mm smoothbore gun

Type: 125 mm smoothbore

Max Rate of Fire: rds/min8

Manual Load Time: rds/min1-2

Weight (Barrel): kg1,073

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Elevation: Deg+14

Minimum Elevation: Deg-6

Traverse Range: Deg360

Automatic Loader: Yes

Thermal Sleeve: Yes

Evacuator Type: central bore evacuator

Effective Full Charge (EFC) Life: rds600

Breech Type: semi-automatic horizontal sliding breech block

Loading System: Korzina electric and hydraulic automatic loading system

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

Rate of Fire: rds/min6-8

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 1)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS Radio

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Variants: 9M112M, 9M112M2, 9M124

Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun

Type: 12.7mm Heavy Machine Gun

Proliferation: over 1 Million

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Range Finder Type: Optical

Action: Gas-Operated, Flapper Locking

Sights: Iron/Optical

Feed System: 50 Round Belt

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Variants: DK, DShKM, DSHKS, Type 54 HMG

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea300

Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Overall): mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea250
Effective Range (Iron Sights): m100- 1,000
Effective Range (With Sight Adjustments): m100-1,500
Maximum Firing Range: m3,800

Fire Control

Name: IG43 fire-control
Computerized FCS: Yes
Thermal Sight Tank Commander: TPN-1-TPV Ukrainian night sight
Thermal Sight Gunner: TPN-1-TPV Ukrainian night sight
Main Gun Stabilization: 2-Plane, 2Eh26M armament stabiliser
Fire on the Move: Yes
Rangefinder: two-axis stabilised IG42 laser rangefinder sight
Ballistic Computer: 1V517 tank ballistic computer
Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks
PZU-5 monocular periscopic sight: Available
Searchlight: Luna infrared searchlight

Protection

Hull Armor: Cast and welded steel armour
Turret Armor: Cast and welded steel armour with Nizh ERA
Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds
Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,
Explosive Reactive Armor: Nizh ERA, capable of defeating HEAT and APFSDS Rounds
Number of ERA Plates: ea200-300
Active Protection System: Yes
Mine Clearing: Roller-plow available
NBC Protection: Yes
Smoke Equipment: "Tucha" 81-mm smoke grenade launchers on the left of the turret.
IR Signature: INA
Automatic Fire Suppression Systems.: Available, PPO fire detection and suppression system,
ERA Protection (HEAT Warheads): mm450
ERA Protection (Artillery Shells): mm200

Notes:

In 2019, UkrOboronProm reported that the Kharkiv Armored Plant (KhBTZ) had delivered over 100 updated tanks to the Ukrainian Armed Forces. The upgraded tanks included new thermal imaging for all crew, remove Luna infrared searchlight, include TPN-1-TPV Ukrainian night sight in place of TPN1-49-23, Nizh reactive armour modules designed for bolt-on replacement on T-64BV turrets, SN-4215 networked satellite navigation unit, and Lybid K-2RB digital radio (under licence from Motorola) providing secure communications with a 70 km range. Russian defense reporter and expert Alexey Khlopotov claims the tank is superior to the Russian upgraded T-72B3.

VT4 (MBT3000) Chinese Main Battle Tank (MBT)





Tiers:



Variants:

- **MBT:** No Data
- **Heavy Infantry Fighting Vehicle:** With additional reinforced frontal armor, 100 mm main gun, 30 mm cannon, and two remote weapons stations at the rear.

System

Alternative Designation: VT4, MBT-3000
Type: Main Battle Tank
Expected Out of Service Date: 2050
Manufacturer: Norinco
Crew: ea3
Maximum Effective Range: km500
Periscopes (Day): ea3
Periscopes (Night): ea1
Panoramic Sight (Commander): Yes

Dimensions

Length: m10.1
Width: m3.5
Height: m2.4
Weight, Combat: kg47,174

Automotive

Engine Name: Water-cooled electronically controlled turbodiesel

Engine Type: Turbodiesel

Engine Power: hp1,200

Transmission: Ch1000B Integrated Transmission

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: 50

Speed, Maximum Swim: km/hINA

Fording Depth: m5

Gradient: %60

Side Slope: %40

Vertical Obstacle: m1.2

Communications

Radio: Tadiran CNR-9000

Note: The Tadiran CNR-9000 is described as a multi-mode VHF/FM COMSEC/ECCM radio for voice and data communications. The mature, third-generation frequency-hopping radio.

↳*TBR-121 VHF Radio*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

:

Main Gun

↳*System*

Name: 125-mm ZPT98 smoothbore cannon

Type: Smoothbore gun

Caliber: mm125

Length (Barrel): mm6,250

Diameter (Barrel): mmINA

Weight (Gun): kg2,400

Barrel Type: 1 with a sliding gun barrel and a smoke evacuator in the middle

Loader: Automatic

Feed: 8 rds/min via automatic loader

After: Wedge Cross

Recoil: Hydraulic and Pneumatic

Shooting Elevation Angle: deg-5 to +15

Rate of Fire (Automatic): Automatic loading machine: 8 rounds / minute

Rate of Fire (Manual): Manual loading: 1-4 rounds/minute

Sight: Sight with Tank

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Name: 3VOF128/3OF82

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Number of Rounds: ea38 (22 in Autoloader)

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Max Range: m5,000

Min Range: mINA

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Round Weight: kg33

Projectile Weight: kg23

Fragments: ea2,500

Armor Penetration: Yes

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Number of Rounds: ea22

Muzzle Velocity: m/s915

Max Dispersion: INA

Max Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Fragments: INA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*APFSDS Rounds (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot Tracer or APFSDS-T rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Number of Rounds: ea22

Muzzle Velocity: m/s2,050

Muzzle Energy: MJ15-24

Max Range: m3,000

Projectile Dimension: mm900

Round Weight: INA

Penetration: mm1,000

Projectile Weight (Estimated): kg11

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Coaxial Weapon System

↳*System*

Name: W-85 Heavy Machine Gun

Type: Anti-Aircraft Machine Gun

Manufacturer: Norinco

Length: mmINA

Diamter: mmINA

Weight (Gun Only): kg18.5

Weight (Tripod): kg17.5

Action: Gas

Rate of Fire: rds/m550-600

Feed System: Belt

Sightts: Iron/Optical

↳***Ammunition***

Type: Rifle

Caliber: 12.7x108

Muzzle Velocity: m/s850

Basic Load: eaINA

Effective Firing Range (vs. Air): m1,500

Effective Firing Range (vs. Ground): m2,000

Armor Penetration: Available

Tertiary Weapon System

↳***System***

Name: Type 80 Chinese Heavy Machine Gun

Manufacturer: Norinco

Type: 7.62mm Heavy Machine Gun

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: mmINA

Action: Gas Operated

Rate of Fire: rds/m700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳***Ammunition***

Type: 7.62×54mmR

Caliber: mm7.62

Muzzle Velocity: m/s840

Number of Rounds: Belts in 100/200/250 round boxes

Effective Firing Range: m100-1,500

Armor Penetration: INA

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Laser Range Finder (Commander): Yes

Thermal Sight Gunner: Yes

Laser Range Finder (Gunner): Yes

Sights: Stabilised day/night second-generation cool TI sights.

Main Gun Strabillization: Yes

Roof-Mounted Stabilized Panoramic Sight: Yes

Navigation: GPS Positioning

Range, Day Sight: mINA

Range, Thermal Sight: mINA

Hunter/Killer Engagements: Enabled

IFF: Yes

Rear View Camera: Yes

Fire Control Radars: ea4

Munition Launchers: ea4

Munition Launchers Maximum Range: yd109

Protection

Hull Armor (Frontal Arc with Side Skirts): Composite Armor

Applique Armor: Yes, composite, with explosive reactive armor (ERA) on the turret and hull front (optional on sides)

Explosive Reactive Armor: Yes, can be added

Active Protection System: Yes, GL5 Active Defense System

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 6 x forward-firing electrically operated smoke grenades

Explosion-Suppression System: Yes

Notes:

The VT-4 is an advanced main battle tank designed by China primarily for export. Its main cannon, fire-control, armor and protective systems are reportedly competitive with those on other advanced tanks around the world. Norinco officials describe the VT4 as the most advanced tank offered by the company. The VT-4 has a crew of three. The driver sits in the front; the fighting compartment is in the center; and the powerpack is at the rear. The driver, situated at the center of the front of the tank, is equipped with three day periscopes, the center of which can be replaced by a passive periscope for night driving. A single-piece hatch is provided above the driver's seat. The driver also has a rear-view camera and monitor for operating the tank in reverse.

T-90A Russian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-90K:** Commander's version of the T-90, with additional communication (station R-163-50K) and navigation equipment (TNA-4-3)
- **T-90:** The T-90 family is built around a core of MBTs that have been widely exported and developed independently by various countries. The original T-90 is an upgrade of the T-72BM and was designed to show that Russian tank production was heading in a new direction, away from the issues that surround the T-80. In theory, the T-90 is the most capable MBT in the fleets of many armies around the world, and its development continues as new systems become available.
- **T-90AK:** Command version of T-90A.
- **T-90AM:** Latest version of the T-90A.[77] The main features include the modernisation of the old turret design, which is equipped with a new advanced fire control system "Kalina" (with integrated combat information and control systems), a new automatic loader and a new upgraded gun 2A46M-5, as well as a remote-controlled anti-aircraft gun "UDP T05BV-1". The new version also includes the Relikt (Реликт (динамическая защита) ERA bricks instead of the Kontakt-5 ERA bricks.
- **T-90M:** New modernized version of T-90A. It's a program of modernization of Vladimir tanks and will include 400 tanks currently in service. Tanks will receive 2A82-1M gun (same as in T-14) and fire control system Kalina. They will be upgraded with Afghanit APS and Relikt ERA. The upgrades are also aimed at improving network-centric warfare capabilities and coordination with Armata project vehicles. The first contract was signed in 2017 and serial production started in 2018.
- **T-90S:** Export version of the T-90, later adopted by the Russian Armed Forces as the T-90A. These tanks were made by Uralvagonzavod and were updated with 1,000 hp (750 kW) engines made by Chelyabinsk Tractor Plant. These tanks carry a leaner version of the Shtora-1 passive/active protection system which lacks the infra-red dazzlers carried on the turret. Sometimes called T-90C (Cyrillic letter es looks like a Latin c). These were initially supplied with cast turrets of the early T-90, and when stocks were depleted, new, welded turrets were fabricated.
- **T-90SK:** Commander's version of the T-90S, with additional communication and navigation equipment. It differs in radio and navigation equipment and Ainet remote-detonation system for HEF rounds.
- **T-90S:** "Bhishma" – modified T-90S in Indian service.
- **T-90MS:** Also known as T-90SM is an updated version of the T-90S. It is equipped with a 1,130 hp engine, a PNM Sosna-U gunner view. a UDP T05BV-1 RWS with a 7.62 mm machine gun, GLONASS, inertial navigation systems, new Relikt explosive reactive armour (ERA) that covers more of the tank, and a steering wheel. A new removable turret bustle is included, which provides storage for eight additional rounds. The T-90MS is ready for serial production.[88] 4 video cameras provide a 360° view of the environment, while the tank is more connected to command. The T-90MS has an upgraded thermal imager that can detect tanks over 3300 meters away.
- **BREM-1M:** Armoured recovery vehicle.
- **IMR-3M:** Combat engineer vehicle.
- **MTU-90:** Bridge layer tank with MLC50 bridge.
- **BMR-3M:** Mine clearing vehicle.
- **MTU-2020:** Bridge layer tank based on the T-90A whose chassis has been extended, along with the addition of a road wheel.

System

Alternative Designation: T-90 "Vladimir"/T-90A

Type: Main Battle Tank

Family: T-90 Family of Main Battle Tanks

Manufacturer: Uralvagonzavod

Generation: 3+

Status: In service

Crew: ea3 (commander, gunner and driver)

Passenger Capacity: INA

Maximum Effective Range (Land): km500

Maximum Effective Range (ATGM): m5,000

Note: The T-90 is the most modern tank currently in service with the Russian Army, which has a requirement for around 1 500 of these tanks. Also currently it is the only mass-produced MBT in Russia.

Estimated Service Life: 25-30 years

Estimated out of Service Date: 2030-2040

Dimensions

Length: m9.63

Width: m3.78

Height: m2.2

Weight, Combat: tons46

Ground Pressure: kg/mINA

Automotive

Engine Name: V-92S2

Engine Type: V-12 Diesel

Engine Power: hp1,000

Auxiliary Power Unit: Yes

Gas Turbocharger: Yes

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed Maximum Swim: km/hNot Amphibious

Speed, Average Cross: 50

Power to Weight Ratio: hp/tons18.2

Suspension: Torsion bar

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.8

Trench: m2.85

Fording Depth (No Preparation): m1.2

Fording Depth (With Preparation): m5

Fuel Type: Gasoline or Kerosene

Transmission: Mechanical

Fuel Capacity: liters1,200

Communications

↳*R-168-100U*

Name: R-168-100U

Family: AKVEDUK R-168 Series

Type: VHF

Frequency: MHz30-108

Capabilities: FH, Voice, Data

Range: km30-60

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

Automated Control Communication: Yes

Main Gun

↳*System*

Name: 2A46M

Type: 125 mm Smoothbore Gun

In Service: 1970 to present

Weight (2A46 125mm Gun): kg2,675

Length (2A46 125mm Gun): mm6,350

Max Rate of Fire (Autoloader): rds/min7

Max Rate of Fire (Manaul): rds/min2-3

Sustain Rate of Fire: rds/min5-7

Range Finder Type: INA

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Traverse Range: deg360

Loader Type: Carousel-type autoloader

Minimum Cycle time for the Autoloader: seconds6.5

Thermal Sleeve: Light Allow

Bore Evacuator: Yes

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread

Breech Maximum Chamber Pressure: 6,500 bar over the 5,100 bar

Max Cycle time for a Round 180deg from the Start Position: seconds15

Carousel Reloading Time: min15

↳*Ammunition (Option 1)*

Type: 3BM42M/3BM44M, 125mm Armour-piercing fin-stabilized discarding sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s125

Basic Load: 44 Total rounds of any combination of 125mm Projectiles

Effective Range (Day): m2,000-3,000

Effective Range (Night): m2,000-2,600

Armor Penetration: Yes, 590-630mm at a range of 2000m

Shell Weight: kg20.4

Projectile Weight: kg7.5

Charge Weight: kg5.3

Penetration: mm/deg270/60

↳*Ammunition (Option 2)*

Type: 3BM9/3BM10, 125mm Armour-piercing discarding sabot (APDS)

Caliber: mm125

Muzzle Velocity: m/s1,715-1,800

Effective Firing Range: m3,000

Shell Weight: kg19.6

Projectile Weight: kg5.67

Charge Weight: kg5

Penetration: mm/deg140/60

↳*Ammunition (Option 3)*

Type: 3BK12M, 125mm (HEAT)

Caliber: mm125

Muzzle Velocity: m/s905-950

Effective Firing Range: m4,000

Shell Weight: kg29

Projectile Weight: kg19

Charge Weight: kg5

Penetration: mm/deg220/60

↳*Ammunition (Option 4)*

Type: 3OF19, 125mm (HE)
Caliber: mm125
Muzzle Velocity: m/s760
Effective Firing Range: m4,000
Shell Weight: kg33
Projectile Weight: kg23
Charge Weight: kg5.0
Penetration: mm/degINA

Anti-Tank Guided Missile

↳*System*

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)
Type: Laser Beam Anti-Tank Guided Missiles
In Service: 1980's to present
Manufacturer: Degtyarev plant
Cost: $37,500
Mass: kg17.2
Diameter: mm125
Basic Load: ea6
Warhead Type: Tandem hollow-charge
Warhead Weight: kg4.5
Max Rate of Fire: INA
Operational Range: m4,000-5,000
Speed: Subsonic
Guidance System: Laser Beam Riding
Launch Platform: 125 mm smoothbore guns
Variants: 9M119M

Tank Commander's Weapon System

↳*System*

Name: 12.7mm Kord Heavy Machine Gun,
Type: 12.7mm Heavy Machine Gun
Manufacturer: V.A. Degtyarev Plant

Cartridge: 12.7×108mm
In Service: 1998-Present
Weight: kg25.5
Length: mm1,980
Max Rate of Fire: rds/min650-750
Sustain Rate of Fire: rds/min550-600
Action: Gas-operated, rotating bolt
Feed System: 50-round linked belt
Sights: Iron Sights
Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

↳ ***Ammunition***

Cartridge: 12.7×108mm
Caliber: mm12.7mm
Muzzle Velocity: m/s860
Basic Load: ea300
Effective Range: m2,000

Loader's Weapon System

↳ ***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: 7.62mm Machine Gun
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Sustain Rate of Fire: rds/min500
Range Finder Type: INA
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Total): mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, ESSA thermal viewer

Thermal Sight Gunner: Yes, ESSA thermal viewer

Panoramic Commander's Sight: No

Main Gun Stabilization: Yes, 2E42-4 Zhasmin System

Note: The Fire Control System is outdated and is from the late 1990s.

Protection

Hull Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Turret Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Turret Update: The T-90A has a welded Turret, compared to the original T-90

Applique Armor: Available

Explosive Reactive Armor: Yes, Kontakt-5 explosive reactive armor blocks, equivalent to up to 500mm of steel armor

Active Protection System: Yes, the Shtora-1 countermeasures system

Mine Clearing: INA

Self-Entrenching Blade: Yes

NBC Protection: Yes, GO-27 PRKhR radiation and chemical agent detection system.

Deep Wading Kit: Available

Jammer: Yes, TShU1-7 IR jammers located either side of the main gun

Laser Radiation Sensors: Yes

IR dazzlers: Yes

Nakidka Signal Reduction Kit: Available

Smoke Equipment: Yes, banks of 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

Fire Suppression System: Yes, the Raduga-2 fire-suppression system

Notes:

T-90A – Russian army version with welded turret, V-92S2 engine and ESSA thermal viewer. Sometimes called T-90 Vladimir, in honor of its chief designer Vladimir Potkin. +The T-90 is a third-generation Russian battle tank that entered service in 1993. The tank is a modern variation of the T-72B and incorporates many features found on the T-80U. Originally called the T-72BU, but later renamed to T-90, it is an advanced tank in service with Russian Ground Forces and the Naval Infantry. The T-90 uses a 125 mm 2A46 smoothbore main gun, the 1A45T fire-control system, an upgraded engine, and gunner's thermal sight. Standard protective measures include a blend of steel and composite armour, smoke grenade dischargers, Kontakt-5 explosive-reactive armour and the Shtora infrared ATGM jamming system. It was designed and built by Uralvagonzavod, in Nizhny Tagil, Russia. Since 2011, the Russian armed forces have ceased any further orders for the T-90, and are instead increasing their numbers of the T-14 Armata that began production in 2016. Variants T-90: Successor to T-72BM, originally called T-72BU, with fire control and armor upgrades similar to those on the T-80U. Despite using the lower cost T-72 chassis, this tank incorporated more recent components than the T-80U and is in some ways superior. The original tank had an II night sight, not the thermal sight upgrade, and the under-powered 840hp engine. Upgrades have been added. T-90A: originally known as T-90SM or T-90M, it is now accepted for Russian service as the standard tank. T-90MS: export variant: improved armor protection and ERA; remote control weapon station on turret rook with 12.7 mm MG; traverse forward 316 degrees; elevate -10 to +45 degree. Improved fire control system for engagement of stationary and moving targets while tank is moving. TC panoramic sight for TC-gunner display linked to laser rangefinder; thermal and 4 television camera-each 95 degree wide/45 degree elev. Improved battle management and land navigation tracking system. External auxiliary diesel power unit for fuel conservation. Some reserve main gun ammo in bustle with blowout panels. Turret and hull rear with bar (lourve) armor; anti-laser warning and protection. 125 mm main gun improved accuracy with 2A46M-5 rather than previous 2A46M in T-90s. T-90S: export variant with option for upgrades. Several subsystem changes, such as upgraded FCS, new engine, removal of SHTORA-1, etc., have been added based on customer preferences, and are included in export versions of the tank. Some early T-90S have been upgraded to this standard. Most of these are being sold to India, with the 1,000hp engine upgrade, and with addition of air conditioning. T-90SK: T-90S command variant Bhishma: Indian variant produced from T-90A knockdown kits. It does not use the SHTORA-1 IRCM system. Engine is T-90A upgrade. The tank is sometimes erroneously called T-90S. Various stages of upgrades will be employed in Indian forces. Russia has provided T-90S tanks with Indian intent to upgrade almost all of its T-90 and T-90S remaining versions in knock-down kits with upgrades to meet the Bhishma standard. An issue remains of no air conditioning system in some export MBT to India cause overHEATing of system components and debilitating environment for tank crew in some environments. Project Rhino: most T-90 and T-90S tanks imported by India to be upgraded as Bhishma under this program and agreement with Russia. Other upgrade versions of the T-72 include features of the T-90A such as the improved gun stabilization, improved fire control system, improved engine, and improved ammunition such as the Ainet and the Invar. Other tanks which provide similar capabilities are the Ukrainian T-72AG and T-72mp. The Czech T-72CZM4 also has a 2nd generation thermal sight. Recent Russian tank upgrade packages for the T-72 are the T-72M1, and the T-72M1M. The above Russian upgrades are for modernizing older tanks, versus T-90/T-90A, which are newly produced tanks. Upgraded T-80U, T80UK, and T-84 tanks also have similar capabilities. Weapons & Ammunition Types And Typical Combat Load 125-mm smoothbore gun (est): 43 APFSDS-T: 14 HEAT-MP/HEAT: 3 Frag-HE: 12 Focused Frag Ainet (available) :8 ATGM: 6 Main Armament Ammunition Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000-4,000 Max Effective Range (m): Day: 3,000-4000 Night: 2,600 Armor Penetration (mm KE): 590-630 at 2,000 meters 125-mm HEAT-MP, BK-29m Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: 2,600 Armor Penetration (mm CE): 650-750 it has some HE effects similar to Frag-HE rounds against personnel and materiel targets. 125-mm HEAT, BK-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 3,000+ Night: 2,600 Armor Penetration (mm CE): 700-800 125-mm HE-shrapnel Focused-Fragmentation, Ainet Maximum Aimed Range (m): 5,200 Max Effective Range (m): Day: 5,000 Night: 2,600 Tactical AA Range: 4,000-5,000 Armor Penetration (mm): can defeat IFV and APC 125-mm Frag-HE-t, of-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 5,000 Night: 2,600 Armor Penetration (mm): can defeat IFV and APC. A near miss will seriously damage or destroy most IFVs and APCs. Other Ammunition Types: French Giat 125G1 APFSDS-T, Russian BM-42 and bm-32 APFSDS-T. Note: the Russians may have a version of the BM-42M with a DU penetrator. Russian BM-48 APFSDS-T penetrates 650-700 mm Sokol-1 Guided Antitank Round Antitank guided missiles: AT-11B/INVAR Warhead Type: tandem shaped charge (HEAT) Armor Penetration (mm CE): 900, 850 behind ERA Range (m): Day: 5,000 Night: 2,600 AT-11/Refleks: missile with Frag-HE warhead to 5,000 m Notes T-90AM: the Russian military decided against T90A for its forces. In SEP 2011, they displayed T-90AM as a deep modernization of T-90A. They include a low-profile turret with a bustle autoloader and blow-out panels. The new 2a82 gun fires a longer (700+ mm est) and heavier APFSDS-T round to 3,500+ m. The original version of the tank has an 840-hp diesel engine. The engine in subsequent models is upgraded. Engine options include 950, 1,000 and 1,100 hp. The original tank had an II sight from the T-80 series (Buran-PA, 800-1300 meters range). However, marketing materials feature the Agava-2 thermal sight. Recent Gen3 sights are available. These night sights permit night launch of ATGMs. Relikt 3d gen ERA is offered to replace Kontakt-5 in several upgrade packages, or as a separate upgrade. The ERA adds up to 600 mm CE protection and 300 mm KE to turret base armor protection, or about 150 mm more than Kontakt-5. Active protection systems. Arena APS is available. Defensive aides suite is Shtora-1 (laser warning receiver with gun auto-slew, LWR-directed smoke grenade

launchers, and EO-IR jammer), or partial package excluding IR jammers. None is on Bhishma. The Shtora-1 IR ATGM countermeasure illuminators can be detected with night sights. Shtora-1 has no effect against most modern ATGM systems, with encoded tracker beacons. Exclusion of Shtora-1 offers more ERA on the turret front and reduces costs. Protection probably includes radar-absorbent materials and IR-resistant paint. The T-90 may be fielded with full Shtora-1 package (laser warning receiver with auto-slew gun capability, LWR-directed smoke grenade launchers, and EO-IR jammer), with a partial package, or without Shtora-1. Shtora-1 illuminators can be used for night illumination. An improved gun, 2A46M-4, with improved accuracy and use life is available for fitting to the T-90. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. The BK-27 HEAT round offers a triple-shaped charge warhead and 50mm more penetration. The 12.7-mm MG NSVT has both remote electronically operated sight PZU-5 with vertical stabilization, night acquisition, and a gun-mounted K10-T reflex sight.

T-72 Russian Main Battle Tank (MBT)





Tiers:



Variants:

- **T-72B:** Second Russian main variant of the T-72 after the T-72A.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.

- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: NA

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note #1: The T-72 Ural main battle tank was developed as a cheaper and more reliable, however less capable alternative to the T-64.

Note #2: 25,000+, one of the most widely produced post-World War II tanks, second only to the T-54/55 family. The T-72 was exported to around 30 countries.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons44.5

Ground Pressure: INA

Automotive

Engine Name: V-92S2F

Engine Type: V-12 diesel

Engine Power: hp780

Power to Weight Ratio: hp/ton18.8

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 45

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Communications

↳*R-168-100U*

Name: R-168-100U

Type: VHF

Family: AKVEDUK R-168 Series

Frequency: MHz30-108

Capabilities: FH, Voice, Data

Range: km30-60

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

Automated Control and Communication: Yes

Main Gun

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type:

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

↳*Ammunition (Option 1)*

Name: Armour-piercing fin-stabilized discarding sabot

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Tank Commander's Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun

Type: 12.7 Anti-Aircraft Machine Gun

Proliferation: over 1 Million

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Range Finder Type: Optical

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Turret: Single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Variants: DK, DShKM, DSHKS, Type 54 HMG

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea1,200

Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Range Finder Type: INA

Time the Max Rate of Fire can be Sustained: INA

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, Type INA

Thermal Sight Gunner: 1K13-49

Main Gun Stabilization: 2Eh42-2, 2-plane

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Turret Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor: Yes, Kontakt-5
Active Protection System: Yes, Arena available
Mine Clearing: Yes, Roller and plow (optional)
Self-Entrenching Blade: Yes
NBC Protection: Yes
Smoke Equipment: Yes, Grenade launcher 8x; VESS
IR Signature: INA
Automatic Fire Extinguishing Equipment.: Yes

Notes:

The T-72 is a family of Soviet main battle tanks that first entered production in 1971. About 20,000 T-72 tanks were built,making it one of the most widely produced post-World War II tanks, second only to the T-54/55 family. The T-72A version introduced in 1979 is considered a second-generation main battle tank. It was widely exported and saw service in 40 countries and in numerous conflicts. The T-72B3 version introduced in 2010 is considered a third-generation main battle tank.

Type 98 Chinese Main Battle Tank







Tiers:

1 2 3 4

System

Crew: ea3

Passenger Capacity: NA

Dimensions

Length: m10.92

Width: m3.37

Height: 2.4m to turret roof; 2.81m overall

Weight, Combat: kg50,000

Ground Pressure: kg/m.9 kg/sq cm

Ground Clearance: m.47

Automotive

Engine Name: Model WD396

Engine Type: V8 turbocharged diesel

Engine Power: hp1,200

Cruising Range: km500

Speed, Maximum Road: km/h75

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth: 1.4m without prep; 5m with prep

Cruising Range with Auxiliary Tanks: km650

Obstacle; vertical: m.85

Obstacle; trench: m3

Main Gun

↳*System*

Name: ZPT-98

Type: 125mm smoothbore

Loader: Automatic

Feed: 8 rpm

Shooting Elevation: -5 to 15 degrees

Rate of Fire (Manual): Max: 4 rpm

Range Finder: Laser

↳*Ammunition (Option 1)*

Type: HE

Muzzle Velocity: m/s850

Max Range: m5,000

Basic Load: 42; 22 in autoloader's carousel

↳*Ammunition (Option 2)*

Type: HEAT

Muzzle Velocity: m/s915

Max Range: m3,000

↳*Ammunition (Option 3)*

Type: APFSDS-T

Muzzle Velocity: m/s2,050

Max Range: m3,000

Tank Commander's Weapon System

↳*System*

Name: Type 88 Machine Gun

Type: 12.7mm Machine Gun

Sustain Rate of Fire: rpm100

Max Rate of Fire: rpm600

↳***Ammunition***

Type: Ball
Caliber: 12.7 x 108
Muzzle Velocity: m/s850
Basic Load: rounds300
Effective Range vs. Air Target: m1,500
Effective Range vs. Ground Target: m2,000

Coaxial Machine Gun

↳***System***

Name: Type 80
Type: 7.62mm Machine Gun
Max Rate of Fire: rpm800

↳***Ammunition***

Caliber: mm7.62
Muzzle Velocity: m/s840
Basic Load: rounds2,000
Effective Range: m1,500

Anti-Tank Guided Missile

↳***System***

Name: AT-11 Sniper
Type: Gun tube launched, laser guided, ATGM

↳***Ammunition***

Effective Range: mUp to 5,500m depending on version
Miniumum Range: m100
Armor Penetration: 700mm of RHA at 4,000m
Flight Time to Max Range: secs15

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Tank Commander: Yes
Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: INA

Range, Thermal Sight: INA

Independent and Stabilized Tank Commander's Sight: Yes

Protection

Armor Note: All-welded steel armor that also incorporates composites and ceramics over the frontal arc.

Applique Armor: Likely

Explosive Reactive Armor: Likely

Active Protection System: Yes; unknown type

Mine Clearing: Minimal with onboard blade

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes, Type 94 grenade launchers on both sides of the turret

IR Jammer: Yes; JD-3

Laser Dazzler System: Yes

Notes:

The Type 98 main battle tank (MBT) is a further development in Chinese armor capability and the next step up from the Type 90, from which it is derived. The tank is similar in appearance to the T-72 , with a variety of small differences. It has a more box-like turret, a box-shaped device behind the gunner on the turret roof, a small dome behind the commander's hatch, a different style of hull skirts and tracks with rubber pads. It is armed with a 125-mm carousel-fed autoloader probably of Soviet/Russian design. The commander has a stabilized independent sight. The driver's compartment is located at the front, the turret in the center and the powerpack at the rear. The hull is longer than the T-72 and is made of all-welded steel armor that also incorporates composites and ceramics over the frontal arc. A dozer blade is carried retracted under the front, which can be used to prepare fire positions and clear battlefield obstacles. The driver is seated at the front of the hull in the center and has an adjustable seat that is suspended from the roof. The seat arrangement is designed to reduce the effects of a mine blast on the driver. A single-piece hatch cover is provided that lifts and swings to the right. The driver is equipped with three 1x periscopes; the center one can be replaced by a passive periscope for night driving. The passive periscope is reportedly of the image-intensification type with an effective range of 660 ft (200 m). Compact diesel fuel tanks are fitted to the left and right of the driver's position. The commander is seated on the right and the gunner on the left of the turret. The turret is also fitted with an advanced armor package on either side of the 125-mm gun. The armor can be rapidly changed if it is damaged or upgraded with new technology. A bank of Type 94 76-mm smoke-grenade launchers is mounted on either side of the turret; to the rear is a stowage cage. The tank commander is equipped with a single-piece hatch that opens to the rear and five observation periscopes. To the immediate front is a stabilized 360-degree day/night panoramic sight, which includes a laser rangefinder. The commander also operates the roof-mounted 12.7-mm Type 88 machine gun. This can be elevated from -4 degrees to 75 degrees and has a rate of fire of up to 100 rds/min. The machine gun can also be installed on two other points on the turret roof. The gunner is provided with a single-piece hatch cover that opens to the front and a roof-mounted stabilized day/night sight that includes a laser rangefinder. The latter feeds data to the fire-control computer, enabling the main gun to be rapidly laid onto the target. The computer also receives inputs from other sensors, such as the trunnion tilt sensor, turret horizontal angular velocity sensor and crosswind sensor. According to some sources, the Type 98 may have an automatic target tracker and automated aim error correction via thermal tracking of the projectile. The gunner's thermal stabilized night sight can be magnified by 5x or 11.4x. The 125-mm ZPT-98 main gun is fitted with a thermal sleeve and fume extractor. The barrel is chrome-plated for 21 ft (6.4 m) of its length to increase its service life. The breech mechanism is of the horizontal wedge type. Maximum recoil is said to be 13 in (0.33 m). A total of 42 rounds of ammunition are carried; 22 are in the carousel of the automatic loader. The gun is also capable of firing laser-guided missiles similar to the AT-11 Sniper. The gunner must keep the sight on the target to ensure a hit. The loader is identical to that fitted to Russian T-72 tanks and is said to provide a rate of fire of up to 8 rds/min. Using manual loading, the rate of fire is between one to two rds/min. Mounted to the right is a 7.62-mm Type 86 machine gun. The tank carries 2,000 rounds of 7.62-mm ammunition in belts of 250 rounds. The Type 98 is powered by a Model WD396 V-8 turbocharged diesel engine developing 1,200 hp and coupled to a manual transmission with one reverse and seven forward gears. The suspension is of the torsion bar type with each side having six dual rubber-tired road wheels, drive sprocket at the rear, idler at the front and four track-return rollers. The first, second and sixth road wheels are provided

with special hydraulic shock-absorbers. The upper part of the suspension is covered with an armored skirt for combat operations. The Type 98 is also equipped with a JD-3 infrared jammer and laser dazzler system. The jammer is similar to the Russian Shtora system and has been designed to jam anti-tank guided missiles. Mounted on the turret roof is a pole-type laser detector and a pedestal-mounted ZM-87 laser jamming device. This is operated by the commander or gunner and can neutralize hostile optics. Additionally, the tank also appears to have an active self-defense system of an unknown type. The Chinese system apparently uses a high-powered laser to attack the optics and gunners of enemy systems, in contrast to Russian systems that launch projectiles to disable or detonate incoming anti-tank weapons. The system appears to use a laser warning receiver (LWR), which warns the crew that the tank is being painted by enemy range-finding or targeting lasers. The laser self-defense device can then be used against the enemy by traversing the turret towards the threat, which some reports indicate may be done automatically. The LWR is located in a small dome behind the commander's hatch on top of the turret. The box-shaped device by the gunner's position is probably the self-defense laser. If similar to other proposed and prototype self-defense weapons, the self-defense laser is first used in a low-power mode to target the enemy optics. The power level would then be increased to disable the optics, also likely causing damage to the eyesight of the enemy gunner. It may be a derivative of the Chinese ZM-87 laser interference device, which has a range of up to 4 mi (7 km) with a power booster. Some reports indicate the laser on the Type 98 has a range of up to 5,000 ft (1,525 m). The laser can likely be elevated to defend against helicopters as well as threats on higher ground. Standard equipment includes a nuclear, biological and chemical (NBC) warfare system, fire detection and suppression system, global positioning system and a snorkel for deep fording. Two additional drum fuel tanks can be fitted to the rear to increase range.

Leopard 1A2 German Main Battle Tank (MBT)





Tiers:



Variants:

- **Leopard 1:** The Leopard project started in November 1956 in order to develop a modern tank, the Standard-Panzer, to replace the Bundeswehr's American-built M47 and M48 Patton tanks, which, though just delivered to West Germany's recently reconstituted army, were rapidly becoming outdated. On 25 July 1957, the detailed specifications were released; the new design needed to weigh no more than 30 tonnes, have a power-to-weight ratio of 30 horsepower per tonne, be able to withstand hits by 20 mm rapid-fire guns on every side as well as to operate in a battlefield contaminated with chemical weapons or radioactive fallout, the then-standard baseline for combat with the Warsaw Pact. In addition, the main armament had to consist of a 105 mm caliber weapon (the new British L7A3 105 mm gun was selected), carrying at least as many rounds as current US tank designs. Mobility had priority, while firepower came second; armour was seen as less essential, as it was believed that no real protection against hollow charge weapons was possible anyway.
- **Leopard 1A1:** After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter.
- **Leopard 1A2:** The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armoured turret, and therefore did not receive the B&V armour add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.
- **Leopard 1A3:** The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.
- **Leopard 1A4:** The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver.
- **Leopard 1A5:** In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour. The first modified vehicle was delivered in early 1987. Since then, almost all users of

the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.

- **Leopard 1A6:** The Leopard 1A6 prototype was a single Leopard 1 A1A1 testbed, modified with additional armour on the turret and equipped with a 120 mm L/44 gun. The project was ended in 1987, as the Leopard 2 was in widespread service at this point and the 1A5 offered a more reasonable upgrade path for a fraction of the cost.

System

Alternative Designation: Leopard 1A2

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann, Munich, Germany Krupp-MaK, Kiel, Germany

Crew: 4 (commander, gunner, loader, driver)

Note: Leopard 1A2: This is the Leopard 1A1 with passive night-vision equipment, improved NBC equipment and a stronger cast turret. A total of 232 were built from 1A1s as part of the fifth production batch.

Dimensions

Length, Hull: 7.09 m

Length, Gun Forward: 9.54 m

Width: 3.37 m

Height: INA

Tracks Length, on the Ground: 4.24 m

Tracks Width: 0.55 m

Ground Clearance: 0.44 m

Weight, Unloaded: 38,700 kg

Weight, Combat: 40,000 kg

Ground Pressure: 0.86 kg/cm sq

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: 2,282-cu in (37.4-liter) liquid-cooled, 4-stroke, prechamber, inter cooled, turbocharged V-10 multi-fuel

Engine Power: 830 hp at 2,200 rpm

Fuel Capacity: 955 liters

Transmission: ZF 4 HP 250 planetary shifter with hydraulic torque converter; 4 forward/2 reverse gears

Power-to-Weight Ratio: 20.75 hp/metric ton

Suspension: torsion bar, 7 road wheels, rear drive (12- tooth sprocket), front idler, 5 shock absorbs (bump travel 9 in/227 mm, rebound travel 5-6 in/128-156 mm), 4 return rollers

Maximum Speed: 65 km/h

Range, Road: 600 km

Range, Cross-Country: 450 km

Vertical Obstacle: 1.15 m

Trench: 3.00 m

Fording, Unprepared: 1.20 m

Fording, with Preparation: 2.25 m

Fording, with Snorkel: 4.00 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x Royal Ordnance L7A3 Rifled Gun

Type: Rifled Gun

Caliber: 105 mm

Length, Barrel: 5.46 m

Muzzle Velocity: INA

Weight: 1,282 kg

Maximum Rate of Fire: 10 rounds per minute (maximum)

Elevation: -9/+20 deg

Traverse: 360 deg

Maximum Firing Range: 4000 m

↳*Ammunition*

Name: L22

Type: Projectile

Caliber: mm105

Basic Load: 60 rounds, 18 ready in turret (Leopard 1A1)

Armor Penetration: INA, Tungsten carbide

Coaxial Weapon System

↳*System*

Name: Heckler & Koch MG5

Type: General Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Heckler & Koch

Length: 1,160 mm

Barrel Length: 550 mm

Height: 239 mm

Width: 120 mm

Weight: 11.20 kg

Action: Gas-operated, rotating bolt

Rate of Fire: 640/720/800 rounds/min

Muzzle Velocity: 840 m/s

Maximum Firing Range: 600–1,000 m

Effective Firing Range: 100–1,000 m

Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,250 rounds

Armor Penetration: INA

Auxiliary Weapon System

Note: 1 x 7.62-mm air defense machine gun

Fire Control System

Name: FLP-10/EMES 18 integrated fire control

Computerized FCS: Yes, FLP-10/EMES 18 integrated fire control system with Zeiss thermal imaging system retrofitted to approximately 1,300 German Leopard 1A1/1A2s

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Infrared: Yes, Paint reflects IR

Rangefinder: TEM 2A optical (Leopard 1A2) turret fully stabilized (A3, A4); retrofit of earlier AEG-Telefunken FLER-H modular hybrid computer (1A4 Krupp-Atlas)

Protection

Hull Armor: Glacis 70 mm at 60-deg: Hull Glacis top 25 mm at 83-deg: Hull nose 70 mm at 55-deg: Hull sides 25-35 mm: Hull rear 25 mm at 88 deg: Hull top 10 mm: Hull bottom 15 mm

Turret Armor: Turret mantlet 60 mm; Turret sides 60 mm; Turret rear 60 mm; Turret front 52 mm

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

NBC Protection: Yes, collective

Smoke Equipment: 2 x 4-barrel 3-in (76-mm) smoke generators, one each side of turret

Notes:

The Leopard (or Leopard 1) is a main battle tank designed and produced by Porsche in West Germany that first entered service in 1965. Developed in an era when HEAT warheads were thought to make conventional heavy armour of limited value, the Leopard focused on firepower in the form of the German-built version of the British L7 105-mm gun, and improved cross-country performance that was unmatched by other designs of the era. The design started as a collaborative project during the 1950s between West Germany and France, and later joined by Italy, but the partnership ended shortly after and the final design was ordered by the Bundeswehr, with full-scale production starting in 1965. In total, 6,485 Leopard tanks have been built, of which 4,744 were battle tanks and 1,741 were utility and anti-aircraft variants, not including 80 prototypes and pre-series vehicles. The Leopard quickly became a standard of European forces, and eventually served as the main battle tank in over a dozen countries worldwide, with West Germany, Italy and the Netherlands being the largest operators until their retirement. Since 1990, the Leopard 1 has gradually been relegated to secondary roles in most armies. In the German Army, the Leopard 1 was completely phased out in 2003 by the Leopard 2, while Leopard 1-based vehicles are still widely used in utility roles. The Leopard 2 has replaced the Leopard 1 in service with many other nations as well, with derived vehicles using the Leopard 1 hull still seeing service. Currently, the largest operators are Greece, with 520 vehicles, Turkey, with 397 vehicles and Brazil with 378 vehicles. Most of these vehicles have been upgraded with various improvements to armor, firepower and sensors to maintain their ability to engage modern threats. Leopard 1A2 The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armored turret, and therefore did not receive the B&V armor add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.

Type 90-II Chinese Main Battle Tank (MBT)





Tiers:



Variants:

- **Type 90-IIA:** Type 90-IIA was an export model offered to Pakistan. It was powered by French diesel engine, developing 1 500 hp. It did not enter service because France joined embargo of Pakistan for its nuclear tests.
- **Type 90-IIM or MBT-2000:** Type 90-IIM or MBT-2000 also was an export model aimed to meet Pakistani armed forces requirement. This version was developed to avoid the problem of embargo. Initially it was fitted with Chinese-made engine, which proved to be unreliable. In 2001 this MBT was demonstrated and was still proposed with an option to be fitted with foreign-made powerpack.
- **Al Khalid:** Al Khalid is a further development of the MBT-2000 with some modifications. It is powered by an Ukrainian 6TD diesel engine, developing 1 200 hp. Pakistan acquired license to produce these tanks locally.

System

Alternative Designation: Type 90-II Chinese Main Battle Tank (MBT)
Type: Main Battle Tank
Manufacturer: NORINCO
Crew: ea3
:
:
:
:
:

Dimensions

Hull Length: m7.3
Length (gun forward): m10.28
Barrel Length: INA
Width: m3.45
Height: m2.3
Weight, Combat: t48

Automotive

Engine Name: 6TD diesel
Engine Type: Diesel
Engine Power: hp1200
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %40
Vertical Step: m0.85
Fording Depth, without Preparation: m5
Fording Depth, with Preparation: m1.4
Trench: m2.7
:

Main Weapon System

↳***System***

Name: 2A46M/2A46M-5
Type: 125mm Smoothbore
Manufacturer: Rheinmetall
Length, Barrel: m6.6
Weight: kg1190
Muzzle Velocity: m/s1580 to 1750
Maximum Rate of Fire: rds/min1-2
Maximum Elevation: deg+14
Minimum Elevation: deg-6
Traverse Range: INA
Traverse Left: INA
Traverse Right: INA
Maximum Firing Range: INA
Effective Firing Range: m4000
Sights: INA
Note #1:: This gun is also fitter with a thermal sleeve and fume extractor.
Note #2:: This gun is capable of firing most types of ammunition, including high-explosive, high-explosive fragmentation and APFSDS. It may also be able to fire Russian AT-11 Sniper anti-tank guided missiles or Chinese copies.

↳*Ammunition*

Name: INA
Type: INA
Caliber: mm120
Shell: INA
Basic Load: rds39
Armor Penetration: INA
:

Coaxial Weapon System

↳*System*

Name: STAMP
Type: General Purpose Machine Gun
Caliber: mm7.62
Length, Barrel: mm565
Weight: kg11.5
Muzzle Velocity: m/s820
Maximum Rate of Fire: rds/min1000-1300
Maximum Elevation: INA
Minimum Elevation: INA
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180
Maximum Firing Range: m600
Effective Firing Range: m200-1200
Magazine: INA
Sights: INA
Note #1:: The other weapon system is located on the top of the roof.

↳*Ammunition*

Name: INA
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62x51NATO mm
Basic Load: rds3000
Armor Penetration: Yes

Auxiliary Weapon System

↳*System*

Name: Type 77

Type: Heavy Machine Gun

Manufacturer: Norinco

Caliber: mm12.7

Length, Barrel: mm1016

Weight: kg28

Muzzle Velocity: m/s825

Action: Gas

Maximum Rate of Fire: rds/min650-700

Feed System: rdsbelt 60

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: INA

Armor Penetration: INA

:

Fire Control System

Name: INA

Computerized FCS: Yes

Main Gun Stabilization: Yes

Direct Fire: INA

Indirect Fire: INA

Automated Tracking System: This system is capable of engaging moving or stationary targets while moving in day or night. The automatic target tracking system uses a thermal image display which can be controlled by either the tank gunner or commander. It is capable of tracking soldiers, vehicles and helicopters. The targeting computer can also calculate lead on moving targets.

Note #1:: This FSC includes a laser rangefinder (accurate to within +/-33 ft or 10 m) incorporated into the gunner's sight, ballistic computer, several sensors and a two-axis gun stabilize r. The sensors measure angular velocity and displacement, elevation angle velocity and trunnion cant. The computer also accepts manual updates for crosswind, air and charge temperatures, distance and types of ammunition.

Protection

Hull Armor: Yes, Composite armor plating

Turret Armor: Yes, Composite armor plating

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, overpressure system, anti-neutron inner liner

Fire Equipment: Yes, automatic suppression and extinguishing system

Smoke Equipment: Yes, 4 x electric dischargers on either side of turret

Note #1:: Its armor was developed from the start to be replaced if damaged or better armor becomes available.

Note #2:: NORINCO also notes that the hull is coated with a layer of "infrared-reflecting" paint to reduce the infrared (IR) signature.

Notes:

The Type 90 MBT was further developed, incorporating advanced features into their next-generation MBT, but besides a few test vehicles for evaluation, this tank was not adopted by the People's Liberation Army, instead, the tank became the export model for Pakistan which developed the MBT-2000 (Al-Khalid) tank based on the Type 90. In the 1970s, the leadership of China's People's Liberation Army was concerned about the Soviet threat and requested an improved main battle tank (MBT). Norinco and the Inner Mongolia First Machine Group Corporation were tasked to develop a series of new tanks. After examining samples of T-72 tanks delivered by Iran in the late 1980s (captured from the Iraqi Army), the Chinese military realized contemporary Chinese tanks were still vulnerable. Design features of the T-72 and some western tanks were used to develop a second generation of Chinese tanks, eventually incorporating a redesigned hull and suspension, a new welded turret and 125 mm autoloaded tank gun. The Type 80 and Type 85 tanks led to the Type 90. The Type 90 was rejected for Chinese service in favour of other designs, but it influenced further development which would lead to China's third-generation Type 99 tanks. The Type 90 is an evolutionary design: the Type 90-II version shares 10% of its components with the Type 59, 15% with Type 69, 20% with Type 85/88C, and is built with 55% new components. This model was put up for sale on the international market. This tank was jointly developed by Beijing 201 Institute (China North Vehicle Research Institute) and Inner Mongolia 617 Factory (Inner Mongolia First Machine Group Corporation). The Type 90 is the first Chinese tank to incorporate the modular design concept for its armor. The frontal arc of the turret is a modular design so that when more advanced composite armor is developed, it can readily replace older composite armor.

Leopard 2A4M CAN Canadian Main Battle Tank (MBT)



Tiers:



Variants:

- **Leopard 2:** The baseline Leopard 2, sometimes informally called the "A0" to differentiate it from later versions, was the first series manufactured version. The vehicles were manufactured from October 1979 until March 1982, altogether 380 vehicles. 209 were built by Krauss Maffei and 171 by MaK. The basic equipment consisted of electrical-hydraulic stabiliser WNA-H22, a fire control computer, a laser rangefinder, a wind sensor, a general-purpose telescope EMES 15, a panorama periscope PERI R17, the gunner's primary sight FERO Z18, on the turret roof as well as a computer-controlled tank testing set RPP 1–8. 200 of the vehicles had a low-light enhancer (PZB 200) instead of thermal imaging. Two chassis served as driver training vehicles.
- **Leopard 2A1:** Minor modifications and the installation of the gunner's thermal sight were worked into the second batch of 450 vehicles Leopard 2, designated the A1. Krauss-Maffei built 248 (Chassis Nr. 10211 to 10458) and Mak built 202 (Chassis Nr. 20173 to 20347). Deliveries of the 2A1 models started in March 1982 and ended in November 1983. The two most notable changes were the modification of the ammunition racks to be identical to those in the M1A1 Abrams, and redesigned fuel filters that reduce refuelling time. A third batch of 300 Leopard 2, 165 by Krauss-Maffei (Chassis Nr. 10459 to 10623) and 135 by MaK (Chassis Nr. 20375 to 20509.), was built between November 1983 and November 1984. This batch included more minor changes that were later retrofitted to the earlier 2A1s.
- **Leopard 2A2:** This designation was given to upgraded vehicles of the first batch of Leopard 2s, brought up to the standard of the second and third batches. This modernisation gradually replaced the original PZB 200 sights in the first batch with thermal sights for the EMES 15 as they became available. Furthermore, the upgrade included the fitting of filler openings and caps to the forward hull fuel tanks to allow separate refuelling, as well as the addition of a deflector plate for the periscope and a large coverplate to protect the existing NBC protection system. Finally, the tank was given new five metre towing cables with a different position. The programme began in 1984 and ended in 1987; the third, fourth and fifth batches, which were produced during this period, had the same features. The modernised first batch can be recognised by the circular plate covering the hole where the cross-wind sensor for the fire-control system was removed.
- **Leopard 2A3:** The fourth batch of 300 vehicles, 165 by Krauss-Maffei (Chassis Nr. 10624 to 10788) and 135 by Mak (Chassis Nr. 20510 to 20644), was delivered between December 1984 and December 1985. The main change was the addition of the SEM80/90 digital radio sets (also being fitted to the Leopard 1 at the same time), and the ammunition reloading hatches being welded shut. Even with these minor changes the new batch was known as the 2A3.
- **Leopard 2A4:** The most widespread version of the Leopard 2 family, the 2A4 models included more substantial changes, including an automated fire and explosion suppression system, an all-digital fire control system able to handle new ammunition types, and an improved turret with flat titanium/tungsten armour. The Leopard 2s were manufactured in eight batches between 1985 and 1992. All the older models were upgraded to 2A4 standard. Until 1994, Germany operated a total of 2,125 2A4s (695 newly built and the rest modified older versions), while the Netherlands had an additional 445 tanks. The 2A4 was also license manufactured in Switzerland as the Panzer 87 "Leopard" or Pz 87. This version included Swiss-built 7.5 mm MG 87 machine guns and communications equipment, and featured improved NBC protection system. Switzerland operated 380 Pz 87 tanks. After 2000, Germany and the Netherlands found themselves with large stocks of tanks that they had no need for after the Cold War. These tanks were sold to NATO or friendly armies around the world. Among these buyers of the surplus tanks were Turkey (purchasing 354 vehicles), Greece (183), Sweden (160), Chile (140), Finland (139), Poland (128), Austria (114), Spain (108), Canada (107), Singapore (96), Norway (52), Denmark (51), and Portugal (37). The Pz 87WE (WertErhaltung) is a planned Swiss modification and upgrade of the Pz 87. The modification significantly improves protection through the addition of the Leopard 2A6M's mine protection kit, thicker armour on the front glacis, and a turret equipped with a Swiss-developed armour package using titanium alloy. The turret roof armour is improved and the smoke grenade launchers redesigned. Further improvements enhance survivability and combat capability, such as a turret electric drive similar to the Leopard 2A5, a

driver rear-view camera, an independent weapons station for the loader, and enhanced command and control systems. The fire control system is also upgraded, using the Carl Zeiss Optronics GmbH PERI-R17A2 fire control system. A remote weapons station containing a fully stabilised Mg 64 0.50 in (12.7 mm) machine gun is also fitted to the tank. The Pz 87-140 is an experimental variant of the Swiss Pz 87 with a 140 mm gun and additional armour, which was later used on the newer production variants. The Leopard 2A4CHL is the upgraded Chilean version of the Leopard 2A4 ordered by Chile in 2007. Upgrades include new electronics, sighting and information systems meant to elevate the Leopard 2A4's networking capability to be equal to that of the Leopard 2A6, a new suspension system and the upgrading of the tanks main gun to the L/55 smoothbore cannon used on the Leopard 2A6. Other upgrades are remote weapon stations over the gunner and commander hatches fitted with the MG3 and HK GMG. The Leopard 2A4CHL also has improved roof and side turret armour and can be uplinked with Chile's battlefield control network. The Leopard 2NG (Next Generation) is a privately funded Turkish upgrade by Aselsan that includes the application of modular composite armour (AMAP), upgraded optics, completely overhauled turret mechanics and a new fire control system on the work since 1995 and to be delivered by late 2011, which is intended to be used on the new Altay MBT. It was developed without an order of the Turkish Army, but might meet the requirements for the modernization of the Turkish Leopard 2A4s. The old powerpack and the L/44 gun barrel are kept, but the combat weight is increased to 65 tonnes. According to Turkish news sources, Finland was interested in getting the Turkish upgrade package to modernise their fleet of Leopard 2A4s. However, in 2015 Finland purchased 120 2A6 vehicles from the Netherlands.

- **Leopard 2 Marksman:** Finland has modernised its Marksman SPAAG vehicles by replacing the original T-55AM chassis with a newer Leopard 2A4 chassis. The upgraded Marksman vehicles were scheduled to enter service with the Finnish Army in 2016. The new Leopard 2 chassis greatly improves mobility compared to the older T-55AM chassis, both on- and off-road. The Leopard 2 chassis is also larger, thus providing a more stable firing platform for the Marksman turret to operate from.
- **Leopard 2 Imp:** "Leopard 2 Improved" was a prototype-series for enhancing the A4, introducing a wedge-shaped, spaced add-on armour to the turret front and the frontal area of the sides. These spaced armour modules defeat a hollow charge prior to reaching the base armour, and causes kinetic-energy penetrators to change direction, eroding them in the process; it does not form a shot-trap, since it does not deflect the penetrators outwards to hit the hull or turret ring. The gun mantlet was redesigned to accept the new armour
- **Leopard 2A5:** From the Leopard 2 Imp was then developed into the A5. There were also some improvements in the main armour composition. The interior received spall liners to reduce fragments if the armour is penetrated. The frontal "heavy" third of the side skirts was replaced with a stronger type. The commander's sight was moved to a new position behind the hatch and it received an independent thermal channel. The gunner's sight was moved to the turret roof as opposed to the cavity in the front armour in previous models. A heavier sliding driver's hatch was fitted. Turret controls went all-electric, increasing reliability and crew safety, as well as weight savings. The gun braking system was improved to prepare for the later mounting of the new L/55 gun tube and to enable firing of more powerful ammunition, such as the DM-53 APFSDS. The first A5s were handed over to the German army tank school in 1995 and started to enter regular service with Panzerbataillon 33 in December the same year. The Leopard 2A5 DK is a variant of the Leopard 2A5 similar to the Leopard 2A6 with some small modifications, used by the Danish Army.
- **Stridsvagn 122:** Also based on the Leopard 2 Improved, Stridsvagn 122 is a Swedish Army tank with 120 units built, 91 of which were licence-produced in Sweden. The tank features increased armour on the turret top and front hull, and improved command-, control- and fire-control systems. Externally, it can be distinguished from the Leopard 2A5 by the French GALIX smoke dispensers, different storage bins, and the much thicker crew hatches. The Strv 122B, a variant equipped with modular AMAP composite armour from IBD Deisenroth, has increased 360° protection against threats like EFPs, RPGs and IEDs.[133] The width of 4 metres (13 ft) has been kept, while the weight increases by only 350 kilograms (770 lb).
- **Leopard 2-140:** In the early 1990s, Rheinmetall began development of a 140 mm smoothbore cannon for use in future tank designs. The new gun was intended to counter new Soviet tank developments, especially since the next generation of Soviet main battle tanks were rumoured to be armed with a 135 mm or 152 mm cannon. The new 140 mm cannon was part of a modernisation programme for the Leopard 2 known as the KWS III.est firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively. Test firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively. The KWS III upgrade was to feature a new turret. This new turret was equipped with the planned 140 mm cannon and an autoloader. The introduction of an autoloader reduced the tank's crew to three members, as a dedicated loader was no longer needed. The gun's 32 rounds of ammunition were stored separate from the crew in a large compartment occupying the entire rear of the turret, in order to increase crew survivability in the event of a cook off. The turntable-style turret had the gun offset to the left side, due to the autoloader's lateral feeding of ammunition into the cannon breech. The turret was powered by an electro-hydraulic drive and also featured an IFIS battlefield management system. The crew was protected by an armoured capsule and ballistic protection for the hull was to be improved; planned protection level of the KWS III upgrade was to be equal to or better than the Leopard 2A5. A total of 650 Leopard 2 KWS III tanks were originally projected to be purchased. However, in 1995, the KWS III programme was cancelled due to changes in the political environment. Despite this, development still continued on the 140 mm cannon, with Rheinmetall coordinating with the British Royal Ordnance and French GIAT companies. The 140 mm cannon was fitted to an old Leopard 2

prototype with the turret T19. Counterweights were added to the rear of the turret to balance the increased weight of the 140 mm cannon; however, the modified Leopard 2 was not equipped with any other KWS III upgrades apart from the new gun. Live fire testing showed mixed results, where the 140 mm cannon showed superior penetrating power compared to the existing 120 mm cannon, but also demonstrated poorer handling characteristics. The lack of the autoloader on the prototype further hampered performance.

- **Leopard 2A6:** The Leopard 2A6 includes the addition of the Rheinmetall 120 mm L/55 smoothbore gun and other changes. All German tank battalions of the "crisis intervention forces" are equipped with the A6. Canada purchased 20 Leopard 2A6s from the Netherlands. These were delivered in 2007. Portugal also purchased 37 Leopard 2A6 from the Dutch in 2007, with delivery in 2008. In January 2014, Finland purchased 100 L2A6s, as well as munitions, simulators, and a ten-year supply of reserve parts from the Netherlands. The tanks were delivered in batches between 2015-2019. The Leopard 2A6M is a version of the 2A6 with enhanced mine protection under the chassis, and internal enhancements to improve crew survivability. In the summer of 2007, Canada borrowed 20 A6Ms from Germany for deployment to Afghanistan. The Leopard 2 Hel is a derivative of the 2A6 that was ordered by the Greek Army in 2003 - the "Hel" stands for "Hellenic". The 170 tanks were to be delivered between 2006 and 2009. A total of 140 will be built in Greece by ELBO, which delivered the first units in late 2006. The Leopard 2A6M CAN is a Canadian variant of the Leopard 2A6M. Significant modifications include distinctive black boxes mounted on the rear of the turret bustle, and stand-off slat armour. The first tanks configured in this variant were 20 loaned from the German Bundeswehr in an effort to increase firepower and protection given to Canadian troops operating in the south of Afghanistan. The loaned tanks retain their German MG3 machine guns, the ex-Dutch tanks are also expected to retain their FN MAG machine guns due to commonality with Canadian stocks of C6 GPMG, itself a variant of the FN MAG. Due to the loaned status of the first 20 tanks, the air conditioning unit originally could not be installed as only minimal changes could be made (the crew wore cooling vests instead, and the turret's electric drive generates less heat than the hydraulic drive of the older Leopard C2). The loaned German tanks will be kept by the Canadian Forces and may be further upgraded, while ex-Dutch Leopard 2A6s were modified to German Leopard 2A6M specifications and used as restitution for the loaned tanks. Canadian Leopard 2s in Afghanistan were later fitted with air conditioning units (a much needed commodity in the scorching desert of Afghanistan) and Saab's Barracuda camouflage mats, which also serve to reduce solar loading by 50 percent.
- **Leopard 2A6TR:** The Leopard 2A6TR was the Turkish variant during Turkish Army's tank procurement project in the year 2000. The version was based on 2A6EX. The project was dropped in favor of developing indigenous Altay tank.
- **Leopard 2E:** The Leopard 2E is a derivative of the 2A6, with greater armour protection, developed under a programme of co-production between the defence industries of Spain and Germany. The programme was developed within the frame of collaboration decided in 1995 between the Defence Ministries of both countries, in which also was included the cession of use by a period of five years of 108 Leopard 2A4 from the German Army to the Spanish Army. However, this cession was extended up to 2016, and after that those tanks will be the sole property of the Spanish Army, as has been made public on 24 January 2006, then having been paid a total of 15,124,014 euros in ten yearly installments, giving the Spanish co-ownership from 2006. In 1998, the Spanish government agreed to contract 219 tanks of the Leopard 2E line, 16 recovery tanks Leopard 2ER (Bufalo) and 4 training vehicles. They chose Santa Bárbara Sistemas as the main contractor. The programme, with a budget of 1,939.4 million Euros, also includes the integrated logistical support, training courses for crew instructors and maintenance engineers and driving, turret, maintenance, aiming and shooting simulators. Deliveries of the first batch began in 2004.
- **Leopard 2 PSO:** The new Leopard 2 PSO (Peace Support Operations) variant is designed specially for urban warfare, which had been encountered in peacekeeping operations with increasing frequency. Therefore, the Leopard 2 PSO is equipped with more effective all-around protection, a secondary weapons station, improved reconnaissance ability, a bulldozer blade, a shorter gun barrel (for manoeuvring on urban streets at the expense of fire range), non-lethal armament, close-range surveillance ability (through camera systems), a searchlight and further changes to improve its perseverance and mobility in a built-up non-wide open area. These features are similar to the Tank Urban Survival Kit for the American M1A2 Abrams.
- **Leopard 2A7:** The Leopard 2A7 is fundamentally different from the KMW variant 2A7+ and is not optimised for combat in urban terrain. A total of 20 vehicles are provided for converting. It involves former Dutch A6NL models returned by Canada to Germany. The original upgrade to A6M has been extended in coordination with Canada and includes a crew-compartment cooling-system from the Leopard 2 A6M-HEL series, a new 20 kW auxiliary power unit based on the Steyr Motors M12 TCA UI engine, the Saab Barracuda Mobile Camouflage System (MCS) with Heat-Transfer Reduction (HTR CoolCam) system, a field trial proven combat management and information system (IFIS: Integriertes Führungs- und Informationssystem), onboard network optimization with ultracapacitors in the chassis and turret, a SOTAS IP digital intercom system, a renewal of the fire suppression system in the crew compartment, and the retrofitting of Attica thermal imaging module in the commander optics. The weapon system is adapted for firing HE ammunition. It is also fitted for, but not with, additional passive side protection armour. The first Leopard 2A7 was handed over to the German Army in Munich on 10 December 2014. A total of 14 vehicles were produced for Tank Battalion 203, plus four more going to the Armoured Corps Training Centre and one vehicle at the Technical School for Land Systems and School for Technology of the Army. The last tank remains as a reference vehicle at KMW.
- **Leopard 2A7+:** The Leopard 2A7+ was first shown to the public during the Eurosatory 2010, featuring the label "Developed by KMW – tested and qualified by the German Ministry of Defence". The Leopard 2A7+ has been tested by the Bundeswehr under the name UrbOp (urban operations). The Leopard 2A7+ is designed to operate both in low intensity and high intensity conflicts. The tank's protection has been increased by modular armour; the frontal

protection has been improved with a dual-kit on the turret and hull front, while 360° protection against RPGs and mine protection increase the survivability of the tank in urban operations. The modular armour's system components were first used by Canada in Afghanistan. It can fire programmable HE munitions and the turret mounted MG3 has been replaced with a stabilised FLW 200 remotely controlled weapon station. The mobility, sustainability and situational awareness have also been improved. In December 2018, Hungary ordered 44 2A7+s, making them the second operator of the improved version, after Qatar.

System

Alternative Designation: Leopard 2A4M

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann Maschinenbau Kiel

Family: Leopard German Main Battle Tank Family

Crew: ea4

Dimensions

Length (gun forward): m9.61

Width: m4.05

Height: m2.5

Weight: t62.5

Hull Length: m7.74

Automotive

Engine Name: MTU Mb 873 ka 501, turbocharged 1500hp Diesel

Engine Type: Diesel

Engine Power: hp1500

Cruising Range: INA

Speed, Maximum Road: km/h68

Speed, Average Cross: INA

Road Range: km550

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m1.15

Fording Depth, without Preparation: m1

Fording Depth, with Preparation: m4

Transmission: RENK HSWL 354, 4 speed forward/2 reverse

Fuel Capacity (total): 1160 litres

Main Weapon System

↳*System*

Name: 120mm Rheinmetall L44 smoothbore gun

Type: 120mm Smoothbore Gun

Manufacturer: Rheinmetall

Max Rate of Fire: INA

Loader Type: Semi-automatic loading system

Basic Load: 42 Total of any combination 120mm Projectiles ea

Maximum Elevation: deg+20

Minimum Elevation: deg-9

Frontal Arc: deg285

Rear Arc: deg75

Fire on the Move: Yes

Weight (Gun Mount): kg3317

Weight (Gun Barrel): kg1190

Length (Barrel): m5.6

Thermal Sleeve: Yes

Bore Evacuator: Centrally-mounted bore evacuator

Barrel Interior Chrome Plating: Yes, to increase wear resistance of the barrel

Effective Full Charge (EFC): rds700

Breech Type: Threaded bayonet connection

Wedge Block Type: Downward-opening semi-automatic sliding wedge block

Breach Mechanism: Hydraulically-operated loading system

Note #1:: The Leopard 2A4 can fire any 120mm NATO Projectile

↳*Ammunition (Option 1)*

Type: DM-13 (XM829) German Armour Piercing Fin Stabilized Discarding Sabot (APFSDS)

Caliber: mm120

Muzzle Velocity: m/s1750

Basic Load: 42 Total of any combination 120mm Projectiles

Operational Range: INA

Armor Penetration: mm230

Cartridge Weight: kg20

Cartridge Length: mm984

Penetrator: Tungsten alloy

Propellant (NC-NG): kg8

Accuracy/Dispersion: 0.2x0.2mil

Maximum Effective Range: m3000

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 2)*

Type: DM-12 (M325) : High-Explosive Anti-Tank Multi-Purpose (HEAT-MP-T)

Caliber: mm120

Muzzle Velocity: m/s1078

Basic Load: 42 Total of any combination 120mm Projectiles

Cartridge Weight: kg25

Cartridge Length: mm984

Fuze: PIBD, electric

High Explosive Comp. B: kg1.8

Accuracy/Dispersion: 0.25X0.25 mil

Maximum Effective Range: m3100

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 3)*

Type: DM53 120mm KE Projectile (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1750

Basic Load: 42 Total of any combination 120mm Projectiles

Round Weight: kg21.4

Projectile Length: mm745

Accuracy: 0.2 mil

Coaxial Weapon System

↳*System*

Name: MG3A1

Type: 7.62mm General-Purpose Machine Gun

Manufacturer: Feed System

Max Rate of Fire: rds/min1200

Fire on the Move: Yes

Weight (Gun Only): kg11.5

Weight (Mounted on Tripod): kg27.5

Length (With Stock): mm1225

Length (Without Stock): mm1097

Length (Barrel Only): mm565

Action: Recoil-operated, roller locked

Effective Firing Range (With Sight Adjustments): m200-1,200

Maximum Firing Range (Bipod Mounted): m600

Maximum Firing Range (Tripod Mounted): m1200

Maximum Firing Range (Gun Carriage): m3000

Maximum Firing Range (Terminal): m3750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: ea2375

Auxiliary Weapon System

↳***System***

Name: MG3A1

Type: 7.62mm General-Purpose Machine Gun

Manufacturer: Rheinmetall

Max Rate of Fire: rds/min1200

Fire on the Move: Yes

Weight (Gun Only): kg11.5

Weight (Mounted on Tripod): kg27.5

Length (With Stock): mm1225

Length (Without Stock): mm1097

Length (Barrel Only): mm565

Action: Recoil-operated, roller locked

Effective Firing Range (With Sight Adjustments): m200-1,200

Maximum Firing Range (Bipod Mounted): m600

Maximum Firing Range (Tripod Mounted): m1200

Maximum Firing Range (Gun Carriage): m3000

Maximum Firing Range (Terminal): m3750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: 2375

:

Fire Control System

Name: Digitaler Ballistikkern (DigBal) digital FCS

Computerized FCS: Yes

Main Gun Stabilization: Hydraulic and provides dual-axis stabilization

Primary Sight: Hauptzielfernrohr (HZF) primary sight System

Commander's Periscope: Carl Zeis fully stabilized monocular PERI R17A1 sight

Thermal Sight Tank Commander: Warmebildgerat X (WBG-X) thermal sight

Thermal Sight Gunner: Warmebildgerat X (WBG-X) thermal sight

Primary Gun Sight: Binocular HZF

Infrared: Yes

Range Finder: EMES 15 laser rangefinder (LRF

Wind Sensor: Yes

Telescope: EMES 15

Tower Sight: FERO Z18

Computer Controlled Tank Testing Set: RPP 1–8

Ballistic Compensator: Field zeroing system

Weapon Slaving System: Waffenachfuhranlage (WNA) H22 weapon slaving system

Emergency Backup Turret Sight: Turmzielfernrohr (TZF) FERO Z18

Fault Detection System: Rechnergesteuertes Panzerpufstsem (RPP 1-8) fault detection system

Field Zeroing System: Feldjustieranlage (FJA) field zeroing system

Protection

Hull Armor: Welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides. Also areas of the hull are fitted with cage armor for better protection. The cage armor provides protection against RPG rounds and anti-tank guided missies.

Turret Armor: Welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides. Areas of the turret are also fitted with cage armor and electric turret controls.

Applique Armor: Yes, Track Skirt

Explosive Reactive Armor: INA

Active Protection System: Yes, Dräger Safety AG & Co

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, KGaA CBRN protection system

Smoke Equipment: MWA [Mehrfachwurfanlage] 76 mm obscurant smoke discharger system

IR Signature: IR suppressive smoke screen system

Fire Suppression System: Yes, Automatic

Grenade Launchers: Eight grenade launchers are mounted on each side of the Turret

Fire Detection and Suppression System: Yes, Kidde-Deugra Brandschutzsysteme System

Emergency Escape Hatch: Yes, below the driver's compartment

Notes:

The Leopard 2A4M CAN is the upgraded Canadian version of the Leopard 2A4 acquired from the Royal Netherlands Army surplus. The Leopard 2A4M CAN is specially designed for the war in Afghanistan, based on experience gained by Leopard 2 operators. The first 20 were delivered in October 2010; of which just five were deployed to Afghanistan at the end of 2010 and operated until July 2011, when combat operations stopped. In the mid 2000s Canadians realized the importance of main battle tanks when their Leopard C2 tanks were rushed in to Afghanistan. Canadians needed a better protected tank, especially against land mines and improvised explosive devices than their C2. There was no point to further upgrade the C2s that are nearly 40 years old and were become increasingly harder to maintain. In an attempt to renovate their heavy armor fleet and for their immediate needs in Afghanistan in 2007 Canada acquired 80 Leopard 2A4, and 20 Leopard 2A6 tanks from Dutch surplus stocks. Another 20 Leopard 2A6 tanks were borrowed from Germany. The oldest and less capable Leopard 2A4 tanks were used by Canadian training squadrons. It is worth noting that Canada actually acquired more Leopard 2A4 and Pz.87 tanks, however these were converted to support vehicles, such as combat engineer vehicles and armored recovery vehicles. In 2009 Canada commissioned Krauss-Maffei Wegmann of Germany to refurbish and upgrade 20 ex-Dutch Leopard 2A4 tanks to the Leopard 2A4M CAN standard. All of these tanks were completed in 2010. Between 2010 and 2011 five Leopard 2A4M tanks were deployed in Afghanistan.

Chonma-ho North Korean Main Battle Tank (MBT)





Tiers:



Variants:

- **Ch'ŏnma-ho ARV:** Armoured recovery vehicle with a casemate superstructure
- **Ch'ŏnma-ho Command:** Command variant of the tank with a fake main gun
- **Juche-Po:** Juche-Po – Self-propelled artillery gun on a modified Ch'ŏnma-ho chassis. The Juche-Po is an improvement over the Tok-Ch'ŏn artillery piece, which was mounted on an ATS-59 chassis. There are at least four M1991 versions of the Juche-Po, each mounting a different gun: the D-30 122 mm, D-74 122 mm, the M-46 130 mm and the ML-20 152 mm howitzer. A fifth M1992 version is armed with the SM-4-1 130 mm howitzer. These artillery pieces can be identified by their six road wheels, as compared to the Tok-Ch'ŏn's five, and a prominent recoil cylinder which protrudes from the turret. Another major difference is that the Juche-Po has a fully encased rounded turret, as opposed to the older open-topped self-propelled artillery pieces used previously.
- **Ch'onma-ho I:** This is a slightly modified version of the T-62A with a 115-mm main gun and a 14.5-mm anti-aircraft machine gun. It is also reported to be lighter, having thinner armor than its predecessor.
- **Ch'onma-ho II:** This is an upgraded version of the Ch'onma-ho I with an externally mounted laser rangefinder above the main gun.
- **Ch'onma-ho III:** This variant was first seen publicly during an April 1992 parade in Pyongyang. It features a laser rangefinder above the 115-mm main gun; thermal shroud on the main gun; full hull-skirting; turret smoke-grenade launchers; two sets on each side of the turret; add-on armor to the turret front and pos sibly the glacis; potential explosive reactive armor (ERA) on the turret sides (from the turret midpoint to turret rear); and an improved fire-control system.
- **Ch'onma-ho IV:** This variant is fitted with a larger gun, said to be the 125-mm main gun from the Russian T-72. Three banks of four smoke-grenade launchers are located on each side of the turret.
- **Ch'onma-ho V:** This updated Ch'onma-ho II has a new engine and 125-mm gun. A box with internal combined night-vision camera and laser rangefinder is fitted above the mantlet.

System

Alternative Designation: Ch'ŏnma-ho or spelled as Chonma-ho

Type: Main Battle Tank

Family: INA

Crew: ea4

Dimensions

Length: m6.63

Width: m3.52

Height: m2.40

Weight, Combat: tons40

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp750

Power-to-Weight Ratio: 18.75 hp/ton

Cruising Range: km450

Speed, Maximum Road: km/h50

Speed, Average Cross: 35

Speed Maximum Swim: Not Amphibious

Fording Depth: m1.4

Fording Depth with Snorkel: m5

Side Slope: deg30

Vertical Obstacle: m0.80

Trench: m2.85

Main Gun

Note: The Chonma-ho can be equipped with 1 x 2A20 115-mm smoothbore; or 1 x 2A46 125-mm smoothbore

↳*System*

Name: U-5TS (production designation 2A20)

Type: 115mm Tank Gun

Caliber: mm115

Barrel Length: 6.05 m

Rate of Fire: 6–10/minute

Muzzle Velocity: 1,600 m/s (APFSDS)

Effective Firing Range: 2,000 m-high target – 1,870 m; 3 m-high target – 2,260 m; 4,000 m AT-12 missile.

↳*Ammunition*

Name: 3VBM-1

Type: APFSDS

Caliber: mm115

Cartridge: 115 x 728 mmR

Basic Load: 40

Effective Range: km2,000 m-high target – 1,870 m; 3 m-high target – 2,260 m; 4,000 m AT-12 missile.

Armor Penetration: INA

Secondary Weapon System

Note: The Chonma-ho is been seen with either a KPV 14.5 mm heavy machine gun, 7.62 mm machine gun in coaxial mount.

↳*System*

Name: KPV

Type: 14.5 Heavy Machine Gun

Caliber: mm14.5

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Effective Firing Range: m3,000

Maximum Firing Range: m4,000

Feed System: 40-round belt

Sights: Iron or optical

↳*Ammunition*

Name: B-32

Type: Armor-piercing incendiary full metal jacket round with a tungsten-carbide core.

Caliber: mm14.5

Cartridge: m/s14.5×114 mm

Basic Load: INA

Armor Penetration: INA

Ammuntion Types: * B-32 - Armor-piercing incendiary full metal jacket round with a tungsten-carbide core. Projectile weight is 64.4 g and muzzle velocity is 976 m/s. Armour penetration at 500 m is 32 mm of rolled homogeneous armour (RHA) at 90 degrees. * BZT - Armor-piercing incendiary tracer full metal jacket round with a steel core. Projectile weight is 59.56 g and muzzle velocity is 1,005 m/s. Tracer burns to at least 2,000 m. * MDZ - High-explosive incendiary bullet of instant action. Projectile weight is 59.68 g.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: 15-100 mm
Turret Armor: 200 mm
Applique Armor: Available
Explosive Reactive Armor: Available
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: INA

Notes:

The Ch'ŏnma-ho or spelled as Chonma-ho (Chosŏn'gŭl: □□□; Hanja: □□□) is one of North Korea's secretive indigenous main battle tank designs. The tank is also known by the name of □□□ □□ (□□□ or the "Chollima Tank"). The original Ch'ŏnma-ho is based on the Soviet T-62. There are at least five different operational versions of the Ch'ŏnma-ho. Since its inception, the Ch'ŏnma-ho has apparently undergone several extensive upgrades. Little public information is available about this tank, and its most recent public appearance was the 65th Anniversary Parade held in Pyongyang, North Korea, on 10 October 2010, celebrating the 65th anniversary of North Korea's ruling party. The Ch'ŏnma-ho has been issued to North Korea's premier armored formations, and would lead the initial attempts to break through South Korean defences. Other armour is relegated to a secondary role in this corps or to North Korea's four mechanized corps. To underscore North Korea's concept of combined arms and the importance of armour, and therefore the importance of the Ch'ŏnma-ho, North Korea's sole armour corps is directly grouped with two mechanized corps and a single artillery corps. However, this forms the second echelon of North Korea's deployment to the DMZ, with the first echelon composed of four infantry corps,[8] and the rest in strategic reserve. This may also play a part in a defensive strategy, as the North Korean army is arrayed in depth, and the armour might be strategically placed to both provide offensive power and a second echelon composed of mobile defences to plug a South Korean breakthrough along the DMZ. The Ch'ŏnma-ho is a product of North Korea's approach of Juche, or self-reliance, which also includes several indigenous self-propelled artillery pieces. The idea of juche comes from a North Korean sentiment of abandonment by their allies, China and Soviet Union/Russia. This accounts for their drive towards overproduction and for recent North Korean nuclear developments, as well as the production of long-range missiles which provide North Korea with its longer range striking power. This all manifests itself within the 'triangle' of North Korean military development – armour, artillery and missiles. In fact, this seems reminiscent from Soviet military theory, including the application of overwhelming artillery support and the use of large amounts of armour to create a breakthrough after the initial artillery disruption. In that sense, North Korean military strategy is very mobile, and the large numbers of tanks underscores this. The Ch'ŏnma-ho is an attempt to partially address the technology gap between its current dated tank forces and South Korean K1A1 and the US M1 Abrams tank. It is unknown which units of the Korean People's Army might be outfitted with the Ch'ŏnma-ho. It is clear that the Ch'ŏnma-ho is a general replacement for previously employed tanks, including the T-62, T-34 and Type 59 medium tanks. It is very possible that the Ch'ŏnma-ho will equip the spearhead and elite of North Korea's armoured forces. They are apparently deployed in sufficient numbers to be strategically significant. There might be as many as 800 T-62s in addition to the over 1000 Ch'ŏnma-ho's in the North Korean army, of which any number could be one of the five Ch'ŏnma-ho variants.

T-80UK Russian Main Battle Tank (MBT)



Tiers:



Parent:

T-80B Russian Main Battle Tank (MBT)

Variants:

- **T-80 (1976):** Initial model, with 1,000-hp gas turbine engine, coincidence rangefinder, and no missile capability. This model does not have fittings for explosive reactive armour. The turret is from the T-64A, and thus retains the use of the old coincidence rangefinder. Characteristics of this type are the V shaped water deflector on the front glacis, coincidence rangefinder in front of the commander's cupola, and Luna searchlight mounted in the same position as a T-64. Around 250 were produced, as the tank's armour was essentially obsolete when introduced. Turret vs APFSDS – 380 mm, hull vs APFSDS – 500 mm (without reactive armour). This was, in effect, a pre-production model. It reportedly was fitted with an early version of the Shtora APS.
- **T-80B (1978):** This model had a new turret, laser rangefinder, fire-control, and autoloader allowing the firing of 9M112-1 Kobra antitank guided missile (80% hit probability while stopped and on the move), and improved composite armour. An improved, 1,100-hp, engine was added in 1980, a new gun in 1982, and fittings for reactive armour in 1985. Reactive armour added protection of 400 mm equivalent armour to defend against HEAT warheads. The longest sighting range for T-80B kinetic energy ammunition and for "cumulative" ammunition – 4,000 m, high-explosive fragmentation – 5,000 m (using the "side level" – 10,000 m). A night sight TPNZ-49 in active mode reached 1,300 and a passive – 850 m. "Reflex" guided missile complex with laser beam allowed it to launch missiles at any tank speed
- **T-80BV (1985):** T-80B with explosive reactive armour Kontakt-1
- **T-80UM::** Russian version, with new Buran thermal imaging sight in place of the Luna IR.
- **Object 219A: Early T-80U (Object 219AS) variant:** It has the T-80U's turret, but not the Kontakt-5 ERA. Instead, it uses the old Kontakt-1/3 system; some 219As did not have ERA at all. Often misnamed T-80A. T-80U (1985): Further development with a better turret, Kontakt-5 explosive reactive armour, improved gunsight, and 9M119 Svir missile system. In 1990 a new, 1,250-hp, engine was installed. Overall protection with Kontakt-5 against APFSDS/HEAT is 780/1,320 mm RHAe.9K119M with antitank guided missile 9M119M installed since 1990. Some of the tanks in commander version (T-80UK) equipped with Shtora-1 APS, and thermal imaging night sight TO1-PO2T (detection range / target classification range = 6,400/4,600 meters at night). Basic thermal night sight of the T-80U is within the limits of 1,750/1,500 meters
- **T-80UD Bereza (1987):** Ukrainian diesel version with 1,000-hp 6TD engine and remote-controlled antiaircraft machine gun
- **T-84 (1999):** Further Ukrainian development of T-80UD with 1,200-hp diesel and new welded turret
- **T-80BVD (2002)::** KMDB's upgrade standard for Ukrainian T-80BVs. Changes include the 6TD diesel engine, remote-controlled commander's machine gun, and better optics. None were produced.
- **T-80UM2/Black Eagle (prototype: cancelled)::** Several Russian prototypes were shown at trade shows, with a longer chassis and extra pair of road wheels, and very a large turret with separate ammunition compartment
- **T-80BVM (2017):** up to 3,000 units, installed "Relikt" ERA, PNM Sosna-U gunner sight (as in the T-90, T-72B3), the improved 125mm gun 2A46M-4, the upgraded gas turbine engine and the upgrades of various other systems. More than 120 already in the service.
- **T-80B (1978):** This model had a new turret, laser rangefinder, fire-control, and autoloader allowing the firing of 9M112-1 Kobra antitank guided missile (80% hit probability while stopped and on the move), and improved composite armour. An improved, 1,100-hp, engine was added in 1980, a new gun in 1982, and fittings for reactive armour in 1985. Reactive armour added protection of 400 mm equivalent armour to defend against HEAT warheads. The longest

sighting range for T-80B kinetic energy ammunition and for "cumulative" ammunition – 4,000 m, high-explosive fragmentation – 5,000 m (using the "side level" – 10,000 m). A night sight TPNZ-49 in active mode reached 1,300 and a passive – 850 m. "Reflex" guided missile complex with laser beam allowed it to launch missiles at any tank speed

System

Alternative Designation: T-80UK

Type: Main Battle Tank

Family: T-80 Series

Generation: 3rd Generation Tank

Crew: ea3

Maximum Effective Range (Road): km335

Driver's Vision Blocks: ea3

Dimensions

Length (Gun Forward): m9.65

length (Hull): m6.98

Width: m3.58

Height: m2.22

Weight, Combat: tons46

Ground Pressure: kg/mINA

Automotive

Engine Name: GTD-1000T

Engine Type: Gas turbine engine

Engine Power: hp1,100

Power to Weight Ratio: hp/ton23.9

Cruising Range: km335

Speed, Maximum Road: km/h75

Speed, Average Cross: 48

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m1

Trench: m2.85

Fording Depth (No Preparation): m1.8

Fording Depth (With Preparation): m5

Cold Start Ability: Yes

Fuel Tank (Regular): liters2,040

Reul Tank (Additional): liters680
Deep Water Snorkel: Available

Communications

R-163-50K HF Transceiver: Equipped, but no information available
R-163-50U Radio set: Equipped, but no information available
R-163-UP Receiver: Equipped, but no information available

↳*R-173*

Frequency Range: MHz30.00 - 75.99
HF Output: W30
Modulation: FM
Display: Digitial
Entry of Frequency: Keypad
Present Channels: 10
Digital Transmition: KBaudINA
Sensitivity: uV1.5
Range: km50
Operational Voltage: V27+-2
Weight: kg43
Size: mm428 × 222 × 238

↳*Receiver R-174/GRR-5*

Main Principle: Superhet with RF-stage; ZF/IF 455 kHz; 2 AF stage(s)
Wave Bands: Wave Bands given in the notes.
Loudspeaker: Permanent Magnet Dynamic (PDyn) Loudspeaker (moving coil)
Dimensions (WHD): mm307 x 335 x 206
Net Weight: kg27.7
Note: Receiver for mobile purposes, 1.5 - 18 MHz in four ranges, AM/CW (BFO), 200 kHz xtal calibrator. Set compartment (CY-615/URR) consists of two chassis: model R-174/GRR-5 receiver and model PP-308/URR power supply plus speaker unit. Tubes only one times listed.

Main Gun

↳*System*

Name: L48 2A46M-1 Smoothbore Cannon
Type: 125 mm smoothbore Gun
Manufacturer: Spetstekhnika Design Bureau
Max Rate of Fire: rds/min6-8

Maximum Range: m4,000

Manually Load Time: rds/min1-2

Maximum Elevation: deg+14

Minimum Elevation: deg-5

Traverse Range: deg360

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Evacuator Type: Central Bore

Thermal Sleeve: Yes

Barrel effective Full Life Charge: rds800

Breech Mechanism: Semi-automatic horizontal sliding breech block

Mazimum Pressure: bar5,100

Loading System: Korzina electric and hydraulic automatic loading system

Carousel Reloading Time: minutes13-15

Muzzle Bead: Yes

Barrel Type: Quick Change

Fuze Type: Timed Fuze System

Note: The L48 2A46M-1 It has been extensively developed into 10 different variations and remains the primary armament of Russian frontline tanks.

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Maximum Effective Range: m5,000

Armor Penetration: INA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Weight: kg11

Projectile Dimesnion: mm900

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)

Type: Laser Beam Anti-Tank Guided Missiles

Caliber: mm125

Manufacturer: Degtyarev plant

In Service: 1980's to present

Proliferation: Widely Proliferated

Operational Range: m4,000-5,000

Weight: kg17.2

Diameter: mm125

Basic Load: ea6

Warhead Type: Tandem hollow-charge

Warhead Weight: kg4.5

Speed: Subsonic

Guidance System: 9S516 guidance system

Launch Platform: 125 mm smoothbore guns

Armor Penetration: 700mmm of homogeneous armour

Time to meet Maximum Range: sec17.6

Control Unit: 9S517 automatic control unit

Voltage Regulator: 9S831 voltage regulator.

Variants: 9M119M

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-present

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,250

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: 1A45 Irtysh, Updated FCS system over the T-80B

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, day and night, vertical plane PNK-4S (Agat) day/night sight

Commander Day Mode Sight: 10^{0} FOV and ×5 magnification

Thermal Sight Gunner: Yes, stabilised T01-K01R Buran-PA night sight.

Main Gun Stabilization: Yes, 2E26M electro-hydraulic dual plane stabilisation system

Main Gun Stabilization Deployment Time: minutes2

Range, Day Sight: m1,000

Range, Thermal Sight: m2,600

IR Searchlight: Yes, L-4A "Luna" IR Searchlight

TNPO-160 Periscopes: ea2

TNPA-65 Periscopes: ea2

Ballistic Computer: 1V528-1 Ballistic Computer

Wind Sensor: DVE-BS wind sensor

Laser Rangefinder: Yes

FCS Fire Gating Capability: YEs

Fire Control Complex: 1A45 fire-control complex,

Protection

Hull Armor: mm440–450

Armor Type: The T-80B is protected by a third iteration Soviet laminate armour that is known as Combination K

Turret Type: Objekt 476

Turret Armor: Renovated ceramic system, Protection equivalent to 550mm

Applique Armor: Yes, Hull side; track skirts

Explosive Reactive Armor: Yes, Kontakt-5 System. Built in ERA system. Upgrade from the T-80B.

Active Protection System: Arena Available

Mine Clearing: Roller-plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, ZETS-11-2 detection system collective overpressure system

Smoke Equipment: Yes, two banks of four 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Smoke Grenade Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

IR Signature: The exhaust is box-shaped and designed to direct heat away from the tank

Anti-Radiation Material: Installed as a inside protective layer

Personal Breathing Apparatus: Equipment

Automatic Fire Extinguisher System: Yes

Radiation and Chemical Detector: PRKhR, Model GO-27, radiation and chemical agent detector system

Soft-Kill APS System: Laser-warning receivers

Sensory Awareness Range: deg360

Jamming System: Shtora-1 IR jamming system with TShU1-7 IR jammers, which interfere with the semi-automatic command to line-of-sight (SACLOS) Guidance Systems

Notes:

Exclusive to PACT nations, the T-80UK is essentially a T-80U tank modified and operated by crew able to for command and

control operations. This makes it the only Command Tank variant of thes cousin variant T-80 series of Main Battle Tanks.This unit retains all the devastating features of the mighty T-80U. At speeds of 75 km/h, faster than any other Pact tank besides its cousin variant, it can apply its heavy fire power on hostiles, before they even get a chance to retreat. Heavy power, speed and stabilisers that can even compare to that of advanced air-superiority jets means that it is an excellent and effective Command Tank, able to quickly grasp control points and clean up any hostile forces. Additionally, The T-80UK is equiped with the Shtora-IR Jamming System.

Chieftain MK 3 British Main Battle Tank (MBT)




Tiers:



Variants:

- **FV4202 "40-ton Centurion":** Test vehicle built by Leyland Motors using Centurion components to test reclining drivers position and mantlet-less turret proposed for FV4201. One built, 1956, official specification for FV4201 issued August 1958.
- **FV4201 P1 - FV4201 P7:** Prototypes. Seven built, 485 hp L60 Mk 1 or 485 hp L60 Mk 4,initial vehicles had internal exhaust silencers, short hull. small diameter road wheels, weight 45 long tons, initial vehicles, 49.5 long tons for later vehicles, 1959-1962
- **Chieftain Mk.1:** 40 training vehicles for 1965–1966 with 585 hp L60 Mk 4 engine, strengthened TN12 gearbox, exhaust silencers moved to external armoured box on hull rear plate, larger 'Centurion' 31.6 inch diameter road wheels, re-positioned final drive and idler wheel assemblies, two-piece commander's hatch cover, rubber track pads fitted for road protection, resilient rubber coaming around engine rear decking to prevent damage from gun with gun depression when turret traversed to the rear, stowage rack added to left rear of turret, dummy stowage 'bin' on front glacis and canvas cover over turret nose to conceal ballistic shapes, [v] weight 50 long tons, Issued to 1 RTR and 5 RTR for troop trials. All Mk.1 to Mk.1/4 vehicles were subsequently to be based at Bovington Camp and Catterick Garrison. 11 short hull units converted to be CH AVLB Mk.6
- **Chieftain Mk.1/2:** Upgrade of Chieftain Mk.1 to Chieftain Mk.2 standard, fitted with 650 hp L60 Mk 4A2 engine, training use only
- **Chieftain Mk.1/3:** Upgrade of Chieftain Mk.1, fitted with 650 hp L60 Mk 5A engine, training use only
- **Chieftain Mk.2:** First service model with 650 hp L60 Mk 4A2 engine, L11A2 or L11A3 main gun,[viii] NBC system fitted to rear of turret, revised turret stowage, one-piece commander's hatch cover, armour removed from searchlight cover, rigid flotation panels replaced by facility for deep wading, road speed 25 mph, range 250 miles, weight 51.5 long tons, first vehicles issued to 11th Hussars at Hohne in West Germany in early 1967, improved 650 hp L60 Mk 5A engine fitted 1969
- **Chieftain Mk.3:** Improved 650 hp L60 Mk 6A engine with two-stage air cleaner, improved auxiliary generator (Coventry Climax A30), better stowage, new No. 15 Mk 2 commander's cupola, road speed improved to 30 mph, range increased to 310 miles, weight 53 long tons, 1970
- **Chieftain Mk 3/2:** Fitted with 720 hp L60 Mk 7A, 1971
- **Chieftain Mk 3/3:** Fitted with 720 hp L60 Mk 7A, Improved main gun range finding,provision for Barr & Stroud TLS (Tank Laser Sight) LF2 laser range finder, 1971
- **Chieftain Mk 3/G:** Chieftain Mk.3 with engine induction through fighting compartment. Prototype only
- **Chieftain Mk.3/3P:** Chieftain Mk 3/3 for Iran, 1973
- **Chieftain Mk 3/S:** Production version of Chieftain Mk 3/G with commander's firing control
- **Chieftain Mk.4:** Chieftain Mk.3 with increased fuel capacity. Only two built.
- **Chieftain Mk.5/5P:** Chieftain Mk.5 for Iran, 1975. Engine later upgraded to 750 hp L60 Mk 10A, 1977
- **Chieftain Mk.5/2K:** Chieftain Mk.5 for Kuwait, 1975
- **Chieftain Mk.6:** Chieftain Mk.2 upgraded to Chieftain Mk.5 standard, 1975 In 1975 all earlier Marks of tanks except Mark 1's were upgraded to Chieftain Mk.5 standard as part of the 1975 "Totem Pole" programme,[xvi] including addition of Clansman radios, fitting of TLS, fitment of Muzzle Reference System (MRS) [upon replacement of L11A3 barrel with L11A5 barrel,[xviii] and fitment of 750 hp L60 Mark 8A. These vehicles were re-designated Chieftain Mk's.6 to Mk.8.
- **Chieftain Mk.7:** Chieftain Mk.3 and Chieftain Mk 3/S upgraded to Chieftain Mk.5 standard, 1975
- **Chieftain Mk.7C:** Chieftain Mk.3 upgraded to Chieftain Mk.5 standard for Oman
- **Chieftain Mk.8:** Chieftain Mk.3/3 upgraded to Chieftain Mk.5 standard, 1975 In 1977 the engines of all vehicles were upgraded to the 750 hp L60 Mark 9A, followed by further upgrading with the 840 hp L60 Mark 11A or L60 Mark 12A [xxi] in 1978 as part of the 1977 "Dark Morn" and the 1978 "Sundance" programmes.

- **Chieftain Mk.9:** Chieftain Mk.6 after completing all phases of "Totem Pole", 1979.
- **Chieftain Mk.10:** Chieftain Mk.7 after completing all phases of "Totem Pole". Later upgraded with addition of Stillbrew Crew Protection Package to the turret front and turret ring, 1984–86
- **Chieftain Mk.11:** Chieftain Mk.8 after completing all phases of "Totem Pole". Later upgraded with Stillbrew, 1984–86
- **Chieftain Mk.12:** Chieftain Mk.5 after completing all phases of "Totem Pole". Later upgraded with Stillbrew, 1984–86
- **Chieftain Mk.12/13:** Proposed further upgrades, cancelled when the Challenger 1 was introduced.
- **Chieftain 800:** Chieftain with Chobham armour and new power train
- **Chieftain 900:** Chieftain with Chobham armour, new power train, and Centaur fire control system
- **FV4204 ARV/ARRV:** Armoured Recovery Vehicle, Armoured Recovery and Repair Vehicle.
- **FV4205 AVLB Mk5:** Bridge-laying vehicle
- **Chieftain AVRE (CHAVRE):** Armoured Vehicle Royal Engineers, twelve early "Willich Chieftain AVRE" vehicles converted by 32 Armoured Engineer Regiment and 21 Engineer Base Workshop of the Royal Engineers, Willich, 1987, remaining 48 ex MBTs converted by Vickers Defence Ltd, 1991, to be a British Army combat engineering variant used by the Royal Engineers.
- **Chieftain Marksman:** Self-propelled anti-aircraft gun version, equipped with the Marksman twin gun turret.
- **Khalid /Shir (Lion) 1:** Also known as "4030 Phase 2 Jordan". Jordanian with the running gear of the Challenger 1. In essence, this was a transition vehicle from the Chieftain to the Shir 2, which had been intended for Iran but was subsequently cancelled due to the 1979 Iranian Revolution. The vehicle chassis comprised the front half of a Chieftain hull, Chieftain running gear and the rear of a 4030/2 Chassis (Sloping Hull). This allowed the fitment in the engine bay of a Rolls-Royce CV12 engine producing 1200 bhp at 2,300 rpm.
- **Weapon Carriers:** The Chieftain chassis was adapted to mount air defence weapons ("Marksman" 2 x 35 mm cannon) and a 155 mm howitzer in a number of variants.
- **Shir 2:** 4030 Phase 3" Iranian variant. Visible external differences from Chieftain Mk.5 included a sloping rear hull, the removal of the searchlight from the left turret area and the refitting of storage baskets, the removal of the water channel from around the driver's hatch on the glacis, modification of the light clusters also on the glacis and the enlargement of the sight housing on the commander's cupola. Not delivered, the Shir 2 tanks became Challenger 1 tanks after reworking at ROF Leeds
- **Mobarez Tank:** Iranian upgraded version of Chieftain.

System

Alternative Designation: Chieftain Mk.3; Chieftain Mk 3/3P

In Service: 1973-Present

Type: Main Battle Tank

Family: Chieftain Main Battle Tank Family

Crew: ea4 (commander, gunner, loader, driver)

Dry-Air Cleaner Element: Yes

Cupola Type: Modified no. 15 Mk 2 Commander Cupola

Dimensions

Length (Overall): m10.8

Length (Hull): m7.5

Width: m3.5

Height: m2.9

Weight, Combat: tons55

Ground Pressure: kg/mINA

Automotive

Engine Name: L60 Mk 7A

Engine Type: Diesel

Engine Power: hp720

Gearbox: TN12 gearbox

Maximum Range: km400

Cruising Range: km200

Speed, Maximum Road: km/h48

Speed, Average Cross: 30

Speed Maximum Swim: km/hNot Amphibious

Steering System: Merritt-Wilson differential steering system

Fuel Capacity: liters950

Suspension: Horstmann suspension

Communications

Primary: Twin Clansman VRC 353 VHF Radio sets

Secondary: 1 C42 1 B47 Larkspur VHF radios

Main Gun

↳*System*

Name: 120 mm L11A5 Rifled Tank Gun

Type: mm120

Max Rate of Fire: rds/min8-10

Manufacturer: Royal Ordnance Factories

Proliferation: 3,012

Bore Evacuator: Yes

Thermal Sleeve: Yes

Weight: kg1,778

Length (Total): m6.858

Length (Barrel): m6.6

Gun Recoil: mm370

Breech Type: semi-automatic cam

Maximum Effective Range: m3,000

Maximum Elevation: Deg+20

Minimum Elevation: Deg-10

↳*Ammunition (Option 1)*

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS) L23

Caliber: mm120

Muzzle Velocity: m/s1,534

Basic Load: 64 total of any 120mm projectile combination

Effective Range: m3,000

Penetrator: Monobloc tungsten alloy rod

Diameter: mm120

Height: mm500

Case Charge: L8 combustible case charge

Note: Average Projectile Load would consists of the following: 33 L26 APFSDS rounds, 13 L31A7 HESH, and 3 white L34 phosphorous smoke rounds.

↳*Ammunition (Option 2)*

Type: APFSDS L26 (CHARM 1)

Caliber: mm120

Muzzle Velocity: m/sINA

Maximum Effective Range: m2,100

Penetrator: Monobloc tungsten nickel copper long rod

Case Charge: L14A1 or L14A2

Basic Load: 64 total of any 120mm projectile combination

Variant: APFSDS L27A1 (CHARM 3).

↳*Ammunition (Option 3)*

Type: HESH L31

Caliber: mm120

Muzzle Velocity: m/s670

Basic Load: 64 total of any 120mm projectile combination

Maximum Effective Range: m8,000

Auxiliary Weapon System

↳*System*

Name: FEG AK-63 / AMM

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fegyver- és Gépgyár

In Service: 1977-Present

Proliferation: +1 Million

Max Rate of Fire: rds/min600

Weight: kg3.6

Length (Total): mm880

Length (Barrel): mm415

Width: INA

Height: INA

Action: Gas-operated, rotating bolt

Effective Firing Range: m500

Feed system: 10, 20, 30, 40-round box magazines, 75 or 100-round drum magazine

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×39mm NATO

Muzzle Velocity: m/sINA

Basic Load: ea200

Fire Control

Name: Fully Integrated Improved Fire-Control System (IFCS)

Computerized FCS: Yes, Marconi 12-12P digital computer

First-Round Hit Probability (Stationary Targets): m3,000

First-Round Hit Probability (Moving Targets): m2,000

Thermal Sight Tank Commander: Yes

Commander's Cupola Traverse Range: Deg360

Thermal Sight Gunner: Yes, the AFV No 36 Mk 2 periscope or L3A1.

Periscopes: Nine AFV No 40 Mk 2 observation periscopes

Main Gun Stabilization: INA

Radar and Defense System: GEC-Marconi Radar and Defence Systems

Search Light: Defence Control Systems Division, IR/white-light searchlight

Search Light Range (IR Mode): m1,000

Search Light Range (White Light Mode): m1,500

Tank Laser Sight Unit (TLSU).: Yes

No 70 Telescopic Sight: Yes, for the Gunner

Gun Control System: all-electric gun control system is a Marconi Fighting Vehicle Gun Control Equipment (FV/GCE) No 7 Mk 4

Laser Rangfinder: Yes, LF2 laser range finder,

Protection

Hull Armor: Welded RHA

Turret Armor: Cast and rolled steel

Applique Armor: Available, Stillbrew armour
Explosive Reactive Armor: Available
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: Available
NBC Protection: Yes, a modified Iranian NBC package
Smoke Equipment: Yes, on each side of the turret there is six electrically-operated 66 mm smoke grenade dischargers.
IR Detector: Yes
Fire Suppression System: FIREWIRE automatic fire-detection system
Air Ventilation and Filtration System: Yes

Notes:

The Chieftain MK3 Main Battle Tank is a variant of the Chieftain series Main Battle Tanks. The MK3 has a revised suspension, Command's Cupola, engine air cleaner and other additional equipment to assist the tank when operating in the desert environment. The Mk.3 was fitted with additional equipments, dry-air cleaner element, modified No 15 Mk 2 commander cupola, upgraded engine and gave birth to Mk 3/2 (Improved electrical equipment and air cleaners), Mk 3/3 (ER RMG, laser rangefinder, 720 bhp engine & modified NBC pack), Mk 3/3P (Iranian version), Mk 3G (Prototype with turret air-breathing for engine aspiration), and the Mk3s (Mk 3/G with turret air-breathing and commander\'s firing switch).

T-72B Russian Main Battle Tank (MBT)





Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72A:** Second Russian main variant of the T-72.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: T-72B; NATO designation: SMT M1988; Development designation: Objekt 174M; Synonyms: Super Dolly Parton

In Service: 1984-present

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note: The T-72B can be distinguished from earlier T-72s by the additional ERA and the additional thickness at the front of the turret.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons41

Ground Pressure: kg/m0.898 kgf/cm2

Automotive

Engine Name: V-84M

Engine Type: Four stroke, liquid cooled diesel engine with a centrifugal supercharger.

Engine Power: hp840

Power to Weight Ratio: hp/ton18.9

Cruising Range: km700

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

R-173 Range: km0-20

Radio #2: R-168-100U (Standard VHF)

Main Gun

Note: Another primary difference between the T-72A and the T-72B is that the T-72B can fire the 125mm 9K120 Svir Missile Complex

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Note: The 9K120 gun-launched missile complex is a two piece guided missile that is loaded and fired from the main gun in the same way as an ordinary round.

ATGM System Name: 9K120 gun-launched missile complex

Missile Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Onboard Guidance System: Yes

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Hit Probability: %80

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Warhead Type: 9N142 shaped charge warhead

Laser Emitter: 1K13 sight's laser

Maximum Effective Range: m4,000

Minimum Effective Range: m100

Elevation Range (Super Elevation): deg-7 to +20

Elevation Range (Standard Elevation): deg-5 to +15

Coaxial Weapon System

System

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: mm7.62
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650-750
Effective Rate of Fire: rds/min250
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length: mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.60
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea2,000
Effective Range (Iron Sights): m1,000
Effective Range (with Sight Adjustments): m100-1,500
Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)
Type: 12.7 Anti-Aircraft Machine Gun
Proliferation: over 1 Million
Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia
Weight (Gun Only): kg25
Muzzle Velocity: m/s845
↳ **Length (Total):** mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, 1K13 sight and aiming complex

Thermal Sight Gunner: Gunner's primary sight is the 1A40-1

Main Gun Stabilization: 2E42-2 (Upgrade)

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Note: The Gunner, using the 1A40-1 sight can designate and engage targets out to a mazimum distance of 4,000 meters with APFSDS and HEAR rounds.

Protection

Hull Armor: Steel and composite armour with additional plates that provide protection equivalent to 950mm of steel against HEAT projectiles, 440mm resistance to KE rounds, and 500mm against shaped charges.

Turret Armor: Steel and composite armour with ERA, 950 mm against HEAT weapons. The Turret has additional Ceramic or

silica inserts to add to the protection level of the T-72B
Applique Armor: Available, Turret top and track skirts
Explosive Reactive Armor: Yes, Kontakt-1. Additional ERA is added to the Turret, Glacis, and sides of the hull.
Armor Cassette Type: 4S20 cassette that is filled with an explosive element and steel armoured plate.
Number of total Armor Cassettes: ea200-300
NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).
Active Protection System: Yes, ZETS11-3 Control System
Mine Clearing: Yes, Roller and plow (optional)
Self-Entrenching Blade: Yes, built in Dozer Blade
Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.
Grenade Maximum Effective Range: m200-300
Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.
Engine Smoke Screen Capable: Yes
IR Signature: INA
Automatic Fire Extinguishing Equipment.: Yes
Note #1: The T-72B can be distinguished from earlier T-72s by the additional ERA and the additional thickness at the front of the turret.
Note #2: The base protection of the T-72B is the same as the T-72A, however the vehicle is upgraded with considerable amounts of additional composite armor.
Note #3: The additional added armor cassettes reduce penetration by as much as 95%.

Notes:

The T-72B MBT (Main Battle Tank) is developed from the Russian main battle tank T-72A. It was entered in service with the Russian army in 1984. Its turret has a new armour package that provides a much higher degree of protection than any previous model of the T-72 MBT. In addition the glacis plate is provided with 20 mm of appliqué armour. Accepted in 1985 and mass-produced since 1988, the T-72B(M) MBT (Ob.187) has protection level comparative to that of the contemporary T-80U, but has a noticeably poorer FCS and vision aids and is underpowered. It is the last model of the (in)famous T-72 line, because the T-72BU MBT, successor to T-72B(M), received a new designation, T-90. However, T-72B(M) tanks and older T-72s upgraded to T-72B(M) standard are the most numerous tanks fielded with the Russian military. With the current financial problems, it will likely remain in wide-spread use well into the 21st century.

Al-Khalid Chinese/Pakistan Main Battle Tank (MBT)





Tiers:



Variants:

- **MBT-2000:** The MBT-2000 was developed in China by NORINCO, where it was known as the Type 90-II and was later marketed for export as the MBT-2000. The MBT-2000 developed and offered for export by NORINCO is believed to have very similar specifications as the Al-Khalid and externally appears almost identical. The MBT-2000 has been exported by NORINCO to Bangladesh. The MBT-2000 has a crew of three, a 125 mm smoothbore gun as a main armament, and an all-welded steel construction with additional layer of composite armour over the frontal arc for protection.
- **VT-1A:** Export Version of the MBT-2000. Bangladesh: 44, Morocco: 54, Myanmar: 50

System

Alternative Designation: MBT-2000, Type 90-11, Al-Khalid
Date of Introduction: 2000
Estimated out of Service Date: 2035-2050
Manufacturer: NORINCO
Proliferation: China: INA, Bangladesh: 44, Morocco: 54, Myanmar: 50. Over 150 total.
Type: Main Battle Tank
Status: In Production
Family: INA
Crew: ea3
Passenger Capacity: INA
Maximum Effective Range (Road): km500
Maximum Effective Range (Main Gun): m5,000
Add on Parts: Yes, Additional Armor

Dimensions

Length: m10.33
Width: m3.5
Height: m2.4
Weight, Combat: tons48
Ground Pressure: kg/mINA

Automotive

Engine Name: Ukrainian 1,200 hp 6TD-2 six cylinder turbocharged multi-fuel diesel engine.
Engine Type: Diesel
Engine Power: hp1,200
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: 55
Speed Maximum Swim: km/hINA
Gradient: deg60
Side Slope: deg40
Vertical Step: m0.85
Fording Depth: m1.4
Fording with Preparation: m5
Tench: m2.7
Suspension: Torsion Bar
Hydraulic Shock Absorbers: Yes

Communications

↳***TBR-121***

VHF Transceiver: Yes
VHF Range: km1 to 50
Proliferated: Widely
Digital Data: Yes, Full
Control: Self-Adaptive Control (Including Automatic Antenna Tuner)
Frequency Agile: Yes
Wireless Network Capabilities: Yes
Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: MBT-2000 Main Gun

Type: 125 mm smoothbore gun

Max Rate of Fire: rds/min6-8

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Laser

Loader Type: Autoloader

Thermal Jacket: Yes

Fume Extractor: Yes

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 39 in total any combination

Maximum Effective Range: m5,000

Minimum Effective Range: mINA

Armor Penetration: Yes

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Fragments: ea2,500

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 39 in total any combination

Maximum Effective Range: m3,000

Minimum Effective Range: mINA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Max Dispersion: INA

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*Ammunition (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot Tracer or APFSDS-T rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Basic Load: 39 in total any combination

Muzzle Velocity: m/s2,050

Muzzle Energy: MJ15-24

Maximum Effective Range: m3,000

Minimum Effective Range: mINA

Projectile Dimension: mm900

Penetration: mm1,000

Projectile Weight: kg11

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Tank Commander's Weapon System

↳*System*

Name: W-85

Type: 12.7mm Anti-Aircraft Machine Gun

Max Rate of Fire: rds/min550-600

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Iron/Optical

Feed System: Belt

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation Angle: deg90

↳***Ammunition***

Type: Type 54 Round

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea750 (50 Round Belts)

Effective Range: km2.5

Armor Penetration: Yes

Mounted: Co-axially with the 125mm Main Gun

Loader's Weapon System

↳***System***

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.62 Coaxial Machine Gun

Manufacturer: NORINCO

Length, Total: 1,192

Length, Barrel: mm658

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Max Rate of Fire: rds/min700-800

Sustain Rate of Fire: rds/minINA

Time the Max Rate of Fire can be Sustained: secondsINA

Range Finder Type: Scope

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign to China): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳***Ammunition***

Type: Rifle

Caliber: mm7.62x54

Muzzle Velocity: m/s840

Basic Load: ea4,000

Effective Range: m100-1,500 (With Sight Adjustments)

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: Yes, Image Stablished FCS

Ballistic Computer: Yes

Thermal Sight Tank Commander: Yes

Two-Axis Panoramix Sight (Commander): Yes

Commander's sight Magnication: x6 with a 10 deg FOV

Thermal Sight Gunner: Yes

Two-Axis Stabilised Fixed Roof-Mounted Sight (Gunner): Yes

Gunner's Sight Magnification: x3 with a 20 percent FOV and x10 with a 6 deg FOV.

Main Gun Stabilization: Yes

Auto-Tracking Function: Yes

Image-Stabilized Gunner Sight: Yes

Fire Control Computer and Sensors: Yes

Laser Rangfinder: Yes

Automatic Target Tracker (ATT): Yes

Thermal Imager Module: Yes

Roof Mounted Crosswind/Angular Velocity Sensor: Yes

Protection

Hull Armor: all-welded steel, Protects from small arms fire and shell splintering

Turret Armor: all-welded steel, Protects from small arms fire and shell splintering

Applique Armor: Yes, Modular Armor

Explosive Reactive Armor: Yes, added to the Glacis Plate, Sides, forward roof, and Vehicle Nose

Active Protection System: Yes

Mine Clearing: No

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Available

IR Reflective Paint: yes

Anti-Neutron Liner: Yes

Notes:

The Al-Khalid (Urdu: الخالد ٹینک—Al-Xālid Ṫaiŋk, pronounced [əl-ˈxɑːlɪɖ ʈæːŋk] literally "The Eternal Tank") is a main battle tank jointly developed by Pakistan and China during the 1990s, based on the Chinese Type 90-IIM tank.[7] The original prototype

was developed by China North Industries Corporation (Norinco) under the name MBT-2000, and Norinco also offered the tank for export. Around 310 Al Khalid MBTs had been produced by 2014. The Bangladesh Army ordered 44 MBT-2000s from China in 2011. The Norinco-made MBT-2000 is also used by the Royal Moroccan Army. It was trialled by the Peruvian Army for possible acquisition, but was not purchased due to financial problems. Operated by a crew of three and armed with a 125 mm smooth-bore tank gun that is reloaded automatically, the tank uses a fire-control system and night-fighting equipment. Al-Khalid is named after the 7th-century Muslim commander Khalid bin al-Walid (592–642 AD). The current production variant of the Al-Khalid uses a diesel engine and transmission supplied by the KMDB design bureau of Ukraine. The first production models entered service with the Pakistan Army in 2001. The country placed an order with Ukraine to further upgrade the tanks with a new engine. Al-Khalid is designed with a 125 mm bore, 48 calibre long smoothbore, auto-frettaged and chrome-plated gun barrel which is manufactured from highly stiff electroslag remelting steel. The gun is then put under stringent quality control process to ensure standard barrel life of 1,100 rounds EFC; barrels that cannot pass this test are rejected. This gun provides very high internal chamber pressures for APFSDS, HEAT FS and guided missiles. The gun can also fire the following types of conventional ammunition: APFSDS, HEAT-FS and HE-FS. The gun is a modified variant of both the ZPT-98 and KBA-3 series of 125 mm smooth bore gun for Al-Khalid MBT which provided compatibility with Ukrainian ATGMs such as Kombat. The gun retains qualities of both Chinese and Ukrainians mated with indigenous design for better and accurate firepower on stationary and moving targets alike. The Gun-launched, laser-guided anti-tank guided missiles can also be launched.

Chieftain MK 5 British Main Battle Tank (MBT)




Tiers:



Variants:

- **FV4202 "40-ton Centurion":** Test vehicle built by Leyland Motors using Centurion components to test reclining drivers position and mantlet-less turret proposed for FV4201. One built, 1956, official specification for FV4201 issued August 1958.
- **FV4201 P1 - FV4201 P7:** Prototypes. Seven built, 485 hp L60 Mk 1 or 485 hp L60 Mk 4,initial vehicles had internal exhaust silencers, short hull. small diameter road wheels, weight 45 long tons, initial vehicles, 49.5 long tons for later vehicles, 1959-1962
- **Chieftain Mk.1:** 40 training vehicles for 1965–1966 with 585 hp L60 Mk 4 engine, strengthened TN12 gearbox, exhaust silencers moved to external armoured box on hull rear plate, larger 'Centurion' 31.6 inch diameter road wheels, re-positioned final drive and idler wheel assemblies, two-piece commander's hatch cover, rubber track pads fitted for road protection, resilient rubber coaming around engine rear decking to prevent damage from gun with gun depression when turret traversed to the rear, stowage rack added to left rear of turret, dummy stowage 'bin' on front glacis and canvas cover over turret nose to conceal ballistic shapes, [v] weight 50 long tons, Issued to 1 RTR and 5 RTR for troop trials. All Mk.1 to Mk.1/4 vehicles were subsequently to be based at Bovington Camp and Catterick Garrison. 11 short hull units converted to be CH AVLB Mk.6
- **Chieftain Mk.1/2:** Upgrade of Chieftain Mk.1 to Chieftain Mk.2 standard, fitted with 650 hp L60 Mk 4A2 engine, training use only
- **Chieftain Mk.1/3:** Upgrade of Chieftain Mk.1, fitted with 650 hp L60 Mk 5A engine, training use only
- **Chieftain Mk.2:** First service model with 650 hp L60 Mk 4A2 engine, L11A2 or L11A3 main gun,[viii] NBC system fitted to rear of turret, revised turret stowage, one-piece commander's hatch cover, armour removed from searchlight cover, rigid flotation panels replaced by facility for deep wading, road speed 25 mph, range 250 miles, weight 51.5 long tons, first vehicles issued to 11th Hussars at Hohne in West Germany in early 1967, improved 650 hp L60 Mk 5A engine fitted 1969
- **Chieftain Mk.3:** Improved 650 hp L60 Mk 6A engine with two-stage air cleaner, improved auxiliary generator (Coventry Climax A30), better stowage, new No. 15 Mk 2 commander's cupola, road speed improved to 30 mph, range increased to 310 miles, weight 53 long tons, 1970
- **Chieftain Mk 3/2:** Fitted with 720 hp L60 Mk 7A, 1971
- **Chieftain Mk 3/3:** Fitted with 720 hp L60 Mk 7A, Improved main gun range finding,provision for Barr & Stroud TLS (Tank Laser Sight) LF2 laser range finder, 1971
- **Chieftain Mk 3/G:** Chieftain Mk.3 with engine induction through fighting compartment. Prototype only
- **Chieftain Mk.3/3P:** Chieftain Mk 3/3 for Iran, 1973
- **Chieftain Mk 3/S:** Production version of Chieftain Mk 3/G with commander's firing control
- **Chieftain Mk.4:** Chieftain Mk.3 with increased fuel capacity. Only two built.
- **Chieftain Mk.5/5P:** Chieftain Mk.5 for Iran, 1975. Engine later upgraded to 750 hp L60 Mk 10A, 1977
- **Chieftain Mk.5/2K:** Chieftain Mk.5 for Kuwait, 1975
- **Chieftain Mk.6:** Chieftain Mk.2 upgraded to Chieftain Mk.5 standard, 1975 In 1975 all earlier Marks of tanks except Mark 1's were upgraded to Chieftain Mk.5 standard as part of the 1975 "Totem Pole" programme,[xvi] including addition of Clansman radios, fitting of TLS, fitment of Muzzle Reference System (MRS) [upon replacement of L11A3 barrel with L11A5 barrel,[xviii] and fitment of 750 hp L60 Mark 8A. These vehicles were re-designated Chieftain Mk's.6 to Mk.8.
- **Chieftain Mk.7:** Chieftain Mk.3 and Chieftain Mk 3/S upgraded to Chieftain Mk.5 standard, 1975
- **Chieftain Mk.7C:** Chieftain Mk.3 upgraded to Chieftain Mk.5 standard for Oman
- **Chieftain Mk.8:** Chieftain Mk.3/3 upgraded to Chieftain Mk.5 standard, 1975 In 1977 the engines of all vehicles were upgraded to the 750 hp L60 Mark 9A, followed by further upgrading with the 840 hp L60 Mark 11A or L60 Mark 12A [xxi] in 1978 as part of the 1977 "Dark Morn" and the 1978 "Sundance" programmes.

- **Chieftain Mk.9:** Chieftain Mk.6 after completing all phases of "Totem Pole", 1979.
- **Chieftain Mk.10:** Chieftain Mk.7 after completing all phases of "Totem Pole". Later upgraded with addition of Stillbrew Crew Protection Package to the turret front and turret ring, 1984–86
- **Chieftain Mk.11:** Chieftain Mk.8 after completing all phases of "Totem Pole". Later upgraded with Stillbrew, 1984–86
- **Chieftain Mk.12:** Chieftain Mk.5 after completing all phases of "Totem Pole". Later upgraded with Stillbrew, 1984–86
- **Chieftain Mk.12/13:** Proposed further upgrades, cancelled when the Challenger 1 was introduced.
- **Chieftain 800:** Chieftain with Chobham armour and new power train
- **Chieftain 900:** Chieftain with Chobham armour, new power train, and Centaur fire control system
- **FV4204 ARV/ARRV:** Armoured Recovery Vehicle, Armoured Recovery and Repair Vehicle.
- **FV4205 AVLB Mk5:** Bridge-laying vehicle
- **Chieftain AVRE (CHAVRE):** Armoured Vehicle Royal Engineers, twelve early "Willich Chieftain AVRE" vehicles converted by 32 Armoured Engineer Regiment and 21 Engineer Base Workshop of the Royal Engineers, Willich, 1987, remaining 48 ex MBTs converted by Vickers Defence Ltd, 1991, to be a British Army combat engineering variant used by the Royal Engineers.
- **Chieftain Marksman:** Self-propelled anti-aircraft gun version, equipped with the Marksman twin gun turret.
- **Khalid /Shir (Lion) 1:** Also known as "4030 Phase 2 Jordan". Jordanian with the running gear of the Challenger 1. In essence, this was a transition vehicle from the Chieftain to the Shir 2, which had been intended for Iran but was subsequently cancelled due to the 1979 Iranian Revolution. The vehicle chassis comprised the front half of a Chieftain hull, Chieftain running gear and the rear of a 4030/2 Chassis (Sloping Hull). This allowed the fitment in the engine bay of a Rolls-Royce CV12 engine producing 1200 bhp at 2,300 rpm.
- **Weapon Carriers:** The Chieftain chassis was adapted to mount air defence weapons ("Marksman" 2 x 35 mm cannon) and a 155 mm howitzer in a number of variants.
- **Shir 2:** 4030 Phase 3" Iranian variant. Visible external differences from Chieftain Mk.5 included a sloping rear hull, the removal of the searchlight from the left turret area and the refitting of storage baskets, the removal of the water channel from around the driver's hatch on the glacis, modification of the light clusters also on the glacis and the enlargement of the sight housing on the commander's cupola. Not delivered, the Shir 2 tanks became Challenger 1 tanks after reworking at ROF Leeds
- **Mobarez Tank:** Iranian upgraded version of Chieftain.

System

Alternative Designation: Chieftain MK 5
Type: Main Battle Tank
Family: Chieftain Main Battle Tank Family
Crew: ea4

Dimensions

Length (Overall): m10.8
Length (Hull): m7.5
Width: m3.5
Height: m2.9
Weight, Combat: tons55
Ground Pressure: kg/m

Automotive

Engine Name: Leyland L60
Engine Type: Diesel
Engine Power: hp750
Gearbox: TN12 gearbox
Maximum Range: km400

Cruising Range: km200

Speed, Maximum Road: km/h48

Speed, Average Cross: 30

Speed Maximum Swim: km/hNot Amphibious

Steering System: Merritt-Wilson differential steering system

Fuel Capacity: liters950

Suspension: Horstmann suspension

Communications

Primary: Twin Clansman VRC 353 VHF Radio sets

Secondary: 1 C42 1 B47 Larkspur VHF radios

Main Gun

↳*System*

Name: 120 mm L11A5 Rifled Tank Gun

Type: mm120

Max Rate of Fire: rds/min8-10

Manufacturer: Royal Ordnance Factories

Proliferation: 3,012

Bore Evacuator: Yes

Thermal Sleeve: Yes

Weight: kg1,778

Length (Total): m6.858

Length (Barrel): m6.6

Gun Recoil: mm370

Breech Type: semi-automatic cam

Maximum Effective Range: m3,000

Maximum Elevation: Deg+20

Minimum Elevation: Deg-10

↳*Ammunition (Option 1)*

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS) L23

Caliber: mm120

Muzzle Velocity: m/s1,534

Basic Load: 64 total of any 120mm projectile combination

Effective Range: m3,000

Penetrator: Monobloc tungsten alloy rod

Diameter: mm120

Height: mm500

Case Charge: L8 combustible case charge

Note: Average Projectile Load would consists of the following: 33 L26 APFSDS rounds, 13 L31A7 HESH, and 3 white L34 phosphorous smoke rounds.

↳*Ammunition (Option 2)*

Type: APFSDS L26 (CHARM 1)

Caliber: mm120

Muzzle Velocity: m/sINA

Maximum Effective Range: m2,100

Penetrator: Monobloc tungsten nickel copper long rod

Case Charge: L14A1 or L14A2

Basic Load: 64 total of any 120mm projectile combination

Variant: APFSDS L27A1 (CHARM 3).

↳*Ammunition (Option 3)*

Type: HESH L31

Caliber: mm120

Muzzle Velocity: m/s670

Basic Load: 64 total of any 120mm projectile combination

Maximum Effective Range: m8,000

Coaxial Weapon System

↳*System*

Name: FN MAG 7.62mm General Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: More than 1 Million

Max Rate of Fire: rds/min650-1,000

Weight: kg11.8

Length (Total): mm1,263

Length (Barrel): mm630

Width: mm118.7

Height: mm263

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): m800

Effective Firing Range (Tripod): m1,800

Maximum firing range: m3,500

Feed system: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: 6,000

Loader's Weapon System

↳*System*

Name: FN MAG 7.62mm General Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: More than 1 Million

Max Rate of Fire: rds/min650-1,000

Weight: kg11.8

Length (Total): mm1,263

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Effective Firing Range (Bipod): m800

Effective Firing Range (Tripod): m1,800

Maximum firing range: m3,500

Feed system: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s840

Basic Load: 6,000

Fire Control

Name: Fully Integrated Improved Fire-Control System (IFCS)

Computerized FCS: Yes, Marconi 12-12P digital computer

First-Round Hit Probability (Stationary Targets): m3,000

First-Round Hit Probability (Moving Targets): m2,000

Thermal Sight Tank Commander: Yes

Commander's Cupola Traverse Range: Deg360

Thermal Sight Gunner: Yes, the AFV No 36 Mk 1 periscope or L3A1.

Periscopes: Nine AFV No 40 Mk 2 observation periscopes

Main Gun Stabilization: INA

Radar and Defense System: GEC-Marconi Radar and Defence Systems

Search Light: Defence Control Systems Division, IR/white-light searchlight

Search Light Range (IR Mode): m1,000

Search Light Range (White Light Mode): m1,500

Tank Laser Sight Unit (TLSU).: Yes

No 70 Telescopic Sight: Yes, for the Gunner

Gun Control System: all-electric gun control system is a Marconi Fighting Vehicle Gun Control Equipment (FV/GCE) No 7 Mk 4

:

Protection

Hull Armor: Welded RHA

Turret Armor: Cast and rolled steel

Applique Armor: Available, Stillbrew armour

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: Available

NBC Protection: Yes

Smoke Equipment: Yes, on each side of the turret there is six electrically-operated 66 mm smoke grenade dischargers.

IR Detector: Yes

Fire Suppression System: FIREWIRE automatic fire-detection system

Air Ventilation and Filtration System: Yes

Notes:

The Chieftain originated from a British Leyland design of a new tank, dating as early as 1950, when the War Office requested a replacement for the Centurion, as the Medium Tank No 2. The Mk.4 were two prototypes with increased fuel capacity and other minor modifications.

M47 Patton American Main Battle Tank (MBT)





Tiers:



Variants:

- **M46E1:** M46E1 – pilot model, M46 hull with T42 turret, fitted with the M36 90 mm Gun, and was longer to incorporate a radio, ventilator, and featured a stereoscopic rangefinder; only one built[
- **M47:** M47 – main production version, M46 hull modified with redesigned glacis, reduction from five to three track return rollers per side, longer mufflers on rear fenders; 8,576 built
- **M47M:** M47M – The product of an improvement program started in the late 1960s, the M47M featured the engine and fire control elements from the M60A1. The assistant driver's position was eliminated in favor of additional 90 mm ammunition. Not used by the US; over 800 vehicles were produced for Iran and Pakistan
- **M47E:** M47E – Spanish M47M austere version (kept original FCS).
- **M47E1:** M47E1 – Second Spanish upgrade batch with rearranged main gun ammunition storage and crew heater. Both new and upgraded M47Es. 330 converted.
- **M47E2:** M47E2 – 45 built. M47E1 with Rh-105 105 mm gun and improved FCS (still electromechanical). Passive night vision for driver and commander. All M47 series MBT in Spanish service retired 1993.
- **M47ER3:** M47ER3 – Spanish armored recovery vehicle. 22 built.
- **Sabalan:** Sabalan – An Iranian upgraded version of the US M47M, It has side skirts and a newly built turret fitted with a 105-mm gun, laser range finder, new fire control system and communication equipment.[34][35] Never used in active service.

System

Alternative Designation: M47 Patto
Date of Introduction: 1951
Proliferation: Iran [168] Jordan [23] (including M48s, in storage) South Korea [400]
Type: Main Battle Tank
Family: INA
Crew: 5 (commander, gunner, loader, driver, assistant driver)

Dimensions

Length: m8.51

Width: m3.51

Height: m3.35

Weight, Combat: 48.6 short tons (44.1 t) combat ready

Automotive

Engine Name: Continental AV-1790-5B V12, air-cooled, gasoline engine

Engine Type: Gasoline Engine

Engine Power: hp810

Operational Range: km160

Speed, Maximum Road: km/h48

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Fuel Capacity: 233 US gal (880 l; 194 imp gal)

Suspension: Torsion bar suspension

Gradient: %60

Vertical Obstacle: 0.91 m

Trench: 2.59 m

Main Gun

↳*System*

Name: 90mm gun M36

Type: Anti-Tank Gun

Length: 9.0 m

Barrel Length: 4,728.21 mm

Width: 4.1 m

Weight: 1,030 kg

Maximum Elevation: deg+19

Minimum Elevation: deg-5

Travere Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Muzzle Velocity: 810 m/s

Maximum Firing Range: 3,200 m

↳***Ammunition***

Type: Rifle

Caliber: mm90

Basic Load: 71 rounds, w/11 in the bustle

Coaxial Weapon System

↳***System***

Name: M1919 Browning

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Manufacturer: Buffalo Arms Corporation Rock Island Arsenal Saginaw Steering Gear division of General Motors

Proliferation: 438,971

Length: 964 mm

Barrel Length: 610 mm

Weight: 14 kg

Action: Recoil-operated/short-recoil operation

Rate of Fire: 400–600 round/min (1200–1500 for AN/M2 variant)

Muzzle Velocity: 850 m/s

Effective Firing Range: 1,500 yd (1,400 m) (maximum effective range)

Feed System: 250-round belt

↳***Ammunition***

Type: Rifle

Caliber: mm7.62mm

Cartridge: .30-06 Springfield (U.S.) 7.62×51mm NATO .303 British 7.92×57mm Mauser 6.5×55mm .22 Long Rifle (Mini) 7.62×54mmR 8×63mm patron m/32 7.65×53mm Argentine 7.5×54mm French

Basic Load: 4,000 rds

Auxiliary Weapon System

↳***System***

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Effective Firing Range: 1,800 m

Maximum Firing Range: 7,400 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 450 rds

Fire Control

Name: INA

Computerized FCS: No

M12: mechanical stereoscopic ballistic rangefinder

M20: periscopes for commander and gunner

M13: periscopes for loader and driver, 6x magnification infrared (IR) driving lights have been fitted to many M47s

Main Gun Stabilization: INA

Protection

Hull Armor: Upper Glacis: 4 in (100 mm) at 60° = 8 in (200 mm) LoS

Turret Armor: Turret Front: 4 in (100 mm) at 40° = 5.22 in (133 mm) LoS

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The M47 Patton was an American main battle tank, a development of the M46 Patton mounting an updated turret, and was in turn further developed as the M48 Patton. It was the second American tank to be named after General George S. Patton, commander of the U.S. Third Army during World War II and one of the earliest American advocates of tanks in battle. The M47 was the U.S. Army's and Marine Corps' primary tank, intended to replace the M26 Pershing and M46 Patton medium tanks. The M47 was widely used by U.S. Cold War allies, both SEATO and NATO countries, and was the only Patton series tank that never saw combat while in US service. Although similar in appearance to the later M48s and M60s, these were completely new tank

designs. Many different M47 Patton models remain in service internationally. The M47 was the last US tank to have a bow-mounted machine gun in the hull. Although a new power plant corrected the mobility and reliability problems of the M26 Pershing, the subsequently renamed M46 was considered a stopgap solution that would be replaced later by the T42 medium tank. However, after fighting erupted in Korea, the Army decided that it needed the new tank earlier than planned. It was deemed that there was not enough time to finish the development of the T42. The final decision was to produce another interim solution, with the turret of the T42 mounted on the existing M46 hull. Although this interim tank was itself technically immature, Army officials felt the improvements over the M46 in firepower and armor were worth the risk. The composite tank, developed by the Detroit Arsenal, was named the M47 Patton. In December 1950 the Army awarded a $100 million contract to the American Locomotive Company for the production of 500 tanks. It entered production in 1951. Its main gun was the M36 90 mm gun with an M12 optical rangefinder fitted. The secondary armament consisted of two .30 cal Browning machine guns, one in the bow and one coaxial with the 90mm main gun in the turret, and a .50 caliber Browning M2 on a pintle mount on the turret roof. The M47 was the last American-designed tank to include a bow machine gun. The T42 turret had a larger turret ring than the M26/M46 turret, and featured a needle-nose design, which improved armor protection of the turret front, an elongated turret bustle and storage bin which protruded halfway across the engine deck, and sloped sides to further improve ballistic protection; this gave the turret a decidedly lozenge-shaped profile. It also featured the M12 stereoscopic rangefinder, which was designed to improve first-round hit probability but proved difficult to use; the rangefinder protruded from both sides of the upper turret front, which would be a feature of American tanks until the advent of the M1 Abrams in 1980. Production at American Locomotive began in July 1951. Logistical and technical issues plagued production almost from the start. Truman administration policy sought to strengthen American arms makers' resilience to aerial attack by encouraging more decentralized weapons production — away from Detroit. The U.S. curtailed civilian automobile production to boost military production with the onset of the Korean War. As a result, Detroit's newly unemployed automotive workers found little work, while tank manufacturers outside Michigan lacked skilled workers. Truman's policy also counted on civilian factories being able to quickly transition to war-time production. However many factories lacked needed tank production machinery, done away with during World War II demobilization. A faulty Ordnance Corps-designed hydraulic turret-control mechanism, shared by the M41 Walker Bulldog, kept the tanks from Korea while engineers worked on a fix. Engineers improved production quality controls of the hydraulics by April 1952, and set about correcting M47s sidelined in storage. By then Army officials had scrapped plans to send the tanks to Korea, in favor of providing them to troops stationed in Europe and at home. The first M47s were not fielded to the 1st and 2nd Armored Divisions until summer 1952. Standardized in May 1952, the M47 Patton's production ran until November 1953; Detroit built 5,481 tanks, and American Locomotive Company (Alco) produced 3,095, for a total production run of 8576 M47 Pattons.

T-90K Russian Main Battle Tank (MBT)



Tiers:



Parent:

T-90 Russian Main Battle Tank (MBT)

Variants:

- **T-90A:** Russian army version with welded turret, V-92S2 engine and ESSA thermal viewer. Sometimes called T-90 Vladimir, in honor of its chief designer Vladimir Potkin
- **T-90AK:** Command version of T-90A.
- **T-90AM:** Latest version of the T-90A.[77] The main features include the modernisation of the old turret design, which is equipped with a new advanced fire control system "Kalina" (with integrated combat information and control systems), a new automatic loader and a new upgraded gun 2A46M-5, as well as a remote-controlled anti-aircraft gun "UDP T05BV-1". The new version also includes the Relikt (Реликт (динамическая защита) ERA bricks instead of the Kontakt-5 ERA bricks.
- **T-90M:** New modernized version of T-90A. It's a program of modernization of Vladimir tanks and will include 400 tanks currently in service. Tanks will receive 2A82-1M gun (same as in T-14) and fire control system Kalina. They will be upgraded with Afghanit APS and Relikt ERA. The upgrades are also aimed at improving network-centric warfare capabilities and coordination with Armata project vehicles. The first contract was signed in 2017 and serial production started in 2018.
- **T-90S:** Export version of the T-90, later adopted by the Russian Armed Forces as the T-90A. These tanks were made by Uralvagonzavod and were updated with 1,000 hp (750 kW) engines made by Chelyabinsk Tractor Plant. These tanks carry a leaner version of the Shtora-1 passive/active protection system which lacks the infra-red dazzlers carried on the turret. Sometimes called T-90C (Cyrillic letter es looks like a Latin c). These were initially supplied with cast turrets of the early T-90, and when stocks were depleted, new, welded turrets were fabricated.
- **T-90SK:** Commander's version of the T-90S, with additional communication and navigation equipment. It differs in radio and navigation equipment and Ainet remote-detonation system for HEF rounds.
- **T-90S:** "Bhishma" – modified T-90S in Indian service.
- **T-90MS:** Also known as T-90SM is an updated version of the T-90S. It is equipped with a 1,130 hp engine, a PNM Sosna-U gunner view. a UDP T05BV-1 RWS with a 7.62 mm machine gun, GLONASS, inertial navigation systems, new Relikt explosive reactive armour (ERA) that covers more of the tank, and a steering wheel. A new removable turret bustle is included, which provides storage for eight additional rounds. The T-90MS is ready for serial production.[88] 4 video cameras provide a 360° view of the environment, while the tank is more connected to command. The T-90MS has an upgraded thermal imager that can detect tanks over 3300 meters away.
- **BREM-1M:** Armoured recovery vehicle.
- **IMR-3M:** Combat engineer vehicle.
- **MTU-90:** Bridge layer tank with MLC50 bridge.
- **BMR-3M:** Mine clearing vehicle.
- **MTU-2020:** Bridge layer tank based on the T-90A whose chassis has been extended, along with the addition of a road wheel.

System

Alternative Designation: T-90

Type: Main Battle Tank

Family: T-90 Family of Main Battle Tanks

Manufacturer: Uralvagonzavod

Generation: 3+

Status: In service

Crew: ea3 (commander, gunner and driver)

Passenger Capacity: INA

Maximum Effective Range (Land): km500

Maximum Effective Range (ATGM): m5,000

Note: The T-90 is the most modern tank currently in service with the Russian Army, which has a requirement for around 1 500 of these tanks. Also currently it is the only mass-produced MBT in Russia.

Estimated Service Life: 25-30 years

Estimated out of Service Date: 2030-2040

Dimensions

Length: m9.63

Width: m3.78

Height: m2.2

Weight, Combat: tons46

Ground Pressure: kg/mINA

Automotive

Engine Name: V-92S2

Engine Type: V-12 Diesel

Engine Power: hp1,000

Auxiliary Power Unit: Yes

Gas Turbocharger: Yes

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed Maximum Swim: km/hNot Amphibious

Speed, Average Cross: 50

Power to Weight Ratio: hp/tons18.2

Suspension: Torsion bar

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.8

Trench: m2.85

Fording Depth (No Preparation): m1.2

Fording Depth (With Preparation): m5

Fuel Type: Gasoline or Kerosene

Transmission: Mechanical

Fuel Capacity: liters1,200

Communications

Antenna Type: AB-1-P28 Telescopic Antenna

Antenna Height: m11

↳*R-163-50K*

Manufacturer: Sarapul Radioplant OJSC

Product Type: C4ISR

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

↳*R-163-50K HF transceiver*

Type: High Frequency

Simplex: Yes

Two-Frequency Simplex Telephone: Yes

Two-Frequency Simplex Telegraph Radio: Yes

MHz Range: MHz2-30

Output Power: W50

Operational Range: km350

Note: Compatible with certain VHF Radios in Simplex Mode.

Navigation System

↳*TNA-4 Navigation System*

Gyro Unit: Yes

Distribution Box: Yes

Transformer Type: Pulse

Distance Measurement Unit System: Yes

Speed Indicator System: Yes

Course Heading Indicator Unit: Yes

Track Recorder Map Display.: Yes

Combined Display/Computer Unit: Yes

Main Gun

↳*System*

Name: 2A46M
Type: 125 mm Smoothbore Gun
In Service: 1970 to present
Weight (2A46 125mm Gun): kg2,675
Length (2A46 125mm Gun): mm6,350
Max Rate of Fire (Autoloader): rds/min7
Max Rate of Fire (Manaul): rds/min2-3
Sustain Rate of Fire: rds/min5-7
Range Finder Type: INA
Maximum Elevation: deg+14
Minimum Elevation: deg-6
Traverse Range: deg360
Loader Type: Carousel-type autoloader
Minimum Cycle time for the Autoloader: seconds6.5
Thermal Sleeve: Light Allow
Bore Evacuator: Yes
Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread
Breech Maximum Chamber Pressure: 6,500 bar over the 5,100 bar
Max Cycle time for a Round 180deg from the Start Position: seconds15
Carousel Reloading Time: min15

↳*Ammunition (Option 1)*

Type: 3BM42M/3BM44M, 125mm Armour-piercing fin-stabilized discarding sabot (APFSDS)
Caliber: mm125
Muzzle Velocity: m/s125
Basic Load: 34 (Due to extra Radio gear) Total rounds of any combination of 125mm Projectiles
Effective Range (Day): m2,000-3,000
Effective Range (Night): m2,000-2,600
Armor Penetration: Yes, 590-630mm at a range of 2000m
Shell Weight: kg20.4
Projectile Weight: kg7.5
Charge Weight: kg5.3
Penetration: mm/deg270/60

↳*Ammunition (Option 2)*

Type: 3BM9/3BM10, 125mm Armour-piercing discarding sabot (APDS)

Caliber: mm125

Muzzle Velocity: m/s1,715-1,800

Effective Firing Range: m3,000

Shell Weight: kg19.6

Projectile Weight: kg5.67

Charge Weight: kg5

Penetration: mm/deg140/60

↳*Ammunition (Option 3)*

Type: 3BK12M, 125mm (HEAT)

Caliber: mm125

Muzzle Velocity: m/s905-950

Effective Firing Range: m4,000

Shell Weight: kg29

Projectile Weight: kg19

Charge Weight: kg5

Penetration: mm/deg220/60

↳*Ammunition (Option 4)*

Type: 3OF19, 125mm (HE)

Caliber: mm125

Muzzle Velocity: m/s760

Effective Firing Range: m4,000

Shell Weight: kg33

Projectile Weight: kg23

Charge Weight: kg5.0

Penetration: mm/degINA

Anti-Tank Guided Missile

↳*System*

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)

Type: Laser Beam Anti-Tank Guided Missiles

In Service: 1980's to present

Manufacturer: Degtyarev plant

Cost: $37,500

Mass: kg17.2

Diameter: mm125

Basic Load: ea6

Warhead Type: Tandem hollow-charge

Warhead Weight: kg4.5

Max Rate of Fire: INA

Operational Range: m4,000-5,000

Speed: Subsonic

Guidance System: Laser Beam Riding

Launch Platform: 125 mm smoothbore guns

Variants: 9M119M

Tank Commander's Weapon System

↳*System*

Name: 12.7mm Kord Heavy Machine Gun,

Type: 12.7mm Heavy Machine Gun

Manufacturer: V.A. Degtyarev Plant

Cartridge: 12.7×108mm

In Service: 1998-Present

Weight: kg25.5

Length: mm1,980

Max Rate of Fire: rds/min650-750

Sustain Rate of Fire: rds/min550-600

Action: Gas-operated, rotating bolt

Feed System: 50-round linked belt

Sights: Iron Sights

Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

↳*Ammunition*

Cartridge: 12.7×108mm

Caliber: mm12.7mm

Muzzle Velocity: m/s860

Basic Load: ea300

Effective Range: m2,000

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Sustain Rate of Fire: rds/min500

Range Finder Type: INA

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: Ainet FCS

Computerized FCS: Yes

Thermal Sight Tank Commander: No

Thermal Sight Gunner: No

Panoramic Commander's Sight: No

Main Gun Stabilization: Yes, 2E42-4 Zhasmin System

Note: The Fire Control System is outdated and is from the late 1990s.

Protection

Hull Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Turret Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Applique Armor: Available

Explosive Reactive Armor: Yes, Kontakt-5 explosive reactive armor blocks, equivalent to up to 500mm of steel armor

Active Protection System: Yes, the Shtora-1 countermeasures system

Mine Clearing: INA

Self-Entrenching Blade: Yes

NBC Protection: Yes, GO-27 PRKhR radiation and chemical agent detection system.

Deep Wading Kit: Available

Jammer: Yes, TShU1-7 IR jammers located either side of the main gun

Laser Radiation Sensors: Yes

IR dazzlers: Yes

Nakidka Signal Reduction Kit: Available

Smoke Equipment: Yes, banks of 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

Fire Suppression System: Yes, the Raduga-2 fire-suppression system

Notes:

Commander's version of the T-90, with additional communication (station R-163-50K) and navigation equipment (TNA-4-3). Distinguishing features As a command vehicle the T-90K carries different communications systems to the standard T-90. This can assist in distinguishing the vehicle as it will carry additional antennae on the roof of the turret. However, the T-90K will generally be almost identical to the T-90 to avoid the easy location and targeting of command vehicles.Armament The weapons carried are identical to the T-90, but the additional command equipment limits the space for stored ammunition to 34 rounds instead of 42 rounds in the standard version. Earlier Russian command vehicles, such as the T-80K, also lost the ability to fire the gun-launched guided missile. It is unclear if this effect is carried on with the T-90K but could be a possibility.

M1A2 Abrams SEP American Main Battle Tank (MBT)







Tiers:



Variants:

- **Variants and upgrades:** * XM1-FSED: Preproduction test model. Eleven Full-Scale Engineering Development test bed vehicles were produced in 1977–78. These vehicles were also called Pilot Vehicles and numbered PV-1 through PV-11. * M1: First production variant. Production began (at Chrysler) in 1979 and continued to 1985 (at General Dynamics) (3,273 built for the US). The first 110 tanks were Low Rate Initial Production (LRIP) models, still called XM1s, because they were built prior to the tank being type-classified as the M1. * M1IP (Improved Performance): Produced briefly in 1984 before the M1A1, contained upgrades and reconfigurations like new turret with thicker frontal armor, new turret is referred as "long" turret instead of older "short" turret, armor upgraded from ~650mm line of sight thickness to ~880mm (894 built for US). * M1A1: Production started in 1985 and continued to 1992, pressurized NBC system, rear bustle rack for improved stowage of supplies and crew belongings, redesigned blow-off panels and M256 120 mm smoothbore cannon (4,976 built for the U.S. Army, 221 for USMC, 59 M1A1 AIM SA sold to Australia). * M1A1HA (Heavy Armor): Added 1st generation depleted uranium armor components. Some tanks were later upgraded with 2nd generation depleted uranium armor components, and are unofficially designated M1A1HA+. * M1A1HC (Heavy Common): Added new 2nd generation depleted uranium armor components, digital engine control and other small upgrades common between Army and Marine Corps tanks. * M1A1D (Digital): A digital upgrade for the M1A1HC, to keep up with M1A2 SEP, manufactured in quantity for only 2 battalions. * M1A1 AIM v.1 (Abrams Integrated Management): A program whereby older units are reconditioned to zero hour conditions;[126] and the tank is improved by adding Forward-Looking Infra-Red (FLIR) and Far Target Locate sensors, a tank-infantry phone, communications gear, including FBCB2 and Blue Force Tracking to aid in crew situational awareness, and a thermal sight for the .50 caliber machine gun. * M1A1 AIM v.2/M1A1 SA (Situational Awareness): Upgrades similar to AIM v.1 tanks + new 3rd generation depleted uranium armor components. Configuration for the Royal Moroccan Army, which is almost identical to the Australian variant, except exportable turret armor is installed by General Dynamics Land System to replace the DU armor. * M1A1 FEP (Firepower Enhancement Package): Similar upgrade to AIM v.2 for USMC tanks. * M1A1KVT (Krasnovian Variant Tank): M1A1s that have been visually modified to resemble Soviet-made tanks for use at the National Training Center, fitted with MILES gear and a Hoffman device. * M1A1M: An export variant ordered by the Iraqi Army with depleted uranium armor removed and older thermal imaging system with lower resolution used. * M1A1 (AIDATS upgrade): Upgrade-only variant to all USMC General Dynamics M1A1 Abrams tanks to improve the tank commander's situational awareness with an upgraded thermal sight, color day camera, and a stationary color display. * M1A2 (Baseline): Production began in 1986 and entered service in 1992(77 built for the U.S. and more than 600 M1s upgraded to M1A2, 315 for Saudi Arabia, 1,005 for Egypt, 218 for Kuwait). The M1A2 offers the tank commander an independent thermal sight and ability to, in rapid sequence, shoot at two targets without the need to acquire each one sequentially, also 2nd generation depleted uranium armor components. * M1A2 SEP (System Enhancement Package): Has upgraded third-generation depleted uranium armor components with graphite coating (240 new built, 300 M1A2s upgraded to M1A2 SEP for the US, also unknown numbers of upgraded basic M1s and M1IPs, also 400 oldest M1A1s

upgraded to M1A2 SEP). * M1A2S (Saudi Package): Saudi Arabian variant upgrade of the M1A2 based on M1A2 SEP, with some features, such as depleted uranium armor, believed to be missing and replaced by special armor. (442 M1A2s upgraded to M1A2S). * M1A2 SEPv2: Added Common Remotely Operated Weapon Station as standard, color displays, improved interfaces, a new operating system, improved front and side armor with ERA (TUSK kit), tank-infantry phone as standard, and an upgraded transmission for better durability. * M1A2C (SEPv3): Has increased power generation and distribution, better communications and networking, new Vehicle Health Management System (VHMS) and Line Replaceable Modules (LRMs) for improved maintenance, an Ammunition DataLink (ADL) to use airburst rounds, improved counter-IED armor package, improved FLIR using long- and mid-wave infrared, a low-profile CROWS RWS, Next Generation Armor Package (NGAP), and an Auxiliary Power Unit (APU) under armor to run electronics while stationary instead of the engine, visually distinguishing the version by a small exhaust at the left rear. More passive ballistic protection added to the turret faces, along with new Explosive Reactive Armor mountings (Abrams Reactive Armor Tile (ARAT)) and Trophy Active Protection systems added to the turret sides. Prototypes began testing in 2015, and the first were delivered in October 2017. Fielding is expected to begin in 2020. * M1A2T: Special configuration variant of the M1A2C reportedly being offered for sale to Taiwan as of March 2019 and approved by US State Department as of July 2019. Per DSCA statement, it is roughly equivalent to M1A2C, except depleted uranium armor is replaced by FMS export armor. There is no mention of the Trophy APS system. The new-built tanks will be produced at Anniston Army Depot, Anniston, Alabama, and the Joint Systems Manufacturing Center, Lima, Ohio. * M1A2D (SEPv4): Under engineering development with delivery planned to start by 2021. The Commander's Primary Sight, also known as the Commander's Independent Thermal Viewer, and Gunner's Primary Sight will be upgraded with 3rd Gen FLIR, an improved laser rangefinder and color cameras. Additional improvements will include advanced meteorological sensors, laser warning/detection receivers, directional smoke grenade launchers and integration of the new XM1147 multi-purpose (AMP) 120mm tank round. The AN/VVR-4 laser warning receiver and ROSY rapid obscurant system have been trialed by the US Army for adoption on the Abrams tank and Bradley fighting vehicle. * M1A2-K: Under development, unique variant for the Kuwaiti Army, slated to replace Kuwait's current M1A2 fleet. * M1A3: Under research development as of 2014. Improvements are to include a lighter 120 mm gun, added road wheels with improved suspension, a more durable track, lighter-weight armor, long-range precision armaments, and infrared camera and laser detectors. The variant is believed to have a new diesel engine, instead of the gas turbine engine used in previous M1 variants * M1 TTB (Tank Test Bed): Prototype with unmanned turret, 3 crew members in armored capsule in front of the heavy armored hull, main armament was 120 mm smoothbore gun, M256 derivative or modification, mechanical loading system under turret, never fielded. * CATTB: The Component Advanced Technology Test Bed was an experimental model with a lightweight 120 mm smoothbore cannon, heavy armored turret and upgraded hull based on the M1 chassis. It had a mechanical loading system in turret bustle, a new engine and probably other upgrades, never fielded. The tank went into trials in 1987–88. * M1 Thumper: Experimental variant by Lockheed Martin, equipped with the 140 mm XM291 ATACS smoothbore cannon. Similar to the CATTB, it included a larger, elongated turret to offer protection levels comparable to the M1A2 while allowing the mounting of the larger cannon and its longer ammunition. Cancelled with the end of the Cold War, and never fielded. * M1 AGDS (Air Ground Defense System): Proposed air defence variant of the Abrams equipped with dual 35 mm Bushmaster III autocannons, 12 ADATS missiles and advanced electro-optical and radar targeting systems derived from the ADATS. It was supposed to be capable of both air defence and anti-tank purposes with the ADATS MIM-146 missiles which was a dual purpose ATGM/SAM. The proposal never saw consideration and was never developed further. * M1 Grizzly Combat Mobility Vehicle (CMV). * M1 Panther II: A remote controlled mine clearing vehicle with turret removed, mine rollers on front, and the Standardized Teleoperation System. * M104 Wolverine Heavy Assault Bridge * M1074 Joint Assault Bridge (JAB): Bridgelayer combining a heavy "scissor" bridge with the M1 Abrams chassis. Expected to reach low-rate initial production in 2019 to replace the M60 AVLB and M104 Wolverine * M1150 Assault Breacher Vehicle (ABV): Assault variant for the USMC. Based upon the M1A1 Abrams chassis, the Assault Breacher Vehicle has a variety of systems installed, such as a full-width mine plow, two linear demolition charges, and a lane-marking system. Reactive armor has been fitted to the vehicle providing additional protection against High-explosive anti-tank warhead-based weapons. The turret has been replaced by a new smaller one with two MICLIC launchers at its rear. A M2HB .50 machine gun in a remote weapons station is mounted on the commander's cupola and a bank of grenade launchers are fitted to each side of the superstructure to cover the frontal arc for self-protection. * M1 Armored Recovery Vehicle: Only a prototype produced.

System

Alternative Designation: M1A2 SEP
Type: Main Battle Tank
Crew: 4 (commander, driver, gunner, loader)
SEP Upgrades: a new computerized mass-memory unit; color maps and displays; enhanced Army Force XXI digital command and control capabilities; a second-generation, forward-looking IR (FLIR) system for the gunner and commander;user-friendly soldier/machine interface (SMI); under-armor auxiliary power unit (UAAPU);

Dimensions

Length, Hull: 7.92 m

Width, with Skirts: 3.65 m

Width, without Skirts: 3.48 m

Track Length on Ground: 4.65 m

Track Width: 0.64 m

Ground Clearance, Center of Hull: 0.48 m

Ground Clearance, Sides: 0.43 m

Height: 2.89 m

Gun Length: 9.83 m

Height to Turret Roof: 2.44 m

Weight, Combat: 63,086 kg

Ground Pressure: 1.08 kg/sq cm

Automotive

Engine Name: Textron-Lycoming AGT-1500 2-spool free-shaft, multi-fuel turbine with Allied-Bendix digital electronic fuel control

Engine Type: Multi-Fuel

Engine Power: 1,500 hp at 3,000 rpm

Power-to-Weight Ratio: 23.77 hp/metric ton

Fuel Capacity: 504 gal (1,908 liters)

Transmission: Allison X-1100-3B Automatic hydro-kinetic, hydrostatic steering, 4 forward and 2 reverse gears

Suspension: advanced torsion bar, 7 road wheels with 15-in (381-mm)travel, rear drive, front idler, 3 internal rotary shock absorbers,2 return rollers

Braking: hydro-mechanical

Road Speed: 66 km/h

Speed, 10 Deg Upslope: 27 km/h

Speed, 60 Deg Upslope: 7 km/h

Acceleration: 32 km/h

Range: 426 km

Auxiliary Power Unit: under-armor auxiliary power unit (UAAPU)

Communications

Radio: single-channel ground and airborne radio system (SINCGARS)

Main Gun

↳*System*

Name: M256 smoothbore

Type: 120-mm/46-cal M256 smoothbore with fume extractor and thermal sleeve

Caliber: 120mm

Length: 5.6 m

Barrel Length: 5.3 m

Width: 728 mm

Bore: 120-mm/44-caliber, smoothbore fitted with fume extractor and thermal sleeve

Gun Weight: 1,905 kg

Barrel Weight: 1,175 kg

Recoil, Maximum: 370 mm

Recoil, Normal: 340 mm

Recoil System: 2 hydraulic buffers and 1 hydropneumatic recuperator

Breech Type: semi-automatic vertical sliding wedge

Muzzle Velocity: 1373+ m/sec

Maximum Range: 2,500+ km

Turret Type: electro-hydraulic, manual backup

Feed System: Manual

Elevation: -10/+20 deg

Traverse: 360 deg

↳*Ammunition (Option 1)*

Name: M830

Type: HEAT-MP

Caliber: mm120

Length: 981 mm

Weight: 24.2 kg

Basic Load: 42 rounds

Ammo Types: HEAT-MP-T, APFSDS-T, MPAT, STAFF

↳*Ammunition (Option 2)*

Name: M829

Type: APFSDS

Caliber: 120mm

Length: 935 mm

Weight: 18.7 kg

Basic Load: 42 Rounds

Coaxial Weapon System

↳*System*

Name: 1 x 7.26-mm M240 machine gun
Type: General-Purpose Machine Gun
Caliber: 7.72mm
Length: 1,260 mm
Barrel Length: 630 mm
Width: 120 mm
Height: (260 mm
Weight: 12.5 kg
Action: Gas-operated long-stroke piston, open bolt
Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM
Muzzle Velocity: 853 m/s
Maximum Firing Range: 3,725 m
Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)
Feed System: Belt-fed using M13 disintegrating links
Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 6,000 Rounds

Loader's Weapon System

Weapon: 1 x 7.62-mm M240 machine gun on Skate Mount
Basic Load: 6,000 Rounds

Commander's Weapon System

↳*System*

Name: 1 x .50-caliber M2 machine gun
Type: Heavy Machine Gun
Caliber: 12.7mm
Length: 1,654 mm
Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3)

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,000

Fire Control

Name: INA

Computerized FCS: Yes

Ballistic Computer: Hughes 12 kilobyte digital computer

Main Gun Stabilization: Yes

Day Optics: Hughes primary stabilized sight with 3- and 10-power day optics

Night Optics: Hughes night-vision/sight with thermal imaging

Rangefinder: GEC Avionics/Kollsman eye-safe CO2 rangefinder replaces the Nd-YAG laser rangefinder

Effective Fire Range: 200 to 7,990 m

Accuracy: 10 m or less

Commander's Thermal Viewer: a Texas Instruments commander's independent thermal viewer (CITV), which permits the commander to search and independently select new targets

Driver's Thermal Viewer: Hughes driver's thermal viewer (DTV) with integrated display, a fire-control electronics unit (FCEU) that coordinates CIT stabilization, primary sight and gun-turret drive

M1A2 SEP Upgrade: improved commander's weapon station (ICWS)

Information System: intervehicular information system (IVIS)

Navigation System: Smith Industries position navigation (POS/NAV) system

Command and Control Upgrade: enhanced Army Force XXI digital command and control capabilities;

FLIR: a second-generation, forward-looking IR (FLIR) system for the gunner and commander

Protection

Hull Armor: upgraded third-generation depleted uranium armor components with graphite coating

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: In addition to the armor, some USMC Abrams tanks are equipped with a Softkill Active protection system, the AN/VLQ-6 Missile Countermeasure Device (MCD) that can impede the function of guidance systems of some semi-active control line-of-sight (SACLOS) wire- and radio guided anti-tank missiles (such as the Russian 9K114 Shturm) and infrared homing missiles.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: 200 SCFM-Clean Cooled Air (collective overpressure); AN/VDR-1 radiological warning device

Smoke Equipment: M250 (British L8A1) 2 x 6-barrel smoke discharger (24 rounds), engine exhaust generation

Fire Suppression: automatic detection and suppression

Fuel Cover: Allied Bendix digital electronic fuel control

Note: Enhanced survivability including better armor on gunner's primary sight (GPS) cover;

Notes:

M1A2 Systems Enhanced Package (SEP) Further improvements on the M1A2 have occurred with the production of the M1A2 SEP . The package includes: *enhanced Army Force XXI digital command and control capabilities; *a second-generation, forward-looking IR (FLIR) system for the gunner and commander; *user-friendly soldier/machine interface (SMI); *under-armor auxiliary power unit (UAAPU); *a new computerized mass-memory unit; *color maps and displays. Deliveries of the SEP began in September 1999. The M1A2 Abrams main battle tank is a further development of the M1A1. Currently it is one of the best MBTs in the world. Development of improved M1A1 began in 1988. About 1 200-1 500 M1A2 main battle tanks were delivered to the US army. Out of this number approximately 1 000 out-dated M1 main battle tanks were upgraded to the M1A2 standard. It is planned that this tank will remain in service beyond 2050. The M1A2 has been exported to Kuwait (218) and Saudi Arabia (457). Approved for production in 1990, the M1A2 represents the U.S. Army’s technological improvement of the basic M1A1 design and the most modern battle tank in the world. Outwardly similar in appearance to the M1A1, the most notable exterior changes on the M1A2 are the redesigned Commander's Weapon Station (CWS) and the addition of a Commander's Independent Thermal Viewer) on the left side of the turret forward of the loader's hatch. Internally, however, the M1A2 has been radically redesigned to take advantage of newer technology. Most notable of these improvements is the addition of the Inter-Vehicle Information System (IVIS.) The IVIS system allows for the automatic and continual exchange of information between vehicles. By incorporating information provided by an on board Position/Navigation (POSNAV) system, unit commander's can track the location and progress of subordinate elements automatically, without tasking vehicle crews. In addition enemy positions can be identified, plotted and disseminated, while reports and artillery requests can be automatically formatted, transmitted, and processed. Lastly, map graphic control measures and operational orders can be rapidly distributed via the IVIS system. To ensure information security, all IVIS data transmissions are routed through the M1A2's SINCGARS radio system. Improving on the "hunter-killer" tank commander-gunner target hand off method pioneered on the German Leopard II, the M1A2 takes this a step further by providing the Tank Commander with an independent thermal sight. This CITV sight allows the commander to independently scan for targets in all weather conditions and through battlefield obscurants. In addition to IVIS and the CITV, the M1A2 incorporates a number of additional electronic upgrades. Power distribution throughout the tank has been improved, relying on multiple bus paths so that in the event one conduit is damaged, power may still be delivered to a component via an alternate path. The driver's instrument display has been upgraded to a more detailed digital display and the Gunner's Primary Sight has been stabilized in two axes for increased accuracy. Approved for implementation in 1995, the M1A2 SEP (System Enhancement Package) is a technology upgrade and standardization program, whereby the Army's fleet of M1s and M1A2s will all be brought to a common standard. Most notable among the modifications will be the introduction of a standard under armor auxiliary power unit and the addition a crew compartment air conditioning and cooling unit. Other modifications within the vehicle will include upgrades to the IVIS system (color display, full size keyboard, digital mapping and graphics generation capability, and voice recognition capabilities), upgrades to the Gunner's Primary Sight assembly, and improvement in the tank's intercom and radio communications systems. Production of the M1A2 was halted after the initial run of 627 vehicles. As part of the fleet upgrade program, 547 of the Army's current inventory of M1s are being upgraded to M1A2 SEP standards, which will require the complete remanufacturing of the turret, while the current fleet of M1A2s will undergo a retrofit to bring them up to SEP standards.

T-64BK Russian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-64A:** Production version of base tank. Tank has a history of reliability problems, and lacks the high armor protection, track skirts, a fcs and atgm launch capability for t-64b.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64BV:** Variant has kontakt era mounted. Combat weight (mt): 42.5 for t-64bv with explosive reactive armor (mm): standard on t-64bv
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64BK

Total Built: +6,000 total

Type: Main Battle Tank

Family: T-64 Family

Crew: ea3

Passenger Capacity: INA, IT"S A TANK

Maximum Effective Range: km600

Land Navigation System: Yes

Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23

Length (Hull): m6.54

Width: m3.41

Height: m2.17

Weight, Combat: tons39

Ground Pressure: kg/mINA

Automotive

Engine Name: 5TDF Diesel

Engine Type: Diesel

Engine Power: hp700

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.72

Fording Depth (Without Preparation): m1.4

Fording Depth (With Preparation): m5

Main Gun

↳*System*

Name: D-81T (aka 2A46)125 mm smoothbore gun

Type: 125 mm smoothbore

Max Rate of Fire: rds/min8

Manual Load Time: rds/min1-2

Weight (Barrel): kg1,073

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Elevation: Deg+14

Minimum Elevation: Deg-6

Traverse Range: Deg360

Automatic Loader: Yes

Thermal Sleeve: Yes

Evacuator Type: central bore evacuator

Effective Full Charge (EFC) Life: rds600

Breech Type: semi-automatic horizontal sliding breech block

Loading System: Korzina electric and hydraulic automatic loading system

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each

round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

Rate of Fire: rds/min6-8

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 1)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS Radio

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Variants: 9M112M, 9M112M2, 9M124

Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun

Type: 12.7mm Heavy Machine Gun

Proliferation: over 1 Million

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Range Finder Type: Optical

Action: Gas-Operated, Flapper Locking

Sights: Iron/Optical

Feed System: 50 Round Belt

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Variants: DK, DShKM, DSHKS, Type 54 HMG

Fire on the Move: Yes

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea300

Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea250

Effective Range (Iron Sights): m100- 1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: IG43 fire-control

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, TKN-3V combination day/night binocular periscopic

Thermal Sight Gunner: Yes, TPN1-49-23 night sigh

Main Gun Stabilization: 2-Plane, 2Eh26M armament stabiliser

Fire on the Move: Yes

Rangefinder: two-axis stabilised IG42 laser rangefinder sight

Ballistic Computer: 1V517 tank ballistic computer

Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks

PZU-5 monocular periscopic sight: Available

Searchlight: L-2AgM infra-red searchlight

Sight Type: G21 sight with laser telemetry

Wind Sensor: B11 cross-wind sensor

Protection

Hull Armor: cast and welded steel armour

Turret Armor: cast armour welded together

Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds

Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,

Explosive Reactive Armor: No Explosive Reactive Armor (ERA)

Active Protection System: Yes

Mine Clearing: Roller-plow available

NBC Protection: Yes

Smoke Equipment: 12 smoke grenade launchers mounted either side of the main gun

IR Signature: INA

Automatic Fire Suppression Systems.: Available, PPO fire detection and suppression system,

Notes:

The T-64BK is a command variant of the T-64B. It is designed for local command of armoured vehicles at the tactical level. It is equipped with additional communications equipment for this purpose.The T-64BK can be differentiated from a T-64B by the positioning of a longer antenna on the turret. The antenna may be secured to the turret with additional cables and when fully extended can be over 10 m long.

Chonma-ho (Pegasus) North Korean Main Battle Tank (MBT)



Tiers:



Variants:

- **Ch'ŏnma-ho ARV:** Armoured recovery vehicle with a casemate superstructure
- **Ch'ŏnma-ho Command:** Command variant of the tank with a fake main gun
- **Juche-Po:** Self-propelled artillery gun on a modified Ch'ŏnma-ho chassis. The Juche-Po is an improvement over the Tok-Ch'ŏn artillery piece, which was mounted on an ATS-59 chassis. There are at least four M1991 versions of the Juche-Po, each mounting a different gun: the D-30 122 mm, D-74 122 mm, the M-46 130 mm and the ML-20 152 mm howitzer. A fifth M1992 version is armed with the SM-4-1 130 mm howitzer. These artillery pieces can be identified by their six road wheels, as compared to the Tok-Ch'ŏn's five, and a prominent recoil cylinder which protrudes from the turret. Another major difference is that the Juche-Po has a fully encased rounded turret, as opposed to the older open-topped self-propelled artillery pieces used previously.
- **Ch'ŏnma-ho Type IV:** The Ch'ŏnma-ho IV is fitted with what resemble EDZ light explosive reactive armour bricks. Judging by photographs, these are mounted specifically on the turret side, with at least eight bricks per side. The Ch'ŏnma-ho IV is reported to be upgraded with new side-mounted smoke launchers
- **Ch'ŏnma-ho Type V:** Newest Version. Very little information on this version

System

Alternative Designation: Chonma-ho, Pegasus,
In Service: 1980 to present
Total Built: More than 1,200 built
Manufacturer: Second Machine Industry Bureau
Type: Main Battle Tank
Family: INA
Crew: ea4
Passenger Capacity: INA
Maximum Effective Range: km400
Note: The most modern Ch'ŏnma-ho tanks seem to be the IV and V versions.

Dimensions

Length: m6.63
Width: m3.52
Height: m2.4

Weight, Combat: tons40

Ground Pressure: kg/cm20.77

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp750

Cruising Range: km450

Speed, Maximum Road: km/h30

Speed, Average Cross: 22

Speed Maximum Swim: km/hNot Amphibious

Vertical Obstacles: m0.8

Trench Obstacles: m2.85

Fording Depth: m1.4

Power to Weight Ratio: hp/ton18.75

Communications

↳*R-109*

Frequency Range: MHz21.5 to 28.5

Modulation: FM

Power Output: W1.3

Maximum Range (Kulikov): km6

Maximum Range (Wire): km25

Power Source: Two 2Nc dry cell batteries

Antenna: Kulikov or wire

Transport: Manpack or vehicle mounted

Origin: USSR

Employment: Armor Units

Main Gun

↳*System*

Name: U-5TS (2A20) 115mm Tank Gun

Type: 115 mm Smoothbore Gun

Origin: Soviet Union

Length (Barrel): m6.05

Max Rate of Fire: rds/min6-10

Sustain Rate of Fire: rds/min4-7

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: INA

Maximum Effective Range (High Target): m2,100

Maximum Effective Range (Med to High Target): m1,870

Accuracy: %45

Thermal Shroud: Yes

↳***Ammunition***

Type: Rifle, 115mm

Caliber: mm115

Cartridge: 115 x 728 mmR

Muzzle Velocity: m/s1,600

Basic Load: 40 Total any combination of 115mm projectiles

Effective Range: m1,870

Armor Penetration: Yes

Tank Commander's Weapon System

↳***System***

Name: 14.5mm KPV Anti-Aircraft Heavy Machine Gun

Type: 14.5mm Heavy Machine Gun

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-present

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min500

Range Finder Type: Optical

Proliferation: Widely Proliferated

Length (Total): mm1,980

Length (Barrel): mm1,346

Width: mm162

Weight: kg49

Action: Short Recoil Operation

Feed System: 40-round belt

Sights: Iron or Optical

↳***Ammunition***

Type: Rifle

Caliber: mm14.5

Muzzle Velocity: m/s1,005

Basic Load: ea300

Maximum Firing Range: m3,000-4,000

Armor Penetration: Avaialble

Round Variant 1: BS: Armor-piercing incendiary original anti-tank round. The projectile weighs 64.4 grams and is 51 millimeters long with a 38.7 gram core of tungsten carbide with 1.8 grams of incendiary material in the tip. The overall round weighs approximately 200 grams and is 155 millimeters long. The projectile has a muzzle velocity of approximately 1,006 meters per second and can penetrate 30-32 millimeters of RHA steel at an incidence of 0 degrees at a range of 500 meters, or 40 millimeters at a range of 100 meters.

Round Variant 2: B-32: Armor-piercing incendiary full metal jacket round with a hardened steel core. Projectile weight is 64 g and muzzle velocity is 1006 m/s. Armour penetration at 500 m is 32 mm of RHA at 90 degrees.

Round Variant 3: BZT: Armor-piercing incendiary tracer full metal jacket round with a steel core. Projectile weight is 59.56 g and muzzle velocity is 1,006 m/s. Tracer burns to at least 2,000 m.

Round Variant 4: MDZ: High-explosive incendiary bullet of instant action. Projectile weight is 59.68 g.

Round Variant 5: ZP: Incendiary tracer round

Round Variant 6: DGJ02: APIDS-T cartridge uses a 45 g tungsten penetrator, wrapped in a discarding sabot (similar to the US military SLAP cartridges) with dual colour tracer to aid ranging. The sabot splits and leaves the penetrator between 150 and 200 m from the muzzle. It has a muzzle velocity of 1,250 m/s and is quoted as being able to penetrate 20 mm of armour plate set at an angle of 60° at 1000 m.

Round Variant 7: DGE02: APHEI cartridge weighs between 175 and 188 g. At 1000 m it is quoted as having a 90 percent chance of being able to penetrate 15 mm of armour plate set at 30°. At 300 m after penetrating a 2 mm soft steel plate (representing an aircraft skin) it can further penetrate a 1.2 mm thick steel plate producing 20 fragments. Upon explosion between 75 and 95 incendiary pieces are formed which have an 80% chance of igniting aviation fuel.

Loader's Weapon System

↳*System*

Name: PK 7.62mm Machine Gun (Pulemyot Kalashnikova)

Type: 7.62mm PKT Coaxial General Purpose Machine Gun

Manufacturer: Degtyaryov plant

Max Rate of Fire: rds/min650

Sustain Rate of Fire: rds/min550

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Optical and Thermal Sights

In Service: 1961-present

Proliferation: +100 Million

Length (Total): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes.

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Variants: PK PKS PKT PKM PKMS

↳*Ammunition*

Type: Rifle
Caliber: mm7.62mmx54mmR
Muzzle Velocity: m/s825
Basic Load: 1,000
Effective Range (Normal Operations: m1,000
Effective Range (with Sight Adjustments): m3,800
Armor Penetration: Available

Fire Control

Name: INA
Computerized FCS: INA
Thermal Sight Tank Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes
Anti-Aircraft Gun: Yes
Range, Thermal Sight: kmINA
Range Finder Type: Laser rangefinder

Protection

Hull Armor: mm15-100
Turret (Front) Armor: mmCast turret, spaced armor, 200
Applique Armor: Available, addition of full-hull skirting
Explosive Reactive Armor: Yes, EDZ light explosive reactive armour bricks
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: Available
NBC Protection: Yes
Smoke Equipment: Yes
IR Signature: INA
"Boom Shield": Equipped in the Late 1980's

Models

Ch'ŏnma-ho I (Ga): Lightened copy of the T-62 with thinner armour
Ch'ŏnma-ho II (Na): Similar to a stock T-62, but has several differences, has a laser rangefinder housed in a blister above the main gun atop the turret (though the original T-62 does have a laser rangefinder, the Ch'onma-ho 1 do not – and the laser rangefinder of the T-62 is an integral part of the fire control system, rather than an add-on part like on the Ch'onma-ho 2). Fitted with spaced appliqué armor on the turret in a ring around the turret ("boom shield") – thin plates of steel welded onto the turret atop bars provide a space between the shields and the turret armor to provide the equivalent of spaced

armor, as well as doubling as turret baskets for crew equipment and vehicle equipment.

Ch'ŏnma-ho III (Da): A simple progressive upgrade of the Ch'onma-ho 2, with a thermal sleeve for the main gun and armored track skirts added. It is possible, but considered unlikely, that lugs for ERA have been added since its introduction; if they are present, they would be most likely found on the glacis and turret sides. A night vision upgrade

Ch'ŏnma-ho IV (Ra): Greatly upgraded armor protection, including composite armor on the glacis and turret front, and appliqué or thickened armor elsewhere. Even the appliqué and/or thickened armor appears to be more advanced than earlier models, does not appear to have gained a huge amount of weight. A ballistic computer was added to the fire control suite, and the fire control suite has been integrated into a complete system rather than being a patchwork of upgrades. Gun stabilization has been improved. Radios are improved, and the suspension beefed up. The new engine is a 750-horsepower model which can lay a thick, oily smoke screen by injecting diesel fuel into its exhaust. Lugs for ERA (similar to the Russian Kontakt-3 ERA) added to turret sides, and lugs on the armored track skirts and on the glacis. Lugs for a relatively small amount of ERA bricks on the turret front; the ERA on the turret front would only protect 40% of hits to the turret front. On side of turret, clusters of four smoke grenade launchers; at the rear of the turret another cluster of four smoke grenade launchers, firing backwards instead of forwards

Ch'ŏnma-ho V (Ma) -: rmor upgrades derived partially from the T-90S and T-72S, as well as a better ballistic computer and the addition of the aforementioned thermal imagers. Upgraded main gun – a copy of the 125mm 2A46 gun, complete with an autoloader. The fire control system replaced with one matching the new main gun, and the spent shell ejection system dispensed . Use wider tracks

Ch'ŏnma-ho VI (Ba): Newly improved armor. fitted with rubber plates to defend shape charged warheads. The chassis has been stretched, and six road wheels per side instead of five

Ch'ŏnma-ho II: Designation for imported T-62

Ch'ŏnma-ho IM: Improved imported T-62

Notes:

The Ch'ŏnma-ho or spelled as Chonma-ho is one of North Korea's secretive indigenous main battle tank designs. The tank is also known by the name of □□□ □□ (□□□ or the "Chollima Tank"). The original Ch'ŏnma-ho is based on the Soviet T-62. There are at least five different operational versions of the Ch'ŏnma-ho. Since its inception, the Ch'ŏnma-ho has apparently undergone several extensive upgrades. Little public information is available about this tank, and its most recent public appearance was the 65th Anniversary Parade held in Pyongyang, North Korea, on 10 October 2010, celebrating the 65th anniversary of North Korea's ruling party.

Karrar Iranian Main Battle Tank (MBT)







Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72A:** Second Russian main variant of the T-72.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: Karrar

Date of Introduction: 2017

Proliferation: Iran: +420

Manufacturer: Uralvagonzavod

In Service: 2017-Present

Type: Main Battle Tank (MBT)

Family: T-72

Crew: ea3

Passenger Capacity: INA

Dimensions

Length (Gun Forward): m10

Length (Hull): m6.8

Width: m3.50

Height: m2.3

Weight, Combat: tons48

Ground Pressure: kg/mINA

Automotive

Engine Name: V-84M

Engine Type: Four stroke, liquid cooled diesel engine with a centrifugal supercharger.

Engine Power: hp840

Power to Weight Ratio: hp/ton18.5

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

R-173 Range: km0-20

Radio Reciever: R-173P Radio Receiver

Radio Set: HR R-134

Intercom System: R-174

Tank Navigiation Aids: TNA-4-3 Tank Navigation Aids

Main Gun

↳*System*

Name: 2A46, 125 mm/L48 Smoothbore Cannon

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Note: The 9K120 gun-launched missile complex is a two piece guided missile that is loaded and fired from the main gun in the same way as an ordinary round.

ATGM System Name: 9K120 gun-launched missile complex

Missile Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Onboard Guidance System: Yes

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Hit Probability: %80

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Warhead Type: 9N142 shaped charge warhead

Laser Emitter: 1K13 sight's laser

Maximum Effective Range: m4,000

Minimum Effective Range: m100

Elevation Range (Super Elevation): deg-7 to +20

Elevation Range (Standard Elevation): deg-5 to +15

Coaxial Weapon System

Note: The NSV 12.7mm Anti-Aircraft Machine Gun is remotely operated

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Anti-Aircraft Machine Gun

Proliferation: over 1 Million

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Length (Total): mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650-750

Effective Rate of Fire: rds/min250

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: Upgraded Fire Control System. Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, 1K13 sight and aiming complex

Thermal Sight Gunner: Gunner's primary sight is the 1A40-1

Main Gun Stabilization: 2E42-2 (Upgrade)

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Hunter-Killer Engagement Capability: Yes

Note: The Gunner, using the 1A40-1 sight can designate and engage targets out to a mazimum distance of 4,000 meters with APFSDS and HEAR rounds.

Protection

Hull Armor: Steel and composite armour with additional plates that provide protection equivalent to 950mm of steel against HEAT projectiles, 440mm resistance to KE rounds, and 500mm against shaped charges. The T-72BM also has a additional twelve separate charges of ERA compared to the T-72B.

Turret Armor: Steel and composite armour with ERA, 950 mm against HEAT weapons. The Turret has additional Ceramic or silica inserts to add to the protection level of the T-72BM. Additionally, the T-72BM has arrow-shaped arrays of ERA added to the turret front

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor (ERA): Yes, Kontakt-V (UPGRADE). Additional ERA is added to the Turret, Glacis, and sides of the hull.

ERA Explosive Element: 4S22

ERA 4S22 Elements (Plates): ea240

Armor Cassette Type: 4S22 cassette that is filled with an explosive element and steel armoured plate.

Number of total Armor Cassettes: ea200-300

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).

Active Protection System: Yes, ZETS11-3 Control System

Self-Entrenching Blade: Yes, built in Dozer Blade

Mine Clearing: Yes, Roller and plow (optional)

Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Effective Range: m200-300

Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.

Engine Smoke Screen Capable: Yes

Exhaust Smoke-Laying System: Yes

Automatic Fire Extinguishing Equipment.: Yes

IR Signature: INA

Note #3: The additional added armor cassettes reduce penetration by as much as 95%.

Notes:

The Karrar (striker) is a new Iranian main battle tank. It is a significantly upgraded version of the Iranian T-72S tank. A number of these tanks were supplied to Iran from Soviet Union. Currently Iran operates around 480 T-72S and even older T-72M1 tanks that could be upgraded to new standard. Footage on the Karrar was released in 2016. The tank itself was first publicly revealed in 2017. The upgraded tank is fitted with new turret, new add-on armor, new observation and aiming systems, new fire control system, and has a number of other upgrades. All of these upgrades significantly improved combat capabilities of the ageing T-72 series tanks in the key areas of protection, firepower and, possibly, mobility. As of 2017 production of the Karrar is underway. However it is unclear if a pre-production or full-scale production batch is being built.

Type 80 (ZTZ80) Chinese Main Battle Tank (MBT)







Tiers:



Variants:

- **Type 80-II:** Type 80-II is fitted with improved fire control and NBC protection systems.
- **Type 85-II:** Type 85-II, developed in 1989, is a further development of the Type 80-II, featuring new turret and additional modular armor at the front of the hull and turret.
- **Type 85-IIA:** Type 85-IIA command tank, fitted with additional communication and navigation equipment.
- **Type 85-III:** Type 85-III is an improved version, aimed mainly at export market.
- **Type 96 i:** Type 96 is a successor to the Type 80 series. It was adopted by the PLA in 1997. This tank was built in large numbers. It is estimated that over 1 500 of these main battle tanks were built, until production ceased in 2005. Other sources claim that 2 000-2 500 of these tanks were built. It is widely used by the PLA and has been exported to Sudan.
- **Type 88:** Type 88 Domestic version of Type 80. Uses an older-style round steel cast turret with new chassis.[7] Domestic version of Type 80.

System

Alternative Designation: Type 80; ZTZ80

Type: Main Battle Tank

Crew: ea4

Dimensions

Hull Length: 6.33 m

Length, Gun Forward: 9.33 m

Width: 3.35 m

Height: 2.29 m

Weight, Combat: 38 tons

Ground Pressure: INA

Automotive

Engine Name: 12150L-7BW
Engine Type: Diesel
Engine Power: hp730
Range: km430
Speed, Maximum Road: km/h60
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %40
Vertical Step: m0.8
Trench: m2.7
Fording without Preparation: m1.4
Fording with Preparation: INA

Main Gun

↳*System*

Name: L7/M68 .
Type: 105mm Rifled Gun
Caliber: 105mm
Length: 5.89 m
Barrel Length: 52 calibres (5.46 m or 17.9 ft)
Weight: 1,282 kg
Rate of Fire: 10 rounds per minute (maximum)
Maximum Firing Range: 4000 m
Maximum Elevation: deg+18
Minimum Elevation: deg-4
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180

↳*Ammunition (Option 1)*

Name: L28
Type: Armour-piercing discarding sabot
Caliber: 105mm
Muzzle Velocity: 1478 m/s

Penetrator: Tungsten carbide

RHA Penetration: 120 mm @ 60° at 914 m

Basic Load: INA

↳*Ammunition (Option 2)*

Name: M110 HE-MP-T

Type: High-Explosive (HE)

Caliber: 105mm

Muzzle Velocity: 800

Penetrator: INA

RHA Penetration: INA

Basic Load: INA

↳*Ammunition (Option 3)*

Name: M456 HEAT-T

Type: Shaped-charge shells

Caliber: 105mm

Muzzle Velocity: 1173

Penetrator: INA

RHA Penetration: 375-400mm

Basic Load: INA

Coaxial Weapon System

↳*System*

Name: Type 80

Type: General-Purpose Machine Gun

Caliber: 7.62mm

In Service: 1983-Present

Manufacturer: Norinco

Proliferationn: Bangladesh: BD-14 variant made in Bangladesh in service with Bangladesh Army and President Guard Regiment. China: Currently in service in small numbers with Chinese special forces. Croatia: In service with Croatian police units during the country's war of independence. Malta: Armed Forces of Malta Niger South Sudan South Sudan Democratic Movement: Mokhtar South Sudan Defence Forces: Type 80 Sudan: Manufactured locally as Mokhtar. Also Chinese-made Type 80s Sri Lanka: In service with the Sri Lanka Army. Around 200 Type 80 GPMGs were supplied by Norinco as part of several defense agreements between China and Sri Lanka

Length: 1,192 mm

Barrel Length: 658 mm

Weight: 12.6 kg

Action: Gas-operated, open bolt

Rate of Fire: 700–800 round/min

Muzzle Velocity: 840 m/s

Effective Firing Range: 100—1,500 m sight adjustments

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500 rds

Auxiliary Weapon System

↳*System*

Name: Type 77

Type: Heavy Machine Gun

Manufacturer: Norinco

Proliferation: Widely Proliferated Afghanistan Cambodia Djibouti Islamic State Mali: People's Movement for the Liberation of Azawad People's Republic of China South Sudan Sudan Syria Free Syrian Army and Turkish-backed Free Syrian Army Iraq Iraqi security forces: Used by Unmanned ground vehicle "Alrobot". Also used by the Popular Mobilization Forces

Length: 2,150 mm

Barrel Length: 1,016 mm

Weight: 28 kg (61.73 lb) (gun only) 28.3 kg (62.39 lb) (tripod)

Action: Gas

Rate of Fire: 650-700 rounds/min

Muzzle Velocity: 825 m/s

Feed System: belt 60 rounds

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Cast Steel

Turret Armor: Cast Steel

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Main Battle Tank Series Type 80 is a new type of main battle tank series developed by NORINCO, which has a very strong firepower, advanced fire control system, high mobility and solid armour protection. The tank series type 80 is suitable to fight under modern war condition. The tanks are equipped with an advanced 105 mm rifled gun and can fire four types ammunition. The tanks are provided with an advanced fire control system which consists of a laser range-finder, ballistic computer and-bi-directional stabilizer, therefore the tanks have a high first round hit probability. The tanks are also fitted with various systems and equipment inside the hull and turret for the use of NBC protection, water-crossing submerged, automatic fire-extinguishing, explosion-restraining and night combat. Development NORINCO (China North Industries Corporation) started concept studies for a second-generation MBT in 1978 with the first prototypes being completed in 1985. Development was completed in 1988 and it was designated the Type 80 MBT, although it has also been referred to as the Type 88 and the Type 69-III. Main improvements to the Type 80 compared with the earlier Type 69 MBT include the installation of a new computerised fire-control system for increased first range hit probability, laser range-finder, stabilisation system, 105 mm rifled tank gun, new torsion bar suspension with six roadwheels for increased crosscountry mobility, more powerful diesel engine for increased power-to-weight ratio, passive night vision equipment and the ability to be fitted with a snorkel for deep fording. The Type 80 MBT can engage moving targets from a stationary firing position. Description The hull of the Type 80 is of all-welded steel construction and has the driver's compartment at the front, the fighting compartment in the centre and the engine and transmission at the rear. The driver sits at the front of the hull on the left side and has a single-piece hatch cover that lifts and swings to the left. In front of this are two day periscopes, one of which can be replaced by an infra-red or passive periscope for driving at night. Mounted on the well-sloped glacis plate is a splashboard to stop water rushing up and into the driver's compartment while the tank is fording. To further improve the Type 80's protection a panel of composite armour can be added at the front. The turret is in the centre of the vehicle with the commander on the left, the gunner forward and below the commander and the loader on the right. Composite armour can also be added to the turret for improved protection. The commander has a cupola which can be traversed manually through a full 360° and, a single forward-opening hatch cover with two integral periscopes for observation to the sides. Forward of this hatch cover are a further three periscopes for observation over the frontal arc. The loader has a circular hatch cover that opens to the left. Main armament comprises a 105 mm rifled gun which fires Western- or Chinese-produced ammunition. This has powered elevation from -4.5 to +18° with the turret having powered traverse through 360°. The 105 mm gun, which is similar in appearance to the Western L7/M68, is fitted with a fume extractor and a thermal sleeve. The 105 mm gun fires the following NORINCO-developed rounds: APFSDS-T (muzzle velocity 1,455 m/s), HEAT-T (1,173.5 m/s), HESH (731.5 m/s) and HE (850 m/s). A 7.62 mm machine gun is mounted coaxially with the 105 mm gun and there is a 12.7 mm machine gun on the loader's hatch for anti-aircraft use. Mounted either side of the turret are four forward-firing electrically operated smoke grenade dischargers. A stowage basket runs around the sides and rear of the turret. The stowage basket provides some protection against HEAT projectiles as these would be detonated away from the main armour of the turret. The fire-control system includes a ballistic computer, a laser range-finder integrated into a stabilised sight, sensors and a gun stabilisation system. Night vision equipment fitted is of the second-generation image intensification type. , The Type 80 MBT is powered by a Model VR36 diesel developing 700 hp at 2,000 rpm but late production engines develop 730 hp at 2,000 rpm. Type 80 has two circular exhaust outlets on the right side of the hull. Diesel fuel can be injected so that the tank can lay its own

smoke screen while moving. To extend the operational range of the tank two large drum fuel tanks can be mounted at the rear; these can be jettisoned if required. An unditching beam is normally carried at the rear of the hull under the long range fuel tanks. The torsion bar suspension is new with six dual rubber-tyred roadwheels, drive sprocket at the rear, idler at the front and three track-return rollers. The first, second, fifth and sixth roadwheel stations have hydraulic shock-absorbers. The upper part of the track is covered by skirts with a wavy lower edge which are hinged up to allow access to the suspension for maintenance. Standard equipment includes an overpressure NBC system, night vision equipment for the commander, gunner and driver and provision to install a snorkel in the roof forward of the loader's hatch; this allows the tank to submerge to a depth of 5 m and cross rivers up to 600 m wide. An unditching beam is carried at the rear of the hull under the long-range fuel tanks. Communications equipment installed includes a YRC-83 radio and VIC-8 intercom system. To further increase the tank's survivability on the battlefield, an automatic explosion suppression and fire extinguishing system is fitted.

Type 59G (BD) Durjoy Bangladesh Main Battle Tank (MBT)




Tiers:



Variants:

- **Type 59:** The basic variant, a T-54A clone without IR searchlight. Entered production in 1957.
- **Type 59-I:** Improved variant fitted with a Type 69-II 100 mm rifled gun, as well as a laser rangefinder, hydraulic servo-system, primitive fire-control system, automatic fire suppression system, and rubber track skirt. The Type 59-I includes several versions with different armour and fire control configurations.
- **Type 59-II:** he Type 59-II (also known as WZ-120B) is an upgrade mounting a 105 mm rifled gun, similar to the Royal Ordnance L7, and adding an image intensification/infrared night sight. Mass increased to 36.5 tonnes
- **Type 59D1:** The Type 59D1 (also known as WZ-120C) is an upgrade with explosive reactive armour, computerized stabilized fire-control system, the 105 mm. gun of the Type 59-II, and night vision system
- **Type 59G:** An upgrade of the Type 59, featuring a redesigned turret and armor. It uses a turret similar to that of the Type 96A, a 125 mm gun, modern fire control systems, arrow-shaped armor, spaced armor, and possibly third-generation subsystems.
- **Jaguar:** The Jaguar was a prototype vehicle based off the Type 59 chassis that was jointly developed by the United States and China during 1980s, made possible by the US-Chinese détente of the 1970s. Planned to replace China's existing tank fleet, as well as for the export market, the tank featured improvements to the standard Type 59's engine, armament, armour, turret, optics, electronics, fire control and suspension. Following Tiananmen Square massacre, American-Chinese relations soured and the Chinese withdrew from the project. The Americans continued alone and successfully completed the design, however the end of the Cold War saw a glut in the international tank market and thus no orders were ever placed for the vehicle
- **Type 62 Light Tank:** In the late 1950s, the PLA submitted requirements for a light tank more suitable for operations in China's southern region. Development on the new Type 62 tank began in 1958, which was a scaled-down Type 59 MBT with simplified equipment. The Type 62 light tank entered batch production in 1963, and approx. 800 were produced by 1978. The Type 62 light tank weights only 21 tons, and is equipped with a Type 62-85TC 85 mm rifled gun, and 3 machine guns. An improved Type 62-I version was produced with better FCS with laser rangefinder, and turret storage racks for added protection. Other versions based on the Type 62 include the Type 79 recovery vehicle (prototype only) and Type 82 earth-mover. The PLA deployed the Type 62 light tank to Vietnam during the 1979 Sino-Vietnam conflict. They found that the thin armor of the Type 62 tank could be penetrated easily by hand-held anti-tank weapons, such as the 40 mm RPG. The Type 62 tank suffered severe losses during the conflict, which convinced the PLA to develop new second-generation MBTs. The Type 62 tank received a major upgrade in 2000, with new welded turret, vertically stabilized 105 mm rifled gun, fire-control system, night vision device, smoke grenade launchers, and explosive reactive armor (ERA) package
- **Type 69 / 79:** Improved Type 59 MBT built by 617 Factory (Inner Mongolia First Machine Group Co. Ltd). Only saw limited service in the PLA, but was an export success in the 1980s with more than 2,000 sold worldwide.
- **Type 73:** This armored recovery vehicle is a Type 59 with its turret removed. The vehicle is armed with a single 12.7 mm machine gun. This armored recovery vehicle is not believed to have a winch and is limited to towing operations.
- **Type 59 Heavy Infantry Fighting Vehicle:** The modernized HIFV model of Type 59 weighs around 40 tons and can carry up to seven passengers. Modifications include moving the engine to the front of the vehicle chassis, increasing tank armor including explosive reactive armor on all sides, and installing a rear door for dismounting infantry
- **QN-506:** It is a modernized variant of the Type 59 using the tank's chassis similar to its Russian counterpart the BMPT Terminator. The vehicle was first appeared at the Zhuhai Air Show in China in November 2018, and is armed with two QN-502C anti-tank missiles, ten QN-201 multi-purpose mini missiles, four S-507 loitering munitions, an unmanned 30 mm cannon, a 7.62 mm machine gun, six grenade launchers, and a quadcopter surveillance drone
- **Type T-72Z:** Iran version
- **Kok'san:** North Korea version.

- **Al-Zarrar:** Pakistan version. Heavy Industries Taxila of Pakistan has introduced the Al-Zarrar Main Battle Tank. The Al-Zarrar series was designed to improve and rebuild the Pakistani army's Type 59 tanks by way of more modern armament, fire control, defensive equipment, etc. Improvements include: 125 mm smoothbore gun, firing APFSDS, HEAT-FS and HE-FS. Semi-automatic loading and image Stabilized fire control. 730 hp Engine for improved mobility. Improved suspension. Improved defense with explosive reactive armour and anti-mine cover underneath.
- **Type 59G(BD) Durjoy:** Bangladesh version. Bangladesh Army's Type-59 are being upgraded to Type 59(BD)G Durjoy locally with Chinese assistance. 174 are being upgraded in First batch. Upgradation process includes: 125mm main gun with new turret (Type 96 turret) 28 rounds, Type-85 12.7×108mm Commander's machine gun (3,000 rounds), Co-axial 7.62mm gun (600 rounds), 81mm Smoke grenades. Chinese 3rd generation ERA on front, turret and side skirts. Modular Composite armour on turret front. Cage armour on back of turret to protect from RPG hits. NBC protection, Collective Fire suppression system. Laser warning receiver, Laser designator, Fire control system, Combat data link, Thermal imaging system. 730 H.P. Diesel engine Barrel launched ATGM firing capability. Rubber padded tracks. VLC 3000 radio contact system.

System

Alternative Designation: INA
Type: Main Battle Tank (MBT)
Family: Type 59
Crew: ea4 (commander, gunner, loader, driver)
Passenger Capacity: INA
Maximum Effective Range: km450
Add on Parts: Yes
Anti-Aircraft: Yes

Dimensions

Length (Hull): m6.04
Length (Gun Foward): m9.0
Height: m2.49
Width: m3.52
Weight, Combat: kg62,500
Ground Pressure: kg/m0.8
Ground Clearance: m0.5

Automotive

Engine Name: Perkins Condor V-12
Engine Type: Diesel V-12
Engine Power: hp1,200
Transmission: David Brown TN54 epicyclical (6 forward/ 2 reverse gears)
Cruising Range: km450
Speed, Maximum Road: km/h56
Speed, Average Cross: 25
Speed Maximum Swim: km/hINA
Fording Depth: m1.7

Gradient: %60

Side Slope: %30

Vertical Step: m0.9

Trench: m2.34

Fording: m1.3

Fuel Capacity: liters1592

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Type 59

Type: 125mm Smoothbore

Caliber: mm100

Length, Gun Foward: m11.5

Length, Hull: m8.327

Max Rate of Fire: rmp7.14

Time the Max Rate of Fire can be Sustained: seconds8.05

Aim time: seconds1.92

Max Fire Range: m720

Traverse Range: deg-180 / +180

Elevation Range: deg20

Gun Depression: deg7

Gun Traverse: deg/Seconds33.25

Turret Traverse: deg/sec47.97

Ammunition

Type: Smoothbore
Caliber: mm100
Shell Velocity: m/s900
Basic Load: ea50
Effective Range: m720
Armor Penetration: mm185
Projectile Weight: kgINA

Coaxial Weapon System

↳*System*

Name: Type 59T
Type: 7.62mm Machine Gun
Location: Mounted Coaxially
Length, Total: mm1,192
Length, Barrel: mm658
Weight (Gun Only): kg12.6
Weight (With Tripod): kg17.5
Max Rate of Fire: rds/min700-800
Time the Max Rate of Fire can be Sustained: INA
Range Finder Type: Scope with Night Vision
Action: Gas-Operated, Open Bolt
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Muzzle Velocity: m/s8547
Basic Load: ea3,500
Effective Range: m460
Armor Penetration: No

Gunner's Weapon System

↳*System*
↳

Name: Type 54 (DShKM)

Type: 12.7mm Anti-aircraft Machine Gun

Location: Above the Gunner's Hatch

Proliferation: Over 1 Million

Max Rate of Fire: rds/min600

Length, Total: mm1,625

Length, Barrel: mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Optical, Iron Sights

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳***Ammunition***

Type: heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea1,200

Max Effective Range: km2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: Type 37A light spot fire-control system

Computerized FCS: Yes

Thermal Sight Tank Commander: Available

Thermal Sight Gunner: Available

Main Gun Stabilization: 2-plane

Range, Day Sight (With Magnification): m5,000

Range, Thermal Sight (With Magnification): m1,000

Infrared Searchlight: Yes

Laser Rangfinder: Yes

Pop-up Vision Blocks: two

Reaction Time (Static Target): seconds6

Reaction Time (Moving Target): seconds9

Protection

Applique Armor: Yes, Track Shirts

Explosive Reactive Armor: Yes

Active Protection System: No

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Grenlaunch 8x; VESS

IR Signature: No

Armor, Front Upper: mm97

Armor, Front Lower: mm99

Armor, Sides Upper: mm79

Armor, Sides Lower: mm20

Armor, Hull Rear: mm46

Armor, Hull Floor: mm20

Armor, Top: mm33

Armor, Turret Front: mm203

Armor, Turret Sides: mm203

Armor, Turret Rear: mm64

Armor, Turret Top: mm39

Smoke Equipment: 8 x 81-mm smoke grenade launchers. Vehicle engine exhaust smoke system.

Notes:

Type 59G(BD) Durjoy (Bengali:□□□□□□) is an upgrade of the Type 59 tank. The Bangladesh Army's obsolete Type 59 tanks are being upgraded to Type 59G(BD) Durjoy locally with Chinese assistance. The name of the tank Durjoy means Indomitable in Bengali. Since the year 2015 Bangladesh has been upgrading its Type 59 tanks, that were bought from China in the early 2000s. In that period of time, the army bought 780 tanks, that for many years were in service for the Bangladesh army but after a few years were starting to be older compared to its modern relatives. That's why the Bangladesh Army started a project to upgrade only 300 type 59 tanks by the time because they were still functional. In the first batch, the army rebuilt 174 as MK I, and by now the army has been rebuilding other 300 type 59 tanks as MK II. China says that if Bangladesh buys VT5: lightweight main battle tanks, then China will give 300 type 59 tanks for free. The Type 59G Durjoy is one of the former MBTs of the Bangladesh Army, and the MK II is just as strong as the T 72 and it's also able to deliver serious damages into the latest versions of the T 72, because it does not have a sufficient armor to match completely with the latest T 72s, although it has much firepower than its closest relatives, such as the Indian Anjun tank or the Ukrainian Oplot tank, in fact the Durjoy's APFSDS can penetrate 500 mm of armor with 2 kms of distance, but in the same distance the Arjun tank can penetrate only 200 mm of armor and the Ukrainian Oplot tank can penetrate 400 mm of armor. This process of rebuilding the type 59 tanks consists of the change of armor, armaments and also the latest technology systems. In the process, only the hull and the chassis remains the same, because the metal of which the tank is made of can last for over 70 years, that's why great nations such as USA, Russia, France, Germany, Italy, and others still use the chassis and the hull of their older tanks. The tank measures 6,04 meters in length, 3,27 meters in width and 2,59 meters in height all packed up with a weight of 40 tons for the MK I and 42 tons for the MK II.

Type 88 (ZTZ88) Chinese Main Battle Tank (MBT)







Tiers:

1 2 **3** 4

Variants:

- **Type 80-II:** Type 80-II is fitted with improved fire control and NBC protection systems.
- **Type 85-II:** Type 85-II, developed in 1989, is a further development of the Type 80-II, featuring new turret and additional modular armor at the front of the hull and turret.
- **Type 85-IIA:** Type 85-IIA command tank, fitted with additional communication and navigation equipment.
- **Type 85-III:** Type 85-III is an improved version, aimed mainly at export market.
- **Type 96 i:** Type 96 is a successor to the Type 80 series. It was adopted by the PLA in 1997. This tank was built in large numbers. It is estimated that over 1 500 of these main battle tanks were built, until production ceased in 2005. Other sources claim that 2 000-2 500 of these tanks were built. It is widely used by the PLA and has been exported to Sudan.
- **Type 88:** Type 88 Domestic version of Type 80. Uses an older-style round steel cast turret with new chassis.[7] Domestic version of Type 80.
- **Type 80:** First Chinese second generation tank design. Uses an older-style round steel cast turret with new chassis. Four-man crew. Export version of Type 88.

System

Alternative Designation: Type 88; ZTZ88

Type: Main Battle Tank

Crew: ea4

Dimensions

Hull Length: 6.33 m

Length, Gun Forward: 9.33 m

Width: 3.35 m

Height: 2.29 m

Weight, Combat: 38 tons

Ground Pressure: INA

Automotive

Engine Name: 12150L-7BW

Engine Type: Diesel

Engine Power: hp730

Range: km430

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording without Preparation: m1.4

Fording with Preparation: INA

Main Gun

↳*System*

Name: L7/M68 .

Type: 105mm Rifled Gun

Caliber: 105mm

Length: 5.89 m

Barrel Length: 52 calibres (5.46 m or 17.9 ft)

Weight: 1,282 kg

Rate of Fire: 10 rounds per minute (maximum)

Maximum Firing Range: 4000 m

Maximum Elevation: deg+18

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳*Ammunition (Option 1)*

Name: L28

Type: Armour-piercing discarding sabot

Caliber: 105mm

Muzzle Velocity: 1478 m/s

Penetrator: Tungsten carbide

RHA Penetration: 120 mm @ 60° at 914 m

Basic Load: INA

↳*Ammunition (Option 2)*

Name: M110 HE-MP-T

Type: High-Explosive (HE)

Caliber: 105mm

Muzzle Velocity: 800

Penetrator: INA

RHA Penetration: INA

Basic Load: INA

↳*Ammunition (Option 3)*

Name: M456 HEAT-T

Type: Shaped-charge shells

Caliber: 105mm

Muzzle Velocity: 1173

Penetrator: INA

RHA Penetration: 375-400mm

Basic Load: INA

Coaxial Weapon System

↳*System*

Name: Type 80

Type: General-Purpose Machine Gun

Caliber: 7.62mm

In Service: 1983-Present

Manufacturer: Norinco

Proliferationn: Bangladesh: BD-14 variant made in Bangladesh in service with Bangladesh Army and President Guard Regiment. China: Currently in service in small numbers with Chinese special forces. Croatia: In service with Croatian police units during the country's war of independence. Malta: Armed Forces of Malta Niger South Sudan South Sudan Democratic Movement: Mokhtar South Sudan Defence Forces: Type 80 Sudan: Manufactured locally as Mokhtar. Also Chinese-made Type 80s Sri Lanka: In service with the Sri Lanka Army. Around 200 Type 80 GPMGs were supplied by Norinco as part of several defense agreements between China and Sri Lanka

Length: 1,192 mm

Barrel Length: 658 mm

Weight: 12.6 kg

Action: Gas-operated, open bolt

Rate of Fire: 700–800 round/min

Muzzle Velocity: 840 m/s

Effective Firing Range: 100—1,500 m sight adjustments

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500 rds

Auxiliary Weapon System

↳*System*

Name: Type 77

Type: Heavy Machine Gun

Manufacturer: Norinco

Proliferation: Widely Proliferated Afghanistan Cambodia Djibouti Islamic State Mali: People's Movement for the Liberation of Azawad People's Republic of China South Sudan Sudan Syria Free Syrian Army and Turkish-backed Free Syrian Army Iraq Iraqi security forces: Used by Unmanned ground vehicle "Alrobot". Also used by the Popular Mobilization Forces

Length: 2,150 mm

Barrel Length: 1,016 mm

Weight: 28 kg (61.73 lb) (gun only) 28.3 kg (62.39 lb) (tripod)

Action: Gas

Rate of Fire: 650-700 rounds/min

Muzzle Velocity: 825 m/s

Feed System: belt 60 rounds

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Cast Steel

Turret Armor: Cast Steel

Applique Armor: Available

Explosive Reactive Armor: Yes

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

In the late 1970s, China's 617 Factory (main contractor), 616 Factory, 477 Factory, and 201 Institute (now China North Vehicle Research Institute) were ordered to develop China's new second-generation tank. The project benefitted from imported Western technologies in the 1980s. The first Type 80 MBT was based on the older Type 79 MBT hull, but equipped with new Chinese-made wheels/tracks, German-designed 730 hp diesel engine, British-designed dual-axis stabilized fire-control with laser range-finder, and NATO-standard 105 mm gun licensed from Austria. The improved version of this tank later entered service in 1988 under the PLA designation of Type 88. The Type 88 tank is unique in that unlike the rest series of Chinese tanks, this series actually includes versions from different families of earlier tanks. Production of Type 88-series MBTs was stopped in 1995. About 400 to 500 Type 88-series tanks are in service with the PLA today. In test its armor was 200 mm vs APFSDS and 300 mm vs HEAT. It has an autoloader which gives it a maximum rate of fire of 2.5 rounds a minute. Type 88 - First Chinese tank to have explosive reactive armor and was accepted into PLA service in 1988, based on Type 80-II design. Front storage racks on turret removed to fit explosive reactive armor (ERA) plates.

M1A1 Abrams American Main Battle Tank (MBT)





Tiers:



Variants:

- **Variants and upgrades:** * XM1-FSED: Preproduction test model. Eleven Full-Scale Engineering Development test bed vehicles were produced in 1977–78. These vehicles were also called Pilot Vehicles and numbered PV-1 through PV-11. * M1: First production variant. Production began (at Chrysler) in 1979 and continued to 1985 (at General Dynamics) (3,273 built for the US). The first 110 tanks were Low Rate Initial Production (LRIP) models, still called XM1s, because they were built prior to the tank being type-classified as the M1. * M1IP (Improved Performance): Produced briefly in 1984 before the M1A1, contained upgrades and reconfigurations like new turret with thicker frontal armor, new turret is referred as "long" turret instead of older "short" turret, armor upgraded from ~650mm line of sight thickness to ~880mm (894 built for US). * M1A1: Production started in 1985 and continued to 1992, pressurized NBC system, rear bustle rack for improved stowage of supplies and crew belongings, redesigned blow-off panels and M256 120 mm smoothbore cannon (4,976 built for the U.S. Army, 221 for USMC, 59 M1A1 AIM SA sold to Australia). * M1A1HA (Heavy Armor): Added 1st generation depleted uranium armor components. Some tanks were later upgraded with 2nd generation depleted uranium armor components, and are unofficially designated M1A1HA+. * M1A1HC (Heavy Common): Added new 2nd generation depleted uranium armor components, digital engine control and other small upgrades common between Army and Marine Corps tanks. * M1A1D (Digital): A digital upgrade for the M1A1HC, to keep up with M1A2 SEP, manufactured in quantity for only 2 battalions. * M1A1 AIM v.1 (Abrams Integrated Management): A program whereby older units are reconditioned to zero hour conditions;[126] and the tank is improved by adding Forward-Looking Infra-Red (FLIR) and Far Target Locate sensors, a tank-infantry phone, communications gear, including FBCB2 and Blue Force Tracking to aid in crew situational awareness, and a thermal sight for the .50 caliber machine gun. * M1A1 AIM v.2/M1A1 SA (Situational Awareness): Upgrades similar to AIM v.1 tanks + new 3rd generation depleted uranium armor components. Configuration for the Royal Moroccan Army, which is almost identical to the Australian variant, except exportable turret armor is installed by General Dynamics Land System to replace the DU armor. * M1A1 FEP (Firepower Enhancement Package): Similar upgrade to AIM v.2 for USMC tanks. * M1A1KVT (Krasnovian Variant Tank): M1A1s that have been visually modified to resemble Soviet-made tanks for use at the National Training Center, fitted with MILES gear and a Hoffman device. * M1A1M: An export variant ordered by the Iraqi Army with depleted uranium armor removed and older thermal imaging system with lower resolution used. * M1A1 (AIDATS upgrade): Upgrade-only variant to all USMC General Dynamics M1A1 Abrams tanks to improve the tank commander's situational awareness with an upgraded thermal sight, color day camera, and a stationary color display. * M1A2 (Baseline): Production began in 1986 and entered service in 1992(77 built for the U.S. and more than 600 M1s upgraded to M1A2, 315 for Saudi Arabia, 1,005 for Egypt, 218 for Kuwait). The M1A2 offers the tank commander an independent thermal sight and ability to, in rapid sequence, shoot at two targets without the need to acquire each one sequentially, also 2nd generation depleted uranium armor components. * M1A2 SEP (System Enhancement Package): Has upgraded third-generation depleted uranium armor components with graphite coating (240 new built, 300 M1A2s upgraded to M1A2 SEP for the US, also unknown numbers of upgraded basic M1s and M1IPs, also 400 oldest M1A1s upgraded to M1A2 SEP). * M1A2S (Saudi Package): Saudi Arabian variant upgrade of the M1A2 based on M1A2 SEP, with some features, such as depleted uranium armor, believed to be missing and replaced by special armor. (442 M1A2s upgraded to M1A2S). * M1A2 SEPv2: Added Common Remotely Operated Weapon Station as standard, color displays, improved interfaces, a new operating system, improved front and side armor with ERA (TUSK kit), tank-infantry phone as standard, and an upgraded transmission for better durability. * M1A2C (SEPv3): Has increased power generation and distribution, better communications and networking, new Vehicle Health Management System (VHMS) and Line Replaceable Modules (LRMs) for improved maintenance, an Ammunition DataLink (ADL) to use airburst rounds, improved counter-IED armor package, improved FLIR using long- and mid-wave infrared, a low-profile CROWS RWS, Next Generation Armor Package (NGAP), and an Auxiliary Power Unit (APU) under armor to run electronics while stationary instead of the engine, visually distinguishing the version by a small exhaust at the left rear. More passive

ballistic protection added to the turret faces, along with new Explosive Reactive Armor mountings (Abrams Reactive Armor Tile (ARAT)) and Trophy Active Protection systems added to the turret sides. Prototypes began testing in 2015, and the first were delivered in October 2017. Fielding is expected to begin in 2020. * M1A2T: Special configuration variant of the M1A2C reportedly being offered for sale to Taiwan as of March 2019 and approved by US State Department as of July 2019. Per DSCA statement, it is roughly equivalent to M1A2C, except depleted uranium armor is replaced by FMS export armor. There is no mention of the Trophy APS system. The new-built tanks will be produced at Anniston Army Depot, Anniston, Alabama, and the Joint Systems Manufacturing Center, Lima, Ohio. * M1A2D (SEPv4): Under engineering development with delivery planned to start by 2021. The Commander's Primary Sight, also known as the Commander's Independent Thermal Viewer, and Gunner's Primary Sight will be upgraded with 3rd Gen FLIR, an improved laser rangefinder and color cameras. Additional improvements will include advanced meteorological sensors, laser warning/detection receivers, directional smoke grenade launchers and integration of the new XM1147 multi-purpose (AMP) 120mm tank round. The AN/VVR-4 laser warning receiver and ROSY rapid obscurant system have been trialed by the US Army for adoption on the Abrams tank and Bradley fighting vehicle. * M1A2-K: Under development, unique variant for the Kuwaiti Army, slated to replace Kuwait's current M1A2 fleet. * M1A3: Under research development as of 2014. Improvements are to include a lighter 120 mm gun, added road wheels with improved suspension, a more durable track, lighter-weight armor, long-range precision armaments, and infrared camera and laser detectors. The variant is believed to have a new diesel engine, instead of the gas turbine engine used in previous M1 variants * M1 TTB (Tank Test Bed): Prototype with unmanned turret, 3 crew members in armored capsule in front of the heavy armored hull, main armament was 120 mm smoothbore gun, M256 derivative or modification, mechanical loading system under turret, never fielded. * CATTB: The Component Advanced Technology Test Bed was an experimental model with a lightweight 120 mm smoothbore cannon, heavy armored turret and upgraded hull based on the M1 chassis. It had a mechanical loading system in turret bustle, a new engine and probably other upgrades, never fielded. The tank went into trials in 1987–88. * M1 Thumper: Experimental variant by Lockheed Martin, equipped with the 140 mm XM291 ATACS smoothbore cannon. Similar to the CATTB, it included a larger, elongated turret to offer protection levels comparable to the M1A2 while allowing the mounting of the larger cannon and its longer ammunition. Cancelled with the end of the Cold War, and never fielded. * M1 AGDS (Air Ground Defense System): Proposed air defence variant of the Abrams equipped with dual 35 mm Bushmaster III autocannons, 12 ADATS missiles and advanced electro-optical and radar targeting systems derived from the ADATS. It was supposed to be capable of both air defence and anti-tank purposes with the ADATS MIM-146 missiles which was a dual purpose ATGM/SAM. The proposal never saw consideration and was never developed further. * M1 Grizzly Combat Mobility Vehicle (CMV). * M1 Panther II: A remote controlled mine clearing vehicle with turret removed, mine rollers on front, and the Standardized Teleoperation System. * M104 Wolverine Heavy Assault Bridge * M1074 Joint Assault Bridge (JAB): Bridgelayer combining a heavy "scissor" bridge with the M1 Abrams chassis. Expected to reach low-rate initial production in 2019 to replace the M60 AVLB and M104 Wolverine * M1150 Assault Breacher Vehicle (ABV): Assault variant for the USMC. Based upon the M1A1 Abrams chassis, the Assault Breacher Vehicle has a variety of systems installed, such as a full-width mine plow, two linear demolition charges, and a lane-marking system. Reactive armor has been fitted to the vehicle providing additional protection against High-explosive anti-tank warhead-based weapons. The turret has been replaced by a new smaller one with two MICLIC launchers at its rear. A M2HB .50 machine gun in a remote weapons station is mounted on the commander's cupola and a bank of grenade launchers are fitted to each side of the superstructure to cover the frontal arc for self-protection. * M1 Armored Recovery Vehicle: Only a prototype produced.

System

Alternative Designation: M1A1

Type: Main Battle Tank

Crew: 4 (commander, driver, gunner, loader)

Dimensions

Length, Hull: 7.92 m

Width, with Skirts: 3.65 m

Width, without Skirts: 3.48 m

Track Length on Ground: 4.65 m

Track Width: 0.64 m

Ground Clearance, Center of Hull: 0.48 m

Ground Clearance, Sides: 0.43 m

Height: 2.89 m

Gun Length: 9.83 m

Height to Turret Roof: 2.44 m

Weight, Combat: 57,154 kg

Ground Pressure: 0.96 kg/cm sq

Automotive

Engine Name: Textron-Lycoming AGT-1500 2-spool free-shaft, multi-fuel turbine

Engine Type: Multi-Fuel

Engine Power: 1,500 hp at 3,000 rpm

Power-to-Weight Ratio: 23.80 hp/metric ton (M1A1)

Fuel Capacity: 504 gal (1,908 liters) internal

Transmission: Allison X-1100-3B hydro-kinetic, 4 forward and 2 reverse gears

Suspension: advanced torsion bar, 7 road wheels with 15-in (381-mm)travel, rear drive, front dler, 3 internal rotary shock absorbers, 2 return rollers

Braking: hydro-mechanical

Road Speed: 66 km/h

Speed, 10 Deg Upslope: 27 km/h

Speed, 60 Deg Upslope: 7 km/h

Acceleration: 32 km/h

Range: 465 km

Main Gun

↳*System*

Name: M256 smoothbore

Type: 120-mm/46-cal M256 smoothbore with fume extractor and thermal sleeve

Caliber: 120mm

Length: 5.6 m

Barrel Length: 5.3 m

Width: 728 mm

Bore: 120-mm/44-caliber, smoothbore fitted with fume extractor and thermal sleeve

Gun Weight: 1,905 kg

Barrel Weight: 1,175 kg

Recoil, Maximum: 370 mm

Recoil, Normal: 340 mm

Recoil System: 2 hydraulic buffers and 1 hydropneumatic recuperator

Breech Type: semi-automatic vertical sliding wedge

Muzzle Velocity: 1373+ m/sec

Maximum Range: 2,500+ km

Turret Type: electro-hydraulic, manual backup

Feed System: Manual

Elevation: -10/+20 deg

Traverse: 360 deg

↳*Ammunition (Option 1)*

Name: M830

Type: HEAT-MP

Caliber: mm120

Length: 981 mm

Weight: 24.2 kg

Basic Load: 42 rounds

Ammo Types: HEAT-MP-T, APFSDS-T, MPAT, STAFF

↳*Ammunition (Option 2)*

Name: M829

Type: APFSDS

Caliber: 120mm

Length: 935 mm

Weight: 18.7 kg

Basic Load: 42 Rounds

Coaxial Weapon System

↳*System*

Name: 1 x 7.26-mm M240 machine gun

Type: General-Purpose Machine Gun

Caliber: 7.72mm

Length: 1,260 mm

Barrel Length: 630 mm

Width: 120 mm

Height: (260 mm

Weight: 12.5 kg

Action: Gas-operated long-stroke piston, open bolt

Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM

Muzzle Velocity: 853 m/s

Maximum Firing Range: 3,725 m

Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)

Feed System: Belt-fed using M13 disintegrating links

Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 6,000 Rounds

Loader's Weapon System

Weapon: 1 x 7.62-mm M240 machine gun on Skate Mount

Basic Load: 6,000 Rounds

Commander's Weapon System

↳*System*

Name: 1 x .50-caliber M2 machine gun

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3)

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,000

Fire Control

Name: INA

Computerized FCS: Yes

Ballistic Computer: Hughes 12 kilobyte digital computer

Main Gun Stabilization: Yes

Day Optics: Hughes primary stabilized sight with 3- and 10-power day optics

Night Optics: Hughes night-vision/sight with thermal imaging

Rangefinder: Unity vision with 18-deg field of view, integrated Hughes Nd-YAG laser

Effective Fire Range: 200 to 7,990 m

Accuracy: 10 m or less

Protection

Hull Armor: Chobham-type armor on glacis and turret,armored bulkheads between turret and engine; depleted uranium armor in production since 1988

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: In addition to the armor, some USMC Abrams tanks are equipped with a Softkill Active protection system, the AN/VLQ-6 Missile Countermeasure Device (MCD) that can impede the function of guidance systems of some semi-active control line-of-sight (SACLOS) wire- and radio guided anti-tank missiles (such as the Russian 9K114 Shturm) and infrared homing missiles.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: 200 SCFM-Clean Cooled Air (collective overpressure); AN/VDR-1 radiological warning device

Smoke Equipment: M250 (British L8A1) 2 x 6-barrel smoke discharger (24 rounds), engine exhaust generation

Fire Suppression: automatic detection and suppression

Notes:

The M1A1 Abrams main battle tank was developed by General Dynamics. It is a further development of the M1 Abrams. The M1A1 was revealed in 1985 with production commencing the same year. It entered service with US Army in 1986. Production ended in 1992 and approximately 4 800 M1A1 Abrams tanks were built. Currently US Army operates nearly 4 400 of these tanks and US Marine Corps just over 400. It is planned that the fleet of refurbished and upgraded M1A1 tanks will remain with the US military until at least 2021. Export operators are Australia (59), Egypt (1 005) and Iraq (140). Recently Morocco ordered 150 of these main battle tanks. The M1A1 has an improved armor protection comparing with its predecessor. Front turret and hull armor of the M1A1 features advanced composite armor reinforced with depleted uranium mesh for better protection. Like in the previous version ammunition is stored in the turret bustle with blow-out panels for better survivability and crew protection. Interior is lined with Kevlar for protection against spalling. Some tanks, most notably of the US Marine Corps, are fitted with a missile countermeasure device. This device can detect and jam guidance systems of laser-guided missiles. One of the most important improvement over the M1 is the M256 120 mm smoothbore gun, originally developed by Rheinmetall and produced in USA under license. The same gun is fitted on the Leopard 2 up to the version of the 2A5. This gun is loaded manually. Ammunition load was decreased to 40 rounds due to larger size. The M1A1 Abrams has a range of effective fire in excess of 4 km. This feature was successfully demonstrated during the Operation Desert Storm in 1991. A special M829A2 armor-piercing round was developed for the M1A1 to counter threat possessed by latest at that time Soviet/Russian MBTs, such as the T-80U and T-90, fitted with Kontakt-5 explosive reactive armor. Currently the MRM-KE or Mid Range-Munition Kinetic Energy round is under development. It is a gun-launched projectile with rocket assistance on the final stage. It will have a maximum effective range of fire in excess of 12 km and will use kinetic energy warhead. A total of 40 rounds are carried for the main gun. Of them 34 rounds are store in the turret bustle, while another 6 rounds are stored in the fighting compartment, in

protective containers. Secondary armament consists of coaxial 7.62 mm machine gun, another roof-mounted 7.62 mm machine gun operated by gunner and 12.7 mm machine gun operated by commander. The tank is powered by Avco Lycoming (now Honeywell) AGT1500 gas turbine engine, developing 1 500 horsepower. Essentially it is a modified helicopter engine, adapted for use on tanks. It is a multi-fuel engine, which can run on any grade of petrol, diesel, aviation fuel or kerosene. This engine has impressive performance and is compact for its power output. So even though the Abrams tank is heavy and bulky, it is surprisingly agile. It is faster than many other tanks and has superior cross-country performance. Also the engine is remarkably quiet. Due to this feature the Abrams is even nicknamed the Whispering Death. Its gas turbine engine has servicing intervals significantly longer than those of diesel engines, however is troublesome to maintain and has very high fuel consumption comparing with diesels. Engine can be replaced in field conditions within 30 minutes. Chassis and transmission of the M1A1 was improved to coupe with increased tank's weight. This main battle tank can be equipped with mine plow or mine rollers. The M1A1 Abrams main battle tanks were produced in Egypt under license, however Egyptian vehicles have composite armor without depleted uranium mesh of the US tanks. Egyptian Army operates 555 of these vehicles.

Zulfiqar-1 Iranian Main Battle Tank (MBT)







Tiers:



Variants:

- **Zulfiqar-2:** The Zulfiqar-2 is an interim main battle tank prototype used as a test bed. This variant is fitted with a new and more powerful engine. It has an extended chassis and possibly uses an improved autoloader.
- **Zulfiqar-3:** The Zulfiqar-3 is the most advanced variant of the Zulfiqar family. It features considerable upgrades to the fire control system, chassis, engine and main gun. The new variant is equipped with the 2A46 125 mm smoothbore cannon with an autoloader, a laser rangefinder and a new fire control system.

System

Alternative Designation: Zulfiqar-1, Zulfiqar
Manufacturer: Shahid Kolah Dooz Industrial Complex
In Service: 1996-Present
Type: Main Battle Tank
Family: Zulfiqar Class
Crew: ea3 (commander, gunner and driver)
Passenger Capacity: INA

Dimensions

Length (Gun Forward): m9.2
Length (Hull): m7
Width: m3.6
Height: m2.5
Weight, Combat: tons40
Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-6-12
Engine Type: V-12 Diesel
Engine Power: hp1,000

Power-to-Weight Ratio: 21.7 hp/metric ton

Cruising Range: km450

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.8

Fording Depth: m1.4

Transmission: SPAT 1200 automatic

Day/Night Driving Lights: Yes, mounted on the glacis plate.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note: The Zulfiqar is armed with a fully-stabilized 125-mm smoothbore gun, fitted with an autoloader. This gun and associated automatic loader are understood to be from the Russian T-72 MBT.

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Fume Extractor: Yes

↳*Ammunition (Option 1)*

Name: 3VBM3

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

↳*Ammunition (Option 2)*

Name: 3VOF22

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 39 Total Rounds of any 125mm Projectiles

Max Dispersion: 0.23 mrad

Maximum Range: m5,000

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Name: 3VBK27/3BK31 "Start"

Type: High-Explosive Anti-Tank (HEAT)

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Max Dispersion: INA

Maximum Range: m3,000

Charge Type: HEAT

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B,

3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Auxiliary Weapon System

Note: The Zulfiqar-1 lacks a coaxial machine gun

↳*System*

Name: Type 54 (DShKM)

Type: 12.7 mm Type 54 Heavy Machine Gun

Proliferation: +1 Million

Length, Total: mm1,625

Barrel length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Rate of Fire: rds/min600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7

Cartridge: 12.7x108 mm

Muzzle Velocity: m/s850

Basic Load: ea1,200

Maximum Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: Slovenian EFCS-3 fire-control system

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Thermal Sight Driver: Yes, passive periscope for night driving.

Main Gun Stabilization: Yes

Domestic System: Yes

Laser Rangefinder: Yes

Fire on the Move: Yes

Driver Periscopes: three day periscopes for driving

Protection

Hull Armor: Reinforced composite armor on the front arc.

Turret Armor: Turret mounts a laser-warning pod

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Zolfaqar is a second generation of Iran's main battle tank (MBT). The test prototypes of the tank were evaluated in 1993. Six semi-industrial prototypes of the tank were produced and tested in 1997. The tank has a distinctive box-shaped, steel-welded turret of local design. Zolfaqar combat weight is reported to be 36 tons and has a 780 hp diesel engine; the tank has a 21.7 hp per ton ratio. Zolfaqar is operated by a crew of three personnel. The automatic loader is believed to be the same one from the T-72 tank. The Iranian Zulfiqar (also written Zolfaqar) main battle tank is believed to be pieced together or developed from major components of the Russian T-72 and American M48 and M60 tanks. This tank, which is claimed to be in production in Iran, is said to be similar in configuration to the M-48 and M-60. Other reports suggest that it bears a close resemblance to the American M1 Abrams.t is named after the sword of Shia leader Hazrat Ali.

M60A1 American Main Battle Tank (MBT)





Tiers:



Variants:

- **Note:** There are over 50 Variants of the M60 Main Battle Tank

System

Alternative Designation: M60A1 Main Battle Tank
Type: Main Battle Tank
In Service: 1960s-Present
Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 6.95 m
Length, Gun Forward: 9.44 m
Width: 3.63 m
Height: 3.27 m
Tracks, Length on Ground: 4.24 m
Tracks Width: 0.71 m
Ground Pressure: 0.46 m
Weight, Unloaded: 48,680 kg
Weight, Combat: 52,620 kg
Ground Pressure: 0.87 kg/cm sq

Automotive

Engine Name: 1 x Continental AVDS-1790-2A engine
Engine Type: 1,790-cu in (29.34-liter) air-cooled, 4-stroke, V-12 multi-fuel
Engine Power: 750 hp at 2,400 rpm
Power-to-Weight Ratio: 14.24 hp/metric ton
Fuel Capacity: 375 gal (1,420 liters)

Transmission: CD-850-5 cross drive transmission

Suspension: torsion bar, 6 road wheels, rear drive, front idler, 3 shock absorbers, 3 track return rollers

Range: 480 km

Speed: 48 km/h

Vertical Obstacle: 0.91 m

Trench: 2.59 m

Fording without Preparation: 1.22 m

Fording with Preparation: 2.40 m

Gradiant: 60 %

Side Slope: 30 %

Shock Absorbers: The addition of a shock absorber on the second roadwheel pair was also accompanied by a slight relocation of the first return roller. These modifications were needed due to the increased weight of the M60A1 turret as well as the additional hull armor.

Main Gun

↳*System*

Name: The M60A1 tank uses the M68E1 variant of the gun carried in the M140 mount. The M68E1 gun shares the same firing characteristics as the M68. It featured several design improvements including an updated gun hydraulic configuration, a stabilization upgrade for the gun, a gun elevation kill switch for the loader, improved ballistic drive and other component refinements.

Type: 105mm Rifled Gun

Caliber: 105mm

Length: 5.89 m

Barrel Length: 52 calibres (5.46 m or 17.9 ft)

Weight: 1,282 kg

Rate of Fire: 10 rounds per minute (maximum)

Maximum Range: 4,000 m

Elevation: -10/+20-deg

Traverse: 360-deg, an improved electro-mechanical traverse assembly

Fume Extractor: A mushroom-shaped fume extractor was placed at the rear left of the turret bustle to vent smoke produced from firing the main or coax guns out of the vehicle.

↳*Ammunition*

Type: Rifle Projectile

Caliber: mm105

Shell: INA

Shell Weight: INA

Basic Load: The ammunition load for the main gun was increased to 63 rounds. Round storage was distributed between the turret bustle, with 15 ready rounds of various types were stowed and accessible for the loader, and the rest are stored inside safe containers on the hull floor.

Coaxial Weapon System

↳*System*

Name: 1 x 7.62mm M240 Machine Gun
Type: General-Purpose Machine Gun
Length: 1,260 mm
Barrel Length: 630 mm
Width: 120 mm
Height: 260 mm
Weight: 12.5 kg
Action: Gas-operated long-stroke piston, open bolt
Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM
Muzzle Velocity: 853 m/s
Maximum Firing Range: 3,725 m
Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)
Feed System: Belt-fed using M13 disintegrating links
Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 6,000 Rounds

Auxiliary Weapon System

↳*System*

Name: M85 Machine Gun
Type: Heavy Machine Gun
Caliber: 12.7mm
In Service: INA
Manufacturer: INA
Proliferation: INA
Length: 1,384.3 mm)
Weight: 29.5 kg
Action: Recoil-operated
Rate of Fire: 400-625 rd/min

Muzzle Velocity: 880.0 m/s

Maximum Firing Range: 6,702.6 m

Effective Firing Range: 1,999.8 m

Feed System: Belt Feed, left or right hand

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7mm

Cartridge: 12.7×99mm NATO (.50 BMG)

Basic Load: Rifle

Fire Control

Name: M19 FCS

Computerized FCS: Yes

Thermal Sight Tank Commander: Texas Instruments AN/VSG-2 tank thermal inder and Mercury-Cadmium-Telluride (HgCdTe) IR detector for passive night and dust vision.

Thermal Sight Gunner: Texas Instruments AN/VSG-2 tank thermal inder and Mercury-Cadmium-Telluride (HgCdTe) IR detector for passive night and dust vision.

Main Gun Stabilization: Add-On Stabilization (AOS) that was introduced in late 1972. This was an add-on kit made to fit with minimum modifications to the existing hydraulic gun control system. The add-on-stabilization system provides stabilization control for both gun elevation and turret traverse. It provides the gunner with the capability of aiming and target tracking and also improved surveillance of the battlefield terrain by the gunner while the tank is moving. It may be used in any one of three modes of control: (1) power-with-stabilization-on, (2) power-with-stabilization-off, and (3) manual. In the power-with-stabilization-on mode, the gunner's aim on target is automatically retained while the vehicle is in motion. This mode provides a fire-on the-move capability. The power-with-stabilization-off option eliminates needless exercise of the stabilization system and provides a back up power mode.

Rangefinder: M17A1 coincidence rangefinder

Searchlight: AN/VSS-1(V)1 IR searchlight above the gun shield.

Ballistic Drive: M10A1 ballistic drive

Ballistic Gunner: mechanical M19E1 ballistic computer for the gunner.

Protection

Hull Armor: The hull's upper glacis armor was increased from 3.67 inches to 4.29 inches at 65 degrees while the turret sides went from 1.9 inches to 2.9 inches at their apex. This brought the frontal armor up to the same 10" line of sight armor standard of the M103 heavy tank.

Turret Armor: M60: equals 7 in (180 mm)

Applique Armor: Available.

Explosive Reactive Armor: INA

Active Protection System: No

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: exhaust smoke generating system; 6-barrel smoke dischargers on turret sides

Notes:

M60A1 series The program to develop the M60A1 was approved in early 1960 in conjunction with abandoning further development of the advanced composite armor and the closure of the T95 Medium Tank project. The first prototype pilots attempts to mate a modified M60 hull with the T95E7 turret took place in March 1960. The turret, even without the siliceous cored armor, provided improved ballistic protection. Additional space for the turret crew was also made available by using the M140 mount thus moving the cannon 5 inches forward. The first two prototypes (Pilot 1 and 2) were ready in May 1961 and the third (Pilot 3) in June 1961, when the vehicle also received its official prototype designation as the M60E1. These vehicles were built by Chrysler Defense. Pilot 1 was sent for evaluation at the Eglin Air Force Base climatic hangar, while Pilot 2 was tested at the Yuma Test Station, and Pilot 3 underwent field trials at Fort Knox. On 22 October 1961, the M60E1 was officially accepted in service under the designation of Tank, Combat, Full Tracked: 105-mm Gun, M60A1. Production began on 13 October 1962 when the Army placed an initial order for 720 of the tanks for 61.2 million dollars. n addition to the new turret design, the hull was upgraded. The hull's upper glacis armor was increased from 3.67 inches to 4.29 inches at 65 degrees while the turret sides went from 1.9 inches to 2.9 inches at their apex. This brought the frontal armor up to the same 10" line of sight armor standard of the M103 heavy tank. A mushroom-shaped fume extractor was placed at the rear left of the turret bustle to vent smoke produced from firing the main or coax guns out of the vehicle. The addition of a shock absorber on the second roadwheel pair was also accompanied by a slight relocation of the first return roller. These modifications were needed due to the increased weight of the M60A1 turret as well as the additional hull armor. The ammunition load for the main gun was increased to 63 rounds. Round storage was distributed between the turret bustle, with 15 ready rounds of various types were stowed and accessible for the loader, and the rest are stored inside safe containers on the hull floor. The uncomfortable wire mesh seats for the loader and gunner were replaced with padded ones. The brake and accelerator pedal and gauges were also rearranged for more efficient and comfortable operation while the steering wheel was replaced by a T bar steering control. The engine and power train were supplied by the Continental AVDS-1790-2A engine and the CD-850-5 cross drive transmission and using the T97 track assembly. Improvements to the electronics package for this version included an improved electro-mechanical traverse assembly and a AN/VSS-1(V)1 IR searchlight above the gun shield.[65] The M19 FCS consisted of the M17A1 coincidence rangefinder, M10A1 ballistic drive and the mechanical M19E1 ballistic computer for the gunner. The M60A1 tank uses the M68E1 variant of the gun carried in the M140 mount. The M68E1 gun shares the same firing characteristics as the M68. It featured several design improvements including an updated gun hydraulic configuration, a stabilization upgrade for the gun, a gun elevation kill switch for the loader, improved ballistic drive and other component refinements.

T-80BK (Ob'yekt 660) Russian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-80 (1976):** Initial model, with 1,000-hp gas turbine engine, coincidence rangefinder, and no missile capability. This model does not have fittings for explosive reactive armour. The turret is from the T-64A, and thus retains the use of the old coincidence rangefinder. Characteristics of this type are the V shaped water deflector on the front glacis, coincidence rangefinder in front of the commander's cupola, and Luna searchlight mounted in the same position as a T-64. Around 250 were produced, as the tank's armour was essentially obsolete when introduced. Turret vs APFSDS – 380 mm, hull vs APFSDS – 500 mm (without reactive armour). This was, in effect, a pre-production model. It reportedly was fitted with an early version of the Shtora APS.
- **T-80BV (1985):** T-80B with explosive reactive armour Kontakt-1
- **T-80UM::** Russian version, with new Buran thermal imaging sight in place of the Luna IR.
- **Object 219A: Early T-80U (Object 219AS) variant:** It has the T-80U's turret, but not the Kontakt-5 ERA. Instead, it uses the old Kontakt-1/3 system; some 219As did not have ERA at all. Often misnamed T-80A. T-80U (1985): Further development with a better turret, Kontakt-5 explosive reactive armour, improved gunsight, and 9M119 Svir missile system. In 1990 a new, 1,250-hp, engine was installed. Overall protection with Kontakt-5 against APFSDS/HEAT is 780/1,320 mm RHAe.9K119M with antitank guided missile 9M119M installed since 1990. Some of the tanks in commander version (T-80UK) equipped with Shtora-1 APS, and thermal imaging night sight TO1-PO2T (detection range / target classification range = 6,400/4,600 meters at night). Basic thermal night sight of the T-80U is within the limits of 1,750/1,500 meters
- **T-80UD Bereza (1987):** Ukrainian diesel version with 1,000-hp 6TD engine and remote-controlled antiaircraft machine gun
- **T-84 (1999):** Further Ukrainian development of T-80UD with 1,200-hp diesel and new welded turret
- **T-80BVD (2002)::** KMDB's upgrade standard for Ukrainian T-80BVs. Changes include the 6TD diesel engine, remote-controlled commander's machine gun, and better optics. None were produced.
- **T-80UM2/Black Eagle (prototype: cancelled)::** Several Russian prototypes were shown at trade shows, with a longer chassis and extra pair of road wheels, and very a large turret with separate ammunition compartment
- **T-80BVM (2017):** up to 3,000 units, installed "Relikt" ERA, PNM Sosna-U gunner sight (as in the T-90, T-72B3), the improved 125mm gun 2A46M-4, the upgraded gas turbine engine and the upgrades of various other systems. More than 120 already in the service.

System

Alternative Designation: T-80B
Type: Main Battle Tank
Family: T-80 Series
Crew: ea3
Maximum Effective Range (Road): km335
Driver's Vision Blocks: ea3
Navigation System: Yes, The T-80BK has land navigation system, which allows the COmmander of a unit to navigate

effectively.

Note: The T-80BK is the command variant of the T-80B. It is an MBT equipped with additional communications equipment allowing local control of armoured units and coordination with the upper levels of C2.

Dimensions

Length (Gun Forward): m9.65

length (Hull): m6.98

Width: m3.58

Height: m2.22

Weight, Combat: tons43.7

Ground Pressure: kg/mINA

Automotive

Engine Name: GTD-1000T

Engine Type: Gas turbine engine

Engine Power: hp1,100

Power to Weight Ratio: hp/ton25.8

Cruising Range: km335

Speed, Maximum Road: km/h70

Speed, Average Cross: 55

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m1

Trench: m2.85

Fording Depth (No Preparation): m1.8

Fording Depth (With Preparation): m5

Cold Start Ability: Yes

Deep Water Snorkel: Available

Communications

Note 1:: The T-80BK carries additional long range radios for reconnaissance. Additionally, the T-80BK has a taller radio mast for C2 of local units.

Note 2:: There is no information on the upgrade Radio/Communication Equipment on the T-80B, but the R-173 and the Receiver R-174/GRR-5 are the standard Radios/Receivers on the T-80B

↳*R-173*

Frequency Range: MHz30.00 - 75.99

HF Output: W30

Modulation: FM

Display: Digitial

Entry of Frequency: Keypad

Present Channels: 10

Digital Transmition: KBaudINA

Sensitivity: uV1.5

Range: km50

Operational Voltage: V27+-2

Weight: kg43

Size: mm428 × 222 × 238

↳*Receiver R-174/GRR-5*

Main Principle: Superhet with RF-stage; ZF/IF 455 kHz; 2 AF stage(s)

Wave Bands: Wave Bands given in the notes.

Loudspeaker: Permanent Magnet Dynamic (PDyn) Loudspeaker (moving coil)

Dimensions (WHD): mm307 x 335 x 206

Net Weight: kg27.7

Note: Receiver for mobile purposes, 1.5 - 18 MHz in four ranges, AM/CW (BFO), 200 kHz xtal calibrator. Set compartment (CY-615/URR) consists of two chassis: model R-174/GRR-5 receiver and model PP-308/URR power supply plus speaker unit. Tubes only one times listed.

Main Gun

↳*System*

Name: L48 2A46M-1 Smoothbore Cannon

Type: 125 mm smoothbore Gun

Manufacturer: Spetstekhnika Design Bureau

Max Rate of Fire: rds/min6-8

Maximum Range: m4,000

Manually Load Time: rds/min1-2

Maximum Elevation: deg+14

Minimum Elevation: deg-5

Traverse Range: deg360

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Evacuator Type: Central Bore

Thermal Sleeve: Yes

Barrel effective Full Life Charge: rds800

Breech Mechanism: Semi-automatic horizontal sliding breech block

Mazimum Pressure: bar5,100

Loading System: Korzina electric and hydraulic automatic loading system

Carousel Reloading Time: minutes13-15

Note: The L48 2A46M-1 It has been extensively developed into 10 different variations and remains the primary armament of Russian frontline tanks.

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Maximum Effective Range: m5,000

Armor Penetration: INA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Weight: kg11

Projectile Dimesnion: mm900

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

Note:: The T-80BK is unable is incapable of firing a 9K112 Kobra Missile due to the increased Communication/Radio gear stored onboard.

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-present

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,250

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: 1A33 FCS

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, the T01-KOIR

Commander Day Mode Sight: 10^0 FOV and ×5 magnification

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, 2E26M electro-hydraulic dual plane stabilisation system

Main Gun Stabilization Deployment Time: minutes2

Range, Day Sight: m1,000

Range, Thermal Sight: m2,600

IR Searchlight: Yes, L-4A "Luna" IR Searchlight

TNPO-160 Periscopes: ea2

TNPA-65 Periscopes: ea2

Protection

Hull Armor: mm440–450

Armor Type: The T-80B is protected by a third iteration Soviet laminate armour that is known as Combination K

Turret Armor: Protection equivalent to 550mm

Applique Armor: Yes, Hull side; track skirts

Explosive Reactive Armor: Yes, Kontakt-1 System

Active Protection System: Arena Available

Mine Clearing: Roller-plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, ZETS-11-2 detection system collective overpressure system

Smoke Equipment: Yes, two banks of four 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Smoke Grenade Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

IR Signature: The exhaust is box-shaped and designed to direct heat away from the tank

Anti-Radiation Material: Installed as a inside protective layer

Personal Breathing Apparatus: Equipment

Automatic Fire Extinguisher System: Yes

Notes:

The T-80BK main battle tank is a further development of the original T-80, which was produced only in small numbers. The T-80B is the first variant produced in quantity. The T-80BK is the command variant of the T-80B. It is an MBT equipped with additional communications equipment allowing local control of armoured units and coordination with the upper levels of C2.

Type 15 (ZTQ-15) Chinese Light Main Battle Tank (MBT)






Tiers:

1 2 3 4

Variants:

- **VT5:** Export version.

System

Alternative Designation: Type 15; ZTQ-15
Type: Main Battle Tank
Crew: ea3
Airlift Capable: Yes

Dimensions

Hull Length: 7.5 m
Length, Gun Forward: 9.2 m
Width: 3.3 m
Height: 2.5 m
Weight, Combat: 33 - 36 tons

Automotive

Engine Name: INA
Engine Type: Electronically controlled diesel engine with fully-automatic transmission
Engine Power: hp1,000
Range: km450
Speed, Maximum Road: km/h70
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %30
Vertical Step: 0.85

Trench: m2.5

Fording Depth: m1.1

Main Gun

↳*System*

Name: INA

Type: 105mm Rifled Gun

Caliber: 105mm

Loading System: The gun has an automatic bustle-mounted ammunition loading system, which allowed to reduce the crew to 3.

Barrel Length: INA

Diameter: INA

Effective Firing Range: km3

Elevation: INA

Traverse Range: INA

Note: This tank can also launch 105 mm anti-tank guided missiles in this tank can also launch 105 mm anti-tank guided missiles in the same manner as ordinary munitions. These extend the effective range to up to 5 km and have a hit probability of over 90% against stationary targets. Furthermore these missiles have tandem High Explosive Anti-Tank (HEAT) warheads and pose serious threat to main battle tanks, and can even target low-flying helicopters. Also the gun can launch ordinary High Explosive (HE) and HEAT rounds for use against light armored vehicles, buildings, field fortifications and infantry.

↳*Ammunition*

Name: INA

Type: APFSDS

Caliber: 105mm

Basic Load: A total of 38 rounds or missiles are carried for the main gun.

Penetration: up to 500 mm of rolled homogenous armor.

Coaxial Weapon System

↳*System*

Name: Type 67

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Manufacturer: China North Industries Corporation

In Service: 1967-Present

Proliferation: Widely Proliferated

Length: 1,650 mm

Barrel Length: 605 mm

Weight: 11 kg

Action: Gas-operated, tilting breechblock

Rate of Fire: 650-700 rounds/min

Effective Firing Range: 800-1000 m

Feed System: 100/250-round belt

Sights: Rear leaf sight, forward post

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: 500

Auxiliary Weapon System #1

↳***System***

Name: QLZ-04

Type: Automatic Grenade Launcher

Caliber: 37mm

Manufacturer: Norinco

Proliferation: Widely Proliferated

In Service: 1970s-Present

Length: 1026 mm

Barrel Length: 380 mm

Weight: 20 kg

Muzzle Velocity: 190 m/s

Rate of Fire: 350-400 rounds per minute

Effective Firing Range: 1750 m

Feed System: Belt

Sights: Optical sight, backup iron sights

↳***Ammunition***

Type: Grenade

Caliber: 37mm

Cartridge: HE-FRAG; HE-DP

Basic Load: 30 rounds

Auxiliary Weapon System #2

↳*System*

Name: W85
Type: Heavy Machine Gun
Caliber: 12.7mm
Manufacturer: Norinco
Proliferation: Widely Proliferated
In Service: 1980s-Present
Length: INA
Weight: 18.5 kg (40.79 lb) (gun only) 17.5 kg (38.58 lb) (tripod)
Action: Gas
Rate of Fire: 550-600 rounds/min
Muzzle Velocity: 850 m/s
Feed System: Belt
Sights: Iron/Optical

↳*Ammunition*

Type: Rifle
Caliber: 12.7mm
Cartridge: 12.7×108 mm
Basic Load: INA

Fire Control

Name: INA
Computerized FCS: Yes, a modern Fire Control System.
Main Gun Stabilization: Yes
Laser Rangfinder: Yes
Ballistic Computer: Yes
Wind Sensor: Yes
Gunner's Thermal Sight: Yes
Commander's Panoramic Sight with Thermal Vision.: Yes, Thermal vision allows to engage targets at night and during adverse weather conditions.
Hunter-Killer Engagement Capable: Yes
Navigation: Yes
Satellite Communication: Yes
Battlefield Management System: Yes

Protection

Hull Armor: Standard steel armour protection against firing of small arms and shell splinters.

Turret Armor: Standard steel armour protection against firing of small arms and shell splinters.

Applique Armor: Yes, modular add-on armor kit.

Explosive Reactive Armor: INA

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, This system triggers smoke grenade dischargers once the tank is illuminated by a laser beam.

Note: Some areas of the hull and turret can be covered with cage armor which provides protection against anti-tank rockets and anti-tank guided missiles.

Notes:

The Type 15 (Chinese: 15□; pinyin: Shíwǔ shì) or ZTQ-15 is a Chinese third generation lightweight main battle tank (MBT). The vehicle was a replacement for the antiquated Type 62 light tank introduced in 1963. Type 15 tank is designed to fulfill the requirement from Chinese army for a lighter, mobile modern tank that can effectively operate in China's plateaus, forests, and water-heavy regions in which heavier Type 99 tanks have difficulties traversing. Sightings of Type 15 were reported by Chinese citizens, but its existence was formally confirmed by the Chinese Ministry of Defense in December 2018. The tank is confirmed in service as of 2018. and was showcased in the 70th National Day parade on Oct 1st 2019. Type 15's rifled gun with new 105 mm ammunition, which is superior to the 105mm tank gun (Type 94) fitted on Type 88 tank and Type 59 tank. When launching 105 mm armor-piercing projectiles, Type 15 is capable to effectively penetrates the active main battle tanks equipped by various countries and regions in southern and southwestern China. The tank is equipped with NRBC protection, air conditioning system, command-and control equipment, a tactical command system and a navigation system that includes INS (Inertial Navigation System) and satellite communications.

Type 59 Chinese Main Battle Tank (MBT)





Tiers:



Variants:

- **Domestic models:** Type 59 The basic variant, a T-54A clone without IR searchlight. Entered production in 1957. Type 59-I Improved variant fitted with a Type 69-II 100 mm rifled gun, as well as a laser rangefinder, hydraulic servo-system, primitive fire-control system, automatic fire suppression system, and rubber track skirt. The Type 59-I includes several versions with different armour and fire control configurations. Type 59-II The Type 59-II (also known as WZ-120B) is an upgrade mounting a 105 mm rifled gun, similar to the Royal Ordnance L7, and adding an image intensification/infrared night sight. Mass increased to 36.5 tonnes. Type 59-IIA Although Type 59-II is very successful design, the tank still rely on the West to supply parts. As a result, the Type 59-IIA was developed. By the end of 1984, the China First Tractor Factory and other production facilities began to develop a further upgrade to the Type 59-II. A prototype was completed by October 1985, featured an improved 105mm Type 83 gun, copied version from the Royal Ordnance L7, with a thermal sleeve, new domestic light spot fire control system with a 2-axis stabilizer, and composite armor. The automatic fire suppression system and automatic fire extinguishing devices were improved so that they could be used while generating smoke or firing the onboard smoke grenade launchers. Type 59D1 The Type 59D1 (also known as WZ-120C) is an upgrade with explosive reactive armour, computerized stabilized fire-control system, the 105 mm gun of the Type 59-II, and night vision system. Type 59D Type 59D (also known as WZ-120D) is an upgrade with the Type 59D1, though it is strange. The Type 59D has a longer 105 mm gun, called Type 83A, or Type 94. The gun has a range of 2000 m, and may fire ATGMs out to 5500 m. A thermal sight is available. Type 59G An upgrade of the Type 59, featuring a redesigned turret and armor. It uses a turret similar to that of the Type 96A, a 125 mm gun, modern fire control systems, arrow-shaped armor, spaced armor, and possibly third-generation subsystems. Jaguar The Jaguar was a prototype vehicle based off the Type 59 chassis that was jointly developed by the United States and China during 1980s, made possible by the US-Chinese détente of the 1970s. Planned to replace China's existing tank fleet, as well as for the export market, the tank featured improvements to the standard Type 59's engine, armament, armour, turret, optics, electronics, fire control and suspension. Following Tiananmen Square massacre, American-Chinese relations soured and the Chinese withdrew from the project. The Americans continued alone and successfully completed the design, however the end of the Cold War saw a glut in the international tank market and thus no orders were ever placed for the vehicle. Type 62 Light Tank In the late 1950s, the PLA submitted requirements for a light tank more suitable for operations in China's southern region. Development on the new Type 62 tank began in 1958, which was a scaled-down Type 59 MBT with simplified equipment. The Type 62 light tank entered batch production in 1963, and approx. 800 were produced by 1978. The Type 62 light tank weights only 21 tons, and is equipped with a Type 62-85TC 85 mm rifled gun, and 3 machine guns. An improved Type 62-I version was produced with better FCS with laser rangefinder, and turret storage racks for added protection. Other versions based on the Type 62 include the Type 79 recovery vehicle (prototype only) and Type 82 earth-mover. The PLA deployed the Type 62 light tank to Vietnam during the 1979 Sino-Vietnam conflict. They found that the thin armor of the Type 62 tank could be penetrated easily by hand-held anti-tank weapons, such as the 40 mm RPG. The Type 62 tank suffered severe losses during the conflict, which convinced the PLA to develop new second-generation MBTs. The Type 62 tank received a major upgrade in 2000, with new welded turret, vertically stabilized 105 mm rifled gun, fire-control system, night vision device, smoke grenade launchers, and explosive reactive armor (ERA) package. Type 69 / 79 Improved Type 59 MBT built by 617 Factory (Inner Mongolia First Machine Group Co. Ltd). Only saw limited service in the PLA, but was an export success in the 1980s with more than 2,000 sold worldwide. Type 73 This armored recovery vehicle is a Type 59 with its turret removed. The vehicle is armed with a single 12.7 mm machine gun. This armored recovery vehicle is not believed to have a winch and is limited to towing operations. Type 59 Heavy Infantry Fighting Vehicle The modernized HIFV model of Type 59 weighs around 40 tons and can carry up to seven passengers. Modifications include moving the engine to the front of the vehicle chassis, increasing tank armor including explosive reactive armor on all sides, and installing a rear door for dismounting infantry. QN-506 It is a modernized variant of the Type 59 using the tank's chassis similar to its Russian

counterpart the BMPT Terminator. The vehicle was first appeared at the Zhuhai Air Show in China in November 2018, and is armed with two QN-502C anti-tank missiles, ten QN-201 multi-purpose mini missiles, four S-507 loitering munitions, an unmanned 30 mm cannon, a 7.62 mm machine gun, six grenade launchers, and a quadcopter surveillance drone.
- **Foreign variants:** United Kingdom designed a variant with 105-mm L7 gun as an upgrade package for owners of the Type 59. No Type 59s served with British forces. Marconi offered their Marksman anti-aircraft system as a conversion to operators of the Type 59. The Marksman consisted of a twin 35 mm autocannon system in a turret that could be fitted to almost any MBT. Iran Iran operates Type T-72Z based on Type 59. North Korea North Korea operates Kok'san – 170 mm artillery piece, based on the Type 59 chassis. Pakistan operates Al-Zarrar – Heavy Industries Taxila of Pakistan has introduced the Al-Zarrar Main Battle Tank. The Al-Zarrar series was designed to improve and rebuild the Pakistani army's Type 59 tanks by way of more modern armament, fire control, defensive equipment, etc. Bangladesh Bangladesh operates Type 59G(BD) Durjoy - Bangladesh Army's Type-59 are being upgraded to Type 59G(BD) Durjoy locally with Chinese assistance. 174 are being upgraded in First batch.

System

Alternative Designation: Type 59; WZ-120

Total Built: Total Built: 9,500

Type: Main Battle Tank

Manufactuer: First Inner Mongolia Machinery Factory, Norinco

In Service: 1959-Present

Crew: ea4

Dimensions

Length: m6.04

Width: m3.27

Height: m2.59

Weight, Combat: tons36

Automotive

Engine Name: Model 12150L

Engine Type: V-12 liquid-cooled diesel

Engine Power: hp520

Power-to-Weight Ratio: 14.44 hp/ton

Maximum Range: km450 km, 600 km with external tanks

Speed, Maximum Road: km/h50

Speed, Maximum Off-Road: km/h25

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: 1.4 Unprepared, 5.5 with snorkel

Main Gun

↳*System*

Name: INA, 105mm Rifled Gun, similar to L7

Type: 105mm Rifled Gun

Length: 5.89 m

Barrel Length: 5.46 m

Weight: 1,282 kg

Rate of Fire: 10 rounds per minute (maximum)

Maximum Firing Range: m4,000

Fire on the Move: Yes

Maximum Elevation: deg+18

Minimum Elevation: deg-5

↳*Ammunition*

Name: M456

Type: HEAT

Caliber: mm105

Cartridge: INA

Basic Load: INA

Armor Penetration: 432, NATO Single Heavy Target

Other Ammunition Types: Chinese Type 83/ UK L64/ US M735 APFSDS, UK L52 APDS, multinational M393 HEP-T, French OE 105-F1 HE, L39 Smoke, cannister

Secondary Weapon System

Note: The Type 59 has been seen with the following secondary weapons: * 2 x Type 59T 7.62 mm coaxial machine gun, * 1 x Type 54 12.7 mm air-defence machine gun

↳*System*

Name: DShk

Type: Heavy Machine Gun

Length: 1,625 mm

Barrel Length: 1,070 mm

Weight: 34 kg (74.96 lb) (gun only) 157 kg (346.13 lb) on wheeled mounting

Action: Gas-operated, flapper locking

Rate of Fire: 600 rounds/min

Muzzle Velocity: 850 m/s

Effective Firing Range: 2,000 m

Maximum Firing Range: 2,500 m

Feed System: 50 round belt

Sights: Iron/optical

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: 12.7×108mm
Basic Load: INA
Armor Penetration: INA

Fire Control

Name: UI light spot fire control system
Computerized FCS: INA
Thermal Sight Gunner: ype DC 1024/00 II sights, x7
Main Gun Stabilization: 2-plane
Rangefinder: LRF
Infrared Searchlight: Yes

Protection

Hull Armor: 20–203 mm
Turret Armor: 20–203 mm
Applique Armor: Available, Track skirts are fitted to some tanks
Explosive Reactive Armor: Available
Active Protection System: INA
Mine Clearing: Mine plows and roller-plows available
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: 8 x 81-mm smoke grenade launchers Vehicle engine exhaust smoke system

Notes:

The Type 59 (Chinese: 59□; pinyin: Wǔ jiǔ shì; industrial designation: WZ-120) main battle tank is a Chinese-produced version of the Soviet T-54A tank, the earliest model of the ubiquitous T-54/55 series. The first vehicles were produced in 1958 and it was accepted into service in 1959, with serial production beginning in 1963. Over 10,000 of the tanks were produced by the time production ended in 1980 with approximately 5,500 serving with the Chinese armed forces. The tank formed the backbone of the Chinese People's Liberation Army until the early 2000s with an estimated 5,000 of the later Type 59-I and Type 59-II variants in service in 2002. The Type 59 was modified several times during its service. It was also the basis of several later Chinese tank designs including the Type 69 and Type 79 tanks. The Type 59 is almost identical to the early production Soviet T-54As, however there are some key differences. The Type 59 was not originally fitted with the infrared searchlight or main gun stabilization of the T-54. The Type 59 has a conventional post-war layout with an engine compartment at the rear and a cast dome-shaped gun turret in the centre of the hull. The hull is welded steel varying in thickness between 99 mm on the front lower glacis to 20 mm on the hull floor. The turret varies in thickness from 39–100 mm. The driver sits in the front left of the hull, and is provided with a hatch immediately above his seat, which opens to the left. The driver has two pop-up vision blocks which give coverage ahead and slightly to the right when buttoned up. The commander sits in the turret along with the gunner and loader. The commander's hatch is on the turret left, with the gunner sitting forward and below him. The loader sits on the right of the turret and has a hatch above him. The turret has a non-rotating floor, which complicated the crew's operations as they would not rotate with the turret. The turret mounts a rifled 100 mm Type 59 cannon, for which 34 rounds are typically carried. A Type 59T 7.62 mm machine gun is mounted coaxially with the main gun. A Type 54 12.7 mm anti-aircraft machine gun (the Chinese copy of the Russian 12.7 mm M1938/46 DShKM heavy machine gun) is provided above the gunner's hatch for

which 200 rounds are carried. Additionally, a Type 59T 7.62 mm bow-mounted machine gun is fitted and is fired by the driver through a tiny hole in the center of the front glacis plate. 3,500 rounds of 7.62 mm ammunition are normally carried. The turret has a powered traverse mechanism that is probably comparable to the T-54 traverse mechanism which can rotate the turret through 360 degrees in 21 seconds. Very early models of the Type 59 gun had manual elevation gear, later replaced with a powered system which allowed the gun to be aimed at between +17 and −4 degrees (the average depression for Western tanks is -10, which allows for better usage of hull-down tactics). Later models added vertical stabilization to make firing on the move practical. An infrared searchlight based night vision system was retrofitted to the tank with infrared periscope for the commander gunner and driver. The tank is powered by a Model 12150L V-12 liquid-cooled diesel engine, which develops 520 horsepower at 2,000 rpm. The engine feeds a manual gearbox with five forward and one reverse gear. A total of 815 litres of diesel can be carried internally in the tank, with a further 400 litres carried externally giving a maximum road range of 600 kilometers, or approximately 430 km using only internal fuel. The tank has five road wheels on each side with a prominent gap between the first and second road wheel. The track is driven by a drive sprocket at the rear, with an idler at the front. It is notable that there are no return rollers. The suspension is a torsion bar system. Engine exhaust is on the left fender. Ammunition is stored inside the turret, which increases the odds of a catastrophic secondary explosion should the tank's interior be penetrated by enemy fire. Crew survivability is hence low.

T-55AMV Russian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-55A:** In 1961, development of improved NBC protection systems began. The goal was to protect the crew from fast neutrons; adequate protection against gamma radiation was provided by the thick armour and a PAZ basic NBC protection system.
- **T-54/T-55 upgrades:** n its long service life, the T-55 has been upgraded many times. Early T-55s were fitted with a new TSh-2B-32P sight. In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough. In 1967, the improved BM8 APDS round, which could penetrate 275 mm thick armour at a range of 2 km, was introduced. In 1970, new and old T-55 tanks had the loader's hatch modified to mount the 12.7 mm DShK machine gun, to deal with the threat of attack helicopters. Starting in 1974, T-55 tanks received the KTD-1 or KTD-2 laser rangefinder in an armoured box over the mantlet of the main gun, as well as the R-123 or R-123M radio set.[10] Simultaneously, efforts were made to modernize and increase the lifespan of the drive train.
- **T-55AM:** upgraded version of the T-55A. It is fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. It entered service in 1983.
- **T-55AM-1:** upgraded version of the T-55AM, powered by a V-46-5M diesel engine, developing 690 hp.
- **T-55AD:** fitted with Drozd active protection system. It also has add-on armor. It entered service in 1983.
- **T-55AD-1:** fitted wit a V-46-5M diesel engine, developing 690 hp.
- **T-55AMV:** fitted with add-on explosive reactive armor and new fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The missile has a range of 4 000 m at daytime and 1 200 m at night. It penetrates 550 mm of rolled homogenous armor. It entered service in 1985.
- **T-55M:** Upgraded version fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. This tank entered service in 1983.
- **T-55M-1:** it is a further upgrade of the T-55M, powered by a V-46-5M diesel engine, developing 690 hp. This tank is also fitted with ballistic computer.
- **T-55MV:** it has improved protection and firepower. It is fitted with add-on explosive reactive armor and improved fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The T-55MV entered service in 1985.
- **T-55MV-1:** fitted with a V-46-5M diesel.
- **T-62A:** an improved T-55 with a stretched chassis, new suspension, new turret. It was armed with a 100 mm gun with improved ballistics. First prototypes were built in 1958 and it was accepted to service in 1962. Only a small number of these tanks were built for experimental service. However it was a forerunner of the T-62 medium tank, that was produced in thousands.
- **TO-55:** flamethrower tank. Coaxial machine gun has been replaced with a flame thrower.
- **BTS-2 and BTS-3:** armored recovery vehicles.
- **MTU-20 and MTU-55:** armored bridgelayers.
- **BTR-T:** is a heavy armored personnel carrier. It was first publicly revealed in 1997. It was converted from obsolete T-55 medium tank. The turret has been removed in order to create a compartment for dismounts. A number of other modifications were made to the vehicle. This armored vehicle has a crew of 2 and accommodates 5 dismounts. The BTR-T received no production orders.
- **Ti-67:** sraeli version, fitted with American M68 105 mm rifled gun. It is also fitted with Israeli fire control system, new engine and transmission and Blazer explosive reactive armor. About 200 T-54/55 tanks, that were captured from Egyptian and Syrian forces, were upgraded to this standard.
- **T-54E Ramzes II:** a proposed upgrade of Egyptian T-54/55 tanks. It is fitted with American M68 105 mm rifled gun, Belgian fire control system, and American Continental AVDS-1790-5A engine.
- **T-55 Enigma,:** upgraded Iraqi version, fitted with composite add-on armor. Add-on armor weights a total of 4.6 t, so a

counterweight was mounted at the turret rear. This tank also has improved night vision devices.
- **TR-580:** a Romanian version of the T-55 with a longer hull. An extra road wheel on each side has been added. It is fitted with a different engine. This tank is fitted with metal side skirts.

System

Alternative Designation: INA

Total Built: 86,000–100,000+ est.

Manufacturer: KhPZ, UVZ (Soviet Union) Bumar-Łabędy (Poland) ZTS Martin (Czechoslovakia)

Type: Main Battle Tank

Crew: ea4

Passenger Capacity: INA

Maximum Effective Range: m500

Status: In service throughout the world. No new production is possible but facilities exist to upgrade and maintain the vehicles

Dimensions

Length: m6.2

Width: m3.30

Height: m2.4

Weight, Combat: tons40.5

Ground Pressure: kg/m0.85

Automotive

Engine Name: V-555M

Engine Type: 2-cylinder 4-stroke one-chamber 38.88 litre water-cooled diesel engine

Engine Power: hp581

Engine Start Up: compressed air engine start-up system primarily, with an electrical back-up

Transmision: 155.08sbB synchronised constant mesh transmission

Cruising Range: km450/650 w extra fuel tanks

Speed, Maximum Road: km/h50

Speed, Average Cross: 25

Speed Maximum Swim: km/hINA

Fording Depth: m1.4 unprep; 5.5 snorkel

Power-to-Weight Ratio: hp/tonne16.1

Maximum Effective Range: km500, with two additional drums on the rear this can be extended to 700 km.

MC-1 Diesel Fuel Filter: Yes

Overall Fuel Capacity: liter680

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: D-10T2S

Type: 100mm Rifled Gun

Loader Type: Manual

Elevation: deg-5 to +18

Fire on the Move: Yes

Stabilization System: M1 Tsiklon, 2 plane

Elevation Range: deg-6 to 16

Traverse Range: def360

First Round Hit Probability: %60

Bore Activator: Yes, New upgrade

↳*Ammunition (Option 1)*

Name: 3UOF17

Type: HE fragmentation projectile

Caliber: mm100mm

Muzzle Velocity: m/s355

Basic Load: ea45 total of any 100 mm Projectile Combination

Max Range: m7,000

Min Range: mINA

Armor Penetration: Yes

Weight, Complete Round: kg22.9

Weight, Missile: kg19.4

Tank Commander's Weapon System

↳*System*

Name: QJZ-89

Type: 12.7mm Heavy Machine Gun

Manufacturer: NORINCO

Cartridge: mm12.7x108

Weight, Gun Only: kg17.5

Weight,Tripod: kg8.5

Length, Total: mm2,119

Length, Barrel: mm1,003

Barrels: ea1

Action: Gas/Recoil

Rate of Fire: rds/min450-600

Muzzle Velocity: m/s850

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: INA

Max Range: m1,600

Min Range: kmINA

Armor Penetration: Yes

Anti-Tank Guided Missile

Type: Laser beam-riding anti-tank missile.

Name: 9M117 Bastion

Caliber: mm100

Entered Service: 1981

Muzzle Velocity: m/s400-500

Basic Load: ea8

Maximum Effective Range: m4,000

Rocket Burn: seconds6

Rocket Motor Ignites Time: seconds1.5

Guidance: Beam-Riding Laser

Prone to Radio or Optical Jamming: No

Missile Flight Time: m4,000

Self Destruct Time: seconds24-41

Fire Control

Name: Volna

Computerized FCS: "Rosa" fire protection system

Thermal Sight Tank Commander: Yes, either the TPKUB or TPKU-2B.

Thermal Sight Gunner: Yes, TNP-165 vision device

Main Gun Stabilization: M1 Tsiklon, 2 plane

Range, Day Sight: m4,000

Range, Thermal Sight: m800-1,300

Infrared: L-4

Protection

Hull Armor: Steel Alloy

Turret Armor: mm200

Applique Armor: 1.4 unprep; 5.5 snorkel

Explosive Reactive Armor: INA

Active Protection System: Drozd APS available

Mine Clearing: Roller-plow available

Self-Entrenching Blade: No

NBC Protection: Yes, PAZ (Protivoatomnaya Zashchita) NBC protection system

Smoke Equipment: grenlaunch/eng smk sys

Note: The T-55 focuses most of its armour around the front 60 deg arc.

Notes:

The T-55 is an upgrade of the T-54 series. It was produced in the greatest quantities and benefits from improved mobility over the earlier T-54s. The original T-55s are thought to have been pre-production versions. T-55MV, it has improved protection and firepower. It is fitted with add-on explosive reactive armor and improved fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The T-55MV entered service in 1985.

Pz 87 (Panzer 87) Swiss Main Battle Tank (MBT)





Tiers:



Parent:

Leopard 2 German Main Battle Tank (MBT)

Variants:

- **Leopard 2A1:** Minor modifications and the installation of the gunner's thermal sight[1] were worked into the second batch of 450 vehicles Leopard 2, designated the A1. Krauss-Maffei built 248 (Chassis Nr. 10211 to 10458) and Mak built 202 (Chassis Nr. 20173 to 20347). Deliveries of the 2A1 models started in March 1982 and ended in November 1983. The two most notable changes were the modification of the ammunition racks to be identical to those in the M1A1 Abrams, and redesigned fuel filters that reduced refuelling time. A third batch of 300 Leopard 2, 165 by Krauss-Maffei (Chassis Nr. 10459 to 10623) and 135 by MaK (Chassis Nr. 20375 to 20509.), was built between November 1983 and November 1984. This batch included more minor changes that were later retrofitted to the earlier 2A1s
- **Leopard 2A2:** This designation was given to upgraded vehicles of the first batch of Leopard 2s, brought up to the standard of the second and third batches. This modernisation gradually replaced the original PZB 200 sights in the first batch with thermal sights for the EMES 15 as they became available. Furthermore, the upgrade included the fitting of filler openings and caps to the forward hull fuel tanks to allow separate refuelling, as well as the addition of a deflector plate for the periscope and a large coverplate to protect the existing NBC protection system. Finally, the tank was given new five metre towing cables with a different position. The programme began in 1984 and ended in 1987; the third, fourth and fifth batches, which were produced during this period, had the same features. The modernised first batch can be recognised by the circular plate covering the hole where the cross-wind sensor for the fire-control system was removed
- **Leopard 2A3:** The fourth batch of 300 vehicles, 165 by Krauss-Maffei (Chassis Nr. 10624 to 10788) and 135 by Mak (Chassis Nr. 20510 to 20644), was delivered between December 1984 and December 1985. The main change was the addition of the SEM80/90 digital radio sets (also being fitted to the Leopard 1 at the same time), and the ammunition reloading hatches being welded shut. Even with these minor changes the new batch was known as the 2A3
- **Leopard 2:** The Leopard 2 is a main battle tank developed by Krauss-Maffei in the 1970s for the West German Army. The tank first entered service in 1979 and succeeded the earlier Leopard 1 as the main battle tank of the German Army. It is armed with a 120 mm smoothbore cannon, and is powered by a V-12 twin-turbo diesel engine. Various versions have served in the armed forces of Germany and 12 other European countries, as well as several non-European nations, including Canada, Chile, Indonesia, Singapore, and Turkey. The Leopard 2 was used in Kosovo with the German Army, and has seen action in Afghanistan with the Dutch, Danish and Canadian contributions to the International Security Assistance Force, as well as also seeing action in Syria with the Turkish Armed Forces against ISIS and the YPG.
- **Leopard 2 Marksman:** Finland has modernised its Marksman SPAAG vehicles by replacing the original T-55AM chassis with a newer Leopard 2A4 chassis. The upgraded Marksman vehicles were scheduled to enter service with the Finnish Army in 2016. The new Leopard 2 chassis greatly improves mobility compared to the older T-55AM chassis, both on- and off-road. The Leopard 2 chassis is also larger, thus providing a more stable firing platform for the Marksman turret to operate from
- **Leopard 2A5:** "Leopard 2 Improved" was a prototype-series for enhancing the A4, introducing a wedge-shaped, spaced add-on armour to the turret front and the frontal area of the sides. These spaced armour modules defeat a hollow charge prior to reaching the base armour, and causes kinetic-energy penetrators to change direction, eroding them in the process; it does not form a shot-trap, since it does not deflect the penetrators outwards to hit the hull or turret ring. The gun mantlet was redesigned to accept the new armour.
- **Stridsvagn 122:** The Stridsvagn 122 is a Swedish Army tank based on the Leopard 2 Improved, with 120 units built, 91

of which were licence-produced in Sweden. The tank features increased armour on the turret top and front hull, and improved command, control and fire control systems. Externally, it can be distinguished from the Leopard 2A5 by the French GALIX smoke dispensers, different storage bins, and the much thicker crew hatches The Strv 122B, a variant equipped with modular AMAP composite armour from IBD Deisenroth, has increased 360° protection against threats like EFPs, RPGs and IEDs. The width of 4 metres (13 ft) has been kept, while the weight increases by only 350 kilograms (770 lb)

- **Leopard 2-140:** n the early 1990s,[citation needed] Rheinmetall began development of a 140 mm smoothbore cannon for use in future tank designs. The new gun was intended to counter new Soviet tank developments, especially since the next generation of Soviet main battle tanks were rumoured to be armed with a 135 mm or 152 mm cannon. The new 140 mm cannon was part of a modernisation programme for the Leopard 2 known as the KWS III. Test firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively
- **Leopard 2A6:** The Leopard 2A6 includes the addition of the Rheinmetall 120 mm L/55 smoothbore gun and other changes. All German tank battalions of the "crisis intervention forces" are equipped with the A6. Canada purchased 20 Leopard 2A6s from the Netherlands. These were delivered in 2007. Portugal also purchased 37 Leopard 2A6 from the Dutch in 2007, with delivery in 2008. In January 2014, Finland purchased 100 L2A6s, as well as munitions, simulators, and a ten-year supply of reserve parts from the Netherlands. The tanks are being delivered in batches between 2015-2019.
- **Leopard 2E:** he Leopard 2E is a derivative of the 2A6, with greater armour protection, developed under a programme of co-production between the defence industries of Spain and Germany. The programme was developed within the frame of collaboration decided in 1995 between the Defence Ministries of both countries, in which also was included the cession of use by a period of five years of 108 Leopard 2A4 from the German Army to the Spanish Army. However, this cession was extended up to 2016, and after that those tanks will be the sole property of the Spanish Army, as has been made public on 24 January 2006, then having been paid a total of 15,124,014 euros in ten yearly installments, giving the Spanish co-ownership from 2006.
- **Leopard 2 PSO:** The new Leopard 2 PSO (Peace Support Operations) variant is designed specially for urban warfare, which had been encountered in peacekeeping operations with increasing frequency. Therefore, the Leopard 2 PSO is equipped with more effective all-around protection, a secondary weapons station, improved reconnaissance ability, a bulldozer blade, a shorter gun barrel (for manoeuvring on urban streets at the expense of fire range), non-lethal armament, close-range surveillance ability (through camera systems), a searchlight and further changes to improve its perseverance and mobility in a built-up non-wide open area. These features are similar to the Tank Urban Survival Kit for the American M1A2 Abrams
- **Leopard 2A7:** The Leopard 2A7 is fundamentally different from the KMW variant 2A7+ and is not optimised for combat in urban terrain. A total of 20 vehicles are provided for converting. It involves former Dutch A6NL models returned by Canada to Germany. The original upgrade to A6M has been extended in coordination with Canada and includes a crew-compartment cooling-system from the Leopard 2 A6M-HEL series, a new 20 kW auxiliary power unit based on the Steyr Motors M12 TCA UI engine, the Saab Barracuda Mobile Camouflage System (MCS) with Heat-Transfer Reduction (HTR CoolCam) system, a field trial proven combat management and information system (IFIS: Integriertes Führungs- und Informationssystem), onboard network optimization with ultracapacitors in the chassis and turret, a SOTAS IP digital intercom system, a renewal of the fire suppression system in the crew compartment, and the retrofitting of Attica thermal imaging module in the commander optics. The weapon system is adapted for firing HE ammunition. It is also fitted for, but not with, additional passive side protection armour. The first Leopard 2A7 was handed over to the German Army in Munich on 10 December 2014. A total of 14 vehicles were produced for Tank Battalion 203, plus four more going to the Armoured Corps Training Centre and one vehicle at the Technical School for Land Systems and School for Technology of the Army. The last tank remains as a reference vehicle at KMW
- **Leopard 2A7+:** The Leopard 2A7+ was first shown to the public during the Eurosatory 2010, featuring the label "Developed by KMW – tested and qualified by German MoD". The Leopard 2A7+ has been tested by the Bundeswehr under the name UrbOp (urban operations).The Leopard 2A7+ is designed to operate both in low intensity and high intensity conflicts.
- **Pz 87:** Pz 87 (standing for Panzer 87, referring to year of service entry) is the designation given to the Leopard 2A4 vehicles built under licence in Switzerland. The vehicles are essentially the same specification as the fifth and sixth production batch 2A4. This version included Swiss built communications equipment and MG 87 MGs, as well as featuring an improved NBC protection system, the installation of a hydraulic track-tensioning system, and the addition of an exhaust silencer. Late model Pz 87 included a field zeroing system, the sealing of the ammunition loading hatch, and from the 120th vehicle, the addition of heavier armoured side skirts.

System

Alternative Designation: Pz 87, Panzer 87

Proliferation: Germany: 42; Canada:12

Manufacturer: RUAG Land Systems

Type: Main Battle Tank

Family: Leopard German Main Battle Tank Family

Crew: ea4

Estimated Service Life: years50

Note: The Pz 87 is a Switzerland upgrade to the Leopard 2

Dimensions

Length (Chassis Overall): m7.7

Width: m3.7

Height: m2.8

Weight, Combat: tons56

Ground Pressure: kg/m0.83

Automotive

Engine Name: MTU MB-837 Ka501 diesel

Engine Type: liquid-cooled V-12 twin-turbo diesel engine

Engine Power: hp1,479

RPMs: RPM2,600

Speed, Maximum Road: km/h69

Cruising Range: km550

Speed, Off Road: km/h50

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Fording Depth (Without Preparation): m1.0

Fording Depth (With Preparation): m4.0

Gradient: Deg60

Side Slope: Deg30

Vertical Step: m1.5

Trench: m3

Transmission: Renk HSWL 354 transmission

Fuel Capacity (Total): liters1,160

Fuel Consumption (Road): 300 liters per 100km

Fuel Consumption (Cross Country): 500 liters per 100km

Power Pack Weight: kg3,025

Snow Grousers: 3 on the left and 7 on the right

Communications

Name: Prüfzusatzbediengerät 80 (PRZB 80) radio
Type: VHF
Cable Drum (Radio): m800
Antennas Location: mounted on the turret roof, one on each side of the Machine Gun

Main Gun

↳*System*

Name: 120mm Rheinmetall L44 smoothbore gun
Type: 120mm Smoothbore Gun
Manufacturer: Rheinmetall
Max Rate of Fire: INA
Loader Type: Semi-automatic loading system
Basic Load: ea42 Total of any combination 120mm Projectiles
Maximum Elevation: Deg+20
Minimum Elevation: Deg-9
Frontal Arc: Deg285
Rear Arc: Deg75
Fire on the Move: Yes
Weight (Gun Mount): kg3,317
Weight (Gun Barrel): kg1,190
Length (Barrel): m5.6
Thermal Sleeve: Yes
Bore Evacuator: Centrally-mounted bore evacuator
Barrel Interior Chrome Plating: Yes, to increase wear resistance of the barrel
Effective Full Charge (EFC): rounds700
Breech Type: Threaded bayonet connection
Wedge Block Type: Downward-opening semi-automatic sliding wedge block
Breach Mechanism: Hydraulically-operated loading system
Note: The Leopard 2A4 can fire any 120mm NATO Projectile

↳*Ammunition (Option 1)*

Type: DM-13 (XM829) German Armour Piercing Fin Stabilized Discarding Sabot (APFSDS)
Caliber: mm120
Muzzle Velocity: m/s1,750
Basic Load: 42 Total of any combination 120mm Projectiles

Operational Range: mINA

Armor Penetration (Steel): mm230

Cartridge Weight: kg20

Cartridge Length: mm984

Penetrator: Tungsten alloy

Propellant (NC-NG): kg8

Accuracy/Dispersion: 0.2x0.2mil

Maximum Effective Range: m3,000

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 2)*

Type: DM-12 (M325) : High-Explosive Anti-Tank Multi-Purpose (HEAT-MP-T)

Caliber: mm120

Muzzle Velocity: m/s1,078

Basic Load: 42 Total of any combination 120mm Projectiles

Cartridge Weight: kg25

Cartridge Length: mm984

Fuze: PIBD, electric

High Explosive Comp. B:: kg1.8

Accuracy/Dispersion: 0.25X0.25 mil

Maximum Effective Range: m3,100

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 3)*

Type: DM53 120mm KE Projectile (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Round Weight: kg21.4

Projectile Length: mm745

Accuracy: mil0.2

Coaxial Weapon System

↳*System*

Name: 7.5mm Mg 51 (Maschinengewehr 1951) Machine Gun

Type: mm7.5mm General Purpose Machine Gun

Manufacturer: Waffenfabrik Bern (Switzerland)

In Service: 1951-present

Weight (Gun with Bipod): kg16

Weight (Gun with Tripod): kg26

Length (Barrel): mm1,270

Length (Total): mm563

Action: Gas-operated, flapper-locked

Rate of Fire: rds/min1,000

Effective Riging Range (With Sight Adjustments): m100-2,000

Feed System: 50-round magazine belt

Sights: Iron sights, 2.3x optical sight

↳***Ammunition***

Type: Rifle

Caliber: mm7.5mm

Cartridge: 7.5×55mm Swiss,

Muzzle Velocity: m/s750

Basic Load: ea2,375

Loader's Weapon System

↳***System***

Name: 7.5mm Mg 51 (Maschinengewehr 1951) Machine Gun

Type: 7.5mm General Purpose Machine Gun mm

Manufacturer: Waffenfabrik Bern (Switzerland)

In Service: 1951-present

Weight (Gun with Bipod): kg16

Weight (Gun with Tripod): kg26

Length (Barrel): mm1,270

Length (Total): mm563

Action: Gas-operated, flapper-locked

Rate of Fire: rds/min1,000

Effective Riging Range (With Sight Adjustments): m100-2,000

Feed System: 50-round magazine belt

Sights: ron sights, 2.3x optical sight

↳***Ammunition***

Type: Rifle

Caliber: mm7.5

Cartridge: 7.5×55mm Swiss

Muzzle Velocity: m/s750

Basic Load: ea2,375

Fire Control

Name: Digitaler Ballistikkern (DigBal) digital FCS

Computerized FCS: Yes

Primary Sight: Hauptzielfernrohr (HZF) primary sight System

Commander's Periscope: Carl Zeis fully stabilised monocular PERI R17A1 sight

Thermal Sight Tank Commander: Warmebildgerat X (WBG-X) thermal sight.

Thermal Sight Gunner: Warmebildgerat X (WBG-X) thermal sight.

Primary Gun Sight: binocular HZF

Main Gun Stabilization: Hydraulic and provides dual-axis stabilisation.

Infrared: Yes

Range Finder: EMES 15 laser rangefinder (LRF).

Wind Senor: Yes

Telescope: EMES 15

Tower Sight: FERO Z18

Computer Controlled Tank Testing Set: RPP 1–8

Ballistic Compensator: Field zeroing system

Weapon Slaving System: Waffenachfuhranlage (WNA) H22 weapon slaving system

Emergency Backup Turret Sight: Turmzielfernrohr (TZF) FERO Z18

Fault Detection System: Rechnergesteuertes Panzerpufstsem (RPP 1-8) fault detection system

Field Zeroing System: Feldjustieranlage (FJA) field zeroing system

Protection

Hull Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Turret Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Applique Armor: Yes, Track Skirt

Explosive Reactive Armor: INA

Active Protection System: Yes, Dräger Safety AG & Co

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, KGaA CBRN protection system

Smoke Equipment: MWA [Mehrfachwurfanlage] 76 mm obscurant smoke discharger system

IR Signature: IR suppressive smoke screen system

Fire Suppression System: Yes, Automatic

Grenade Launchers: Eight grenade launchers are mounted on each side of the Turret

Fire Detection and Suppression System: Yes, Kidde-Deugra Brandschutzsysteme System

Emergency Escape Hatch: Yes, below the driver's compartment

Notes:

The Pz 87 WE Leopard 2 (Werterhaltung) is the most modern version of the Pz 87. The first 2 prototypes were completed in 2003 and featured new armor packages, sighting equipment and Remote Weapon Station. However the actual Pz 87 WE did not recieve the full upgrades offered by Swiss Defence Company Ruag. Instead its Battlefield management and communications capabilities were upgraded as well as a new Commanders Independent Sight installed. There are references to a new thermal imager, but is most likely only for the CIS. All work was carried out by Ruag.

Pz 87WE (Panzer 87 Werterhaltung) Swiss Main Battle Tank (MBT)



Tiers:



Parent:

Leopard 2 German Main Battle Tank (MBT)

Variants:

- **Leopard 2A1:** Minor modifications and the installation of the gunner's thermal sight[1] were worked into the second batch of 450 vehicles Leopard 2, designated the A1. Krauss-Maffei built 248 (Chassis Nr. 10211 to 10458) and Mak built 202 (Chassis Nr. 20173 to 20347). Deliveries of the 2A1 models started in March 1982 and ended in November 1983. The two most notable changes were the modification of the ammunition racks to be identical to those in the M1A1 Abrams, and redesigned fuel filters that reduced refuelling time. A third batch of 300 Leopard 2, 165 by Krauss-Maffei (Chassis Nr. 10459 to 10623) and 135 by MaK (Chassis Nr. 20375 to 20509.), was built between November 1983 and November 1984. This batch included more minor changes that were later retrofitted to the earlier 2A1s
- **Leopard 2A2:** This designation was given to upgraded vehicles of the first batch of Leopard 2s, brought up to the standard of the second and third batches. This modernisation gradually replaced the original PZB 200 sights in the first batch with thermal sights for the EMES 15 as they became available. Furthermore, the upgrade included the fitting of filler openings and caps to the forward hull fuel tanks to allow separate refuelling, as well as the addition of a deflector plate for the periscope and a large coverplate to protect the existing NBC protection system. Finally, the tank was given new five metre towing cables with a different position. The programme began in 1984 and ended in 1987; the third, fourth and fifth batches, which were produced during this period, had the same features. The modernised first batch can be recognised by the circular plate covering the hole where the cross-wind sensor for the fire-control system was removed
- **Leopard 2A3:** The fourth batch of 300 vehicles, 165 by Krauss-Maffei (Chassis Nr. 10624 to 10788) and 135 by Mak (Chassis Nr. 20510 to 20644), was delivered between December 1984 and December 1985. The main change was the addition of the SEM80/90 digital radio sets (also being fitted to the Leopard 1 at the same time), and the ammunition reloading hatches being welded shut. Even with these minor changes the new batch was known as the 2A3
- **Leopard 2:** The Leopard 2 is a main battle tank developed by Krauss-Maffei in the 1970s for the West German Army. The tank first entered service in 1979 and succeeded the earlier Leopard 1 as the main battle tank of the German Army. It is armed with a 120 mm smoothbore cannon, and is powered by a V-12 twin-turbo diesel engine. Various versions have served in the armed forces of Germany and 12 other European countries, as well as several non-European nations, including Canada, Chile, Indonesia, Singapore, and Turkey. The Leopard 2 was used in Kosovo with the German Army, and has seen action in Afghanistan with the Dutch, Danish and Canadian contributions to the International Security Assistance Force, as well as also seeing action in Syria with the Turkish Armed Forces against ISIS and the YPG.
- **Leopard 2 Marksman:** Finland has modernised its Marksman SPAAG vehicles by replacing the original T-55AM chassis with a newer Leopard 2A4 chassis. The upgraded Marksman vehicles were scheduled to enter service with the Finnish Army in 2016. The new Leopard 2 chassis greatly improves mobility compared to the older T-55AM chassis, both on- and off-road. The Leopard 2 chassis is also larger, thus providing a more stable firing platform for the Marksman turret to operate from
- **Leopard 2A5:** "Leopard 2 Improved" was a prototype-series for enhancing the A4, introducing a wedge-shaped, spaced add-on armour to the turret front and the frontal area of the sides. These spaced armour modules defeat a hollow charge prior to reaching the base armour, and causes kinetic-energy penetrators to change direction, eroding them in the process; it does not form a shot-trap, since it does not deflect the penetrators outwards to hit the hull or turret ring. The gun mantlet was redesigned to accept the new armour.
- **Stridsvagn 122:** The Stridsvagn 122 is a Swedish Army tank based on the Leopard 2 Improved, with 120 units built, 91

of which were licence-produced in Sweden. The tank features increased armour on the turret top and front hull, and improved command, control and fire control systems. Externally, it can be distinguished from the Leopard 2A5 by the French GALIX smoke dispensers, different storage bins, and the much thicker crew hatches The Strv 122B, a variant equipped with modular AMAP composite armour from IBD Deisenroth, has increased 360° protection against threats like EFPs, RPGs and IEDs. The width of 4 metres (13 ft) has been kept, while the weight increases by only 350 kilograms (770 lb)

- **Leopard 2-140:** n the early 1990s,[citation needed] Rheinmetall began development of a 140 mm smoothbore cannon for use in future tank designs. The new gun was intended to counter new Soviet tank developments, especially since the next generation of Soviet main battle tanks were rumoured to be armed with a 135 mm or 152 mm cannon. The new 140 mm cannon was part of a modernisation programme for the Leopard 2 known as the KWS III. Test firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively
- **Leopard 2A6:** The Leopard 2A6 includes the addition of the Rheinmetall 120 mm L/55 smoothbore gun and other changes. All German tank battalions of the "crisis intervention forces" are equipped with the A6. Canada purchased 20 Leopard 2A6s from the Netherlands. These were delivered in 2007. Portugal also purchased 37 Leopard 2A6 from the Dutch in 2007, with delivery in 2008. In January 2014, Finland purchased 100 L2A6s, as well as munitions, simulators, and a ten-year supply of reserve parts from the Netherlands. The tanks are being delivered in batches between 2015-2019.
- **Leopard 2E:** he Leopard 2E is a derivative of the 2A6, with greater armour protection, developed under a programme of co-production between the defence industries of Spain and Germany. The programme was developed within the frame of collaboration decided in 1995 between the Defence Ministries of both countries, in which also was included the cession of use by a period of five years of 108 Leopard 2A4 from the German Army to the Spanish Army. However, this cession was extended up to 2016, and after that those tanks will be the sole property of the Spanish Army, as has been made public on 24 January 2006, then having been paid a total of 15,124,014 euros in ten yearly installments, giving the Spanish co-ownership from 2006.
- **Leopard 2 PSO:** The new Leopard 2 PSO (Peace Support Operations) variant is designed specially for urban warfare, which had been encountered in peacekeeping operations with increasing frequency. Therefore, the Leopard 2 PSO is equipped with more effective all-around protection, a secondary weapons station, improved reconnaissance ability, a bulldozer blade, a shorter gun barrel (for manoeuvring on urban streets at the expense of fire range), non-lethal armament, close-range surveillance ability (through camera systems), a searchlight and further changes to improve its perseverance and mobility in a built-up non-wide open area. These features are similar to the Tank Urban Survival Kit for the American M1A2 Abrams
- **Leopard 2A7:** The Leopard 2A7 is fundamentally different from the KMW variant 2A7+ and is not optimised for combat in urban terrain. A total of 20 vehicles are provided for converting. It involves former Dutch A6NL models returned by Canada to Germany. The original upgrade to A6M has been extended in coordination with Canada and includes a crew-compartment cooling-system from the Leopard 2 A6M-HEL series, a new 20 kW auxiliary power unit based on the Steyr Motors M12 TCA UI engine, the Saab Barracuda Mobile Camouflage System (MCS) with Heat-Transfer Reduction (HTR CoolCam) system, a field trial proven combat management and information system (IFIS: Integriertes Führungs- und Informationssystem), onboard network optimization with ultracapacitors in the chassis and turret, a SOTAS IP digital intercom system, a renewal of the fire suppression system in the crew compartment, and the retrofitting of Attica thermal imaging module in the commander optics. The weapon system is adapted for firing HE ammunition. It is also fitted for, but not with, additional passive side protection armour. The first Leopard 2A7 was handed over to the German Army in Munich on 10 December 2014. A total of 14 vehicles were produced for Tank Battalion 203, plus four more going to the Armoured Corps Training Centre and one vehicle at the Technical School for Land Systems and School for Technology of the Army. The last tank remains as a reference vehicle at KMW
- **Leopard 2A7+:** The Leopard 2A7+ was first shown to the public during the Eurosatory 2010, featuring the label "Developed by KMW – tested and qualified by German MoD". The Leopard 2A7+ has been tested by the Bundeswehr under the name UrbOp (urban operations).The Leopard 2A7+ is designed to operate both in low intensity and high intensity conflicts.
- **Pz 87:** Pz 87 (standing for Panzer 87, referring to year of service entry) is the designation given to the Leopard 2A4 vehicles built under licence in Switzerland. The vehicles are essentially the same specification as the fifth and sixth production batch 2A4. This version included Swiss built communications equipment and MG 87 MGs, as well as featuring an improved NBC protection system, the installation of a hydraulic track-tensioning system, and the addition of an exhaust silencer. Late model Pz 87 included a field zeroing system, the sealing of the ammunition loading hatch, and from the 120th vehicle, the addition of heavier armoured side skirts.

System

Alternative Designation: Pz 87WE, Panzer 87 Werterhaltung

Manufacturer: Krauss-Maffei Wegmann Maschinenbau Kiel

Type: Main Battle Tank

Family: Leopard German Main Battle Tank Family

Crew: ea4

Estimated Service Life: years50

Driver Rear-View Camera: Yes

Dimensions

Length (Chassis Overall): m7.7

Width: m3.7

Height: m2.8

Weight, Combat: tons56

Ground Pressure: kg/m0.83

Automotive

Engine Name: MTU MB-837 Ka501 diesel

Engine Type: liquid-cooled V-12 twin-turbo diesel engine

Engine Power: hp1,479

RPMs: RPM2,600

Speed, Maximum Road: km/h69

Cruising Range: km550

Speed, Off Road: km/h50

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Fording Depth (Without Preparation): m1.0

Fording Depth (With Preparation): m4.0

Gradient: Deg60

Side Slope: Deg30

Vertical Step: m1.5

Trench: m3

Transmission: Renk HSWL 354 transmission

Fuel Capacity (Total): liters1,160

Fuel Consumption (Road): 300 liters per 100km

Fuel Consumption (Cross Country): 500 liters per 100km

Power Pack Weight: kg3,025

Snow Grousers: 3 on the left and 7 on the right

Communications

Name: Prüfzusatzbediengerät 80 (PRZB 80) radio

Type: VHF

Cable Drum (Radio): m800

Antennas Location: mounted on the turret roof, one on each side of the Machine Gun

C2: Enhanced C2 Suite, no name

Main Gun

↳*System*

Name: 120mm Rheinmetall L44 smoothbore gun

Type: 120mm Smoothbore Gun

Manufacturer: Rheinmetall

Max Rate of Fire: INA

Loader Type: Semi-automatic loading system

Basic Load: ea42 Total of any combination 120mm Projectiles

Maximum Elevation: Deg+20

Minimum Elevation: Deg-9

Frontal Arc: Deg285

Rear Arc: Deg75

Fire on the Move: Yes

Weight (Gun Mount): kg3,317

Weight (Gun Barrel): kg1,190

Length (Barrel): m5.6

Thermal Sleeve: Yes

Bore Evacuator: Centrally-mounted bore evacuator

Barrel Interior Chrome Plating: Yes, to increase wear resistance of the barrel

Effective Full Charge (EFC): rounds700

Breech Type: Threaded bayonet connection

Wedge Block Type: Downward-opening semi-automatic sliding wedge block

Breach Mechanism: Hydraulically-operated loading system

Note: The Leopard 2A4 can fire any 120mm NATO Projectile

↳*Ammunition (Option 1)*

Type: DM-13 (XM829) German Armour Piercing Fin Stabilized Discarding Sabot (APFSDS)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Operational Range: mINA

Armor Penetration (Steel): mm230

Cartridge Weight: kg20

Cartridge Length: mm984

Penetrator: Tungsten alloy

Propellant (NC-NG): kg8

Accuracy/Dispersion: 0.2x0.2mil

Maximum Effective Range: m3,000

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 2)*

Type: DM-12 (M325) : High-Explosive Anti-Tank Multi-Purpose (HEAT-MP-T)

Caliber: mm120

Muzzle Velocity: m/s1,078

Basic Load: 42 Total of any combination 120mm Projectiles

Cartridge Weight: kg25

Cartridge Length: mm984

Fuze: PIBD, electric

High Explosive Comp. B:: kg1.8

Accuracy/Dispersion: 0.25X0.25 mil

Maximum Effective Range: m3,100

Cartridge Type: Semi-combustible cartridge

↳*Ammunition (Option 3)*

Type: DM53 120mm KE Projectile (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Round Weight: kg21.4

Projectile Length: mm745

Accuracy: mil0.2

Coaxial Weapon System

↳*System*

Name: 7.5mm Mg 51 (Maschinengewehr 1951) Machine Gun

Type: mm7.5mm General Purpose Machine Gun

Manufacturer: Waffenfabrik Bern (Switzerland)

In Service: 1951-present

Weight (Gun with Bipod): kg16

Weight (Gun with Tripod): kg26

Length (Barrel): mm1,270

Length (Total): mm563

Action: Gas-operated, flapper-locked

Rate of Fire: rds/min1,000

Effective Riging Range (With Sight Adjustments): m100-2,000

Feed System: 50-round magazine belt

Sights: Iron sights, 2.3x optical sight

↳***Ammunition***

Type: Rifle

Caliber: mm7.5mm

Cartridge: 7.5×55mm Swiss,

Muzzle Velocity: m/s750

Basic Load: ea2,375

Loader's Weapon System

↳***System***

Name: 7.5mm Mg 51 (Maschinengewehr 1951) Machine Gun

Type: 7.5mm General Purpose Machine Gun mm

Manufacturer: Waffenfabrik Bern (Switzerland)

In Service: 1951-present

Weight (Gun with Bipod): kg16

Weight (Gun with Tripod): kg26

Length (Barrel): mm1,270

Length (Total): mm563

Action: Gas-operated, flapper-locked

Rate of Fire: rds/min1,000

Effective Riging Range (With Sight Adjustments): m100-2,000

Feed System: 50-round magazine belt

Sights: ron sights, 2.3x optical sight

↳***Ammunition***

Type: Rifle

Caliber: mm7.5

Cartridge: 7.5×55mm Swiss

Muzzle Velocity: m/s750

Basic Load: ea2,375

Fire Control

Name: Digitaler Ballistikkern (DigBal) digital FCS

Computerized FCS: Yes

Primary Sight: Hauptzielfernrohr (HZF) primary sight System

Commander's Periscope: Carl Zeis fully stabilised monocular PERI R17A2 sight

Thermal Sight Tank Commander: OPHELIOS-P, also referred to as the Thermal Imaging Module (TIM)

Thermal Sight Gunner: OPHELIOS-P, also referred to as the Thermal Imaging Module (TIM)

Primary Gun Sight: binocular HZF

Main Gun Stabilization: Hydraulic and provides dual-axis stabilisation.

Infrared: Yes

Range Finder: EMES 15 laser rangefinder (LRF).

Wind Senor: Yes

Telescope: EMES 15

Tower Sight: FERO Z18

Computer Controlled Tank Testing Set: RPP 1–8

Ballistic Compensator: Field zeroing system

Weapon Slaving System: Waffenachfuhranlage (WNA) H22 weapon slaving system

Emergency Backup Turret Sight: Turmzielfernrohr (TZF) FERO Z18

Fault Detection System: Rechnergesteuertes Panzerpufstsem (RPP 1-8) fault detection system

Field Zeroing System: Feldjustieranlage (FJA) field zeroing system

Gun Control equipment System: EWNA [Elektrische Waffennachführanlage - electric tracker]

Protection

Hull Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Turret Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Turret Type: All-electric turret

Applique Armor: Yes, Track Skirt

Explosive Reactive Armor: INA

Active Protection System: Yes, Dräger Safety AG & Co

Mine Clearing: Yes, taken from the Leopard 2A6M

Self-Entrenching Blade: No

NBC Protection: Yes, KGaA CBRN protection system

Smoke Equipment: MWA [Mehrfachwurfanlage] 76 mm obscurant smoke discharger system

IR Signature: IR suppressive smoke screen system

Fire Suppression System: Yes, Automatic

Grenade Launchers: Eight grenade launchers are mounted on each side of the Turret. Minor upgrade over the Pz 87.

Fire Detection and Suppression System: Yes, Kidde-Deugra Brandschutzsysteme System

Emergency Escape Hatch: Yes, below the driver's compartment

Notes:

The Pz 87 WE Leopard 2 (Werterhaltung) is the most modern version of the Pz 87. The first 2 prototypes were completed in 2003 and featured new armor packages, sighting equipment and Remote Weapon Station. However the actual Pz 87 WE did not receive the full upgrades offered by Swiss Defence Company Ruag. Instead its Battlefield management and communications capabilities were upgraded as well as a new Commanders Independent Sight installed. There are references to a new thermal imager, but is most likely only for the CIS. All work was carried out by Ruag.

M1A2 Abrams American Main Battle Tank (MBT)



Tiers:



Variants:

- **Variants and upgrades:** * XM1-FSED: Preproduction test model. Eleven Full-Scale Engineering Development test bed vehicles were produced in 1977–78. These vehicles were also called Pilot Vehicles and numbered PV-1 through PV-11. * M1: First production variant. Production began (at Chrysler) in 1979 and continued to 1985 (at General Dynamics) (3,273 built for the US). The first 110 tanks were Low Rate Initial Production (LRIP) models, still called XM1s, because they were built prior to the tank being type-classified as the M1. * M1IP (Improved Performance): Produced briefly in 1984 before the M1A1, contained upgrades and reconfigurations like new turret with thicker frontal armor, new turret is referred as "long" turret instead of older "short" turret, armor upgraded from ~650mm line of sight thickness to ~880mm (894 built for US). * M1A1: Production started in 1985 and continued to 1992, pressurized NBC system, rear bustle rack for improved stowage of supplies and crew belongings, redesigned blow-off panels and M256 120 mm smoothbore cannon (4,976 built for the U.S. Army, 221 for USMC, 59 M1A1 AIM SA sold to Australia). * M1A1HA (Heavy Armor): Added 1st generation depleted uranium armor components. Some tanks were later upgraded with 2nd generation depleted uranium armor components, and are unofficially designated M1A1HA+. * M1A1HC (Heavy Common): Added new 2nd generation depleted uranium armor components, digital engine control and other small upgrades common between Army and Marine Corps tanks. * M1A1D (Digital): A digital upgrade for the M1A1HC, to keep up with M1A2 SEP, manufactured in quantity for only 2 battalions. * M1A1 AIM v.1 (Abrams Integrated Management): A program whereby older units are reconditioned to zero hour conditions;[126] and the tank is improved by adding Forward-Looking Infra-Red (FLIR) and Far Target Locate sensors, a tank-infantry phone, communications gear, including FBCB2 and Blue Force Tracking to aid in crew situational awareness, and a thermal sight for the .50 caliber machine gun. * M1A1 AIM v.2/M1A1 SA (Situational Awareness): Upgrades similar to AIM v.1 tanks + new 3rd generation depleted uranium armor components. Configuration for the Royal Moroccan Army, which is almost identical to the Australian variant, except exportable turret armor is installed by General Dynamics Land System to replace the DU armor. * M1A1 FEP (Firepower Enhancement Package): Similar upgrade to AIM v.2 for USMC tanks. * M1A1KVT (Krasnovian Variant Tank): M1A1s that have been visually modified to resemble Soviet-made tanks for use at the National Training Center, fitted with MILES gear and a Hoffman device. * M1A1M: An export variant ordered by the Iraqi Army with depleted uranium armor removed and older thermal imaging system with lower resolution used. * M1A1 (AIDATS upgrade): Upgrade-only variant to all USMC General Dynamics M1A1 Abrams tanks to improve the tank commander's situational awareness with an upgraded thermal sight, color day camera, and a stationary color display. * M1A2 (Baseline): Production began in 1986 and entered service in 1992(77 built for the U.S. and more than 600 M1s upgraded to M1A2, 315 for Saudi Arabia, 1,005 for Egypt, 218 for Kuwait). The M1A2 offers the tank commander an independent thermal sight and ability to, in rapid sequence, shoot at two targets without the need to acquire each one sequentially, also 2nd generation depleted uranium armor components. * M1A2 SEP (System Enhancement Package): Has upgraded third-generation depleted uranium armor components with graphite coating (240 new built, 300 M1A2s upgraded to M1A2 SEP for the US, also unknown numbers of upgraded basic M1s and M1IPs, also 400 oldest M1A1s upgraded to M1A2 SEP). * M1A2S (Saudi Package): Saudi Arabian variant upgrade of the M1A2 based on M1A2 SEP, with some features, such as depleted uranium armor, believed to be missing and replaced by special armor. (442 M1A2s upgraded to M1A2S). * M1A2 SEPv2: Added Common Remotely Operated Weapon Station as standard, color displays, improved interfaces, a new operating system, improved front and side armor with ERA (TUSK kit), tank-infantry phone as standard, and an upgraded transmission for better durability. * M1A2C (SEPv3): Has increased power generation and distribution, better communications and networking, new Vehicle Health Management System (VHMS) and Line Replaceable Modules (LRMs) for improved maintenance, an Ammunition DataLink (ADL) to use airburst rounds, improved counter-IED armor package, improved FLIR using long- and mid-wave infrared, a low-profile CROWS RWS, Next Generation Armor Package (NGAP), and an Auxiliary Power Unit (APU) under armor to run electronics while stationary instead of the engine, visually distinguishing the version by a small exhaust at the left rear. More passive

ballistic protection added to the turret faces, along with new Explosive Reactive Armor mountings (Abrams Reactive Armor Tile (ARAT)) and Trophy Active Protection systems added to the turret sides. Prototypes began testing in 2015, and the first were delivered in October 2017. Fielding is expected to begin in 2020. * M1A2T: Special configuration variant of the M1A2C reportedly being offered for sale to Taiwan as of March 2019 and approved by US State Department as of July 2019. Per DSCA statement, it is roughly equivalent to M1A2C, except depleted uranium armor is replaced by FMS export armor. There is no mention of the Trophy APS system. The new-built tanks will be produced at Anniston Army Depot, Anniston, Alabama, and the Joint Systems Manufacturing Center, Lima, Ohio. * M1A2D (SEPv4): Under engineering development with delivery planned to start by 2021. The Commander's Primary Sight, also known as the Commander's Independent Thermal Viewer, and Gunner's Primary Sight will be upgraded with 3rd Gen FLIR, an improved laser rangefinder and color cameras. Additional improvements will include advanced meteorological sensors, laser warning/detection receivers, directional smoke grenade launchers and integration of the new XM1147 multi-purpose (AMP) 120mm tank round. The AN/VVR-4 laser warning receiver and ROSY rapid obscurant system have been trialed by the US Army for adoption on the Abrams tank and Bradley fighting vehicle. * M1A2-K: Under development, unique variant for the Kuwaiti Army, slated to replace Kuwait's current M1A2 fleet. * M1A3: Under research development as of 2014. Improvements are to include a lighter 120 mm gun, added road wheels with improved suspension, a more durable track, lighter-weight armor, long-range precision armaments, and infrared camera and laser detectors. The variant is believed to have a new diesel engine, instead of the gas turbine engine used in previous M1 variants * M1 TTB (Tank Test Bed): Prototype with unmanned turret, 3 crew members in armored capsule in front of the heavy armored hull, main armament was 120 mm smoothbore gun, M256 derivative or modification, mechanical loading system under turret, never fielded. * CATTB: The Component Advanced Technology Test Bed was an experimental model with a lightweight 120 mm smoothbore cannon, heavy armored turret and upgraded hull based on the M1 chassis. It had a mechanical loading system in turret bustle, a new engine and probably other upgrades, never fielded. The tank went into trials in 1987–88. * M1 Thumper: Experimental variant by Lockheed Martin, equipped with the 140 mm XM291 ATACS smoothbore cannon. Similar to the CATTB, it included a larger, elongated turret to offer protection levels comparable to the M1A2 while allowing the mounting of the larger cannon and its longer ammunition. Cancelled with the end of the Cold War, and never fielded. * M1 AGDS (Air Ground Defense System): Proposed air defence variant of the Abrams equipped with dual 35 mm Bushmaster III autocannons, 12 ADATS missiles and advanced electro-optical and radar targeting systems derived from the ADATS. It was supposed to be capable of both air defence and anti-tank purposes with the ADATS MIM-146 missiles which was a dual purpose ATGM/SAM. The proposal never saw consideration and was never developed further. * M1 Grizzly Combat Mobility Vehicle (CMV). * M1 Panther II: A remote controlled mine clearing vehicle with turret removed, mine rollers on front, and the Standardized Teleoperation System. * M104 Wolverine Heavy Assault Bridge * M1074 Joint Assault Bridge (JAB): Bridgelayer combining a heavy "scissor" bridge with the M1 Abrams chassis. Expected to reach low-rate initial production in 2019 to replace the M60 AVLB and M104 Wolverine * M1150 Assault Breacher Vehicle (ABV): Assault variant for the USMC. Based upon the M1A1 Abrams chassis, the Assault Breacher Vehicle has a variety of systems installed, such as a full-width mine plow, two linear demolition charges, and a lane-marking system. Reactive armor has been fitted to the vehicle providing additional protection against High-explosive anti-tank warhead-based weapons. The turret has been replaced by a new smaller one with two MICLIC launchers at its rear. A M2HB .50 machine gun in a remote weapons station is mounted on the commander's cupola and a bank of grenade launchers are fitted to each side of the superstructure to cover the frontal arc for self-protection. * M1 Armored Recovery Vehicle: Only a prototype produced.

System

Alternative Designation: M1A2

Type: Main Battle Tank

Crew: 4 (commander, driver, gunner, loader)

Dimensions

Length, Hull: 7.92 m

Width, with Skirts: 3.65 m

Width, without Skirts: 3.48 m

Track Length on Ground: 4.65 m

Track Width: 0.64 m

Ground Clearance, Center of Hull: 0.48 m

Ground Clearance, Sides: 0.43 m

Height: 2.89 m

Gun Length: 9.83 m

Height to Turret Roof: 2.44 m

Weight, Combat: 63,086 kg

Ground Pressure: 1.08 kg/sq cm

Automotive

Engine Name: Textron-Lycoming AGT-1500 2-spool free-shaft, multi-fuel turbine with Allied-Bendix digital electronic fuel control

Engine Type: Multi-Fuel

Engine Power: 1,500 hp at 3,000 rpm

Power-to-Weight Ratio: 23.77 hp/metric ton

Fuel Capacity: 504 gal (1,908 liters)

Transmission: Allison X-1100-3B Automatic hydro-kinetic, hydrostatic steering, 4 forward and 2 reverse gears

Suspension: advanced torsion bar, 7 road wheels with 15-in (381-mm)travel, rear drive, front idler, 3 internal rotary shock absorbers,2 return rollers

Braking: hydro-mechanical

Road Speed: 66 km/h

Speed, 10 Deg Upslope: 27 km/h

Speed, 60 Deg Upslope: 7 km/h

Acceleration: 32 km/h

Range: 426 km

Communications

Radio: single-channel ground and airborne radio system (SINCGARS)

Main Gun

↳*System*

Name: M256 smoothbore

Type: 120-mm/46-cal M256 smoothbore with fume extractor and thermal sleeve

Caliber: 120mm

Length: 5.6 m

Barrel Length: 5.3 m

Width: 728 mm

Bore: 120-mm/44-caliber, smoothbore fitted with fume extractor and thermal sleeve

Gun Weight: 1,905 kg

Barrel Weight: 1,175 kg

Recoil, Maximum: 370 mm

Recoil, Normal: 340 mm

Recoil System: 2 hydraulic buffers and 1 hydropneumatic recuperator

Breech Type: semi-automatic vertical sliding wedge

Muzzle Velocity: 1373+ m/sec

Maximum Range: 2,500+ km

Turret Type: electro-hydraulic, manual backup

Feed System: Manual

Elevation: -10/+20 deg

Traverse: 360 deg

↳***Ammunition (Option 1)***

Name: M830

Type: HEAT-MP

Caliber: mm120

Length: 981 mm

Weight: 24.2 kg

Basic Load: 42 rounds

Ammo Types: HEAT-MP-T, APFSDS-T, MPAT, STAFF

↳***Ammunition (Option 2)***

Name: M829

Type: APFSDS

Caliber: 120mm

Length: 935 mm

Weight: 18.7 kg

Basic Load: 42 Rounds

Coaxial Weapon System

↳***System***

Name: 1 x 7.26-mm M240 machine gun

Type: General-Purpose Machine Gun

Caliber: 7.72mm

Length: 1,260 mm

Barrel Length: 630 mm

Width: 120 mm

Height: (260 mm

Weight: 12.5 kg

Action: Gas-operated long-stroke piston, open bolt

Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM

Muzzle Velocity: 853 m/s

Maximum Firing Range: 3,725 m

Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)

Feed System: Belt-fed using M13 disintegrating links

Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 6,000 Rounds

Loader's Weapon System

Weapon: 1 x 7.62-mm M240 machine gun on Skate Mount

Basic Load: 6,000 Rounds

Commander's Weapon System

↳*System*

Name: 1 x .50-caliber M2 machine gun

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3)

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,000

Fire Control

Name: INA

Computerized FCS: Yes

Ballistic Computer: Hughes 12 kilobyte digital computer

Main Gun Stabilization: Yes

Day Optics: Hughes primary stabilized sight with 3- and 10-power day optics

Night Optics: Hughes night-vision/sight with thermal imaging

Rangefinder: GEC Avionics/Kollsman eye-safe CO2 rangefinder replaces the Nd-YAG laser rangefinder

Effective Fire Range: 200 to 7,990 m

Accuracy: 10 m or less

Commander's Thermal Viewer: a Texas Instruments commander's independent thermal viewer (CITV), which permits the commander to search and independently select new targets

Driver's Thermal Viewer: Hughes driver's thermal viewer (DTV) with integrated display, a fire-control electronics unit (FCEU) that coordinates CIT stabilization, primary sight and gun-turret drive

M1A2 Upgrade: improved commander's weapon station (ICWS)

Information System: intervehicular information system (IVIS)

Navigation System: Smith Industries position navigation (POS/NAV) system

Protection

Hull Armor: Chobham-type armor on glacis and turret,armored bulkheads between turret and engine; depleted uranium armor in production since 1988

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: In addition to the armor, some USMC Abrams tanks are equipped with a Softkill Active protection system, the AN/VLQ-6 Missile Countermeasure Device (MCD) that can impede the function of guidance systems of some semi-active control line-of-sight (SACLOS) wire- and radio guided anti-tank missiles (such as the Russian 9K114 Shturm) and infrared homing missiles.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: 200 SCFM-Clean Cooled Air (collective overpressure); AN/VDR-1 radiological warning device

Smoke Equipment: M250 (British L8A1) 2 x 6-barrel smoke discharger (24 rounds), engine exhaust generation

Fire Suppression: automatic detection and suppression

Fuel Cover: Allied Bendix digital electronic fuel control

Note: Enhanced survivability including better armor on gunner's primary sight (GPS) cover;

Notes:

M1A2 Abrams Main Battle Tank The M1A2 Abrams main battle tank is a further development of the M1A1. Currently it is one of the best MBTs in the world. Development of improved M1A1 began in 1988. About 1 200-1 500 M1A2 main battle tanks were delivered to the US army. Out of this number approximately 1 000 out-dated M1 main battle tanks were upgraded to the M1A2 standard. It is planned that this tank will remain in service beyond 2050. The M1A2 has been exported to Kuwait (218) and Saudi Arabia (457). Approved for production in 1990, the M1A2 represents the U.S. Army’s technological improvement of the basic M1A1 design and the most modern battle tank in the world. Outwardly similar in appearance to the M1A1, the most notable exterior changes on the M1A2 are the redesigned Commander's Weapon Station (CWS) and the addition of a Commander's Independent Thermal Viewer) on the left side of the turret forward of the loader's hatch. Internally, however, the M1A2 has been radically redesigned to take advantage of newer technology. Most notable of these improvements is the addition of the Inter-Vehicle Information System (IVIS.) The IVIS system allows for the automatic and continual exchange of information between vehicles. By incorporating information provided by an on board Position/Navigation (POSNAV) system, unit commander's can track the location and progress of subordinate elements automatically, without tasking vehicle crews. In addition enemy positions can be identified, plotted and disseminated, while reports and artillery requests can be automatically formatted, transmitted, and processed. Lastly, map graphic control measures and operational orders can be rapidly distributed via the IVIS system. To ensure information security, all IVIS data transmissions are routed through the M1A2's SINCGARS radio system. Improving on the "hunter-killer" tank commander-gunner target hand off method pioneered on the German Leopard II, the M1A2 takes this a step further by providing the Tank Commander with an independent thermal sight. This CITV sight allows the commander to independently scan for targets in all weather conditions and through battlefield obscurants. In addition to IVIS and the CITV, the M1A2 incorporates a number of additional electronic upgrades. Power distribution throughout the tank has been improved, relying on multiple bus paths so that in the event one conduit is damaged, power may still be delivered to a component via an alternate path. The driver's instrument display has been upgraded to a more detailed digital display and the Gunner's Primary Sight has been stabilized in two axes for increased accuracy. Approved for implementation in 1995, the M1A2 SEP (System Enhancement Package) is a technology upgrade and standardization program, whereby the Army's fleet of M1s and M1A2s will all be brought to a common standard. Most notable among the modifications will be the introduction of a standard under armor auxiliary power unit and the addition a crew compartment air conditioning and cooling unit. Other modifications within the vehicle will include upgrades to the IVIS system (color display, full size keyboard, digital mapping and graphics generation capability, and voice recognition capabilities), upgrades to the Gunner's Primary Sight assembly, and improvement in the tank's intercom and radio communications systems. Production of the M1A2 was halted after the initial run of 627 vehicles. As part of the fleet upgrade program, 547 of the Army's current inventory of M1s are being upgraded to M1A2 SEP standards, which will require the complete remanufacturing of the turret, while the current fleet of M1A2s will undergo a retrofit to bring them up to SEP standards.

Pokpung-ho North Korea Main Battle Tank (MBT)







Tiers:



Variants:

- **Pokpung-Ho I:** The initial variant. Armed with the 115 mm 2A20 gun from the T-62 series and equipped with applique and spaced armor. First observed publicly during the spring of 2010.
- **Pokpung-Ho II:** A variant with heavily improved armament and protection, the Pokpung-Ho II mounts a 125 mm 2A26/46 smoothbore gun and has a new turret seemingly augmented with composite armour. ERA was also fitted on the front glacis. First observed publicly during the October 10, 2010 military parade. SA-7 MANPADS can also be fitted.
- **Pokpung-Ho III:** Currently the most advanced variant of the Pokpung-Ho, this version possesses most of the traits of the Pokpung-Ho II but has additional reactive armour on the turret front and forward part of the turret roof.
- **Pokpung-Ho IV:** An upgrade of the Pokpong-Ho I rather than II or III. 2 AT-14 Spriggan launchers fitted above main armament and 1 SA-16 MANPADS fitted on the turret rear.

System

Alternative Designation: Pokpung-ho; Chonma-Ho 215-216

Type: Main Battle Tank

Manufacturer: Ryu Kyong-su Tank Factory

Crew: ea4

Dimensions

Length: m7

Width: m3.5

Height: m2.2

Weight, Combat: tons44.3

Automotive

Engine Name: INA

Engine Type: 12 cylinder diesel engine

Engine Power: hp1,000

Cruising Range: km370-500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: mINA

Main Gun (Option 1)

↳*System*

Name: Chonma-216 (2A46)

Type: 125mm Gun

Length: 6350 mm

Weight: 2675 kg

Muzzle Velocity: APDS: 1715-1800 m/s HEAT: 905-950 m/s HE: 760 m/s

Effective Firing Range: APDS / HEAT: 3000 m HE: 4000 m ATGM: 5000 m

↳*Ammunition (Option 1)*

Name: 3VBM3

Type: APFSDS

Caliber: mm125

Basic Load: INA

Armor Penetration: 140mm

Effective Firing Range: m3,000

↳*Ammunition (Option 2)*

Name: 3VBK7

Type: HEAT

Caliber: mm125

Baslic Load: INA

Armor Penetration: 220mm

Effective Firing Range: m3,000

Main Gun (Option 2)

↳*System*

Name: Chonma-215 (2A20)

Type: 115mm Gun

Caliber: mm115

Barrel Length: m6.05

Rate of Fire: 6–10/minute

Muzzle Velocity: m/s1,600

Effective Firing Range: 2,000 m-high target – 1,870 m; 3 m-high target – 2,260 m; 4,000 m AT-12 missile.

↳*Ammunition*

Name: 3VBM-1

Type: APFSDS

Caliber: mm115

Cartridge: 115 x 728 mmR

Basic Load: INA

Armor Penetration: INA

Secondary Weapon System

Note: The Pokpung-Hu can be equipped with a variety of secondary weapons to include: * 14.5 mm KPVT heavy anti-aircraft machine gun (300 rounds), * 7.62 mm PKT (Chonma-215/216) * Dual AGS-30 automatic grenade launcher, * Dual Bulsae-3, * Dual Igla MANPADS, * 7.62 mm PKT (Chonma mod.2017)

↳*System*

Name: AGS-30

Type: Automatic Grenade Launcher

Caliber: mm30

Manufacturer: ZID

Proliferation: Widely Proliferated.

In Service: 1990-Present

Length: 1,165 mm

Weight, Unloaded: kg16

Action: Blowback

Rate of Fire: 400 round/min

Muzzle Velocity: m/s185

Effective Firing Range: 2,100 m

Feed System: 29 grenades belt

Sights: Adjustable telescopic sight, day-night sight, mechanical sight, portable radar

Note: Main service grenade launcher in the Russian Armed Forces. Completely replaced complex AGS-17

↳***Ammunition***

Name: VOG-17M

Type: HE

Caliber: mm30

Basic Load: 200 Rounds

Armor Penetration: INA

Available Ammunition Options: VOG-17M (HE) IO-30 (HE) IO-30TP (Practice) VOG-30 (HE) VOG-30D (HE) VUS-30 (Smoke) GPD-30 (HE)

Anti-Tank Guided Missile

Note: The Pokpung-ho is also reported to be equipped with the following ATGMs: * Dual Bulsae-3 (9M133 Kornet) * Dual Igla MANPADS

Fire Control

Name: The fire control system of the P'okp'ung-ho is relatively modern and based on the presence of a meteorological mast is almost certainly computerized, and some reports claim that it may be based on the Chieftain FCS, which Iran may have illegally exchanged for North Korean technology.

Computerized FCS: Possibly

Day and Night Sighting System: If the P'okp'ung-ho's FCS is based on the T-72's, it may implement the PNK-3 or PNK-4 day and night sighting system with the 1K13-49 periscope combined passive/active sight guidance system. However the night sighting system is most likely to be the same with obsolete T-62. The quality of the equipment are likely inferior to the South Korean counterparts.

Infrared Sensor: TPN-3-49 or TPN-4)

Main Gun Stabilization: INA

Laser Rangefinder: Yes

Searchlight: Yes

Note: Although the quality of the equipment are likely inferior to the South Korean counterparts, the P'okp'ung-ho is believed to be a considerable threat at medium/short range engagements, although lacking when firing from long ranges at night

Protection

Hull Armor: Although the engine compartment and the layout show some resemblance to a T-72 hull, the chassis is basically a heavily modified version of T-62, with greater length and an additional pair of road wheels. Maximum estimated armor thickness without ERA - 500 mm vs HEAT.

Turret Armor: The turret is reinforced with wedge-shaped armor modules in Pokpung-Ho I and seems to be protected by composite armour similar to the later export variant T-72M1 in Pokpung-Ho II with ERA added in Pokpung-Ho III.

Applique Armor: Available

Explosive Reactive Armor: Optional

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The P'okp'ung-ho or spelled Pokpung-ho (Korean: □□□) is a North Korean main battle tank (MBT) developed in the 1990s. The tank may incorporate technology found in the T-62, T-72, and Ch'onma-ho MBTs. Outside parties codename the tank M-2002 because the tank went through performance trials on February 16, 2002 (therefore being officially confirmed by outside sources), although the tank may have been in existence since 1992. The P'okp'ung-ho is only known to be used in North Korea. Unclassified images of the P'okp'ung-ho finally surfaced in 2010, which showed the tank design appeared to be developed from the later models of the Chonma-ho and influenced by the T-72. The P'ok'pung-ho has better mobility, survivability and firepower than the Ch'onma-ho. Capabilities of the tank have been speculated to be nearly identical to T-90, however the limited access to technical information regarding the P'okp'ung-ho makes accurate comparisons difficult. The P'okp'ung-ho's primary armament was almost certainly the 2A20 115mm gun in early examples; however, later versions seemed to be armed with the 2A26/2A46 125mm smoothbore gun, which fires AP rounds produced in North Korea. The tank also has a heavy KPV anti-aircraft machine gun and a coaxial machine gun, as well as four smoke grenade launchers on the each side of the turret. The tank does not have the capability to fire ATGMs from its main gun. A model displayed at an April 2017 parade was equipped with two MANPADS launchers at the rear of the turret, two ATGM launchers mounted on the left side of the turret, and twin automatic grenade launchers mounted on the right side of commander hatch. Although the engine compartment and the layout show some resemblance to a T-72 hull, the chassis is basically a heavily modified version of T-62, with greater length and an additional pair of road wheels. The glacis plate of the Pokpung-ho is heavily sloped and protected by appliqué armor in the initial version with ERA added in later versions. The turret is reinforced with wedge-shaped armor modules in Pokpung-Ho I and seems to be protected by composite armour similar to the later export variant T-72M1 in Pokpung-Ho II with ERA added in Pokpung-Ho III. The panels along the tracks seem to be made of a light laminar armour. Although the horsepower of the P'okp'ung-ho's engine has been speculated to be as high as 1500, the engine is likely to have around 1000-1100 horsepower. It has been reported that North Korea rejected developing the 1,250 hp (930 kW) engine of the T-80, judging that it would not be suitable for a tank engagement within the narrow, mountainous terrain of Korea, and that it would prove to be of little difference on defensive missions. During aggressive missions, the P'okp'ung-ho can quickly engage the enemy due to its already excellent speed and acceleration, which is the basis of North Korean tank tactics. The fire control system of the P'okp'ung-ho is relatively modern and based on the presence of a meteorological mast is almost certainly computerized, and some reports claim that it may be based on the Chieftain FCS, which Iran may have illegally exchanged for North Korean technology. If the P'okp'ung-ho's FCS is based on the T-72's, it may implement the PNK-3 or PNK-4 day and night sighting system with the 1K13-49 periscope combined passive/active sight guidance system.[3] However the night sighting system is most likely to be the same with obsolete T-62. The quality of the equipment are likely inferior to the South Korean counterparts. The P'okp'ung-ho also has an infrared sensor (TPN-3-49 or TPN-4), a laser rangefinder and a search light, all of which allow the P'okp'ung-ho to operate during the night. Although the quality of the equipment are likely inferior to the South Korean counterparts, the P'okp'ung-ho is believed to be a considerable threat at medium/short range engagements, although lacking when firing from long ranges at night.

T-72A Russian Main Battle Tank (MBT)




Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72B:** Second Russian main variant of the T-72 after the T-72A.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: T-72A; SMT 1980/2; SMT 1981/3; Objekt 174; Ural; Dolly Parton (Synonyms)

In Service: 1978 to present

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note: The T-72A can be discerned from the original T-72 by investigating the right of the turret, where the T-72A lacks a port for the rangefinder, additionally, the front of the T-72A's turret is almost vertical, as opposed to an incline on the original vehicle.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons41

Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-6 V-12 Diesel Engine, which is supercharged by the H24 centrifugal system

Engine Type: V-12 Diesel

Engine Power: hp780

Power to Weight Ratio: hp/ton18.8

Cruising Range: km700

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Fuel used Per Hour: liters240

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

Radio #2: R-168-100U (Standard VHF)

Main Gun

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳***System***

Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Hit Probability: %80

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Laser Emitter: 1K13 sight's laser

Onboard Guidance System: Yes

Maximum Effective Range: m4,000

Coaxial Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650-750

Effective Rate of Fire: rds/min250

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7 Anti-Aircraft Machine Gun

Proliferation: over 1 Million

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Length (Total): mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-1

Computerized FCS: Yes, Electric FCS

Thermal Sight Tank Commander: Yes, TPNZ-49

Thermal Sight Gunner: 1K13-49

Main Gun Stabilization: 2Eh28M electrohydraulic system

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Laser Rangefinder: Yes

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Turret Armor: Steel and composite armour with ERA, 500 mm against APFSDS projectiles and to 560 mm against HEAT weapons.

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor: Yes, Kontakt-5

Active Protection System: Yes, ZETS11-3 Control System

Mine Clearing: Yes, Roller and plow (optional)

Self-Entrenching Blade: Yes, built in Dozer Blade

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).

Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Effective Range: m200-300

Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.

Engine Smoke Screen Capable: Yes

IR Signature: INA

Automatic Fire Extinguishing Equipment.: Yes

Notes:

The T-72A is the second generation of Soviet-made main battle tank MBT in the T-72 family. The first version of the T-72 entered production in 1970. It is a further development of the T-62 with some features of the T-64A (upgraded version of basic T-64) and has been further developed as the T-90. The T-72A was accepted for service with the Russian army in June 1979 and is a further development of the standard MBT T-72. The T-72 was the most common tank used by the Soviet Army from the 1970s to the collapse of the Soviet Union. It was also exported to other Warsaw Pact countries, as well as Finland, India, Iran, Iraq, Syria and Yugoslavia, as well as being copied elsewhere, both with and without licenses. T-72A (1979) Added laser rangefinder and electronic fire control, turret front and top being heavily reinforced with composite armour (nicknamed Dolly Parton by US intelligence), provisions for mounting reactive armor, smoke grenade launchers, flipper armour mount on front mudguards, internal changes. T-72 Uralvagonzavod produced the first prototype with a 125-mm gun and V-45K engine in 1968 as "Object 172". After intensive comparative testing with the T-64A, Object 172 was re-engineered in 1970 to deal with some minor problems. However, being only a mobilization model, serial production of Object 172 was not possible in peacetime. In an unclear political process decree number 326-113 was issued, which allowed the production of Object 172 in the Soviet Union from 1 January 1972, and freed Uralvagonzavod from the T-64A production. The first batch was built as "Object 172M" and, after some modifications, it was tested again in 1973 and accepted into service as the "T-72" under Soviet ministry directive number 554-172 dated 7 August 1973. At least some technical documentation on the T-72 is known to have been passed to the CIA by the Polish Colonel Ryszard Kukliński between 1971 and 1982. In 2018, the 3rd Central Research Institute in Moscow had tested a proof-of-concept demonstration for robotic tank mobility, and was planning to further develop it based on the T-72B3 and other platforms.

M60 American Main Battle Tank (MBT)





Tiers:



Variants:

- **Note:** There are over 50 Variants of the M60 Main Battle Tank

System

Alternative Designation: M60 Main Battle Tank
Type: Main Battle Tank
In Service: 1959-Present
Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 6.95 m
Length, Gun Forward: 9.44 m
Width: 3.63 m
Height: 3.27 m
Tracks, Length on Ground: 4.24 m
Tracks Width: 0.71 m
Ground Pressure: 0.46 m
Weight, Unloaded: 48,680 kg
Weight, Combat: 52,620 kg
Ground Pressure: 0.87 kg/cm sq

Automotive

Engine Name: 1 x Continental AVDS-1790-2C
Engine Type: 1,790-cu in (29.34-liter) air-cooled, 4-stroke, V-12 multi-fuel
Engine Power: 750 hp at 2,400 rpm
Power-to-Weight Ratio: 14.24 hp/metric ton
Fuel Capacity: 375 gal (1,420 liters)
Transmission: Allison CD-850-6/6A powershift crossdrive; 2 forward/1 reverse gears
Suspension: torsion bar, 6 road wheels, rear drive, front idler, 3 shock absorbers, 3 track return rollers
Range: 480 km
Speed: 48 km/h
Vertical Obstacle: 0.91 m
Trench: 2.59 m
Fording without Preparation: 1.22 m
Fording with Preparation: 2.40 m
Gradiant: 60 %
Side Slope: 30 %

Main Gun

↳*System*

Name: 1 x 105-mm/51-cal M68 rifled gun with fume extractor and thermal sleeve
Type: 105mm Rifled Gun
Caliber: 105mm
Length: 5.89 m
Barrel Length: 52 calibres (5.46 m or 17.9 ft)
Weight: 1,282 kg
Rate of Fire: 10 rounds per minute (maximum)
Maximum Range: 4,000 m
Elevation: -10/+20-deg
Traverse: 360-deg

↳*Ammunition*

Type: Rifle Projectile
Caliber: mm105
Shell: INA
Shell Weight: INA
Basic Load: 63 Rounds

Coaxial Weapon System

↳*System*

Name: 1 x 7.62mm M240 Machine Gun
Type: General-Purpose Machine Gun
Length: 1,260 mm
Barrel Length: 630 mm
Width: 120 mm
Height: 260 mm
Weight: 12.5 kg
Action: Gas-operated long-stroke piston, open bolt
Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM
Muzzle Velocity: 853 m/s
Maximum Firing Range: 3,725 m
Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)
Feed System: Belt-fed using M13 disintegrating links
Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 6,000 Rounds

Auxiliary Weapon System

↳*System*

Name: M85 Machine Gun
Type: Heavy Machine Gun
Caliber: 12.7mm
In Service: INA
Manufacturer: INA
Proliferation: INA
Length: 1,384.3 mm)
Weight: 29.5 kg
Action: Recoil-operated
Rate of Fire: 400-625 rd/min

Muzzle Velocity: 880.0 m/s

Maximum Firing Range: 6,702.6 m

Effective Firing Range: 1,999.8 m

Feed System: Belt Feed, left or right hand

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7mm

Cartridge: 12.7×99mm NATO (.50 BMG)

Basic Load: Rifle

Fire Control

Name: INA

Computerized FCS: M21 solid-state analog ballistic

Thermal Sight Tank Commander: Texas Instruments AN/VSG-2 tank thermal inder and Mercury-Cadmium-Telluride (HgCdTe) IR detector for passive night and dust vision.

Thermal Sight Gunner: Texas Instruments AN/VSG-2 tank thermal inder and Mercury-Cadmium-Telluride (HgCdTe) IR detector for passive night and dust vision.

Main Gun Stabilization: INA

Rangefinder: ughes AN/VVG-2 ruby laser rangefinder usable by both commander and gunner

Protection

Hull Armor: Upper Glacis: M60: 3.67 in (93 mm) at 65° 8.68 in (220 mm) LoS

Turret Armor: M60: equals 7 in (180 mm)

Applique Armor: Available.

Explosive Reactive Armor: INA

Active Protection System: No

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: exhaust smoke generating system; 6-barrel smoke dischargers on turret sides

Notes:

The M60 is an American second generation main battle tank (MBT). It was officially standardized as the Tank, Combat, Full Tracked: 105-mm Gun, M60 in March 1959. Although developed from the M48 Patton, the M60 series was never officially classified as a member of the Patton tank family, but as a "product-improved descendant" of the Patton tank's design. The United States fully committed to the Main Battle Tank doctrine in 1963 when the Marine Corps retired the last (M103) heavy tank battalion. The M60 tank series became America's primary main battle tank during the Cold War. Over 15,000 M60s were built by Chrysler. Hull production ended in 1983, but 5,400 older models were converted to the M60A3 variant ending in 1990. It reached operational capability with fielding to US Army units in Europe beginning in December 1960. The first combat usage of the M60 was with Israel during the 1973 Yom Kippur War where it saw service under the "Magach 6" designation, performing

well in combat against comparable tanks such as the T-62. In 1982 the Israelis once again used the M60 during the 1982 Lebanon War, equipped with upgrades such as explosive reactive armor to defend against guided missiles that proved very effective at destroying tanks. The M60 also saw use in 1983 with Operation Urgent Fury, supporting US Marines in an amphibious assault into Grenada. M60s delivered to Iran also served in the Iran–Iraq War. The United States' largest deployment of M60s was in the 1991 Gulf War, where the US Marines equipped with M60A1s effectively defeated Iraqi armored forces, including T-72M tanks. The United States readily retired the M60 after Operation Desert Storm, with the last units being retired from active service in 1997. M60-series vehicles continue in front-line service with a number of countries' militaries, though most of these have been highly modified and had their firepower, mobility and protection upgraded to increase their combat effectiveness on the modern battlefield. The M60 underwent many updates over its service life. The interior layout, based on the design of the M48, provided ample room for updates and improvements, extending the vehicle's service life for over four decades. It was widely used by the US and its Cold War allies, especially those in NATO, and remains in service throughout the world today, despite having been superseded by the M1 Abrams in the US military. The tank's hull also developed a wide variety of prototypical, utility and support vehicles such as armored recovery vehicles, bridge layers and combat engineering vehicles. As of 2015 Egypt is the largest operator with 1,716 upgraded M60A3s, Turkey is second with 866 upgraded units in service, and Saudi Arabia is third with over 650 units.

M1A2S Saudi Arabian Main Battle Tank







Tiers:



Variants:

- **Variants and upgrades:** * XM1-FSED: Preproduction test model. Eleven Full-Scale Engineering Development test bed vehicles were produced in 1977–78. These vehicles were also called Pilot Vehicles and numbered PV-1 through PV-11. * M1: First production variant. Production began (at Chrysler) in 1979 and continued to 1985 (at General Dynamics) (3,273 built for the US). The first 110 tanks were Low Rate Initial Production (LRIP) models, still called XM1s, because they were built prior to the tank being type-classified as the M1. * M1IP (Improved Performance): Produced briefly in 1984 before the M1A1, contained upgrades and reconfigurations like new turret with thicker frontal armor, new turret is referred as "long" turret instead of older "short" turret, armor upgraded from ~650mm line of sight thickness to ~880mm (894 built for US). * M1A1: Production started in 1985 and continued to 1992, pressurized NBC system, rear bustle rack for improved stowage of supplies and crew belongings, redesigned blow-off panels and M256 120 mm smoothbore cannon (4,976 built for the U.S. Army, 221 for USMC, 59 M1A1 AIM SA sold to Australia). * M1A1HA (Heavy Armor): Added 1st generation depleted uranium armor components. Some tanks were later upgraded with 2nd generation depleted uranium armor components, and are unofficially designated M1A1HA+. * M1A1HC (Heavy Common): Added new 2nd generation depleted uranium armor components, digital engine control and other small upgrades common between Army and Marine Corps tanks. * M1A1D (Digital): A digital upgrade for the M1A1HC, to keep up with M1A2 SEP, manufactured in quantity for only 2 battalions. * M1A1 AIM v.1 (Abrams Integrated Management): A program whereby older units are reconditioned to zero hour conditions;[126] and the tank is improved by adding Forward-Looking Infra-Red (FLIR) and Far Target Locate sensors, a tank-infantry phone, communications gear, including FBCB2 and Blue Force Tracking to aid in crew situational awareness, and a thermal sight for the .50 caliber machine gun. * M1A1 AIM v.2/M1A1 SA (Situational Awareness): Upgrades similar to AIM v.1 tanks + new 3rd generation depleted uranium armor components. Configuration for the Royal Moroccan Army, which is almost identical to the Australian variant, except exportable turret armor is installed by General Dynamics Land System to replace the DU armor. * M1A1 FEP (Firepower Enhancement Package): Similar upgrade to AIM v.2 for USMC tanks. * M1A1KVT (Krasnovian Variant Tank): M1A1s that have been visually modified to resemble Soviet-made tanks for use at the National Training Center, fitted with MILES gear and a Hoffman device. * M1A1M: An export variant ordered by the Iraqi Army with depleted uranium armor removed and older thermal imaging system with lower resolution used. * M1A1 (AIDATS upgrade): Upgrade-only variant to all USMC General Dynamics M1A1 Abrams tanks to improve the tank commander's situational awareness with an upgraded thermal sight, color day camera, and a stationary color display. * M1A2 (Baseline): Production began in 1986 and entered service in 1992(77 built for the U.S. and more than 600 M1s upgraded to M1A2, 315 for Saudi Arabia, 1,005 for Egypt, 218 for Kuwait). The M1A2 offers the tank commander an independent thermal sight and ability to, in rapid sequence, shoot at two targets without the need to acquire each one sequentially, also 2nd generation depleted uranium armor components. * M1A2 SEP (System Enhancement Package): Has upgraded third-generation depleted uranium armor components with graphite coating (240 new built, 300 M1A2s upgraded to M1A2 SEP for the US, also unknown numbers of upgraded basic M1s and M1IPs, also 400 oldest M1A1s

upgraded to M1A2 SEP). * M1A2S (Saudi Package): Saudi Arabian variant upgrade of the M1A2 based on M1A2 SEP, with some features, such as depleted uranium armor, believed to be missing and replaced by special armor. (442 M1A2s upgraded to M1A2S). * M1A2 SEPv2: Added Common Remotely Operated Weapon Station as standard, color displays, improved interfaces, a new operating system, improved front and side armor with ERA (TUSK kit), tank-infantry phone as standard, and an upgraded transmission for better durability. * M1A2C (SEPv3): Has increased power generation and distribution, better communications and networking, new Vehicle Health Management System (VHMS) and Line Replaceable Modules (LRMs) for improved maintenance, an Ammunition DataLink (ADL) to use airburst rounds, improved counter-IED armor package, improved FLIR using long- and mid-wave infrared, a low-profile CROWS RWS, Next Generation Armor Package (NGAP), and an Auxiliary Power Unit (APU) under armor to run electronics while stationary instead of the engine, visually distinguishing the version by a small exhaust at the left rear. More passive ballistic protection added to the turret faces, along with new Explosive Reactive Armor mountings (Abrams Reactive Armor Tile (ARAT)) and Trophy Active Protection systems added to the turret sides. Prototypes began testing in 2015, and the first were delivered in October 2017. Fielding is expected to begin in 2020. * M1A2T: Special configuration variant of the M1A2C reportedly being offered for sale to Taiwan as of March 2019 and approved by US State Department as of July 2019. Per DSCA statement, it is roughly equivalent to M1A2C, except depleted uranium armor is replaced by FMS export armor. There is no mention of the Trophy APS system. The new-built tanks will be produced at Anniston Army Depot, Anniston, Alabama, and the Joint Systems Manufacturing Center, Lima, Ohio. * M1A2D (SEPv4): Under engineering development with delivery planned to start by 2021. The Commander's Primary Sight, also known as the Commander's Independent Thermal Viewer, and Gunner's Primary Sight will be upgraded with 3rd Gen FLIR, an improved laser rangefinder and color cameras. Additional improvements will include advanced meteorological sensors, laser warning/detection receivers, directional smoke grenade launchers and integration of the new XM1147 multi-purpose (AMP) 120mm tank round. The AN/VVR-4 laser warning receiver and ROSY rapid obscurant system have been trialed by the US Army for adoption on the Abrams tank and Bradley fighting vehicle. * M1A2-K: Under development, unique variant for the Kuwaiti Army, slated to replace Kuwait's current M1A2 fleet. * M1A3: Under research development as of 2014. Improvements are to include a lighter 120 mm gun, added road wheels with improved suspension, a more durable track, lighter-weight armor, long-range precision armaments, and infrared camera and laser detectors. The variant is believed to have a new diesel engine, instead of the gas turbine engine used in previous M1 variants * M1 TTB (Tank Test Bed): Prototype with unmanned turret, 3 crew members in armored capsule in front of the heavy armored hull, main armament was 120 mm smoothbore gun, M256 derivative or modification, mechanical loading system under turret, never fielded. * CATTB: The Component Advanced Technology Test Bed was an experimental model with a lightweight 120 mm smoothbore cannon, heavy armored turret and upgraded hull based on the M1 chassis. It had a mechanical loading system in turret bustle, a new engine and probably other upgrades, never fielded. The tank went into trials in 1987–88. * M1 Thumper: Experimental variant by Lockheed Martin, equipped with the 140 mm XM291 ATACS smoothbore cannon. Similar to the CATTB, it included a larger, elongated turret to offer protection levels comparable to the M1A2 while allowing the mounting of the larger cannon and its longer ammunition. Cancelled with the end of the Cold War, and never fielded. * M1 AGDS (Air Ground Defense System): Proposed air defence variant of the Abrams equipped with dual 35 mm Bushmaster III autocannons, 12 ADATS missiles and advanced electro-optical and radar targeting systems derived from the ADATS. It was supposed to be capable of both air defence and anti-tank purposes with the ADATS MIM-146 missiles which was a dual purpose ATGM/SAM. The proposal never saw consideration and was never developed further. * M1 Grizzly Combat Mobility Vehicle (CMV). * M1 Panther II: A remote controlled mine clearing vehicle with turret removed, mine rollers on front, and the Standardized Teleoperation System. * M104 Wolverine Heavy Assault Bridge * M1074 Joint Assault Bridge (JAB): Bridgelayer combining a heavy "scissor" bridge with the M1 Abrams chassis. Expected to reach low-rate initial production in 2019 to replace the M60 AVLB and M104 Wolverine * M1150 Assault Breacher Vehicle (ABV): Assault variant for the USMC. Based upon the M1A1 Abrams chassis, the Assault Breacher Vehicle has a variety of systems installed, such as a full-width mine plow, two linear demolition charges, and a lane-marking system. Reactive armor has been fitted to the vehicle providing additional protection against High-explosive anti-tank warhead-based weapons. The turret has been replaced by a new smaller one with two MICLIC launchers at its rear. A M2HB .50 machine gun in a remote weapons station is mounted on the commander's cupola and a bank of grenade launchers are fitted to each side of the superstructure to cover the frontal arc for self-protection. * M1 Armored Recovery Vehicle: Only a prototype produced.

System

Alternative Designation: M1A2S

Type: Main Battle Tank

Crew: 4 (commander, driver, gunner, loader)

M1A2S Upgrades: a new computerized mass-memory unit; color maps and displays; enhanced Army Force XXI digital command and control capabilities; a second-generation, forward-looking IR (FLIR) system for the gunner and commander;user-friendly soldier/machine interface (SMI); under-armor auxiliary power unit (UAAPU);

Dimensions

Length, Hull: 7.92 m

Width, with Skirts: 3.65 m

Width, without Skirts: 3.48 m

Track Length on Ground: 4.65 m

Track Width: 0.64 m

Ground Clearance, Center of Hull: 0.48 m

Ground Clearance, Sides: 0.43 m

Height: 2.89 m

Gun Length: 9.83 m

Height to Turret Roof: 2.44 m

Weight, Combat: 63,086 kg

Ground Pressure: 1.08 kg/sq cm

Automotive

Engine Name: Textron-Lycoming AGT-1500 2-spool free-shaft, multi-fuel turbine with Allied-Bendix digital electronic fuel control

Engine Type: Multi-Fuel

Engine Power: 1,500 hp at 3,000 rpm

Power-to-Weight Ratio: 23.77 hp/metric ton

Fuel Capacity: 504 gal (1,908 liters)

Transmission: Allison X-1100-3B Automatic hydro-kinetic, hydrostatic steering, 4 forward and 2 reverse gears

Suspension: advanced torsion bar, 7 road wheels with 15-in (381-mm)travel, rear drive, front idler, 3 internal rotary shock absorbers,2 return rollers

Braking: hydro-mechanical

Road Speed: 66 km/h

Speed, 10 Deg Upslope: 27 km/h

Speed, 60 Deg Upslope: 7 km/h

Acceleration: 32 km/h

Range: 426 km

Auxiliary Power Unit: under-armor auxiliary power unit (UAAPU)

Communications

Radio: single-channel ground and airborne radio system (SINCGARS)

Main Gun

↳*System*

Name: M256 smoothbore

Type: 120-mm/46-cal M256 smoothbore with fume extractor and thermal sleeve

Caliber: 120mm

Length: 5.6 m

Barrel Length: 5.3 m

Width: 728 mm

Bore: 120-mm/44-caliber, smoothbore fitted with fume extractor and thermal sleeve

Gun Weight: 1,905 kg

Barrel Weight: 1,175 kg

Recoil, Maximum: 370 mm

Recoil, Normal: 340 mm

Recoil System: 2 hydraulic buffers and 1 hydropneumatic recuperator

Breech Type: semi-automatic vertical sliding wedge

Muzzle Velocity: 1373+ m/sec

Maximum Range: 2,500+ km

Turret Type: electro-hydraulic, manual backup

Feed System: Manual

Elevation: -10/+20 deg

Traverse: 360 deg

↳*Ammunition (Option 1)*

Name: M830

Type: HEAT-MP

Caliber: mm120

Length: 981 mm

Weight: 24.2 kg

Basic Load: 42 rounds

Ammo Types: HEAT-MP-T, APFSDS-T, MPAT, STAFF

↳*Ammunition (Option 2)*

Name: M829

Type: APFSDS

Caliber: 120mm

Length: 935 mm

Weight: 18.7 kg

Basic Load: 42 Rounds

Coaxial Weapon System

↳*System*

Name: 1 x 7.26-mm M240 machine gun
Type: General-Purpose Machine Gun
Caliber: 7.72mm
Length: 1,260 mm
Barrel Length: 630 mm
Width: 120 mm
Height: (260 mm
Weight: 12.5 kg
Action: Gas-operated long-stroke piston, open bolt
Rate of Fire: M240, M240E1, M240C, M240D and M240G: Gas Setting 1: 650–750 RPM Gas Setting 2: 750–850 RPM Gas Setting 3: 850–950 RPM M240B, M240L and M240H: 550–650 RPM Barrett 240LW and 240 LWS: 550–650 RPM
Muzzle Velocity: 853 m/s
Maximum Firing Range: 3,725 m
Effective Firing Range: 800 m (875 yd) (bipod) 1,100 m (1,203 yd) (tripod)
Feed System: Belt-fed using M13 disintegrating links
Sights: Iron sights: front blade and folding rear leaf with aperture and notch

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Basic Load: 6,000 Rounds

Loader's Weapon System

Weapon: 1 x 7.62-mm M240 machine gun on Skate Mount
Basic Load: 6,000 Rounds

Commander's Weapon System

↳*System*

Name: 1 x .50-caliber M2 machine gun
Type: Heavy Machine Gun
Caliber: 12.7mm
Length: 1,654 mm
Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3)

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,000

Fire Control

Name: INA

Computerized FCS: Yes

Ballistic Computer: Hughes 12 kilobyte digital computer

Main Gun Stabilization: Yes

Day Optics: Hughes primary stabilized sight with 3- and 10-power day optics

Night Optics: Hughes night-vision/sight with thermal imaging

Rangefinder: GEC Avionics/Kollsman eye-safe CO2 rangefinder replaces the Nd-YAG laser rangefinder

Effective Fire Range: 200 to 7,990 m

Accuracy: 10 m or less

Commander's Thermal Viewer: a Texas Instruments commander's independent thermal viewer (CITV), which permits the commander to search and independently select new targets

Driver's Thermal Viewer: Hughes driver's thermal viewer (DTV) with integrated display, a fire-control electronics unit (FCEU) that coordinates CIT stabilization, primary sight and gun-turret drive

M1A2S Upgrade: improved commander's weapon station (ICWS)

Information System: intervehicular information system (IVIS)

Navigation System: Smith Industries position navigation (POS/NAV) system

Command and Control Upgrade: enhanced Army Force XXI digital command and control capabilities;

FLIR: a second-generation, forward-looking IR (FLIR) system for the gunner and commander

Protection

Hull Armor: Depleted uranium armor, believed to be missing and replaced by special armor.

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: In addition to the armor, some USMC Abrams tanks are equipped with a Softkill Active protection system, the AN/VLQ-6 Missile Countermeasure Device (MCD) that can impede the function of guidance systems of some semi-active control line-of-sight (SACLOS) wire- and radio guided anti-tank missiles (such as the Russian 9K114 Shturm) and infrared homing missiles.

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: 200 SCFM-Clean Cooled Air (collective overpressure); AN/VDR-1 radiological warning device

Smoke Equipment: M250 (British L8A1) 2 x 6-barrel smoke discharger (24 rounds), engine exhaust generation

Fire Suppression: automatic detection and suppression

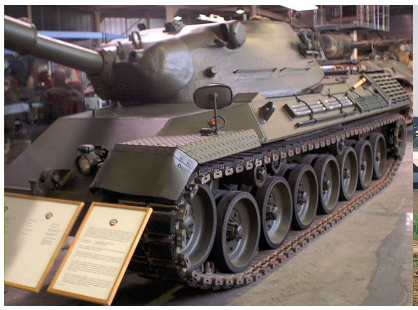
Fuel Cover: Allied Bendix digital electronic fuel control

Note: Enhanced survivability including better armor on gunner's primary sight (GPS) cover;

Notes:

M1A2S (Saudi Package): Saudi Arabian variant upgrade of the M1A2 based on M1A2 SEP, with some features, such as depleted uranium armor, believed to be missing and replaced by special armor. (442 M1A2s upgraded to M1A2S). M1A2 Systems Enhanced Package (SEP) Further improvements on the M1A2 have occurred with the production of the M1A2 SEP . The package includes: *enhanced Army Force XXI digital command and control capabilities; *a second-generation, forward-looking IR (FLIR) system for the gunner and commander; *user-friendly soldier/machine interface (SMI); *under-armor auxiliary power unit (UAAPU); *a new computerized mass-memory unit; *color maps and displays. Deliveries of the SEP began in September 1999. The M1A2 Abrams main battle tank is a further development of the M1A1. Currently it is one of the best MBTs in the world. Development of improved M1A1 began in 1988. About 1 200-1 500 M1A2 main battle tanks were delivered to the US army. Out of this number approximately 1 000 out-dated M1 main battle tanks were upgraded to the M1A2 standard. It is planned that this tank will remain in service beyond 2050. The M1A2 has been exported to Kuwait (218) and Saudi Arabia (457). Approved for production in 1990, the M1A2 represents the U.S. Army’s technological improvement of the basic M1A1 design and the most modern battle tank in the world. Outwardly similar in appearance to the M1A1, the most notable exterior changes on the M1A2 are the redesigned Commander's Weapon Station (CWS) and the addition of a Commander's Independent Thermal Viewer) on the left side of the turret forward of the loader's hatch. Internally, however, the M1A2 has been radically redesigned to take advantage of newer technology. Most notable of these improvements is the addition of the Inter-Vehicle Information System (IVIS.) The IVIS system allows for the automatic and continual exchange of information between vehicles. By incorporating information provided by an on board Position/Navigation (POSNAV) system, unit commander's can track the location and progress of subordinate elements automatically, without tasking vehicle crews. In addition enemy positions can be identified, plotted and disseminated, while reports and artillery requests can be automatically formatted, transmitted, and processed. Lastly, map graphic control measures and operational orders can be rapidly distributed via the IVIS system. To ensure information security, all IVIS data transmissions are routed through the M1A2's SINCGARS radio system. Improving on the "hunter-killer" tank commander-gunner target hand off method pioneered on the German Leopard II, the M1A2 takes this a step further by providing the Tank Commander with an independent thermal sight. This CITV sight allows the commander to independently scan for targets in all weather conditions and through battlefield obscurants. In addition to IVIS and the CITV, the M1A2 incorporates a number of additional electronic upgrades. Power distribution throughout the tank has been improved, relying on multiple bus paths so that in the event one conduit is damaged, power may still be delivered to a component via an alternate path. The driver's instrument display has been upgraded to a more detailed digital display and the Gunner's Primary Sight has been stabilized in two axes for increased accuracy. Approved for implementation in 1995, the M1A2 SEP (System Enhancement Package) is a technology upgrade and standardization program, whereby the Army's fleet of M1s and M1A2s will all be brought to a common standard. Most notable among the modifications will be the introduction of a standard under armor auxiliary power unit and the addition a crew compartment air conditioning and cooling unit. Other modifications within the vehicle will include upgrades to the IVIS system (color display, full size keyboard, digital mapping and graphics generation capability, and voice recognition capabilities), upgrades to the Gunner's Primary Sight assembly, and improvement in the tank's intercom and radio communications systems. Production of the M1A2 was halted after the initial run of 627 vehicles. As part of the fleet upgrade program, 547 of the Army's current inventory of M1s are being upgraded to M1A2 SEP standards, which will require the complete remanufacturing of the turret, while the current fleet of M1A2s will undergo a retrofit to bring them up to SEP standards.

Leopard 1A1 German Main Battle Tank





Tiers:



Variants:

- **Leopard 1:** The Leopard project started in November 1956 in order to develop a modern tank, the Standard-Panzer, to replace the Bundeswehr's American-built M47 and M48 Patton tanks, which, though just delivered to West Germany's recently reconstituted army, were rapidly becoming outdated. On 25 July 1957, the detailed specifications were released; the new design needed to weigh no more than 30 tonnes, have a power-to-weight ratio of 30 horsepower per tonne, be able to withstand hits by 20 mm rapid-fire guns on every side as well as to operate in a battlefield contaminated with chemical weapons or radioactive fallout, the then-standard baseline for combat with the Warsaw Pact. In addition, the main armament had to consist of a 105 mm caliber weapon (the new British L7A3 105 mm gun was selected), carrying at least as many rounds as current US tank designs. Mobility had priority, while firepower came second; armour was seen as less essential, as it was believed that no real protection against hollow charge weapons was possible anyway.
- **Leopard 1A1:** After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter.
- **Leopard 1A2:** The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armoured turret, and therefore did not receive the B&V armour add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.
- **Leopard 1A3:** The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.
- **Leopard 1A4:** The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver.
- **Leopard 1A5:** In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour. The first modified vehicle was delivered in early 1987. Since then, almost all users of

the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.
- **Leopard 1A6:** The Leopard 1A6 prototype was a single Leopard 1 A1A1 testbed, modified with additional armour on the turret and equipped with a 120 mm L/44 gun. The project was ended in 1987, as the Leopard 2 was in widespread service at this point and the 1A5 offered a more reasonable upgrade path for a fraction of the cost.

System

Alternative Designation: Leopard 1A1

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann, Munich, Germany Krupp-MaK, Kiel, Germany

Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 7.09 m

Length, Gun Forward: 9.54 m

Width: 3.37 m

Height: INA

Tracks Length, on the Ground: 4.24 m

Tracks Width: 0.55 m

Ground Clearance: 0.44 m

Weight, Unloaded: 38,700 kg

Weight, Combat: 40,000 kg

Ground Pressure: 0.86 kg/cm sq

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: 2,282-cu in (37.4-liter) liquid-cooled, 4-stroke, prechamber, inter cooled, turbocharged V-10 multi-fuel

Engine Power: 830 hp at 2,200 rpm

Fuel Capacity: 955 liters

Transmission: ZF 4 HP 250 planetary shifter with hydraulic torque converter; 4 forward/2 reverse gears

Power-to-Weight Ratio: 20.75 hp/metric ton

Suspension: torsion bar, 7 road wheels, rear drive (12- tooth sprocket), front idler, 5 shock absorbs (bump travel 9 in/227 mm, rebound travel 5-6 in/128-156 mm), 4 return rollers

Maximum Speed: 65 km/h

Range, Road: 600 km

Range, Cross-Country: 450 km

Vertical Obstacle: 1.15 m

Trench: 3.00 m

Fording, Unprepared: 1.20 m

Fording, with Preparation: 2.25 m

Fording, with Snorkel: 4.00 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x Royal Ordnance L7A3 Rifled Gun

Type: Rifled Gun

Caliber: 105 mm

Length, Barrel: 5.46 m

Muzzle Velocity: INA

Weight: 1,282 kg

Maximum Rate of Fire: 10 rounds per minute (maximum)

Elevation: -9/+20 deg

Traverse: 360 deg

Maximum Firing Range: 4000 m

↳*Ammunition*

Name: L22

Type: Projectile

Caliber: mm105

Basic Load: 60 rounds, 18 ready in turret (Leopard 1A1)

Armor Penetration: INA, Tungsten carbide

Coaxial Weapon System

↳*System*

Name: Heckler & Koch MG5

Type: General Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Heckler & Koch

Length: 1,160 mm

Barrel Length: 550 mm

Height: 239 mm

Width: 120 mm

Weight: 11.20 kg

Action: Gas-operated, rotating bolt

Rate of Fire: 640/720/800 rounds/min

Muzzle Velocity: 840 m/s

Maximum Firing Range: 600–1,000 m

Effective Firing Range: 100–1,000 m

Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,250 rounds

Armor Penetration: INA

Auxiliary Weapon System

Note: 1 x 7.62-mm air defense machine gun

Fire Control System

Name: FLP-10/EMES 18 integrated fire control

Computerized FCS: Yes, FLP-10/EMES 18 integrated fire control system with Zeiss thermal imaging system retrofitted to approximately 1,300 German Leopard 1A1/1A2s

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Infrared: Yes, Paint reflects IR

Rangefinder: TEM 2A optical (Leopard 1A1) turret fully stabilized (A3, A4); retrofit of earlier AEG-Telefunken FLER-H modular hybrid computer (1A4 Krupp-Atlas)

Protection

Hull Armor: Glacis 70 mm at 60-deg: Hull Glacis top 25 mm at 83-deg: Hull nose 70 mm at 55-deg: Hull sides 25-35 mm: Hull rear 25 mm at 88 deg: Hull top 10 mm: Hull bottom 15 mm

Turret Armor: Turret mantlet 60 mm; Turret sides 60 mm; Turret rear 60 mm; Turret front 52 mm

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

NBC Protection: Yes, collective

Smoke Equipment: 2 x 4-barrel 3-in (76-mm) smoke generators, one each side of turret

Notes:

The Leopard (or Leopard 1) is a main battle tank designed and produced by Porsche in West Germany that first entered service in 1965. Developed in an era when HEAT warheads were thought to make conventional heavy armour of limited value, the Leopard focused on firepower in the form of the German-built version of the British L7 105-mm gun, and improved cross-country performance that was unmatched by other designs of the era. The design started as a collaborative project during the 1950s between West Germany and France, and later joined by Italy, but the partnership ended shortly after and the final design was ordered by the Bundeswehr, with full-scale production starting in 1965. In total, 6,485 Leopard tanks have been built, of which 4,744 were battle tanks and 1,741 were utility and anti-aircraft variants, not including 80 prototypes and pre-series vehicles. The Leopard quickly became a standard of European forces, and eventually served as the main battle tank in over a dozen countries worldwide, with West Germany, Italy and the Netherlands being the largest operators until their retirement. Since 1990, the Leopard 1 has gradually been relegated to secondary roles in most armies. In the German Army, the Leopard 1 was completely phased out in 2003 by the Leopard 2, while Leopard 1-based vehicles are still widely used in utility roles. The Leopard 2 has replaced the Leopard 1 in service with many other nations as well, with derived vehicles using the Leopard 1 hull still seeing service. Currently, the largest operators are Greece, with 520 vehicles, Turkey, with 397 vehicles and Brazil with 378 vehicles. Most of these vehicles have been upgraded with various improvements to armor, firepower and sensors to maintain their ability to engage modern threats. After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter. Between 1974 and 1977, all of the machines in the first four batches were brought to the same Leopard 1A1A1 standard, and given additional turret armour developed by Blohm & Voss. A further upgrade in the 1980s added leftover image-intensifier night sights, which were being handed down from the Leopard 2 as they were themselves upgraded. The PZB 200 image intensification system was mounted in a large box on the upper right of the gun, creating the Leopard 1A1A2. A further upgrade with SEM80/90 all-digital radios created the Leopard 1A1A3. Later improvements to the image intensifier created the Leopard 1A1A4.

T-64U Ukrainian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-64B:** The T-64 MBT was, at the time it entered service, the third generation of tanks to be produced by factories and design bureaus in Ukraine. It was the first Soviet tank to assume the mantel of an MBT, finally expelling the notion of light, medium, and heavy tanks.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64BV:** Variant has kontakt era mounted. Combat weight (mt): 42.5 for t-64bv with explosive reactive armor (mm): standard on t-64bv
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64U
Type: Main Battle Tank
Family: T-64 Family
Crew: ea3
Passenger Capacity: INA
Maximum Effective Range (Road): km600
Maximum Effective Range (Main Gun): m5,000
Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23
Length (Hull): m6.54
Width: m3.41
Height: m2.17
Weight, Combat: tons45

Ground Pressure: kg/mINA

Automotive

Engine Name: 6TDF Diesel

Engine Type: Diesel

Engine Power: hp1,000

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.72

Fording Depth (Without Preparation): m1.4

Fording Depth (With Preparation): m5

Main Gun

↳*System*

Name: KBA-3125 mm smoothbore gun

Type: 125 mm smoothbore

Max Rate of Fire: rds/min8

Length (Barrel): m6

Weight (Barrel): kg2,500

Manual Load Time: rds/min1-2

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Penetration: mm750

Rate of Fire: rds/min6-8

Maximum Elevation: Deg+14

Minimum Elevation: Deg-6

Traverse Range: Deg360

Automatic Loader: Yes

Thermal Sleeve: Yes

Guidance System: Semi-Automatic Guidance System

Evacuator Type: Central bore evacuator

Effective Full Charge (EFC) Life: rds600

Breech Type: semi-automatic horizontal sliding breech block

Loading System: Korzina electric and hydraulic automatic loading system

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

Muzzle Reference System: Yes

Maximum Effective Range (Main Gun): m5,000

:

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳***Ammunition (Option 1)***

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳***System***

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Maximum Chamber Pressure: kgf/cm36,500

Horizontal and Vertical Dispersion: mils0.2

Kombat Gun-Launched Missile Capable: Yes
Variants: 9M112M, 9M112M2, 9M124
Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun
Type: 12.7mm Heavy Machine Gun
Proliferation: over 1 Million
Length (Total): mm1,625
Length (Barrel): mm1,070
Weight (Gun Only): kg34
Weight (on Wheeled Mounting): kg157
Max Rate of Fire: rds/min600
Range Finder Type: Optical
Action: Gas-Operated, Flapper Locking
Sights: Iron/Optical
Feed System: 50 Round Belt
Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.
Variants: DK, DShKM, DSHKS, Type 54 HMG
Fire on the Move: Yes

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: mm12.7x108
Muzzle Velocity: m/s850
Basic Load: ea300
Effective Range: m2,500
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: mm7.62
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea250

Effective Range (Iron Sights): m100- 1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 1V528-2 fire-control compute

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, TKN-4S combination day/night binocular periscopic. Additionally, the T-64U is equiped with the PZU-7 Anti-aircraft Sight

Gunner's Aiming System: 1A42 Aiming System

Thermal Sight Gunner: Yes, the IG46 gunner's sight

1G46 Magnification: 2.7 and ×12 magnification

Rangefinder: IG46 Gunner Sight, Laser

IG46 Rangefinder Maximum Range: m400

IG46 Rangefinder Minumum Range: m5,115

Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks

Main Gun Stabilization: 2-Plane, 2E42 system that uses electromechanical systems

Fire on the Move: Yes

Rangefinder: two-axis stabilised IG42 laser rangefinder sight

Ballistic Computer: 1V517 Tank Ballistic Computer

PZU-5 monocular periscopic sight: Available

Searchlight: L-4 searchlight.

Sight Type: 1G21 sight with Laser Telemetry

Wind Sensor: DVE-BS wind sensor

Protection

Hull Armor: Cast and welded steel armour

Turret Armor: Cast armour welded together

Turret Type: ROM-7 commander's cupola

Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds

Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,

Explosive Reactive Armor: Nozh ERA system

Nozh ERA Strength: 1.5-2.5 times more effective than exiating ERA Designs.

Noza ERA Compatability: interchangeable with the Russian-developed 4C20 and 4C22 ERA systems.

Active Protection System: Yes

Mine Clearing: Roller-plow available

NBC Protection: Yes

Smoke Equipment: 902A "Tucha-1" smoke grenade launcher in two groups of four, on each side of the gun

IR Signature: INA

Automatic Fire Suppression Systems.: Available, PPO fire detection and suppression system,

Notes:

The T-64U is modernized with a 1A45 fire control (T-80U), as well as PNK-4SU and TKN-4S optics and PZU-7 for the roof HMG. The tank commander is given redundant fire controls or overrides if needed. Kontakt-5 ERA is was added to some of these, but fittings are placed in case. In addition, these have the option to receive the 6TDF 1,000 hp (735 kW) engine.T-64U which integrated on top the 1A45 fire control (from the T-80U and T-84), PNK-4SU and TKN-4S optics for the tank commander and PZU-7 for the AA machine gun. The tank leader is then able to drive the tank and to use the gun directly if needed. Kontakt-5 Armor added few prototypes build

T-64 Russian Main Battle Tank (MBT)




Tiers:



Variants:

- **T-64A:** Production version of base tank. Tank has a history of reliability problems, and lacks the high armor protection, track skirts, a fcs and atgm launch capability for t-64b.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64BV:** Variant has kontakt era mounted. Combat weight (mt): 42.5 for t-64bv with explosive reactive armor (mm): standard on t-64bv
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64B, T-64
Type: Main Battle Tank
Family: T-64 Family
Crew: ea3
Passenger Capacity: INA, IT"S A TANK
Maximum Effective Range: km600
Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23
Length (Hull): m6.54
Width: m3.41
Height: m2.17
Weight, Combat: tons39
Ground Pressure: kg/mINA

Automotive

Engine Name: 5TDF Diesel
Engine Type: Diesel
Engine Power: hp700
Cruising Range: km600
Speed, Maximum Road: km/h60
Speed, Average Cross: 50
Speed Maximum Swim: km/hNot Amphibious
Gradient: Deg60
Side Slope: Deg40
Vertical Step: m0.8
Trench: m2.72
Fording Depth (Without Preparation): m1.4
Fording Depth (With Preparation): m5

Main Gun

↳*System*

Name: D-81T (aka 2A46)125 mm smoothbore gun
Type: 125 mm smoothbore
Max Rate of Fire: rds/min8
Manual Load Time: rds/min1-2
Weight (Barrel): kg1,073
Autoloader: Yes, Carousel-Type Autoloader
Fire on the Move: Yes, Main Gun
Maximum Elevation: Deg+14
Minimum Elevation: Deg-6
Traverse Range: Deg360
Automatic Loader: Yes
Thermal Sleeve: Yes
Evacuator Type: central bore evacuator
Effective Full Charge (EFC) Life: rds600
Breech Type: semi-automatic horizontal sliding breech block
Loading System: Korzina electric and hydraulic automatic loading system
Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired
Carousel Load Time: min13-15

Basic Load Time: min27

Rate of Fire: rds/min6-8

Maximum Effective Range (Day): m2,000

Maximum Effective Range (Night): m600

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 1)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS Radio

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Variants: 9M112M, 9M112M2, 9M124

Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun

Type: 12.7mm Heavy Machine Gun

Proliferation: over 1 Million

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Range Finder Type: Optical

Action: Gas-Operated, Flapper Locking

Sights: Iron/Optical

Feed System: 50 Round Belt

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Variants: DK, DShKM, DSHKS, Type 54 HMG

Fire on the Move: Yes

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea300

Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea250

Effective Range (Iron Sights): m100- 1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 1A33

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, TKN-3V combination day/night binocular periscopic

Thermal Sight Gunner: Yes, TPN1-49-23 night sigh

Main Gun Stabilization: 2-Plane, 2Eh26M armament stabiliser

Fire on the Move: Yes

Rangefinder: two-axis stabilised IG42 laser rangefinder sight

Ballistic Computer: 1V517 Tank Ballistic Computer

Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks

PZU-5 monocular periscopic sight: Available

Searchlight: L-2AgM infra-red searchlight

Sight Type: 1G21 sight with Laser Telemetry

Wind Sensor: 1B11 cross-wind sensor.

Protection

Hull Armor: cast and welded steel armour

Turret Armor: cast armour welded together

Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds

Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,

Explosive Reactive Armor: No Explosive Reactive Armor (ERA)

Active Protection System: Yes

Mine Clearing: Roller-plow available

NBC Protection: Yes

Smoke Equipment: 902A "Tucha-1" smoke grenade launcher in two groups of four, on each side of the gun

IR Signature: INA

Automatic Fire Suppression Systems.: Available, PPO fire detection and suppression system,

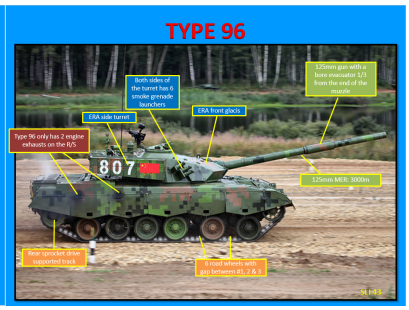
Notes:

The T-64 (T-64B) is a Soviet second-generation main battle tank introduced in the early 1960s. It was a more advanced counterpart to the T-62: the T-64 served tank divisions, while the T-62 supported infantry in motorized rifle divisions. It introduced a number of advanced features including composite armor, a compact engine and transmission, and a smoothbore 125-mm gun equipped with an autoloader to allow the crew to be reduced to three so the tank could be smaller and lighter. In spite of being armed and armored like a heavy tank, the T-64 weighed only 38 tonnes (42 short tons; 37 long tons).

Type 96 (ZTZ96) Chinese Main Battle Tank (MBT)







Tiers:

1 **2** 3 4

Variants:

- **Type 96A:** Additional "arrow shaped" modular armor similar to the Type 99 is installed on the turret front. The back of the hull is now completely flat compared to the Type 96. The Type 96A was first revealed in 2006, but in-service tanks were first seen in a military parade in 2009. The Type 96A is a third-generation upgrade of the Type 96. Its internal electronics may have been upgraded to Type 99 standards. The visual profile of the Type 96A is similar to the Type 99. However, the Type 96A can be distinguished from the Type 99 by the driver's position of the left side of the hull. FY-4 ERA was added on front upper glacis.The vehicle is equipped with a thermal imager. Features an upgraded 800 hp engine. A laser defense system similar to the Shtora has been installed as well. Electro-optical jammers which are able to jam enemy guided missiles, rangefinders, and designators are found on the tank
- **Type 96B:** Variant first seen in July 2016 loaded on a Russia-bound train to participate in the 2016 Tank biathlon. It is equipped with an improved engine, improved high-performance gun with an upgraded fire-control system, new transmission, chassis, ventilation, communications and computer systems, exhaust and suspension. Additionally it features an independent commander sight and lighter, more reliable running wheels. The specifications of the upgraded engine are unknown but is speculated to produce between 1,000 and 1,200 horsepower
- **VT-2:** Export variant of Type-96A. Debuted at the 2012 Defence Services Asia Exhibition. Can be equipped with Remote Weapons Station and has a maximum speed of 70 km/h (on road). Capable of turning on its own axis.

System

Alternative Designation: Type 96, ZTZ96
Manufacturer: First Inner Mongolia Machinery Factory
Type: Main Battle Tank
Family: Type 96 Main Battle Tank Family
Crew: ea3

Dimensions

Length (Hull): m6.33
Length (Gun Forward): m10.65
Width: m3.45
Height: m2.30
Weight, Combat: tons41.5
Ground Pressure: kg/m0.77

Automotive

Engine Name: INA

Engine Type: Liquid-cooled diesel

Engine Power: hp1,000

Additional Fuel Capable: Yes, 400 Liters

Cruising Range: km400

Speed, Maximum Road: km/h65

Speed, Maximum Off Road: km/h45

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.7

Fording (Without Preparation): m1.4

Fording (With Preparation): m5

Suspension: Torsion Bar

0 to 60 Time: seconds16

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 125 mm L50 ZPT-98

Type: 125mm Smoothbore Gun

Max Rate of Fire (Automatic Loading): rds/min8

Max Rate of Fire (Manual Loading): rds/min1-4

Length (Barrel): mm6,000

Barrel Type: 1 with a sliding gun barrel and a smoke evacuator in the middle

Loader Type: Autoloader

Thermal Sleeve: Yes, Light Alloy

Bore Evacuator: Yes

Barrel Life: rounds800

Loader Type: Carousel auto-loader and Manual Loading capable

Launch Mode: Single Shot

After: Wedge Cross

Recoil: Hydraulic and pneumatic

Note: The L50 ZPT-98 can replce the barrel without removing the turret

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Muzzle Velocity: m/s850

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m4,000

Minimum Effective Range: mINA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Round Weight: kg33

Projectile Weight: kg23

Fragments: ea2,500

Armor Penetration: Yes

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 42 total rounds of any 125mm Projectiles

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Fragments: INA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*Ammunition (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS) Rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m3,000

Projectile Dimension: mm900

Round Weight: INA

Projectile Weight (Estimated): kg11

Armor Penetration: mm1,000

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Tank Commander's Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.72mm Heavy Machine Gun

Manufacturer: Norinco

Date of Introduction: 1985

Max Rate of Fire: rds/min700-800

Length (Total): mm1,192

Length (Barrel): mm658

Diameter: mmINA

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s840

Basic Load: ea2,250

Effective Range (With Sight Adjustments): m100-1,500

Armor Penetration: Available

Loader's Weapon System

↳*System*

Name: QJG89

Type: 12.7mm Heavy Machine Gun

Manufacturer: INA

Max Rate of Fire: rds/min400-600

Length (Total): mm2,119

Length (Barrel): mm1,003

Weight (Gun Only): kg18.5

Weight (Tripod): kg17.5

Action: Gas Operated

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s825

Basic Load: ea500

Effective Range (vs. Air): m1,500

Effective Range (vs. Ground): m2,000

Feed System: Belt fed, 50 rounds

Action: Hybrid direct impingement and short recoil

Fire Control

Name: ISFCS-212

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Night Sight Maximum Distance: m1,200

Main Gun Stabilization: Dual axis gun stabilisation

Periscopes: ea3

Rangefinder: Laser

Sights, Maximum Distance (Day): m5,000

Sights, Maximum Distance (Night): m1,200

Ballistic Computer: Yes

Step Motor Driver: Yes

Crosswind Velocity Sensor: Yes

Note: The Type 96 is unable to perform hunter-killer engagements

Protection

Hull Armor: Type 96: Composite armor (classified)

Turret Armor: Type 96: Composite armor (classified)

Applique Armor: Available, Track Skirts

Explosive Reactive Armor: 2d gen ERA

Active Protection System: INA

Mine Clearing: Roller-plow available

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Grenlaunch 12x; VESS

IR Signature: INA

Grenades: Six 76mm grenades are equipped on each side of the turret

Automatic Fire Suppression System: Yes

Notes:

The Type 96 Main Battle Tank (MBT) was developed from the Type 85-III, which was mainly aimed at the export market. The Type 96 has some minor modifications. Sometimes it is referred as the the Type 88C or ZTZ96. It entered service with Chinese

army in 1997. It replaced in production the previous Type 88 MBT. Production of the original Type 96 ceased in 2005. It is estimated that over 1 500 of these main battle tanks were built. Other sources claim, that 2 000-2 500 of these tanks were produced. Currently it is a mainstay of the China's MBT fleet. These tanks are being gradually upgraded. The only export customer of this tank is Sudan. The Type 96 MBT is armed with a fully-stabilized 125 mm smoothbore gun, fitted with an autoloader. Both the gun and autoloader were copied from the Soviet T-72. This main battle tank might be compatible with the Russian AT-11 Sniper gun-launched anti-tank guided missiles, or its Chinese copy. Maximum rate of fire is 6-8 rounds per minute. A total of 42 rounds are carried.

T-72B3 Russian Main Battle Tank (MBT)







Tiers:

1 2 3 4

Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72A:** Second Russian main variant of the T-72.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: T-72B3

In Service: 2013-present

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note: The T-72B3 can be distinguished from the its predecessors by the additional panoramic sight on the left of the turret. Also, you will most likely see the T-72BM or T-72B3 in current theaters of operations.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons45

Ground Pressure: kg/m0.898 kgf/cm2

Note: The T-72B3 is much heavier than its predecessors due to the additional Armor and ERA.

Automotive

Engine Name: V-92S2F

Engine Type: Four stroke, liquid cooled diesel engine with a centrifugal supercharger.

Engine Power: hp1,130

Power to Weight Ratio: hp/ton18.9

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

R-173 Range: km0-20

Radio #2: R-168-25VE Tactical Radio

R-168-25VE Frequency Range: 30 to 107,975 MHz

R-168-25VE Range: km0-35

Antenna: R-168BBMA antenna

Main Gun

Note: Another primary difference between the T-72A and the T-72B is that the T-72B can fire the 125mm 9K120 Svir Missile Complex

↳*System*

Name: 2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds1,200

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: 3VBM23 Svinets-2 Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mmpenetrate up to 500 mm of RHA at 2,000 m

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: The 3VBM23 Svinets-2 APFSDS round is designed to engage modern tanks protected by composite armour and advanced ERA,

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Note: The 9K120 gun-launched missile complex is a two piece guided missile that is loaded and fired from the main gun in the same way as an ordinary round.

ATGM System Name: 9K120 gun-launched missile complex

Missile Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Onboard Guidance System: Yes

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Hit Probability: %80

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Warhead Type: 9N142 shaped charge warhead

Laser Emitter: 1K13 sight's laser

Maximum Effective Range: m4,000

Minimum Effective Range: m100

Elevation Range (Super Elevation): deg-7 to +20

Elevation Range (Standard Elevation): deg-5 to +15

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: mm7.62
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650-750
Effective Rate of Fire: rds/min250
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length: mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.60
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea2,000
Effective Range (Iron Sights): m1,000
Effective Range (with Sight Adjustments): m100-1,500
Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)
Type: 12.7 Anti-Aircraft Machine Gun
Proliferation: over 1 Million
Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia
Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Length (Total): mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-4

Computerized FCS: Yes

Thermal Sight Tank Commander: Sosna-U thermal sight and the TKN-3MK sight

Thermal Sight Gunner: Sosna-U thermal sight

Main Gun Stabilization: 2E42-2 (Upgrade)

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Battle Management System: Andromeda-D

Note: The Gunner, using the 1A40-1 sight can designate and engage targets out to a mazimum distance of 4,000 meters with APFSDS and HEAR rounds.

Protection

Hull Armor: Steel and composite armour with additional plates that provide protection equivalent to 950mm of steel against

HEAT projectiles, 440mm resistance to KE rounds, and 500mm against shaped charges. The T-72BM also has a additional twelve separate charges of ERA compared to the T-72B.

Turret Armor: Steel and composite armour with ERA, 950 mm against HEAT weapons. The Turret has additional Ceramic or silica inserts to add to the protection level of the T-72BM. Additionally, the T-72BM has arrow-shaped arrays of ERA added to the turret front

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor (ERA): Yes, Kontakt-5 (UPGRADE). Additional ERA is added to the Turret, Glacis, and sides of the hull.

ERA Explosive Element: 4S22

ERA 4S22 Elements (Plates): ea240

Armor Cassette Type: 4S22 cassette that is filled with an explosive element and steel armoured plate.

Number of total Armor Cassettes: ea200-300

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).

Active Protection System: Yes, ZETS11-3 Control System

Self-Entrenching Blade: Yes, built in Dozer Blade

Mine Clearing: Yes, Roller and plow (optional)

Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Effective Range: m200-300

Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.

Engine Smoke Screen Capable: Yes

IR Signature: INA

Automatic Fire Extinguishing Equipment.: Yes

Cage Armor: Yes

Tank Skirts: Available

Note #1: The additional added armor cassettes reduce penetration by as much as 95%.

Notes:

The T-72B3 is a development of the standard Russian-made T-72B series currently in service in the Russian army. The T-72B3 version was introduced in 2010 and considered as a third-generation of Russian main battle tank. The T-72B3 has significantly improved its combat characteristics with more fire power, protection, mobility and command controllability. Besides the improved armor and targeting systems, it kept all the good features of previous versions of T-72. The modernized version of the T-72, which was a main second-generation battle tank produced in the Soviet Union since the 1970s, is equipped with new generation communications and firing systems and a ballistic data computer. The T-72B3 contract was performed by the Russian Defense Company "Uralvagonzavod". The T-72B3 along with the T-72BM have become the backbone of the Russian Army.

Zulfiqar-2 Iranian Main Battle Tank (MBT)



Tiers:



Variants:

- **Zulfiqar-1:** The Zulfiqar-1 is based on the M60 Patton model acquired under the pre-revolution era. The Zulfiqar-1 was first revealed in public in 1994. A total of six prototypes were completed and field tested in 1997. The Zulfiqar-1 is protected by a welded steel hull and the turret is reinforced by a composite armour. The Zulfiqar-1 is armed with a 125mm Smoothbore gun taken from a T-72.
- **Zulfiqar-3:** The Zulfiqar-3 is the most advanced variant of the Zulfiqar family. It features considerable upgrades to the fire control system, chassis, engine and main gun. The new variant is equipped with the 2A46 125 mm smoothbore cannon with an autoloader, a laser rangefinder and a new fire control system.

System

Alternative Designation: Zulfiqar-2
Manufacturer: Shahid Kolah Dooz Industrial Complex
In Service: 1998-Present
Type: Main Battle Tank
Family: Zulfiqar Class
Crew: ea3 (commander, gunner and driver)
Passenger Capacity: INA

Dimensions

Length (Gun Forward): m9.4
Length (Hull): m7.2
Width: m3.6
Height: m2.5
Weight, Combat: tons41
Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-6-12
Engine Type: V-12 Diesel

Engine Power: hp1,000

Power-to-Weight Ratio: 21.7 hp/metric ton

Cruising Range: km450

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.8

Fording Depth: m1.4

Transmission: SPAT 1200 automatic

Day/Night Driving Lights: Yes, mounted on the glacis plate.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note: The Zulfiqar-2 is armed with a fully-stabilized 125-mm smoothbore gun, fitted with an autoloader. This gun and associated automatic loader are understood to be from the Russian T-72 MBT.

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Fume Extractor: Yes

↳*Ammunition (Option 1)*

Name: 3VBM3

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

↳*Ammunition (Option 2)*

Name: 3VOF22

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 39 Total Rounds of any 125mm Projectiles

Max Dispersion: 0.23 mrad

Maximum Range: m5,000

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Name: 3VBK27/3BK31 "Start"

Type: High-Explosive Anti-Tank (HEAT)

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Max Dispersion: INA

Maximum Range: m3,000

Charge Type: HEAT

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Auxiliary Weapon System

Note: The Zulfiqar-1 lacks a coaxial machine gun

↳*System*

Name: Type 54 (DShKM)

Type: 12.7 mm Type 54 Heavy Machine Gun

Proliferation: +1 Million

Length, Total: mm1,625

Barrel length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Rate of Fire: rds/min600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: Heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7

Cartridge: 12.7x108 mm

Muzzle Velocity: m/s850

Basic Load: ea1,200

Maximum Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: Slovenian EFCS-3 fire-control system

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Thermal Sight Driver: Yes, passive periscope for night driving.

Main Gun Stabilization: Yes

Domestic System: Yes

Laser Rangefinder: Yes

Fire on the Move: Yes

Driver Periscopes: three day periscopes for driving

Protection

Hull Armor: Reinforced composite armor on the front arc.

Turret Armor: Turret mounts a laser-warning pod

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Zulfiqar 2, or Zolfaqar 2, is a further development of the Zulfiqar 1. This MBT is named after a legendary sword. It was designed during the 1990s. It appears to be only an interim type, which served as a test bed for the Zulfiqar 3. It was never produced in quantity. This is an upgraded variant with a longer hull, seven road wheels and a more powerful engine. A reworked turret is also equipped.

T-72AK Russian Main Battle Tank (MBT)



Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72B:** Second Russian main variant of the T-72 after the T-72A.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
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- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: T-72AK; Ob'yekt 176K

In Service: 1984 to present

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note: The T-72AK can be distinguished from the T-72A, and other T-72s, by the presence of the commander's antenna at the rear right of the vehicle. The antenna will be up to 4 m long, noticeably longer than any of its nearby vehicles.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons41

Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-6 V-12 Diesel Engine, which is supercharged by the H24 centrifugal system

Engine Type: V-12 Diesel

Engine Power: hp780

Power to Weight Ratio: hp/ton18.8

Cruising Range: km700

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Fuel used Per Hour: liters240

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Auxiliary Generator: Yes, the AB-1-P

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

Radio #2: R-168-100U (Standard VHF)

Radio #3: R-130M radio system

R-130M Capabilities: simplex telephone/telegraph HF radio set

R-130M Frequencies: 1.5 to 10.99 MHz range

R-130M Maximum Operating Range: km350

Antenna: 10 m long telescopic aerial antenna

Main Gun

Note: The T-72AK carries 6 fewer 125mm rounds due to the increase in C2 equipment

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Hit Probability: %80

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Laser Emitter: 1K13 sight's laser

Onboard Guidance System: Yes

Maximum Effective Range: m4,000

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650-750
Effective Rate of Fire: rds/min250
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length: mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.60
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea1,500
Effective Range (Iron Sights): m1,000
Effective Range (with Sight Adjustments): m100-1,500
Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)
Type: 12.7 Anti-Aircraft Machine Gun
Proliferation: over 1 Million
Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia
Weight (Gun Only): kg25
Muzzle Velocity: m/s845
Length (Total): mm1,560
Max Rate of Fire: rds/min700-800
Weight (On Tripod): kg41
Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳ ***Ammunition***

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea200

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, TPNZ-49

Thermal Sight Gunner: 1K13-49

Main Gun Stabilization: 2Eh28M electrohydraulic system

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Navigation Device: TNA-3 navigation device

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Turret Armor: Steel and composite armour with ERA, 500 mm against APFSDS projectiles and to 560 mm against HEAT weapons.

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor: Yes, Kontakt-5

Active Protection System: Yes, ZETS11-3 Control System

Mine Clearing: Yes, Roller and plow (optional)

Self-Entrenching Blade: Yes, built in Dozer Blade

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).

Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Effective Range: m200-300

Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.

Engine Smoke Screen Capable: Yes

IR Signature: INA

Automatic Fire Extinguishing Equipment.: Yes

Notes:

T-72AK (Ob'yekt 176K): Command version of T-72A. In NATO code T-72AK was represented by three different designations: T-72AK1, T-72AK2 and T-72AK3 which represented the company command version, battalion command version and regiment command version.

Type 96A (ZTZ-96Gai) Chinese Main Battle Tank (MBT)






Tiers:

1 **2** 3 4

Parent:

Type 96 (ZTZ96) Chinese Main Battle Tank (MBT)

Variants:

- **Type 96:** Domestic version of Type 85-IIM. Also sometimes mistakenly referred to as the Type 88C.[8] Renamed Type 96 when put into PLA service.[1] In comparison to the Type 85 and Type 88, the Type 96 features a more powerful engine, improved electronics and a western-style turret. Type 96 was accepted by the PLA in 1996.
- **Type 96B:** Variant first seen in July 2016 loaded on a Russia-bound train to participate in the 2016 Tank biathlon. It is equipped with an improved engine, improved high-performance gun with an upgraded fire-control system, new transmission, chassis, ventilation, communications and computer systems, exhaust and suspension. Additionally it features an independent commander sight and lighter, more reliable running wheels. The specifications of the upgraded engine are unknown but is speculated to produce between 1,000 and 1,200 horsepower
- **VT-2:** Export variant of Type-96A. Debuted at the 2012 Defence Services Asia Exhibition. Can be equipped with Remote Weapons Station and has a maximum speed of 70 km/h (on road). Capable of turning on its own axis.

System

Alternative Designation: Type 96A, ZTZ-96Gai; Type 96G
Manufacturer: First Inner Mongolia Machinery Factory
Type: Main Battle Tank
Family: Type 96 Main Battle Tank Family
Crew: ea3
Note: The Type 96A looks different from the Type 96 because of the additional arrow shaped armor on the turret front and the extra ERA plates

Dimensions

Length (Hull): m6.33
Length (Gun Forward): m10.65
Width: m3.45
Height: m2.30
Weight, Combat: tons46
Ground Pressure: kg/m0.77

Automotive

Engine Name: 12150ZLC

Engine Type: V12 turbocharged diesel

Engine Power: hp900

Additional Fuel Capable: Yes, 400 Liters

Cruising Range: km400

Speed, Maximum Road: km/h65

Speed, Maximum Off Road: km/h45

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.7

Fording (Without Preparation): m1.4

Fording (With Preparation): m5

Suspension: Torsion Bar

0 to 60 Time: seconds21

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 125 mm L50 ZPT-98

Type: 125mm Smoothbore Gun

Max Rate of Fire (Automatic Loading): rds/min8

Max Rate of Fire (Manual Loading): rds/min1-4

Length (Barrel): mm6,000

Barrel Type: 1 with a sliding gun barrel and a smoke evacuator in the middle

Loader Type: Autoloader

Thermal Sleeve: Yes, Light Alloy

Bore Evacuator: Yes

Barrel Life: rounds800

Loader Type: Carousel auto-loader and Manual Loading capable

Launch Mode: Single Shot

After: Wedge Cross

Recoil: Hydraulic and pneumatic

Note: The L50 ZPT-98 can replce the barrel without removing the turret

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Muzzle Velocity: m/s850

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m4,000

Minimum Effective Range: mINA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Round Weight: kg33

Projectile Weight: kg23

Fragments: ea2,500

Armor Penetration: Yes

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 42 total rounds of any 125mm Projectiles

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Fragments: INA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*Ammunition (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS) Rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m3,000

Projectile Dimension: mm900

Round Weight: INA

Projectile Weight (Estimated): kg11

Armor Penetration: mm1,000

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Tank Commander's Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.72mm Heavy Machine Gun

Manufacturer: Norinco

Date of Introduction: 1985

Max Rate of Fire: rds/min700-800

Length (Total): mm1,192

Length (Barrel): mm658

Diameter: mmINA

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s840

Basic Load: ea2,250

Effective Range (With Sight Adjustments): m100-1,500

Armor Penetration: Available

Loader's Weapon System

↳*System*

Name: QJG89

Type: 12.7mm Heavy Machine Gun

Manufacturer: INA

Max Rate of Fire: rds/min400-600

Length (Total): mm2,119

Length (Barrel): mm1,003

Weight (Gun Only): kg18.5

Weight (Tripod): kg17.5

Action: Gas Operated

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s825

Basic Load: ea500

Effective Range (vs. Air): m1,500

Effective Range (vs. Ground): m2,000

Feed System: Belt fed, 50 rounds

Action: Hybrid direct impingement and short recoil

Fire Control

Name: New Updated FCS, ISFCS-213

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Maximum Night Vision Distance: m1,500

Main Gun Stabilization: Dual axis gun stabilisation

Periscopes: ea3

Rangefinder: Laser

Sights, Maximum Distance (Day): m5,000

Ballistic Computer: Yes

Sights, Maximum Distance (Night): m1,200

Step Motor Driver: Yes

Crosswind Velocity Sensor: Yes

Note: The Type 96 is unable to perform hunter-killer engagements

:

Protection

Hull Armor: Type 96: Composite armor, FY Series ERA Added

Turret Armor: Type 96: Composite armor, FY Series ERA Added.

Turret Protection: 670mm of RHAe

Applique Armor: Available, Track Skirts

Explosive Reactive Armor: FY Series ERA

Active Protection System: INA

Mine Clearing: Roller-plow available

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Grenlaunch 12x; VESS

IR Signature: INA

Grenades: Six 76mm grenades are equipped on each side of the turret

Automatic Fire Suppression System: Yes

Jammer: JD-3 IR Jammer

Note: The RY Series ERA is capable of protecting the Type 96A against single or multiple HEAR projectiles and the manufacturer claims the ERA can withstand SABOT Rounds.

Notes:

The Type 96A was an upgrad of the Type 96 that entered service in 2006, it reflects the developments made in Chinese tank design such as the arrow shaped add on turret armour also found on the Type 99. The vehicle described below is offered for export in the format described below with the designation of VT2.A total of 42 rounds are carried. Additional "arrow shaped" modular armor similar to the Type 99 is installed on the turret front. The back of the hull is now completely flat compared to the Type 96. The Type 96A was first revealed in 2006, but in-service tanks were first seen in a military parade in 2009. The Type 96A is a third-generation upgrade of the Type 96. Its internal electronics may have been upgraded to Type 99 standards. The visual profile of the Type 96A is similar to the Type 99. However, the Type 96A can be distinguished from the Type 99 by the driver's position of the left side of the hull. FY-4 ERA was added on front upper glacis.The vehicle is equipped with a thermal imager. Features an upgraded 800 hp engine. A laser defense system similar to the Shtora has been installed as well.[Electro-optical jammers which are able to jam enemy guided missiles, rangefinders, and designators are found on the tank.

Leopard 1A5 German Main Battle Tank (MBT)





Tiers:



Variants:

- **Leopard 1:** The Leopard project started in November 1956 in order to develop a modern tank, the Standard-Panzer, to replace the Bundeswehr's American-built M47 and M48 Patton tanks, which, though just delivered to West Germany's recently reconstituted army, were rapidly becoming outdated. On 25 July 1957, the detailed specifications were released; the new design needed to weigh no more than 30 tonnes, have a power-to-weight ratio of 30 horsepower per tonne, be able to withstand hits by 20 mm rapid-fire guns on every side as well as to operate in a battlefield contaminated with chemical weapons or radioactive fallout, the then-standard baseline for combat with the Warsaw Pact. In addition, the main armament had to consist of a 105 mm caliber weapon (the new British L7A3 105 mm gun was selected), carrying at least as many rounds as current US tank designs. Mobility had priority, while firepower came second; armour was seen as less essential, as it was believed that no real protection against hollow charge weapons was possible anyway.
- **Leopard 1A1:** After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter.
- **Leopard 1A2:** The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armoured turret, and therefore did not receive the B&V armour add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.
- **Leopard 1A3:** The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.
- **Leopard 1A4:** The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver.
- **Leopard 1A5:** In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour. The first modified vehicle was delivered in early 1987. Since then, almost all users of

the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.
- **Leopard 1A6:** The Leopard 1A6 prototype was a single Leopard 1 A1A1 testbed, modified with additional armour on the turret and equipped with a 120 mm L/44 gun. The project was ended in 1987, as the Leopard 2 was in widespread service at this point and the 1A5 offered a more reasonable upgrade path for a fraction of the cost.

System

Alternative Designation: Leopard 1A5

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann, Munich, Germany Krupp-MaK, Kiel, Germany

Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 7.09 m

Length, Gun Forward: 9.54 m

Width: 3.37 m

Height: INA

Tracks Length, on the Ground: 4.24 m

Tracks Width: 0.55 m

Ground Clearance: 0.44 m

Weight, Unloaded: 38,700 kg

Weight, Combat: 40,000 kg

Ground Pressure: 0.86 kg/cm sq

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: 2,282-cu in (37.4-liter) liquid-cooled, 4-stroke, prechamber, inter cooled, turbocharged V-10 multi-fuel

Engine Power: 830 hp at 2,200 rpm

Fuel Capacity: 955 liters

Transmission: ZF 4 HP 250 planetary shifter with hydraulic torque converter; 4 forward/2 reverse gears

Power-to-Weight Ratio: 20.75 hp/metric ton

Suspension: torsion bar, 7 road wheels, rear drive (12- tooth sprocket), front idler, 5 shock absorbs (bump travel 9 in/227 mm, rebound travel 5-6 in/128-156 mm), 4 return rollers

Maximum Speed: 65 km/h

Range, Road: 600 km

Range, Cross-Country: 450 km

Vertical Obstacle: 1.15 m

Trench: 3.00 m

Fording, Unprepared: 1.20 m

Fording, with Preparation: 2.25 m

Fording, with Snorkel: 4.00 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x Royal Ordnance L7A3 Rifled Gun

Type: Rifled Gun

Caliber: 105 mm

Length, Barrel: 5.46 m

Muzzle Velocity: INA

Weight: 1,282 kg

Maximum Rate of Fire: 10 rounds per minute (maximum)

Elevation: -9/+20 deg

Traverse: 360 deg

Maximum Firing Range: 4000 m

↳*Ammunition*

Name: L22

Type: Projectile

Caliber: mm105

Basic Load: 60 rounds, 18 ready in turret (Leopard 1A1)

Armor Penetration: INA, Tungsten carbide

Coaxial Weapon System

↳*System*

Name: Heckler & Koch MG5

Type: General Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Heckler & Koch

Length: 1,160 mm

Barrel Length: 550 mm

Height: 239 mm

Width: 120 mm

Weight: 11.20 kg

Action: Gas-operated, rotating bolt

Rate of Fire: 640/720/800 rounds/min

Muzzle Velocity: 840 m/s

Maximum Firing Range: 600–1,000 m

Effective Firing Range: 100–1,000 m

Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,250 rounds

Armor Penetration: INA

Auxiliary Weapon System

Note: 1 x 7.62-mm air defense machine gun

Fire Control System

Name: Krupp-Atlas EMES-18 FCS

Computerized FCS: Yes, Krupp-Atlas EMES-18 FCS

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Infrared: Yes, Paint reflects IR

Rangefinder: TEM 2A optical (Leopard 1A2) turret fully stabilized (A3, A4); retrofit of earlier AEG-Telefunken FLER-H modular hybrid computer (1A4 Krupp-Atlas)

Thermal Imaging System: Zeiss thermal-imaging system

Protection

Hull Armor: Glacis 70 mm at 60-deg: Hull Glacis top 25 mm at 83-deg: Hull nose 70 mm at 55-deg: Hull sides 25-35 mm: Hull rear 25 mm at 88 deg: Hull top 10 mm: Hull bottom 15 mm

Turret Armor: Turret mantlet 60 mm; Turret sides 60 mm; Turret rear 60 mm; Turret front 52 mm

Applique Armor: Available, The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

NBC Protection: Yes, collective

Smoke Equipment: 2 x 4-barrel 3-in (76-mm) smoke generators, one each side of turret

Notes:

The Leopard (or Leopard 1) is a main battle tank designed and produced by Porsche in West Germany that first entered service in 1965. Developed in an era when HEAT warheads were thought to make conventional heavy armour of limited value, the Leopard focused on firepower in the form of the German-built version of the British L7 105-mm gun, and improved cross-country performance that was unmatched by other designs of the era. The design started as a collaborative project during the 1950s between West Germany and France, and later joined by Italy, but the partnership ended shortly after and the final design was ordered by the Bundeswehr, with full-scale production starting in 1965. In total, 6,485 Leopard tanks have been built, of which 4,744 were battle tanks and 1,741 were utility and anti-aircraft variants, not including 80 prototypes and pre-series vehicles. The Leopard quickly became a standard of European forces, and eventually served as the main battle tank in over a dozen countries worldwide, with West Germany, Italy and the Netherlands being the largest operators until their retirement. Since 1990, the Leopard 1 has gradually been relegated to secondary roles in most armies. In the German Army, the Leopard 1 was completely phased out in 2003 by the Leopard 2, while Leopard 1-based vehicles are still widely used in utility roles. The Leopard 2 has replaced the Leopard 1 in service with many other nations as well, with derived vehicles using the Leopard 1 hull still seeing service. Currently, the largest operators are Greece, with 520 vehicles, Turkey, with 397 vehicles and Brazil with 378 vehicles. Most of these vehicles have been upgraded with various improvements to armor, firepower and sensors to maintain their ability to engage modern threats. Leopard 1A5 In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armor. The first modified vehicle was delivered in early 1987. Since then, almost all users of the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.

Leopard 1A4 German Main Battle Tank (MBT)





Tiers:



Variants:

- **Leopard 1:** The Leopard project started in November 1956 in order to develop a modern tank, the Standard-Panzer, to replace the Bundeswehr's American-built M47 and M48 Patton tanks, which, though just delivered to West Germany's recently reconstituted army, were rapidly becoming outdated. On 25 July 1957, the detailed specifications were released; the new design needed to weigh no more than 30 tonnes, have a power-to-weight ratio of 30 horsepower per tonne, be able to withstand hits by 20 mm rapid-fire guns on every side as well as to operate in a battlefield contaminated with chemical weapons or radioactive fallout, the then-standard baseline for combat with the Warsaw Pact. In addition, the main armament had to consist of a 105 mm caliber weapon (the new British L7A3 105 mm gun was selected), carrying at least as many rounds as current US tank designs. Mobility had priority, while firepower came second; armour was seen as less essential, as it was believed that no real protection against hollow charge weapons was possible anyway.
- **Leopard 1A1:** After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter.
- **Leopard 1A2:** The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armoured turret, and therefore did not receive the B&V armour add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.
- **Leopard 1A3:** The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.
- **Leopard 1A4:** The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver.
- **Leopard 1A5:** In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour. The first modified vehicle was delivered in early 1987. Since then, almost all users of

the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.
- **Leopard 1A6:** The Leopard 1A6 prototype was a single Leopard 1 A1A1 testbed, modified with additional armour on the turret and equipped with a 120 mm L/44 gun. The project was ended in 1987, as the Leopard 2 was in widespread service at this point and the 1A5 offered a more reasonable upgrade path for a fraction of the cost.

System

Alternative Designation: Leopard 1A4

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann, Munich, Germany Krupp-MaK, Kiel, Germany

Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 7.09 m

Length, Gun Forward: 9.54 m

Width: 3.37 m

Height: INA

Tracks Length, on the Ground: 4.24 m

Tracks Width: 0.55 m

Ground Clearance: 0.44 m

Weight, Unloaded: 40,400 kg

Weight, Combat: 42,400 kg

Ground Pressure: 0.88 kg/cm sq

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: 2,282-cu in (37.4-liter) liquid-cooled, 4-stroke, prechamber, inter cooled, turbocharged V-10 multi-fuel

Engine Power: 830 hp at 2,200 rpm

Fuel Capacity: 955 liters

Transmission: ZF 4 HP 250 planetary shifter with hydraulic torque converter; 4 forward/2 reverse gears

Power-to-Weight Ratio: 19.58 hp/metric ton

Suspension: torsion bar, 7 road wheels, rear drive (12- tooth sprocket), front idler, 5 shock absorbs (bump travel 9 in/227 mm, rebound travel 5-6 in/128-156 mm), 4 return rollers

Maximum Speed: 62 km/h

Range, Road: 600 km

Range, Cross-Country: 450 km

Vertical Obstacle: 1.15 m

Trench: 3.00 m

Fording, Unprepared: 1.20 m

Fording, with Preparation: 2.25 m

Fording, with Snorkel: 4.00 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x Royal Ordnance L7A3 Rifled Gun

Type: Rifled Gun

Caliber: 105 mm

Length, Barrel: 5.46 m

Muzzle Velocity: INA

Weight: 1,282 kg

Maximum Rate of Fire: 10 rounds per minute (maximum)

Elevation: -9/+20 deg

Traverse: 360 deg

Maximum Firing Range: 4000 m

↳*Ammunition*

Name: L22

Type: Projectile

Caliber: mm105

Basic Load: 60 rounds, 18 ready in turret (Leopard 1A1)

Armor Penetration: INA, Tungsten carbide

Coaxial Weapon System

↳*System*

Name: Heckler & Koch MG5

Type: General Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Heckler & Koch

Length: 1,160 mm

Barrel Length: 550 mm

Height: 239 mm

Width: 120 mm

Weight: 11.20 kg

Action: Gas-operated, rotating bolt

Rate of Fire: 640/720/800 rounds/min

Muzzle Velocity: 840 m/s

Maximum Firing Range: 600–1,000 m

Effective Firing Range: 100–1,000 m

Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,250 rounds

Armor Penetration: INA

Auxiliary Weapon System

Note: 1 x 7.62-mm air defense machine gun

Fire Control System

Name: FLP-10/EMES 18 integrated fire control

Computerized FCS: Yes, FLP-10/EMES 18 integrated fire control system with Zeiss thermal imaging system retrofitted to approximately 1,300 German Leopard 1A1/1A2s

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Infrared: Yes, Paint reflects IR

Rangefinder: TEM 2A optical (Leopard 1A2) turret fully stabilized (A3, A4); retrofit of earlier AEG-Telefunken FLER-H modular hybrid computer (1A4 Krupp-Atlas)

Protection

Hull Armor: Glacis 70 mm at 60-deg: Hull Glacis top 25 mm at 83-deg: Hull nose 70 mm at 55-deg: Hull sides 25-35 mm: Hull rear 25 mm at 88 deg: Hull top 10 mm: Hull bottom 15 mm

Turret Armor: Turret mantlet 60 mm; Turret sides 60 mm; Turret rear 60 mm; Turret front 52 mm

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

NBC Protection: Yes, collective

Smoke Equipment: 2 x 4-barrel 3-in (76-mm) smoke generators, one each side of turret

Notes:

Leopard 1A4 The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver. The Leopard (or Leopard 1) is a main battle tank designed and produced by Porsche in West Germany that first entered service in 1965. Developed in an era when HEAT warheads were thought to make conventional heavy armour of limited value, the Leopard focused on firepower in the form of the German-built version of the British L7 105-mm gun, and improved cross-country performance that was unmatched by other designs of the era. The design started as a collaborative project during the 1950s between West Germany and France, and later joined by Italy, but the partnership ended shortly after and the final design was ordered by the Bundeswehr, with full-scale production starting in 1965. In total, 6,485 Leopard tanks have been built, of which 4,744 were battle tanks and 1,741 were utility and anti-aircraft variants, not including 80 prototypes and pre-series vehicles. The Leopard quickly became a standard of European forces, and eventually served as the main battle tank in over a dozen countries worldwide, with West Germany, Italy and the Netherlands being the largest operators until their retirement. Since 1990, the Leopard 1 has gradually been relegated to secondary roles in most armies. In the German Army, the Leopard 1 was completely phased out in 2003 by the Leopard 2, while Leopard 1-based vehicles are still widely used in utility roles. The Leopard 2 has replaced the Leopard 1 in service with many other nations as well, with derived vehicles using the Leopard 1 hull still seeing service. Currently, the largest operators are Greece, with 520 vehicles, Turkey, with 397 vehicles and Brazil with 378 vehicles. Most of these vehicles have been upgraded with various improvements to armor, firepower and sensors to maintain their ability to engage modern threats. Leopard 1A2 The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armored turret, and therefore did not receive the B&V armor add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.

T-90MS Russian Main Battle Tank (MBT)







Tiers:

1 2 3 4

System

Alternative Designation: T-90MS Tagil; T-90SM
Type: Main Battle Tank
Family: T-90 Series
Crew: ea3

Dimensions

Length, Gun Forward: 10 m
Length, Hull: 6.8 m
Width: 3.5 m
Height: 2.3 m
Weight, Combat: 48 t

Automotive

Engine Name: V-92S2F
Engine Type: Diesel
Engine Power: hp1,130
Cruising Range: km
Speed, Maximum Road: km/h72
Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.85

Fording, without Preparation: m1.2

Fording, with Preparation: m5

Communications

Main Weapon System

Note:

↳*System*

Name: 2A46M-5 Smoothbore Gun

Caliber: 125mm

Barrel Length: 6000 mm

Weight: 2400 kg

Elevation: -6 to + 14 degrees

Traverse: 360 degrees

Fume Extractor: Yes

Thermal Sleeve: Yes

Muzzle Reference System: Yes

Muzzle Velocity: APDS: 1715-1800 m/s HEAT: 905-950 m/s HE: 760 m/s

Maximum Effective Range: INA

Effective Firing Range: APDS / HEAT: 3000 m HE: 4000 m ATGM: 5000 m

↳*Ammunition*

Type: Projectile

Caliber: mm125

Shell: INA

Basic Load: 40 Rounds, A total of 22 125-mm ready rounds are carried, with another 18 rounds carried in reserve.

Types of Ammunition: APDS, HEAT, HE:

Anti-Tank Guided Missile

↳*System*

Name: 9M119 Svir/Refleks (AT-11 Sniper)

Type: Anti-Tank Guided Missile
Launch Platform: 125 mm smoothbore guns
Length: INA
Diameter: 125 mm
Weight: 17.2 kg
Warhead: Tandem hollow-charge
Warhead Weight: 4.5 kg
Operational Range: 5,000 m
Maximum Speed: Subsonic
Guidance System: Laser beam riding

Coaxial Weapon System

↳*System*

Name: PKTM 7.62mm Machine Gun
Type: mm7.62
Length: 1,192 mm
Barrel Length: 605 mm
Weight: 7.5 kg (16.53 lb) (gun + integral bipod) + 4.5 kg (9.92 lb) (tripod).
Action: Gas-operated, open bolt
Rate of Fire: 650 rounds/min
Muzzle Velocity: 825 m/s
Maximum Firing Range: 3,800 m
Effective Firing Range: 1,000 m
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Basic Load: 2,800 Rounds

Fire Control

Name: INA
Computerized FCS: The T-90MS is equipped with a computerized fire-control system that can be used to engage static and mobile targets while the tank is in motion with a high first-round hit probability under most weather conditions.
Thermal Sight Tank Commander: separate stabilized panoramic sight,

Thermal Sight Gunner: PNM Sosna-U gunner display

Main Gun Stabilization: Yes

Satellite Navigation System: Yes

Inertial Navigation: Yes

Ballistic Computer: Yes

Meteorological Sensor: Yes

Automatic Target Tracker: Yes

Laser Rangefinder: Yes

Hunter-Killer Engaement: Yes

TV Camera: Yes

Thermal Sight: Yes, with a Laser Rangefinder

Missile Guidance System: Yes, the Reflects Missile Guidance Sighting System

Protection

Hull Armor: The rear of the hull and turret is provided with slat armor to protect against rocket-propelled grenades. Spall liners are fitted in the crew compartment.

Turret Armor: The rear of the hull and turret is provided with slat armor to protect against rocket-propelled grenades. Spall liners are fitted in the crew compartment.

Applique Armor: Available

Explosive Reactive Armor: Yes, Relikt explosive reactive armor (ERA) in place of the previous Kontakt-5.

Active Protection System: Yes, There is an active protection system that includes a number of coarse and fine laser detectors positioned to cover 360 degrees.

Mine Clearing: INA

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: The turret can also be automatically slewed in the direction of the threat to launch 81-mm smoke grenades.

Notes:

The T-90MS is the next step in the development of the Russian-made main battle tank T-90. The new T-90MS was presented for the first time to the public during the defence exhibition Russian Expo arms in September 2011. This new tank is a complete modernization of the T-90 by touching all the characteristics of the basic variant to increase its operational capabilities in combat and against modern threats of the battlefield. The weight of the T-90MS has increased of 1,500 kg, compared to the basic model of the T-90 to reach 48 tons, but it remains significantly lower compared to the German main battle tank Leopard 2A6 and the American M1A2 Abrams. On April 2019, India’s Cabinet Committee on Security (CCS) has approved the INR134.48 billion (USD 1.93 billion) procurement of 464 Russian-made T-90MS main battle tanks (MBTs) for the Indian Army (IA), the New Delhi Times reports. According to a news released on November 8, 2019, to the official website of the "Times of India", the Indian Ministry of defense has signed a contract with with the Heavy Vehicles Factory at Avadi in Chennai to produce 469 Russian T-90 Main Battle Tanks (MBTs), that could be the MS version of the T-90 family.

T-80U Russian Main Battle Tank (MBT)




Tiers:

1 2 3 4

Parent:

T-80B Russian Main Battle Tank (MBT)

Variants:

- **T-80 (1976):** Initial model, with 1,000-hp gas turbine engine, coincidence rangefinder, and no missile capability. This model does not have fittings for explosive reactive armour. The turret is from the T-64A, and thus retains the use of the old coincidence rangefinder. Characteristics of this type are the V shaped water deflector on the front glacis, coincidence rangefinder in front of the commander's cupola, and Luna searchlight mounted in the same position as a T-64. Around 250 were produced, as the tank's armour was essentially obsolete when introduced. Turret vs APFSDS – 380 mm, hull vs APFSDS – 500 mm (without reactive armour). This was, in effect, a pre-production model. It reportedly was fitted with an early version of the Shtora APS.
- **T-80B (1978):** This model had a new turret, laser rangefinder, fire-control, and autoloader allowing the firing of 9M112-1 Kobra antitank guided missile (80% hit probability while stopped and on the move), and improved composite armour. An improved, 1,100-hp, engine was added in 1980, a new gun in 1982, and fittings for reactive armour in 1985. Reactive armour added protection of 400 mm equivalent armour to defend against HEAT warheads. The longest sighting range for T-80B kinetic energy ammunition and for "cumulative" ammunition – 4,000 m, high-explosive fragmentation – 5,000 m (using the "side level" – 10,000 m). A night sight TPNZ-49 in active mode reached 1,300 and a passive – 850 m. "Reflex" guided missile complex with laser beam allowed it to launch missiles at any tank speed
- **T-80BV (1985):** T-80B with explosive reactive armour Kontakt-1
- **T-80UM::** Russian version, with new Buran thermal imaging sight in place of the Luna IR.
- **Object 219A: Early T-80U (Object 219AS) variant:** It has the T-80U's turret, but not the Kontakt-5 ERA. Instead, it uses the old Kontakt-1/3 system; some 219As did not have ERA at all. Often misnamed T-80A. T-80U (1985): Further development with a better turret, Kontakt-5 explosive reactive armour, improved gunsight, and 9M119 Svir missile system. In 1990 a new, 1,250-hp, engine was installed. Overall protection with Kontakt-5 against APFSDS/HEAT is 780/1,320 mm RHAe.9K119M with antitank guided missile 9M119M installed since 1990. Some of the tanks in commander version (T-80UK) equipped with Shtora-1 APS, and thermal imaging night sight TO1-PO2T (detection range / target classification range = 6,400/4,600 meters at night). Basic thermal night sight of the T-80U is within the limits of 1,750/1,500 meters
- **T-80UD Bereza (1987):** Ukrainian diesel version with 1,000-hp 6TD engine and remote-controlled antiaircraft machine gun
- **T-84 (1999):** Further Ukrainian development of T-80UD with 1,200-hp diesel and new welded turret
- **T-80BVD (2002)::** KMDB's upgrade standard for Ukrainian T-80BVs. Changes include the 6TD diesel engine, remote-controlled commander's machine gun, and better optics. None were produced.
- **T-80UM2/Black Eagle (prototype: cancelled)::** Several Russian prototypes were shown at trade shows, with a longer chassis and extra pair of road wheels, and very a large turret with separate ammunition compartment
- **T-80BVM (2017):** up to 3,000 units, installed "Relikt" ERA, PNM Sosna-U gunner sight (as in the T-90, T-72B3), the improved 125mm gun 2A46M-4, the upgraded gas turbine engine and the upgrades of various other systems. More than 120 already in the service.
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System

Alternative Designation: T-80U

Type: Main Battle Tank

Cost: $831,000 (1987)

Family: T-80 Series

Generation: 3rd Generation Tank

Crew: ea3

Maximum Effective Range (Road): km335

Driver's Vision Blocks: ea3

Dimensions

Length (Gun Forward): m9.65

length (Hull): m6.98

Width: m3.58

Height: m2.22

Weight, Combat: tons46

Ground Pressure: kg/mINA

Automotive

Engine Name: GTD-1000T

Engine Type: Gas turbine engine

Engine Power: hp1,100

Power to Weight Ratio: hp/ton23.9

Cruising Range: km335

Speed, Maximum Road: km/h70

Speed, Average Cross: 48

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m1

Trench: m2.85

Fording Depth (No Preparation): m1.8

Fording Depth (With Preparation): m5

Cold Start Ability: Yes

Fuel Tank (Regular): liters1,090

Reul Tank (Additional): liters680

Deep Water Snorkel: Available

Communications

↳*R-173*

Frequency Range: MHz30.00 - 75.99

HF Output: W30

Modulation: FM

Display: Digitial

Entry of Frequency: Keypad

Present Channels: 10

Digital Transmition: KBaudINA

Sensitivity: uV1.5

Range: km50

Operational Voltage: V27+-2

Weight: kg43

Size: mm428 × 222 × 238

↳*Receiver R-174/GRR-5*

Main Principle: Superhet with RF-stage; ZF/IF 455 kHz; 2 AF stage(s)

Wave Bands: Wave Bands given in the notes.

Loudspeaker: Permanent Magnet Dynamic (PDyn) Loudspeaker (moving coil)

Dimensions (WHD): mm307 x 335 x 206

Net Weight: kg27.7

Note: Receiver for mobile purposes, 1.5 - 18 MHz in four ranges, AM/CW (BFO), 200 kHz xtal calibrator. Set compartment (CY-615/URR) consists of two chassis: model R-174/GRR-5 receiver and model PP-308/URR power supply plus speaker unit. Tubes only one times listed.

Main Gun

↳*System*

Name: L48 2A46M-1 Smoothbore Cannon

Type: 125 mm smoothbore Gun

Manufacturer: Spetstekhnika Design Bureau

Max Rate of Fire: rds/min6-8

Maximum Range: m4,000

Manually Load Time: rds/min1-2

Maximum Elevation: deg+14

Minimum Elevation: deg-5

Traverse Range: deg360

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Evacuator Type: Central Bore

Thermal Sleeve: Yes

Barrel effective Full Life Charge: rds800

Breech Mechanism: Semi-automatic horizontal sliding breech block

Mazimum Pressure: bar5,100

Loading System: Korzina electric and hydraulic automatic loading system

Carousel Reloading Time: minutes13-15

Muzzle Bead: Yes

Barrel Type: Quick Change

Note: The L48 2A46M-1 It has been extensively developed into 10 different variations and remains the primary armament of Russian frontline tanks.

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Maximum Effective Range: m5,000

Armor Penetration: INA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Weight: kg11

Projectile Dimesnion: mm900

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)

Type: Laser Beam Anti-Tank Guided Missiles

Caliber: mm125

Manufacturer: Degtyarev plant

In Service: 1980's to present

Proliferation: Widely Proliferated

Operational Range: m4,000-5,000

Weight: kg17.2

Diameter: mm125

Basic Load: ea6

Warhead Type: Tandem hollow-charge

Warhead Weight: kg4.5

Speed: Subsonic

Guidance System: 9S516 guidance system

Launch Platform: 125 mm smoothbore guns

Armor Penetration: 700mmm of homogeneous armour

Time to meet Maximum Range: sec17.6

Control Unit: 9S517 automatic control unit

Voltage Regulator: 9S831 voltage regulator.

Variants: 9M119M

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: 7.62mm Machine Gun
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
Manufacturer: Degtyaryov plant
In Service: 1961-present
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Total): mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea1,250
Effective Range (Iron Sights): m1,000
Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: 1A45 Irtysh, Updated FCS system over the T-80B
Computerized FCS: Yes
Thermal Sight Tank Commander: Yes, day and night, vertical plane PNK-4S (Agat) day/night sight
Commander Day Mode Sight: 10^0 FOV and ×5 magnification
Thermal Sight Gunner: Yes, stabilised T01-K01R Buran-PA night sight.
Main Gun Stabilization: Yes, 2E26M electro-hydraulic dual plane stabilisation system
Main Gun Stabilization Deployment Time: minutes2
Range, Day Sight: m1,000
Range, Thermal Sight: m2,600

IR Searchlight: Yes, L-4A "Luna" IR Searchlight
TNPO-160 Periscopes: ea2
TNPA-65 Periscopes: ea2
Ballistic Computer: 1V528-1 Ballistic Computer
Wind Sensor: DVE-BS wind sensor
Laser Rangefinder: Yes
FCS Fire Gating Capability: YEs
Fire Control Complex: 1A45 fire-control complex,

Protection

Hull Armor: mm440–450
Armor Type: The T-80B is protected by a third iteration Soviet laminate armour that is known as Combination K
Turret Type: Objekt 476
Turret Armor: Renovated ceramic system, Protection equivalent to 550mm
Applique Armor: Yes, Hull side; track skirts
Explosive Reactive Armor: Yes, Kontakt-5 System. Built in ERA system. Upgrade from the T-80B.
Active Protection System: Arena Available
Mine Clearing: Roller-plow available
Self-Entrenching Blade: Yes
NBC Protection: Yes, ZETS-11-2 detection system collective overpressure system
Smoke Equipment: Yes, two banks of four 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade
Smoke Grenade Range: m250-300
Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.
IR Signature: The exhaust is box-shaped and designed to direct heat away from the tank
Anti-Radiation Material: Installed as a inside protective layer
Personal Breathing Apparatus: Equipment
Automatic Fire Extinguisher System: Yes
Radiation and Chemical Detector: PRKhR, Model GO-27, radiation and chemical agent detector system

Notes:

The T-80U main battle tank is a further development of the original T-80, which was produced only in small numbers. T-80U (1985): Further development with a better turret, Kontakt-5 explosive reactive armour, improved gunsight, and 9M119 Svir missile system. In 1990 a new, 1,250-hp, engine was installed. Overall protection with Kontakt-5 against APFSDS/HEAT is 780/1,320 mm RHAe.[8] 9K119M with antitank guided missile 9M119M installed since 1990. Some of the tanks in commander version (T-80UK) equipped with Shtora-1 APS, and thermal imaging night sight TO1-PO2T (detection range / target classification range = 6,400/4,600 meters at night). Basic thermal night sight of the T-80U is within the limits of 1,750/1,500 meters

Leopard 2 German Main Battle Tank (MBT)





Tiers:



Variants:

- **Leopard 2A1:** Minor modifications and the installation of the gunner's thermal sight[1] were worked into the second batch of 450 vehicles Leopard 2, designated the A1. Krauss-Maffei built 248 (Chassis Nr. 10211 to 10458) and Mak built 202 (Chassis Nr. 20173 to 20347). Deliveries of the 2A1 models started in March 1982 and ended in November 1983. The two most notable changes were the modification of the ammunition racks to be identical to those in the M1A1 Abrams, and redesigned fuel filters that reduced refuelling time. A third batch of 300 Leopard 2, 165 by Krauss-Maffei (Chassis Nr. 10459 to 10623) and 135 by MaK (Chassis Nr. 20375 to 20509.), was built between November 1983 and November 1984. This batch included more minor changes that were later retrofitted to the earlier 2A1s
- **Leopard 2A2:** This designation was given to upgraded vehicles of the first batch of Leopard 2s, brought up to the standard of the second and third batches. This modernisation gradually replaced the original PZB 200 sights in the first batch with thermal sights for the EMES 15 as they became available. Furthermore, the upgrade included the fitting of filler openings and caps to the forward hull fuel tanks to allow separate refuelling, as well as the addition of a deflector plate for the periscope and a large coverplate to protect the existing NBC protection system. Finally, the tank was given new five metre towing cables with a different position. The programme began in 1984 and ended in 1987; the third, fourth and fifth batches, which were produced during this period, had the same features. The modernised first batch can be recognised by the circular plate covering the hole where the cross-wind sensor for the fire-control system was removed
- **Leopard 2A3:** The fourth batch of 300 vehicles, 165 by Krauss-Maffei (Chassis Nr. 10624 to 10788) and 135 by Mak (Chassis Nr. 20510 to 20644), was delivered between December 1984 and December 1985. The main change was the addition of the SEM80/90 digital radio sets (also being fitted to the Leopard 1 at the same time), and the ammunition reloading hatches being welded shut. Even with these minor changes the new batch was known as the 2A3
- **Leopard 2A4:** The most widespread version of the Leopard 2 family, the 2A4 models included more substantial changes, including an automated fire and explosion suppression system, an all-digital fire control system able to handle new ammunition types, and an improved turret with flat titanium/tungsten armour. The Leopard 2s were manufactured in eight batches between 1985 and 1992. All the older models were upgraded to 2A4 standard. Until 1994, Germany operated a total of 2,125 2A4s (695 newly built and the rest modified older versions), while the Netherlands had an additional 445 tanks. The 2A4 was also license manufactured in Switzerland as the Panzer 87 "Leopard" or Pz 87. This version included Swiss-built 7.5 mm MG 87 machine guns and communications equipment, and featured improved NBC protection system. Switzerland operated 380 Pz 87 tanks.
- **Leopard 2 Marksman:** Finland has modernised its Marksman SPAAG vehicles by replacing the original T-55AM chassis with a newer Leopard 2A4 chassis. The upgraded Marksman vehicles were scheduled to enter service with the Finnish Army in 2016. The new Leopard 2 chassis greatly improves mobility compared to the older T-55AM chassis, both on- and off-road. The Leopard 2 chassis is also larger, thus providing a more stable firing platform for the Marksman turret to operate from

- **Leopard 2A5:** "Leopard 2 Improved" was a prototype-series for enhancing the A4, introducing a wedge-shaped, spaced add-on armour to the turret front and the frontal area of the sides. These spaced armour modules defeat a hollow charge prior to reaching the base armour, and causes kinetic-energy penetrators to change direction, eroding them in the process; it does not form a shot-trap, since it does not deflect the penetrators outwards to hit the hull or turret ring. The gun mantlet was redesigned to accept the new armour.
- **Stridsvagn 122:** The Stridsvagn 122 is a Swedish Army tank based on the Leopard 2 Improved, with 120 units built, 91 of which were licence-produced in Sweden. The tank features increased armour on the turret top and front hull, and improved command, control and fire control systems. Externally, it can be distinguished from the Leopard 2A5 by the French GALIX smoke dispensers, different storage bins, and the much thicker crew hatches The Strv 122B, a variant equipped with modular AMAP composite armour from IBD Deisenroth, has increased 360° protection against threats like EFPs, RPGs and IEDs. The width of 4 metres (13 ft) has been kept, while the weight increases by only 350 kilograms (770 lb)
- **Leopard 2-140:** n the early 1990s,[citation needed] Rheinmetall began development of a 140 mm smoothbore cannon for use in future tank designs. The new gun was intended to counter new Soviet tank developments, especially since the next generation of Soviet main battle tanks were rumoured to be armed with a 135 mm or 152 mm cannon. The new 140 mm cannon was part of a modernisation programme for the Leopard 2 known as the KWS III. Test firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively
- **Leopard 2A6:** The Leopard 2A6 includes the addition of the Rheinmetall 120 mm L/55 smoothbore gun and other changes. All German tank battalions of the "crisis intervention forces" are equipped with the A6. Canada purchased 20 Leopard 2A6s from the Netherlands. These were delivered in 2007. Portugal also purchased 37 Leopard 2A6 from the Dutch in 2007, with delivery in 2008. In January 2014, Finland purchased 100 L2A6s, as well as munitions, simulators, and a ten-year supply of reserve parts from the Netherlands. The tanks are being delivered in batches between 2015-2019.
- **Leopard 2E:** he Leopard 2E is a derivative of the 2A6, with greater armour protection, developed under a programme of co-production between the defence industries of Spain and Germany. The programme was developed within the frame of collaboration decided in 1995 between the Defence Ministries of both countries, in which also was included the cession of use by a period of five years of 108 Leopard 2A4 from the German Army to the Spanish Army. However, this cession was extended up to 2016, and after that those tanks will be the sole property of the Spanish Army, as has been made public on 24 January 2006, then having been paid a total of 15,124,014 euros in ten yearly installments, giving the Spanish co-ownership from 2006.
- **Leopard 2 PSO:** The new Leopard 2 PSO (Peace Support Operations) variant is designed specially for urban warfare, which had been encountered in peacekeeping operations with increasing frequency. Therefore, the Leopard 2 PSO is equipped with more effective all-around protection, a secondary weapons station, improved reconnaissance ability, a bulldozer blade, a shorter gun barrel (for manoeuvring on urban streets at the expense of fire range), non-lethal armament, close-range surveillance ability (through camera systems), a searchlight and further changes to improve its perseverance and mobility in a built-up non-wide open area. These features are similar to the Tank Urban Survival Kit for the American M1A2 Abrams
- **Leopard 2A7:** The Leopard 2A7 is fundamentally different from the KMW variant 2A7+ and is not optimised for combat in urban terrain. A total of 20 vehicles are provided for converting. It involves former Dutch A6NL models returned by Canada to Germany. The original upgrade to A6M has been extended in coordination with Canada and includes a crew-compartment cooling-system from the Leopard 2 A6M-HEL series, a new 20 kW auxiliary power unit based on the Steyr Motors M12 TCA UI engine, the Saab Barracuda Mobile Camouflage System (MCS) with Heat-Transfer Reduction (HTR CoolCam) system, a field trial proven combat management and information system (IFIS: Integriertes Führungs- und Informationssystem), onboard network optimization with ultracapacitors in the chassis and turret, a SOTAS IP digital intercom system, a renewal of the fire suppression system in the crew compartment, and the retrofitting of Attica thermal imaging module in the commander optics. The weapon system is adapted for firing HE ammunition. It is also fitted for, but not with, additional passive side protection armour. The first Leopard 2A7 was handed over to the German Army in Munich on 10 December 2014. A total of 14 vehicles were produced for Tank Battalion 203, plus four more going to the Armoured Corps Training Centre and one vehicle at the Technical School for Land Systems and School for Technology of the Army. The last tank remains as a reference vehicle at KMW
- **Leopard 2A7+:** The Leopard 2A7+ was first shown to the public during the Eurosatory 2010, featuring the label "Developed by KMW – tested and qualified by German MoD". The Leopard 2A7+ has been tested by the Bundeswehr under the name UrbOp (urban operations).The Leopard 2A7+ is designed to operate both in low intensity and high intensity conflicts.

System

Alternative Designation: Leopard 2, Swiss Pz87, Stry121

Total Built: +380

Manufacturer: Krauss-Maffei Wegmann Maschinenbau Kiel

Type: Main Battle Tank

Family: Leopard German Main Battle Tank

Crew: ea4

Estimated Service Life: years50

Dimensions

Length (Chassis Overall): m7.7

Width: m3.7

Height: m2.8

Weight, Combat: tons56

Ground Pressure: kg/m0.83

Automotive

Engine Name: MTU MB-837 Ka501 diesel

Engine Type: Diesel

Engine Power: hp1,500

Cruising Range: km550

Speed, Maximum Road: km/h70

Speed, Off Road: km/h50

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Fording Depth (Without Preparation): m1.0

Fording Depth (With Preparation): m4.0

Gradient: Deg60

Side Slope: Deg30

Vertical Step: m1.5

Trench: m3

Communications

Type: INA

Main Gun

↳*System*

Name: 120 mm Rheinmetall L/55 smoothbore gun

Type: 120mm Smoothbore Gun

Manufacturer: Rheinmetall

Max Rate of Fire: INA

Loader Type: Manual

Basic Load: ea42 Total of any combination 120mm Projectiles

Maximum Elevation: Deg+20

Minimum Elevation: Deg-9

Fire on the Move: Yes

Weight (Gun Barrel): kg1,190

Weight (Gun Mount(: kg3,317

Length (Barrel): m6.6

↳*Ammunition (Option 1)*

Type: Laser Homing Attack or Laser Homing Anti-Tank (LAHAT)

Caliber: mm120

Muzzle Velocity: m/s1,580-1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Operational Range: m6,000-8,000

Armor Penetration: Yes

Weight: kg13

Length: mm975

Diameter: mm105mm

Warhead Type: Tandem HEAT

Warhead Weight: kg4.5

Speed: m/s285-300

Guidance System: Semi-Active Laser Homing

Penetration (2,000 Meters): mm450

↳*Ammunition (Option 2)*

Type: DM63 KE Cartridge (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1,650

Basic Load: 42 Total of any combination 120mm Projectiles

Propulsion System: Propulsion System (TIPS) utilizing the SCDB technology

Bulk Powder Weight: kg8.45

↳*Ammunition (Option 3)*

Type: DM53 120mm KE Projectile (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Round Weight: kg21.4

Projectile Length: mm745

Accuracy: mil0.2

Tank Commander's Weapon System

↳*System*

Name: MG3A1

Type: 7.62mm General-Purpose Machine Gun

Manufacturer: Rheinmetall

Proliferation: + 1 Million

In Service: 1960-present

Max Rate of Fire: rds/min1,200

Fire on the Move: Yes

Weight (Gun Only): kg11.5

Weight (Mounted on Tripod): kg27.5

Length (With Stock): mm1,225

Length (Without Stock): mm1,097

Length (Barrel Only): mm565

Action: Recoil-operated, roller locked

Effective Firing Range (With Sight Adjustments): m200-1,200

Maximum Firing Range (Bipod Mounted): m600

Maximum Firing Range (Tripod Mounted): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: ea1,500

Loader's Weapon System

↳*System*

Name: MG3A1
Type: 7.62mm General-Purpose Machine Gun
Manufacturer: Rheinmetall
Proliferation: +1 Million
Max Rate of Fire: rds/min1,200
In Service: 1960-present
Fire on the Move: Yes
Weight (Gun Only): kg11.5
Weight (Mounted on Tripod): kg27.5
Length (With Stock): mm1,225
Length (Without Stock): mm1,097
Length (Barrel Only): mm565
Action: Recoil-operated, roller locked
Effective Firing Range (With Sight Adjustments): m200-1,200
Maximum Firing Range (Bipod Mounted): m600
Maximum Firing Range (Tripod Mounted): m1,200
Maximum Firing Range (Gun Carriage): m3,000
Maximum Firing Range (Terminal): m3,750
Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt
Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO
Muzzle Velocity: m/s820
Basic Load: ea1,500

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Tank Commander: No, Instead a Low Light Enhancer PZB 200
Thermal Sight Gunner: No, Instead a Low Light Enhancer PZB 200

Main Gun Stabilization: WNA-H22, 2-plane

Infrared: Yes

Range Finder: Laser

Wind Senor: Yes

Telescope: EMES 15

Periscope: PERI R17

Tower Sight: FERO Z18

Computer Controlled Tank Testing Set: RPP 1–8

Protection

Hull Armor: Welded hull and turret, provides good protection from Armor-piercing rounds and ATGWs.

Turret Armor: Welded hull and turret, provides good protection from Armor-piercing rounds and ATGWs.

Applique Armor: Yes, Track Skirt

Explosive Reactive Armor: INA

Active Protection System: Yes, Galiz, Stry122

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: grenlaunch 8x2 at turret

IR Signature: INA

Fire Suppression System: Yes, Automatic

Notes:

The Leopard 2 is a main battle tank developed by Krauss-Maffei in the 1970s for the West German Army. The tank first entered service in 1979 and succeeded the earlier Leopard 1 as the main battle tank of the German Army. It is armed with a 120 mm smooth bore cannon, and is powered by a V-12 twin-turbo diesel engine. Various versions have served in the armed forces of Germany and 12 other European countries, as well as several non-European nations, including Canada, Chile, Indonesia, Singapore, and Turkey. The Leopard 2 was used in Kosovo with the German Army, and has seen action in Afghanistan with the Dutch, Danish and Canadian contributions to the International Security Assistance Force, as well as seeing action in Syria with the Turkish Armed Forces against ISIS and the YPG. There are two main development batches of the tank: the original models up to Leopard 2A4, which have vertically faced turret Armour, and the improved batch, namely the Leopard 2A5 and newer versions, which have angled arrow-shaped turret applique Armour together with other improvements. All models feature digital fire control systems with laser rangefinders, a fully stabilized main gun and coaxial machine gun, and advanced night vision and sighting equipment (first vehicles used a low-light level TV system or LLLTV; thermal imaging was introduced later on). The tank has the ability to engage moving targets while moving over rough terrain. Even as the Leopard 1 was just entering service, the German military was interested in producing an improved tank in the next decade. This resulted in the start of the MBT-70 development in cooperation with the United States beginning in 1963.[6] However already in 1967 it became questionable whether the MBT-70 would enter service at any time in the foreseeable future. Therefore, the German government issued the order to research future upgrade options of the Leopard 1 to the German company Porsche in 1967. This study was named vergoldeter Leopard (Gilded Leopard) and focused on incorporating advanced technology into the Leopard design. The projected upgrades added an auto loader, a coaxial auto cannon and an independent commander's periscope.[8] The anti-air machine gun could be operated from inside the vehicle and a TV surveillance camera was mounted on an extendable mast. The shape of the turret and hull was optimized using cast steel armor, while the suspension, transmission and the engine exhaust vents were improved. Following the end of the Gilded Leopard study in 1967, the West-German government decided to focus on the Experimental (experimental development) in a feasibility study and to develop new components for upgrading the Leopard 1 and for use on a future main battle tank program. At first 25 million DM were invested, but after the industry came to the conclusion that with such a low budget the development of the two projected test beds was not possible, a total of 30 to 32 million DM was invested. The experimental development was contracted to the company Krauss-Maffei, but with the obligation

to cooperate with Porsche for the development of the chassis and with Wegmann for the development of the turret. Two prototypes with differing components were built with the aim to improve the conception of the Leopard 1 in such a way that it would match the firepower requirements of the MBT-70. A high first-hit probability at ranges of 2,000 metres (6,600 ft) and the ability to accurately engage targets on the move using a computerized fire control system were the main goals of the experimental development. The resulting vehicles were nicknamed Keiler ("tusker"). Two prototypes (ET 01 and ET 02) of the Keiler were built in 1969 and 1970, both of them being powered by the MB 872 engine. The MBT-70 was a revolutionary design, but after large cost overruns and technological problems, Germany withdrew from the project in 1969. After unsuccessful attempts of saving the MBT-70 by conceptual changes in order to eliminate the biggest issue—the driver being seated in the turret—it became clear in late 1969 that Germany would stop the bi-national development. The assistant secretary of the military procurement division of the German Ministry of Defense suggested reusing as much technologies developed for the MBT-70 as possible in a further program, which was nicknamed Eber ("boar") due to his being named Eberhardt. The Eber used a modified MBT-70 turret and hull, with the driver being seated in the hull. Only a wooden mock-up was made. One year later, a choice was made to continue the development based on the earlier Keiler project of the late 1960s, instead of finishing the development of the Eber. In 1971, the name of the design was determined as Leopard 2 with the original Leopard retroactively becoming the Leopard 1, and Paul-Werner Krapke became the project officer of the Leopard 2 program. Originally two versions were projected: the gun-armed Leopard 2K and the Leopard 2FK, which would be armed with the XM150 gun/launcher weapon of the MBT-70. That year 17 prototypes were ordered, but only 16 hulls were built as the production of hull PT12 was cancelled. Ten were ordered initially before another seven were ordered. The 17 turrets were designated T1 to T17, and the hulls were designated PT1 to PT11 and PT13 to PT17. To test a larger number of components and concepts, each prototype was fitted with components not found on the other prototypes. Ten of the turrets were equipped with 105 mm smoothbore guns, and the other seven prototypes were equipped with a 120 mm smoothbore gun. Hulls PT11 and PT17 were fitted with a hydropneumatic suspension based on the MBT-70 design. The running gears of these two hulls had only six road wheels. Different types of APUs were mounted in the prototypes. All turrets were equipped with a machine gun for air defense except the turret mounted on PT11, where a 20 mm remotely operated auto cannon was mounted. With the exception of hulls PT07, PT09, PT15 and PT17, all prototypes used the MB 873 engine. The road wheels were taken from the MBT-70 and the return rollers from the Leopard 1. The prototypes were designed with a projected weight of MLC50, which equals approximately 47.5 tonnes (46.7 long tons; 52.4 short tons). The welded turret utilized spaced armour formed by two steel plates. The prototypes were equipped with an EMES-12 optical rangefinder and fire control system, which later was adopted on the Leopard 1A4. In mid-1973 a new turret was designed by Wegmann saving 1.5 tonnes (1.5 long tons; 1.7 short tons) weight.[15] It was nicknamed the Spitzmaus-Turm (shrew turret) due to the highly sloped front. This design was only possible with the new EMES-13 optical rangefinder, which required a base length of only 350 millimetres (14 in) instead of the previous 1,720 millimetres (68 in). Based on experiences in the Yom Kippur War, a higher level of protection than the prototypes' heavily sloped spaced armour was demanded in late 1973 and the Spitzmaus-Turm was never produced. The weight limit was increased from MLC50 to MLC60, which equals approximately 55 tonnes (54 long tons; 61 short tons). The turret T14 was modified to test a new armor configuration, taking on a blockier-looking appearance as a result of using vertical modules of spaced multilayer armour. It was also used to test the new EMES-13 optical rangefinder. The modified turret T14 was designated T14 mod and was fitted with a fully electric turret drive and stabilization system, which was developed together by the companies General Electric and AEG Telefunken.

T-64 BM Bulat Ukrainian Main Battle Tank (MBT)







Tiers:



Variants:

- **T-64B:** The T-64 MBT was, at the time it entered service, the third generation of tanks to be produced by factories and design bureaus in Ukraine. It was the first Soviet tank to assume the mantel of an MBT, finally expelling the notion of light, medium, and heavy tanks.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64BV:** Variant has kontakt era mounted. Combat weight (mt): 42.5 for t-64bv with explosive reactive armor (mm): standard on t-64bv
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64 BM Bulat
Type: Main Battle Tank
Family: T-64 Family
Crew: ea3
Passenger Capacity: INA
Maximum Effective Range (Road): km312
Maximum Effective Range (Main Gun): m5,000
Maximum Operation Duration: hours10
Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23

Length (Hull): m6.54

Width: m3.41

Height: m2.17

Weight, Combat: tons45

Ground Pressure: kg/mINA

Automotive

Engine Name: 5TDFM Diesel

Engine Type: Two-stroke multifuel, 5-cylinder diesel with gas turbine supercharg

Engine Power: hp850

Maximum RPM's: RPM2,800

Power to Weight Ratio: hp/ton18.9

Cruising Range: km312

Speed, Maximum Road: km/h70

Speed, Average Cross: 37

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.72

Fording Depth (Without Preparation): m1.4

Fording Depth (With Preparation): m5

Fuel Tank: liters1,270

Main Gun

↳*System*

Name: KBA-3125 mm smoothbore gun

Type: 125 mm smoothbore

Max Rate of Fire: rds/min8

Length (Barrel): m6

Weight (Barrel): kg2,500

Manual Load Time: rds/min1-2

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Penetration: mm750

Rate of Fire: rds/min6-8

Maximum Elevation: Deg+14

Minimum Elevation: Deg-6

Traverse Range: Deg360

Automatic Loader: Yes

Thermal Sleeve: Yes

Guidance System: TAK0-621 Guided Weapon Complex

Evacuator Type: Central bore evacuator

Effective Full Charge (EFC) Life: rds600

Breech Type: semi-automatic horizontal sliding breech block

Loading System: Korzina electric and hydraulic automatic loading system

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

Muzzle Reference System: Yes

Maximum Effective Range (Day): m2,300-2,500

Maximum Effective Range (Night): m1,500

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 1)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Maximum Chamber Pressure: kgf/cm36,500

Horizontal and Vertical Dispersion: mils0.2

Kombat Gun-Launched Missile Capable: Yes

Variants: 9M112M, 9M112M2, 9M124

Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun

Type: 12.7mm Heavy Machine Gun

Proliferation: over 1 Million

Length (Total): mm1,625

Length (Barrel): mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Range Finder Type: Optical

Action: Gas-Operated, Flapper Locking

Sights: Iron/Optical

Feed System: 50 Round Belt

Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.

Variants: DK, DShKM, DSHKS, Type 54 HMG

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea300

Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea250

Effective Range (Iron Sights): m100- 1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 1V528-2 fire-control compute

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, TKN-4S combination day/night binocular periscopic. Additionally, the T-64U is equiped with the PZU-7 Anti-aircraft Sight

Gunner's Aiming System: 1G46M Aiming System

Thermal Sight Gunner: Yes, T01-K01ER Night Sight

1G46 Magnification: 2.7 and ×12 magnification

Rangefinder: IG46 Gunner Sight, Laser

Sighting and Observation System: TKN-4CR, also known as the PNK-4SR

IG46 Rangefinder Maximum Range: m400

IG46 Rangefinder Minumum Range: m5,115

Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks

Fire on the Move: Yes

Main Gun Stabilization: 2-Plane, 2E42M Stabilization System

Rangefinder: two-axis stabilised IG42 laser rangefinder sight

2E42M Stabilization System (Horizontal Error): mrad0.4

2E42M Stabilization System (Vertical Error): mrad.03

Ballistic Computer: 1B528-1 Ballistic Calculator.

PZU-5 Monocular Periscopic Sight: Available

Searchlight: L-4 searchlight.

Wind Sensor: DVE-BS wind sensor

Guidance System: TAK0-621 Guided Weapon Complex

Protection

Hull Armor: Cast and welded steel armour

Turret Armor: Cast armour welded together

Turret Type: ROM-7 commander's cupola

Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds

Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,

Explosive Reactive Armor: Nozh ERA system

Explosive Reactive Armor Weight: tons3.5

Explosive Reactive Armor Install Time: hours6

Nozh ERA Strength: 1.5-2.5 times more effective than exiating ERA Designs.

Noza ERA Compatability: interchangeable with the Russian-developed 4C20 and 4C22 ERA systems.

Active Protection System (APS): Zaslon APS

Doppler Radar: Yes

Mine Clearing: Roller-plow available

NBC Protection: Yes

Smoke Equipment: 902A "Tucha-1" smoke grenade launcher in two groups of four, on each side of the gun
IR Signature: INA
Automatic Fire Suppression Systems.: Yes, PPA Fire Suppression System
Zaslon APS: Available
Note: The Explosive Reactive Armor (ERA) protects the T-64 BM Bulat against attacks by 220% and against Kinetic Energy Attacks by 190%

Notes:

The BM “Bulat” started as the Obyekt 447AM-1, this tank presented itself as a modernized version of the T-64BM. After studies of modernization in the early 2000s, work started at the Kharkiv Malyshev Factory design bureau by a first batch of 10 T-64B tanks converted to the BM “Bulat” standard in 2010. These were followed by 19 in 2011 and others in 2012, for a total of 76.

T-72S (Shilden) Iranian Main Battle Tank (MBT)




Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72A:** Second Russian main variant of the T-72.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: T-72S; Shilden

In Service: 1985-present

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons46.5

Ground Pressure: kg/m0.898 kgf/cm2

Automotive

Engine Name: V-84M

Engine Type: Four stroke, liquid cooled diesel engine with a centrifugal supercharger.

Engine Power: hp840

Power to Weight Ratio: hp/ton18.5

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

R-173 Range: km0-20

Radio Reciever: R-173P Radio Receiver

Radio Set: HR R-134

Intercom System: R-174

Tank Navigiation Aids: TNA-4-3 Tank Navigation Aids

Main Gun

↳*System*

Name: D-81 smoothbore Gun

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Note: The 9K120 gun-launched missile complex is a two piece guided missile that is loaded and fired from the main gun in the same way as an ordinary round.

ATGM System Name: 9K120 gun-launched missile complex

Missile Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Onboard Guidance System: Yes

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Hit Probability: %80

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Warhead Type: 9N142 shaped charge warhead

Laser Emitter: 1K13 sight's laser

Maximum Effective Range: m4,000

Minimum Effective Range: m100

Elevation Range (Super Elevation): deg-7 to +20

Elevation Range (Standard Elevation): deg-5 to +15

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650-750

Effective Rate of Fire: rds/min250

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7 Anti-Aircraft Machine Gun

Proliferation: over 1 Million

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Length (Total): mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳***Ammunition***

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, 1K13 sight and aiming complex

Thermal Sight Gunner: Gunner's primary sight is the 1A40-1

Main Gun Stabilization: 2E42-2 (Upgrade)

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Note: The Gunner, using the 1A40-1 sight can designate and engage targets out to a mazimum distance of 4,000 meters with APFSDS and HEAR rounds.

Protection

Hull Armor: Steel and composite armour with additional plates that provide protection equivalent to 950mm of steel against HEAT projectiles, 440mm resistance to KE rounds, and 500mm against shaped charges. The T-72BM also has a additional twelve separate charges of ERA compared to the T-72B.

Turret Armor: Steel and composite armour with ERA, 950 mm against HEAT weapons. The Turret has additional Ceramic or silica inserts to add to the protection level of the T-72BM. Additionally, the T-72BM has arrow-shaped arrays of ERA added to the turret front

Applique Armor: Available, Turret top and track skirts
Explosive Reactive Armor (ERA): Yes, Kontakt-V (UPGRADE). Additional ERA is added to the Turret, Glacis, and sides of the hull.
ERA Explosive Element: 4S22
ERA 4S22 Elements (Plates): ea240
Armor Cassette Type: 4S22 cassette that is filled with an explosive element and steel armoured plate.
Number of total Armor Cassettes: ea200-300
NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).
Active Protection System: Yes, ZETS11-3 Control System
Self-Entrenching Blade: Yes, built in Dozer Blade
Mine Clearing: Yes, Roller and plow (optional)
Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.
Grenade Maximum Effective Range: m200-300
Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.
Engine Smoke Screen Capable: Yes
Exhaust Smoke-Laying System: Yes
Automatic Fire Extinguishing Equipment.: Yes
IR Signature: INA
Note #3: The additional added armor cassettes reduce penetration by as much as 95%.

Notes:

The T-72S Russian Main Battle Tank is a This is export model of the T-72A, upgraded to the T-72BM standard by Nizhny Tagil in Russia. Known also as the "Shilden," the upgrade package reportedly boosts performance by 1.7 percent. It is modified to accept explosive reactive armor. The tank is fitted with a 125mm D-81 smoothbore gun, a 7.62mm co-axial machine gun and a 12.7mm air defence machine gun mounted on the commander’s cupola. The T-72S carries 45 rounds of 125mm ammunition, 22 rounds of which are carried on an automatic loading carousel.

T-90 Russian Main Battle Tank (MBT)





Tiers:



Variants:

- **T-90K:** Commander's version of the T-90, with additional communication (station R-163-50K) and navigation equipment (TNA-4-3)
- **T-90A:** Russian army version with welded turret, V-92S2 engine and ESSA thermal viewer. Sometimes called T-90 Vladimir, in honor of its chief designer Vladimir Potkin
- **T-90AK:** Command version of T-90A.
- **T-90AM:** Latest version of the T-90A.[77] The main features include the modernisation of the old turret design, which is equipped with a new advanced fire control system "Kalina" (with integrated combat information and control systems), a new automatic loader and a new upgraded gun 2A46M-5, as well as a remote-controlled anti-aircraft gun "UDP T05BV-1". The new version also includes the Relikt (Реликт (динамическая защита) ERA bricks instead of the Kontakt-5 ERA bricks.
- **T-90M:** New modernized version of T-90A. It's a program of modernization of Vladimir tanks and will include 400 tanks currently in service. Tanks will receive 2A82-1M gun (same as in T-14) and fire control system Kalina. They will be upgraded with Afghanit APS and Relikt ERA. The upgrades are also aimed at improving network-centric warfare capabilities and coordination with Armata project vehicles. The first contract was signed in 2017 and serial production started in 2018.
- **T-90S:** Export version of the T-90, later adopted by the Russian Armed Forces as the T-90A. These tanks were made by Uralvagonzavod and were updated with 1,000 hp (750 kW) engines made by Chelyabinsk Tractor Plant. These tanks carry a leaner version of the Shtora-1 passive/active protection system which lacks the infra-red dazzlers carried on the turret. Sometimes called T-90C (Cyrillic letter es looks like a Latin c). These were initially supplied with cast turrets of the early T-90, and when stocks were depleted, new, welded turrets were fabricated.
- **T-90SK:** Commander's version of the T-90S, with additional communication and navigation equipment. It differs in radio and navigation equipment and Ainet remote-detonation system for HEF rounds.
- **T-90S:** "Bhishma" – modified T-90S in Indian service.
- **T-90MS:** Also known as T-90SM is an updated version of the T-90S. It is equipped with a 1,130 hp engine, a PNM Sosna-U gunner view. a UDP T05BV-1 RWS with a 7.62 mm machine gun, GLONASS, inertial navigation systems, new Relikt explosive reactive armour (ERA) that covers more of the tank, and a steering wheel. A new removable turret bustle is included, which provides storage for eight additional rounds. The T-90MS is ready for serial production.[88] 4 video cameras provide a 360° view of the environment, while the tank is more connected to command. The T-90MS has an upgraded thermal imager that can detect tanks over 3300 meters away.
- **BREM-1M:** Armoured recovery vehicle.
- **IMR-3M:** Combat engineer vehicle.
- **MTU-90:** Bridge layer tank with MLC50 bridge.
- **BMR-3M:** Mine clearing vehicle.
- **MTU-2020:** Bridge layer tank based on the T-90A whose chassis has been extended, along with the addition of a road wheel.

System

Alternative Designation: T-90

Type: Main Battle Tank

Family: T-90 Family of Main Battle Tanks

Manufacturer: Uralvagonzavod

Generation: 3+

Status: In service

Crew: 3 (commander, gunner and driver)

Passenger Capacity: INA

Maximum Effective Range (Land): km500

Maximum Effective Range (ATGM): m5,000

Note: The T-90 is the most modern tank currently in service with the Russian Army, which has a requirement for around 1 500 of these tanks. Also currently it is the only mass-produced MBT in Russia.

Estimated Service Life: 25-30 years

Estimated out of Service Date: 2030-2040

Dimensions

Length: m9.63

Width: m3.78

Height: m2.2

Weight, Combat: tons46

Ground Pressure: INA

Automotive

Engine Name: V-92S2

Engine Type: V-12 Diesel

Engine Power: hp1,000

Auxiliary Power Unit: Yes

Gas Turbocharger: Yes

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed Maximum Swim: Not Amphibious

Speed, Average Cross: 50

Power to Weight Ratio: hp/tons18.2

Suspension: Torsion bar

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.8

Trench: m2.85

Fording Depth (No Preparation): m1.2

Fording Depth (With Preparation): m5

Fuel Type: Gasoline or Kerosene

Transmission: Mechanical

Fuel Capacity: liters1,200

Communications

↳*R-168-100U*

Name: R-168-100U

Family: AKVEDUK R-168 Series

Type: VHF

Frequency: MHz30-108

Capabilities: FH, Voice, Data

Range: km30-60

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

Automated Control Communication: Yes

Main Gun

↳*System*

Name: 2A46M

Type: 125 mm Smoothbore Gun

In Service: 1970 to present

Weight (2A46 125mm Gun): kg2,675

Length (2A46 125mm Gun): mm6,350

Max Rate of Fire (Autoloader): rds/min7

Max Rate of Fire (Manaul): rds/min2-3

Sustain Rate of Fire: rds/min5-7

Range Finder Type: INA

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Traverse Range: deg360

Loader Type: Carousel-type autoloader

Minimum Cycle time for the Autoloader: seconds6.5

Thermal Sleeve: Light Allow

Bore Evacuator: Yes

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread

Breech Maximum Chamber Pressure: 6,500 bar over the 5,100 bar

Max Cycle time for a Round 180deg from the Start Position: seconds15

Carousel Reloading Time: min15

↳*Ammunition (Option 1)*

Type: 3BM42M/3BM44M, 125mm Armour-piercing fin-stabilized discarding sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s125

Basic Load: 44 Total rounds of any combination of 125mm Projectiles

Effective Range (Day): m2,000-3,000

Effective Range (Night): m2,000-2,600

Armor Penetration: Yes, 590-630mm at a range of 2000m

Shell Weight: kg20.4

Projectile Weight: kg7.5

Charge Weight: kg5.3

Penetration: mm/deg270/60

↳*Ammunition (Option 2)*

Type: 3BM9/3BM10, 125mm Armour-piercing discarding sabot (APDS)

Caliber: mm125

Muzzle Velocity: m/s1,715-1,800

Effective Firing Range: m3,000

Shell Weight: kg19.6

Projectile Weight: kg5.67

Charge Weight: kg5

Penetration: mm/deg140/60

↳*Ammunition (Option 3)*

Type: 3BK12M, 125mm (HEAT)

Caliber: mm125

Muzzle Velocity: m/s905-950

Effective Firing Range: m4,000

Shell Weight: kg29

Projectile Weight: kg19

Charge Weight: kg5

Penetration: mm/deg220/60

↳***Ammunition (Option 4)***

Type: 3OF19, 125mm (HE)
Caliber: mm125
Muzzle Velocity: m/s760
Effective Firing Range: m4,000
Shell Weight: kg33
Projectile Weight: kg23
Charge Weight: kg5.0
Penetration: mm/degINA

Anti-Tank Guided Missile

↳***System***

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)
Type: Laser Beam Anti-Tank Guided Missiles
In Service: 1980's to present
Manufacturer: Degtyarev plant
Cost: $37,500
Mass: kg17.2
Diameter: mm125
Basic Load: ea6
Warhead Type: Tandem hollow-charge
Warhead Weight: kg4.5
Max Rate of Fire: INA
Operational Range: m4,000-5,000
Speed: Subsonic
Guidance System: Laser Beam Riding
Launch Platform: 125 mm smoothbore guns
Variants: 9M119M

Tank Commander's Weapon System

↳***System***

Name: 12.7mm Kord Heavy Machine Gun,
Type: 12.7mm Heavy Machine Gun
Manufacturer: V.A. Degtyarev Plant
Cartridge: 12.7×108mm

In Service: 1998-Present

Weight: kg25.5

Length: mm1,980

Max Rate of Fire: rds/min650-750

Sustain Rate of Fire: rds/min550-600

Action: Gas-operated, rotating bolt

Feed System: 50-round linked belt

Sights: Iron Sights

Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

↳***Ammunition***

Cartridge: 12.7×108mm

Caliber: mm12.7mm

Muzzle Velocity: m/s860

Basic Load: ea300

Effective Range: m2,000

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Sustain Rate of Fire: rds/min500

Range Finder Type: INA

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳ ***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: No

Thermal Sight Gunner: No

Panoramic Commander's Sight: No

Main Gun Stabilization: Yes, 2E42-4 Zhasmin System

Note: The Fire Control System is outdated and is from the late 1990s.

Protection

Hull Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Turret Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Applique Armor: Available

Explosive Reactive Armor: Yes, Kontakt-5 explosive reactive armor blocks, equivalent to up to 500mm of steel armor

Active Protection System: Yes, the Shtora-1 countermeasures system

Mine Clearing: INA

Self-Entrenching Blade: Yes

NBC Protection: Yes, GO-27 PRKhR radiation and chemical agent detection system.

Deep Wading Kit: Available

Jammer: Yes, TShU1-7 IR jammers located either side of the main gun

Laser Radiation Sensors: Yes

IR dazzlers: Yes

Nakidka Signal Reduction Kit: Available

Smoke Equipment: Yes, banks of 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

Fire Suppression System: Yes, the Raduga-2 fire-suppression system

Notes:

The T-90 is a third-generation Russian battle tank that entered service in 1993. The tank is a modern variation of the T-72B and incorporates many features found on the T-80U. Originally called the T-72BU, but later renamed to T-90, it is an advanced tank in service with Russian Ground Forces and the Naval Infantry. The T-90 uses a 125 mm 2A46 smoothbore main gun, the 1A45T fire-control system, an upgraded engine, and gunner's thermal sight. Standard protective measures include a blend of steel and composite armour, smoke grenade dischargers, Kontakt-5 explosive-reactive armour and the Shtora infrared ATGM jamming system. It was designed and built by Uralvagonzavod, in Nizhny Tagil, Russia. Since 2011, the Russian armed forces have ceased any further orders for the T-90, and are instead increasing their numbers of the T-14 Armata that began production in 2016. Variants T-90: Successor to T-72BM, originally called T-72BU, with fire control and armor upgrades similar to those on the T-80U. Despite using the lower cost T-72 chassis, this tank incorporated more recent components than the T-80U and is in some ways superior. The original tank had an II night sight, not the thermal sight upgrade, and the under-powered 840hp engine. Upgrades have been added. T-90A: originally known as T-90SM or T-90M, it is now accepted for Russian service as the standard tank. T-90MS: export variant: improved armor protection and ERA; remote control weapon station on turret rook with 12.7 mm MG; traverse forward 316 degrees; elevate -10 to +45 degree. Improved fire control system for engagement of stationary and moving targets while tank is moving. TC panoramic sight for TC-gunner display linked to laser rangefinder; thermal and 4 television camera-each 95 degree wide/45 degree elev. Improved battle management and land navigation tracking system. External auxiliary diesel power unit for fuel conservation. Some reserve main gun ammo in bustle with blowout panels. Turret and hull rear with bar (lourve) armor; anti-laser warning and protection. 125 mm main gun improved accuracy with 2A46M-5 rather than previous 2A46M in T-90s. T-90S: export variant with option for upgrades. Several subsystem changes, such as upgraded FCS, new engine, removal of SHTORA-1, etc., have been added based on customer preferences, and are included in export versions of the tank. Some early T-90S have been upgraded to this standard. Most of these are being sold to India, with the 1,000hp engine upgrade, and with addition of air conditioning. T-90SK: T-90S command variant Bhishma: Indian variant produced from T-90A knockdown kits. It does not use the SHTORA-1 IRCM system. Engine is T-90A upgrade. The tank is sometimes erroneously called T-90S. Various stages of upgrades will be employed in Indian forces. Russia has provided T-90S tanks with Indian intent to upgrade almost all of its T-90 and T-90S remaining versions in knock-down kits with upgrades to meet the Bhishma standard. An issue remains of no air conditioning system in some export MBT to India cause overHEATing of system components and debilitating environment for tank crew in some environments. Project Rhino: most T-90 and T-90S tanks imported by India to be upgraded as Bhishma under this program and agreement with Russia. Other upgrade versions of the T-72 include features of the T-90A such as the improved gun stabilization, improved fire control system, improved engine, and improved ammunition such as the Ainet and the Invar. Other tanks which provide similar capabilities are the Ukrainian T-72AG and T-72mp. The Czech T-72CZM4 also has a 2nd generation thermal sight. Recent Russian tank upgrade packages for the T-72 are the T-72M1, and the T-72M1M. The above Russian upgrades are for modernizing older tanks, versus T-90/T-90A, which are newly produced tanks. Upgraded T-80U, T80UK, and T-84 tanks also have similar capabilities. Weapons & Ammunition Types And Typical Combat Load 125-mm smoothbore gun (est): 43 APFSDS-T: 14 HEAT-MP/HEAT: 3 Frag-HE: 12 Focused Frag Ainet (available) :8 ATGM: 6 Main Armament Ammunition Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000-4,000 Max Effective Range (m): Day: 3,000-4000 Night: 2,600 Armor Penetration (mm KE): 590-630 at 2,000 meters 125-mm HEAT-MP, BK-29m Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: 2,600 Armor Penetration (mm CE): 650-750 it has some HE effects similar to Frag-HE rounds against personnel and materiel targets. 125-mm HEAT, BK-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 3,000+ Night: 2,600 Armor Penetration (mm CE): 700-800 125-mm HE-shrapnel Focused-Fragmentation, Ainet Maximum Aimed Range (m): 5,200 Max Effective Range (m): Day: 5,000 Night: 2,600 Tactical AA Range: 4,000-5,000 Armor Penetration (mm): can defeat IFV and APC 125-mm Frag-HE-t, of-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 5,000 Night: 2,600 Armor Penetration (mm): can defeat IFV and APC. A near miss will seriously damage or destroy most IFVs and APCs. Other Ammunition Types: French Giat 125G1 APFSDS-T, Russian BM-42 and bm-32 APFSDS-T. Note: the Russians may have a version of the BM-42M with a DU penetrator. Russian BM-48 APFSDS-T penetrates 650-700 mm Sokol-1 Guided Antitank Round Antitank guided missiles: AT-11B/INVAR Warhead Type: tandem shaped charge (HEAT) Armor Penetration (mm CE): 900, 850 behind ERA Range (m): Day: 5,000 Night: 2,600 AT-11/Refleks: missile with Frag-HE warhead to 5,000 m Notes T-90AM: the Russian military decided against T90A for its forces. In SEP 2011, they displayed T-90AM as a deep modernization of T-90A. They include a low-profile turret with a bustle autoloader and blow-out panels. The new 2a82 gun fires a longer (700+ mm est) and heavier APFSDS-T round to 3,500+ m. The original version of the tank has an 840-hp diesel engine. The engine in subsequent models is upgraded. Engine options include 950, 1,000 and 1,100 hp. The original tank had an II sight from the T-80 series (Buran-PA, 800-1300 meters range). However, marketing materials feature the Agava-2 thermal sight. Recent Gen3 sights are available. These night sights permit night launch of ATGMs. Relikt 3d gen ERA is offered to replace Kontakt-5 in several upgrade packages, or as a separate upgrade. The ERA adds up to 600 mm CE protection and 300 mm KE to turret base armor protection, or about 150 mm more than Kontakt-5. Active protection systems. Arena APS is available. Defensive aides suite is Shtora-1 (laser warning receiver with gun auto-slew, LWR-directed smoke grenade launchers, and EO-IR jammer), or partial package excluding IR jammers. None is on Bhishma. The Shtora-1 IR ATGM countermeasure illuminators can be detected with night sights. Shtora-1 has no effect against most modern ATGM systems, with encoded tracker beacons. Exclusion of Shtora-1 offers more ERA on the turret front and reduces costs. Protection probably includes radar-absorbent materials and IR-resistant

paint. The T-90 may be fielded with full Shtora-1 package (laser warning receiver with auto-slew gun capability, LWR-directed smoke grenade launchers, and EO-IR jammer), with a partial package, or without Shtora-1. Shtora-1 illuminators can be used for night illumination. An improved gun, 2A46M-4, with improved accuracy and use life is available for fitting to the T-90. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. The BK-27 HEAT round offers a triple-shaped charge warhead and 50mm more penetration. The 12.7-mm MG NSVT has both remote electronically operated sight PZU-5 with vertical stabilization, night acquisition, and a gun-mounted K10-T reflex sight.

M48 Patton American Main Battle Tank (MBT)







Tiers:



Variants:

- **M48:** M48: Differed from the M47 in having yet another new turret design and a redesigned hull, doing away with the bow machine gun position, featuring the M41 90 mm gun. These turrets give the M48 its distinctive non-M26 style look. Originally, the gun featured a Y-shape muzzle brake, but this was changed to the more characteristic T-shape.
- **M48C:** M48C: Over a hundred original production hulls were found to be lacking correct ballistic protection and were relegated to training as the M48C.
- **M48A1:** M48A1: New driver hatch and M1 commander's cupola, allowing the M2HB .50 caliber machine gun to be operated and reloaded from within the vehicle.
- **M48A2:** M48A2: Improved powerpack and transmission, redesigned rear plate, and improved turret control.
- **M48A2C:** M48A2C: M48A2s with an improved rangefinder, M17, new ballistic drive and bore evacuator for the main gun, and the auxiliary tensioning wheels were deleted.
- **M48 AVLB:** M48 AVLB: M48A2 chassis, fitted with a scissors-type bridge. All later upgraded to A3 standard.
- **M48A3:** Refit of M48A1 through M48A2C models to diesel engines and a new fire control system. 1,019 converted.
- **M48A3 Mod. B:** M48A3 Mod. B: Additional armor on the exhausts and tail lights, and a raised commander's cupola.
- **M48A4:** M48A4: upgrade proposed 15 October 1966 by Chrysler Defense, mating the T95E5 turret of the original variant of the M60 series tank to the M48A3 hull. Used by Israel in some Magach 3 variants.
- **M48A5:** M48A5: Up-gunned with the 105 mm M68 gun. 2,069 converted.
- **M48A5E1:** M48A5E1: New laser rangefinder, digital fire-control system, improving night vision system.
- **M48A5PI:** M48A5PI: M1 cupola replaced by the Israeli Urdan model.
- **M67 "Zippo":** M67 "Zippo": M48 armed with a flamethrower inside a dummy model of the main gun with a fake muzzle brake. Named after a popular brand of cigarette lighter.
- **M247 Sergeant York::** M247 Sergeant York: This self-propelled anti-aircraft gun, cancelled in 1985 before it was deployed, used the M48A5 chassis.

System

Alternative Designation: M48 Patton
Type: Main Battle Tank
In Service: 1953-Present
Crew: 4 (commander, gunner, loader, driver)

Dimensions

Length, Hull: 6.42 m

Length, Gun Forward: 9.31 m

Width: 3.63 m

Height: 3.09 m

Track, Length on Ground: 4.00 m

Track, Width: 0.71 m

Ground Clearance: 0.41 mm

Ground Pressure: 0.88 kg/cm sq

Weight, Combat: 48,987 kg

Weight, Unloaded: 46,287 kg

Automotive

Engine Name: 1 x Teledyne Continental AVDS-1790-2D 1,790-cu in (29.3-liter) air-cooled

Engine Type: V-12 Diesel

Engine Power: 750 hp at 2,400 rpm

Range: 499 km

Speed, Maximum Road: 48 kph

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 60%

Vertical Obstacle: 0.92 m

Trench: 2.59 m

Fording Depth, without Preparation: 1.22 m

Fording Depth, with Preparation: 2.44 m

Main Armament

↳*System*

Name: M68

Type: 105mm Rifled Gun

Caliber: 105mm

Length: 5,550 mm

Barrel Length: 50 Calibres

Weight: 1,128 kg

Fume Extractor: Yes

Elevation: -9 deg to 19 deg

Traverse: 360 deg

Maximum Firing Range: 4,000 m

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm105

Shell: INA

Shell Weight: INA

Basic Load: 54 Rounds

Coaxial Weapon System

↳*System*

Name: M73 Machine Gun

Type: Medium Machine Gun

Caliber: 7.62mm

Quantity: 1 x 7.62mm M73 machine gun

Manufacturer: United States

Proliferation: The M73 and M219 are 7.62 mm NATO caliber machine guns designed for tank use. NATO no longer uses them, but they were used on the M48 Patton and M60 Patton MBT series (including the M728 Combat Engineer Vehicle), and on the M551 Sheridan Armored Reconnaissance / Airborne Assault Vehicle (AR/AAV).

In Service: 1959-1990s

Length: 1,219.2 mm

Barrel Length: 609.6 mm

Weight: 14.1 kg

Rate of Fire: 500-625 round/min

Action: Recoil-operated/short-recoil operation with gas assist

Muzzle Velocity: 853.44 m/s

Maximum Firing Range: 3,657.6 m

Effective Firing Range: 899.8 m

Feed System: Belt Feed, left or right hand

Sight: INA

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 2,000 Rounds

Auxiliary Weapon System

↳*System*

Name: M60D

Type: 7.62mm

Caliber: General-Purpose Machine Gun

Quantity: 2 x 7.62mm M60D Machine Gun

Manufacturer: Saco Defense U.S. Ordnance

Proliferation: Widely Proliferated

In Service: 1957-Present

Length: 1,105 mm

Barrel Length: 560 mm

Weight: 10.5 kg

Action: Gas-operated, short-stroke gas piston, open bolt

Rate of Fire: 550–650 RPM

Muzzle Velocity: 853 m/s

Effective Firing Range: 1,100 m

Feed System: Disintegrating belt with M13 Links

Sights: Iron sights

Note: The M60D is a mounted variant of the standard M60. It can be mounted on boats, vehicles and as a pintle-mounted door gun in helicopters. When used in aircraft, it differs from the M60C in that it is not controlled by the pilot—rather, it is mounted in a door and operated by a member of the crew. Like the rest of the M60 family, it is an air-cooled, gas-operated, belt-fed weapon. Unlike other models, however, the M60D normally has spade grips and an aircraft ring-type sight or similar, as well as an improved ammunition feed system. A canvas bag is also affixed to the gun to capture ejected casings and links, preventing them from being sucked into the rotor blades or into an engine intake. The M60D was equipped on the UH-1B Huey (using the M23, XM29, M59, and the Sagami mounts), the CH-47 Chinook (using the M24 and M41 mounts) in both door and ramp locations, the ACH-47A "Guns-A-Go-Go" variant of the Chinook (using the XM32 and XM33 mounts), and on the UH-60 Black Hawk (using the M144 mount). The M60D is also used by the British on Royal Air Force Chinooks. In US service, the M60D has been primarily replaced by the M240H. The M60D is still manufactured by U.S. Ordnance and still used on the SH-60 Seahawk.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 3,000 Rounds Each

Fire Control

Name: INA

Computerized FCS: Yes, The fire control system included a rangefinder, mechanical ballistic computer, ballistic drive, and

gunner's periscope. Collectively, these mechanical devices resembled in miniature the fire control systems used in naval gunnery. Only after the Second World War did such systems become small enough for use in combat vehicles. These mechanical fire control systems permitted tanks to engage effectively at much longer ranges than in World War II, a critical consideration for the Army, expecting to enter the European battlefield outnumbered. Instead of a gunner's sight being slaved to the gun tube, the ballistic computer and drive computed the range and elevated the gun. The gunner's primary responsibility lay in keeping the sight on the target.

Thermal Sight Tank Commander: thermal sights (Taiwanese and Turkish M48s only)

Infrared: driving lights and searchlights

Main Gun Stabilization: INA

Rangefinders: There are two basic types of optical rangefinders, stereoscopic and coincidence. With a stereoscopic model range determination occurred by measuring the distance from the observer to a target using the observer's capability of binocular vision. The coincidence rangefinder uses a single eyepiece. Light from the target enters the rangefinder through two windows located at either end of the instrument. The ARCOVE emphasis upon increased long range accuracy led to the incorporation of a fire control system (FCS) in the M48.

Ballistic Computer: M13 electro-mechanical ballistic computer. The mechanical ballistic computer made a more accurate computation of range possible by mathematically accounting for such factors as vehicle cant and ammunition type. Many developmental range finders based on pulses of IR light, such as the OPTAR rangefinder of the T95 continued into 1957.

Protection

Hull Armor: hull front: 101/120 mm hull sides: 76 mm hull rear: 44 mm hull top: 57 mm

Turret Armor: turret front: 110 mm turret sides: 76 mm turret rear: 50 mm turret top: 25 mm

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: limited protection

Smoke Equipment: M339 smoke grenade dischargers; engine smoke-laying system

Notes:

The M48 Patton is an American first generation main battle tank (MBT) introduced in February 1951. It was designed as a replacement for the M26 Pershing, M4 Sherman variants and M46 Pattons used in the Korean War, and as the successor to the M47 Patton. Nearly 12,000 M48s were built, mainly by Chrysler and AlCo, from 1952 to 1961. The M48 underwent many design modifications and improvements during its production life. This led to a wide variety of suspension systems, cupola styles, power packs, fenders and other details among individual tanks. The early designs, up to the M48A2C, were powered by a gasoline engine. The M48A3 and A5 versions used a diesel engine, however gasoline engine versions were still in use in the US Army National Guard through 1968 and through 1975 by many West German Army units. Numerous examples of the M48 saw combat use in various Arab–Israeli conflicts and the Vietnam War. Beginning in 1959, most American M48A1s and A2s were upgraded to the M48A3 model. The M48 Patton-series saw widespread service with the United States and NATO until it was superseded by the M60 tank as well as being widely exported. The tank's hull also developed a wide variety of prototypical, utility and support vehicles such as armored recovery vehicles and bridge layers. Some M48A5 models served into the mid-1980s with US Army National Guard units, and were used as targets for weapons and radar testing into the mid-1990s. Many M48s remain in service in other countries though most of these have been highly modified and had their firepower, mobility and protection upgraded to increase their combat effectiveness on the modern battlefield. The Turkish Army has the largest number of modernized M48 MBTs, with more than 1,400 in its inventory. Of these, around 1,000 have been phased out, placed in storage, or modified as armoured recovery vehicles. Chrysler began building the new Newark Tank Plant in Newark, Delaware in 1951 to produce the M48 while Chrysler Defense Engineering and ARCOVE continued advanced production engineering (APE) to evolve the design using the T48 prototypes at the OTAC Detroit Arsenal. In May 1952 Chrysler came to an agreement to take control on a Government Owned and Contractor Operated (GOCO) basis of the Newark Tank plant production facility with the US Government and to continue production design refinement of the T48 at the OTAC Detroit Arsenal. The first Chrysler production tank was unveiled on 1 July 1952 as the 90mm Gun Tank M48 and christened the M48

Patton by Mrs. Beatrice Ayer Patton, wife of the late General George S Patton.[28] To meet the urgent need for tanks, production contracts were also awarded to General Motors and Ford Motor Company to produce the tank in Michigan starting in 1952. Also in July 1952 the Army awarded American Locomotive Company a $200 million contract to start producing the tank in 1953 at the Schenectady Tank Plant in New York. All four companies were given initial production contracts in that same year for around 400 tanks each. The M48 featured a gasoline-powered engine, different models were used depending on availability and manufacturer. Originally the M48(Mod A) was built at the Chrysler Defense using the Continental AV-1790-5B coupled to a General Motors CD-850-4A or 4B cross-drive transmission as used for the M47. The M48(Mod B) used a Continental AV-1790-5C gasoline engine and either an Allison CD-850-4A or 4B cross-drive transmission. Most of these were built by the American Locomotive Company. Additionally a two-cylinder, gasoline, air-cooled engine (sometimes referred to as the "Little Joe" by tank crews) was provided to power a 28 volt, 300 ampere generator when the main engine was not needed. Fuel capacity was 200 gallons providing a cruising range of about 70 miles (110 km). The suspension consisted of six roadwheel pairs with a torsion bar suspension system and five return rollers. There was a dual compensating idler arm at the front, and dual auxiliary track tension wheels behind the last road wheels, using the T97E2 track assembly as were the previous M46 and M47 tanks. It had hydraulic shock absorbers mount on the first, second and sixth roadwheel pairs (opposite of the M46 and M47). The bow mounted machine gun and its related crew station was eliminated thus providing more ammunition storage for the main gun. The driver's station was moved to the front center of the hull. The steering controls were redesigned. A large aircraft-styled steering wheel (replacing the wobble stick control of the M46 and M47) and placing the transmission range selector on the floor to the driver's right. Mod A hulls had a small oval overhead hatch for the driver. It incorporated a mechanism that dropped his three periscope heads to provide clearance for the hatch door as it swung to the right, and the driver then had to reposition the periscopes by hand once the hatch was closed again. The vehicle did not have an NBC protection system for the crew and a fording depth of approximately 1.2 meters. The M48's turret consisted of a redesigned flat gun shield and standard pop-up hatch for the commander's station. The M48 Mod A turret design had a smaller roof hatches for both the commander and loader. A .50cal M2HB using a M1 remote control mount on a pedestal was available for the commander. When not in use, the machine gun mount could be stowed on a bracket welded to the turret roof in front of the loader. The M48's direct fire control system consisted of an M12/T41 stereoscopic rangefinder with a field of view of 5 degrees and magnification of x7.5, an azimuth indicator, an M20 gunner's periscope and a T13 superelevation actuator. Two main bearings are bolted to the mounting plate on the roof of the tank turret to support the range finder on steel radial ball bearings. A parallel gun linkage between the gun trunnion and the range finder assures that the line of sight of the range finder reproduces the exact motion of the gun in elevation. A .30 caliber M1919E4 machine gun was coaxially mounted to the main gun's right and was operated by the gunner. An M12 full field optical range finder was used, the same as the M47. The tank was not fitted with any night fighting or computerized fire control systems. It featured the 90 mm T139 main gun using a Y-shaped muzzle brake on the barrel and carried 53 rounds. Eight ready rounds were stored in the left side of the turret bustle for the loader, the rest were stored inside safe containers in the hull. Tank crews complained that the Y-shaped fume extractor was found to be prone to snagging brush. It was replaced with a T-shaped model early in production. These early M48 tanks suffered from engine, transmission, track, and suspension problems. The M12 rangefinder was too fragile and often broke. Army Field Forces (AFF) found these tanks to be unsuitable for combat use in Europe and was regulated to limited use by US Army CONUS units until numerous shortcomings were corrected. Furthermore, some 120 hulls were found to have insufficient hull armor. These were denoted as the M48C and relegated to the United States Army Training and Doctrine Command (TRADOC) for non-ballistic training use by the Armor School at Fort Knox to train crewmembers and maintenance personnel.

T-80B Russian Main Battle Tank (MBT)





Tiers:



Variants:

- **T-80 (1976):** Initial model, with 1,000-hp gas turbine engine, coincidence rangefinder, and no missile capability. This model does not have fittings for explosive reactive armour. The turret is from the T-64A, and thus retains the use of the old coincidence rangefinder. Characteristics of this type are the V shaped water deflector on the front glacis, coincidence rangefinder in front of the commander's cupola, and Luna searchlight mounted in the same position as a T-64. Around 250 were produced, as the tank's armour was essentially obsolete when introduced. Turret vs APFSDS – 380 mm, hull vs APFSDS – 500 mm (without reactive armour). This was, in effect, a pre-production model. It reportedly was fitted with an early version of the Shtora APS.
- **T-80BV (1985):** T-80B with explosive reactive armor Kontakt-1
- **T-80UM::** Russian version, with new Buran thermal imaging sight in place of the Luna IR.
- **Object 219A: Early T-80U (Object 219AS) variant:** It has the T-80U's turret, but not the Kontakt-5 ERA. Instead, it uses the old Kontakt-1/3 system; some 219As did not have ERA at all. Often misnamed T-80A. T-80U (1985): Further development with a better turret, Kontakt-5 explosive reactive armour, improved gunsight, and 9M119 Svir missile system. In 1990 a new, 1,250-hp, engine was installed. Overall protection with Kontakt-5 against APFSDS/HEAT is 780/1,320 mm RHAe.9K119M with antitank guided missile 9M119M installed since 1990. Some of the tanks in commander version (T-80UK) equipped with Shtora-1 APS, and thermal imaging night sight TO1-PO2T (detection range / target classification range = 6,400/4,600 meters at night). Basic thermal night sight of the T-80U is within the limits of 1,750/1,500 meters
- **T-80UD Bereza (1987):** Ukrainian diesel version with 1,000-hp 6TD engine and remote-controlled antiaircraft machine gun
- **T-84 (1999):** Further Ukrainian development of T-80UD with 1,200-hp diesel and new welded turret
- **T-80BVD (2002)::** KMDB's upgrade standard for Ukrainian T-80BVs. Changes include the 6TD diesel engine, remote-controlled commander's machine gun, and better optics. None were produced.
- **T-80UM2/Black Eagle (prototype: cancelled)::** Several Russian prototypes were shown at trade shows, with a longer chassis and extra pair of road wheels, and very a large turret with separate ammunition compartment
- **T-80BVM (2017):** Up to 3,000 units, installed "Relikt" ERA, PNM Sosna-U gunner sight (as in the T-90, T-72B3), the improved 125mm gun 2A46M-4, the upgraded gas turbine engine and the upgrades of various other systems. More than 120 already in the service.

System

Alternative Designation: T-80B

Total Built: The T-80B is the first variant produced in quantity. Russia: 5,391

Type: Main Battle Tank

Family: T-80 Series

Crew: ea3

Maximum Effective Range (Road): km335

Driver's Vision Blocks: ea3

Dimensions

Length (Gun Forward): m9.65

length (Hull): m6.98

Width: m3.58

Height: m2.22

Weight, Combat: tons43.7

Ground Pressure: kg/mINA

Automotive

Engine Name: GTD-1000T

Engine Type: Gas turbine engine

Engine Power: hp1,100

Power to Weight Ratio: hp/ton25.8

Cruising Range: km335

Speed, Maximum Road: km/h70

Speed, Average Cross: 55

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m1

Trench: m2.85

Fording Depth (No Preparation): m1.8

Fording Depth (With Preparation): m5

Cold Start Ability: Yes

Deep Water Snorkel: Available

Communications

↳*R-173*

Frequency Range: MHz30.00 - 75.99

HF Output: W30

Modulation: FM

Display: Digitial

Entry of Frequency: Keypad

Present Channels: 10

Digital Transmition: KBaudINA

Sensitivity: uV1.5

Range: km50

Operational Voltage: V27+-2

Weight: kg43

Size: mm428 × 222 × 238

↳*Receiver R-174/GRR-5*

Main Principle: Superhet with RF-stage; ZF/IF 455 kHz; 2 AF stage(s)

Wave Bands: Wave Bands given in the notes.

Loudspeaker: Permanent Magnet Dynamic (PDyn) Loudspeaker (moving coil)

Dimensions (WHD): mm307 x 335 x 206

Net Weight: kg27.7

Note: Receiver for mobile purposes, 1.5 - 18 MHz in four ranges, AM/CW (BFO), 200 kHz xtal calibrator. Set compartment (CY-615/URR) consists of two chassis: model R-174/GRR-5 receiver and model PP-308/URR power supply plus speaker unit. Tubes only one times listed.

Main Gun

↳*System*

Name: L48 2A46M-1 Smoothbore Cannon

Type: 125 mm smoothbore Gun

Manufacturer: Spetstekhnika Design Bureau

Max Rate of Fire: rds/min6-8

Maximum Range: m4,000

Manually Load Time: rds/min1-2

Maximum Elevation: deg+14

Minimum Elevation: deg-5

Traverse Range: deg360

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Evacuator Type: Central Bore

Thermal Sleeve: Yes

Barrel effective Full Life Charge: rds800

Breech Mechanism: Semi-automatic horizontal sliding breech block

Mazimum Pressure: bar5,100

Loading System: Korzina electric and hydraulic automatic loading system

Carousel Reloading Time: minutes13-15

Note: The L48 2A46M-1 It has been extensively developed into 10 different variations and remains the primary armament of Russian frontline tanks.

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Maximum Effective Range: m5,000

Armor Penetration: INA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Weight: kg11

Projectile Dimesnion: mm900

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)
Name: 3VBK27/3BK31 "Start"
Caliber: mm125
Basic Load: 36 total rounds of any 125mm Russian Projectiles
Muzzle Velocity: m/s915
Max Dispersion: INA
Maximum Effective Range: m3,000
Charge: INA
Charge Weight: kg1.62
Projectile Weight: kg18.4
Armor Penetration: Estimated at 800 mm triple charge HEAT
Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)
Type: SACLOS Anti-Tank Missile System
Caliber: mm125
Manufacturer: KB Tochmash
In Service: 1976-present
Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan
Weight: kg23.2
Effective Firing Range: m100-4,000
Guidance System: SACLOS Radio
Warhead Weight: kg4.5
Muzzle Velocity: m/s125, which increases to 800m/s at its peak
Flight Time to a 4,000 Meter Targetsec: 9-10
Armor Penetration: 600mm of RHA
Hit Probability: %80
Variants: 9M112M, 9M112M2, 9M124
Note: Fired from the T-64 and T-80 Family of Russian Tanks

Coaxial Weapon System

↳***System***

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)
Type: 12.7mm Anti-Aircraft Machine Gun
Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia
Weight (Gun Only): kg25
Muzzle Velocity: m/s845
Max Rate of Fire: rds/min700-800
Weight (On Tripod): kg41
Weight (50-Round Belt): kg11
Length (Total): mm1,560
Action: Gas Operated
Feed System: 50-Round Belt
Sights: Iron Sights

↳***Ammunition***

Type: Rifle
Caliber: mm12.7
Cartridge: 12.7×108mm
Muzzle Velocity: m/s845
Basic Load: ea500
Effective Firing Range (vs. Air Targets): m1,500
Effective Firing Range (vs. Ground Targets): m2,000

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: 7.62mm Machine Gun
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
Manufacturer: Degtyaryov plant
In Service: 1961-present
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Total): mm1,203
Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,250

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: 1A33 FCS

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, the T01-KOIR

Commander Day Mode Sight: 10^0 FOV and ×5 magnification

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, 2E26M electro-hydraulic dual plane stabilisation system

Main Gun Stabilization Deployment Time: minutes2

Range, Day Sight: m1,000

Range, Thermal Sight: m2,600

IR Searchlight: Yes, L-4A "Luna" IR Searchlight

TNPO-160 Periscopes: ea2

TNPA-65 Periscopes: ea2

Protection

Hull Armor: mm440–450

Armor Type: The T-80B is protected by a third iteration Soviet laminate armour that is known as Combination K

Turret Armor: Protection equivalent to 550mm

Applique Armor: Yes, Hull side; track skirts

Explosive Reactive Armor: Yes, Kontakt-1 System

Active Protection System: Arena Available

Mine Clearing: Roller-plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, ZETS-11-2 detection system collective overpressure system

Smoke Equipment: Yes, two banks of four 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Smoke Grenade Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

IR Signature: The exhaust is box-shaped and designed to direct heat away from the tank

Anti-Radiation Material: Installed as a inside protective layer

Personal Breathing Apparatus: Equipment

Automatic Fire Extinguisher System: Yes

Notes:

The T-80B is a front-line combat vehicle which combines operational mobility and tactical offensives and defensive capabilities. This variant features the 9K112 Kobra missile system. It also has improvements to the computerized fire-control system, including a laser rangefinder. The T-80B main battle tank is a further development of the original T-80, which was produced only in small numbers. The T-80B is the first variant produced in quantity. Small scale production of this tank commenced in 1978. At least 5,391 T-80B and improved T-80BV tanks were produced. Due to expensive maintenance the Russian Army planned to retire all T-80 series tanks by 2015. However in 2017 upgraded versions of this tank was publicly revealed. Protection of the T-80B was improved comparing with the T-80. The tank is fitted with a composite armor at the front of the hull and turret. Its hull provides protection equivalent to 570-820mm of Rolled Homogeneous Armor (RHA) against armor piercing rounds, depending on the projectile type. Turret provides protection equivalent to 420-760mm or RHA. This tank is fitted with NBC protection and fire suppression systems. The original T-80B tanks lacked explosive reactive armor, which was fitted to improved models and were painted olive drab. Fording depths (m): 12.0 with BROD-M system. The night sight cannot be used to launch the ATGM. The day sight can be used at night for launching ATGMs if the target is illuminated. A variety of thermal sights are available. They include the Russian Agava-2, French Sagem-produced Alis and Namut sight from Peleng. There are thermal sights available for installation, which permit night launch of ATGMs. The 12.7mm MG NSVT has both remote electronically operated sight PZU-5 and gun-mounted K10-t reflex sight. The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armor and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round, has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for FRAG-HE (as with NATO countries) or complement FRAG-HE-he. With three round (APFSDS-T, HEAT-MP, ATGMs) in the auto loader versus four, more antitank rounds would be available for the higher rate of fire. The ATGM may be launched while moving slowly. The AT-8 can be auto-loaded with the two halves mated during ramming; but the stub charge is manually loaded. The GTA-18A auxiliary power unit is used when the engine is off

T-64BV Russian Main Battle Tank (MBT)




Tiers:

1 2 3 4

Variants:

- **T-64A:** Production version of base tank. Tank has a history of reliability problems, and lacks the high armor protection, track skirts, a fcs and atgm launch capability for t-64b.
- **T-64BK:** Command tank version, with 10-m whip antenna.
- **T-64B1:** Variant has partial era mounted; the few original t-80s retained were upgraded to this standard
- **T-64B:** T-64B or 447A (1976) – Fitted with redesigned armour, 1A33 fire control system, 9K112-1 "Kobra" ATGM system (NATO code "AT-8 Songster"), TPN-1-49-23 sight, 2A46-2 gun, 2E26M stabiliser and 6ETs40 loader. Later B/BV models have more modern systems 1A33-1, TPN-3-49, 2E42 and a 2A46M-1 gun. From 1985 the T-64B was fitted with stronger glacis armour; older tanks were upgraded with a 16-mm armour plate. Tanks, equipped with the 1,000 hp 6DT engine are known as T-64BM.
- **T-64U/T-64BM2:** Upgrade series marketed by ukrainian malyshev in 2001. T-64u prototype featured 2nd gen era, composite armor, and fire suppression equipment. Variant added t-80u fire control (1a42 gunner day sight) and thermal night sight-permits it to replace rf-guided at-8/kobra atgm with better refleks series (svir/invar) laser-beam rider atgms. Ukrainian-developed lbr-guided atgm kombat similar to refleks. A later variant changed the fcs to t-80ud/t-90 type, with 1a45 day sight, and agat thermal night sight
- **BM BULAT:** This 45 mt upgrade variant is currently being advertised. It includes an 850-hp engine, fcs with 1g46m lrf-based sight and catherine-based thermal night sight. Remote fired 12.7-mm mg and 5,000 m

System

Alternative Designation: T-64BV
Total Built: +6,000 total
Type: Main Battle Tank
Family: T-64 Family
Crew: ea3
Passenger Capacity: INA, IT"S A TANK
Maximum Effective Range: km600
Note: The T-64 became the primary MBT of Soviet forces until it was replaced by the T-80 and T-72.

Dimensions

Length (Gun Forward): m9.23
Length (Hull): m6.54
Width: m3.41
Height: m2.17

Weight, Combat: tons42

Ground Pressure: kg/mINA

Automotive

Engine Name: 5TDF Diesel

Engine Type: Diesel

Power to Weight Ratio: hp/ton16.6

Engine Power: hp700

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.72

Fording Depth (Without Preparation): m1.4

Fording Depth (With Preparation): m5

Main Gun

↳*System*

Name: D-81T (aka 2A46)125 mm smoothbore gun

Type: 125 mm smoothbore

Max Rate of Fire: rds/min8

Manual Load Time: rds/min1-2

Weight (Barrel): kg1,073

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Elevation: Deg+14

Minimum Elevation: Deg-6

Traverse Range: Deg360

Automatic Loader: Yes

Thermal Sleeve: Yes

Evacuator Type: central bore evacuator

Effective Full Charge (EFC) Life: rds600

Breech Type: semi-automatic horizontal sliding breech block

Loading System: Korzina electric and hydraulic automatic loading system

Carousel: The carousel can accommodate 28 two-piece rounds of ammunition, and rotates automatically after each round is fired

Carousel Load Time: min13-15

Basic Load Time: min27

Rate of Fire: rds/min6-8

↳*Ammunition (Option 1)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot ((APFSDS))

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Effective Range: m2,000-3,000

Maximum Range: m4,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Effective Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Proectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

Ammunition (Option 1)

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 36 Total Rounds any combination of 125mm Projectiles

Muzzle Velocity: 915

Max Dispersion: INA

Maximum Range: m3,00

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Manufacturer: KB Tochmash

In Service: 1976-present

Proliferation: Widely Proliferated throughout Armenia, Azerbaijan, Belarus, India Iran, Russia, Ukraine, and Uzbekistan

Basic Load: ea4-6

Weight: kg23.2

Warhead Weight: kg4.5

Guidance System: SACLOS Radio

Effective Firing Range: m100-4,000

Muzzle Velocity: m/s125 m/s, which increases to 800m/s at its peak m/s

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Variants: 9M112M, 9M112M2, 9M124

Note: Fired from the T-64 and T-80 Family of Russian Tanks

↳

Coaxial Weapon System

↳*System*

Name: Type 54 DShK Anti-Aircraft Machine Gun
Type: 12.7mm Heavy Machine Gun
Proliferation: over 1 Million
Length (Total): mm1,625
Length (Barrel): mm1,070
Weight (Gun Only): kg34
Weight (on Wheeled Mounting): kg157
Max Rate of Fire: rds/min600
Range Finder Type: Optical
Action: Gas-Operated, Flapper Locking
Sights: Iron/Optical
Feed System: 50 Round Belt
Turret: single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.
Variants: DK, DShKM, DSHKS, Type 54 HMG
Fire on the Move: Yes

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: mm12.7x108
Muzzle Velocity: m/s850
Basic Load: ea300
Effective Range: m2,500
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: mm7.62
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +

Max Rate of Fire: rds/min650
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length (Overall): mm1,203
Length (Barrel): mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s825
Basic Load: ea250
Effective Range (Iron Sights): m100- 1,000
Effective Range (With Sight Adjustments): m100-1,500
Maximum Firing Range: m3,800

Fire Control

Name: IG43 fire-control
Computerized FCS: Yes
Thermal Sight Tank Commander: Yes, TKN-3V combination day/night binocular periscopic
Thermal Sight Gunner: Yes, TPN1-49-23 night sigh
Main Gun Stabilization: 2-Plane, 2Eh26M armament stabiliser
Fire on the Move: Yes
Rangefinder: two-axis stabilised IG42 laser rangefinder sight
Ballistic Computer: 1V517 tank ballistic computer
Vision Blocks: 1 x TPNO-16, 2 x TPNA-65 day vision blocks
PZU-5 monocular periscopic sight: Available
Searchlight: L-2AgM infra-red searchlight

Protection

Hull Armor: cast and welded steel armour
Turret Armor: cast armour welded together
Armor Protection (Front): mm370-440 of RHA against KE rounds and 500 mm to 575 mm of RHA against HEAT rounds
Applique Armor: Available

Self-Entrenching Blade: KMT-4 roller or the KMT-6 track width mine plough,
Explosive Reactive Armor: Kontakt-1, also known as 4S20 cassettes
Number of ERA Plates: ea200-300
Active Protection System: Yes
Mine Clearing: Roller-plow available
NBC Protection: Yes
Smoke Equipment: "Tucha" 81-mm smoke grenade launchers on the left of the turret.
IR Signature: INA
Automatic Fire Suppression Systems.: Available, PPO fire detection and suppression system,
ERA Protection (HEAT Warheads): mm450
ERA Protection (Artillery Shells): mm200

Notes:

The T-64BV – Features "Kontakt-1" reactive armour and "Tucha" 81-mm smoke grenade launchers on the left of the turret. The T-64BV can be differentiated from the T-64B by the large quantity of ERA added to the turret and hull. The T-64BV is a modernized version of the T-64B main battle tank with an armour upgrade package. The T-64B version was adopted in service in 1976. The T-64BV featured an enhanced anti-radiation protection and add-on explosive reactive armour. The production of the T-64BV has started in 1985. In 2014, Ukraine sold 50 T-64BV to the Democratic Republic of the Congo (RDC). The T-64BV is currently in service with Russia, Uzbekistan, RDC and Ukraine.

T-72BM Russian Main Battle Tank (MBT)




Tiers:



Parent:

T-72 Russian Main Battle Tank (MBT)

Variants:

- **T-72A:** Second Russian main variant of the T-72.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: Objekt 184; T-72B obr.1989; T-72B(M)

Manufacturer: Uralvagonzavod

Type: Main Battle Tank (MBT)

Family: INA

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note: The T-72BM can be distinguished from the T-72B and T-72B1 by the shape of the ERA, which is arrow-shaped on the turret front and built from larger ERA cassettes

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons41

Ground Pressure: kg/m0.898 kgf/cm2

Automotive

Engine Name: V-84M

Engine Type: Four stroke, liquid cooled diesel engine with a centrifugal supercharger.

Engine Power: hp840

Power to Weight Ratio: hp/ton18.9

Cruising Range: km700

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h35-45

Acceleration Speed (0-32 km/h: sec18

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Fording Kit: OPVT deep water fording kit

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Gyrocompass: GPK-59 gyrocompass

Rechargeable Batteries: four 12ST-85R 34 AMP rechargeable batteries

Starter Generator: SG-10-1S

Communications

Radio #1: R-173 (Standard Radio for Russian Tanks)

R-173 Range: km0-20

Radio #2: R-168-100U (Standard VHF)

Main Gun

Note: Another primary difference between the T-72A and the T-72B is that the T-72B can fire the 125mm 9K120 Svir Missile Complex

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Barrel Life: rounds600

Sustain Rate of Fire: INA

Thermal Sleeve: Yes, alloy thermal sleeve

Bore Type: Central Bore Evacuator

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread.

Autoloader: Yes, electromechanical carousel autoloader

Time to reload the Autoloader: min4-5

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

↳*Ammunition (Option 1)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Dimension: mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 45 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile

↳*System*

Note: The 9K120 gun-launched missile complex is a two piece guided missile that is loaded and fired from the main gun in the same way as an ordinary round.

ATGM System Name: 9K120 gun-launched missile complex

Missile Name: 9K119 SVIR / AT-11

Type: Laser Guided Anti-tank guided missile launcher

Manufacturer: KBP Instrument Design Bureau

Caliber: mm125

Round Type: 3UBK20 round

Guidance System: 9M119M Laser Guided Missile

Voltage Converter: 9S831 voltage converter.

Tracking System: IK13 tracker

Basic Load: ea6

Onboard Guidance System: Yes

Sight Assembly: coded laser guidance beam 1K13-49

Gunner's Night Sight: TPN-1-49 secondary night sight.

Fire Control System: 1A40-1

Hit Probability: %80

Penetration: up to 700mm of armor

Warhead Weight (HEAT): kg4.2

Warhead Type: 9N142 shaped charge warhead

Laser Emitter: 1K13 sight's laser

Maximum Effective Range: m4,000

Minimum Effective Range: m100

Elevation Range (Super Elevation): deg-7 to +20

Elevation Range (Standard Elevation): deg-5 to +15

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650-750

Effective Rate of Fire: rds/min250

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea2,000

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Secondary Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7 Anti-Aircraft Machine Gun

Proliferation: over 1 Million

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Length (Total): mm1,560

Max Rate of Fire: rds/min700-800

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Maximum Elevation: deg+75

Minimum Elevation: deg-4

Sights: Iron Sights

Feed System: 50-Round Belt

↳***Ammunition***

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s845

Basic Load: ea300

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, 1K13 sight and aiming complex

Thermal Sight Gunner: Gunner's primary sight is the 1A40-1

Main Gun Stabilization: 2E42-2 (Upgrade)

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Gyrocompass: GPK-59 gyrocompass

Searchlight: L-4A "Luna" IR searchlight

Collimator Sight: K10T collimator sight

Periscopes: two TNPO-160 prismatic periscopes

Note: The Gunner, using the 1A40-1 sight can designate and engage targets out to a mazimum distance of 4,000 meters with APFSDS and HEAR rounds.

Protection

Hull Armor: Steel and composite armour with additional plates that provide protection equivalent to 950mm of steel against HEAT projectiles, 440mm resistance to KE rounds, and 500mm against shaped charges. The T-72BM also has a additional twelve separate charges of ERA compared to the T-72B.

Turret Armor: Steel and composite armour with ERA, 950 mm against HEAT weapons. The Turret has additional Ceramic or silica inserts to add to the protection level of the T-72BM. Additionally, the T-72BM has arrow-shaped arrays of ERA added to the turret front

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor (ERA): Yes, Kontakt-V (UPGRADE). Additional ERA is added to the Turret, Glacis, and sides of the hull.

ERA Explosive Element: 4S22

ERA 4S22 Elements (Plates): ea240

Armor Cassette Type: 4S22 cassette that is filled with an explosive element and steel armoured plate.

Number of total Armor Cassettes: ea200-300

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM).

Active Protection System: Yes, ZETS11-3 Control System

Self-Entrenching Blade: Yes, built in Dozer Blade

Mine Clearing: Yes, Roller and plow (optional)

Grenade Launcher: Yes, twelve 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Effective Range: m200-300

Grenade Smoke Screen Size: 30 m wide and 10 m high for 60 seconds per grenade.

Engine Smoke Screen Capable: Yes

IR Signature: INA

Automatic Fire Extinguishing Equipment.: Yes

Note #2: The base protection of the T-72BM is the same as the T-72B, however the vehicle is upgraded with considerable amounts of additional composite armor and ERA Plates.

Note #3: The additional added armor cassettes reduce penetration by as much as 95%.

Notes:

The T-72BM is an upgraded version of the T-72, fitted with Kontakt-5 explosive reactive armor. This version appeared in 1989. Russia: Widely Proliferated, the T-72BM has become the most numerous tank in the Russian inventory.

Type 79, Chinese Main Battle Tank





Tiers:



Variants:

- **Type 79 I:** This designation was given to the late production vehicles that were equipped with a more powerful 730 hp diesel engine.
- **Type 79 II:** This is an improved variant that has been reportedly fitted with a new fire-control system, which has the laser rangefinder integrated into the gunner's sight, rather than mounted externally over the 105-mm gun. An export variant with the same designation had an armor array on the turret, 76-mm electrically operated smoke grenade launchers and the sight system of the older Type 69 tank. This type never entered quantity production or service.

System

Alternative Designation: T-79, Type 69 III, WZ-121 D (manufacturer's designation)
Type: Main Battle Tank
Crew: ea4
Passenger Capacity: NA
Maximum Effective Range: m1600

Dimensions

Length: m6.24
Width: m3.31
Height: m2.4
Weight, Combat: kg37,500
Ground Pressure: INA

Automotive

Engine Name: Model 12150L-7BW

Engine Type: Water cooled, V-12 turbocharged

Engine Power: hp730

Cruising Range: km430

Speed, Maximum Road: km/h50

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hINA

Fording Depth: Unprepared: .8m; Prepared: 1.4m; With Snorkel: 5m

Gradient: percent60

Side Slope: percent40

Main Gun

↳*System*

Name: Type 83-1

Type: 105mm, rifled gun fitted with fume extractor and thermal shroud

Max Rate of Fire: INA

Sustain Rate of Fire: INA

Range Finder Type: Laser

Elevation: -4 degrees to 18 degrees

Traverse: 360 degrees

Tank Commander's Weapon System

↳*System*

Name: Type 54 (DShKM)

Type: 12.7mm Machine Gun

Length: 1,625mm

Barrel Length: 1,070mm

Weight (Gun Only): 34kg

Rate of Fire: 600rpm

Action: Gas operated, flapper locking

Feed System: 50 round belt

Sights: Iron / Optical

Variants: DK, KSHKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: Heavy machine gun and anti-material rifle cartridge

Caliber: mm12.7 x 108

Muzzle Velocity: m/s850

Basic Load: rounds500

Effective Range: km2

Armor Penetration: API: 21mm at 500m and 13mm at 1,000m (RHA)

Coaxial

↳*System*

Name: PK 7.62mm Machine Gun

Type: 7.62mm Machine Gun

Manufacturer: Degtyaryov Plant

Weight: 9kg

Length, Total: 1,203mm

Rate of Fire: 650rpm

Feed System: Non-disintegrating metal 50 round belts

Sights: Tangent iron sights; optical, night sights, thermal, and radar options

↳*Ammunition*

Type: 7.62mm Coaxial Machine Gun

Caliber: 7.62mm x 54mm

Muzzle Velocity: m/s825

Basic Load: rounds2,250

Effective Range: km1

Armor Penetration: INA

Maximum Firing Range: m3,800

Fire Control

Computerized FCS: Ballistic Computer

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Range Finder: Laser

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: Capable

Explosive Reactive Armor: Capable

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Overpressure system

Smoke Equipment: 4 electronic launchers on each side of the turret

IR Signature: NA

Notes:

The Type 79 is a Chinese main battle tank (MBT) having the same hull and turret as the earlier Type 59 /69 MBT but a different chassis. It is also designated the Type 69 -III. A development of the Type 69-II, the Type 79 is said to have improved firepower, fire control, night-vision and communications equipment. A large rectangular window has been added to the turret, installed forward of the commander's cupola and possibly housing an internal laser rangefinder. Four electrical smoke dischargers are mounted to each side of the turret with a metal stowage box behind them (probably carrying additional grenades). Additional smoke can be generated by injecting diesel fuel into the exhaust outlet on the left side of the hull. A stowage rack runs around the back of the turret, which reportedly provides some protection against high-explosive anti-tank (HEAT) rounds, detonating them before they come in contact with the armor. The main armament is a Type 83-I rifled 105-mm gun, derived from the British L7 design, fitted with a fume extractor and thermal sleeve. It is capable of firing armor-piercing, fin-stabilized, discarding-sabot (APFSDS), HEAT and HEAT fragmentation (HEAT-FRAG) rounds. A 12.7-mm anti-aircraft machine gun is mounted on the loader's cupola. The turret also carries a 7.62-mm coaxial machine gun. While similar to the hull of the Type 69, the rear hull of the Type 79 exhibits slight differences due to a different power pack. In addition, the towing eyes are under the nose and the headlamps are similar to those found on the Type 80. The Type 79 has six road wheels and the upper portion of the suspension is covered by five removable skirts. The tracks on the Type 79 typically come with removable rubber pads. Standard equipment includes a simple fire-control system; night-vision equipment for the commander, gunner and driver; an NBC overpressure system; long-range fuel tanks carried on the rear of the hull; and an unditching beam. Some current Type 79 tanks are fitted with a new sighting system, featuring a laser rangefinder integrated into the gun sight and fitted with new tracks with rubber pads. Later production Type 79s include upgraded fire-control systems, a thermal imager and an electro-hydraulic hybrid 2-axis gun stabilizer. They also feature an expanded bustle rack similar to those equipping the Type 69-II.

ZTZ-99A (Type 99) Chinese Main Battle Tank (MBT)




Tiers:



Variants:

- **Project 9910 prototype:** Also known as the WZ-123. The early pre-production (small batch production) prototype was called Project 9910. Features included composite armor panels and a 1200 hp diesel engine. 1st generation ERA may have been an option.The armor layout of the early pre-production prototype may have been similar to the T-80U and T-80UK.
- **Type 99:** Also known as the Type 99G and Type 99A1. Upgradable from small batch production prototype. The wedged shaped turret and applique armor panels on turret front and sides. Upgraded to third generation ERA and second generation thermal sight. Has a semi-automatic transmission
- **Type 99G:** is a modified version of the basic version of the ZTZ99. A photo from China's Xinhua News Agency in February 2008 revealed this upgraded version. The ZTZ99 G will be equipped with a new observation system and new protection. The vehicle leader's optical system seems wider than the basic version of the ZTZ99, which could indicate the use of a thermal imaging vision system.
- **Type 99Z:** Successor Type 99G and Predecessor Type 99A1
- **Type 99A2:** This latest version has undergone many upgrades and improvements, so we can consider the Type 99A2 version as a new tank. The Type 99A2 is equipped with a new sighting system, an on-board computer giving battlefield information, a new shield design, and a wider turret, The Type 99A2 is also equipped with an active system of turret mounted protection, a new vision system for the vehicle head and a new propulsion unit.
- **Type 99KM:** New version with many upgrades, upgrade the modular system of active protection, upgrade the JD-4 laser defense system, it would be equipped with a 155 mm gun, capable of firing missiles and a new generation of ammunition. Reports state that the Type 99KM version would be 10 years ahead of any existing battle tanks.
- **Type 99A3 / ZTZ-99A:** This is the latest version in operational service. It features a stabilized 125-mm gun and improved armor and targeting systems. The tank reportedly includes an upgraded JD-4 active laser defense system and a 125-mm gun with the ability to launch both missiles and next-generation kinetic rounds. Next-generation explosive reactive armor is fitted on the turret and a new composite armor on the top. The Type 99A3 is also China's first networked tank, with information-sharing, combat coordination and status monitoring capabilities. The tank is slightly taller than the baseline Type 99. An automatic transmission is fitted.

System

Alternative Designations: ZTZ-99; Type 99Gai; 99G

Proliferation: 1

Type: Main Battle Tank

Crew: ea3

Maximum Effective Range: km600

Dimensions

Length: m7.7

Width: m3.5

Height: m2.5

Weight, Combat: mt53

Ground Pressure: INA

Automotive

Engine Type: Diesel, based on the MB871KA501 engine

Engine Power: hp1,500

Cruising Range: km550

Speed, Maximum Road: km/h80

Speed, Average Cross: 60

Speed, Maximum Swim: INA

Fording Depth: m4.5

Communications

HF/VHF Radio: Yes

Laser Communication: Yes

Encrypted Voice, Text and Data: Yes

GLONSS/GPS Receiver: Available

Effective Range: 3,600

Battle Management System: Yes

Inertial Navigation System: Yes

Protection

Hull Armor: Welded steel armour, composites and ceramics

Turret Armor: Welded steel armour, composites and ceramics

Applique Armor: Track Skirts

Explosive Reactive Armor: Yes, 2d or 3d gen ERA

Active System: Yes

Mine Clearing: Available

Self-Entrenching Blade: Available

NBC Protection: Yes

Smoke Equipment: Yes, Grenlaunch 12x; VESS

Countermeasures Laser Warning Receiver: Yes

Counter Measures Laser Dazzler: km5

Countermeasures Laser Self-Defense Weapon: Yes

JD-3 Infra-red Jammer: Yes

Armament

↳*Main Gun*

Type: Smoothbore
Caliber/Length: mm125
Number of Rounds: ea22
Loader Type: Autoloader; Manual
Fire on the Move: Yes
Muzzle Velocity: m/s1,780
Penetration: 850 steel armour from a distance of 2000 meters
Stabilization: Yes, 2-Plane
Rate of Fire: rd/m8
Max Range: m2,500
Armor Penetration: Yes
Total Capacity: ea42
Autoloader Capacity: ea22

↳*Coaxial Weapon System*

Type: 7.62mm Type 86 Coaxial Machine Gun
Caliber/Length: mm7.62
Number of Rounds: INA
Fire on the Move: Yes
Muzzle Velocity: m/s730.3
Max Range: m1000
Armor Penetration: Available

↳*Tank Commander's Weapon System*

Type: QJC Type 88 Heavy Machine Gun
Caliber/Length: mm12.7 x 108
Number of Rounds: Belt
Rate of Fire: rd/min550-600
Max Range: m1,828
Armor Penetration: mm25

↳*Anti-Tank Guided Missile (ATGM)*

Name: AT-11/Svir/Invar
Caliber/Length: mm125
Number of Rounds: INA

Max Range: m4,000
Min Range: m100
Armor Penetration: Yes

Fire Control

Name: ISFCS-212
Computerized FCS: Yes
Thermal Tank Commander: Yes
Thermal Gunner: Yes
Main Gun Stabilization: Yes, 2-plane
Range, Day Sight: km5
Thermal Sight Magnification: 5x and 11.4X
IFF: Yes
IR Automatic Target Tracker: Yes

Notes:

Type 99A1 is the latest version of the ZTZ99 in service in the Chinese military, but a Type 99A2 version is undergoing testing and evaluation. The turret of Type 99A1 has been modified, which modifies the physical aspect of the turret, by the disappearance of the bump on the upper part. This modification of the turret has increased its protection and the interior space for the gunner and the head of the vehicle. A shielding kit was mounted on the front and sides of the hull, and the ERA shield was expanded. Type 99A1 has also received new equipment for computers and fire control.

Leopard 2A4 German Main Battle Tank (MBT)





Tiers:



Parent:

Leopard 2 German Main Battle Tank (MBT)

Variants:

- **Leopard 2A1:** Minor modifications and the installation of the gunner's thermal sight[1] were worked into the second batch of 450 vehicles Leopard 2, designated the A1. Krauss-Maffei built 248 (Chassis Nr. 10211 to 10458) and Mak built 202 (Chassis Nr. 20173 to 20347). Deliveries of the 2A1 models started in March 1982 and ended in November 1983. The two most notable changes were the modification of the ammunition racks to be identical to those in the M1A1 Abrams, and redesigned fuel filters that reduced refuelling time. A third batch of 300 Leopard 2, 165 by Krauss-Maffei (Chassis Nr. 10459 to 10623) and 135 by MaK (Chassis Nr. 20375 to 20509.), was built between November 1983 and November 1984. This batch included more minor changes that were later retrofitted to the earlier 2A1s
- **Leopard 2A2:** This designation was given to upgraded vehicles of the first batch of Leopard 2s, brought up to the standard of the second and third batches. This modernisation gradually replaced the original PZB 200 sights in the first batch with thermal sights for the EMES 15 as they became available. Furthermore, the upgrade included the fitting of filler openings and caps to the forward hull fuel tanks to allow separate refuelling, as well as the addition of a deflector plate for the periscope and a large coverplate to protect the existing NBC protection system. Finally, the tank was given new five metre towing cables with a different position. The programme began in 1984 and ended in 1987; the third, fourth and fifth batches, which were produced during this period, had the same features. The modernised first batch can be recognised by the circular plate covering the hole where the cross-wind sensor for the fire-control system was removed
- **Leopard 2A3:** The fourth batch of 300 vehicles, 165 by Krauss-Maffei (Chassis Nr. 10624 to 10788) and 135 by Mak (Chassis Nr. 20510 to 20644), was delivered between December 1984 and December 1985. The main change was the addition of the SEM80/90 digital radio sets (also being fitted to the Leopard 1 at the same time), and the ammunition reloading hatches being welded shut. Even with these minor changes the new batch was known as the 2A3
- **Leopard 2:** The Leopard 2 is a main battle tank developed by Krauss-Maffei in the 1970s for the West German Army. The tank first entered service in 1979 and succeeded the earlier Leopard 1 as the main battle tank of the German Army. It is armed with a 120 mm smoothbore cannon, and is powered by a V-12 twin-turbo diesel engine. Various versions have served in the armed forces of Germany and 12 other European countries, as well as several non-European nations, including Canada, Chile, Indonesia, Singapore, and Turkey. The Leopard 2 was used in Kosovo with the German Army, and has seen action in Afghanistan with the Dutch, Danish and Canadian contributions to the International Security Assistance Force, as well as also seeing action in Syria with the Turkish Armed Forces against ISIS and the YPG.
- **Leopard 2 Marksman:** Finland has modernised its Marksman SPAAG vehicles by replacing the original T-55AM chassis with a newer Leopard 2A4 chassis. The upgraded Marksman vehicles were scheduled to enter service with the Finnish Army in 2016. The new Leopard 2 chassis greatly improves mobility compared to the older T-55AM chassis, both on- and off-road. The Leopard 2 chassis is also larger, thus providing a more stable firing platform for the Marksman turret to operate from
- **Leopard 2A5:** "Leopard 2 Improved" was a prototype-series for enhancing the A4, introducing a wedge-shaped, spaced add-on armour to the turret front and the frontal area of the sides. These spaced armour modules defeat a hollow charge prior to reaching the base armour, and causes kinetic-energy penetrators to change direction, eroding them in the process; it does not form a shot-trap, since it does not deflect the penetrators outwards to hit the hull or turret ring. The gun mantlet was redesigned to accept the new armour.
- **Stridsvagn 122:** The Stridsvagn 122 is a Swedish Army tank based on the Leopard 2 Improved, with 120 units built, 91

of which were licence-produced in Sweden. The tank features increased armour on the turret top and front hull, and improved command, control and fire control systems. Externally, it can be distinguished from the Leopard 2A5 by the French GALIX smoke dispensers, different storage bins, and the much thicker crew hatches The Strv 122B, a variant equipped with modular AMAP composite armour from IBD Deisenroth, has increased 360° protection against threats like EFPs, RPGs and IEDs. The width of 4 metres (13 ft) has been kept, while the weight increases by only 350 kilograms (770 lb)

- **Leopard 2-140:** n the early 1990s,[citation needed] Rheinmetall began development of a 140 mm smoothbore cannon for use in future tank designs. The new gun was intended to counter new Soviet tank developments, especially since the next generation of Soviet main battle tanks were rumoured to be armed with a 135 mm or 152 mm cannon. The new 140 mm cannon was part of a modernisation programme for the Leopard 2 known as the KWS III. Test firing of the new 140 mm cannon was conducted. Results showed that the gun had high penetration values, and had a muzzle velocity of around 2000 metres a second, with potential to be increased further. However, the 140 mm rounds were too heavy for the tank crew to handle effectively
- **Leopard 2A6:** The Leopard 2A6 includes the addition of the Rheinmetall 120 mm L/55 smoothbore gun and other changes. All German tank battalions of the "crisis intervention forces" are equipped with the A6. Canada purchased 20 Leopard 2A6s from the Netherlands. These were delivered in 2007. Portugal also purchased 37 Leopard 2A6 from the Dutch in 2007, with delivery in 2008. In January 2014, Finland purchased 100 L2A6s, as well as munitions, simulators, and a ten-year supply of reserve parts from the Netherlands. The tanks are being delivered in batches between 2015-2019.
- **Leopard 2E:** he Leopard 2E is a derivative of the 2A6, with greater armour protection, developed under a programme of co-production between the defence industries of Spain and Germany. The programme was developed within the frame of collaboration decided in 1995 between the Defence Ministries of both countries, in which also was included the cession of use by a period of five years of 108 Leopard 2A4 from the German Army to the Spanish Army. However, this cession was extended up to 2016, and after that those tanks will be the sole property of the Spanish Army, as has been made public on 24 January 2006, then having been paid a total of 15,124,014 euros in ten yearly installments, giving the Spanish co-ownership from 2006.
- **Leopard 2 PSO:** The new Leopard 2 PSO (Peace Support Operations) variant is designed specially for urban warfare, which had been encountered in peacekeeping operations with increasing frequency. Therefore, the Leopard 2 PSO is equipped with more effective all-around protection, a secondary weapons station, improved reconnaissance ability, a bulldozer blade, a shorter gun barrel (for manoeuvring on urban streets at the expense of fire range), non-lethal armament, close-range surveillance ability (through camera systems), a searchlight and further changes to improve its perseverance and mobility in a built-up non-wide open area. These features are similar to the Tank Urban Survival Kit for the American M1A2 Abrams
- **Leopard 2A7:** The Leopard 2A7 is fundamentally different from the KMW variant 2A7+ and is not optimised for combat in urban terrain. A total of 20 vehicles are provided for converting. It involves former Dutch A6NL models returned by Canada to Germany. The original upgrade to A6M has been extended in coordination with Canada and includes a crew-compartment cooling-system from the Leopard 2 A6M-HEL series, a new 20 kW auxiliary power unit based on the Steyr Motors M12 TCA UI engine, the Saab Barracuda Mobile Camouflage System (MCS) with Heat-Transfer Reduction (HTR CoolCam) system, a field trial proven combat management and information system (IFIS: Integriertes Führungs- und Informationssystem), onboard network optimization with ultracapacitors in the chassis and turret, a SOTAS IP digital intercom system, a renewal of the fire suppression system in the crew compartment, and the retrofitting of Attica thermal imaging module in the commander optics. The weapon system is adapted for firing HE ammunition. It is also fitted for, but not with, additional passive side protection armour. The first Leopard 2A7 was handed over to the German Army in Munich on 10 December 2014. A total of 14 vehicles were produced for Tank Battalion 203, plus four more going to the Armoured Corps Training Centre and one vehicle at the Technical School for Land Systems and School for Technology of the Army. The last tank remains as a reference vehicle at KMW
- **Leopard 2A7+:** The Leopard 2A7+ was first shown to the public during the Eurosatory 2010, featuring the label "Developed by KMW – tested and qualified by German MoD". The Leopard 2A7+ has been tested by the Bundeswehr under the name UrbOp (urban operations).The Leopard 2A7+ is designed to operate both in low intensity and high intensity conflicts.
- **Pz 87:** Pz 87 (standing for Panzer 87, referring to year of service entry) is the designation given to the Leopard 2A4 vehicles built under licence in Switzerland. The vehicles are essentially the same specification as the fifth and sixth production batch 2A4. This version included Swiss built communications equipment and MG 87 MGs, as well as featuring an improved NBC protection system, the installation of a hydraulic track-tensioning system, and the addition of an exhaust silencer. Late model Pz 87 included a field zeroing system, the sealing of the ammunition loading hatch, and from the 120th vehicle, the addition of heavier armoured side skirts.

System

Alternative Designation: Leopard 2A4

Manufacturer: Krauss-Maffei Wegmann Maschinenbau Kiel

Type: Main Battle Tank

Family: Leopard German Main Battle Tank Family

Crew: ea4

Estimated Service Life: years50

Note: The Leopard 2A4 is the 5th Generation Leopard 2 Family MBT.

Dimensions

Length (Chassis Overall): m7.7

Width: m3.7

Height: m2.8

Weight, Combat: tons56

Ground Pressure: kg/m0.83

Automotive

Engine Name: MTU MB-837 Ka501 diesel

Engine Type: liquid-cooled V-12 twin-turbo diesel engine

Engine Power: hp1,479

RPMs: RPM2,600

Speed, Maximum Road: km/h69

Cruising Range: km550

Speed, Off Road: km/h50

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Fording Depth (Without Preparation): m1.0

Fording Depth (With Preparation): m4.0

Gradient: Deg60

Side Slope: Deg30

Vertical Step: m1.5

Trench: m3

Transmission: Renk HSWL 354 transmission

Fuel Capacity (Total): liters1,160

Fuel Consumption (Road): 300 liters per 100km

Fuel Consumption (Cross Country): 500 liters per 100km

Power Pack Weight: kg3,025

Communications

Name: Prüfzusatzbediengerät 80 (PRZB 80) radio

Type: VHF

Cable Drum (Radio): m800

Antennas Location: mounted on the turret roof, one on each side of the Machine Gun

:

Main Gun

↳*System*

Name: 120mm Rheinmetall L44 smoothbore gun

Type: 120mm Smoothbore Gun

Manufacturer: Rheinmetall

Max Rate of Fire: INA

Loader Type: Semi-automatic loading system

Basic Load: ea42 Total of any combination 120mm Projectiles

Maximum Elevation: Deg+20

Minimum Elevation: Deg-9

Frontal Arc: Deg285

Rear Arc: Deg75

Fire on the Move: Yes

Weight (Gun Mount): kg3,317

Weight (Gun Barrel): kg1,190

Length (Barrel): m5.6

Thermal Sleeve: Yes

Bore Evacuator: Centrally-mounted bore evacuator

Barrel Interior Chrome Plating: Yes, to increase wear resistance of the barrel

Effective Full Charge (EFC): rounds700

Breech Type: Threaded bayonet connection

Wedge Block Type: Downward-opening semi-automatic sliding wedge block

Breach Mechanism: Hydraulically-operated loading system

Note: The Leopard 2A4 can fire any 120mm NATO Projectile

↳*Ammunition (Option 1)*

Type: DM-13 (XM829) German Armour Piercing Fin Stabilized Discarding Sabot (APFSDS)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Operational Range: mINA

Armor Penetration (Steel): mm230

Cartridge Weight: kg20

Cartridge Length: mm984

Penetrator: Tungsten alloy

Propellant (NC-NG): kg8

Accuracy/Dispersion: 0.2x0.2mil

Maximum Effective Range: m3,000

Cartridge Type: Semi-combustible cartridge

↳***Ammunition (Option 2)***

Type: DM-12 (M325) : High-Explosive Anti-Tank Multi-Purpose (HEAT-MP-T)

Caliber: mm120

Muzzle Velocity: m/s1,078

Basic Load: 42 Total of any combination 120mm Projectiles

Cartridge Weight: kg25

Cartridge Length: mm984

Fuze: PIBD, electric

High Explosive Comp. B:: kg1.8

Accuracy/Dispersion: 0.25X0.25 mil

Maximum Effective Range: m3,100

Cartridge Type: Semi-combustible cartridge

↳***Ammunition (Option 3)***

Type: DM53 120mm KE Projectile (Rheinmetall)

Caliber: mm120

Muzzle Velocity: m/s1,750

Basic Load: 42 Total of any combination 120mm Projectiles

Round Weight: kg21.4

Projectile Length: mm745

Accuracy: mil0.2

Coaxial Weapon System

↳***System***

Name: MG3A1

Type: 7.62mm General-Purpose Machine Gun

Manufacturer: Rheinmetall

Proliferation: + 1 Million

In Service: 1960-present

Max Rate of Fire: rds/min1,200

Fire on the Move: Yes

Weight (Gun Only): kg11.5

Weight (Mounted on Tripod): kg27.5

Length (With Stock): mm1,225

Length (Without Stock): mm1,097

Length (Barrel Only): mm565

Action: Recoil-operated, roller locked

Effective Firing Range (With Sight Adjustments): m200-1,200

Maximum Firing Range (Bipod Mounted): m600

Maximum Firing Range (Tripod Mounted): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: ea2,375

Loader's Weapon System

↳*System*

Name: MG3A1

Type: 7.62mm General-Purpose Machine Gun

Manufacturer: Rheinmetall

Proliferation: +1 Million

Max Rate of Fire: rds/min1,200

In Service: 1960-present

Fire on the Move: Yes

Weight (Gun Only): kg11.5

Weight (Mounted on Tripod): kg27.5

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Maximum Firing Range (Bipod Mounted): m600

Maximum Firing Range (Tripod Mounted): m1,200

Maximum Firing Range (Gun Carriage): m3,000

Maximum Firing Range (Terminal): m3,750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: ea2,375

Fire Control

Name: Digitaler Ballistikkern (DigBal) digital FCS

Computerized FCS: Yes

Primary Sight: Hauptzielfernrohr (HZF) primary sight System

Commander's Periscope: Carl Zeis fully stabilised monocular PERI R17A1 sight

Thermal Sight Tank Commander: Warmebildgerat X (WBG-X) thermal sight.

Thermal Sight Gunner: Warmebildgerat X (WBG-X) thermal sight.

Primary Gun Sight: binocular HZF

Main Gun Stabilization: Hydraulic and provides dual-axis stabilisation.

Infrared: Yes

Range Finder: EMES 15 laser rangefinder (LRF).

Wind Senor: Yes

Telescope: EMES 15

Tower Sight: FERO Z18

Computer Controlled Tank Testing Set: RPP 1–8

Ballistic Compensator: Field zeroing system

Weapon Slaving System: Waffenachfuhranlage (WNA) H22 weapon slaving system

Emergency Backup Turret Sight: Turmzielfernrohr (TZF) FERO Z18

Fault Detection System: Rechnergesteuertes Panzerpufstsem (RPP 1-8) fault detection system

Field Zeroing System: Feldjustieranlage (FJA) field zeroing system

Protection

Hull Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Turret Armor: welded steel plates, with spaced multilayer passive composite armour protecting the glacis and hull sides as well as the turret front and sides.

Applique Armor: Yes, Track Skirt

Explosive Reactive Armor: INA

Active Protection System: Yes, Dräger Safety AG & Co

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, KGaA CBRN protection system

Smoke Equipment: MWA [Mehrfachwurfanlage] 76 mm obscurant smoke discharger system

IR Signature: IR suppressive smoke screen system

Fire Suppression System: Yes, Automatic

Grenade Launchers: Eight grenade launchers are mounted on each side of the Turret

Fire Detection and Suppression System: Yes, Kidde-Deugra Brandschutzsysteme System

Emergency Escape Hatch: Yes, below the driver's compartment

Notes:

The most widespread version of the Leopard 2 family, the 2A4 models included more substantial changes, including an automated fire and explosion suppression system, an all-digital fire control system able to handle new ammunition types, and an improved turret with flat titanium/tungsten armour. The Leopard 2s were manufactured in eight batches between 1985 and 1992. All the older models were upgraded to 2A4 standard. Until 1994, Germany operated a total of 2,125 2A4s (695 newly built and the rest modified older versions), while the Netherlands had an additional 445 tanks. The 2A4 was also license manufactured in Switzerland as the Panzer 87 "Leopard" or Pz 87. This version included Swiss-built 7.5 mm MG 87 machine guns and communications equipment, and featured improved NBC protection system. Switzerland operated 380 Pz 87 tanks.After 2000, Germany and the Netherlands found themselves with large stocks of tanks that they had no need for after the Cold War. These tanks were sold to NATO or friendly armies around the world. Among these buyers of the surplus tanks were Turkey (purchasing 354 vehicles), Greece (183), Sweden (160), Chile (140), Finland (139), Poland (128), Austria (114), Spain (108), Canada (107), Singapore (96), Norway (52), Denmark (51), and Portugal (37).

Type 59D Chinese Main Battle Tank (MBT)



Tiers:



Variants:

- **Type 59:** The basic variant, a T-54A clone without IR searchlight. Entered production in 1957.
- **Type 59-I:** Improved variant fitted with a Type 69-II 100 mm rifled gun, as well as a laser rangefinder, hydraulic servo-system, primitive fire-control system, automatic fire suppression system, and rubber track skirt. The Type 59-I includes several versions with different armour and fire control configurations.
- **Type 59-II:** This version was fitted with a two-axis, stabilized, rifled 105-mm gun with a fume extractor and thermal sleeve. The Chinese-made gun is very similar to the British L7/U.S. M68 105-mm tank gun. The Type 59 II also has a 580-hp diesel engine, a light spot fire-control system and an automatic fire extinguisher. New radios and communication systems were installed. It is known to U.S. forces as Model 1984, representing the first year it was identified. Mass increased to 36.5 tonnes.
- **Type 59D1:** The Type 59D1 (also known as WZ-120C) is an upgrade with explosive reactive armour, computerized stabilized fire-control system, the 105 mm. gun of the Type 59-II, and night vision system
- **Type 59G:** An upgrade of the Type 59, featuring a redesigned turret and armor. It uses a turret similar to that of the Type 96A, a 125 mm gun, modern fire control systems, arrow-shaped armor, spaced armor, and possibly third-generation subsystems.
- **Jaguar:** The Jaguar was a prototype vehicle based off the Type 59 chassis that was jointly developed by the United States and China during 1980s, made possible by the US-Chinese détente of the 1970s. Planned to replace China's existing tank fleet, as well as for the export market, the tank featured improvements to the standard Type 59's engine, armament, armour, turret, optics, electronics, fire control and suspension. Following Tiananmen Square massacre, American-Chinese relations soured and the Chinese withdrew from the project. The Americans continued alone and successfully completed the design, however the end of the Cold War saw a glut in the international tank market and thus no orders were ever placed for the vehicle
- **Type 62 Light Tank:** In the late 1950s, the PLA submitted requirements for a light tank more suitable for operations in China's southern region. Development on the new Type 62 tank began in 1958, which was a scaled-down Type 59 MBT with simplified equipment. The Type 62 light tank entered batch production in 1963, and approx. 800 were produced by 1978. The Type 62 light tank weights only 21 tons, and is equipped with a Type 62-85TC 85 mm rifled gun, and 3 machine guns. An improved Type 62-I version was produced with better FCS with laser rangefinder, and turret storage racks for added protection. Other versions based on the Type 62 include the Type 79 recovery vehicle (prototype only) and Type 82 earth-mover. The PLA deployed the Type 62 light tank to Vietnam during the 1979 Sino-Vietnam conflict. They found that the thin armor of the Type 62 tank could be penetrated easily by hand-held anti-tank weapons, such as the 40 mm RPG. The Type 62 tank suffered severe losses during the conflict, which convinced the PLA to develop new second-generation MBTs. The Type 62 tank received a major upgrade in 2000, with new welded turret, vertically stabilized 105 mm rifled gun, fire-control system, night vision device, smoke grenade launchers, and explosive reactive armor (ERA) package
- **Type 69 / 79:** Improved Type 59 MBT built by 617 Factory (Inner Mongolia First Machine Group Co. Ltd). Only saw limited service in the PLA, but was an export success in the 1980s with more than 2,000 sold worldwide.
- **Type 73:** This armored recovery vehicle is a Type 59 with its turret removed. The vehicle is armed with a single 12.7 mm machine gun. This armored recovery vehicle is not believed to have a winch and is limited to towing operations.
- **Type 59 Heavy Infantry Fighting Vehicle:** The modernized HIFV model of Type 59 weighs around 40 tons and can carry up to seven passengers. Modifications include moving the engine to the front of the vehicle chassis, increasing tank armor including explosive reactive armor on all sides, and installing a rear door for dismounting infantry
- **QN-506:** It is a modernized variant of the Type 59 using the tank's chassis similar to its Russian counterpart the BMPT Terminator. The vehicle was first appeared at the Zhuhai Air Show in China in November 2018, and is armed with two QN-502C anti-tank missiles, ten QN-201 multi-purpose mini missiles, four S-507 loitering munitions, an unmanned 30

mm cannon, a 7.62 mm machine gun, six grenade launchers, and a quadcopter surveillance drone
- **Type T-72Z:** Iran version
- **Kok'san:** North Korea version.
- **Al-Zarrar:** Pakistan version. Heavy Industries Taxila of Pakistan has introduced the Al-Zarrar Main Battle Tank. The Al-Zarrar series was designed to improve and rebuild the Pakistani army's Type 59 tanks by way of more modern armament, fire control, defensive equipment, etc. Improvements include: 125 mm smoothbore gun, firing APFSDS, HEAT-FS and HE-FS. Semi-automatic loading and image Stabilized fire control. 730 hp Engine for improved mobility. Improved suspension. Improved defense with explosive reactive armour and anti-mine cover underneath.
- **Type 59G(BD) Durjoy:** Bangladesh version. Bangladesh Army's Type-59 are being upgraded to Type 59(BD)G Durjoy locally with Chinese assistance. 174 are being upgraded in First batch. Upgradation process includes: 125mm main gun with new turret (Type 96 turret) 28 rounds, Type-85 12.7×108mm Commander's machine gun (3,000 rounds), Co-axial 7.62mm gun (600 rounds), 81mm Smoke grenades. Chinese 3rd generation ERA on front, turret and side skirts. Modular Composite armour on turret front. Cage armour on back of turret to protect from RPG hits. NBC protection, Collective Fire suppression system. Laser warning receiver, Laser designator, Fire control system, Combat data link, Thermal imaging system. 730 H.P. Diesel engine Barrel launched ATGM firing capability. Rubber padded tracks. VLC 3000 radio contact system.

System

Alternative Designation: WZ-120D, ZTZ-59D

Type: Main Battle Tank (MBT)

Family: Type 59

Crew: 4 (commander, gunner, loader, driver)

Passenger Capacity: INA

Maximum Effective Range: km450

Add on Parts: Yes

Anti-Aircraft: Yes

Dimensions

Length (Hull): m6.04

Length (Gun Foward): m9.0

Height: m2.6

Width: m3.3

Weight, Combat: tons38

Ground Pressure: kg/m0.8

Automotive

Engine Name: 12150L diesel

Engine Type: Diesel V-12

Engine Power: hp520

Cruising Range: km420/600w extra fuel tanks

Speed, Maximum Road: km/h55

Speed, Average Cross: 25

Speed Maximum Swim: km/hINA

Fording Depth: 1.4m unprep; 5.5m snorkel

Gradient: %60

Side Slope: %30

Vertical Step: m0.7

Trench: m2.7

Fording: m1.3

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Type 83A

Type: 100mm Gun (copy of the Soviet D-10 gun)

Max Rate of Fire: rmp4

Time the Max Rate of Fire can be Sustained: INA

Range Finder: Yes

Barrel Length: 27 Caliber

Max Fire Range: km17.2 to 22

Elevation Range: deg-5 to +65

Traverse Range: deg360

↳*Ammunition*

Type: Rifle

Caliber: mm44

Muzzle Velocity: INA

Basic Load: ea34

Effective Range: km17.2 to 22

Armor Penetration: mm600

Projectile Weight: kg43.56

Coaxial Weapon System

↳*System*

Name: Type 59T

Type: 7.62mm Machine Gun

Location: Mounted Coaxially

Length, Total: mm1,192

Length, Barrel: mm658

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Max Rate of Fire: rds/min700-800

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Scope with Night Vision

Action: Gas-Operated, Open Bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s8547

Basic Load: ea3,500

Effective Range: m460

Armor Penetration: No

Gunner's Weapon System

↳*System*

Name: Type 54 (DShKM)

Type: 12.7mm Anti-aircraft Machine Gun

Location: Above the Gunner's Hatch

Proliferation: Over 1 Million

Max Rate of Fire: rds/min600

Length, Total: mm1,625

Length, Barrel: mm1,070

Weight (Gun Only): kg34

Weight (on Wheeled Mounting): kg157

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Optical, Iron Sights

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳***Ammunition***

Type: Heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea1,200

Max Effective Range: km2,500

Armor Penetration: API: 21mm at 500 m & 13mm at 1000 m (RHA)

Fire Control

Name: Type 37A light spot fire-control system

Computerized FCS: Yes

Thermal Sight Tank Commander: Available

Thermal Sight Gunner: Available

Main Gun Stabilization: 2-plane

Range, Day Sight (With Magnification): m5,000

Range, Thermal Sight (With Magnification): m1,000

Infrared Searchlight: Yes

Laser Rangfinder: Yes

Pop-up Vision Blocks: two

Reaction Time (Static Target): seconds6

Reaction Time (Moving Target): seconds9

Protection

Applique Armor: Yes, Track Shirts

Explosive Reactive Armor: Yes

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Grenlaunch 8x; VESS

IR Signature: No

Armor, Front Upper: mm97

Armor, Front Lower: mm99

Armor, Sides Upper: mm79

Armor, Sides Lower: mm20

Armor, Hull Rear: mm46

Armor, Hull Floor: mm20

Armor, Top: mm33

Armor, Turret Front: mm203

Armor, Turret Sides: mm203

Armor, Turret Rear: mm64

Armor, Turret Top: mm39

Smoke Equipment: 8 x 81-mm smoke grenade launchers. Vehicle engine exhaust smoke system.

Notes:

Type 59D (also known as WZ-120D) is an upgrade with the Type 59D1. The Type 59D has a longer 105 mm gun, called Type 83A, or Type 94. The gun has a range of 2000 m, and may fire ATGMs out to 5500 m. A thermal sight is available.

Zulfiqar-3 Iranian Main Battle Tank (MBT)



Tiers:



Variants:

- **Zulfiqar-1:** The Zulfiqar-1 is based on the M60 Patton model acquired under the pre-revolution era. The Zulfiqar-1 was first revealed in public in 1994. A total of six prototypes were completed and field tested in 1997. The Zulfiqar-1 is protected by a welded steel hull and the turret is reinforced by a composite armour. The Zulfiqar-1 is armed with a 125mm Smoothbore gun taken from a T-72.
- **Zulfiqar-2:** The Zulfiqar-2 is an interim main battle tank prototype used as a test bed. This variant is fitted with a new and more powerful engine. It has an extended chassis and possibly uses an improved autoloader.

System

Alternative Designation: Zulfiqar-3
Manufacturer: Shahid Kolah Dooz Industrial Complex
In Service: 2012-Present
Type: Main Battle Tank
Family: Zulfiqar Class
Crew: ea3 (commander, gunner and driver)
Passenger Capacity: INA

Dimensions

Length (Gun Forward): m9.4
Length (Hull): m7.2
Width: m3.6
Height: m2.5
Weight, Combat: tons41
Ground Pressure: kg/mINA

Automotive

Engine Name: INA
Engine Type: V-12 Diesel
Engine Power: hp1,000

Power-to-Weight Ratio: 21.7 hp/metric ton

Cruising Range: km450

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.8

Fording Depth: m1.4

Transmission: SPAT 1200 automatic

Day/Night Driving Lights: Yes, mounted on the glacis plate.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note: The Zulfiqar-2 is armed with a fully-stabilized 125-mm smoothbore gun, fitted with an autoloader. This gun and associated automatic loader are understood to be from the Russian T-72 MBT.

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Fume Extractor: Yes

Note: The cannon can fire a wide range of ammunition including HE-FRAG (High Explosive - Fragmentation), APFSDS (Armor Piercing, Fin Stabilized, Discarding Sabot-Tracer) and HEAT (High Explosive Anti-Tank). The cannon is also able to fire AT-11 ATGM (Anti-Tank Guided Missile) named in Russia 9K119 Svir.

↳*Ammunition (Option 1)*

Name: 3VBM3

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

↳*Ammunition (Option 2)*

Name: 3VOF22

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Muzzle Velocity: m/s850

Basic Load: 39 Total Rounds of any 125mm Projectiles

Max Dispersion: 0.23 mrad

Maximum Range: m5,000

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Name: 3VBK27/3BK31 "Start"

Type: High-Explosive Anti-Tank (HEAT)

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Max Dispersion: INA

Maximum Range: m3,000

Charge Type: HEAT

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Anti-Tank Guided Missile (ATGM)

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)

Type: Laser Beam Anti-Tank Guided Missiles (ATGM)

Caliber: mm125

Manufacturer: Degtyarev plant

In Service: 1980's to present

Proliferation: Widely Proliferated

Operational Range: m4,000-5,000

Weight: kg17.2

Diameter: mm125

Basic Load: ea6

Warhead Type: Tandem hollow-charge

Warhead Weight: kg4.5

Speed: Subsonic

Guidance System: 9S516 guidance system

Launch Platform: 125 mm smoothbore guns

Armor Penetration: 700mmm of homogeneous armour

Time to meet Maximum Range: seconds17.6

Control Unit: 9S517 automatic control unit

Voltage Regulator: 9S831 voltage regulator.

Auxiliary Weapon System #1

Note: The Zulfiqar-3 lacks a coaxial machine gun

↳*System*

Name: Type 54 (DShKM)

Type: 12.7 mm Type 54 Heavy Machine Gun

Proliferation: +1 Million

Length, Total: mm1,625

Barrel length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Rate of Fire: rds/min600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: Heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7

Cartridge: 12.7x108 mm

Muzzle Velocity: m/s850

Basic Load: ea1,200

Maximum Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Auxiliary Weapon System #2

Note: The Rheinmetall MG 3, 7.62mm General Purpose Machine Gun is mounted on the front of the turret and is controlled remotely.

↳*System*

Name: Rheinmetall MG 3

Type: 7.62mm General Purpose Machine Gun

In Service: 1960-Present

Manufacturer: Rheinmetall

Proliferation: +1 Million

Weight, Gun Only: kg25.35

Weight, Gun Mounted on Tripod): kg27.5

Length, with the Stock: mm1,225

Length, without the Stock: mm1,097

Barrel Length: mm565

Action: Recoil-operated, roller locked

Rate of Fire: rds/min1,000-1,300

Effective Firing Range (With Sight Adjustment): m200-1,200

Maximum Riring Range (Bipod): m600

Maximum Riring Range (Tripod Mounted): m1,200

Maximum Riring Range (Gun Carriage): m3,000

Maximum Riring Range (Terminal): m7,750

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳***Ammunition***

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s820

Basic Load: ea2,000

Fire Control

Name: Upgraded Fire Control System compared to the Zulfiqar-1 and Zulfiqar-2. Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Thermal Sight Driver: Yes, passive periscope for night driving.

Main Gun Stabilization: Yes

Domestic System: Yes

Laser Rangefinder: Yes

Fire on the Move: Yes

Driver Periscopes: three day periscopes for driving

Protection

Hull Armor: Reinforced composite armor on the front arc.

Turret Armor: Turret mounts a laser-warning pod and the steel is welded providing protection from small arms fire

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Six electrically operated smoke-grenade launchers are mounted on each side of the turret.

Note: An armored skirt covers the wheels and the turret is reinforced

Notes:

The Zulfiqar-3 is the most advanced variant of the Zulfiqar family. It features considerable upgrades to the fire control system, chassis, engine and main gun. The new variant is equipped with the 2A46 125 mm smoothbore cannon with an autoloader, a laser rangefinder and a new fire control system. It is also fitted with a reinforced turret and the wheels are covered by an armoured skirt.

T-55 Russian Main Battle Tank (MBT)





Tiers:



Variants:

- **T-55A:** In 1961, development of improved NBC protection systems began. The goal was to protect the crew from fast neutrons; adequate protection against gamma radiation was provided by the thick armour and a PAZ basic NBC protection system.
- **T-54/T-55 upgrades:** n its long service life, the T-55 has been upgraded many times. Early T-55s were fitted with a new TSh-2B-32P sight. In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough. In 1967, the improved BM8 APDS round, which could penetrate 275 mm thick armour at a range of 2 km, was introduced. In 1970, new and old T-55 tanks had the loader's hatch modified to mount the 12.7 mm DShK machine gun, to deal with the threat of attack helicopters. Starting in 1974, T-55 tanks received the KTD-1 or KTD-2 laser rangefinder in an armoured box over the mantlet of the main gun, as well as the R-123 or R-123M radio set.[10] Simultaneously, efforts were made to modernize and increase the lifespan of the drive train.
- **T-55AM:** upgraded version of the T-55A. It is fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. It entered service in 1983.
- **T-55AM-1:** upgraded version of the T-55AM, powered by a V-46-5M diesel engine, developing 690 hp.
- **T-55AD:** fitted with Drozd active protection system. It also has add-on armor. It entered service in 1983.
- **T-55AD-1:** fitted wit a V-46-5M diesel engine, developing 690 hp.
- **T-55AMV:** fitted with add-on explosive reactive armor and new fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The missile has a range of 4 000 m at daytime and 1 200 m at night. It penetrates 550 mm of rolled homogenous armor. It entered service in 1985.
- **T-55M:** Upgraded version fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. This tank entered service in 1983.
- **T-55M-1:** it is a further upgrade of the T-55M, powered by a V-46-5M diesel engine, developing 690 hp. This tank is also fitted with ballistic computer.
- **T-55MV:** it has improved protection and firepower. It is fitted with add-on explosive reactive armor and improved fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The T-55MV entered service in 1985.
- **T-55MV-1:** fitted with a V-46-5M diesel.
- **T-62A:** an improved T-55 with a stretched chassis, new suspension, new turret. It was armed with a 100 mm gun with improved ballistics. First prototypes were built in 1958 and it was accepted to service in 1962. Only a small number of these tanks were built for experimental service. However it was a forerunner of the T-62 medium tank, that was produced in thousands.
- **TO-55:** flamethrower tank. Coaxial machine gun has been replaced with a flame thrower.
- **BTS-2 and BTS-3:** armored recovery vehicles.
- **MTU-20 and MTU-55:** armored bridgelayers.
- **BTR-T:** is a heavy armored personnel carrier. It was first publicly revealed in 1997. It was converted from obsolete T-55 medium tank. The turret has been removed in order to create a compartment for dismounts. A number of other modifications were made to the vehicle. This armored vehicle has a crew of 2 and accommodates 5 dismounts. The BTR-T received no production orders.
- **Ti-67:** sraeli version, fitted with American M68 105 mm rifled gun. It is also fitted with Israeli fire control system, new engine and transmission and Blazer explosive reactive armor. About 200 T-54/55 tanks, that were captured from Egyptian and Syrian forces, were upgraded to this standard.
- **T-54E Ramzes II:** a proposed upgrade of Egyptian T-54/55 tanks. It is fitted with American M68 105 mm rifled gun, Belgian fire control system, and American Continental AVDS-1790-5A engine.
- **T-55 Enigma:** upgraded Iraqi version, fitted with composite add-on armor. Add-on armor weights a total of 4.6 t, so a

counterweight was mounted at the turret rear. This tank also has improved night vision devices.
- **TR-580:** a Romanian version of the T-55 with a longer hull. An extra road wheel on each side has been added. It is fitted with a different engine. This tank is fitted with metal side skirts.

System

Alternative Designation: T-55

Estimated Out of Service Date: Phased out of service with Russia in the early 1990s. Likely to remain in service with current users until the capital can be raised to replace the vehicles according to defence priorities

Total Built: 86,000–100,000+ est. The T-55 has been used worldwide by as many as 50 countries and quasi-armies. They have been subject to numerous improvements throughout their production history and afterwards and many are still in service today.

Manufacturer: KhPZ, UVZ (Soviet Union) Bumar-Łabędy (Poland) ZTS Martin (Czechoslovakia)

Type: Main Battle Tank

Crew: ea4

Modifications: Modifications to the T-54/55 series over the years have changed almost every aspect of the vehicle. Initially, Soviet modifications included a better turret shape, improved NBC protection and an improved powerplant. Later, improved fire-control equipment and night-vision equipment was added. Foreign improvements, both in Warsaw Pact nations and elsewhere, have further improved protection, powerplant, and firepower. T-54/55s have been re-armed with improved tank guns, AA machine guns, advanced armour arrays, and technologies, such as laser range finders and computerized fire control systems, that did not exist when the tank was first being built in the early days of the Cold War.

Dimensions

Length: 9.00 m (with gun forward)

Width: 3.37 m

Height: 2.40 m

Weight, Combat: 36 tons

Automotive

Engine Name: Model V-55

Engine Type: V-12 water-cooled. 38.88-l diesel

Engine Power: hp500

Power-to-Weight Ratio: 14.6 hp (10.4 kW) / tonne

Transmision: Mechanical [synchromesh], 5 forward, 1 reverse gears

Fuel Capacity: 580 l internal, 320 l external (less on early T54), 400 l jettisonable rear drums

Cruising Range: INA

Speed, Maximum Road: km/h48

Speed, Average Cross: km/h25

Speed Maximum Swim: Not Amphibious

Fording Depth: m1.4 unprep; 5.5 snorkel

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Main Gun

↳*System*

Name: D-10 Tank Gun

Type: Anti-Tank Gun

Caliber: mm100

Length: 5.608 m

Barrel Length: 5.35 m

Weight: 1,438 kg

Loader Type: Manual

Fire on the Move: Yes

Traverse Range: INA

First Round Hit Probability: %60

Bore Activator: Yes, New upgrade

Maximum Elevation: deg+18

Minimum Elevation: deg-3

Breech: Horizontal sliding wedge (semi-automatic)

Recoil: Hydraulic buffer and hydropneumatic recuperator

Carriage: Vehicle mount

Rate of Fire: 4 rounds/min avg 5–6 rounds/min max.

Muzzle Velocity: m/s1,000

Maximum Firing Range: 14,600 m (16,000 yds), or 16,000 m (17,500 yds)

↳*Ammunition (Option 1)*

Name: 3UOF17

Type: HE fragmentation projectile

Caliber: mm100mm

Muzzle Velocity: m/s355

Basic Load: ea45 total of any 100 mm Projectile Combination

Max Range: m7,000

Min Range: mINA

Armor Penetration: Yes

Weight, Complete Round: kg22.9

Weight, Missile: kg19.4

Tank Commander's Weapon System

↳*System*

Name: QJZ-89
Type: 12.7mm Heavy Machine Gun
Manufacturer: NORINCO
Cartridge: mm12.7x108
Weight, Gun Only: kg17.5
Weight,Tripod: kg8.5
Length, Total: mm2,119
Length, Barrel: mm1,003
Barrels: ea1
Action: Gas/Recoil
Rate of Fire: rds/min450-600
Muzzle Velocity: m/s850
Feed System: Belt
Sights: Iron/Optical

↳*Ammunition*

Type: Heavy Machine Gun
Caliber: mm12.7
Muzzle Velocity: m/s850
Basic Load: INA
Max Range: m1,600
Min Range: INA
Armor Penetration: Yes

Anti-Tank Guided Missile

Type: Laser beam-riding anti-tank missile.
Name: 9M117 Bastion
Caliber: mm100
Entered Service: 1981
Muzzle Velocity: m/s400-500
Basic Load: ea8
Maximum Effective Range: m4,000
Rocket Burn: seconds6
Rocket Motor Ignites Time: seconds1.5

Guidance: Beam-Riding Laser

Prone to Radio or Optical Jamming: No

Missile Flight Time: m4,000

Self Destruct Time: seconds24-41

Fire Control

Name: INA

Computerized FCS: INA

Laser Rangefinder: KTD-1 or KTD-2

Night Sight: TPN-1-22-11 night sight

Protection

Hull Armor: 120 mm hull front at 60° (100 mm after 1949) 79 mm hull upper sides 20 mm hull lower sides 60 mm at 0° hull rear 20 mm hull bottom 33-16 mm hull roof

Turret Armor: 205 mm turret front 130 mm turret sides 60 mm turret rear 30 mm turret roof

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: Roller-plow available, In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough.

Self-Entrenching Blade: No

NBC Protection: Yes, PAZ (Protivoatomnaya Zashchita) NBC protection system

Smoke Equipment: grenlaunch/eng smk sys

Note: The T-55 focuses most of its armour around the front 60 deg arc.

Notes:

The T-54 and T-55 tanks are a series of Soviet main battle tanks introduced in the years following the Second World War. The first T-54 prototype was completed at Nizhny Tagil by the end of 1945. Initial production ramp up settled for 1947 at Nizhny Tagil, and 1948 for Kharkiv were halted and curtailed as many problems were uncovered; the T-34-85 still accounted for 88 percent of production through the 1950s. The T-54 eventually became the main tank for armoured units of the Soviet Army, armies of the Warsaw Pact countries, and many others. T-54s and T-55s have been involved in many of the world's armed conflicts since the later part of the 20th century. The T-54/55 series eventually became the most-produced tank in military history. Estimated production numbers for the series range from 86,000 to 100,000. They were replaced by the T-62, T-64, T-72, T-80 and T-90 tanks in the Soviet and Russian armies, but remain in use by up to 50 other armies worldwide, some having received sophisticated retrofitting. During the Cold War, Soviet tanks never directly faced their NATO adversaries in combat in Europe. However, the T-54/55's first appearance in the West around the period of the 1950s (then the beginning of the Cold War) spurred the United Kingdom to develop a new tank gun, the Royal Ordnance L7, and the United States to develop the M60 Patton. Trials with nuclear weapons showed that a T-54 could survive a 2–15 kt nuclear charge at a range of more than 300 metres (980 ft) from the epicentre, but the crew only had a chance of surviving at 700 metres (2,300 ft). It was decided to create an NBC (nuclear, biological, and chemical) protection system which would start working 0.3 seconds after detecting gamma radiation. The task of creating a basic PAZ (Protivoatomnaya Zashchita) NBC protection system offering protection against the blast of a nuclear explosion and (radioactive) particulate filtration, but not against external gamma radiation or gas, was given to the KB-60 design bureau in Kharkiv and was completed in 1956. The documentation was sent to Uralvagonzavod. It was decided to increase the tank's battle capabilities by changing the tank's construction and introducing new production technologies. Many of those changes were initially tested on the T-54M (Ob'yekt 139). The tank was fitted with the new V-55 12-cylinder 4-stroke one-chamber 38.88 litre water-cooled diesel engine developing 581 hp (433 kW). Greater engine power was accomplished by increasing the pressure of the fuel delivery and charging degree. The designers planned to introduce a heating system for the engine compartment and MC-1 diesel fuel filter. The engine was to be started pneumatically with the

use of an AK-150S charger and an electric starter. This eliminated the need for the tank to carry a tank filled with air. To allow easier access during maintenance and repairs, it was decided to change hatches over the engine compartment. To increase the operational range, 300 litres (66 imp gal; 79 US gal) fuel tanks were added to the front of the hull, increasing the overall fuel capacity to 680 litres (150 imp gal; 180 US gal). The ammunition load for the main gun was increased from 34 to 45, with 18 shells stored in so called "wet containers" located in hull fuel tanks (the concept for which came from Kartsev's cancelled Ob'yekt 140). The ammunition load included high explosive-fragmentation and anti-tank rounds and designers also planned to introduce the BK5M HEAT rounds which penetrated 390 millimetres (15 in) thick armour. The TPKU commander's vision device was replaced by either the TPKUB or TPKU-2B. The gunner received a TNP-165 vision device. The loader's hatch-mounted 12.7 mm DShK anti-aircraft heavy machine gun was dropped, because it was deemed worthless against high-performance jets. The tank was supposed to be equipped with the "Rosa" fire protection system. The tank had a thicker turret casting and the improved two-plane gun stabilization system from the T-54B, as well as night vision fighting equipment. To balance the weight of the new equipment, the armour on the back of the hull was thinned slightly. The T-55 was superior to the IS-2/IS-3/T-10 heavy tanks in many respects, including the rate of fire of the gun (at least four compared to fewer than three rounds per minute). Despite somewhat thinner frontal turret armour (200 millimetres (7.9 in) instead of 250 millimetres (9.8 in)) it compared favourably with the IS-3, thanks to its improved antitank gun and better mobility. Heavy tanks soon fell from favour, with only 350 IS-3s produced. The old model of highly mobile medium tanks and heavily armoured heavy tanks was replaced by a new paradigm: the "main battle tank". Parallel developments in the West would produce similar results. Kartsev combined all the ongoing improvements being offered, or planned, on the T-54 into one design. This became the Ob'yekt 155, and entered production at Uralvagonzavod 1 January 1958 as the T-55. It was accepted for service with the Red Army on 8 May. It suffered a significant lapse in one area: there was no antiaircraft machine gun, which had been present on the T-54. After 1959, it served as a basis for the T-55K command tank which was equipped with an additional R-112 radio set, an AB-1-P/30 fuel powered accumulator charging unit, and TPN-1-22-11 night vision sight. All this additional equipment made it necessary to decrease the ammunition load for the main gun to 37 rounds and eliminate the bow machine gun. In the beginning of the 1960s, a T-55K was experimentally fitted with a Uran TV relay apparatus for battlefield surveillance. The tank was fitted with an external camera, the picture from which was relayed to a receiver in a BTR-50PU command vehicle. There was an observation camera mounted on a folding mast which was in turn mounted on a UAZ 69 car. The range within which the picture could be relayed varied between 10 and 30 kilometres (6.2 and 18.6 mi). In 1961, a T-55 tank was used to test the "Almaz" TV complex, which was supposed to replace the standard observation devices right after a nuclear explosion or while fording a body of water. There was a camera mounted on the hull for the driver and two cameras mounted on the turret, one for aiming and one for observation, and the picture from the cameras was relayed to two control screens. The tank had the front hull fuel tanks and bow machine gun removed. The commander was seated in the driver's usual position while the driver sat next to him. The cameras allowed battlefield observation and firing during daytime at ranges between 1.5 and 2 kilometres (0.93 and 1.24 mi). Because of the low quality of the equipment, the trials gave negative results. In the beginning of the 1960s, the OKB-29 design bureau in Omsk was working on adapting the tank to use a GTD-3T gas turbine engine developing 700 hp (522 kW). One T-55 tank fitted with this gas turbine engine passed trials but was deemed unsatisfactory and the design did not go into production. The Omsk OKB-29 group tested three experimental T-55 tanks (designated Ob'yekt 612) between 1962 and 1965 that were fitted with an automatic gearbox controlled by electro-hydraulic systems. The trials found that such gearboxes were prone to frequent breakdowns in tanks. At the same time the Ob'yekt 155ML, a T-55 fitted with a launcher for three 9M14 "Malyutka" (NATO code: AT-3 Sagger) ATGMs mounted on the rear of the turret, was tested. Along with standard tanks a flamethrower-armed version was designed (designated TO-55 (Ob'yekt 482)), which was produced until 1962. It was fitted with 460 litre tanks filled with flammable liquid instead of the frontal hull fuel tanks. The flamethrower replaced the coaxial machine gun. This was a much better way to mount a flamethrower than in the experimental Ob'yekt 483, based on the T-54 tank, where the flamethrower replaced the main gun. TO-55 flamethrower tanks were withdrawn from service in 1993.

ZTZ-96A (Type 96) Chinese Main Battle Tank (MBT)







Tiers:



Parent:

Type 96 (ZTZ96) Chinese Main Battle Tank (MBT)

Variants:

- **Type 96:** Domestic version of Type 85-IIM. Also sometimes mistakenly referred to as the Type 88C.[8] Renamed Type 96 when put into PLA service.[1] In comparison to the Type 85 and Type 88, the Type 96 features a more powerful engine, improved electronics and a western-style turret. Type 96 was accepted by the PLA in 1996.
- **Type 96B:** Variant first seen in July 2016 loaded on a Russia-bound train to participate in the 2016 Tank biathlon. It is equipped with an improved engine, improved high-performance gun with an upgraded fire-control system, new transmission, chassis, ventilation, communications and computer systems, exhaust and suspension. Additionally it features an independent commander sight and lighter, more reliable running wheels. The specifications of the upgraded engine are unknown but is speculated to produce between 1,000 and 1,200 horsepower
- **VT-2:** Export variant of Type-96A. Debuted at the 2012 Defence Services Asia Exhibition. Can be equipped with Remote Weapons Station and has a maximum speed of 70 km/h (on road). Capable of turning on its own axis.

System

Alternative Designation: Type 96A, ZTZ-96Gai; Type 96G

Manufacturer: First Inner Mongolia Machinery Factory

Type: Main Battle Tank

Family: Type 96 Main Battle Tank Family

Crew: ea3

Note: The Type 96A looks different from the Type 96 because of the additional arrow shaped armor on the turret front and the extra ERA plates

Dimensions

Length (Hull): m6.33

Length (Gun Forward): m10.65

Width: m3.45

Height: m2.30

Weight, Combat: tons46

Ground Pressure: kg/m0.77

Automotive

Engine Name: 12150ZLC

Engine Type: V12 turbocharged diesel

Engine Power: hp900

Additional Fuel Capable: Yes, 400 Liters

Cruising Range: km400

Speed, Maximum Road: km/h65

Speed, Maximum Off Road: km/h45

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg40

Vertical Step: m0.8

Trench: m2.7

Fording (Without Preparation): m1.4

Fording (With Preparation): m5

Suspension: Torsion Bar

0 to 60 Time: seconds21

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: 125 mm L50 ZPT-98

Type: 125mm Smoothbore Gun

Max Rate of Fire (Automatic Loading): rds/min8

Max Rate of Fire (Manual Loading): rds/min1-4

Length (Barrel): mm6,000

Barrel Type: 1 with a sliding gun barrel and a smoke evacuator in the middle

Loader Type: Autoloader

Thermal Sleeve: Yes, Light Alloy

Bore Evacuator: Yes

Barrel Life: rounds800

Loader Type: Carousel auto-loader and Manual Loading capable

Launch Mode: Single Shot

After: Wedge Cross

Recoil: Hydraulic and pneumatic

Note: The L50 ZPT-98 can replce the barrel without removing the turret

↳*Ammunition (Option 1)*

Type: High Explosives (HE)

Caliber: mm125

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Muzzle Velocity: m/s850

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m4,000

Minimum Effective Range: mINA

Max Dispersion: mrad0.23

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Round Weight: kg33

Projectile Weight: kg23

Fragments: ea2,500

Armor Penetration: Yes

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 2)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Muzzle Velocity: m/s915

Basic Load: 42 total rounds of any 125mm Projectiles

Max Dispersion: INA

Maximum Effective Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Fragments: INA

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

↳*Ammunition (Option 3)*

Type: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS) Rounds.

Name: 3VBM?/3BM69 "Vacuum-1"

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 42 total rounds of any 125mm Projectiles

Maximum Effective Range: m3,000

Projectile Dimension: mm900

Round Weight: INA

Projectile Weight (Estimated): kg11

Armor Penetration: mm1,000

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Tank Commander's Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.72mm Heavy Machine Gun

Manufacturer: Norinco

Date of Introduction: 1985

Max Rate of Fire: rds/min700-800

Length (Total): mm1,192

Length (Barrel): mm658

Diameter: mmINA

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas-operated, open bolt

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4 (Foreign): BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s840

Basic Load: ea2,250

Effective Range (With Sight Adjustments): m100-1,500

Armor Penetration: Available

Loader's Weapon System

↳*System*

Name: QJG89

Type: 12.7mm Heavy Machine Gun

Manufacturer: INA

Max Rate of Fire: rds/min400-600

Length (Total): mm2,119

Length (Barrel): mm1,003

Weight (Gun Only): kg18.5

Weight (Tripod): kg17.5

Action: Gas Operated

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7x108

Muzzle Velocity: m/s825

Basic Load: ea500

Effective Range (vs. Air): m1,500

Effective Range (vs. Ground): m2,000

Feed System: Belt fed, 50 rounds

Action: Hybrid direct impingement and short recoil

Fire Control

Name: New Updated FCS, ISFCS-213

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Maximum Night Vision Distance: m1,500

Main Gun Stabilization: Dual axis gun stabilisation

Periscopes: ea3

Rangefinder: Laser

Sights, Maximum Distance (Day): m5,000

Ballistic Computer: Yes

Sights, Maximum Distance (Night): m1,200

Step Motor Driver: Yes

Crosswind Velocity Sensor: Yes

Note: The Type 96 is unable to perform hunter-killer engagements

:

Protection

Hull Armor: Type 96: Composite armor, FY Series ERA Added

Turret Armor: Type 96: Composite armor, FY Series ERA Added.

Turret Protection: 670mm of RHAe

Applique Armor: Available, Track Skirts

Explosive Reactive Armor: FY Series ERA

Active Protection System: INA

Mine Clearing: Roller-plow available

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Grenlaunch 12x; VESS

IR Signature: INA

Grenades: Six 76mm grenades are equipped on each side of the turret

Automatic Fire Suppression System: Yes

Jammer: JD-3 IR Jammer

Note: The RY Series ERA is capable of protecting the Type 96A against single or multiple HEAR projectiles and the manufacturer claims the ERA can withstand SABOT Rounds.

Notes:

The ZTZ-96A (Type 96) that entered service in 2006, it reflects the developments made in Chinese tank design such as the arrow shaped add on turret armour also found on the Type 99. The vehicle described below is offered for export in the format described below with the designation of VT2.A total of 42 rounds are carried. Additional "arrow shaped" modular armor similar to the Type 99 is installed on the turret front. The back of the hull is now completely flat compared to the Type 96. The Type 96A was first revealed in 2006, but in-service tanks were first seen in a military parade in 2009. The ZTZ-96A (Type 96) is a third-generation upgrade of the Type 96. Its internal electronics may have been upgraded to Type 99 standards. The visual profile of the ZTZ-96A (Type 96) is similar to the Type 99. However, the Type 96A can be distinguished from the Type 99 by the driver's position of the left side of the hull. FY-4 ERA was added on front upper glacis.The vehicle is equipped with a thermal imager. Features an upgraded 800 hp engine. A laser defense system similar to the Shtora has been installed as well.[Electro-optical jammers which are able to jam enemy guided missiles, rangefinders, and designators are found on the tank.

T-14 Armata Russian Main Battle Tank





Tiers:



Variants:

- **T-16 Armata BREM:** Armored recovery version with the T-14 chassis. The standard turret of the T-14 is removed and replaced by a small, remotely operated, weapon station armed with a Kord 12.7mm caliber heavy machine gun. A crane is mounted on the right side on the top of the hull which is protected at the front with slat armor.

System

Alternative Designation: T-14 Armata
Crew: ea3
Passenger Capacity: NA
Maximum Effective Range: m8,000
Meteorological Mast: Yes
Satellite Communications: Yes
Global Navigation Satellite System (GLONASS): Yes

Dimensions

Length: m8.7
Width: m3.5
Height: m3.3
Weight, Combat: 55 tons (sources range from 48 tons to 65 tons)
Ground Pressure: kg/mINA

Automotive

Engine Name: ChTZ 12N360 (A-85-3A)

Engine Type: Diesel

Engine Power: hp1,500-2,000

Power / Weight: hp/t31

Transmission: 12-speed automatic

Cruising Range: km500

Speed, Maximum Road: km/h80-90

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.8

Fording without Preparation: m1.2

Fording with Preparation: INA

Communications

Data-link and Radio Communications Antennae: Yes

Primary Tactical Radio: R-168 Akveduk

Note: It is anticipated that the T-14 Armata will have a modern suite of digital and FM communication capabilities.

Main Gun

Note: The T-14 is equipped with a unmanned Turret mounting a 125mm 2A82-1M smoothbore gun fed by an automatic loader. The turret carries a total of 45 rounds of ammunition, including ready-to-use ammunition.

↳*System*

Name: 2A82-1M (later versions may have the 2A83, 152mm cannon)

Type: Smoothbore Cannon

Caliber: mm125

Length: m7

Weight: kg2,675

Loader Type: Automatic Loader

Autoloader Basic Load: 32 ready-to-use rounds

Range Finder Type: Laser

Maximum Range: m8,000

Max Rate of Fire: rds/min10-12

Sustain Rate of Fire: INA

↳*Ammunition (Option 1)*

: 3VBM3/3BM9/10
Type: APFSDS
Caliber: mm125
Muzzle Velocity: m/s1,800
Basic Load: 45 rounds, 32 rounds in the autoloader
Effective Range: km3
Armor Penetration: mm140

↳*Ammunition (Option 2)*

Name: 9M119 Svir, 9M119M Refleks
Type: Laser beam ATGM
In Service: 1980 to present
Manufacturer: Degtyarev Plant
Mass: kg17.2
Diameter: mm125
Warhead Type: Tandem hollow-charge
Warhead Weight: kg4.5
Basic Load: 45 rounds, 32 rounds in the autoloader
Operational Range: m5,000
Guidance: Laser beam riding

↳*Ammunition (Option 3)*

Name: 3VBK7/3BK12
Type: HEAT-FS
Caliber: mm125
Muzzle Velocity: m/s950
Effective Firing Range: m4,000
Shell Weight: kg29
Projectile Weight: kg19
Basic Load: 45 rounds, 32 rounds in the autoloader
Charge Weight: kg5
Penetration: mm220

↳*Ammunition (Option 4)*

Name: 3VOF22/3OF19
Type: HE-Frag-FS

Round Weight: kg33

Muzzle Velocity: m/s850

Projectile Weight: kg23

Basic Load: 45 rounds, 32 rounds in the autoloader

Charge Weight: kg3.4

Auxiliary Weapon System #1

Note #1: Note #1: The T-14 is equipped with a Remotely-Controlled Weapon Station (RCWS). The RCWS can mount one machinegun of either one medium 7.62mm machine gun or a 12.7mm heavy machine gun.

↳*System*

Name: Kord 12.7mm Machine Gun

Type: 12.7mm

In Service: 1998-Present

Manufacturer: V.A. Degtyarev Plant

Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

Length: mm1,980

Weight: kg25.5

Action: Gas-operated, rotating bolt

Rate of Fire: rds/min650-750

Effective Firing Range: m2,000

Feed System: 50-round linked belt

Sights: Iron Sights

↳*Ammunition*

Type: Armor Piercing

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s860

Basic Load: ea300

Effective Range: m2,000

Maximum Effective Range vs Aircraft: m1,000

Maximum Effective Range vs Armor: m800

Maximum Effective Range vs Ground Targets: m2,000

Maximum Range: m7,850

Auxiliary Weapon System #2

Note #1: The T-14 is equipped with a Remotely-Controled Weapon Station (RCWS)

↳*System*

Name: 7.62mm PK (Kalashnikov's) Machine

Type: 7.62mm Machine Gun

Caliber: mm7.62

In Service: 1961-Present

Length: mm1,203

Barrel length: mm605

Weight: kg9

Max Rate of Fire: rds/min800

Sustain Rate of Fire: rds/min250

Action: Gas-operated, open bolt

Maximum Firing Range: m3,000

Effective Firing Range: m1,000

Feed System: Non-disintegrating metal 50 round belts in 100, 200, and 250 round boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Ball

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: rds/min1,000

Effective Range: m1,500

Armor Penetration: INA

Maximum Firing Range: m4,000

Fire Control

Name: Kalina System

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Battle Field Management System: Yes

Laser Rangefinder: Yes

Cameras: Several cameras provide for a 360 degree visual coverage

Automatic Target Tracker: Yes

Protection

Hull Armor: 44S-sv-Sh: effective to 900mm vs Sabot and 1400mm vs HEAT.

Turret Armor: Lightly armored; relies on APS.

Applique Armor: Capable

Explosive Reactive Armor: Malachit dual ERA (4th Gen) can reduce penetration of APFSDS and HEAT rounds by 50%.

Active Protection System: Yes, Afghanit (similar to Israeli "Trophy"); NII Stali Upper Hemisphere Protection Complex; AESA radar slaved to the AA machine gun.

Mine Clearing: Yes, the T-14 has a active mine countermeasure system.

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes

IR Signature: Can warn of electro-optical and infrared interrogation.

Note: There are reports that the T-14 will be equipped with STANAG 4569 Level 5 protection.

Notes:

The T-14 MBT can be a significant capability to Russia’s tank fleet once a substantial number of T-14s appear in operational units. Although varied ways exist to classify tanks by characteristics of weight, roles, or main armament, current tank design descriptions sometimes blur terms, such as main battle tank versus medium tank. Overall size of a tank appears less important than developments to optimize technological advantages in automotive performance, weapon system lethality, and vehicle and crew survivability within a general category of main battle tank.The Armata chassis now presents the ability to apply major improvements to Russia’s tank fleet that were previously constrained by the chassis and turret dimensions of the basic T-72 MBT design and those of its predecessors. Some of the most significant changes in the T-14 design, besides its visual dimensions, are— • Unmanned turret with a 125mm main gun and autoloader of main gun ammunition from a cassette within the turret base, and a remotely-controlled weapon station (RCWS) on top of the turret that mounts one medium 7.62mm machine gun (there is no machine gun mounted coaxially to the main gun); • Crew compartment capsule separated and protected from the turret and main gun ammunition to enhance crew survivability if turret area stored ammunition experiences a catastrophic explosion; • Vehicle survivability armor appliques and active protection systems that improve the probability to defeat main gun, missile, large rocket-propelled grenade, and mine threats; and • Improved automotive engineering, crew situational awareness systems, weapon system effectiveness, and digital command and fire control systems. The larger dimensions of the T-14 allow for future design modifications as Russian requirements evolve and technology advances. Although some designers suggest a fully-robotic Armata vehicle could be considered in the future, or that a larger cannon or gun could be mounted to the Armata MBT, neither robotics nor a larger main weapon appear to be in the current program. Other capability claims have yet to be fully substantiated, such as radically-reduced emission signatures to diminish or negate infrared or thermal detection. T-14 Main Battle Tank System Description Although several specific capabilities of the T-14 remain to be proven in public forum, Russian defense industry and government sources state several aspects of this advanced weapon system are quite impressive. Examples from open source material, as well as some speculation of capabilities in the T-14, are as follows: Crew Compartment The tank crew is three individuals: tank commander, gunner, and driver. When viewing the MBT from in front of the tank, the commander is on the left side, the driver is on the right side, and the gunner is positioned in the middle of the crew compartment. Interior views of the crew capsule from Russian promotional videotapes show much more crew space than in previous Russian tank hull or turret compartments. Design aspects of ergonomics and crew efficiencies greatly improve conditions from the cramped crew space of earlier Russian tank designs. Digital displays span the entire width of the crew capsule compartment and illustrate the computerized nature of the T-14 command and fire control systems. Automotive Performance Some reports estimate a turbocharged diesel engine capable of producing up to 1500 horsepower (hp) that functions with an automatic transmission.11 However, other comments indicate that an engine is being tested that operates more typically in the 1200–1350 hp range. The gross vehicle weight estimate is approximately 57 metric tons.This weight is realistic versus early open source speculation that the T-14 would remain in the relative weight category of 46 to 48 metric tons of the T-90 MBT series. Some reports suggest that an improved basic armor composite might reduce overall weight of the tank by hundreds of kilograms.Nonetheless, length, height, and width comparisons of the T-14 with a T-90 series MBT suggest that the T-14 is heavier than the T-90 MBT. Cruising range in favorable terrain is approximately 500 kilometers, and the maximum speed in field conditions may exceed 80 kilometers/hour. An adjustable suspension system assists in greater mobility and improved target engagement in rugged or sloped terrain. Improved engine and transmission

capabilities enhance more effective driver operations and maneuverability. The larger chassis has seven road wheels rather than the six of most former tank designs. Armament The main armament is a 125mm 2A82-1M smoothbore gun. The main gun tube has a thermal sleeve and a muzzle reference system. However, the main gun barrel does not have a bore evacuator on the gun barrel, which is very visible in many other tank models. This is different from most tanks, since the unmanned turret of the T-14 does not have the requirement of previous tank models to evacuate fumes for the crew in the turret after firing the main gun. The T-14 has an integrated fume extractor. The main gun fires three types of conventional ammunition and an antitank guided missile. The armor-piercing fin-stabilized discarding sabot round has a heavy-metal alloy tungsten-based penetrator. A high-explosive fragmentation (HE-FRAG or HEF) round has the capability to be detonated over a target, as well as to engage a target using direct line-of-sight. With an Ainet system, targets can be engaged by HEF rounds with a special electronic detonator at extended distances and within the acquisition of the laser rangefinder. This capability allows engagements several kilometers beyond the typical range of main gun direct fire. A tank gunner must lase to a target before this HEF round is loaded into the gun breech. With the registered laser targeting data, the system automatically sets the fuse to detonate at the designated distance. This type of fragmentation round can be particularly effective on infantry, light armor or vehicles in entrenched positions, or hovering helicopters. The other typical main gun round is high explosive antitank (HEAT)—a shaped charge—that can defeat various types of armor or materiel targets. Special main gun rounds such as antipersonnel canister are available, when required, in a tank's ammunition combat load for particular mission conditions, but are not promoted in the typical ammunition on-board load. The T-14 carries up to 45 main-gun rounds. An autoloader system in the hull stores up to 32 rounds of ammunition for immediate use. The mix of stowed 125mm rounds can be adjusted depending on how many antitank guided missiles are configured for a tank's combat load of ammunition. One auxiliary weapon is a 7.62mm machine gun or a 12.7mm Kord Machine Gun turret mounted in a remote-controlled weapon station atop the turret, with a full 360-degree traverse capability. The ability to engage ground and aerial targets spans a depression of -5 degrees to an elevation of +75 degrees. The RCWS carries up to 500 rounds of machinegun ammunition for immediate use. Additional ammunition is stowed to manually replenish the weapon station. Antitank Guided Missile Launcher The main gun can fire an antitank guided missile (ATGM), Sprinter, with a tandem HEAT warhead. The tandem warhead reduces the protection provided by modern types of armor, to include variants in the appliques of explosive reactive armor (ERA). The missile tracks with semiautomatic laser beam-riding guidance controlled by the tank gunner and has a maximum range of 5,000 meters.Earlier versions of ATGM Refleks (AT-11), or Sniper as its NATO designation, can also range five kilometers. Although a tank-to-target track could be feasible at this missile maximum distance, tactical conditions can typically limit effective long-range ATGM engagements. Fire Control The tank houses an advanced fire control system and battlefield management system. The commander has an independent sighting system from the gunner's sight to assist in targeting and tactical situational awareness. A panoramic sight mounted on top of the turret complements optics with improved day and night acquisition, and complements thermal imaging and integrate laser range-finding for acquisition and tracking of targets. This provides a tank commander-to-gunner hunter/killer capability to identify multiple targets and pass engaging a target to the gunner while the tank commander acquires and tracks additional targets. Several cameras mounted on the T-14 provide for 360-degree visual coverage and situational awareness of the tank's immediate surrounding area. Fire control system components of the Kalina system in the T-14, including the automatic target tracker and fire control computer, are also being planned for use in the modernization upgrade to selected T-72 and T-90 MBTs. The T-72B3 and T-90 MBTs selected for upgrading are already fitted with an earlier version of the Kalina computerized fire control system (FCS). The most current FCS version is installed in the T-14 MBT. This modularity concept and example of modernization of other tanks in Russia's tank fleet will significantly improve the capabilities of acquisition, tracking, and engagement of targets for probability of a first-round target hit or kill. Protection Additional armor protection applique, a norm among modern MBTs, is visible on the T-14 turret, front glacis, and along each side of the tank from the front glacis to about three-quarters the length of the tank. The remaining one-quarter side-to-rear area of the T-14 mounts bar/slat armor. Other applique armor provides a degree of protection to other areas of the tank. The T-14 has a new advanced ERA suite according to Russian production sources. An ERA called Malachit may provide a significant increase in tank hull and turret protection from kinetic penetrator and shaped charge main gun rounds, guided missiles, or large rocket-propelled grenades.30 Russian sources state, "specifications exceed those of Kontakt-1, Kontakt-5, and Relict 9 [ERA systems]." Metal-ceramic plates comprise the vehicle main armor of this new tank, and Russian sources claim the new metal-ceramic armor applied to the T-14 MBT has "one-and-a-half times more resistance than fully metal systems." The T-14 has active protection systems (APSs). The Afghanit system comprises five launch "hard-kill" tubes recessed under the left and right side of the turret base. Detection by radar of an incoming threat by the APS causes a launcher to automatically slew toward the incoming projectile, intercept it with a counter-projectile, and defeat its trajectory to the tank. Four "soft-kill" countermeasure launchers complement overall protection of the tank. Two launchers on rotating pedestals carry twelve small charges in each pedestal to counter attacks from the flanks. Two other launchers orient upward to counter incoming engagements from above the tank. The launch of these projectiles are soft-kill in that they create a thick, multi-spectral smoke screen that obscures to defeat the tracking lock by guided missiles, laser, or similar targeting systems and weapons. The manufacturer describes its operation to disrupt the guidance system of precision-guided munitions as a "powerful electromagnetic pulse or the creation of securable multispectral aerosol cloud." The T-14 may also have a vehicle engine exhaust smoke system capability. This provides the ability to produce a smoke screen, as in previous Russian tank models, by injecting diesel fuel into the exhaust channel outlet, which creates a thick cloud of obscurant. An active mine countermeasure system, mounted on the lower front edge of the tank hull, can detect and disable some types of mines in front of the tank. Mounting a retractable blade under the front slope of the tank, as in some previous tank designs, allows for limited self-entrenchment and protection to create an expedient fighting position with multiple scrapes by the blade. Other protection means counter aspects of chemical, biological, radiological, and nuclear weapons. Source: The information provided above is from the January 2017 article titled "T-14 Gun-Missile Tank for the Russian Federation," by Jon H. Moilanen published in the

Osorio Brazilian Main Battle Tank (MBT)







Tiers:

1 2 **3** 4

System

Alternative Designation: Brazilian Osorio Main Battle Tank
Type: Tank
Manufacturer: Engesa
Crew: ea4

Dimensions

Length (gun forward): m10.1
Barrel Length: m2.97
Width: m3.2
Height: m2.37
Weight, Combat: t43.7
Hull Length: m7.13

Automotive

Engine Name: Dutch MWM TBD 234
Engine Type: Diesel
Engine Power: hp1040
Cruising Range: km550
Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m1.15

Fording Depth, without Preparation: m1.2

Fording Depth, with Preparation: m2

Ditch: m3

Main Weapon System

↳*System*

Name: GIAT G Smoothbore Gun

Type: Machine Gun

Length, Barrel: mm120

Weight: kg3500

Muzzle Velocity: APFSDS: 1790m/s or HEAT: 1100m/s

Maximum Rate of Fire: rds/m12

Maximum Elevation: deg18

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: INA

Effective Firing Range: APFSDS: 4,000m or HEAT: 3,000m

Sights: SCS-5 and LRS-5

Note #1:: Main gun is stabilized in two planes. It's aiming and turret rotation devices are based on electricity. LRS-5 is combined periscope type sight. It combines optical sight with day and thermo vision night channels, also laser rangefinder and ballistic computer. Commander's sight differs from gunners in absence of laser rangefinder and ballistic computer. It is placed in commanders turret and connected with a main gun. Commander is able to aim and to fire independently from gunner. Tank's commander use 5 periscopes for 360 degree observation.

↳*Ammunition*

Name: OFL G1

Type: APFDS

Caliber: mm120

Basic Load: 38 rounds

Complete Round: kg18.7

Projectile: kg6.3

Weight, sabot: kg3.8

Material, sabot: Tungsten

Muzzle velocity: m/s1650

Armor Penetration: 500mm @ 2000m

Note #1:: It also fires APFSDS, HE, HESH, HEAT, APERS, WP, and canister rounds.

Coaxial Weapon System

↳*System*

Name: MG3

Type: General Purpose Machine gun

Caliber: mm7.62

Length, Barrel: mm565

Weight: kg11.5

Muzzle Velocity: m/s820

Maximum Rate of Fire: rpm1000-1300

Maximum Elevation: INA

Minimum Elevation: INA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: m600

Effective Firing Range: m200-1200

Magazine: INA

Sights: Open tangent iron sights

Note #1:: The other weapon system is located on the top of the roof.

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: mm7.62x51NATO

Basic Load: rd1000

Armor Penetration: Yes

Auxiliary Weapon System

↳*System*

Name: M2Browning .50 Caliber Machine Gun
Type: Heavy Machine gun
Caliber: mm.50
Length, Barrel: mm1143
Weight: kg83.78
Muzzle Velocity: m/s2910
Maximum Rate of Fire: rds/m450-600
Maximum Firing Range: m7400
Effective Firing Range: m1800
Magazine: INA
Sights: INA
:
:

↳*Ammunition*

Name: INA
Type: INA
Caliber: mm12.7
Cartridge: .50 BMG
Basic Load: rds/m2000
Armor Penetration: INA

Fire Control System

Name: INA
Computerized FCS: Yes
Main Gun Stabilization: Yes
Direct Fire: INA
Indirect Fire: INA

Protection

Hull Armor: Composite armor containing steel, aluminum, carbon fibers and ceramics
Turret Armor: Composite armor containing steel, aluminum, carbon fibers and ceramics
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: Rated to defeat any anti-tank projectile over the frontal arc that was in service in 1986
Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Automatic Fire Suppression: Yes

Notes:

The Engesa EE-T1 Osório was a Brazilian main battle tank prototype. It was developed as a privately funded venture by Engesa, with little government support. It was intended to be sold first to Arab and other Third World countries, jump-starting production — and enabling the Brazilian Army to later place its own orders without having to fund development costs. However macro-political events including the Gulf War and American political pressure led to the tank's demise, and the tank was never acquired by the Brazilian Army.

Leopard 1A3 German Main Battle Tank (MBT)







Tiers:



Variants:

- **Leopard 1:** The Leopard project started in November 1956 in order to develop a modern tank, the Standard-Panzer, to replace the Bundeswehr's American-built M47 and M48 Patton tanks, which, though just delivered to West Germany's recently reconstituted army, were rapidly becoming outdated. On 25 July 1957, the detailed specifications were released; the new design needed to weigh no more than 30 tonnes, have a power-to-weight ratio of 30 horsepower per tonne, be able to withstand hits by 20 mm rapid-fire guns on every side as well as to operate in a battlefield contaminated with chemical weapons or radioactive fallout, the then-standard baseline for combat with the Warsaw Pact. In addition, the main armament had to consist of a 105 mm caliber weapon (the new British L7A3 105 mm gun was selected), carrying at least as many rounds as current US tank designs. Mobility had priority, while firepower came second; armour was seen as less essential, as it was believed that no real protection against hollow charge weapons was possible anyway.
- **Leopard 1A1:** After the first batch was delivered, the next three batches were the Leopard 1A1 model, which included a new gun stabilization system from Cadillac Gage that allowed the tank to fire effectively on the move. The 1A1 also added the now-famous "skirts" along the sides to protect the upper tracks, and a new thermal jacket on the gun barrel to control heating. A less important change was to use rectangular rubber blocks fastened to the treads with a single pin instead of the earlier two-pin "shaped" versions. The rubber blocks could be easily replaced with metal X-shaped crampons for movement on ice and snow in the winter.
- **Leopard 1A2:** The first 232 tanks of the fifth production batch were delivered as the Leopard 1A2 between 1972 and 1974. The A2 included a heavier and better armoured turret, and therefore did not receive the B&V armour add-ons as did the earlier machines. However, they did receive the other upgrades; the Leopard 1A2A1 received the PZB 200, the Leopard 1A2A2 received digital radios, and the Leopard 1A2A3 got both.
- **Leopard 1A3:** The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.
- **Leopard 1A4:** The Leopard 1A4 formed the sixth batch of 250 vehicles, delivery starting in 1974. The 1A4 was externally similar to the 1A3, but included a new computerized fire control system and the new EMES 12A1 sighting system to aim it. In addition, the commander was provided with his own independent night sighting system, the PERI R12. The new equipment used up space and the ammunition load was reduced to 55 rounds, of which 42 were stored in the magazine to the left of the driver.
- **Leopard 1A5:** In 1980, a research program was undertaken to study further improvements to the Leopard 1, providing it with a completely modern fire control system and fully effective night/bad-weather vision system. The decision was made to base the upgrades on the earlier models, which were no longer competitive. The resulting Leopard 1A5 was based on 1,225 vehicles of the Leopard 1A1A1 model. The turrets were again modified for the 1A5, both in order to store all of the new equipment, as well as to move more of the ammunition into the rear of the turret, as opposed to the left side of the driver where it had previously been stored. The new turret was also able to mount the newer 120 mm gun from the Leopard 2 if desired, although this option has not been used. After trials, the Krupp-Atlas Elektronik EMES 18 fire control system, which was developed from the EMES 15 used on the Leopard 2, was selected in December 1983. The EMES 18 included two new sights on the top of the turret, and no longer required the "bumps" as did the earlier optical systems. A crucial part of the upgrade was the introduction of more effective ammunition, including new APFSDS rounds. The Leopard tank could also be fitted with bolt-on polycarbonate (Lexan) armour panels, which have increased the effectiveness of the armour. The first modified vehicle was delivered in early 1987. Since then, almost all users of

the Leopard 1 have also applied similar changes to their own vehicles, and in most ways the 1A5 be considered the "standard" Leopard 1 today. In the Netherlands, an improved version equivalent to the A5 called "Leopard 1 Verbeterd" (improved) was developed, the same version is used by the Chilean Army.

- **Leopard 1A6:** The Leopard 1A6 prototype was a single Leopard 1 A1A1 testbed, modified with additional armour on the turret and equipped with a 120 mm L/44 gun. The project was ended in 1987, as the Leopard 2 was in widespread service at this point and the 1A5 offered a more reasonable upgrade path for a fraction of the cost.

System

Alternative Designation: Leopard 1A3

Type: Main Battle Tank

Manufacturer: Krauss-Maffei Wegmann, Munich, Germany Krupp-MaK, Kiel, Germany

Crew: 4 (commander, gunner, loader, driver)

Note: Leopard 1A3: The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armour consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.

Dimensions

Length, Hull: 7.09 m

Length, Gun Forward: 9.54 m

Width: 3.37 m

Height: INA

Tracks Length, on the Ground: 4.24 m

Tracks Width: 0.55 m

Ground Clearance: 0.44 m

Weight, Unloaded: 38,700 kg

Weight, Combat: 40,000 kg

Ground Pressure: 0.86 kg/cm sq

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: 2,282-cu in (37.4-liter) liquid-cooled, 4-stroke, prechamber, inter cooled, turbocharged V-10 multi-fuel

Engine Power: 830 hp at 2,200 rpm

Fuel Capacity: 955 liters

Transmission: ZF 4 HP 250 planetary shifter with hydraulic torque converter; 4 forward/2 reverse gears

Power-to-Weight Ratio: 20.75 hp/metric ton

Suspension: torsion bar, 7 road wheels, rear drive (12- tooth sprocket), front idler, 5 shock absorbs (bump travel 9 in/227 mm, rebound travel 5-6 in/128-156 mm), 4 return rollers

Maximum Speed: 65 km/h

Range, Road: 600 km

Range, Cross-Country: 450 km

Vertical Obstacle: 1.15 m

Trench: 3.00 m

Fording, Unprepared: 1.20 m

Fording, with Preparation: 2.25 m

Fording, with Snorkel: 4.00 m

Gradient: 60 percent

Side Slope: 30 percent

Main Weapon System

↳*System*

Name: 1 x Royal Ordnance L7A3 Rifled Gun

Type: Rifled Gun

Caliber: 105 mm

Length, Barrel: 5.46 m

Muzzle Velocity: INA

Weight: 1,282 kg

Maximum Rate of Fire: 10 rounds per minute (maximum)

Elevation: -9/+20 deg

Traverse: 360 deg

Maximum Firing Range: 4000 m

↳*Ammunition*

Name: L22

Type: Projectile

Caliber: mm105

Basic Load: 60 rounds, 18 ready in turret (Leopard 1A1)

Armor Penetration: INA, Tungsten carbide

Coaxial Weapon System

↳*System*

Name: Heckler & Koch MG5

Type: General Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Heckler & Koch

Length: 1,160 mm

Barrel Length: 550 mm

Height: 239 mm

Width: 120 mm

Weight: 11.20 kg

Action: Gas-operated, rotating bolt

Rate of Fire: 640/720/800 rounds/min

Muzzle Velocity: 840 m/s

Maximum Firing Range: 600–1,000 m

Effective Firing Range: 100–1,000 m

Feed System: Disintegrating DM60/M13 belt in 50-round Gurttrommel or 120-round in separate belt box or from stand-alone ammunition boxes

Sights: Diopter sight or optical sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,250 rounds

Armor Penetration: INA

Auxiliary Weapon System

Note: 1 x 7.62-mm air defense machine gun

Fire Control System

Name: FLP-10/EMES 18 integrated fire control

Computerized FCS: Yes, FLP-10/EMES 18 integrated fire control system with Zeiss thermal imaging system retrofitted to approximately 1,300 German Leopard 1A1/1A2s

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Infrared: Yes, Paint reflects IR

Rangefinder: TEM 2A optical (Leopard 1A2) turret fully stabilized (A3, A4); retrofit of earlier AEG-Telefunken FLER-H modular hybrid computer (1A4 Krupp-Atlas)

Protection

Hull Armor: Glacis 70 mm at 60-deg: Hull Glacis top 25 mm at 83-deg: Hull nose 70 mm at 55-deg: Hull sides 25-35 mm: Hull rear 25 mm at 88 deg: Hull top 10 mm: Hull bottom 15 mm

Turret Armor: Turret mantlet 60 mm; Turret sides 60 mm; Turret rear 60 mm; Turret front 52 mm

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

NBC Protection: Yes, collective

Smoke Equipment: 2 x 4-barrel 3-in (76-mm) smoke generators, one each side of turret

Notes:

The Leopard (or Leopard 1) is a main battle tank designed and produced by Porsche in West Germany that first entered service in 1965. Developed in an era when HEAT warheads were thought to make conventional heavy armour of limited value, the Leopard focused on firepower in the form of the German-built version of the British L7 105-mm gun, and improved cross-country performance that was unmatched by other designs of the era. The design started as a collaborative project during the 1950s between West Germany and France, and later joined by Italy, but the partnership ended shortly after and the final design was ordered by the Bundeswehr, with full-scale production starting in 1965. In total, 6,485 Leopard tanks have been built, of which 4,744 were battle tanks and 1,741 were utility and anti-aircraft variants, not including 80 prototypes and pre-series vehicles. The Leopard quickly became a standard of European forces, and eventually served as the main battle tank in over a dozen countries worldwide, with West Germany, Italy and the Netherlands being the largest operators until their retirement. Since 1990, the Leopard 1 has gradually been relegated to secondary roles in most armies. In the German Army, the Leopard 1 was completely phased out in 2003 by the Leopard 2, while Leopard 1-based vehicles are still widely used in utility roles. The Leopard 2 has replaced the Leopard 1 in service with many other nations as well, with derived vehicles using the Leopard 1 hull still seeing service. Currently, the largest operators are Greece, with 520 vehicles, Turkey, with 397 vehicles and Brazil with 378 vehicles. Most of these vehicles have been upgraded with various improvements to armor, firepower and sensors to maintain their ability to engage modern threats. Leopard 1A3 The next 110 vehicles in the fifth batch were fitted with a new welded turret, which was equipped with a new armor consisting of two spaced steel plates with a plastic filling between them (high-hardness armor, and a wedge-shaped gun mantlet, creating the Leopard 1A3. Although the level of armor area density was equivalent to the A2's new welded version, the internal volume was increased by 1.2 m^3 and the effective protection level was increased by half. The improved TRP 2A independent sight was installed for the commander. Upgrades were identical to the 1A2 models, the Leopard 1A3A1 with the night sights, Leopard 1A3A2 with the new radios, and the Leopard 1A3A3 with both.

→Light Tanks

Type 62-I (ZTQ-62) Chinese Light Tank





Tiers:



System

Alternative Designation: ZTQ-62, WZ-131 (Manufacturer's Designation)
Type: Light Tank
Crew: ea4
Passenger Capacity: NA
Maximum Effective Range: m1,200

Dimensions

Length, Hull: m5.5
Length, Including the Gun Forward: m7.9
Width: m2.86
Height: m2.25
Weight, Combat: kg21,000
Ground Pressure: .71 kg/cm squared

Automotive

Engine Type: Liquid cooled diesel
Engine Power: hp430
Cruising Range: km500
Speed, Maximum Road: km/h60
Speed, Average Cross: km/h35
Speed Maximum Swim: INA
Fording Depth: m1.3
Obstacle, Vertical: m.70
Obstacle, Trench: m2.55

Main Gun

↳*System*

Name: Type 62-85TC
Type: mm85
Range Finder Type: Laser
Elevation: -4 to 20 degrees
Traverse: 360 degrees
Range: m1,200

↳*Ammunition*

Type: APFSDS and HEAT
Caliber: mm85
Muzzle Velocity: INA
Basic Load: rounds47
Effective Range: INA
Armor Penetration: INA

Tank Commander's Weapon System

↳*System*

Name: Type 54
Type: 12.7mm Machine Gun
Rate of Fire: 600rpm

↳*Ammunition*

Type: Heavy machine gun and anti-material rifle cartridge
Caliber: mm12.7 x 108
Muzzle Velocity: m/s850
Basic Load: rounds1,250
Effective Range: km2
Armor Penetration: API: 21mm at 500m and 13mm at 1000m (RHA)

Coaxial Machine Gun and Bow Gun

↳*System*

Name: Type 59T
Type: 7.62mm Machine Gun

Max Rate of Fire: 800rpm

Sustain Rate of Fire: INA

↳***Ammunition***

Caliber: mm7.62

Muzzle Velocity: m/s8,547

Basic Load: 3,500

Effective Range: m460

Armor Penetration: NA

Fire Control

Computerized FCS: No

Thermal Sight Tank Commander: No

Thermal Sight Gunner: No

Main Gun Stabilization: No

Range, Day Sight: INA

Range, Thermal Sight: NA

Laser Range Finder: Yes

Protection

Hull Armor: 16mm on sides

Turret Armor: 32mm to 50mm

Roof and Belly Armor: 13mm

Glacis: 25mm

Lower Glacis: 20mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: Carries two smoke pots

Notes:

The Type 62 light tank appears to be a scaled-down Type 59 main battle tank (MBT) that is used in the reconnaissance role or as an MBT in rugged terrain. The tank was originally designed for use in China's southern river network areas and hilly terrain where heavier vehicles are difficult to deploy. Crew location is identical to the Type 59. The driver sits at the left front of the hull, with the commander and gunner to the left of the turret and the loader to its right. The driver is provided with a single-piece hatch cover that lifts and swings to the left and two standard periscopes for observation over the frontal arc. To the right of the driver are stowed ammunition and a diesel fuel tank. The engine and transmission are at the rear of the hull. The torsion

bar suspension on either side consists of five road wheels with a distinct gap between the first and second wheels. The drive sprocket is at the rear and the idler at the front. The initial road wheel was of a stamped design, similar to that of the Russian PT-76, but has been replaced b y a new design similar to that on the larger T-54A/Type 59 tank. The Type 62 is armed with an 85mm main gun, likely the same as that used on the Type 63 light amphibious tank. It fires fixed ammunition, including armor-piercing discarding-sabot (APDS), high-explosive anti-tank (HEAT) and high-explosive rounds. The turret observation and weapon sighting equipment are the same as that used on the Type 59 tank. It includes a TSh-1A hinged telescopic sight with a magnification of x3.5 and x7 for aiming the main gun and a TPK-1 observation device in the commander's cupola. There are also two roof-mounted MK-4 day periscopes, one for the gunner and one for the loader. A 7.62-mm machine gun is mounted coaxial to the right of the main gun and a 12.7-mm Type 54 heavy machine gun is mounted at the loader's position for anti-aircraft purposes. The Type 62 cannot lay its own smoke screen by injecting diesel fuel into the exhaust. It does carry two smoke pots that can be activated by remote control from the crew compartment. Similar to the Type 59, the Type 62 can be recognized by its squat, dome-shaped cast turret and large space between the first and second road wheels on each side. The Type 62-I version was developed after China's border war with Vietnam in 1979. The modernization included a laser rangefinder for better firing accuracy and a machine gunner protection shield on the turret. Some later variants were also fitted with turret storage racks and hull skirts for additional prot ection against HEAT projectiles.

→Medium Tanks

T-62 Russian Medium Tank





Tiers:



Variants:

- **Note:** T-62 (Model 1962) T-62A (Model 1972) T-62 (Model 1975) T-62D T-62K T-62M Other T-62M upgrades TO-62 flamethrower IT-2 RO -115 T-62 with 120-mm gun TP-62 T-62ME Upgrade Package T-62 upgrade TV-62M ARV KMDB T-62 upgrades

System

Alternative Designation: T-62
Type: Medium Tank
Family: T-62
Crew: 4 (commander, gunner, loader and driver)

Dimensions

Length, Total: m6.63
Length, Gun Forward: m9.33
Width: m3.30
Height: m2.40
Weight, Combat: kg40,000
Weight, Unloaded: kg38,000
Ground Clearance: mm425
Ground Pressure: 0.77 kg/sq cm
Track, Length on Ground: m4.15
Track Width: mm580

Automotive

Engine Name: 1 x V55-5
Engine Type: V-12 water-cooled diesel

Engine Power: hp580

Power-to-Weight Ratio: 4.5 hp/metric ton

Transmission: manual synchromesh transmission; 5 forward/1 reverse gears

Operational Range with Normal Fuel and on Paved Roads: 450 km

Operational Range with Normal Fuel on Dirt Roads: 320 km

Operational Range with External Fuel Tanks: 650 km

Speed, Maximum Road: km/h50

Speed Maximum Swim: km/hNot Amphibious

Fuel Capacity, Internal: 675 liters

Fuel Capacity, External Fixed: 285 liters

Fuel Capacity, External Jettisonable: 400 liters

Suspension: torsion bar, five road wheels, rear drive, front idler, two shock absorbers on each side

Vertical Obstacle: 0.80 m

Trench: 2.80 m

Graident: %60

Fording without Preparation: 1.40 m

Fording with Snorkel: 5.50 m

Main Gun

↳*System*

Name: U-5TS

Type: 115mm Tank Gun

Caliber: mm115

Barrel Length: 6.05 m

Carriage: 115 x 728 mmR

Rate of Fire: 6–10/minute

Muzzle Velocity: 1,600 m/s (APFSDS)

Effective Firing Range: 2,000 m-high target – 1,870 m; 3 m-high target – 2,260 m; 4,000 m AT-12 missile.

Maximum Elevation: deg+17

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳*Ammunition*

Name: 3VBM-1

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS)

Caliber: mm115

Basic Load: 40

Armor Penetration: INA

Note: 0 rounds: typically 12 HVAPFSDS, 6 HEAT and 22 HE-FRAG; also fires 115-mm Sheksna laser-guided missile

Secondary Weapon System

Coaxial Weapon: 7.62-mm PKT Machine Gun with 2,500 Rounds

Anti-Aircraft Weapon: 12.7-mm DShK Machine Gun (T-62A) with 500 Rounds

Fire Control

Name: INA

Computerized FCS: No

Main Gun Stabilization: INA

Commander's Day Sight: 5x magnification, 10-deg field of view (FOV)

Commander's Night Sight: 4.2x magnification, 8-deg FOV, 1,312-ft (400-m) range w/OU-3GK searchlight

Gunner Sight: TSh2B-41u telescope w/3.5x magnification, 18-deg FOV or 7x magnification, 8-deg FOV TPN1-41-11 IR sight w/3.5x magnification, 6-deg

Optics: Some may have laser rangefinder and passive night-vision system

Driving Aids: Some have GPK-48 or -59 directional gyro driving aids; GPK-48 is accurate for 15 min w/out resetting; GPK-59, accurate for 90 min w/out resetting (some have map coordinate and direction indicator;) earlier version was suitable for 100-km grid square and the later version was expanded to 1,000-km grid square

Protection

Hull Armor: front 102-mm sides 79-mm rear 46-mm top 31-mm

Turret Armor: front 242-mm sides 153-mm rear 97-mm top 40-mm hatches 30-mm

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: AZ collective nuclear warning and protection system blower/dust separator removes fallout no chemical or biological agent filters

Smoke Equipment: Generated from the engine exhaust

Notes:

The T-62 is a Soviet main battle tank that was first introduced in 1961. As a further development of the T-55 series, the T-62 retained many similar design elements of its predecessor including low profile and thick turret armor. In contrast with previous tanks, which were armed with rifled tank guns, the T-62 was the first tank armed with a smoothbore tank gun that could fire APFSDS rounds at higher velocities. While the T-62 became the standard tank in the Soviet arsenal, it did not fully replace the T-55 in export markets due to its higher manufacturing costs and maintenance requirements compared to its predecessor. Although the T-62 was replaced in Russia and the successor states of the Soviet Union, it is still used in some countries and its design features became standardized in subsequent Soviet and Russian mass-produced tanks. The T-62 has a typical tank layout: driver's compartment at the front, fighting compartment in the center and engine compartment in the rear. The four-

man crew consists of the commander, driver, gunner and loader. Although the T-62 is very similar to the T-55 and makes use of many of the same parts, there are some differences. These include the hull, which is a few centimeters longer and wider, the different road wheels, and differences in characteristic uneven gaps between road wheels. Unlike the T-54 and T-55 main battle tanks, the gaps between the last three pairs of road wheels are larger than the rest. The armament consists of the 115 mm U-5TS "Molot" (2A20) Rapira smoothbore tank gun with a two-axis "Meteor" stabilizer and 7.62 mm PKT coaxial general-purpose machine gun mounted on the right of the main gun. The 12.7 mm DShK 1938/46 antiaircraft heavy machine gun is mounted on the loader's hatch. It was optional until 1972 when all newly built tanks were fitted with the AA heavy machine gun. The tank carries 40 rounds for the main gun (although only 4 are placed in the turret, the rest are stored in the back of the fighting compartment and in the front of the hull, to the right of the driver) and 2500 rounds for the coaxial machine gun. All of the vehicle's armament is mounted in or on the round cast egg-shaped turret from the Ob'yekt 140 prototype main battle tank, mounted over the third pair of road wheels. The T-62 was armed with the world's first smoothbore tank gun, giving it considerably greater muzzle velocity than the Western 90 mm and 105 mm tank guns of its time. It can fire BM-3 APFSDS-T, BK-4, BK-4M HEAT and OF-18 Frag-HE rounds. The 115 mm gun introduced the first successful APFSDS ammunition, albeit with a steel penetrator. A smoothbore gun allowed a significantly better performance (from 10% to 20%) from HEAT ammunition, which was considered the main ammunition type for fighting enemy armour at medium and long ranges. The gun can be elevated or depressed between −6° and +16°. It is reloaded manually and gets automatically reset to +3.5° of elevation after it is fired if the stabilizer is enabled. Empty cartridges are automatically ejected outside the vehicle through a small hatch in the rear of the turret. The gun has a range of effective fire of about 4 km during day conditions and 800 m (with the use of night vision equipment) at night. This tank was fitted with a Meteor two-axis stabilizer, it allows the T-62 to aim and fire while moving, according to tests conducted by the US army the Meteor gave the T-62 a first hit probability of 70% for a moving target at 1000 meters with the tank moving up to 20 km/per hour. This gave the tank a good advantage in dynamic battlefields and breakthrough operations, especially in Central Europe where most of tank battles would take place under the 1500 meters range. The T-62 uses torsion bar suspension. It has five pairs of rubber-tired road wheels, a drive sprocket at the rear and idler at the front on each side, with no return rollers. The first and last road wheels each have a hydraulic shock absorber. The tank is powered by the V-55 12-cylinder 4-stroke one-chamber 38.88 litre water-cooled diesel engine developing 581 hp (433 kW) at 2,000 rpm. This is the same engine as the one used in the T-55. Because the T-62 weighs more than the T-55, it is less maneuverable. Like the T-55, the T-62 has three external diesel fuel tanks on the right fender and a single auxiliary oil tank on the left fender. The tank carries 960 litres of fuel in its internal and external fuel tanks. Two optional 200-litre drum-type fuel tanks can be fitted on the rear of the vehicle for an increased operational range

T-34-85 Russian Medium Tank





Tiers:



Variants:

- **Model 1943:** Short production run of January–March 1944 with D-5T 85 mm gun.
- **Model 1944:** Produced from March 1944 through to the end of that year, with simpler ZiS-S-53 85 mm gun, radio moved from the hull into a turret with improved layout and new gunner's sight.
- **Model 1945:** Produced from 1944 to 1945, with an electrically powered turret traverse motor, an enlarged commander's cupola with a one-piece hatch, and the TDP smoke system with electrically detonated MDSh canisters.
- **Model 1946:** Production model with the improved V-2-34M engine, new wheels, and other minor details.
- **Model 1960:** A refurbishing program introduced a new V-2-3411 engine and other modernizations.
- **Model 1969:** (also called T-34-85M): Another refurbishing program introducing night driving equipment, additional fuel, and other modernizations.

System

Alternative Designation: T-34-85
Type: Medium Tank
Family: T-34
Crew: ea5

Dimensions

Length: m6.68
Width: m3.00
Height: m2.45
Weight, Combat: tons26.5
Ground Pressure: INA
Ground Clearance: m0.4

Automotive

Engine Name: Model V-2-34
Engine Type: V12 Diesel
Engine Power: hp500
Operational Range: km250–300

Speed, Maximum Road: km/h53

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Gun

↳*System*

Name: M1939

Type: 85mm Gun

Length: m7.05

Barrel length: m4.7

Width: m2.15

Height: m2.25

Weight: kg4,500

Breech: Vertical sliding-wedge

Recoil: Hydro-pneumatic

Carriage: 2-axle and 4-wheeled with outriggers

Maximum Elevation: deg+82

Minimum Elevation: deg-3

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire: 10-12 rounds per minute

Muzzle Velocity: m/s792

Effective Firing Range: m10,500

Maximum Firing Range: km15.65

↳*Ammunition*

Type: Rifle

Caliber: mm85

Shell: 85×629 mmR

Shell Weight: kg9.2

Basic Load: INA

Armor Penetration: INA

Secondary Weapon System

↳*System*

Name: Degtyaryov (DP-28) Machine Gun
Type: 7.62mm Light Machine Gun
Manufacturer: Vasily Degtyaryov
Caliber: mm7.62
Proliferation: Total: 795,000 (all variants) Over 25 Countries still field this weapon
In Service: 1928-Present
Length: DP, DPM – 1,270 mm
Barrel Length: DP, DPM – 604 mm (23.8 in) RP-46 – 605 mm (23.8 in)
Weight: 9.12 kg (20.11 lb) (unloaded) 11.5 kg (25 lb) (loaded)
Action: Gas-Operated, flapper locking
Rate of Fire: 550 rpm
Muzzle Velocity: 840 m/s
Effective Firing Range: 800 m
Feed System: 47-round pan 63-round pan (DT & DTM) belt feed (RP-46) 30-round overhead box magazine (PD-36 and DTM-4)
Sights: Adjustable iron sights, front post and rear notch on a scaled tangent

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: m/s7.62×54mmR
Basic Load: 200
Armor Penetration: INA

Fire Control

Name: INA
Computerized FCS: INA
Thermal Sight Tank Commander: INA
Thermal Sight Gunner: INA
Main Gun Stabilization: INA

Protection

Hull Armor: Hull front 47 mm /60° (upper part) 45 mm (1.8")/60° (lower part), Hull side 40 mm/41°(upper part), Hull rear 45 mm, Hull top 20 mm, Hull bottom 15 mm
Turret Armor: Turret front 60 mm (2.4"), Turret side 52 mm/30°, Turret rear 30 mm, Turret top 16 mm
Applique Armor: Available
Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The T-34, a Soviet medium tank, had a profound and lasting effect on the field of tank design. At its introduction in 1940, the T-34 possessed an unprecedented combination of firepower, mobility, protection and ruggedness. Its 76.2 mm (3 in) high-velocity tank gun provided a substantial increase in firepower over any of its contemporaries while its well-sloped armour was difficult to penetrate by most contemporary anti-tank weapons. The 60 degree sloped armor and Christie suspension were inherited from the design of American Walter Christie's M1928 tank, versions of which were sold turret-less to the Red Army and documented as "farm tractors", after being rejected by the U.S. Army. When it was first encountered in 1941, German general Paul Ludwig Ewald von Kleist called it "the finest tank in the world" and Heinz Guderian affirmed the T-34's "vast superiority" over existing German armour of the period. "As early as July 1941 OKW chief Alfred Jodl noted in his war diary the surprise at this new and thus unknown wunder-armament being unleashed against the German assault divisions." Although its armour and armament were surpassed later in the war, it has been often credited to have been the most influential tank design of the Second World War. The T-34 was the mainstay of Soviet armoured forces throughout the Second World War. Its general specifications remained nearly unchanged until late 1944, when it received a major upgrade to firepower and ergonomics with the introduction of the greatly improved T-34/85 variant. Despite this, its production method had been continuously refined to meet the constantly increasing needs of the Eastern Front, making the T-34 quicker and cheaper to produce. Soviet industry would eventually produce over 80,000 T-34s of all variants, allowing steadily greater numbers to be fielded while the war progressed despite the loss of tens of thousands of them in combat against the German Wehrmacht. Replacing many light and medium tanks in Red Army service, it was the most-produced tank of the war, as well as the second most produced tank of all time (after its successor, the T-54/55 series). At 44,900 losses during the war, it also suffered the most tank losses of all time. Its development led directly to the T-54 and T-55 series of tanks, which in turn evolved into the later T-62, T-72, and T-90 that form the armoured core of many modern armies. T-34 variants were widely exported after World War II, and even as recently as 2010, the tank has seen limited front-line service with several developing countries. The T-34 had well-sloped armour, a relatively powerful engine and wide tracks. The initial T-34 version had a powerful 76.2 mm gun, and is often called the T-34/76 (originally a World War II German designation, never used by the Red Army). In 1944, a second major version began production, the T-34-85, with a larger 85 mm gun intended to deal with newer German tanks. Comparisons can be drawn between the T-34 and the U.S. M4 Sherman tank. Both tanks were the backbone of the armoured units in their respective armies, both nations distributed these tanks to their allies, who also used them as the mainstay of their own armoured formations, and both were upgraded extensively and fitted with more powerful guns. Both were designed for mobility and ease of manufacture and maintenance, sacrificing some performance for these goals. Both chassis were used as the foundation for a variety of support vehicles, such as armour recovery vehicles, tank destroyers, and self-propelled artillery. Both were an approximately even match for the standard German medium tank, the Panzer IV, though each of these three tanks had particular advantages and weaknesses compared with the other two. Neither the T-34 nor the M4 was a match for Germany's heavier tanks, the Panther (technically a medium tank) or the Tiger I; the Soviets used the IS-2 heavy tank and the U.S. used the M26 Pershing as the heavy tanks of their forces instead. After improved German Panzer IVs with the high-velocity 75 mm (2.95 in) gun were encountered in combat in 1942, a project to design an entirely new Soviet tank was begun, with the goals of increasing armour protection while adding modern features like a torsion-bar suspension and a three-man turret. This new tank, the T-43, was intended to be a universal tank to replace both the T-34 and the KV-1 heavy tank. However, the T-43 prototype's armour, though heavier, was still not proof against German 88 mm guns, while its mobility was found to be inferior to the T-34. Finally, although the T-43 shared over 70% of its components with the T-34, manufacturing it would still have required a significant slow-down in production. Consequently, the T-43 was cancelled. Not only were the weapons of German tanks improving, so was their armour. Soviet firing tests against a captured Tiger I heavy tank in April 1943 showed that the T-34's 76 mm gun could not penetrate the front of the Tiger I at all, and the side only at the very close range. A Soviet 85 mm anti-aircraft gun, the 52-K, was found capable of doing the job, and so derivatives of it were developed for tanks. The resulting tank gun could penetrate the side armour of the Tiger I from a distance of 800 meters and the turret side from a distance of 600 meters. It was still not enough to match the Tiger, as a Tiger could destroy the T-34 from a distance of 1,500 to 2,000 meters, but it was a noticeable improvement. With the T-43 canceled, the Soviet command made the decision to retool the factories to produce an improved version of the T-34. Its turret ring was enlarged from 1,425 mm (56 in) to 1,600 mm (63 in), allowing a larger turret to be fitted and thus the larger 85 mm gun. The prototype T-43's turret design was hurriedly adopted by Vyacheslav Kerichev at the Krasnoye Sormovo Factory to fit the T-34.[102] This was a larger three-man turret, with radio (previously in the hull) and observation cupola in the roof. Now the tank commander needed only to command (aided by cupola and radio systems), leaving the operation of the gun to the gunner and the loader. The turret armour was much thicker, 90 mm, even if bigger and less sloped than the original T-34 turret. This made the turret, overall, a bigger target (due to the three-man crew and bigger gun), but more resistant to enemy fire. The ammunition load shrank from around 90-100 to 55-60 shells,

but the projectiles were 50% heavier (9 kg) and were much better in the anti-armour role, and reasonable in a general purpose role. The resulting new tank, the T-34-85, was seen as a compromise between advocates for the T-43 and others who wanted to continue to build as many 76 mm-armed T-34s as possible without interruption. Production of the T-34-85 began in January 1944 at Factory No. 112, first using the D-5T 85 mm gun. Parallel to the production of the T-34-85 with the D-5T gun, production of the T-34-85 using the S-53 gun (later to be modified and redesignated as the ZIS-S-53 gun) began in February 1944 at Factory No. 112. The improved T-34-85 became the standard Soviet medium tank, with an uninterrupted production run until the end of the war. A T-34-85 initially cost about 30 percent more to produce than a Model 1943, at 164,000 rubles; by 1945 this had been reduced to 142,000 rubles.[105] During the course of the World War II, the cost of a T-34 tank was reduced by almost half, from 270,000 rubles in 1941, while in the meantime its top speed remained about the same, and its main gun's armour penetration and turret frontal armour thickness both nearly doubled. The T-34-85 gave the Red Army a tank with better armour and mobility than the German Panzer IV tank and StuG III assault gun. While it could not match the armour or weapons of the heavier Panther and Tiger tanks, its improved firepower made it much more effective than earlier models, and overall it was more cost-effective than the heaviest German tanks. In comparison with the T-34-85 program, the Germans instead chose an upgrade path based on the introduction of completely new, expensive, heavier, and more complex tanks, greatly slowing the growth of their tank production and aiding the Soviets in maintaining a substantial numerical superiority in tanks. By May 1944, T-34-85 production had reached 1,200 tanks per month. In the entire war, production figures for all Panther types reached no more than 6,557, and for all Tiger types (including the Tiger I and Tiger II) 2,027. Production figures for the T-34-85 alone reached 22,559.

T-54 Russian Medium Tank





Tiers:



Variants:

- **T-55A:** In 1961, development of improved NBC protection systems began. The goal was to protect the crew from fast neutrons; adequate protection against gamma radiation was provided by the thick armour and a PAZ basic NBC protection system.
- **T-54/T-55 upgrades:** n its long service life, the T-55 has been upgraded many times. Early T-55s were fitted with a new TSh-2B-32P sight. In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough. In 1967, the improved BM8 APDS round, which could penetrate 275 mm thick armour at a range of 2 km, was introduced. In 1970, new and old T-55 tanks had the loader's hatch modified to mount the 12.7 mm DShK machine gun, to deal with the threat of attack helicopters. Starting in 1974, T-55 tanks received the KTD-1 or KTD-2 laser rangefinder in an armoured box over the mantlet of the main gun, as well as the R-123 or R-123M radio set.[10] Simultaneously, efforts were made to modernize and increase the lifespan of the drive train.
- **T-55AM:** upgraded version of the T-55A. It is fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. It entered service in 1983.
- **T-55AM-1:** upgraded version of the T-55AM, powered by a V-46-5M diesel engine, developing 690 hp.
- **T-55AD:** fitted with Drozd active protection system. It also has add-on armor. It entered service in 1983.
- **T-55AD-1:** fitted wit a V-46-5M diesel engine, developing 690 hp.
- **T-55AMV:** fitted with add-on explosive reactive armor and new fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The missile has a range of 4 000 m at daytime and 1 200 m at night. It penetrates 550 mm of rolled homogenous armor. It entered service in 1985.
- **T-55M:** Upgraded version fitted with add-on composite armor and rubber side skirts. The gun is fitted with a thermal sleeve. This tank entered service in 1983.
- **T-55M-1:** it is a further upgrade of the T-55M, powered by a V-46-5M diesel engine, developing 690 hp. This tank is also fitted with ballistic computer.
- **T-55MV:** it has improved protection and firepower. It is fitted with add-on explosive reactive armor and improved fire control system. It is capable of launching anti-tank guided missiles in the same manner as ordinary projectiles. The T-55MV entered service in 1985.
- **T-55MV-1:** fitted with a V-46-5M diesel.
- **T-62A:** an improved T-55 with a stretched chassis, new suspension, new turret. It was armed with a 100 mm gun with improved ballistics. First prototypes were built in 1958 and it was accepted to service in 1962. Only a small number of these tanks were built for experimental service. However it was a forerunner of the T-62 medium tank, that was produced in thousands.
- **TO-55:** flamethrower tank. Coaxial machine gun has been replaced with a flame thrower.
- **BTS-2 and BTS-3:** armored recovery vehicles.
- **MTU-20 and MTU-55:** armored bridgelayers.
- **BTR-T:** is a heavy armored personnel carrier. It was first publicly revealed in 1997. It was converted from obsolete T-55 medium tank. The turret has been removed in order to create a compartment for dismounts. A number of other modifications were made to the vehicle. This armored vehicle has a crew of 2 and accommodates 5 dismounts. The BTR-T received no production orders.
- **Ti-67:** sraeli version, fitted with American M68 105 mm rifled gun. It is also fitted with Israeli fire control system, new engine and transmission and Blazer explosive reactive armor. About 200 T-54/55 tanks, that were captured from Egyptian and Syrian forces, were upgraded to this standard.
- **T-54E Ramzes II:** a proposed upgrade of Egyptian T-54/55 tanks. It is fitted with American M68 105 mm rifled gun, Belgian fire control system, and American Continental AVDS-1790-5A engine.
- **T-55 Enigma,:** upgraded Iraqi version, fitted with composite add-on armor. Add-on armor weights a total of 4.6 t, so a

counterweight was mounted at the turret rear. This tank also has improved night vision devices.
- **TR-580:** a Romanian version of the T-55 with a longer hull. An extra road wheel on each side has been added. It is fitted with a different engine. This tank is fitted with metal side skirts.

System

Alternative Designation: T-54

Estimated Out of Service Date: Phased out of service with Russia in the early 1990s. Likely to remain in service with current users until the capital can be raised to replace the vehicles according to defence priorities

Manufacturer: KhPZ, UVZ (Soviet Union) Bumar-Łabędy (Poland) ZTS Martin (Czechoslovakia)

Type: Main Battle Tank

Crew: ea4

Modifications: Modifications to the T-54/55 series over the years have changed almost every aspect of the vehicle. Initially, Soviet modifications included a better turret shape, improved NBC protection and an improved powerplant. Later, improved fire-control equipment and night-vision equipment was added. Foreign improvements, both in Warsaw Pact nations and elsewhere, have further improved protection, powerplant, and firepower. T-54/55s have been re-armed with improved tank guns, AA machine guns, advanced armour arrays, and technologies, such as laser range finders and computerized fire control systems, that did not exist when the tank was first being built in the early days of the Cold War.

Dimensions

Length: 9.00 m (with gun forward)

Width: m3.37 m

Height: m2.40 m

Weight, Combat: 36 tons

Automotive

Engine Name: Model V-55

Engine Type: V-12 water-cooled. 38.88-l diesel

Engine Power: hp500

Power-to-Weight Ratio: 14.6 hp (10.4 kW) / tonne

Transmision: Mechanical [synchromesh], 5 forward, 1 reverse gears

Fuel Capacity: 580 l internal, 320 l external (less on early T54), 400 l jettisonable rear drums

Cruising Range: INA

Speed, Maximum Road: km/h48

Speed, Average Cross: 25

Speed Maximum Swim: Not Amphibious

Fording Depth: m1.4 unprep; 5.5 snorkel

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Main Gun

↳*System*

Name: D-10 Tank Gun
Type: Anti-Tank Gun
Caliber: mm100
Length: 5.608 m
Barrel Length: 5.35 m
Weight: 1,438 kg
Loader Type: Manual
Fire on the Move: Yes
Traverse Range: INA
First Round Hit Probability: %60
Bore Activator: Yes, New upgrade
Maximum Elevation: deg+18
Minimum Elevation: deg-3
Breech: Horizontal sliding wedge (semi-automatic)
Recoil: Hydraulic buffer and hydropneumatic recuperator
Carriage: Vehicle mount
Rate of Fire: 4 rounds/min avg 5–6 rounds/min max.
Muzzle Velocity: m/s1,000
Maximum Firing Range: 14,600 m (16,000 yds), or 16,000 m (17,500 yds)

↳*Ammunition (Option 1)*

Name: 3UOF17
Type: HE fragmentation projectile
Caliber: mm100mm
Muzzle Velocity: m/s355
Basic Load: ea45 total of any 100 mm Projectile Combination
Max Range: m7,000
Min Range: mINA
Armor Penetration: Yes
Weight, Complete Round: kg22.9
Weight, Missile: kg19.4

Tank Commander's Weapon System

↳*System*

Name: QJZ-89 (Type 89)
Type: 12.7mm Heavy Machine Gun
Manufacturer: NORINCO
In Service: INA
Proliferation: INA
Cartridge: mm12.7x108
Weight, Gun Only: kg17.5
Weight,Tripod: kg8.5
Length, Total: mm2,119
Length, Barrel: mm1,003
Barrels: ea1
Action: Gas/Recoil
Rate of Fire: rds/min450-600
Muzzle Velocity: m/s850
Feed System: Belt
Sights: Iron/Optical

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Muzzle Velocity: m/s850
Basic Load: INA
Max Range: m1,600
Min Range: kmINA
Armor Penetration: Yes

Anti-Tank Guided Missile

Type: Laser beam-riding anti-tank missile.
Name: 9M117 Bastion
Caliber: mm100
Entered Service: 1981
Muzzle Velocity: m/s400-500
Basic Load: ea8
Maximum Effective Range: m4,000
Rocket Burn: seconds6

Rocket Motor Ignites Time: seconds1.5

Guidance: Beam-Riding Laser

Prone to Radio or Optical Jamming: No

Missile Flight Time: m4,000

Self Destruct Time: seconds24-41

Fire Control

Name: INA

Computerized FCS: INA

Laser Rangefinder: KTD-1 or KTD-2

Night Sight: TPN-1-22-11 night sight

Commander's Sight: TPK-1

Gunner's Sight: Sh 2-22, 3 1/2-power or 7-power

Rangefinder: on some T-55M

Protection

Hull Armor: 120 mm hull front at 60° (100 mm after 1949) 79 mm hull upper sides 20 mm hull lower sides 60 mm at 0° hull rear 20 mm hull bottom 33-16 mm hull roof

Turret Armor: 205 mm turret front 130 mm turret sides 60 mm turret rear 30 mm turret roof

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: Roller-plow available, In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough.

Self-Entrenching Blade: No

NBC Protection: Yes, PAZ (Protivoatomnaya Zashchita) NBC protection system

Smoke Equipment: grenlaunch/eng smk sys

Note: The T-55 focuses most of its armour around the front 60 deg arc.

Notes:

The T-54 and T-55 tanks are a series of Soviet main battle tanks introduced in the years following the Second World War. The first T-54 prototype was completed at Nizhny Tagil by the end of 1945. Initial production ramp up settled for 1947 at Nizhny Tagil, and 1948 for Kharkiv were halted and curtailed as many problems were uncovered; the T-34-85 still accounted for 88 percent of production through the 1950s. The T-54 eventually became the main tank for armoured units of the Soviet Army, armies of the Warsaw Pact countries, and many others. T-54s and T-55s have been involved in many of the world's armed conflicts since the later part of the 20th century. The T-54/55 series eventually became the most-produced tank in military history. Estimated production numbers for the series range from 86,000 to 100,000. They were replaced by the T-62, T-64, T-72, T-80 and T-90 tanks in the Soviet and Russian armies, but remain in use by up to 50 other armies worldwide, some having received sophisticated retrofitting. During the Cold War, Soviet tanks never directly faced their NATO adversaries in combat in Europe. However, the T-54/55's first appearance in the West around the period of the 1950s (then the beginning of the Cold War) spurred the United Kingdom to develop a new tank gun, the Royal Ordnance L7, and the United States to develop the M60 Patton. Production of the initial series of T-54s began slowly as 1,490 modifications were made. The Red Army received a tank that was superior to World War II designs and theoretically better than the newest tanks of potential opponents. The 100 mm gun fired BR-412 series full-calibre APHE ammunition, which had superior penetration capability when compared to the T-34 that it replaced. The serial production version, designated T-54-1, differed from the second T-54 prototype. It had thicker hull

armour (80 mm on the sides, 30 mm on the roof and 20 mm on the bottom). As production ramped up, quality problems emerged. Production was stopped and an improved T-54-2 (Ob'yekt 137R) version was designed. Several changes were made and a new turret was fitted. The new dome-shaped turret with flat sides was inspired by the turret from the IS-3 heavy tank; it is similar to the later T-54 turret but with a distinctive overhang at the rear. It also had a shorter bustle. The fender machine guns were removed in favour of a single bow-mounted machine gun. The transmission was modernized and the track was widened to 580 mm. The T-54-2 entered production in 1949, at Stalin Ural Tank Factory No. 183 (Uralvagonzavod). In 1951, a second modernization was made, designated T-54-3 (Ob'yekt 137Sh), which had a new turret without side undercuts, as well as the new TSh-2-22 telescopic gunner's sight instead of the TSh-20. The tank featured the TDA smoke generating system. A command version was built, the T-54K (komandirskiy), with a second R-113 radio.

→Amphibious Tanks

ZTD-05 (ZBD-2000) Chinese Amphibious Light Tank





Tiers:



Variants:

- **PLZ-07B:** The PLZ-07B is an SPH designed for the Chinese Marine Corps. It is based on the Type 05 hull and uses the weapon system from the PLZ-07, which is based on a different hull. The vehicle is designed to have the same mobility and protection as the ZBD-05, however, it is equipped with a large-calibre howitzer and attendant FCS so that it can provide organic indirect fire support for ZBD-05 formations.
- **Type 001:** The Type 001 is an APC based on the Type 05 hull. It is believed that the Type 001 is more likely to be found in service with the amphibious elements of the PLA rather than the Marine Corps, as it has been shown on exercises with the 74th Army Group. It is designed to perform as an APC and is capable of carrying a section of equipped infantry into combat alongside other Type 005 variants.

System

Alternative Designation: ZTD-05, ZBD 2000, ZLT-05, VN16
Manufacturer: Norinco
Family: Type 05
Crew: ea4

Dimensions

Length: m9.5
Width: m3.36
Height: m3.04
Weight, Combat: tons28.5
Ground Pressure: INA

Automotive

Engine Name: INA

Engine Type: Four-stroke turbocharged water-cooled diesel

Engine Power (Land): hp500

Engine Power (Sea): hp1,577

Transmission: Machanical

Cruising Range (Land): km500

Cruising Range (Sea): INA, estimates have it going as far as 2/3 of it's land range.

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h40

Speed, Maximum Swim: INA

Maximum Distance at Sea: km90

Tracks: Tracks are supported by two return rollers located between the first and last pairs of road wheels.

Suspension: Hydropneumatic

Wheels: 6, unevenly-spaced road wheels per side

Gradient: %60

Side Slope: %30

Vertical Obstacle: m0.6

Trench: m2.9

Fording Depth: Amphibious

Sea State Capable: Sea State 4

Buoyancy Reserve: Yes

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: ZTS63A, or Type 83

Type: mm105

Caliber: 44

Rate of Fire: rds/min6-8

Bore evacuator: Yes

Maximum Firing Range: km17.2-22

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+18

Minimum Elevation: deg-5

Muzzle Brake: Yes

Bore Evacuator: Yes

Loading Type: Manual with a hydraulic ram assistance

↳*Ammunition (Option 1)*

Name: BTA2 105mm Projectile

Type: APFSDS

Basic Load: 30 total rounds of 105mm Projectiles

Warhead Type: INA

Maximum Effective Range: m2,800

Penetration: 220mm of RHA set at 66.4 deg from 2,000 meters

↳*Ammunition (Option 2)*

Name: DTP1A, 105mm Projectile

Type: HEAT

Basic Load: 30 total rounds of 105mm Projectiles

Warhead Type: HEAT warhead

Maximum Effective Range: m3,000

Penetration: 80mm of RHA set at 60 deg and protected by ERA

Anti-Tank Guided Missile (ATGM)

ATGM Type: HJ-73 Red Arrow Anti-Tank Missile System

↳*HJ-73 Red Arrow ATGM (Option 1)*

Name: Red Arrow 73B

Type: Anti-Tank Missile System

Muzzle Velocity: m/s120

Maximum Range: m2,800

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 200 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 2)*

Name: Red Arrow 73D

Type: Anti-Tank Missile System

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Tandem-Heat

Hit Probability: %90

Penetration Probability: %80

Penetration: 280 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 3)*

Name: Red Arrow 73E

Type: Anti-Tank Missile System

Muzzle Velocity: m/s135

Maximum Range: m3,000

Warhead Type: Tandem-HEAT

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

↳*HJ-73 Red Arrow ATGM (Option 4)*

Name: Red Arrow 73F

Type: Anti-Tank Missile System (Bunker Buster)

Muzzle Velocity: m/s130

Maximum Range: m2,800

Warhead Type: Fuel Air Explosive Warhead

Hit Probability: %90

Penetration Probability: %80

Penetration: 300 mm of RHA set at 68° and protected by ERA

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun
Manufacturer: Norinco
Type: 7.62mm Heavy Machine Gun
Length, Total: mm1,192
Length, Barrel: mm658
Diameter: INA
Action: Gas Operated
Rate of Fire: rds/min700-800
Feed System: Belts in 100/200/250 round boxes
Sights: Open sights. Optical/Night vision scope can be outfitted.

↳*Ammunition*

Type: 7.62×54mmR
Caliber: mm7.62x54
Muzzle Velocity: m/s840
Basic Load: Belts in 100/200/250 round boxes
Max Range: m100-1,500
Min Range: m100
Armor Penetration: INA

Commander's Weapon System

↳*System*

Name: QJZ-89 or Type 89
Type: 12.7mm Heavy Machine Gun
Manufacturer: NORINCO
Length, Total: mm2,119
Length, Barrel: mm1,003
Weight (Gun Only): kg17.5
Weight, (Tripod Only): kg8.5
Max Rate of Fire: rds/min600
Sustain Rate of Fire: rds/min400-600
Action: Gas/Recoil
Feed System: Belt

Sights: Iron/Optical

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Basic Load: ea1,200

Max Effective Range: m1,600

Fire Control

Name: BMS System

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: Yes

3D Map of the OE: Yes, Standard

Satellite Navigation System: BeiDou Satellite

Battle Management System: Yes

Navigation System: BeiDou satellite navigation system,

Protection

Hull Armor Type: Hull is of aluminium base armour protected by composite appliqué armour.

Hull Armor: mm30

Sides and Rear Armor: mm14.5

Turret Armor: INA

Applique Armor: Yes

Explosive Reactive Armor: INA

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 8 Total, 4 on each side 76mm

Bow Blade: Yes

Belly Plate: Yes

Self-Sealing Fuel Tank: Yes, capable of stopping a 25 mm APFSDS round at 2,000 m.

Automatic Fire Suppression Device.: Yes

Notes:

The ZBD-2000 is a family of Chinese tracked amphibious assault vehicles. They are designed for beach assault missions and to accompany infantry as ground forces move inland. The vehicle resembles the (now cancelled) U.S. Expeditionary Fighting Vehicle (EFV). The vehicle has a boat-shaped hull with six road wheels and lead return rollers. A welded turret is mounted over the middle of the hull. The commander and gunner sit inside the turret, with the driver at the front, to the left of the engine. The driver has a single-piece hatch cover that opens to the rear. It can be locked in the vertical position with at least three day periscopes providing observation to the frontal arc. The middle periscope can be replaced by a passive periscope for driving at night. The troop compartment is provided with two oblong roof hatches that open outwards and can be locked in the vertical position. The troops enter and leave through a door in the hull rear that opens to the right. The ZBD-2000 is propelled in the water by a pair of waterjets. Speeds of up to 28 mph (45 kph) can be achieved. The vehicle utilizes hydraulically actuated bow and transom flaps, which are designed to aid the vehicle's hull skimming. The vehicle is able to travel more than 6 mi (10 km) over the water. The vehicle has all-welded armor over the hull and turret, providing protection against 25-mm armor-piercing rounds over the frontal arc and all-round protection against 7.62-mm armor-piercing rounds. This version is equipped with a three-man turret armed with a 105-mm gun, 7.62-mm coaxial machine gun and roof-mounted 12.7-mm machine gun. The manually loaded gun can fire a variety of munitions, including gun-launched anti-tank guided missiles. The ZTD-05 has a crew of four (commander, driver, gunner, loader), and can carry up to four personnel. The commander and gunner sit in tandem to the left of the main gun. The loader is to the right and is also responsible for manning the 12.7-mm machine gun. The rear part of the turret has a storage rack for additional protection against high-explosive anti-tank (HEAT) rounds. The ZTD-05 is equipped with a computerized fire-control system that includes a fire-control computer, light spot commander sight with laser rangefinder, and light spot gunner sight with passive night vision. It is also fitted with a GPS navigation system and image-intensifier night-vision or thermal-imaging system. The PLA and marine corps have about 200 and 140 of these vehicles, respectively.

M1985 North Korea Light Amphibious Battle Tank






Tiers:

1 2 **3** 4

System

Alternative Designations: M1985 light tank
Crew: ea3
Combat Weight: mt19.0
Length: m7.0
Height: m2.6
Width: m3.2

Automotive

Engine Type: 320-hp Diesel
Cruising Range: km500
Max On-Road: km/h60
Max Off-Road: INA
Max Cross-Country: INA
Max Swim: km/h10
Fording Depths: mAmphibious

Protection

Radio: INA
Armor (turret front): mm30

Applique Armor: N/A

Explosive Reactive Armor: N/A

Mobility (mine clearing, self-entrenching): N/A

NBC Protection System: INA

Smoke Equipment: INA

Fire Control

FCS Name: INA

Main Gun Stabilization: No

Rangefinder: None

Infrared Searchlight: Yes

↳*INA*

Type: Day Sight

Field of View: INA

Acquisition Range: m3000

↳*INA*

Type: Night Sight

Field of View: INA

Acquisition Range: m800

Armament

↳*Type 62/63*

Caliber (mm): mm85

Type: Rifled gun

Rate of Fire: prac6

Rate of Fire: cyclic8

Fire on Move: Yes

Elevation: deg-4, + 30

↳*Type 54/DShKM*

Caliber (mm): mm12.7

Type: HMG

Rate of Fire: prac250

Rate of Fire: cyclic650

Fire on Move: Yes

↳*PKT*

Caliber: mm7.62

Type: Machinegun

Rate of Fire: prac250

Rate of Fire: cyclic650

Fire on Move: Yes

↳*9P111*

Type: ATGM

Rate of Fire: prac2

Rate of Fire: cyclic2

Fire on Move:

Ammunition

↳*BR-365PK*

Caliber (mm): mm85

Type: HVAP-T

Max Aimed Range: m1500

Max Eff Range, Day: m1150

Max Eff Range, Night: m800

Penetration: mm130, KE

↳*Type 367*

Caliber (mm): mm85

Type: APC-T

Max Aimed Range: m1500

Max Eff Range, Day: m1150

Max Eff Range, Night: m800

Penetration: mm120, CE

↳*BK-2M*

Caliber: mm85

Type: HEAT-FS

Max Aimed Range: m1500

Max Eff Range, Day: m1150

Max Eff Range, Night: m800

Penetration: 100, KE

↳*AT-3*

Type: ATGM

Max Aimed Range: m1500

Penetration: mm410, CE

Warhead Type: Tandem HEAT

↳*Red Arrow-73A (CHN)*

Type: ATGM

Max Aimed Range: m3000

Penetration: mm580, CE

Warhead Type: HEAT

↳*Malyutka-2*

Type: ATGM

Max Aimed Range: m3000

Penetration: INA

Warhead Type: Frag-HE

Notes:

The M1985 is a North Korean light tank that is based on the designs of the Russian PT-76 and the Chinese Type 63 amphibious light tanks. The M1985 hull is similar in size and appearance to the Type 63 , but has a turret resembling the PT-76. The hull is probably based on the same chassis as the VTT-323 armored personnel carrier (see separate record). The North Korean turret does differ in several aspects. On the forward edge of the turret, in line with the main gun, is an anti-tank guided missile rail. The commander's hatch has a semi-circle shape, unlike the Soviet-era oval hatch, and is located on the top left side of the turret. The hatch op ens to the front, rather than to the rear as in the PT-76. The hull is all-welded steel. The driver sits to the front left. Ammunition is stored to his right. The engine and transmission are in the rear. The M1985 probably does not have any horizontal or vertical gun stabilizers; that, however, is unconfirmed. It may come equipped with a night-vision system and nuclear, biological and chemical (NBC) warfare protection.

ZTS-63 Chinese Amphibious Light Tank




Tiers:



Variants:

- **Type 63A1:** The Type 63AI is a slightly modified version of the Type 63A, which is designed to increase the protection of the vehicle against cumulative projectiles.

System

Alternative Designation: Type 63A; ZTZ-63A; WZ 213
Type: Amphibious Tanks
Family: IIght Armoured Amphibious Tanks
In Service: 1997-Present
Crew: ea4, 4 (Driver, Loader, Commander, Gunner)
Status: In service, but no further production.
Purpose: designed to transport a force from ship-to-shore during a contested landing and provide direct, as well as indirect, fire support to those forces once deployed.
Passenger Capacity: INA
Maximum Effective Range (Land): km400
Maximum Effective Range (Sea): km+120
Amphibious: Yes
Propellers: 2, at the rear of the tank
Note: The Type 63A has weak protection compared to other tanks

Dimensions

Length: m7.3
Width: m3.2
Height: m2.6
Weight, Combat: kg22,000
Ground Pressure: kg/mINA

Automotive

Engine Name: Model 12150-L

Engine Type: Diesel

Engine Power: hp581

Power to Weight Ratio: hp/tons26.4

Maximum Range, Land: km400

Maximum Range, Sea: km90

Speed, Maximum Road: km/h75

Speed, Average Cross: km/h70

Speed Maximum Swim: km/h14

Suspension: Torsion Bar

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.9

Fording Depth: mAmphibious

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: ZTS63A, or Type 83

Type: 105mm Rifled Gun

Turret Name: BK1970 Turret

Turret Type: Three Man Turret

Caliber: 44

Max Rate of Fire: INA

Sustain Rate of Fire: INA

Armor Penetration: mm150

Range Finder Type: Laser

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+18

Minimum Elevation: deg-5

Note: The 63A fire APFSDS, HEAT and HEAT FRAG rounds, significantly increasing the tank's firepower

↳*Ammunition (Option 1)*

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS) i

Caliber: mm44

Muzzle Velocity: m/s1,530

Basic Load: 38 rounds total any 105mm Combination

Effective Range: m9,000

Armor Penetration: mm150

Cartridge Length: mm1,000

Penetrator: Tungsten alloy

Propellant NC-NG: kg5.8

Accuracy/Dispersion (typical): 0.2X0.2 mil

Temperature limits (Firing): -40 to +52ºC

Temperature limits (Storage): -46 to +63ºC

↳*Ammunition (Option 2)*

Type: HE-MP-T: High-Explosive Multi-Purpose Tracer tank cartridge

Caliber: mm44

Muzzle Velocity: m/s800

Basic Load: 38 rounds total any 105mm Combination

Effective Range: m9,000

Armor Penetration: mm180

Cartridge Weight: kg23.5

Cartridge Length: mm990

Projectile Weight: kg13.6

High Explosive CLX663 (IM): kg1

Fuze: Electronic/programmable/ multifunctional

Propellant NC-NG: kg3

Accuracy/Dispersion (typical): 0.3X0.3 mil

Temperature limits (Firing): 40 to +52ºC

Temperature limits (Storage): -40 to +63ºC

↳*Ammunition (Option 3)*

Type: HESH-T (HEP-T): High-Explosive Squash-Head Tracer tank cartridge

Caliber: mm44

Muzzle Velocity: m/s731

Basic Load: 38 rounds total any 105mm Combination

Effective Range: 9,500

Armor Penetration: Yes

Cartridge Weight: kg21.2

Cartridge Length: mm939

Projectile Weight: INA

High Explosive Comp: kg2.2

Propellant M6: kg2.8

Accuracy/Dispersion (typical H+B): cm171

Temperature limits (Firing): -40 to +52ºC

Temperature limits: (Storage): -40 to +63ºC

Anti-Aircraft Weapon System

↳*System*

Name: W-85 (QJC88)

Type: 12.7mm Anti-Aircraft Machine Gun

Max Rate of Fire: rds/min550-600

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Laser

Stabilized: No

Muzzle Velocity: m/s200

Operational Range: m3,000-4,000

Guidance System: SACLOS Wire Guidance

Armor Penetration: Yes

Fuel Capacity: liters4501

Gears: 5 Forward and 1 Reverse

Feed System: Belt

Sights: Iron/Optical

Type Round: Type 54 Round

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation Angle: deg90

↳***Ammunition***

Type: Anti-Aircraft Machine Gun

Muzzle Velocity: m/s850

Basic Load: belt-fed by boxes of 250 rounds.

Maximum Effective Range: m1,200-1,800

Armor Penetration: Yes

Coaxial Weapon System

↳***System***

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.62mm Coaxial Machine Gun

Manufacturer: NORINCO

Date of Introduction: 1985

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Range Finder Type: Optical/Night Vision

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4: BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

Ammunition

Type: Rifle
Caliber: 7.62×54mmR
Muzzle Velocity: m/s840
Basic Load: INA, Belts in 100/200/250 round boxes
Effective Range: 100-1,500m (With Sight Adjustments) m
Armor Penetration: Available

Anti-Tank Guided Missile

↳*System*

Name: HJ-8
Type: Anti-Tank Guided Missiles
Function: Wire-Guided Anti-Tank Missile System
Maximum Range of Fire: m4,000-5,000
Hit Probability (Static Targets: %90
Time the Max Rate of Fire can be Sustained: INA
Range Finder Type: Laser Guidance System
Caliber/Length: mm1,566
Diameter: mm120

Fire Control

Name: INA
Computerized FCS: Yes, believed to be the same FCS that is installed on Type 80 tanks
Thermal Sight Tank Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes, stabilised in both axes to improve accuracy
Direct Fire Support: Yes
Indirect Fire Support: Yes
Laser Rangefinder: Yes

Protection

Armor Type: All-welded steel
Hull Armor: Steel armour, 25mm thick
Turret Armor: Steel armour, 25mm thick
Applique Armor: Available
↳ **Explosive Reactive Armor:** Yes

Active Protection System: Yes

Mine Clearing: Yes, Type 762 light mine clearance device

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Four smoke-grenade launchers are mounted on each side of the turret

IR Signature: INA

Note #1: It is likely that the vehicle's mine or blast resistance is low and that the protection is sufficient only for large-calibre small arms fire such as 12.7 or 14.5 mm rounds at typical combat ranges.

Note #2: Storage racks provide additional protection against HEAT rounds

Notes:

North Korea imports a large amount of their military equipment from China and Russia. The Type 63A amphibious light tank is a radically improved variant of the Type 63. The Type 63A entered service with Chinese Army in 1997. Over 300 of these light tanks were built for the Chinese Army. Some sources report that this light tank has been exported to Venezuela. Currently very few countries develop amphibious tanks and China is one of them. Its predecessor, the Type 63, was originally designed for river-crossing operations at inland rivers and lakes, however it was unsuitable for high-speed, long-distance maritime operations. The new Type 63A has specially modified features to improve its amphibious performance at sea. It can be launched from amphibious ships 10 km or more offshore. Before the mid-1990s, Chinese ground forces relied on the Type 63 amphibious light tank developed in the early 1960s. The low swimming-speed and weak firepower of the Type 63 was insufficient to the needs of modern maritime amphibious assault operations that PLA would conduct. The PLA demanded a replacement for the Type 63 in the early 1990s, which led to the development of the Type 63A in 1997. Reports indicate that over 300 examples has been delivered to the PLA by the end of 2000. The tank is also used by the Tanzanian armed forces. The Type 63A is a lightly armoured amphibious light tank with a flat, boat-like hull. Suspension is made up of 6 road wheels and lead or return rollers. A redesigned welded turret from the original Type 63 is mounted center of the hull, with the powerpack positioned in the rear. The Type 63A has 2 additional floating tanks to increase the stability of the vehicle in the water. There are 3 water inlets on both sides of the hull. In the rear of the hull there are to allow 2 large water jets for travelling in water. Type 63A introduces an enlarged welded turret replacing the original Type 63 turret, the modernised Type 63A utilises a dual-way stabilised 105 mm rifled gun replacing the 85 mm gun. The 105 mm rifled gun fires armour piercing fin stabilised discarding sabot (APFSDS), high explosive (HE), and high-explosive anti-tank (HEAT) ammunitions, with 45 rounds carried inside the vehicle. APFSDS round penetrates 400 mm steel armour or destroy a reinforced concrete bunker a distance of 2,000 m. To overcome the inaccuracy of firing when swimming, the Type 63A uses laser-beam guidance ATGM which is not affected by wave motion while swimming. The missile has a maximum firing range of 4–5 km with a first hit probability of +90% against stationary targets. Its secondary functions can engage low-flying helicopters. The Type 63A enhance capability allows the vehicle to conduct amphibious operations from its host amphibious warfare ships at distances from 5–7 km to shore at a speed of 28 km/h. Compared to the Type 63, the Type 63A featured five major improvements: The modernised Type 63 to Type 63A has given enhanced sea travelling performance, increased swimming speed, improved fire-control system, ATGM capability, and larger 105 mm rifled gun with dual stabilizers. The FCS includes digital fire-control computer, integrated commander sight with laser rangefinder input, and white-light spotter or image-stabilised gunner's sight w/ passive night vision. The Type 63A night vision is an image intensifier system. Alternatively the gunner sight can be fitted with a thermal imager night vision. It is also equipped with the satellite positioning (GPS/GLONASS) system to allow accurate landing position in harsh weather conditions and night operations. It's also equipped with computerised fire-control to enable accurate firing both on land and at sea.

Model 1981 "Shin'heung" (PT-85) North Korean Light Amphibious Tank



Tiers:

1 2 **3** 4

System

Alternative Designation: Model 1981 "Shin'heung"; PT-85

Type: Light Amphibious Tank

Crew: ea4

In Service: 1981-Present

Dimensions

Length, Gun Forward: m9.4 m

Width: m3.1

Height: m2.8

Weight, Combat: tons20

Ground Pressure: INA

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Operational Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Fording Depth: INA

Main Gun

↳*System*

Name: D-44

Type: 85mm Divisional Gun

Caliber: mm85

Length: m8.34

Barrel Length: m4.7

Width: m1.78

Height: m1.42

Weight: kg1,725

Breech: Semi-automatic vertical sliding-wedge

Recoil: Hydro-pneumatic

Carriage: Split trail

Maximum Elevation: deg+35

Minimum Elevation: deg-7

Traverse Range: deg54

Traverse Left: deg27

Travere Right: deg27

Rate of Fire: up to 20 rounds per minute (burst)

Muzzle Velocity: m/s1,030

Effective Firing Range: m1,150

Maximum Firing Range: km15.65

Sights: OP-2-7 w/5.5X Magnification

↳***Ammunition***

Name: BR-365P

Type: HVAP

Caliber: mm85

Weight: 5 kg

Shell: 85×629 mm

Basic Load: 25

Maximum Range: INA

Armor Penetration: 107 mm (4 in) at 1,000 m (1,094 yd)

Anti-Aircraft Weapon System

↳***System***

Name: KPV

Type: Heavy Machine Gun

Caliber: 14.5mm

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: m/s1,005

Effective Firing Range: m3,000

Maximum Firing Range: m4,000

Feed System: 40-round belt

Sights: iron or optical

↳***Ammunition***

Name: B-32

Type: Armor-piercing incendiary full metal jacket round with a tungsten-carbide core.

Caliber: mm14.5

Cartridge: 14.5×114 mm

Basic Load: 200

Armor Penetration: Armour penetration at 500 m is 32 mm of rolled homogeneous armour (RHA) at 90 degrees.

Other Ammunition Types: B-32 - Armor-piercing incendiary full metal jacket round with a tungsten-carbide core. Projectile weight is 64.4 g and muzzle velocity is 976 m/s. Armour penetration at 500 m is 32 mm of rolled homogeneous armour (RHA) at 90 degrees. BZT - Armor-piercing incendiary tracer full metal jacket round with a steel core. Projectile weight is 59.56 g and muzzle velocity is 1,005 m/s. Tracer burns to at least 2,000 m. MDZ - High-explosive incendiary bullet of instant action. Projectile weight is 59.68 g.

Anti-Tank Guided Missile

Note: 1 x 9M14 Malyutka launcher ATGM

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

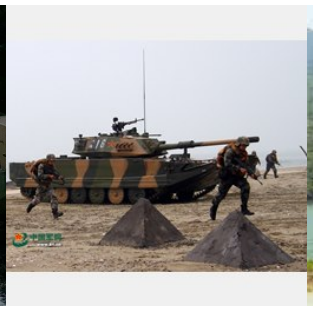
NBC Protection: INA

Smoke Equipment: INA

Notes:

The Model 1981 "Shin'heung" (Rise) is a North Korean amphibious light tank. Its common western designation is PT-85. It is built for the needs of their army, with around 500 examples operated. The Model 1981 "Shin'heung is based on the lengthened VTT-323 APC chassis, and although the turret appears similar to PT-76, the PT-85 has a higher horseshoe-shaped turret, with an 85 mm gun and hatches similar to those of a T-54. Early examples of the Model 1981 "Shin'heung" tank have shown a 9M14 Malyutka (AT-3 "Sagger") anti-tank guided missile installed on top of the turret directly above the main gun, and with two lights on the front of either side of the hull. In recent parades, the Model 1981 "Shin'heung" has been observed with a large IR projector (possibly a reverse engineered copy of a L-2 Luna IR spotlight on the turret, linked to the gun with a brace for elevation, as on the Russian T-55/62 tanks. The arrangement of the lights on the hull has also changed: there are three lights on the right side of the front glacis (two black ones and one white), plus one on the left side plate; sometimes some of these lights are omitted. The AT-3 "Sagger" missile is also now absent on the PT-85; it's unclear if these new or upgraded variants can be armed with that missile, and if so where the launcher would be installed. In 2015, Model 1981 "Shin'heung" tanks in parades have also been observed with a Manpad SAM installed on the rear of the turret, as well as three smoke mortars on each side of the turret.

Type 63A (ZTS-63A) Chinese Amphibious Light Tank


Tiers:

1 2 3 4

Variants:

- **Type 63A1:** The Type 63AI is a slightly modified version of the Type 63A, which is designed to increase the protection of the vehicle against cumulative projectiles.

System

Alternative Designation: Type 63A; ZTZ-63A; WZ 213
Type: Amphibious Tanks
Family: IIght Armoured Amphibious Tanks
Crew: ea4, 4 (Driver, Loader, Commander, Gunner)
Status: In service, but no further production.
Purpose: designed to transport a force from ship-to-shore during a contested landing and provide direct, as well as indirect, fire support to those forces once deployed.
Passenger Capacity: INA
Maximum Effective Range (Land): km400
Maximum Effective Range (Sea): km+120
Amphibious: Yes
Propellers: 2, at the rear of the tank
Note: The Type 63A has weak protection compared to other tanks

Dimensions

Length: m7.3
Width: m3.2
Height: m2.6
Weight, Combat: 22,000 kg
Ground Pressure: kg/mINA

Automotive

Engine Name: Model 12150-L

Engine Type: Diesel

Engine Power: hp581

Power to Weight Ratio: hp/tons26.4

Maximum Range, Land: km400

Maximum Range, Sea: km90

Speed, Maximum Road: km/h75

Speed, Average Cross: 70

Speed Maximum Swim: km/h14

Suspension: Torsion Bar

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.9

Fording Depth: mAmphibious

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: ZTS63A, or Type 83

Type: 105mm Rifled Gun

Turret Name: BK1970 Turret

Turret Type: Three Man Turret

Caliber: 44

Max Rate of Fire: INA

Sustain Rate of Fire: INA

Armor Penetration: mm150

Range Finder Type: Laser

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+18

Minimum Elevation: deg-5

Note: The 63A fire APFSDS, HEAT and HEAT FRAG rounds, significantly increasing the tank's firepower

↳*Ammunition (Option 1)*

Type: Armour-piercing fin-stabilized discarding sabot (APFSDS) i

Caliber: mm44

Muzzle Velocity: m/s1,530

Basic Load: 38 rounds total any 105mm Combination

Effective Range: m9,000

Armor Penetration: mm150

Cartridge Length: mm1,000

Penetrator: Tungsten alloy

Propellant NC-NG: kg5.8

Accuracy/Dispersion (typical): 0.2X0.2 mil

Temperature limits (Firing): -40 to +52ºC

Temperature limits (Storage): -46 to +63ºC

↳*Ammunition (Option 2)*

Type: HE-MP-T: High-Explosive Multi-Purpose Tracer tank cartridge

Caliber: mm44

Muzzle Velocity: m/s800

Basic Load: 38 rounds total any 105mm Combination

Effective Range: m9,000

Armor Penetration: mm180

Cartridge Weight: kg23.5

Cartridge Length: mm990

Projectile Weight: kg13.6

High Explosive CLX663 (IM): kg1

Fuze: Electronic/programmable/ multifunctional

Propellant NC-NG: kg3

Accuracy/Dispersion (typical): 0.3X0.3 mil

Temperature limits (Firing): 40 to +52ºC

Temperature limits (Storage): -40 to +63ºC

↳*Ammunition (Option 3)*

Type: HESH-T (HEP-T): High-Explosive Squash-Head Tracer tank cartridge

Caliber: mm44

Muzzle Velocity: m/s731

Basic Load: 38 rounds total any 105mm Combination

Effective Range: 9,500

Armor Penetration: Yes

Cartridge Weight: kg21.2

Cartridge Length: mm939

Projectile Weight: INA

High Explosive Comp: kg2.2

Propellant M6: kg2.8

Accuracy/Dispersion (typical H+B): cm171

Temperature limits (Firing): -40 to +52ºC

Temperature limits: (Storage): -40 to +63ºC

Anti-Aircraft Weapon System

↳*System*

Name: W-85 (QJC88)

Type: 12.7mm Anti-Aircraft Machine Gun

Max Rate of Fire: rds/min550-600

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Laser

Stabilized: No

Muzzle Velocity: m/s200

Operational Range: m3,000-4,000

Guidance System: SACLOS Wire Guidance

Armor Penetration: Yes

Fuel Capacity: liters4501

Gears: 5 Forward and 1 Reverse

Feed System: Belt

Sights: Iron/Optical

Type Round: Type 54 Round

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation Angle: deg90

↳*Ammunition*

Type: Anti-Aircraft Machine Gun

Muzzle Velocity: m/s850

Basic Load: belt-fed by boxes of 250 rounds.

Maximum Effective Range: m1,200-1,800

Armor Penetration: Yes

Coaxial Weapon System

↳*System*

Name: Type 80 Chinese Heavy Machine Gun

Type: 7.62mm Coaxial Machine Gun

Manufacturer: NORINCO

Date of Introduction: 1985

Length, Total: mm1,192

Length, Barrel: mm658

Diameter: INA

Range Finder Type: Optical/Night Vision

Weight (Gun Only): kg12.6

Weight (With Tripod): kg17.5

Action: Gas Operated

Rate of Fire: rds/min700-800

Feed System: Belts in 100/200/250 round boxes

Sights: Open sights. Optical/Night vision scope can be outfitted.

Variant 1: Type 80 - The copy of the PKM GPMG, chambered in 7.62×54mmR

Variant 2: Type 86 - A machine gun only used for tanks as a secondary weapon.

Variant 3: CF06 - An export-only version of the Type 80, which is chambered for 7.62 NATO ammunition.

Variant 4: BD-14 - A variant of the Type 80 made by Bangladesh Ordnance Factories under license which uses 7.62×51mm NATO instead of 7.62×54mmR

↳*Ammunition*

Type: Rifle

Caliber: 7.62×54mmR

Muzzle Velocity: m/s840

Basic Load: INA, Belts in 100/200/250 round boxes

Effective Range: 100-1,500m (With Sight Adjustments) m

Armor Penetration: Available

Anti-Tank Guided Missile

↳*System*

Name: HJ-8

Type: Anti-Tank Guided Missiles

Function: Wire-Guided Anti-Tank Missile System

Maximum Range of Fire: m4,000-5,000

Hit Probability (Static Targets: %90

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Laser Guidance System

Caliber/Length: mm1,566

Diameter: mm120

Fire Control

Name: INA

Computerized FCS: Yes, believed to be the same FCS that is installed on Type 80 tanks

Thermal Sight Tank Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, stabilised in both axes to improve accuracy

Direct Fire Support: Yes

Indirect Fire Support: Yes

Laser Rangefinder: Yes

Protection

Armor Type: All-welded steel

Hull Armor: Steel armour, 25mm thick

Turret Armor: Steel armour, 25mm thick

Applique Armor: Available

Explosive Reactive Armor: Yes

Active Protection System: Yes

Mine Clearing: Yes, Type 762 light mine clearance device

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Four smoke-grenade launchers are mounted on each side of the turret

IR Signature: INA

Note #1: It is likely that the vehicle's mine or blast resistance is low and that the protection is sufficient only for large-calibre small arms fire such as 12.7 or 14.5 mm rounds at typical combat ranges.

Note #2: Storage racks provide additional protection against HEAT rounds

Notes:

The Type 63A amphibious light tank is a radically improved variant of the Type 63. The Type 63A entered service with Chinese Army in 1997. Over 300 of these light tanks were built for the Chinese Army. Some sources report that this light tank has been exported to Venezuela. Currently very few countries develop amphibious tanks and China is one of them. Its predecessor, the Type 63, was originally designed for river-crossing operations at inland rivers and lakes, however it was unsuitable for high-speed, long-distance maritime operations. The new Type 63A has specially modified features to improve its amphibious performance at sea. It can be launched from amphibious ships 10 km or more offshore. Before the mid-1990s, Chinese ground forces relied on the Type 63 amphibious light tank developed in the early 1960s. The low swimming-speed and weak firepower of the Type 63 was insufficient to the needs of modern maritime amphibious assault operations that PLA would conduct. The PLA demanded a replacement for the Type 63 in the early 1990s, which led to the development of the Type 63A in 1997. Reports indicate that over 300 examples has been delivered to the PLA by the end of 2000. The tank is also used by the Tanzanian armed forces. The Type 63A is a lightly armoured amphibious light tank with a flat, boat-like hull. Suspension is made up of 6 road wheels and lead or return rollers. A redesigned welded turret from the original Type 63 is mounted center of the hull, with the powerpack positioned in the rear. The Type 63A has 2 additional floating tanks to increase the stability of the vehicle in the water. There are 3 water inlets on both sides of the hull. In the rear of the hull there are to allow 2 large water jets for travelling in water. Type 63A introduces an enlarged welded turret replacing the original Type 63 turret, the modernised Type 63A utilises a dual-way stabilised 105 mm rifled gun replacing the 85 mm gun. The 105 mm rifled gun fires armour piercing fin stabilised discarding sabot (APFSDS), high explosive (HE), and high-explosive anti-tank (HEAT) ammunitions, with 45 rounds carried inside the vehicle. APFSDS round penetrates 400 mm steel armour or destroy a reinforced concrete bunker a distance of 2,000 m. To overcome the inaccuracy of firing when swimming, the Type 63A uses laser-beam guidance ATGM which is not affected by wave motion while swimming. The missile has a maximum firing range of 4–5 km with a first hit probability of +90% against stationary targets. Its secondary functions can engage low-flying helicopters. The Type 63A enhance capability allows the vehicle to conduct amphibious operations from its host amphibious warfare ships at distances from 5–7 km to shore at a speed of 28 km/h. Compared to the Type 63, the Type 63A featured five major improvements: The modernised Type 63 to Type 63A has given enhanced sea travelling performance, increased swimming speed, improved fire-control system, ATGM capability, and larger 105 mm rifled gun with dual stabilizers. The FCS includes digital fire-control computer, integrated commander sight with laser rangefinder input, and white-light spotter or image-stabilised gunner's sight w/ passive night vision. The Type 63A night vision is an image intensifier system. Alternatively the gunner sight can be fitted with a thermal imager night vision. It is also equipped with the satellite positioning (GPS/GLONASS) system to allow accurate landing position in harsh weather conditions and night operations. It's also equipped with computerised fire-control to enable accurate firing both on land and at sea.

2S25 Sprut-SD Russian Light Amphibious Tank







Tiers:

1 2 **3** 4

Variants:

- **Sprut-SDM1:** New version with fire-control system and remote weapon station.[

System

Alternative Designation: 2S25 Sprut-SD
Type: self-propelled tank destroyer or light tank
Crew: ea3

Dimensions

Length: 9.77 m (32 ft 1 in) (gun forward) 7.08 m (23 ft 3 in) (chassis)
Width: 3.15 m
Height: 2.72 m
Weight, Combat: 18 Tons
Ground Pressure: INA

Automotive

Engine Name: 2V-06-2S
Engine Type: water cooled diesel engine
Engine Power: hp510
Range: km500
Speed, Maximum Road: km/h70

Speed, Maximum Off-Road: km/h45

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.9 m

Trench: 1.8 m

Fording: Amphibious

Main Gun

↳*System*

Name: 2A75 smoothbore gun

Type: 125mm

Length: INA

Barrel Length: 0.925 m

Width: INA

Elevation: - 5 to + 15 degrees

Traverse: 360 degrees

Autoloader: YEs

Rate of Fire: The 2s25 Sprut SD has a rate of fire of 7 rounds per minute.

Maximum Effective Fire: 50 km

Note: This gun is also used to launch anti-tank guided missies in the same manner as ordinary projectiles. This feature is common to all modern Russian MBTs. Laser-guided anti-tank missiles has a range of effective fire of up to 5 km.

↳*Ammunition*

Type: Projectile

Caliber: mm125

Basic Load: 40 Rounds

Note: The gun uses the same ammunition as the D-81 series of guns used on the T-64, T-72, T-80 and T-90 tanks.

Coaxial Weapon System

↳*System*

Name: PKT

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Length: 1,203 mm

Barrel Length: 605 mm

Weight: 9 kg

Maximum Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Action: Gas-operated, open bolt

Maximum Firing Range: 4,000 m

Effective Firing Range (with Sight Adjustments): 100-1,500 m

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: Yes, a modernized FCS

Thermal Sight Tank Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Protection

Hull Armor: The hull of the 2S25 self-propelled anti-tank gun is composed of welded aluminum armor with a composite skin to maintain a light weight. Through the frontal arc, 40° left and right of the frontal armor provides protection against attack from 23 mm weapons at 500 m (550 yd) and against small arms fire and shell splinters through the remainder of the vehicle.

Turret Armor: Turret – Welded steel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Two banks of three smoke-grenade dischargers are mounted towards the rear on each side of the turret as countermeasures to infrared weapons.

Automatic Fire Suppression System: Yes

Notes:

The 2S25 Sprut-SD (Russian: 2С25 «Спрут-СД»; 2S25 "Kraken-SD") is a self-propelled tank destroyer or light tank developed and manufactured by the Russian defence company, Volgograd Tractor Plant joint stock company, to meet the requirements of the VDV. In mid-2001, the Volgograd tractor plant revealed that the development of the 2S25 had lasted several years. The

Sprut-SD is designed to defeat tanks, hard-skinned material and enemy manpower by airborne and amphibious landing forces, as well as by specially designated units of ground forces. Its main armament, the 2A75, is capable of firing APFSDS, HE-Frag, HEAT and ATGM ammunition. This allows the 2S25 to be as powerful as a main battle tank and as maneuverable and amphibious as airborne infantry combat vehicles. The 2S25 can be used by units of ground forces and naval infantry as a light amphibious tank. Currently, the only operators of the 2S25 are the Russian airborne troops with 24 of these vehicles in service. The Republic of Korea and the Indian military have expressed interest in acquiring the 2S25 Sprut-SD. The 2S25 is based on the chassis of the BMD-3 Infantry fighting vehicle, which is also produced by the Volgograd tractor factory and is in service with the Russian airborne troops. Notable distinctions from the BMD-3 are the armament, the fire control system and the addition of two wheels to each side of the vehicle; which increases the number to seven on each side. The crew is located at the front of the chassis. The turret and ammunition occupies the middle of the vehicle, while the engine-transmission compartment is towards the rear. The driver has a hatch on the front deck; the commander and gunner have hatches on the turret deck. In the stowed position, the commander sits to the right of the driver, while the gunner sits to the left. Each crew member has available built-in roof observant instruments with the day and night channels. Standard equipment includes an electronic NBC protection system to ensure survivability of the crew in case of nuclear fallout. The 2S25 Sprut-SD is equipped with a two-man turret armed with a 125 mm anti-tank gun. The gun is fitted with an autoloader, which ensures the high rate of fire of 6−8 rounds per minute with both conventional projectiles and rounds with guided missiles. It is completely stabilized in the vertical and horizontal planes and conducts fire with the same 125 mm separate case ammunition loadings that are used for the 2A46 smoothbore tank gun. With the fire control system featuring this stabilization of the elevation and azimuth, it also includes a laser rangefinder and a ballistic computer that provides ever-changing data about the target. The two-plane stabilization of the commander's sight is aligned with the laser sight for aiming the 125 mm shells onto the laser rangefinder. The main armament of the 2S25 is a 125 mm smoothbore 2A75 tank gun, which is a derivative of the 125 mm 2A46 tank gun installed on Russian main battle tanks. The angles of elevation and depression for the anti-tank gun are +15° and −5° respectively. When aimed towards the stern of the vehicle, the elevation and depression of the gun changes to +17° and −3° respectively. Given the need to install a gun to a substantially lighter chassis, designers created a new recoil device with a new ejector and thermal insulation jacket; it lacks a muzzle brake. The 2A75's ammunition includes laser guided missiles like the 9M119 Svir, which have a maximum range of 4 km, for defeating armored targets. Reloading the main gun is completed by means of a horizontal autoloader mounted behind the turret. It can carry 40 rounds for the main armament, with 22 ready to use in the autoloader. In case the autoloader is no longer intact, manual loading is possible at the cost of a substantially longer reload time. A coaxial 7.62 mm PKT machine gun mounted to the left side of the main armament serves as the secondary armament of the 2S25; equipped with one tape of 2000 rounds.

PT-76 Russian Light Amphibious Tank







Tiers:



Variants:

- **PT-76A:** This variant is equipped with a D-56T gun with a multi-slotted muzzle brake
- **PT-76B:** This version features the D-56TS gun with a double-baffle muzzle brake, fume extractor and two-axis stabilizer system. Two auxiliary fuel tanks, each with 25 gal (95 liters), were also fitted, increasing overall weight by 440 lb (200 kg). Speed is increased to 37 mph (60 kmh). The hull was raised by 5 in (130 mm), the bow lengthened and the stern given a slightly steeper reverse angle to enhance buoyancy.
- **PT-76C:** This variant is fitted with a 12.7-mm air defense machine gun.
- **PT-76(M):** NIMDA, an Israeli company, designed an upgrade package for the PT-76. This included a new Detroit Diesel 6V-92T engine developing 300 hp at 2,100 rpm coupled to the original transmission and a new clutch; a Cockerill Mk 3M-A2 90-mm main gun; and a new fire-control system with a laser rangefinder. The 90-mm barrel measures 10 ft 8 in (3.25 m). The upgrade kit also includes a new alternator; new cooling and electrical system; and fuel, exhaust, air inlet, hull and top deck modifications.
- **PT-76 with AU-220M 57-mm turret:** First shown in 2005 as an export-oriented upgrade, the AU-220M replaces the existing PT-76 two-man turret with the AU-220M two-man turret equipped with a 57-mm automatic gun and a 7.62-mm machine gun. The fully stabilized main gun, equipped with a muzzle brake, fires a 57 x 347 SR round. Its ammunition-handling system manages the 20 ready rounds stored in the turret and replaces them with 70 more in the vehicle.
- **Chinese Type 63:** he Chinese Type 63 is a modification of the PT-76 design.

System

Alternative Designation: PT-76
Type: Light Amphibious Tank
Manufacturer: VTZ, Kirov Factory
In Service: 1951-Present
Crew: ea3 (commander, gunner, driver)

Dimensions

Length, Hull: m6.91

Length, with Gun Forward: m7.63

Width: m3.14

Height: m2.26

Weight, Combat: kg14,000

Ground Pressure: 0.48 kg/sq cm

Track Length on the Ground: m4.08

Track Width: m0.36

Ground Clearance: m0.37

Automotive

Engine Name: 1 x Model V-6B

Engine Type: water-cooled, in-line six-cyl diesel

Engine Power: 240 hp at 1,800 rpm

Main Fuel Capacity: 380 liters

Auxiliary Fuel Capacity: 190 liters

Speed, Road: 44 kph

Speed, Water: 10 kph

Maximum Road Range: 370 km

Maximum Road Range with Aux Fuel Tanks: 480 km

Maximum Water Range: 120 km

Gradient: %70

Vertical Obstacle: 1.10 m

Trench: 2.80 m

Fording: Amphibious w/hydrojet

Suspension: torsion bar, 6 road wheels, rear drive, front idler, no return rollers

Main Gun

↳*System*

Name: D-56T

Type: Rifled Anti-Tank Fun

Caliber: mm76.2

Length: 42 calibers (3.2 metres)

Carriage: Vehicle Mount

Rate of Fire: 6-8 rounds per minute

Maximum Firing Range: 1,500 metres

Maximum Elevation: deg+30

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳*Ammunition*

Name: BM-354P

Type: High Velocity Armor Piercing (HVAP)

Caliber: mm76.2

Cartridge: INA

Basic Load: 40

Maximum Effective Range: 650 meters by day and 600 meters at night.

Other Types of Ammunition: BM-354P High Velocity Armor Piercing (HVAP); BK-350M High Explosive Anti Tank or HEAT; OF-350 Frag-HE

Coaxial Weapon System

Note: The PT-76 has been seen with the following types of secondary weapons: * 1 x 7.62 mm SGMT, * 1 x PKT machine gun, * 1 x 12.7mm DSHKM Machine Gun

↳*System*

Name: Goryunov SG-43

Type: 7.62mm Heavy Machine Gun

Caliber: mm7.62

Length: mm1,150

Barrel Length: mm720

Weight, Unloaded: kg120.81

Action: Gas-Operated

Muzzle Velocity: m/s800

Rate of Fire: 600 Rounds per Minute

Effective Range: m1,097

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: INA

Basic Load: 1,000

Armor Penetration: INA

Fire Control

Name: INA

Computerized FCS: INA

Night Vision: only the driver had a night vision device

Main Gun Stabilization: stabilized in both planes

Protection

Hull Armor: front upper 11 mm at 80 deg front lower 14 mm at 45 deg side 14 mm at 0 deg rear upper 7 mm at 0 deg rear lower 7 mm at 45 deg top 7 mm belly 5 mm

Turret Armor: front 17 mm at 35 deg sides 16 mm at 35 deg rear 11 mm at 35 deg top 8 mm mantlet 11 mm at 33 deg

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Only with the PT-76B and later

Smoke Equipment: Diesel fuel injected into exhaust system

Notes:

The PT-76 is a Soviet amphibious light tank that was introduced in the early 1950s and soon became the standard reconnaissance tank of the Soviet Army and the other Warsaw Pact armed forces. It was widely exported to other friendly states, like India, Iraq, Syria, North Korea and North Vietnam. Overall, some 25 countries used the PT-76. The tank's full name is Floating Tank–76 (плавающий танк, plavayushchiy tank, or ПТ-76). 76 stands for the caliber of the main armament: the 76.2 mm D-56T series rifled tank gun. The PT-76 is used in the reconnaissance and fire-support roles. Its chassis served as the basis for a number of other vehicle designs, many of them amphibious, including the BTR-50 armored personnel carrier, the ZSU-23-4 self-propelled antiaircraft gun, the ASU-85 airborne self-propelled gun and the 2K12 Kub anti-aircraft missile launch vehicle. The PT-76 has a typical tank layout: the steering compartment at the front, the combat compartment in the center and the engine compartment at the back. The tank has a three-man crew, with the commander also acting as the radio operator and gunner. This reduces his effectiveness as an observer. The commander and loader stations are located inside the turret, the commander sits on the left side of the main gun and the loader sits on the right. They have a large oval shaped double hatch, which opens forwards on top of the turret. The driver sits in the center of the front of the hull and has a one piece hatch that opens to the right, with three vision blocks and periscopes located beneath the main gun at the top of the sloping glacis plate. Under the driver's seat, there is an emergency hatch that can be used by all crew members. At night, the center periscope is swapped for a TVN-2B night vision device which gives the driver clear vision up to 60 meters. Its main armament consists of a 76.2 mm D-56T series rifled tank gun, which has an effective range of approximately 1,500 meters and a rate of fire of six to eight rounds per minute. This gun is 42 calibers long. The PT-76 carries 40 rounds for its gun. A typical ammunition load consists of 24 x OF-350 Frag-HE, 4 x AP-T, 4 x API-T and 8 x BK-350M HEAT rounds (with AP-T rounds substituted for HVAP when available). The gun is mounted in an oval dish-type circular truncated cone turret with flat, sloping sides which is mounted over the second, third, and fourth pair of road wheels. All PT-76s have a fume extractor for the main gun at the rear of the turret. The 7.62 mm SGMT coaxial medium machine gun comes with 1,000 rounds. This weapon has a maximum effective range of 1,000 meters in daylight while the vehicle is stationary, 400 to 500 meters in daylight while the vehicle is on the move and 600 meters at night. Maximum range is 1,500 meters. It can be fired in 2 to 10 round bursts and has a practical rate of fire of 250 rounds per minute and a cyclic rate of fire of 650 rounds per minute. From 1967, the machine gun was replaced with PKT of the same caliber. The main gun, considered light for a modern tank, can fire BM-354P HVAP, API-T, AP-T, BR-350 API-T and OF-350 Frag-HE rounds (as can the 76.2 mm M1942 (ZiS-3) divisional gun) and is capable of penetrating the armour of APCs and other lightly armored vehicles. The commander/gunner has a cupola on the left side of the double hatch. The cupola has the TPKU-2B observation device and two TNP day periscopes and can be rotated 360 degrees by hand. The commander also has a 4X optical sight mounted to the left of the main armament and a TShK-66 sight/rangefinder. The loader has the MK-4 observation device mounted on the turret's roof in front of the hatch.

Artillery

→Gun/Howitzer Artillery Systems

→→Towed Gun/Howitzer Artillery Systems

M1985 Romanian 152mm Towed Howitzer




Tiers:



Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Family: M1985
Type: 152mm Towed Gun-Howitzer
Manufactuer: Artillery Plant Number 9, Yekaterinburg
In Service: 1955-Present
Crew: ea8
Emplacement Time: min2.5
Displacement Time: min2.5

Dimensions

Length, Firing: m8.69
Length, Travel: m8.10
Width, Firing: m2.32
Width, Traveling: INA
Height, Overall: m2.52
Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck

Towing Speed, Road: km/h60

Towing Speed, Off Road: km/h30

Gun-Howitzer System

↳*Cannon*

Type: Cannon

Cailber/Length: mm152

Length, Barrel: m5.195

Rate of Fire, Burst: rd/min5-6

Rate of Fire, Normal: INA

Rate of Fire, Sustained: rd/min1

Loader Type: Manual

Breech Type: Vertical semi-automatic sliding-wedge

Muzzle Brake Type: Double flared

Traverse Range: deg58

Traverse, Left: deg29

Traverse, Right: deg29

Maximum Elevation: deg+45

Minimum Elevation: deg-5

Maximum Effective Range: km17.4

Sights: PG1M indirect sight and OP4M direct fire sight.

Recoil: hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32

Type: Frag-HE

Cailber/Length: 152mm

Weight: kg(OF25) 43.56

Range, Minimum: m4,600

Range: m17,400

Muzzle Velocity: m/s655

Fuze Type: V-90 PD

Ammunition (Option 2)

Name: BP-540
Type: HEAT
Cailber/Length: mm152
Weight: kg27
Range, Minimum: m0
Range, Maximum: m1000
Armor Penetration: INA
Muzzle Velocity: m/s655
Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96
Type: Frag-HE
Cailber/Length: mm152
Weight: kg(OF-64) 43.56
Range, Minimum: INA
Range, Maximum: m24,400
Muzzle Velocity: INA
Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel
Direct Fire: OP 4M
Collimator: K-1

Notes:

The M1985 152mm Towed Howitzer is a Romanian version of the Russian M1955 (D-20) 152mm Towed Howitzer. The 152 mm gun-howitzer M1955, also known as the D-20, (Russian: 152-мм пушка-гаубица Д-20 обр. 1955 г.) is a manually loaded, towed 152 mm artillery piece, manufactured in the Soviet Union during the 1950s. It was first observed by the west in 1955, at which time it was designated the M1955. Its GRAU index is 52-P-546. The D-20 has a 34 calibre (5.195 m) barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breech, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breech. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breech. The breech has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 58° and the vertical elevation range is −5° to 45°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in the centre for traverse before towing the gun. Large spades are permanently fixed close to the end of each trail; these are hinged and it appears that the gun can be fired with them up or down depending on the terrain, but they are always up when the gun is towed. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on the ground. When the gun is brought into action, the pivot jack is folded down and adjusted to be on the ground. If a large traverse is required, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail

jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in the centre for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period, the gun has a shield, including a folding piece below the cradle support. The centre section of the upper shield slides both up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defence against machine gun fire. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M) in a mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale, coupled to an elevation leveling bubble mounted on dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Like most Soviet artillery, the gun fires separate ammunition using metal cartridge cases that also provide obturation. The ammunition is interchangeable with that used with other 152 mm guns, although the more modern ones also have a third, much larger cartridge. The D-20 uses two types of cartridge; one has a base charge and up to five increments, the other is a single 'super' charge cartridge. The standard shell weight is 44 kg with a muzzle velocity of 655 m/s, but some projectiles are more or less than this. The basic shell is HE-Fragmentation, other projectiles include smoke, illuminating, chemical and probably incendiary. Later projectiles include bomblet, anti-personnel mine, flechette, Krasnopol precision munition, communications jammer, and extended range HE using rocket assistance (RAP). The normally maximum range is 17.4 km, RAP being greater. Two direct-fire anti-tank projectiles have been used, HEAT and APHE, the latter being 5.2 kg heavier and with a lower muzzle velocity. The maximum rate of fire is usually stated as five rounds/minute, and 65 rounds/hour sustained. In Soviet service, the unit of fire was 60 rounds. The detachment was either 8 or 10 men, probably differing between armies and the time period. In Soviet service, the 5,700 kg gun was usually towed by a URAL-375 6×6 truck or, in some regions, an AT-S or AT-L medium tractor.

D-20 (Export) Iranian 152mm Towed Gun Howitzer





Tiers:



Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Alternate Name: D-20; M1955 Angola — 4 as of 2016 Armenia — 34 as of 2016 Azerbaijan — 24 as of 2016 Bulgaria — 44 as of 2016 Georgia — 12 received from Bulgaria in 2009 People's Republic of China — Type 66 Republic of the Congo — Hungary - 18 as of 2016 Iran — 30 as of 2016 Iraq — All were destroyed in the 2003 invasion, new models bought from Bulgaria in 2015. Iraqi Kurdistan Laos — In service as of January 2019. Moldova — as of 2016 Myanmar — 35 delivered in 2009 from DPRK. Nicaragua — 12 in service and 30 in store as of 2016 Nigeria — 4 M81/M85 from Romanian Army stocks. Russia — 1,075 as of 2016 Romania — The Romanian Army has 247 M81 howitzers and 103 M85 gun-howitzers. Sri Lanka — 46 Type 66 as of 2016 Syria — Turkmenistan — 72 as of 2016 Ukraine — 130+ as of 2016 Vietnam —

Type: 152mm Towed Gun-Howitzer

Manufactuer: Artillery Plant Number 9, Yekaterinburg

In Service: 1947-Present

Crew: ea8

Family: D-20

Emplacement Time: min2.5

Displacement Time: min2.5

Dimensions

Length, Firing: m8.69

Length, Travel: m8.10

Width, Firing: m2.32

Width, Traveling: INA

Height, Overall: 2.52

Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck

Towing Speed, Road: km/h60

Towing Speed, Off Road: km/h30

Gun-Howitzer System

↳*Cannon*

Type: Cannon

Cailber/Length: mm152

Length, Barrel: m5.195

Rate of Fire, Burst: rd/min5-6

Rate of Fire, Normal: rd/minINA

Rate of Fire, Sustained: rd/min1

Loader Type: Manual

Breech Type: Vertical semi-automatic sliding-wedge

Muzzle Brake Type: Double flared

Traverse Range: deg58

Traverse, Left: deg29

Traverse, Right: deg29

Maximum Elevation: deg+45

Minimum Elevation: deg-5

Maximum Effective Range: km17.4

Sights: PG1M indirect sight and OP4M direct fire sight.

Recoil: hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32

Type: Frag-HE

Cailber/Length: mm152mm

Weight: kg43.56(OF25)

Range, Minimum: m4,600

Range: m17,400

Muzzle Velocity: m/s655

Fuze Type: V-90 PD

↳*Ammunition (Option 2)*

Name: BP-540

Type: HEAT

Cailber/Length: mm152

Weight: kg27

Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96

Type: Frag-HE

Cailber/Length: mm152

Weight: kg43.56 (OF-64)

Range, Minimum: mINA

Range, Maximum: m24,400

Muzzle Velocity: m/sINA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M

Collimator: K-1

Notes:

Iran imports a large amount of their military equipment and weapons from Russia, China, and America. The D-20 was the first 152-mm cannon system to incorporate a semiautomatic vertical-sliding-wedge breech block. Although the ammunition for the system was not changed, this modification allowed a slightly higher rate of fire to be achieved (6 rounds per minute rather than 4), although the sustained Rate of fire was unchanged. Because the carriage is based on that of the 122-mm gun D-74, the D-20 cannot be elevated above 45°. Variants M1974: North Korean self-propelled howitzer with a vVTT-323 APC chassis and a D-20 mounted in the side-armored rear bay Type 66: Chinese copy of D-30 Type 83: Self-propelled howitzer based on the Type 66, and an armored tracked chassis Other ammunition types: DPICM, DPICM-BB, incendiary, expendable jammer, chemical, flechette, semi-active laser-guided Krasnopol-m frag-HE. The cannon is ballistically matched to the 2S3M self-propelled howitzer. Thus it can generally fire the same ammunition to the same range. Selection of rounds available may differ based on tier of the system.

M114A1 American 155mm Towed Howitzer



Tiers:



Variants:

- **M114A2:** This is the standard M114 fitted with the longer barrel of the newer M198.
- **M114/39:** This was an upgrade developed by RDM (De Rotterdamsche Droogdok Maatschappij BV) Defense Engineering in Rotterdam, Netherlands. Longer barrel (39 calibers vs. 23) with increased rifling twist from 1 in 25 calibers to 1 in 20, a three-port muzzle brake, larger-capacity equilibrators, revised recoil system inclu ding new metering and recoil rods, maximum elevation increase to 70-deg (1,245 mils) and a greater barrel-chamber volume. The gun carriage was modified to handle the increased forces. Firing weight is 16,755 lb (7,600 kg); traveling length is 32 ft 10 in (10.0 m).
- **Modified M114 (Israel):** his version was developed as a private venture by Soltam of Israel.
- **155-mm M65 Howitzer:** This is a South Korean conversion of the M114A1 (see separate database entry).
- **M114 (Iran):** The variant is an Iranian upgraded M114 with an M114/39 barrel designated the HM41.

System

Alternative Designation: M114, M114A

Type: 155mm Towed Howitzer

Family: M114

Manufacturer: Rock Island Arsenal (US)

In Service: 1941-Present

Crew: ea11

Displacement Time: minINA

Emplacement Time: minINA

Carriage: Split trail

Dimensions

Length, Traveling: m7.32

Length, Barrel: m3.78

Width: m2.44

Height: 1.80

Ground Clearance: mm229

Weight, FIring: kg5,800

Weight, Traveling: kg5,760

Automotive Requirement

Prime Mover: 6x6 or 8x8 truck

Communications

Primary: INA

Howitzer System

↳*Howitzer*

Name: M114 155mm Howitzer

Type: mm155

Length, Barrel: m3.78

Breech Type: stepped thread, interrupted screw

Loader Type: Manual

Muzzle Brake Type: INA

Bore Type: 155-mm/23-cal rifled

Maximum Elevation: deg+65

Minimum Elevation: deg-2

Traverse Range: deg49

Traverse Right: deg25

Traverse Left: deg24

Recoil System: hydropneumatic

Maximum Effective Range: m14,600

Rate of Fire, first 30 seconds: 2 rounds, 1st 1/2 min

Rate of Fire, first 4 minutes: 8 rounds, 1st 4 min

Rate of Fire, first 10 minutes: 16 rounds, 1st 10 min

Sustained Rate of Fire: 40 rds/hr

↳*Ammunition (Option 1)*

Name: M449

Type: HE-APERS

Caliber: mm155

Projectile Length: mm698

Projectile Weight: kg43.09

Muzzle Velocity: m/s563

Basic Load: INA

Shell Type: Separate-loading bagged charge

↳*Ammunition (Option 2)*

Name: M107

Type: HE

Caliber: mm155

Projectile Length: mm607

Projectile Weight: kg42.91

Muzzle Velocity: 5623

Basic Load: INA

Shell Type: Separate-loading bagged charge

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Protection

Notes:

Iran imports many of their military equipment and weapons from China, Russia, and the United States. The M114 155mm howitzer, which was replaced by the M198, is a towed weapon first produced in 1942 as medium artillery. The weapon uses NATO standard 155mm ammunition, with a range of about 14,000m, and was used during World War II in Korea, and in Viet Nam. Until recently they were in service with the National Guard. It was the U.S. Army and Marine Corps' principal 155-mm howitzer until the introduction o f the M198 in the early 1980s. It was exported to many other countries as well.

ZPU-2 Russian 14.5mm Towed Anti-Aircraft Gun




Tiers:

1 2 3 **4**

Variants:

- **Type 58:** Type 58: Chinese version of ZPU-2
- **PKM-2:** PKM-2 – Polish-built version.

System

Alternative Designation: ZPU-2
Type: 14.5mm Towed Anti-Aircraft Gun
Crew: 5
Carriage: INA
Displacement Time: minutes5
Emplacement Time: minutes5

Dimensions

Length, Traveling: m3.54
Barrel Length: m1.36
Width: m1.92
Height: m1.83
Weight, Traveling: kg649
Weight, Firing: kg621
Ground Clearance: m0.27

Cannon

↳*System*

Name: ZPU-2
Type: two Model KPV machine guns mounted on a two-wheel carriage.
Barrels: 2

Bore: 14.5-mm; fitted w/flash hiders

Muzzle Velocity: m/s1,000

Maximum Vertical Range: m5,000

Maximum Horizontal Range: m8,000

Effective Vertical Range: m1,400

Max Elevation: deg+85

Min Elevation: deg-15

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Cyclic Rate of Fire: 600 rds/min

Practical Rate of Fire: 150 rds/min

↳*Ammunition (Option 1)*

Name: BS.41

Type: API

Caliber: mm14.5

Basic Load: INA

Core: Tungsten carbide core

Projectile Weight: 64.4 g

Muzzle Velocity: m/s1,000

Armor Penetration: Armor-penetration at 500 m (550 yd) is 32 mm (1.3 in) of RHA at 90 degrees.

↳*Ammunition (Option 2)*

Name: BZT

Type: API-T

Caliber: 14.5

Basic Load: INA

Core: Steel Core

Projectile Weight: 59.56 g

Muzzle Velocity: m/s1,005

Tracer Burns: Tracer burns to at least 2,000 m (2,200 yd).

↳*Ammunition (Option 3)*

Name: ZP

Type: I-T (Instantaneous Incendiary)

Caliber: mm14.5

Basic Load: INA

Core: INA

Projectile Weight: 60.0 g

Note: I-T (ZP) – "Instantaneous Incendiary" bullet with internal fuze, incendiary in tip, tracer container in base.

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The ZPU-2 consists of two Model KPV machine guns mounted on a two-wheel carriage. The ZPU-2 was introduced in 1949 and is a twin version of the ZPU-1 basic Soviet 14.5MM machine gun. The ZPU-2 was used in Korea and considered a dangerous opposition in Vietnam. The Type 58 is the Chinese version, while the individual KPV machine guns as the Type 56. The twin ZPU-2 has appeared on two different two-wheeled carriages. The earlier model has larger fenders and a double tubular tow bar. In firing position the crew removes the wheels, and the weapon rests on a three-point platform. The later model, which is lighter in weight, has smaller fenders, a tighter single tow bar, and a tower silhouette. When in firing position the wheels are raised, but not removed. A very similar carriage is used for the twin 23mm automatic antiaircraft gun ZU-23, although the ammunition boxes, barrels and flash hiders are distinctly different. The ZPU-2 was used in the 1970s by some Warsaw Pact armies and by security elements such as the East German Workers' militia. All weapons in this series fire the API (BS 41) projectiles weighing 64.4 grams having a muzzle velocity of 1000 meters per second which will penetrate 32 mm of armour.

Type 54 Chinese 122mm Towed Howitzer





Tiers:



Variants:

- **M-30S:** Slightly modified variant; was used as the main armament of the SU-122 assault gun.
- **U-11:** A gun with identical ballistics, but equipped with a more compact recoil mechanism for easier mounting in vehicles. It was tried on the experimental SU-122M and rejected due to insufficient reliability. A variant of the same gun was also mounted on the experimental Obiekt 234 tank, also known as Iosif Stalin no. 2 (not to be confused with the IS-2).
- **D-6:** Another vehicle mounted gun with identical ballistics. It was used on the experimental SU-122-III and, like the U-11, proved unreliable.
- **Type 54:** China Licence version.
- **Type 54-1:** Slightly improved version.
- **Wz.1938/1985:** Existing Wz.1938 that was fitted with a castor wheel, PGO-9H sight and a second firing mechanism for direct fire.
- **M-30M:** In the 1980s Romanian Army M-30s were upgraded with new, larger pneumatic wheels, new brakes, a new optical sight for direct fire and a second height sighting mechanism for anti-tank combat. These upgraded howitzers were designated M-30M.

System

Alternative Designation: Type 54
Country of Origin: China
Type: Towed 122mm Howitzer
In Service: 1939-Present
Crew: 8
Carriage: Split trail
Displacement Time: less than 2 minutes
Emplacement Time: less than 2 minutes

Dimensions

Length: 5.9 m (19 ft 4 in) (with limber)
Barrel Length: bore: 2.67 m (8 ft 9 in) L/21.9 overall: 2.8 m (9 ft 2 in) L/23 (without breech block)
Width: 1.98 m (6 ft 6 in)
Height: 1.82 m (6 ft)
Weight: combat: 2,450 kg (5,401 lbs) travel: 3,100 kg (6,834 lbs)

Howitzer

↳*System*

Name: Type 54
Type: Towed 12mm Howitzer
Caliber: mm122
Breech: Interrupted screw
Recoil: Hydro-pneumatic
Carriage: Split trail
Elevation: -3° to 63.5°
Traverse: 49°
Rate of FIre: 5-6 rounds per minute
Maximum Firing Range: 11.8 km (7.33 mi)

↳*Ammunition (Option 1)*

Name: BP-460A
Type: HEAT
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: INA
Maximum Range: 2,000 m

↳*Ammunition (Option 2)*

Name: OF-462
Type: HE-Frag, steel (1,000 fragments to hit personnel in radius of 30 meters)
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: 21.76 kg
Maximum Range: 11,720

↳*Ammunition (Option 3)*

Name: H-462
Type: Chemical
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: 21.8 kg
Maximum Range: 11,800 m

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The Type 54 Chinese 122mm Towed Howitzer is a licensed version of the M-30 Russian 122mm Towed Howitzer. The 122 mm howitzer M1938 (M-30) was a Soviet 121.92 mm (4.8 inch) howitzer. The weapon was developed by the design bureau of Motovilikha Plants, headed by F. F. Petrov, in the late 1930s, and was in production from 1939 to 1955. The M-30 saw action in World War II, mainly as a divisional artillery piece of the Red Army (RKKA). Captured guns were also employed later in the conflict by the German Wehrmacht and the Finnish Army. Post World War II the M-30 saw combat in numerous conflicts of the mid- to late twentieth century in service of other countries' armies, notably in the Middle East. The barrel of the M-30 was of built-up construction and consisted of a liner, jacket and breech. The breechblock was of interrupted screw type, with forced cartridge case extraction. The gun was equipped with a hydraulic recoil buffer and hydropneumatic recuperator. A panoramic sight was used for both indirect and direct fire. The M-30 had a modern split trail carriage with leaf spring suspension and steel wheels with rubber tires. It was usually towed by vehicle without a limber. The carriage allowed for a towing speed of up to 50 km/h on paved road and up to 35 km/h on gravel or dirt roads, although the gun could also be moved by a team of six horses, in which case a limber was used. When the trails were swung open the suspension locked automatically . In an emergency it was possible to shoot in a "single trail" mode, at the price of a drastically reduced traverse (1°30'). The time required to set the gun up for combat was about 1–1.5 minutes. The carriage of the M-30 was later used for the D-1 152 mm howitzer. In the M-30, RKKA units finally received a modern divisional howitzer which successfully combined increased firepower and better mobility with reliability and ease of use. A summary of its employment by the Red Army was provided by Marshal G. F. Odintsov, who said "Nothing can be better". The long post-war employment of the howitzer is additional testimony to its combat and operational utility and effectiveness. It is hard to compare the M-30 directly with contemporary foreign guns since the artillery of France, Germany and United States employed in similar roles was either the much smaller 105 mm (Great Britain used the even smaller—87.6 mm—25 pounder gun-howitzer) or much larger 150 to 155 mm caliber guns. Howitzers of similar calibers existed but most of those were World War I era pieces, such as the Vickers 114 mm howitzer used by the Finnish Army. Naturally, 150 mm howitzers were more powerful, but much heavier than the M-30; while 105 mm pieces were lighter but their smaller shells contained less explosive. The most direct German equivalent was the 10.5 cm leFH 18 light howitzer. Weighing 1985 kg, it had a maximum elevation of 42°, muzzle velocity of 470 m/s and maximum range of 10,675 m. In the upgraded leFH 18/40 version, muzzle velocity was improved to 540 m/c, elevation to 45° and range to 12,325 m. About equal in range, the German howitzer had a less powerful HE shell and its smaller maximum elevation made it less effective against dug-in troops, although it also weighed some 400 kg less than M-30. Both guns were well suited for mass production with 16.887 M-30s and 15.388 leFH 18 built in 1941–45.

G-5 South African 155mm Towed Gun Howitzer





Tiers:



Variants:

- **G5 Mk I:**
- **G5 Mk II:**
- **G5 Mk III:**
- **G5 Mk IIIA:**
- **G5-2000: 52-calibre gun:**

System

Alternative Designation: GV, G5, Leopard
Crew: ea8
Prime Mover: Samil 100 6x6 or equiv
Emplacement Time: min2
Displacement Time: min1
Range, Maximum: km30
Range, Minimum: km3

Dimensions

Length, Overall Firing: m11
Length, Overall Travel: m12.1
Height, Overall: m2.3
Width, Firing: m8.7
Width, Travel: m3.3

Weight, Combat: mT13.75

Auxiliary Propulsion

Engine Type: 76 hp, air-cooled diesel

Cruising Range: km100

Speed, Maximum On: km/h16

Speed, Maximum Off: INA

Swim: NA

Automotive (Samil 100 6x6)

Engine Name:

Engine Type: Diesel

Engine Power: hp76

Towing Speed, Maximum On: 90

Towing Speed, Maximum Off: 50

Fording Depth: m.6

Fire Control System

Indirect Fire: Digital Panoramic Telescope

Direct Fire: Trunnion Mounted Telescopic

Collimator: INA

Fire Control Computer: None

Gun Display: None

Armament

↳***Cannon***

Name: INA

Cailber/Length: mm155

Type: Cannon

Length, Barrel: cal45

Rate of Fire, Burst: rd/min3

Rate of Fire, Normal: rd/min2

Rate of Fire, Sustained: rd/min2

Loader Type: Semi-Automatic

Breech Type: Interrupted Screw

Muzzle Brake Type: Single Baffle

Traverse Left: deg41

Traverse Right: deg41

Traverse Total: deg82

Elevation (-/+): deg-3/+75

Ammunition

↳*Option 1*

Name: M1 HE

Cailber/Length: mm155

Type: Frag-HE

Range, Minimum: m3,000

Range, Maximum: m30,000

Projectile Weight: kg8.7

Muzzle Velocity: m/s897

Fuze Type: PD M841

↳*Option 2*

Name: M1 HE

Cailber/Length: mm155

Type: HE BB

Range, Minimum: mINA

Range, Maximum: m39,000

Projectile Weight: kg8.7

Muzzle Velocity: m/sINA

Fuze Type: PD M841

↳*Other Ammunition Options*

Note: DPICM, DPICM-BB, Incendiary, Expendable Jammer, Chemical, Flechette, Semi-Active Laser Guided Krasnopol-M Frag-HE.

Notes:

The APU, combined with the tandem walking-beam suspension, gives the G5 excellent self-propelled mobility over short distances. The four wheels are all powered and give the gun excellent traction over most terrain. But, the APU serves purposes other than mobility. It provides power to open and close the trails, raise and lower the trail wheels, and raise and lower the firing platform. However, there is no power traverse or elevation. Although designed for an eight-man section, the South African defense force normally operates the G5 with a five-man section. However, the G5 can operate with minimum of two people when all of the powered systems are working. The G-5 MKIII includes 35 reliability modifications and performance improvements. The improvements include the addition of the AS2000 gun monitor, an improved braking system, bigger diameter and wider trail wheels (specifically designed for sand), and incorporation of the Reutech ACV 58 communication system. The cannon is ballistically matched to the 2S3M self-propelled howitzer thus, it can generally fire the same ammunition to the same range.

PL-96 (Type 96) Chinese 122mm Towed Howitzer



Tiers:



Variants:

- **Type 89:** Type 89 is a tracked 122 mm artillery system with the 122 mm ordnance. Actually it uses ordnance of the older Type 86 howitzer. Since the late 1970s a number of 122 mm self-propelled howitzers were developed in China to meet Chinese Army requirements. The PLA required mobile artillery system to provide medium- to long-range indirect fire support for motorized infantry and armored troops and capable of keeping pace with them. However none of them could meet these requirements. The Type 89, also known as the PLZ89, was developed in late 1980s. It was Chinese attempt to develop indigenous self-propelled howitzer with similar capabilities to the Soviet 2S1 Gvosdika. The Type 89 is currently in service with Chinese Army and Marines. Several hundred of these artillery systems were built. Currently these are being replaced by the PLZ-07 and PLZ-07B self-propelled howitzers.
- **SH-3:** SH-3 is a tracked artillery system. It is an improved version of the Type 89, developed mainly for export. It can be seen as a China's newly-built equivalent to the Soviet 2S1 Gvosdika. It offers greater mobility, improved fire control system and delivers greater firepower than the 2S1 or the Type 89 self-propelled howitzers.
- **PLZ-07:** PLZ-07 is a version of the SH-3, adopted by the Chinese army. It is a successor to the Type 89 self-propelled howitzer. It was adopted in the late 2000s and first publicly revealed in 2009. The PLZ-07 is being fielded by the Chinese army in large numbers. This artillery system is not amphibious, though it seems that it might be fitted with floatation kit in order to ford inland rivers and lakes.
- **PLZ-07B:** PLZ-07B is an amphibious self-propelled howitzer, used by China's marine corps. This artillery system is fully amphibious. It has a boat-like hull for improved floatation and is fitted with a trim vane and two waterjets. Though it uses a similar turret as the SH-3 and PLZ-07. The PLZ-07B can be launched at sea from amphibious assault ships and swim over short distances to shore.
- **SH-2:** SH-2 is another truck-mounted howitzer. It is based on a 6x6 light utility truck chassis and uses ordnance of the PL-96. This artillery system was first publicly revealed in 2007. It was aimed mainly at export customers. However it received no production orders.
- **PCL-09:** PCL-09 is a truck-mounted howitzer. It is based on a Shaanxi 6x6 military truck and uses ordnance of the PL-96. This artillery system was adopted in around 2009 and is widely used by Chinese army.
- **PLL-09:** PLL-09 is a self-propelled artillery system, which is based on a ZBL-09 Snow Leopard armored personnel carrier chassis with 8x8 configuration. This self-propelled howitzer is widely used by the China's army. A number of these systems are used by China's marines. It provides indirect fire support for rapid deployment brigades. The PLL-09 has good cross-country mobility and is capable of keeping pace with main battle tanks.
- **CS/SH-1:** CS/SH-1 airportable truck-mounted howitzer, intended for airborne forces. It also utilizes modified ordnance of the PL-96, mounted on an open-top 4x4 truck. This artillery system can be airdropped. It was first publicly revealed in 2014.
- **SH-4:** SH-4 is a recent truck-mounted artillery system, which utilizes modified ordnance of the PL-96 122 mm howitzer, based on a 4x4 military truck chassis with an armored cab.

System

Alternative Designation: PL-96 (Type 96) Chinese 122mm Towed Howitzer
Type: Towed 122mm Howitzer
Crew: 5 men
Towing vehicles: This field howitzer is towed by a 6x6 truck. It is typically seen towed by Dongfeng EQ2102 or Shaanxi

SX2150 trucks, that also carry crew and ammunition.

Displacement Time: minutes1.5 - 2.5

Emplacement Time: minutes1.5 - 2.5

Maximum Range of Fire: 18 - 27 km

Maximum Rate of Fire: 6 - 8 rpm

Sustained Rate of Fire: 1 - 2 rpm

Elevation Range: - 7 to + 70 degrees

Traverse Range: 360 degrees

:

:

Dimensions

Length (in traveling order): m5.4

Barrel Length: 32 calibers

Gun Bore: 122mm

Weight, Combat: kg3.2

Ammunition

Name: INA

Type: Projectile

Caliber: 122mm

Basic Load: INA

Types of Projectiles: A whole family of 122 mm ammunition is produced in China for its artillery system. This howitzer fires High Explosive (HE), High Explosive Fragmentation (HE-FRAG), cargo, incendiary, smoke, illumination, and possibly other types of shells.

Compatibility: The PCL-09 is compatible with all standard 122 mm ammunition of Russian D-30 howitzer.

HE-FRAG Projectile Maximum Range of Fire: 18 km

Extended-Range Projectile Maximum Range of Fire: 21 km

Rocket Assisted Projectile Maximum Range of Fire: 27 km

Laser-Guided Projectile Capable: Yes

HE Projectile Penetration: 180 mm of steel armor

HEAT Projectile Penetration: Around 450-500 mm of steel armor

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The PL-96 is a Chinese copy of the Soviet D-30 howitzer. It is also referred as the Type 96. It is a slightly improved version of the Type 86 howitzer.

M115 American 203mm Towed Howitzer




Tiers:



Variants:

- **M43 self-propelled howitzer:** This version was developed during World War II. It entered service in 1946 in small numbers; all have been retired.
- **M55 self-propelled howitzer:** This was based on the M48 tank chassis. It serves in Turkey. This has the same elevation and traverse ranges as M115. It was superseded in U.S. service by the M110.
- **M110 self-propelled howitzer:** This gun has a lighter chassis for air-portability. See separate database entry

System

Alternative Designation: M115
Type: 203mm Towed Howitzer
In Service: 1939-Present
Manufacturer: Hughes Tool, Houston, Texas (now part of Baker Hughes)
Family: M115
Crew: ea14
Carriage: M35 Prime Mover gun tractor or a Mack 7⅓ ton 6×6 truck
Displacement Time: INA
Emplacement Time: INA
Note: It is capable of firing U.S. 203-mm nuclear and chemical munitions, but the United States does not export those.

Dimensions

Length, Traveling: m10.97
Barrel Length: m5.14
Width, Firing: m6.86
Width, Traveling: m2.84
Height: m2.74
Weight, Firing: kg13,471
Weight, Traveling: kg14,515
Ground Clearance: mm320

Trail Type: split; towed on 2-wheel limber

Automotive Requirement

Prime Mover: M35 Prime Mover gun tractor or a Mack 7⅓ ton 6×6 truck

Communications

Primary: INA

Howitzer System

↳*Armament (Barrel)*

Name: M115

Type: 203mm Howitzer

Breech Type: Stepped-thread, interrupted screw

Length, Barrel: m5.14

Loader Type: INA

Normal Rate of Fire: 1 rd/2 min

Maximum Rate of Fire: 1 rd/1 min

Muzzle Velocity: m/s587

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: def60

Traverse Right: deg30

Traverse Left: deg30

Bore: 8-in (203-mm)/25-cal, rifled

Equilibrator Assemblies: Yes

↳*Ammunition (Option 1)*

Name: M426

Type: CHEM GB/VX

Caliber: mm203

Muzzle Velocity: m/s587

Basic Load: eaINA

Length: mm892

Weight: kg92.53

↳*Ammunition (Option 2)*

Name: M106

Type: HE

Caliber: mm203

Muzzle Velocity: m/s587

Basic Load: eaINA

Length: mm871

Weight: kg92.53

↳***Ammunition (Option 3)***

Name: M404

Type: APICM

Caliber: mm203

Muzzle Velocity: m/s587

Basic Load: INA

Length: mm886

Weight: kg90.72

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Spades: Four spades, carried on the trails, are used to emplace the weapon.

Protection

Notes:

The M115 8-in (203-mm) towed howitzer is the largest towed artillery weapon ever developed in the United States. It is no longer in service with the U.S. Army, but is remains the arsenals of several other countries. The M115 8 in (203 mm) howitzer, which was replaced by the M110 self-propelled howitzer, is a towed weapon developed prior to World War II as a heavy artillery weapon. The weapon uses NATO standard 203mm ammunition, and was used during World War II, in Korea, and in Viet Nam. In NATO service their prime mission was to fire nuclear rounds which have since been phased out of service. Tests of the prototype T3 howitzer began at Aberdeen Proving Ground in 1939 and the howitzer entered service as the 8 in Howitzer M1. After the Second World War the complete weapon was redesignated the Howitzer, Heavy, Towed: 8 in: M115. Variants of the M110 with a longer barrel includes the M110A1 (no muzzle brake) and the M110A2 (fitted with muzzle brake). In most countries the M115 and the M110 have been phased out of service due to short range. The carriage of the 8 in howitzer is also used to mount the 155 mm Gun M1 (Long Tom), which is still in use with some armies.

2A65 Msta-B Russian 152mm Towed Gun Howitzer




Tiers:

1 2 **3** 4

System

Alternative Designation: 2A65 Msta-B; M1987
Manufacturer: Motovilikha Plants
In Service: 1987-Present
Crew: ea6
Prime Mover: Ural 4320
Towing Speed Road: km/h80
Towing Speed Off Road: km/h20
Displacement Time: min3
Emplacement Time: min3

Dimensions

Height, Overall: m2.95
Length, Chassis Overall Firing: mINA
Length, Chassis Overall Travel: m12.7
Width, Firing: mINA
Width, Travel: m2.5
Weight, Combat: mt7

Armament

↳*Weapon 1*

Name: L/47
Type: Cannon
Cailber/Length: mm152
Length, Barrel: cal48

Rate of Fire, Burst: rd/min8

Rate of Fire, Normal: rd/min6

Rate of Fire, Sustained: rd/min4

Loader Type: Manual

Breech Type: Vertical Sliding Wedge

Muzzle Brake Type: Multi-Baffle

Maximum Elevation: deg+70

Minimum Elevation: deg-4

Traverse Range: deg54

Traverse, Left: deg27

Traverse, Right: deg27

Ammunition

Other Ammunitions Types: DPICM, DPICM-BB, Incendiary, Chemical, Flechette, Semi-active laser-guided Krasnopol-M Frag-HE. The cannon is ballistically matched to the 2S5/2S5M self-propelled gun system. Thus it can generally fire the same ammunition to the same range.

↳*Ammunition (Option 1)*

Name: OF-72

Type: Frag-HE

Cailber/Length: mm152

Range, Minimum: m6500

Range, Maximum: m24700

Projectile Weight: kg43.56

Muzzle Velocity: m/s864

Fuze Type: RGM-2 PD

↳*Ammunition (Option 2)*

Name: BP-540

Type: HEAT

Cailber/Length: mm152

Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: mmINA

Projectile Weight: kg27

Muzzle Velocity: m/s655

Fuze Type: GPV-2 PD

↳*Ammunition (Option 3)*

Name: OF-91
Type: Frag-HE
Cailber/Length: mm152
Range, Minimum: m6710
Range, Maximum: m29000
Projectile Weight: kg42.86
Muzzle Velocity: m/s828
Fuze Type: KZ-88 PD

Fire Control System

Indirect Fire: PG-1M PANTEL
Direct Fire: OP 5M
Collimator: K-1
Fire Control Computer: None
Gun Display Unit: None

Notes:

The towed, nuclear-capable 152-mm field gun M1976, along with its self- propelled counterpart 2S5, replaced the 130-mm field gun M-46 in gun battalions organic to artillery regiments and brigades at front and army level. This gun has a distinctive four-wheeled carriage, and has an armored shield that slopes to the rear and extends over the wheels. It has been fielded since 1978 and deployed in Soviet forces in Eastern Europe. This deployment indicated the importance Soviet doctrine placed on the capability to deliver low-yield nuclear strikes relatively close to Soviet forces.

2A36 Giatsint-B Russian 152mm Towed Gun







Tiers:

1 **2** 3 4

System

Alternative Designation: 2A36 Giatsint-B
Crew: ea8
Weight, Combat: mt9.8
Prime Mover: KrAZ-4556, KrAZ-255B, or AT-S
Towing Speed Road: km/h70
Towing Speed Off Road: km/h20
Displacement Time: min7
Emplacement Time: min5

Dimensions

Height, Overall: m2.7
Length, Chassis Overall Firing: m12.3
Length, Chassis Overall Travel: m12.9
Width, Firing: m8.7
Width, Travel: m2.7

Armament

↳*Cannon*

Cailber/Length: mm152

Type: Cannon

Length, Barrel: cal49

Rate of Fire, Burst: rd/min6

Rate of Fire, Normal: rd/min5

Rate of Fire, Sustained: rd/min4

Loader Type: Semi-Automatic

Breech Type: Horizontal Sliding Wedge

Muzzle Brake Type: Multi-Baffle

Traverse, Left: deg25

Traverse, Right: deg25

Traverse: deg50

Elevation (-/+): deg-2/+57

Fire Control System

Indirect Fire: PG-1M PANTEL

Direct Fire: N/A

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Ammunition

Other Ammunitions Types: DPICM, DPICM-BB, Incendiary, Chemical, Flechette, Semi-active laser-guided Krasnopol-M Frag-HE. The cannon is ballistically matched to the 2S5/2S5M self-propelled gun system. Thus it can generally fire the same ammunition to the same range.

↳*Frag-HE*

Name: OF-39 (RAP)

Cailber/Length: mm152

Type: Frag-HE

Range, Minimum: m9100

Range, Maximum: m28400

Projectile Weight: kg43.51

Muzzle Velocity: m/s945

Fuze Type: V-429 PD

↳*HEAT*

Name: BP-540

Cailber/Length: mm152

Type: HEAT

Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Projectile Weight: kg27

Muzzle Velocity: m/s655

Fuze Type: GPV-2 PD

↳***Frag-HE***

Name: OF-86

Cailber/Length: mm152

Type: Frag-HE

Range, Minimum: INA

Range, Maximum: m30500

Projectile Weight: kg43.8

Muzzle Velocity: m/s945

Fuze Type: V-429 PD

Communications

Radio: Low Power Handheld

Notes:

The most distinguishing feature of the 2A36 is its lower carriage. The large system weight required the use of tandem “walking-beam” axles and four wheels to provide mobility. A hydraulically powered firing pedestal is mounted on the front of the lower carriage and serves as part of the travel lock (similar to the D-20). Although the trails do not have the folding summer spades of the D-20, they do have two large spades similar to those found on the M-46/M-47. The weight of the 2A36 normally requires it to be towed by a heavy truck (like the KRAZ-255B). The KRAZ-255B is equipped with a special winch used to lift the trails in order to attach the gun’s lunette to the towing pintle.

GHN-45 Iranian 155mm Towed Gun Howitzer







Tiers:



Variants:

- **GHN-45:** Licensed Austrian copy, made by Noricum. These were the first mass-produced GC-45s.
- **GHN-45 with Auxiliary Power Unit (APU):** Independence from a separate prime mover is achieved with a 110-hp Porsche APU that can be mounted on the front of the carriage in about two days. The APU is equipped with headlights, a right-side driver's seat and two 7.9-US gal (30-liter) gasoline tanks.
- **155-mm Type WA 021 (PLL01):** This is a Chinese variant based on GHN-45 technology obtained from Austria.

System

Alternative Designation: GHN-45
Type: 155mm Towed Gun-Howitzer
Manufacturer: Space Research Corporation, Noricum, NORINCO
In Service: 1977-Present
Family: GC-45
Carriage: 6x6 truck
Crew: ea6
Displacement Time: min1.5
Emplacement Time: min1.5

Dimensions

Length, Traveling: m9.72
Length, Barrel: m7.05
Length, Rifling: m5.82

Width, Traveling: m2.50

Width, FIring: m9.93

Height: m2.05

Weight, Combat: kg10,070

Ground Clearance: mm310

Trail type: Split

Automotive Requirement

Prime Mover: 6x6 truck

Road Towing Speed: km/h90

Cross-Country Towing Speed: km/h50

Auto-propulsion speed: km/h20

Auxiliary Power Unit (optional)

Engine Name: Porsche 2.3-liter petrol

Engine Power: 120

Maximum Road Speed: km/h30

Maximum Cross-Country Speed: km/h15

Auto-Propulsion Range (on roads): km/h130

Fuel Capacity: litters30

Maximum Range a one Tank of Fuel: km130

Gradient: deg40

Note: Independence from a separate prime mover is achieved with a 110-hp Porsche APU that can be mounted on the front of the carriage in about two days. The APU is equipped with headlights, a right-side driver's seat and two 7.9-US gal (30-liter) gasoline tanks.

Communications

Primary: INA

Gun-Howitzer System

↳*Cannon*

Name: GC-45, 155mm Gun-Howitzer

Type: Gun-Howitzer

Gun Bore: 155mm

Length, Barrel: 7.05m (45 calibers)

Loader Type: Manual

Maximum Firing Range: 39.6 with Base Bleed

Max Elevation: deg+72

Min Elevation: deg-5

Traverse Range: km70

Traverse Right: deg40

Traverse Left: deg30

Mussle Brake Type: Fitted w/multi-baffle muzzle brake

Breech Type: Semi-automatic with pneumatic rammer

Bore Type: 155-mm/45-cal

Max Rate of Fire, Burst: 3 rds in 16 seconds

Max Rate of Fire, Normal: 2 rds/min

Max Rate of Fire, Maximum: 7 rds/min

↳*Ammunition (Option 1)*

Type: ERFB

Caliber: mm155

Cartridge: Split trail

Projectile Weight: kg45.4

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m30,000

↳*Ammunition (Option 2)*

Name: SN-101

Type: mm155

Cartridge: Split trail

Projectile Weight: kg42.3

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m25,100

↳*Ammunition (Option 3)*

Name: SN-107

Type: mm155

Cartridge: Split trail

Projectile Weight: kg42.3

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m17,800

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Collimator: INA

Protection

Notes:

Iran imports many of their military weapons and equipment from Russia, Canada, America, and China. The GC-45 (Gun, Canada, 45-calibre) is a 155 mm howitzer designed by Gerald Bull's Space Research Corporation (SRC) in the 1970s. Versions were produced by a number of companies during the 1980s, notably in Austria and South Africa. The most publicized use of the design was in Iraq, where the GHN-45 variant used by some Iraqi artillery units had a longer range than any coalition cannon systems. This initially caused considerable worry on the part of the allied forces in the Persian Gulf War.

GC-45 Canadian 155mm Towed Gun Howitzer





Tiers:

1 2 **3** 4

Variants:

- **GHN-45:** Licensed Austrian copy, made by Noricum. These were the first mass-produced GC-45s.
- **GHN-45 with Auxiliary Power Unit (APU):** Independence from a separate prime mover is achieved with a 110-hp Porsche APU that can be mounted on the front of the carriage in about two days. The APU is equipped with headlights, a right-side driver's seat and two 7.9-US gal (30-liter) gasoline tanks.
- **155-mm Type WA 021 (PLL01):** This is a Chinese variant based on GHN-45 technology obtained from Austria.

System

Alternative Designation: GC-45
Type: 155mm Towed Gun-Howitzer
Manufacturer: Space Research Corporation, Noricum, NORINCO
In Service: 1977-Present
Family: GC-45
Carriage: 6x6 truck
Crew: ea6
Displacement Time: min1.5
Emplacement Time: min1.5

Dimensions

Length, Traveling: m9.72
Length, Barrel: m7.05
Length, Rifling: m5.82

Width, Traveling: m2.50

Width, FIring: m9.93

Height: m2.05

Weight, Combat: kg10,070

Ground Clearance: mm310

Trail type: Split

Automotive Requirement

Prime Mover: 6x6 truck

Road Towing Speed: km/h90

Cross-Country Towing Speed: km/h50

Auto-propulsion speed: km/h20

Auxiliary Power Unit (optional)

Engine Name: Porsche 2.3-liter petrol

Engine Power: 120

Maximum Road Speed: km/h30

Maximum Cross-Country Speed: km/h15

Auto-Propulsion Range (on roads): km/h130

Fuel Capacity: litters30

Maximum Range a one Tank of Fuel: km130

Gradient: deg40

Note: Independence from a separate prime mover is achieved with a 110-hp Porsche APU that can be mounted on the front of the carriage in about two days. The APU is equipped with headlights, a right-side driver's seat and two 7.9-US gal (30-liter) gasoline tanks.

Communications

Primary: INA

Gun-Howitzer System

↳*Cannon*

Name: GC-45, 155mm Gun-Howitzer

Type: Gun-Howitzer

Gun Bore: 155mm

Length, Barrel: 7.05m (45 calibers)

Loader Type: Manual

Maximum Firing Range: 39.6 with Base Bleed

Max Elevation: deg+72

Min Elevation: deg-5

Traverse Range: km70

Traverse Right: deg40

Traverse Left: deg30

Mussle Brake Type: fitted w/multi-baffle muzzle brake

Breech Type: semi-automatic with pneumatic rammer

Bore Type: 155-mm/45-cal

Max Rate of Fire, Burst: 3 rds in 16 seconds

Max Rate of Fire, Normal: 2 rds/min

Max Rate of Fire, Maximum: 7 rds/min

↳*Ammunition (Option 1)*

Type: ERFB

Caliber: mm155

Cartridge: Split trail

Projectile Weight: kg45.4

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m30,000

↳*Ammunition (Option 2)*

Name: SN-101

Type: mm155

Cartridge: Split trail

Projectile Weight: kg42.3

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m25,100

↳*Ammunition (Option 3)*

Name: SN-107

Type: mm155

Cartridge: Split trail

Projectile Weight: kg42.3

Muzzle Velocity: m/s897

Basic Load: INA

Maximum Range: m17,800

Fire Control

Name: INA
Computerized FCS: No
Direct Fire: No
Indirect Fire: Yes
Collimator: INA

Protection

Notes:

The GC-45 (Gun, Canada, 45-calibre) is a 155 mm howitzer designed by Gerald Bull's Space Research Corporation (SRC) in the 1970s. Versions were produced by a number of companies during the 1980s, notably in Austria and South Africa. The most publicized use of the design was in Iraq, where the GHN-45 variant used by some Iraqi artillery units had a longer range than any coalition cannon systems. This initially caused considerable worry on the part of the allied forces in the Persian Gulf War

Type 66 Chinese 152mm Towed Howitzer




Tiers:



Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Family: Type 66
Type: 152mm Towed Gun-Howitzer
Manufactuer: Artillery Plant Number 9, Yekaterinburg
Crew: ea8
Emplacement Time: min2.5
Displacement Time: min2.5

Dimensions

Length, Firing: m8.69
Length, Travel: m8.10
Width, Firing: m2.32
Width, Traveling: INA
Height, Overall: m2.52
Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck
Towing Speed, Road: km/h60
Towing Speed, Off Road: km/h30

Gun-Howitzer System

Cannon

Type: Cannon

Cailber/Length: mm152

Length, Barrel: m5.195

Rate of Fire, Burst: rd/min5-6

Rate of Fire, Normal: INA

Rate of Fire, Sustained: rd/min1

Loader Type: Manual

Breech Type: Vertical semi-automatic sliding-wedge

Muzzle Brake Type: Double flared

Traverse Range: deg58

Traverse, Left: deg29

Traverse, Right: deg29

Maximum Elevation: deg+45

Minimum Elevation: deg-5

Maximum Effective Range: km17.4

Sights: PG1M indirect sight and OP4M direct fire sight.

Recoil: hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32

Type: Frag-HE

Cailber/Length: 152mm

Weight: kg(OF25) 43.56

Range, Minimum: m4,600

Range: m17,400

Muzzle Velocity: m/s655

Fuze Type: V-90 PD

↳*Ammunition (Option 2)*

Name: BP-540

Type: HEAT

Cailber/Length: mm152

Weight: kg27

↳

Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96

Type: Frag-HE

Cailber/Length: mm152

Weight: kg(OF-64) 43.56

Range, Minimum: INA

Range, Maximum: m24,400

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M

Collimator: K-1

Notes:

The Type 66 152mm Towed Howitzer is a Chinese version of the Russian D-20 152mm Towed Howitzer. The 152 mm gun-howitzer M1955, also known as the D-20, (Russian: 152-мм пушка-гаубица Д-20 обр. 1955 г.) is a manually loaded, towed 152 mm artillery piece, manufactured in the Soviet Union during the 1950s. It was first observed by the west in 1955, at which time it was designated the M1955. Its GRAU index is 52-P-546. The D-20 has a 34 caliber (5.195 m) barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breech, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breech. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breech. The breech has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 58° and the vertical elevation range is −5° to 45°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in the center for traverse before towing the gun. Large spades are permanently fixed close to the end of each trail; these are hinged and it appears that the gun can be fired with them up or down depending on the terrain, but they are always up when the gun is towed. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tired wheels supporting the gun on the ground. When the gun is brought into action, the pivot jack is folded down and adjusted to be on the ground. If a large traverse is required, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in the center for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period, the gun has a shield, including a folding piece below the cradle support. The center section of the upper shield slides both up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defense against machine gun fire. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M) in a mounting, an angle of sight scale, and a range drum for each

charge engraved with the range (distance) scale, coupled to an elevation leveling bubble mounted on dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Like most Soviet artillery, the gun fires separate ammunition using metal cartridge cases that also provide obscuration. The ammunition is interchangeable with that used with other 152 mm guns, although the more modern ones also have a third, much larger cartridge. The D-20 uses two types of cartridge; one has a base charge and up to five increments, the other is a single 'super' charge cartridge. The standard shell weight is 44 kg with a muzzle velocity of 655 m/s, but some projectiles are more or less than this. The basic shell is HE-Fragmentation, other projectiles include smoke, illuminating, chemical and probably incendiary. Later projectiles include bomblet, anti-personnel mine, flechette, Krasnopol precision munition, communications jammer, and extended range HE using rocket assistance (RAP). The normally maximum range is 17.4 km, RAP being greater. Two direct-fire anti-tank projectiles have been used, HEAT and APHE, the latter being 5.2 kg heavier and with a lower muzzle velocity. The maximum rate of fire is usually stated as five rounds/minute, and 65 rounds/hour sustained. In Soviet service, the unit of fire was 60 rounds. The detachment was either 8 or 10 men, probably differing between armies and the time period. In Soviet service, the 5,700 kg gun was usually towed by a URAL-375 6×6 truck or, in some regions, an AT-S or AT-L medium tractor.

2S19M2 (Msta-SM2) Russian 152mm Self-Propelled Howitzer (SPH)




Tiers:



Parent:

2S19 Msta Russian Self-Propelled Howitzer (SPH)

Variants:

- **152 mm howitzer 2A65:** a towed version of the same gun.
- **1K17 Szhatie -:** a "laser tank" armed with a battery of lasers meant to disable optoelectronic systems; uses Msta-S chassis and turret.
- **2S33 "Msta-SM":** Improved version. Prototype.
- **2S19M1 (2000):** Improved version with automatic laying system and Glonass.
- **2S19M2 "Msta-SM2" (2013):** mproved version currently in production equipped with a new automatic fire control system which increases the rate of fire. Digital electronic maps are now available which significantly speeds up the terrain orientation in difficult geographical conditions and allows performing faster and more efficiently firing missions.
- **2S19M1-155 (2006):** 155mm export version of the 2S19M1, fitted with an L/52 gun with a range of 40+ km.
- **2S27 "Msta-K":** Wheeled variant (K = kolyosnij), based on a 8x8 truck chassis. There were several different prototypes, including one based on a KrAZ-ChR-3130 and two based on the Ural-5323 (with and without turret).
- **2S30 "Iset":** Improved version, prototype only.
- **2S35 "Koalitsiya-SV" -:** Project for a new artillery system for the Russian land forces (SV = sukhoputniye voyska). Early prototypes consisted of a 2S19 chassis with modified turret, fitted with an over-and-under dual autoloaded 152mm howitzer. Development of this variant was abandoned in favour of an entirely new artillery system using the same designation

System

Alternative Designation: 2S19M2
Estimated out of service date: 2058
Manufacturer: Uraltransmash
Type: Self-propelled howitzer
Family: Msta-S 2S19 family
Crew: ea5
Chassis: Modified T-72
Displacement Time: min1.5
Emplacement Time: min1.5
Navigation System: Yes, GNSS
Air Conditioning Unit: Yes, the AP18DM system

Note: The 2S19M2 can be distinguished from other variants by the presence of two external stowage containers on the right side of the turret.

Dimensions

Length: m7.15

Width: m3.38

Height: m2.99

Weight, Combat: tons43.24

Ground Pressure: kg/mINA

Automotive

Engine Name: V-84MS, the vehicle is capable of being outfitted with a V-92S2, which is used in the T-90

Engine Type: Liquid cooled and includes a gas turbocharger.Diesel

Engine Power: hp1,000

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h25

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.85

Trench: m2.8

Fording Depth (Without Preparation): m1.2

Fording Depth (With Preparation): m5

Suspension: torsion bar

Auxiliary Power: AP-18D system

Communications

Primary: R-173M

Intercom: 1V116 intercom

Main Gun

↳*System*

Name: 152 mm 2A64 Long Barrel Gun

Type: mm152

Breech Type: Vertical sliding wedge

Manufacturer: Motovilikha Plants

Length, Barrel: 7,200m L/47

Weight: kg6,800

Loader Type: Automated

Max Rate of Fire: rds/min10 (New upgraded FCS)

Sustain Rate of Fire: rds/min4-5

Muzzle Brake Type: Double baffle

Max Elevation: deg+68

Min Elevation: deg-3

Traverse Range: deg360

Range Finder Type: INA

Central Bore Evacuator: Yes

Travel Lock: Yes

TZM-K 2F66-1 Capable: Yes

Multiple Round Simultaneous Impact (MRSI) Capable: Yes, this is a new update

Note # 1: Engage a target within 30 seconds of receiving target coordinates,

Note # 2: Automated unsighted gun laying and its restoration after each shooting.

↳*Ammunition (Option 1)*

Type: 152-mm Frag-HE, OF-72

Caliber: mm152

Muzzle Velocity: m/s864

Fuse Type: RGM-2 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m24,700

Complete Projectile Weight (OF-45): kg43.56

↳*Ammunition (Option 2)*

Type: 152-mm Frag-HEAT, BP-540

Caliber: mm152

Muzzle Velocity: m/s655

Fuse Type: GPV-3 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m27,000

Complete Projectile Weight: kg27

↳*Ammunition (Option 3)*

Type: 152-mm Frag-HE BB, OF-91

Caliber: 152

Muzzle Velocity: m/s828

Fuse Type: KZ-88 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m29,000

Complete Projectile Weight (OF-61): kg42.86

Note: The 2S19 can fire the additional 152mm projectiles: 9K25 Krasnopol guided projectile and the 3-RB-30 radio jamming round

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: mm12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Max Rate of Fire: rds/min700-800

Weight (Gun Only): kg25

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7 mm

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: new automatic fire control system. ASUNO-M 1V169-1 System with the 1V180-1 fire control system

Computerized FCS: Yes

Gun Control System: 2E46M2 gun control system

Thermal Sight Vehicle Commander: Yes, PZU-5 or PZU-7 sight

Thermal Sight Gunner: Yes, Panoramic 1P22 sight and 1P23 direct fire set

Main Gun Stabilization: Yes, via the 2Eh46

Indirect Fire: 1P22 Panoramic Telescope (PANTEL)

Direct Fire: 1P23

Collimator: K-1

Ballistic Computer: Yes

Traverse: Semi-Automatic

Artillery Command and Control System: 1V12M Falstet artillery command and control system

Target Mode: Simultaneous Fire Attack

Digital Electronic Maps: Available

Note: Returns the barrel to its firing line automatically after every shot

Protection

Hull Armor: mmClassified

Turret Armor: mmClassified

Armor Material: Rolled homogeneous armour that is further protected by Combination-K armour.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Built-in bulldozer blade: Yes

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM)

Smoke Equipment: Yes, via the exhaust manifold

Grenade Launcher: Yes, six 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Grenade Range: m200-300

Grenade Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade

Automatic fire suppression systems.: Yes

Camouflage system: Yes, new Nakidka "cloak" set system

Camouflage IR Reduction: %30

Notes:

The most modern variant of the 2S19 Family the 2S19M2 entered in service in Russia's Armed Forces in 2013, the 2S19 M2 152 mm self-propelled howitzer is a new upgraded howitzer with enhanced performance characteristics and improved operational parameters. Highlighted on static display, the 2S19M2 is also performing an impressive live firing demonstration at Russian Arms Expo 2015.

Type 60 Chinese 122mm Towed Gun




Tiers:

1 2 3 4

System

Alternative Designation: Type 60
Type: 122mm Towed Gun
Crew: 7~9
Carriage: Split-trail
Displacement Time: minutesunder 2
Emplacement Time: minutesunder 2

Dimensions

Length: 9.875 m
Barrel Length: 6.45 m
Width: 2.35 m
Height: 2.7 m
Weight: 5,620 kg

Main Weapon System

↳ ***System***

Name: Type 60
Type: Towed Gun
Caliber: mm122
Breech: Semi-automatic vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Split-trail
Elevation: +45/−5 degree
Traverse: 45 degree

Rate of Fire: Maximum: 8–10 rpm

Muzzle Velocity: 885 m/s

Maximum Firing Range: 24 km

Effective Firing Range: Indirect: 23.9 km (15 mi) Direct: 1,080 m (1,181 yds)

↳*Ammunition*

Type: Rifle

Caliber: mm122

Shell: Separate loading charge and projectile

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

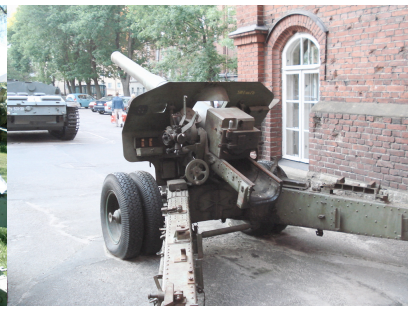
Notes:

The 122mm D-74 towed gun is a Soviet-built gun. Developed in the late 1950s it provided direct and indirect fire for the Soviet Army. Today it is in reserve units with the Russian Army. It is in active service with the Egyptian Army and the Pakistani Army. The 122 mm (originally 48 lines) caliber has been in Russian service since the early 20th century. After World War II the Soviet Union developed two new long range guns to replace existing 122 mm and 152 mm guns such as 122 mm gun M1931 (A-19), 122 mm gun M1931/37 (A-19), 152 mm gun M1910/30 and 152 mm gun M1935 (Br-2). The two new guns were the 122 mm D-74 and the 130 mm M-46. The D-74 design was probably initiated in the late 1940s and it was first seen in public in 1955. It was designed by the well established design bureau at Artillery Plant No. 9 in Sverdlovsk (now Motovilikha Plants in Yekaterinburg), led by the eminent artillery designer Fëdor Fëdorovich Petrov who was also responsible for several World War II and later artillery designs. The design team also developed the 152 mm gun howitzer D-20 at much the same time, and both D-74 and D-20 use the same carriage. Both the 122 mm D-74 and 130 mm M-46 entered Soviet service, but the heavier shell and greater range of the M-46 meant that it outlasted the D-74. The D-74 has a 52 caliber barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breach, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breach. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breach. The breach has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. The Type 60 122mm towed gun is the Soviet D-74 122mm gun produced by the Chinese under licence. Developed in the late 1950s, it provided direct/indirect fire for the PLA. It remains in service with reserve units in gun battalions attached to motorized infantry and armored divisions. It is in active service with the Sri Lankan Army, introduced in the early 1990s to replace the Ordnance QF 25 pounder field gun. It has seen action in the Sri Lankan civil war. Top traverse totals 60° and the vertical elevation range in -5° to 50°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in center for traverse before towing the gun. There are small spades at the end of each trail leg, and fittings for large spades that are carried on the side of each trail leg. The large spades are used on soft ground and are fitted to the trail ends via have a pintle in the same way as the similar spades on M-46. These spades are the main difference from the D-20 carriage. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on the ground. When the gun is brought into action the pivot jack is folded down and adjusted to be on the ground. If the requires large traverse, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in center for traverse with a bolt on the cradle support. The jack is

folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period the gun has a shield, including a folding piece below the cradle support. The center section of the upper shield both slides up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defense against machine gun fire. The non-reciprocating sights are designed for one-person laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M), an angle of sight scale, and a range drum for the single charge engraved with the range (distance) scale, coupled to an elevation levelling bubble mounted on dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. The gun fires separate ammunition using a metal cartridge case that also provides obscuration. The ammunition is different to that used with 122 mm howitzers. There is a single charge without increments. The shell weight is 25 kg with a muzzle velocity of 900 m/s although the slightly lighter APHE shell has a higher muzzle velocity. Maximum rate of fire is usually stated as six rounds per minute. The detachment was either eight or nine men, probably differing between armies and period. In Soviet service the 5,600 kg gun was usually towed by a URAL-375 6×6 truck, AT-S or AT-L medium tractor in some regions.

M1938 (M-10) Russian 152mm Towed Howitzer





Tiers:



Variants:

- **M1938 (M-10T):** In addition to the towed howitzer, a vehicle-mounted variant was developed for use in KV-2 heavy tanks. This variant—152 mm tank howitzer M1938 (M-10T)—had a shorter barrel. A single prototype with powder bag loading was built in 1939.

System

Alternative Designation: M1938 (M-10)
Type: 152mm Towed Howitzer
Caliber: 152mm
Crew: 10
Carriage: Split trail
Breech: Interrupted screw
Recoil: Hydro-pneumatic
Elevation: −1° to 65°
Traverse: 50°
Rate of Fire: 3–4 rounds per minute
Muzzle Velocity: 432–508 m/s
Maximum Firing Range: 12.4 km
Sights: panoramic
Displacement Time: Under 5 Minutes
Emplacement Time: Under 5 Minutes

Dimensions

Length: 3.7 m
Width: INA
Height: INA
Weight, Combat: 4,150 kg

Weight, Traveling: 4,550 kg

Ammunition

Note: The M-10 used separate-loading ammunition, with eight different charges. The charges ranges from the "full charge" Zh-536 and smaller charges ranging from the "first" to "sixth", which was the smallest. A "special charge" was used with the BP-540 HEAT projectile. Propellant charges were produced in "full" and "third" variants in munitions factories. All other charges were derived from removing small gunpowder bags from the charge cartridge. For flash suppression there was a special chemical mixture which was inserted into cartridges before night firing.152 mm projectiles for the M-10 weighed about 40 kg, making a difficult job for loaders, who had to carry the projectiles alone. When set to fragmentation mode, the OF-530 projectile produced fragments which covered an area 70 meters wide and 30 meters deep. When set to high-explosive (HE) action, the exploding shell produced a crater about 3.5 meters in diameter and about 1.2 meters deep. The OF-530 is still fired from modern 152 mm ordnance pieces of the Russian Army. The G-530 HEAC anti-concrete shell had a muzzle velocity of 457 m/s when fired with the "first" charge. At a range of one kilometer it had 358 m/s terminal velocity and was able to punch through up to 80 centimeters of reinforced concrete before detonating a TNT charge which increased the total penetration to 114 centimeters. The G-530 could not be fired with a "full" charge without putting the crew at risk of having the shell explode in the barrel. A special version of the shell, the G-530Sh, was developed to allow use with the full charge. The BP-540 HEAT projectile was not used during World War II. It had an armour penetration of 250 millimeters at an incident angle of 90°, 220 millimeters at 60°, 120 millimeters at 30°.

↳*Ammunition (Option 1)*

Name: BP-540

Type: HEAT

Caliber: 152mm

Projectile Weight: 51.07 kg

Muzzle Velocity: INA

Maximum Range: INA

↳*Ammunition (Option 2)*

Name: Sh-501

Type: Shrapnel with 45 sec. tube

Caliber: 152mm

Projectile Weight: 41.16–41.83 kg

Muzzle Velocity: INA

Maximum Range: INA

↳*Ammunition (Option 3)*

Name: HS-530

Type: Chemical howitzer shell

Caliber: 152mm

Projectile Weight: 38.8 kg

Muzzle Velocity: INA

Maximum Range: INA

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

152-mm howitzer M1938 (M-10) (Russian: 152-мм гаубица обр. 1938 г. (М-10)) was a Soviet 152.4 mm (6 inch) howitzer of World War II era. It was developed in 1937–1938 at the Motovilikha Mechanical Plant by a team headed by F. F. Petrov. Although production of the gun was stopped in 1941, it saw combat with the Red Army until the end of World War II and remained in service until the 1950s. Captured pieces were used by Wehrmacht and the Finnish Army. The latter kept the M-10 in service until 2000. The M-10 was much more advanced design compared to older Soviet 152 mm howitzers. It had a modern split trail carriage which allowed for a much larger traverse. The trails were of riveted construction. The carriage was equipped with suspension and wheels from the ZiS-5 truck, increasing towing speed. The barrel, much longer than that of older designs, was fitted with an interrupted screw breechblock with recoil devices consisting of a hydraulic recoil buffer and hydro-pneumatic recuperator. The recoil travel was variable. A gun shield provided some protection from bullets and shell fragments. Unlike its eventual successor, the D-1, the M-10 was not equipped with a muzzle brake. While softening recoil and thus allowing for a lighter carriage, a muzzle brake has the disadvantage of redirecting some of the gases that escape the barrel toward the ground where they raise dust, revealing the gun position. The gun could be towed by an artillery tractor or a team of horses. In the latter case, a 400-kg limber was used. In a tank-mounted variant, M-10T, the gun was mounted on the KV-2 heavy tank. By the early 1930s the Red Army (RKKA) started to look for a replacement for the 152-mm howitzer M1909 and the 152-mm howitzer M1910. Those pieces, developed before World War I, had unsprung fixed trail carriages and short barrels, which meant poor mobility, insufficient elevation and traverse angles and short range. Although both pieces were eventually modernized, resulting in the 152-mm howitzer M1909/30 and the 152-mm howitzer M1910/37 respectively, these were relatively minor upgrades which brought only limited improvement in some areas and didn't address others. It was clear that a completely new design was needed. However, at that time, the Soviets had little experience in developing modern artillery pieces. An initial attempt was made to overcome that issue through a collaboration with Germany. Constrained by the limitations of the Treaty of Versailles, Germany was looking for ways to proceed with weapons development and joint projects gave them such an opportunity. Among other weapons supplied by Germans was a heavy howitzer, designated 152-mm howitzer M1931 (NG) in the USSR. Soon the Motovilikha Mechanical Plant (MMZ) was tasked with the production of this gun. However, only eight pieces were completed in 1932–1934 until production was stopped. The design proved to be too complicated for the Soviet industry of the early 1930s, similar to other designs like 122-mm howitzer M1934 or 20-mm and 37-mm autocannons. Also it was considered somewhat heavy at 5,445 kg in travelling configuration. But these early failures gave Soviet developers some valuable experience. In 1937, F. F. Petrov and his design team at the Motovilikha Ordnance Plant started work on a new design, the M-10. Technical papers were submitted to the Artillery Directorate on 1 August 1937 and on 2 November the first prototype was completed. Ground trials (19–25 October 1938) featured two pieces: No. 302 (L/25 barrel with constant rifling) and No. 303 (L/20 barrel with progressive rifling). The No. 303 was found to be superior. The trials also revealed numerous defects in the gun construction: the howitzer suffered from insufficient upper carriage strength, leaks in the recoil buffer, unreliable suspension etc. For army tests early in 1939, an improved design with a longer barrel was presented. Another series of army tests followed from 22 December 1939 to 10 January 1940, but even before it started—on 29 September 1939—the gun was adopted as 152 mm divisional howitzer model 1938. Later, the word divisional was removed from the designation.

Uragan-1M Russian 220mm/300mm Multiple Launch Rocket System (MRL)



Tiers:

1 2 3 4

Parent:

BM-27 Uragan Russian 220mm Multiple Launch Rocket System

Variants:

- **9P140 Uragan:** Standard variant on ZIL-135 truck
- **Uragan-1M:** Variant presented to the public in 2007; all processes are automated. Can also fire the 300 mm rockets of the BM-30 Smerch system. Reloading is simplified by substituting barrels; can be fitted with two banks of 6 300 mm launch tubes or 15 220 mm launch tubes. Deliveries to the Russian Army started as of September 2016
- **9A53 Uragan-U:** Successor with 2 × 15 launch tubes; presented in 2009 on 8×8 MZKT-7930. Thanks to its modular assembly the BM-30 Smerch and BM-21 Grad rockets can also be fired.
- **Bastion-03:** Prototype by Ukrainian company AvtoKrAZ, presented in 2010. Installed on a 6×6 truck type KrAZ-63221RA.

System

Alternative Designation: Uragan-1M (Hurricane-1M)'

Type: 220mm/300mm Multiple Launch Rocket System

Chassis/Carriage: MZKT-7930

Manufacturer: Splav State Research and Production Enterprise

In Service: 2007-Present

Crew: ea3

Displacement Time: min3

Emplacement Time: min3

Note: Brief redeployment time allows to avoid counter-battery fire. Rockets are launched directly form the cab, or remotely form the vehicle.

Automotive

Engine Name: YaMZ-846

Engine Type: Diesel

Engine HP: hp500

Fording Depth: m1.2

Range, Cruising: km1,000

Speed, Maximum On: 70

Speed, Maximum Cross: 45

Speed, Maximum Off Road: INA

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.6

Trench: m2

Fording: m1.4

Dimensions

Length: m13

Width: m3

Height: m3.29

Weight, Combat: tons40

Communications

Primary: R-108M Radio

Amplifier: UM-3 power amplifier

220mm Main Gun Weapon System (Option 1)

↳*Launch System*

Name: 9K57 System

Type: Multiple Launch Rocket System

Caliber: mm220

Chassis: 9P140 Vehicle

Number of Tubes: ea30

Effective Firing Range: km34

Full Salvo Duration: 9-20 seconds

Reloading Time: min15-20

Maximum Elevation: deg+55

Minimum Elevation: deg0

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

Main Gun Stabilizer: Yes

Launch Mode: Single Fire or Salvo Fire

Single Launch Mode Time to Fire: seconds8.8

Salvo Launch Mode Time to Fire (16 Rockets): seconds20

Note: The Uragan-1M launcher is escorted by an associated reloading vehicle, which is referred as 9T249.

↳*Ammunition (Option 1)*

Name: 9M27F

Type: HE FRAG

Caliber: mm220

Rocket Weight: kg100

Explosive Weight: kg51.9

Maximum Effective Range: km10

Minimum Effective Range: km3.5

Penetration: 8 meters wide and 3 meters deep

↳*Ammunition (Option 2)*

Name: 9M27K

Type: Cluster warhead

Caliber: mm220

Maximum Effective Range: km10

Minimum Effective Range: km3.5

Note: The 9M27K contains 30 9N210 dual-purpose fragmentation bomblets. Each submunition generates 370 to 400 2-g preformed fragments.

↳*Ammunition (Option 3)*

Name: 9M27K2

Type: Anti-tank mines

Caliber: mm220

Maximum Effective Range: km10

Minimum Effective Range: km3.5

Warhead Type: 9N218K2

Note: 9N218K2 warhead, which contains 24 PTM-1 or PTM-1G scatterable anti-tank mines. Designed to break tracks.

300mm Main Gun Weapon System (Option 2)

↳*System*

Name: 9A52, 300mm Launcher

Type: mm300

Number of Tubes: 12 (3 rows of 4 tubes)

Launch Rate: INA

Full Salvo Time: 12 rounds in 38 seconds

Single Rocket Interval: 3 Seconds per Rocket

Loader Type: Manual

Reload Time: 36 minutes

Launcher Drive: Electric

Maximum Elevation: deg+55

Minimum Elevation: deg-0

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳***Ammunition (Option 1)***

Name: 9M55F

Type: FRAG-HE

Caliber: mm300

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg258

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic Timing (ET)

↳***Ammunition (Option 2)***

Name: 9M55K

Type: DPICM

Caliber: mm300

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg235

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic Timing (ET)

↳***Ammunition (Option 3)***

Name: 9M55K1

Type: Sensor-fuzed (MOTIV-3M)

Caliber: mm300

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg233

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic Timing (ET)

Note: Additional Ammunition Types include: Smoke, Incendiary, Chemical, Leaflet, Fuel Air Explosive (FAE), R-90 expendable miniature UAV (experi-mental)

Fire Control Systems

FCS Name: Kapustnik-B automated fire-control system (FCS)

Collimator: K-1

Indirect Fire: PG-1M PANTEL

Direct Fire Capable: Yes

Sights: D726-45 Sight and the PG-1M Sight

Spotlight: Luch-S71M spotlight

Protection

Armor: Unarmoured

Land Navigation: No

Smoke Equipment: No

NBC Protection: No

Notes:

Presented to the public in 2007, all processes of the Uragan are automated. The Uragan can fire the 300mm rockets of the BM-30 Smerch system. Reloading is simplified by substituting launch tubes; can be fitted with two banks of six 300mm launch tubes or fifteen 220mm launch tubes. Deliveries to the Russian army started as of September 2016. The Uragan-1M is based on a 8x8 military truck chassis, MZKT-7930, developed in Belarus early 1990s. The forward control cab of the MZKT-7930 accommodates the driver and two passengers. The Uragan-1M is fitted with two launcher pods, each containing two layers of three rockets ready to fire, giving a total of 12 launch tubes. The rocket launcher station is mounted on a turntable at the rear of the truck chassis with powered elevation and traverse.

M101 American 105mm Towed Howitzer





Tiers:



Variants:

- **M101:** The original production model had the M2A1 carriage and the M2A1 model gun, which had a straight barrel.
- **M101A1:** This is covered in the main entry. It has a M2A2 carriage (which differs from the M2A1 chiefly in the amount of shielding) and the M2A2 gun, which has a thickened muzzle.
- **German M101 modification:** It features a longer barrel with single-baffle muzzle brake, new breech ring and new sights. Maximum range is 15,420 yds (14,100 m).
- **M101/33 Upgrade:** This was proposed by RDM (De Rotterdamsche Droogdok Maatschappij BV) Defence Engineering of Rotterdam, Netherlands. It features a longer barrel of 33 calibers; progressive twist rifling increasing from 1 in 35 to 1 in 18 over the first 9 ft 2 in (2.974 m) and holding 1 in 18 over last 12 in (306 mm); and a slotted muzzle brake. The loaded weight increases to 5,247 lb (2,380 kg). In March 1994, RDM was awarded a US$13.75 million contract by the Canadian army to upgrade 96 M101 howitzers to the M101/33 standard. The contract included two options, one for an additional 29 howitzers, and another for an additional 60. The first upgraded howitzers were shipped back to Canada in late 1995 with the entire batch of 96 to be completed in 1998. It was also trialed in Indonesia and Malaysia. In 1994, a single model of a Brazilian M101 was upgraded by RDM with a 37-caliber barrel from the Royal Ordnance L118 Light Gun. At the time, Brazil had a requirement for up to 80 upgraded M101s.
- **M101/LG1 Upgrade:** Giat Industries has developed an upgrade for the M101 that replaces the 23-caliber barrel of the M101 with the 30-caliber barrel used by Giat's LG1 Mk II 105-mm Light Gun. The upgrade allows the M101 to fire new Giat HE extended-range base-bleed ammunition out to 17,500 m (10.9 miles). Giat was awarded a contract by the Philippines in July 1996 to modify 12 M101A1s with the newer barrel. An order for the rest of the Philippines inventory of M101s was seen as possible. Thailand reportedly ordered 300 upgraded kits for its stock of M101s.

System

Alternative Designation: M101
Type: 105mm Towed Howitzer
In Service: 1941-Present
Crew: 8
Carriage: split trail, post-war designation of M2A1 on carriage M2A1
Displacement Time: Less than 2 Minutes
Emplacement Time: Less than 2 Minutes

Dimensions

Length, Overall: 5.99 m
Barrel Length: 2.57 m
Rifling Length: 1.98 m

Width, Firing: 3.66 m

Width, Traveling: 2.16 m

Height: 1.57 m

Ground Clearance: 356 mm

Weight: 2,258 kg

Howitzer

↳*System*

Name: M101

Type: Towed Howitzer

Caliber: 105mm

Carriage: split trail, post-war designation of M2A1 on carriage M2A1

Bore: 105-mm/23-cal M2A1 or M2A2, rifled (barrel has a life of 20,000 rounds)

Rifling: 1 in 20 constant twist, 36 grooves

Elevation: -5 deg to 66 deg (-89 mils to 1,156 mils)

Traverse: 23 deg (409 mils) to each side

Breech Type: horizontal sliding wedge

Recoil System: hydropneumatic

Rate of Fire, Sustained: 3 rds/min

Rate of Fire, Maximum: 10 rds/min

↳*Ammunition (Option 1)*

Name: M548

Type: HERA

Caliber: mm105mm

Length: 830mm

Weight: 17.46 kg

Muzzle Velocity: 548 mps

Maximum Range: 14,600 m

↳*Ammunition (Option 2)*

Name: M546

Type: APERS-T

Caliber: 105mm

Length: 867mm

Weight: 17.35kg

Muzzle Velocity: 549 mps

Maximum Range: 11,600 m

↳*Ammunition (Option 3)*

Name: INA

Type: HE, GB, HD, WP, HC, ILLUM

Caliber: 105mm

Length: Varies

Weight: Varies

Muzzle Velocity: 472.4 mps

Maximum Range: 11,270 m

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The 105 mm M101A1 howitzer (previously designated M2A1) is an artillery piece developed and used by the United States. It was the standard U.S. light field howitzer in World War II and saw action in both the European and Pacific theaters. Entering production in 1941, it quickly gained a reputation for accuracy and a powerful punch. The M101A1 fires 105 mm high explosive (HE) semi-fixed ammunition and has a range of 12,330 yards (11,270 m), making it suitable for supporting infantry. All of these qualities of the weapon, along with its widespread production, led to its adoption by many countries after the war. Its ammunition type also became the standard for many foreign countries' later models. During the Second World War, U.S. artillery regiments consisted of an HQ detachment, one 155 mm artillery battalion, and three 105 mm artillery battalions. Both the 155 mm and 105 mm battalions had twelve guns each, divided into three batteries of four guns. That gave each regiment a total of twelve 155 mm howitzers, and thirty-six 105 mm howitzers. The U.S. military artillery designation system was changed in 1962, redesignating the 105 mm M2A1 howitzer the M101A1. The gun continued to see service in the Korean and Vietnam Wars. Though a similar model, the M102 howitzer, shared the same roles in battle, it never fully replaced the M101A1. Today, the M101A1 has been retired by the U.S. military, though it continues to see service with many other countries. By the end of the Second World War, 8,536 105 mm towed howitzers had been built and post-war production continued at Rock Island Arsenal until 1953, by which time 10,202 had been built. The Canadian Army continued to use the M2A1 as the C2 Howitzer until 1997 when a modification was made to extend its service life; it is now designated the C3. The changes include a longer barrel, a muzzle brake, reinforced trails and the removal of shield flaps. It remains the standard light howitzer of Canadian Forces Reserve units. The C3 is used by Reserve units in Glacier National Park in British Columbia as a means of avalanche control. In addition, the M101 has found a second use in the U.S. as an avalanche control gun, supervised by the US Forest Service and the US Army TACOM's cooperative effort in the Avalanche Artillery Users of North America Committee (AAUNAC). The M101 is used by a number of ski areas and state departments of transportation for long-range control work. Under the designation of M2A2, the 2nd Battalion, 2nd Field Artillery Regiment, 428th Field Artillery Brigade performs salutes with 7 guns with World War Two Medal of Honor recipient names on their barrels. France and the State of Vietnam used M2A1 howitzers during the First Indochina War, as did the Viet Minh guerilla forces they fought against, who were supplied with at least 24 by the People's Republic of China, along with other captured American artillery pieces and mortars formerly operated by both Nationalist Chinese forces (the Kuomintang military) and US troops fighting in Korea.[citation needed] Today upgraded M2A1 howitzers (some of which have been mounted on trucks and employed as self-propelled artillery) are still being used by the People's Army of Vietnam (the VPA). The French Army used the M2 howitzer, designated HM2, in the Algerian War and during the Opération Tacaud in Chad.[5] France later supplied a battery of HM2 to the Rwandan Armed Forces during the Rwandan Civil War that led into the Rwandan genocide. A number of M2/M101 howitzers were used by the Socialist Federal Republic of Yugoslavia and approximately 50 were inherited by Croatia, of which four are still in use for training with the Croatian Army. M2 Howitzers are still in limited service in the Australian Army Reserve, but are being replaced with 81-millimetre (3.2 in) mortars with an emphasis on the retention of indirect fire support skills. In regular service they were replaced by the 105 mm L119

Hamel gun and the 155-millimetre (6.1 in) M198 howitzers. Two M2 howitzers (1942) are still employed in providing the gun salute at Kristiansten Fortress, in Trondheim, Norway. M101/M2 is one of three approved salute guns in the Norwegian armed forces, and have been reduced to a caliber of 75 millimetres (3.0 in) for this purpose. They are used for gun salute also at Rena and Setermoen. Five M101A1 howitzers are owned by the Virginia Military Institute and are used for parades, evening retreat and other ceremonies.

PL-66 (Type 66) Chinese 152mm Towed Gun-Howitzer





Tiers:

1 2 3 4

Variants:

- **Type 83:** Type 83 self-propelled howitzer with a modified ordnance of the PL-66 with an added semi-automatic loader and fume extractor. It was modeled after a Soviet 2S3 Akatsiya self-propelled howitzer, which utilized a modified ordnance of D-20. This Chinese artillery system uses an armored tracked chassis.
- **APU-66-152:** APU-66-152 is a recent version of the PL-66, fitted with auxiliary power unit. This allows to self-deploy over short distances. Also auxiliary power unit aids in emplacement and displacement. This artillery system was first publicly revealed in 2018.
- **PL-66 Truck Mounted:** It uses the same light armored chassis with 6x6 configuration as the SH-2 and SH-5 artillery systems. This truck-mounted howitzer was first publicly revealed in 2018, alongside the APU-66-152.

System

Alternate Designation: PL-66
Manufacturer: INA
In Service: 1966 to present
Barrel Length: 26 calibers
Maximum Rate of Fire: 5 - 6 rpm
Maximum Range of Fire: 17.4 - 22 km
Gun Bore: 152mm
Elevation Range: - 5 to + 45 degrees
Traverse Range: 58 degrees

Dimensions

Weight: 5.56 t
Length (in traveling order): 8.69m

Length (in combat order): INA

:

Ammunition

Type:

Caliber: 26

Projectile Weight: 43.56 kg

Note #1:: This artillery piece is towed by a 6x6 military truck, which carries the whole gun crew, as well as ammunition. A Chinese Shaanxi SX2150 6x6 army truck is typically used for this role.

Note #2:: The PL-66 artillery systems are deployed in batteries of 6 artillery pieces.

Notes:

The PL-66, also known as Type 66, is a Chinese 152 mm field howitzer. It is a license-produced version of the Soviet D-20 howitzer, that was created during the early 1950s and is one of the most prolific artillery systems ever. It is unknown if this howitzer is still in production. Though this artillery system is still widely used in China and was exported to some countries, including Iraq and Sri Lanka.

AH-1/AH-1A Chinese 155mm Towed Artillery



Tiers:



Variants:

- **AH-1:** AH-1 is an improved version of the PLL-01, manufactured in China by NORINCO. It has a more powerful auxiliary power unit, consisting of an air-cooled diesel engine, developing 110 hp. This howitzer has a maximum auto-propulsion speed of 20 km/h. Reportedly, the AH1 is in service with Ethiopia.
- **AH-2:** AH2 is a 52-caliber version of the AH1 towed howitzer. It has a longer range.
- **GM-45:** Same cannon fit onto a lighter carriage. This allows the system to be easier to maneuver but provides less stability to the system.

System

Alternative Designation: AH-1/AH-1A
Crew: ea6
Displacement Time: min1.5
Emplacement Time: min1.5
Range with standard ammunition: km24
Range with ERFB: km30
Range with ERFB-BB: km39
Minimum Range: m5,400

Dimensions

Length (in Travelling Order): m7
Length (in Combat Order): m11.4
Width (in Travelling Order): m2.5
Width (in Combat Order): m9.3
Height: INA
Weight, Combat: tons12.5
Turning Radius: m7

Automotive Requirement

Prime Mover: 6 x 6 Truck

Towing Speed, Maximum On: km/h90

Cross-Country Towing Speed: km/h50

↳*Auxiliary Power Unit (APU)*

Engine: 493Q diesel

Engine Power: hp110

Auto-propulsion Speed: km/h20

Auto-propulsion Range (on roads): km80-100

Maximum Range without Refuelling: km100

Armament & Ammo

↳*Cannon*

Caliber: mm155

Breech Type: The difference between the AH1 and the AH1A is a conventional screw breechblock on the AH1 and a laterally sliding wedge breechblock on the AH1A.

Muzzle Velocity, Max: m/s903

Max Range: km39

Min Range: m5,400

Armor Penetration: INA

Fuse Type: INA

Barrel Length: INA

Loader Type: Semi-Automatic

Muzzle Brake Type: Multi-slotted

Max Elevation: deg72

Min Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire, Burst: rounds4

Rate of Fire, Sustain: rounds2

Rate of Fire, Normal: INA

SP Capable: Yes

Pneumatic Rammer: Yes

ERFB/HE: Yes

ERFB-BB/HE: Yes

ERFB-BB/RA: Yes

ERFB/WP: Yes

ERFB/Illumination: Yes

ERFB/Smoke: Yes

ERFB-BB/Cargo: Yes

Laser Guided Munitions: Yes

Fire Control System

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Collimator: Yes

Gun Display Unit: Yes

Protection

Armor Roof: None

Armor, Front: None

Armor, Side: None

NBC Protection: No

Smoke Equipment: INA

Notes:

The AH-1/AH-1A Chinese 155mm Towed Artillery is a variant of the PLL-01 Chinese 155mm Towed Artillery that is equipped with a APU. The APU provides limited self-propulsion to move into or out of the firing position and enables powered deployment in the firing position. The difference between the AH1 and the AH1A is a conventional screw breechblock on the AH1 and a laterally sliding wedge breech block on the AH1A.

M777A2 AUS Australian 155mm Towed Howitzer




Tiers:



Variants:

- **M777:** gun with optical fire control
- **M777A1:** digitization upgrades with the addition of an on-board power source, satellite global positioning, inertial navigation, radio, Gun Display Unit (GDU) and Section Chief Assembly (SCA).
- **M777A2:** Block 1A software upgrade. Addition of an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to enable Excalibur and precision munition compatibility.
- **M777ER:** Experimental upgrade created by the Extended Range Cannon Artillery (ERCA) project modified with a 52-caliber barrel, adding 1.8 m (5.9 ft) to the cannon and less than 450 kilograms (990 lb) to the overall system, extending range from 30 to 70 km (19 to 43 mi); concept only

System

Alternative Designation: M777A2 AUS
Type: Towed Howitzer
Crew: 7+1
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: Combat: 10.7 m (35 ft 1 in) Travel: 9.5 m (31 ft 2 in)
Barrel Length: 5.08 m
Weight: 4,200 kg

Main Weapon System

↳*System*

Name: M777A2 AUS
Type: Towed Howitzer
Caliber: mm155
Carriage: Split trail

Elevation: 0° to +71.7°

Traverse: INA

Rate of Fire: Normal: 2 rpm Maximum: 5 rpm

Muzzle Velocity: Charge 8S: 827 m/s (2713.25 ft/s)

Effective Firing Range: 24-40 km

↳*Ammunition (Option 1)*

Name: M107

Type: Projectile

Caliber: mm155

Length: 605.3 mm

Diameter: 154.71 mm

Weight as Fired: 43.2 kilograms

Fuzes: PD M51A5, M728 family, M557, M572, M739, M564, M577, M582, M732

Explosive Content: NT 6.86 kilograms

Effective Firing Range: 24 km

Note: The M107 155mm projectile was the standard 155mm high explosive (HE) projectile for howitzers of the US Army and US Marine Corps. A bursting round with fragmentation and blast effects, the M107 is being superseded in the US military by the M795.

↳*Ammunition (Option 2)*

Name: M795

Type: Projectile

Caliber: mm155

Length: 605.3 mm

Diameter: 154.89 mm

Weight as Fired: 46.7 kg

Fuzes: INA

Explosive Content: TNT: 10.8 kg with a charge liner OR IMX-101(IMX was adopted by the Army; Marines still use TNT)

Effective Firing Range: 22.5 km

Note: The M795 155mm projectile is the US Army and US Marine Corps' standard 155mm high explosive (HE) projectile for howitzers. It is a bursting round with fragmentation and blast effects. The M795 is designed to be a more lethal, longer range version of the M107. A welded band replaces the swaged rotating band of the M107, allowing the M795 to be fired with M119 or M203 propelling charges, increasing range by 6,000 meters. The explosive payload was also improved, as was the fragmentation pattern, giving 30% higher lethality.

↳*Ammunition (Option 3)*

Name: M982 Excalibur

Type: Projectile

Caliber: mm155

Length: 996 mm

Diameter: 155 mm

Weight: 48 kg

Warhead: PBXN-9

Guidance System: GPS, inertial navigation

Accuracy: 5-20 m

Effective Firing Range: 40 km

Fire Control

Name: INA

Computerized FCS: The M777A2 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly.

Direct Fire: No

Indirect Fire: Yes

Collimator: INA

Notes:

In 2008, the Australian Defence Force made a US Foreign Military Sales request for 57 M777A2s worth an estimated US$248m. Subsequently, 35 guns were purchased for the Australian Army to re-equip the 1st Regiment, Royal Australian Artillery, the 4th Regiment, Royal Australian Artillery and the 8th/12th Regiment, Royal Australian Artillery to replace 155 mm M198s and 105 mm L119 Hamels. The first deliveries of M777A2 began in late 2010. An additional 19 guns will be bought directly from American production lines to enable a total of six batteries. Concurrently, the Australian Army has acquired guided 155 mm munitions in the form of the M982 Excalibur and XM1156 Precision Guidance Kit. M777A2 – Block 1A software upgrade. Addition of an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to enable Excalibur and precision munition compatibility. The M777 howitzer is a towed 155 mm artillery piece. It succeeded the M198 howitzer in the United States Marine Corps and United States Army in 2005. The M777 is also used by the ground forces of Australia, Canada, India and Saudi Arabia. It made its combat debut in the War in Afghanistan. The M777 is manufactured by BAE Systems' Global Combat Systems division. Prime contract management is based in Barrow-in-Furness in the United Kingdom as well as manufacture and assembly of the titanium structures and associated recoil components. Final integration and testing of the weapon is undertaken at BAE's facility in Hattiesburg, Mississippi. The M777 began as the Ultralight Field Howitzer (UFH), developed by Vickers Shipbuilding and Engineering's (VSEL) Armaments Division in Barrow-in-Furness, United Kingdom. VSEL was bought by BAE Systems after the UFH prototypes had been manufactured and demonstrated, consequently BAE became responsible for future design refinements and re-named the gun 'M777'. Upon taking-over responsibility for the weapon BAE to a large degree 'americanised' the construction and assembly through its US-based BAE Systems Land and Armaments group. The M777 now uses about 70% US-built parts including the gun barrel manufactured at the Watervliet Arsenal. With a weight of 4,200 kg (9,300 lb), the M777 is 41% lighter than the 7,154 kg (15,772 lb) M198 howitzer it replaces. Much of the weight reduction is due to the extensive use of titanium. The M777 can be transported by helicopter sling-load, transporter aircraft such as the C-130, or towed by air-braked vehicles weighing over 2.5 tonnes (2.8 short tons), such as the FMTV and MTVR. The minimal gun crew required is five, compared to a previous nine. The M777 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly. The Canadian M777 in conjunction with the traditional "glass and iron sights/mounts" also uses a digital fire control system called the Digital Gun Management System (DGMS) produced by Leonardo MW with components of the Indirect Fire Control Software Suite (IFCSS) built by the Firepower team in the Canadian Army Land Software Engineering Centre. The Leonardo MW portion of the system, known as LINAPS, had been proven previously through earlier fielding on the British Army Royal Artillery's L118 Light Gun The Digital Fire Control System will be powered by a unique new design of rotary hybrid-electric engine designed and manufactured by Liquid Piston. The M777 may be combined with the M982 Excalibur GPS-guided munition, which allows accurate fire at a range of up to 40 km (25 mi). This almost doubles the area covered by a single battery to about 1,250 km2 (480 sq mi). Testing at the Yuma Proving Ground by the US Army placed 13 of 14 Excalibur rounds, fired from up to 24 kilometres (15 mi), within 10 m (33 ft) of their target, suggesting a circular error probable of 5 m (16 ft). In June 2012, Golf Battery, 2nd Battalion, 11th Marines, out of Camp Pendleton, California, dropped the M982 Excalibur round on insurgents at a range of 36 km (22 mi) in Helmand Province, Afghanistan. This marked the longest operational shot in the history of the M777 howitzer, and the longest operational tube artillery shot in history for the Marine Corps. In 2014 the US military began fielding

several upgrades to its M777 howitzers including new liquid crystal display units, software updates, improved power systems, and muzzle sensors for onboard ballistic computing. Future upgrades include a touchscreen Chief Section Display, a new Mission System Computer, and a digital radio. In May 2017, the US Army revealed it was buying the Swedish BONUS round as an interim system as a result of the required phasing out of cluster munitions from artillery shells, complying with policy to achieve less than 1% unexploded ordnance from non-unitary explosives; the BONUS has two sensor-fused munitions deployed by a 155 mm carrier projectile that scan the ground for targets and fire explosively formed penetrators down from the air. The system has been tested from the M777 howitzer.

M1 (M59) American 155mm Towed Gun





Tiers:



Variants:

- **Gun Variants:** *M1920 – prototype. *T4 – prototype. *M1 (1938) – first production variant, 20 built. *M1A1 (1941) – modified breech ring. *M1A1E1 – prototype with chromium-plated bore. *M1A1E3 – prototype with liquid cooling. *M2 Standard (1945) – with modified breech ring.
- **Carriage Variants:** *T2 – prototype. *M1 (1938). *M1A1 – refurbished T2 carriages. *M2 Standard
- **Limber Variants:** *M1 Standard (1938) *M5 Heavy (1945) The gun was also mounted on a modified M4 medium tank chassis, in mount M13. The resulting vehicle was initially designated 155 mm Gun Motor Carriage T83 and eventually standardized as 155 mm Gun Motor Carriage M40.[15] 155 mm Gun Motor Carriage T79, based on T23 Medium Tank chassis, never advanced past proposal stage. A portable "Panama mount" M1 was also provided.

System

Alternative Designation: M1; M59

Type: Towed Gun

Crew: 14

Carriage: M1 Carriage The gun carriage provides a stable, yet mobile, base for the gun. The new split-trail carriage featured an eight-wheel integral two-axle bogie and a two-wheel limber that supported the trails for transport. The carriage was a two-piece design. The upper carriage included the side frames with trunnion bearings that supported the recoil mechanism that carried the gun cradle, slide and gun tube. The upper carriage also incorporated the elevating and azimuth gearing. The upper carriage pivoted in azimuth on the lower carriage. The lower carriage included the transport suspension and the split-trail that stabilized and absorbed recoil when the gun was fired. After the gun was placed in a firing position with the gun pointing in the desired direction, the trails were lowered to the ground and the limber was removed. The carriage wheels would then be raised using built-in ratcheting screw-jacks, lowering the gun carriage to the ground. Once on the ground, the limber-end of the trail legs were separated to form a wide "vee" with its apex at the center of the carriage pivot point. A recoil spade at the limber-end of each trail leg required a correctly positioned hole to be dug for the spade, which was attached to the trail end, to transmit the recoil from gun carriage through the trails and into the earth. This made the gun very stable and assisted its accuracy. The removable spades were transported in brackets on the trail legs. The carriage M1 and M2 were shared with the 8 inch Howitzer M1, differing only in the gun tube, sleigh, cradle, recoil and equilibrators, weight due to the heavier barrel.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length: Travel: 11 m

Barrel Length: 6.97 m

Width: Travel: 2.5 m

Height: Travel: 2.7 m

Weight, Combat: Travel: 13,880 kg

Main Weapon System

↳*System*

Name: M1 (M59)

Type: Towed Long Gun

Caliber: mm155

Breech: Asbury mechanism

Recoil: Hydro-pneumatic

Carriage: M1 Carriage

Elevation: −2°/+65°

Traverse: 60°

Rate of Fire: 40 rounds per hour

Muzzle Velocity: 853 m/s

Maximum Firing Range: 23.7 km

↳*Ammunition*

Type: Projectile

Caliber: mm155

Shell: Separate loading charge and projectile

Basic Load: INA

Types of Ammunition: APBC/HE; HE; Smoke; Chemical; Dummy

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Collimator: INA

Notes:

The 155 mm gun M1 was a 155 millimeter caliber field gun developed and used by the United States military. Nicknamed "Long Tom" (an appellation with a long and storied history in U.S. field and naval artillery), it was produced in M1 and M2 variants, later known as the M59. Developed to replace the Canon de 155mm GPF, the gun was deployed as a heavy field weapon during World War II and the Korean War, and also classed as secondary armament for seacoast defense. The gun could fire a 100 lb (45 kg) shell to a maximum range of 14 mi (23 km), with an estimated accuracy life of 1,500 rounds. The Long Tom was also adopted by a number of other nations, including the United Kingdom, Austria, Israel, and the Netherlands. The new gun design used a barrel similar to the earlier 155 mm GPF, but with an Asbury mechanism that incorporated a vertically-hinged breech plug support. This type of breech used an interrupted-thread breech plug with a lock that opened and closed the breech by moving a single lever.[4] The ammunition for the 155 mm gun was "separate-loading", that is with the shell and the powder

charge packaged, shipped and stored separately. The shell is lifted into position behind the breech and then rammed into the chamber to engage the shell's rotating band into the barrel rifling. Ramming the shell home is followed by loading a number of powder bags, as required for the desired range.The powder charge could be loaded in up to seven charge settings. Once the powder is loaded, the breech plug is closed and locked, and a primer is placed in the breech plug's firing mechanism. After setting the elevation and azimuth, the gun is ready to fire. The firing mechanism is a device for initiating the ammunition primer. The primer then sets off the igniter which ignites the propelling charge of the ammunition. A continuous-pull lanyard first cocks the firing pin, then fires the primer when pulled. The gun was developed into M1A1 and M2 variants. After World War II, the United States Army re-organized, and the gun was re-designated as the M59.

Type 83 Chinese 122mm Towed Gun Howitzer







Tiers:



Variants:

- **2A18M or D-30M:** new double baffle muzzle brake, square central base plate, towing lunette assembly.
- **2A18M-1 or D-30M-1:** with semi-automatic loader. Prototype.
- **D-30A:** modified recoil system, new muzzle brake
- **2S1 Gvozdika s:** self-propelled version.
- **Type 85 or D-30-2:** Chinese self-propelled version of the D-30.
- **D-30-3:** Chinese upgrade of the Type 56 85 mm field gun with 122 mm weapon.
- **Type 86, variously, Type 83, Type 96:** Chinese licence-production or derivative of the D-30.
- **D30 RH M-94:** Croatian built version, new muzzle brake, redesigned trail, improved hydraulic brake.
- **D 30-M:** Egyptian licence version of the D-30.
- **SPH 122:** Self-propelled version, mounted on a modified M-109 chassis.
- **T-122:** Self-propelled version, mounted on a modified T-34 chassis.
- **HM 40:** Iranian version.
- **Shafie D-30I or HM-40:** Iranian version.
- **D-30J:** Yugoslav version of the D-30 - heavily modified version based on license designed by Military Technical Institute Belgrade
- **Saddam:** Iraqi designation of Yugoslavia D-30J produced on license bought from Yugoslavia.
- **D-30JA1:** Improved Serbian version - further development of D-30J.
- **Sora 122mm:** Self-propelled version of D-30J
- **M-91 "Mona":** Yugoslav variant with the 100 mm ordnance of the MT-12. Prototype only.
- **Khalifa-1:** Sudanese licensed version of the D-30.

System

Alternative Designation: Type 83
Manufacturer: INA
In Service: 1963-Present
Crew: 5 (section of 6)
Displacement Time: min3.5

Emplacement Time: min1.5

Dimensions

Length, Chassis Overall Travel: m5.4

Height, Travel: m1.6

Width, Travel: m1.9

Weight, Combat: mt3.2

Automotive

Prime Mover: MT-LB, Ural-4320

Maximum Towing Speed, Road: km/h60

Maximum Towing Speed, Off-Road: km/h25

Fording Depth: m0.5

Armament

Name: 2A18M cannon

Caliber, Type, Name: mm122

Barrel Length: cal38

Rate of Fire – Burst: rpm8

Rate of Fire – Normal: rpm6

Rate of Fire – Sust: rpm4

Loader Type: Semi- Automatic

Breech Type: Vertical Sliding Wedge

Muzzle Brake Type: Multi-baffle

Maximum Elevation: deg+70

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Ammunition

↳*Ammunition (Option 1)*

Name: OF-81

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: m1000

Range, Maximum: m15300

Projectile Weight: kg21.76

Muzzle Velocity: m/s680

Fuze Type: RGM-2 PD

↳*Ammunition (Option 2)*

Name: HEAT-FS

Type: HEAT

Cailber/Length: mm122

Range, Minimum: m0

Range, Maximum: m1000

Projectile Weight: kg21.58

Muzzle Velocity: m/s740

Fuze Type: GPV-2 PIBD

↳*Ammunition (Option 3)*

Name: Frag-HE Rocket Assisted

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: INA

Range, Maximum: 21900

Projectile Weight: kg21.76

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M-45

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Notes:

The Type 83 122mm Towed Gun Howitzer is a Chinese version of the D-30 Russian 122mm Towed Gun Howitzer. The D-30, also known as the M1963, replaced the older 122mm howitzer M-30 (M1938). The original D-30 was fielded in 1963 and the midlife product improvements occurred in the mid to late 1970's. The original D-30 is in use with at least 50 different countries. The 2A18M, D-30A and D-30M are midlife product improvements of the D-30 that are currently in production. The D-30 features a unique three-trail carriage, a conspicuous boxy shield for the recuperator above the tube, and a small protective shield between the wheels. The gun has a semiautomatic, vertically sliding, wedge-type breechblock. It is towed muzzle-first by a truck or armored tractor, at speeds up to 80 kilometers per hour, with its trails folded under the barrel. Distinctive features of the D-30 include its low mobile mounting and above-barrel recoil system. The three-legged mobile mount is unusual for field artillery, with stabilizers that are clamped together for towing and deployed when in action. A large tow linkage is fixed to the muzzle; in transport the barrel serves as a trail. Similar mounts were a feature of several 76-mm pre-war (1931–1935) universal

(both field and anti-aircraft) guns designed by Leningrad's Kirov Plant (L-1, L-2 and L-3). Other examples were the 1939 French 47SA39 APX, and 1943 German 105-mm light field howitzers designs by Skoda and Krupp; neither entered service. The Bofors 105 mm L28 Light Field Howitzer 4140 was similarly arranged with four legs and did enter Swedish service. The 1930s-designed British 2-pdr. anti-tank gun was another piece featuring a three-legged mounting. Compared to the M-30, the new howitzer had a significantly longer 35 calibre gun barrel, just short of being a gun-howitzer by Soviet definition. Like other guns of the period, it had a high efficiency muzzle brake; this improved muzzle velocity by 175 m/s to a total of 650 m/s for HE, and raised maximum range by 3,500 m beyond the similar M-30. Maximum range was 2 km better than the 76 mm M1942 at 15.3 km. Weight increased by 650 kg over the M-30, to 3,150 kg; the D-30 is over twice the weight of the 76mm M1942. Accuracy improved, with mean error at about 10 km dropping from 35 m with the M-30 to just 21 m. Effective stabilisation length is a fundamental aspect of a gun mount, and legs 120° apart need to be longer than those with a smaller angle. The D-30's design minimises this problem in several ways. Trunnions are close to the ground, as a result of placing the recoil system and cradle above the barrel. The trunnions are also at the very rear of the breech; this maximises the recoil space when firing at higher elevation angles. Their rearward position also pushes the recoiling element forward on the mount, maximizing relative rearward span of the stabilizers and so stability during recoil. Additionally there is a very efficient muzzle brake, which absorbs about half the recoil. There is no mechanism to reduce recoil length as the angle of elevation increases. Some of the design decisions have a price. The muzzle brake produces about twice the overpressure in the area around the gun that is acceptable to Western armies, and is the reason it is often seen being fired with a long lanyard, which reduces rate of fire. Furthermore, the maximum elevation angle is restricted to 18° (early versions) or 22° (later versions) when the breech is over a trail leg. This is enforced by a mechanical cam that prevents the piece firing for about 60% of the total top traverse, and limits range to about 12 km, with full maximum range only possible in the central arc of about 48° between each pair of legs. The extreme rearward location of the trunnions means the elevating mass is unbalanced, requiring a strong balancing mechanism to enable manual elevation. To do this, the D-30 uses compression balancing gears. A central jack is powered by hand-operated hydraulics. This jack is lowered while the wheels are raised to permit two of the stabiliser legs to be swung 120° rearwards. The mounting is then lowered and the ends of the legs spiked to the ground. This mounting provides for quick traversing to fire in any direction. The pair of large tires are suspended on a single trailing arm; maximum towing speed is 60 km/h on the road. As was normal in Soviet designs, the tyres were filled with foam. Initially, the D-30 had no brakes and no seat for the layer—non-essential luxuries. A sliding block breech was adopted instead of the M-30's pre-1914 screw pattern, giving a slight increase in the rate of fire. It is a semi-automatic vertical sliding block breech, with a tied jaw; the block moves down to open and opens automatically ejecting the empty cartridge case as the recuperator forces the gun tube back into battery after a round is fired. The design is closely related to those of breeches on other Soviet post–World War II guns and howitzers. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale. The elevation leveling bubble is mounted on the dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Soviet 122 mm howitzers used different ammunition to 122 mm guns, although there was some compatibility. In the case of ammunition for the D-30, the standard 122 mm howitzer shell weight of 21.8 kg was retained, with a metal cartridge case holding variable propelling charges. Cartridge and shell are loaded separately; this means that the shells have to be hand-rammed by a man to the right of the breech with a ramming rod. The D-30 could fire the older M-30 ammunition; however, new shells were also introduced, eventually including a rocket assisted projectile with a range of 21.9 km. The M-30's range of propelling charges, comprising base and eight increments, was replaced by a new set comprising base and four increments; single base propellant was retained. A more effective High Explosive (HE) shell was developed, as well as smoke, illumination and chemical filled projectiles. In keeping with Soviet doctrine, the anti-tank role is important; there is a HEAT shell capable of penetrating 460 mm of steel armour plate. The maximum rate of fire of the D-30 is 6–8 rounds per minute, and about 75 rounds per hour. There is disagreement as to whether this maximum rate of fire is achievable for indirect fire. Based on reloading speeds of similar guns using separate charges, solo re-laying, and given a stable emplacement, semi-automatic breech and no long lanyard, (examples are the 25-pdr. and 105mm L118), and assuming concurrent lay adjustment during reloads, then it probably is when in the hands of a competent detachment. However, 5-6 rounds per minute may be more realistic with a poorly trained gun crew. The D-30 is noted for simplicity of maintenance by its users; reputedly there are no special tools, all jobs can be done with a wrench and large hammer. However, like any other gun, routine maintenance is essential, and western troops in Afghanistan have reported Afghan manned D-30s having problems with shells sticking in the barrel due to lack of cleaning. A location chosen for emplacement of the D-30 should be as level as reasonably possible. Firstly, the carriage is raised via an internal hydraulic jack located under the cradle of the gun. Once the gun is at the required height, the wheels are raised via the wheel lifting lever; this allows the two split stabilizer legs to be separated from the mono stabiliser leg and brought rearward into firing configuration. The legs are then locked in place with locking pins. The carriage is lowered via the hydraulic jack so that the legs touch the ground; integral stakes are then hammered into the ground. At this point, the gun is ready for direct fire using the OP4 direct fire sight, or can be orientated and have its position fixed via the aiming circles for subsequent indirect fire using the Pantel sight.

M-46 (M1954) Russian 130mm Towed Gun





Tiers:



Variants:

- **M-47:** This is a 152 mm field gun (Russian: 152-мм пушка М-47 обр. 1953 г.) that was developed alongside the M-46. The M-47 had a range of 20,470 m and was far less successful than its 130 mm counterpart. Only a small number was built between 1954 and 1957.
- **Type 59:** This is a licensed version of the M-46.
- **Type 59-1:** This is a combination of the 130 mm ordnance of the Type 59 with the carriage of the Type 60 (D-74 copy). The result is a gun with the same range as the M-46, but with a much lower weight of 6.3 t.
- **Type GM-45:** For the export market, NORINCO (China North Industries Corporation) developed this upgrade package where the original barrel of the Type 59 is replaced by the 155/45 mm ordnance of the WA 021.
- **SP-130 "Catapult":** Indian-designed self-propelled version, mounted on the hull of the Vijayanta tank.
- **M-46S:** This is an upgrade of an existing M-46 or Type 59, carried out by Soltam Systems Ltd. The original barrel is replaced by a new model of 155/45mm (western ammunition) for a range of 25.8 (HE) to 39 km (ERFB-BB). A 39-calibre barrel is optional. In March 2000, Soltam won a contract worth $47,524,137 for upgrading 180 M-46s to M-46S standard (Indian designator: 155/45mm (E1) Soltam).
- **M46/84:** This is a conversion that involved replacing the original 130 mm barrel with a new 155/45 mm barrel or 152 mm barrel. With ERFB-BB ammunition, this version has a range of 38,600 m and with M05 152 mm range exceeds 40 km
- **A412:** License-built Chinese Type 59-1 with D-20 carriage.

System

Alternative Designation: None
Manufactuer: MOTZ
In Service: 1954-Present
Crew: ea8
Displacement Time: min7
Emplacement Time: min6
Prime Mover: AT-S, KrAZ-255

Dimensions

Length, Firing: m11.10

Length, Travel: m11.73

Width, Travel: m2.45

Width, Firing: INA

Height, Overall: m2.5

Weight, Combat: mt8.45

Communications

↳*Radio*

Primary: R-173

Gun System

↳*Cannon*

Name: M-46 (M1954)

Type: 130mm Cannon

Length, Barrel: 52 cal

Breech Type: Horizontal sliding wedge

Maximum Elevation: deg+45

Minimum Elevation: deg-2.5

Loader Type: Manual

Muzzle Brake Type: Multi-perforated (pepper pot)

Rate of Fire, Burst: 8 rd/min

Rate of Fire, Normal: 6 rd/min

Rate of Fire, Sustained: 4 rd/min

Traverse Range: deg50

Traverse Left: deg25

Traverse Right: deg25

↳*Ammunition (Option 1)*

Name: OF44

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m22,500

Range, Minimum: mINA

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Ammunition (Option 2)*

Name: BR-482

Cailber/Length: mm130

Type: APC-T

Range, Maximum Indirect Fire: m11,140

Range, Minimum: m0

Weight: kg33.49

Muzzle Velocity: m/sINA

Fuze Type: DBR BD

↳*Ammunition (Option 3)*

Name: OF43

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m27,500

Range, Minimum: mINA

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Ammunition (Option 4)*

Name: OF43

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m38,000

Range, Minimum: mINA

Muzzle Velocity: m/s940

Fuze Type: ML-5 PD

Fire Control System

Indirect Fire: PG-1 PANTEL

Direct Fire: OP 4-35

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Notes:

The 130mm towed field gun M-46 (Russian: (130мм пушка М-46) is a manually loaded, towed 130mm artillery piece, manufactured in the Soviet Union in the 1950s. It was first observed by the west in 1954. There is also a Chinese copy, called the Type 59. For many years, the M-46 was one of the longest range artillery systems around, with a range of more than 27 km. The M-46 was developed from the M-36 130 mm naval gun used on ships and for coast defence. It is a true gun, being unable to fire much above 45° and having a long barrel and a single propelling charge. In contrast, most Western field guns of this period had a dual high and low angle fire capability, a gun-howitzer. It has a 39 calibre barrel with a tied jaw horizontal sliding-block breach and 'pepperpot' muzzle brake. The latter is not notably efficient, but subjective reports suggest that it is quite effective in reducing muzzle flash. The hydro-pneumatic recoil system comprises a buffer below the barrel and a recuperator above the barrel. The long barrel enables a substantial propelling charge by providing more length in which to achieve 'all-burnt' and hence projectile acceleration space and thus achieve its 930 m/s muzzle velocity. The barrel is mounted on a split-trail carriage, with deep box section trails and foam filled road wheels on the ground when firing and 50° of top traverse. The small shield protects little more than the sights, possible including from the effects of muzzle blast, and some protection from machine gun fire in anti-tank engagements. The gun has long and robust trails to provide stability when firing, a large detachable spade is fitted to the end of each when the gun is brought into action. Non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (a dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum engraved with the range (distance) scale, coupled to a mounted elevation levelling bubble. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. An APN-3 was later provided for direct fire at night in place of the day telescope. For travel, the gun is towed via a two-wheeled limber fitted to the end of the closed trails, with the spades removed and carried on each trail. Simple jacks on the trails just behind the main wheels are used to lift and support the closed trails so that the limber can be connected. The barrel and recuperator are pulled back between the closed trails and locked in a travelling position. There is a large bicycle chain arrangement on the right trail for this, and a compressed air cylinder, charged by the gun firing, is used to bring the barrel forward when the gun is brought back into action. It takes about four minutes to bring the gun into action, the normal detachment is eight strong. Propelling charges are in metal cartridge cases and loaded separately from the projectile. Projectiles originally included HE fragmentation, Armour Piercing solid shot, smoke, illuminating and chemical. HE shells weigh some 33 kg. Illuminating shells have a substantially lower muzzle velocity. APHE and extended range shells were introduced later. Maximum rate of fire is probably 6-7 rounds/minute, and about 70 rounds/hour. The standard Soviet unit of fire was 80 rounds.

D-1 (M1943) Russian 152mm Towed Howitzer





Tiers:

1 2 3 4

Variants:

- **Variants:** In addition to the towed howitzer, Petrov's team developed a vehicle-mounted variant of the D-1. Red Army offensive operations in the summer and fall of 1943 reawakened interest in the idea of a heavy "artillery" tank similar to the KV-2, that could provide close fire support to rifle and tank units and would be capable of demolishing heavy fortifications. Probable causes for the development of such a vehicle were the cessation of mass production of the SU-122 medium assault gun and diversion of SU-152 heavy assault guns for anti-tank actions. The tank variant of the D-1 was originally intended for mounting in a variant of the KV-1s heavy tank. It utilized the mount of the 85 mm D-5, leading to the unofficial name D-1-5 and eventually to the official designation of D-15. Only one example was built. There is no information about the gun being mounted in the KV tank. By October 1943 Soviet authorities were anticipating the start of mass production of the powerful IS-2 heavy tank; as a result the idea of a specialized artillery tank based on the obsolete KV chassis was dropped. Another project combining the T-34 tank chassis with the D-15 gun was also considered. Designated SU-D15, the medium assault gun was intended as a replacement for the SU-122. Although the project received a lot of support from the authorities it never entered production, both because of its shortcomings (the heavy gun put too much strain on the suspension and ammunition stowage was too limited) and because it was made redundant by the ISU-152. However lessons learned mounting a powerful gun in the T-34 allowed for rapid development of the SU-100 tank destroyer.
- **Type 54:** This is a Chinese-produced copy of the D-1. Firing weight is 5,512 lb (2,500 kg); projectile weight, 48 lb (21.76 kg); and maximum range, 12,904 yd (11,800 m). It is in service in China. Ref: Military Periscope, May 2015

System

Alternative Designation: D-1; M1943
Type: 152mm Towed Howitzer
Manufacturer: No. 9 Plant
Crew: 8
Carriage: Split trail
Displacement Time: minutes2
Emplacement Time: minutes2

Dimensions

Length: m6.7
Barrel Length: Bore: 3.117 m (10 ft 3 in) L/24.6
Width: m1.9
Height: m1.8

Weight, Combat: kg3,600

Main Weapon System

↳*System*

Name: D-1

Type: Towed Howitzer

Caliber: 152.4 mm

Breech: Interrupted screw

Recoil: Hydro-pneumatic

Carriage: Split trail

Rate of Fire: 3-4 rounds/min

Muzzle Velocity: 508 m/s

Max Firing Range: 12.4 km

Max Elevation: deg63.5

Min Elevation: deg-3

Traverse Range: deg35

Traverse Right: deg17.5

Traverse Left: deg17.5

↳*Ammunition (Option 1)*

Name: BP-540

Type: HEAT

Caliber: 152.4 mm

Shell: Separate loading charge and projectile

Maximum Range: m3,000

Basic Load: INA

↳*Ammunition (Option 2)*

Name: OF-530A

Type: HE-Fragmentation, steely iron

Caliber: 152.4 mm

Shell: Separate loading charge and projectile

Maximum Range: m12,400

Basic Load: INA

Note: The D-1 had a large variety of ammunition, including high-explosive, armor-piercing, HEAT, shrapnel, illumination, and chemical. The D-1 used separate loading ammunition, with eight different charges. The charges included the "full charge" Zh-536 and smaller charges ranging from the "first" to "sixth", which was the smallest. A "special charge" was used with the BP-540 HEAT projectile. Propellant charges were produced in "full" and "third" variants in munitions factories. All other charges were derived from them by removing small gunpowder bags from the charge cartridge. For

flash suppression there was a special chemical mixture which was to be inserted into a cartridge before night firing. 152 mm projectiles for the D-1 weighed about 40 kg; a difficult job for the loaders, who had to carry the projectiles alone. When set to fragmentation mode, the OF-530 projectile produced fragments which covered an area 70 meters wide and 30 meters deep. When set to high-explosive (HE) action, the exploding shell produced a crater about 3.5 meters in diameter and about 1.2 meters deep. Despite the D-1's withdrawal from service in the mid- 1970s, the OF-530 is still fired from modern 152 mm ordnance pieces of the Russian Army. The G-530 HEAC anti-concrete shell had a muzzle velocity of 457 m/s when fired with the "first" charge. At a range of one kilometer it had a 358 m/s terminal velocity and was able to punch through up to 80 centimeters of reinforced concrete before detonating a TNT charge which increased the total penetration to 114 centimeters. The G-530 could not be fired with a "full" charge without putting the crew at risk of having the shell explode in the barrel. A special version of the shell, the G-530Sh, was developed to allow use with the full charge. The BP-540 HEAT projectile was not used during World War II. It had an armour penetration of 250 millimeters at an incident angle of 90°, 220 millimeters at 60°, 120 millimeters at 30°. In the late 1950s old ammunition stocks for the D-1 were removed from the Soviet inventory. The only shells retained were the OF-530, O-530, G-530/G-530Sh, and possibly chemical shells. The Soviet Army also possessed a 152 mm nuclear shell, but it is not clear whether that shell could be used with the D-1

Notes:

The D-1 howitzer M1943 (Russian: 152-mm gaubitsa obr. 1943 g. (D-1)) is a Soviet World War II-era 152.4 mm howitzer. The gun was developed by the design bureau headed by F. F. Petrov in 1942 and 1943, based on the carriage of the 122 mm howitzer M1938 (M-30) and using the barrel of the 152 mm howitzer M1938 (M-10). The powerful and mobile D-1, with its wide range of ammunition, significantly increased the firepower and breakthrough abilities of Red Army tank and motor rifle formations. Several hundred D-1s were manufactured before the end of World War II. Post World War II, the D-1 saw combat in numerous conflicts during the mid- to late 20th century. The long operational history of D-1 howitzers in national armies of numerous countries is a testimony to its qualities; the gun still remains in service in a number of post-Soviet states and some other countries. The D-1 is widely considered a valuable element of Soviet artillery. The D-1 howitzer was essentially a combination of the barrel of the 152-mm howitzer model 1938 (M-10) on the carriage of the 122-mm howitzer M1938 (M-30). Since the new carriage was lighter than that of the M-10, the barrel was fitted with a massive double-baffle muzzle brake DT-3 to soften the shock of recoil. The breech block was of interrupted screw type, the recoil system consisted of a hydraulic buffer and a hydro-pneumatic recuperator. The separately loaded ammunition included a variety of shells and eight different propellant charges in cartridges. The carriage was nearly identical to the carriage of the M-30. It had suspension and steel wheels with pneumatic rubber tires. The trails were initially of riveted construction, but were eventually replaced in production by welded ones. Late production pieces were equipped with caster wheels to ease manhandling. Time to set up for combat was about two minutes. In an emergency it was possible to fire without splitting trails; however this was at the price of a drastically reduced traverse (1°30'). Since the gun was not equipped with a limber, it could be towed only by vehicle. The maximum towing speed was 40 km/h on paved roads, 30 km/h on cobbled roads and 10 km/h off-road. To give the crew some protection from bullets and shell fragments, the gun was fitted with a shield.

SM-4-1 Russian 130mm Towed Coastal Defense Gun





Tiers:

1 2 3 4

System

Alternative Designation: SM-4-1
Type: Towed Coastal Defense Gun
Crew: INA
Carriage: INA
Displacement Time: minutesINA
Emplacement Time: minutesINA

Dimensions

Length, Traveling: 12.80 m
Barrel Length: 7.60 m
Width: 2.85 m
Height: 3.05 m
Ground Clearance: 300 mm
Weight, Combat: 16,000 kg
Weight, Traveling: 19,000 kg

Automotive Requirement

Prime Mover: AT-T heavy tracked artillery tractor

Main Weapon System

↳*System*

Name: SM-4-1
Type: Towed Coastal Defense Gun
Caliber: 130mm
Bore: 130-mm/58-cal, rifled; fitted w/muzzle brake

Elevation: -5 deg to 45 deg (-89 mils to 800 mils)

Traverse: 360 deg (6,400 mils)

Maximum Range: 29,500 m

Muzzle Velocity: 1,050 mps

Rate of Fire: 5 rpm, normal

↳*Ammunition*

Type: APHE Projectile

Caliber: mm130

Projectile Weight: 33.6 kg

Penetration, APHE: 250 mm of steel armor at 1,090 yd (1,000 m) at 0-deg incidence

Type of Ammunition: HE, APHE

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Radar System

Radar: ZALP-B Top Bow

Notes:

The 130-mm SM-4-1 is a mobile coastal defense gun that is in limited use. It is thought to have been derived from a naval gun of a similar caliber and is carried in a very large four-wheeled carriage; each wheel is dual-tired. In the firing position, the axles are removed and four stabilizers -- two to each side -- are staked down. The SM-4-1 was designated the K54 when in Finnish service. The gun fires high-explosive (HE) and armor-piercing HE (APHE) projectiles.

PKM-2 Polish 14.5mm Towed Anti-Aircraft Gun



Tiers:

1 2 3 **4**

Variants:

- **Type 58:** Type 58: Chinese version of ZPU-2
- **PKM-2:** PKM-2 – Polish-built version.

System

Alternative Designation: ZPU-2
Type: 14.5mm Towed Anti-Aircraft Gun
Crew: 5
Carriage: INA
Displacement Time: minutes5
Emplacement Time: minutes5

Dimensions

Length, Traveling: m3.54
Barrel Length: m1.36
Width: m1.92
Height: m1.83
Weight, Traveling: kg649
Weight, Firing: kg621
Ground Clearance: m0.27

Cannon

↳*System*

Name: ZPU-2
Type: two Model KPV machine guns mounted on a two-wheel carriage.
Barrels: 2

Bore: 14.5-mm; fitted w/flash hiders

Muzzle Velocity: m/s1,000

Maximum Vertical Range: m5,000

Maximum Horizontal Range: m8,000

Effective Vertical Range: m1,400

Max Elevation: deg+85

Min Elevation: deg-15

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Cyclic Rate of Fire: 600 rds/min

Practical Rate of Fire: 150 rds/min

↳*Ammunition (Option 1)*

Name: BS.41

Type: API

Caliber: mm14.5

Basic Load: INA

Core: Tungsten carbide core

Projectile Weight: 64.4 g

Muzzle Velocity: m/s1,000

Armor Penetration: Armor-penetration at 500 m (550 yd) is 32 mm (1.3 in) of RHA at 90 degrees.

↳*Ammunition (Option 2)*

Name: BZT

Type: API-T

Caliber: 14.5

Basic Load: INA

Core: Steel Core

Projectile Weight: 59.56 g

Muzzle Velocity: m/s1,005

Tracer Burns: Tracer burns to at least 2,000 m (2,200 yd).

↳*Ammunition (Option 3)*

Name: ZP

Type: I-T (Instantaneous Incendiary)

Caliber: mm14.5

Basic Load: INA

Core: INA

Projectile Weight: 60.0 g

Note: I-T (ZP) – "Instantaneous Incendiary" bullet with internal fuze, incendiary in tip, tracer container in base.

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The PKM-2 is a Polish version of the Russian ZPU-2. The ZPU-2 consists of two Model KPV machine guns mounted on a two-wheel carriage. The ZPU-2 was introduced in 1949 and is a twin version of the ZPU-1 basic Soviet 14.5MM machine gun. The ZPU-2 was used in Korea and considered a dangerous opposition in Vietnam. The Type 58 is the Chinese version, while the individual KPV machine guns as the Type 56. The twin ZPU-2 has appeared on two different two-wheeled carriages. The earlier model has larger fenders and a double tubular tow bar. In firing position the crew removes the wheels, and the weapon rests on a three-point platform. The later model, which is lighter in weight, has smaller fenders, a tighter single tow bar, and a tower silhouette. When in firing position the wheels are raised, but not removed. A very similar carriage is used for the twin 23mm automatic antiaircraft gun ZU-23, although the ammunition boxes, barrels and flash hiders are distinctly different. The ZPU-2 was used in the 1970s by some Warsaw Pact armies and by security elements such as the East German Workers' militia. All weapons in this series fire the API (BS 41) projectiles weighing 64.4 grams having a muzzle velocity of 1000 meters per second which will penetrate 32 mm of armour.

Type 59-1 Chinese 130mm Towed Artillery




Tiers:



Variants:

- **GM-45:** This was developed by NORINCO to field a Chinese-built version of the Austrian GHN-45 gun on the many 130-mm M-46/Type 59 and 152-mm Type 66 carriages remaining in service. The M46 carriage was adapted to ensure its recoil resistance was able to withstand the more powerful gun by: Raising maximum elevation to +55 deg (978 mils); Limiting maximum recoil distance to 49.2 in (1,250 mm); modifying the GHN-45's recuperator (minimum distance is 30.5 in/775 mm); Adopting a pneumatic rammer; Modifying the panoramic sight and sight mount; Changing the M-46/Type 59's breech ring and breech block to the semi-automatic screw type of the GHN-45; Adding compressed-air supply; and Incorporating hydraulically actuated trail-wheel raising. Weight is 18,739 lb (8,500 kg) firing, 19,401 lb (8,800 kg) traveling; rate of elevation is 11.8 mils/revolution; rate of traverse, 11.25 mils/revolution. Ammunition is extended-range full-bore high-explosive (ERFB), ERFB/smoke (ERFB/WP), ERFB/base-bleed (ERFB/BB) and ERFB/BB illuminating (ERFB/BB IL) projectiles. Range with ERFB is 32,808 yds (30,000 m), ERFB/BB 42,651 yds (39,000 m). ERFB/WP is 28,433 yds (26,000 m) and ERFB/BB IL is 26,247 yds (2 4,000 m). The system is available for export; no buyers have been publicly announced. Ref: Military Periscope, May 2015

System

Date of Introduction: Developed in the 1970s, delivered in the 1980s
Country of Origin: China
Crew: 8
Breech: Vertical Sliding Wedge
Loader: Semi-automatic
Elevation: -2.5 degrees to 45 degrees
Azimuth of traverse: 50 degrees
Maximum Rate of fire: rpm8-10
Range: km27 (37 km with improved munitions)
Speed while being towed on road: kmh50
Speed while being towed off road: kmh20
Speed while being towed cross country: kmh10
Emplacement Time: min6
Displacement Time: min7
Prime Mover: Most medium trucks in the Chinese inventory

Direct Fire Mode: Can penetrate 250mm of armor at a range of 1,500m

Dimensions

Length (Traveling): m11.75

Length (Firing): m11.1

Height: m2.55

Weight: mt6.1

Width (Traveling): n2.45

Protection

NBC: No

Frontal Armor: Provides limited protection to the crew against small arms fire

Armament

↳*Cannon*

Description: 130mm

Barrel Length: caliber52

Muzzle Brake: Double buffed muzzle

↳*Munition 1, Frag-HE, OF 44*

Minimum Range: INA

Maximum Range: m22,500

Complete Projectile Weight: kg33.4 (OF 33)

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Munition 2, APC-T*

Minimum Range: m0

Maximum Range: m1140

Complete Projectile Weight: kg33.49 (BR-482B)

Muzzle Velocity: m/sINA

Fuze Type: DBR BD

↳*Munition 3, Frag-HE, OF 43*

Minimum Range: INA

Maximum Range: m27,500

Complete Projectile Weight: kg33.4 (OF-33)

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Munition 4, Frag-HE, ERFB-BB*

Minimum Range: INA

Maximum Range: m38,000

Complete Projectile Weight: kg33.4

Muzzle Velocity: m/s940

Fuze Type: ML-5 PD

Fire Control System

Indirect Fire: PG-1 Panoramic Telescope (PANTEL)

Direct Fire: OP 4-35

Collimator: K-1

Gun Display Unit: None

Fire Control Computer: None

Night Vision: Available for Direct Fire

Notes:

The Type 59 Field Gun is a licensed copy of the Soviet, Cold War era M-46 Field Gun. Normally had two road wheels however, two additional road wheels have been seen on some variants. The Type 59-1 is the result to improve on some of the design flaws of the Type 59. These improvements include: a new carriage which is based upon the Type 66. The improvement has allowed am improvement in the emplacement and displacement times. The addition of a base plate gives the gun more stability while firing and, along with the wheels at the end of the split trails, allows the gun to be rotated thus, giving it 360 traverse ability.

2S1 (Gvozdika) Russian 122mm Self-Propelled Howitzer (SPH)





Tiers:



Variants:

- **2S34 Hosta:** Modernisation of the 2S1 with the 122 mm 2A31 gun replaced by the 120 mm 2A80-1 gun-mortar. Further improvements include a new Malakhit fire control system, a battlefield observation system and the ability to fire the Kitolov-2M guided ammunition. One unit, the 21st Mechanized Brigade in Totskoye is currently being equipped with the system.
- **2S15 "Norov":** A prototype tank destroyer equipped with a radar-based fire control system and a 100 mm gun
- **Kevlar-E:** Infantry fighting vehicle based on the 2S1 platform, equipped with Shturm remote weapon station and room for 6 passengers in addition to the 3 crew. The original 300 horsepower V8 diesel engine has been replaced with 420 horsepower diesel engine, produced by Caterpillar, Cummins or Deutz, increasing the maximum road speed to 70 km/h. Additionally, the vehicle is amphibious, includes air conditioning, a fire detection and suppression system, an NBC system, navigation system and night-vision equipment. The variant was first introduced in April 2018.
- **2S1M Goździk:** Version with special amphibious kit that increases the vehicle's amphibious capabilities.
- **2S1T Goździk:** Version with a TOPAZ digital fire control system from WB electronics. The system consists of a FONET-IP digital intercom system, new digital radio, military GPS receiver, military computer and dedicated software. The same system is used on other Polish Armed Forces artillery systems like the AHS Krab, Dana-T and WR-40 Langusta.
- **Model 89:** Romanian variant that uses a modified version of the hull of the MLI-84.
- **Raad-1 ('thunder'):** Iranian variant that is based on the hull of the Boragh APC.

System

Alternative Designation: S21, Gvozdika
In Service: 1972-present
Type: Self-Propelled Howitzer (SPH)
Family: S21, Artillery Command and Reconnaissance Vehicle (ACRV) family
Designer: Kharkiv Tractor Plant
Crew: ea4
Displacement Time: min1
Emplacement Time: min2
Chassis: MT-LBu

Dimensions

Length: m7.26
Width: m2.85
Height: m2.73

Weight, Combat: tons15.7

Ground Pressure: kg/mINA

Automotive

Engine Name: YaMZ-238V

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Maximum Off-Road: km/h30

Speed Maximum Swim: km/hNot Amphibious

Gradient: Deg60

Side Slope: Deg30

Vertical Step: m0.6

Trench: m2.4

Fording Depth: mAmphibious

Suspension: Torsion bar

Communications

Primary: R-123M

Secondary: R55P Radio System,

Main Gun

↳*System*

Name: 2A18 122 mm (4.8 in) howitzer

Type: mm122

Breech Type: Horizontal sliding-wedge, semi-automatic

Length, Barrel: mmINA

Loader Type: Semi-automatic

Max Rate of Fire: rds/min4-5

Sustained Rate of Fire: rds/min1-2

Muzzle Brake Type: Double Baffle

Max Elevation: Deg+70

Min Elevation: Deg-3

Traverse Range: Deg360

Collimator Type: K-1

↳*Ammunition (Option 1)*

Type: HEAT-FS
Caliber: mm122
Muzzle Velocity: m/s680
Fuse Type: GPV-2 PIBD
Basic Load: 40 Total, any combination of 122mm Projectiles
Maximum Effective Range (Conventional): m1,000
Shell: separate loading, cased charge
Armor Penetration: 460mm at 0 degree obliquity any range
Projectile Weight: kg21.58

↳*Ammunition (Option 2)*

Type: OF-81, FRAG-HE
Caliber: mm122
Muzzle Velocity: m/s680
Minumum Range: m1,000
Maximum Range: m15,300
Projectile Weight: kg21.76
Fuze Type: RGM-2 PD
Basic Load: 40 Total, any combination of 122mm Projectiles

↳*Ammunition (Option 3)*

Type: Rocket Assisted FRAG-HE
Caliber: 122mm
Muzzle Velocity: m/sINA
Minimum Range: mINA
Maximum Range: m21,900
Projectile Weight: kg21.76
Basic Load: 40 Total, any combination of 122mm Projectiles

Coaxial Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: 7.62 mm
Manufacturer: Degtyaryov plant
Function: in use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Max Rate of Fire: rds/min650

Proliferation: 1 Million +

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea250

Effective Range (Iron Sights): m100-1,000

Effective Range (With Sight Adjustments): m100,1,500

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Indirect Fire: Yes, PG-2 Pantel

Direct Fire: Yes, OP 5-37

Protection

Hull Armor: mm20

Turret Armor: mm10

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

IR Signature: INA

Notes:

The 2S1 Gvozdika is a tracked 122mm self-propelled howitzer of Russian origin. It was developed in the late 1960's and entered large scale production in 1971. 2S1 was the GRAU designation for the new weapon system. In service the name Gvozdika, carnation in English, is most common. In the West it was known as the M1974, based on the year it was first observed by the West.

HM 40 (Shafie D-301) Iranian 122mm Towed Gun Howitzer



Tiers:



Variants:

- **2A18M or D-30M:** new double baffle muzzle brake, square central base plate, towing lunette assembly.
- **2A18M-1 or D-30M-1:** with semi-automatic loader. Prototype.
- **D-30A:** modified recoil system, new muzzle brake
- **2S1 Gvozdika s:** self-propelled version.
- **Type 85 or D-30-2:** Chinese self-propelled version of the D-30.
- **D-30-3:** Chinese upgrade of the Type 56 85 mm field gun with 122 mm weapon.
- **Type 86, variously, Type 83, Type 96:** Chinese licence-production or derivative of the D-30.
- **D30 RH M-94:** Croatian built version, new muzzle brake, redesigned trail, improved hydraulic brake.
- **D 30-M:** Egyptian licence version of the D-30.
- **SPH 122:** Self-propelled version, mounted on a modified M-109 chassis.
- **T-122:** Self-propelled version, mounted on a modified T-34 chassis.
- **HM 40:** Iranian version.
- **Shafie D-30I or HM-40:** Iranian version.
- **D-30J:** Yugoslav version of the D-30 - heavily modified version based on license designed by Military Technical Institute Belgrade
- **Saddam:** Iraqi designation of Yugoslavia D-30J produced on license bought from Yugoslavia.
- **D-30JA1:** Improved Serbian version - further development of D-30J.
- **Sora 122mm:** Self-propelled version of D-30J
- **M-91 "Mona":** Yugoslav variant with the 100 mm ordnance of the MT-12. Prototype only.
- **Khalifa-1:** Sudanese licensed version of the D-30.

System

Alternative Designation: HM 40 (Shafie D-301)
Manufacturer: PJSC Plant № 9
In Service: 1963-Present
Crew: ea5 (section of 6)
Displacement Time: min3.5
Emplacement Time: min1.5

Dimensions

Length, Chassis Overall Travel: m5.4
Height, Travel: m1.6
Width, Travel: m1.9

Weight Combat: mt3.2

Automotive

Prime Mover: MT-LB, Ural-4320

Maximum Towing Speed, Road: km/h60

Maximum Towing Speed, Off-Road: km/h25

Fording Depth: m0.5

Armament

Name: 2A18M cannon

Caliber, Type, Name: mm122

Barrel Length: cal38

Rate of Fire – Burst: rpm8

Rate of Fire – Normal: rpm6

Rate of Fire – Sust: rpm4

Loader Type: Semi- Automatic

Breech Type: Vertical Sliding Wedge

Muzzle Brake Type: Multi-baffle

Maximum Elevation: deg+70

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Ammunition

↳*Ammunition (Option 1)*

Name: OF-81

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: m1000

Range, Maximum: m15300

Projectile Weight: kg21.76

Muzzle Velocity: m/s680

Fuze Type: RGM-2 PD

↳*Ammunition (Option 2)*

Name: HEAT-FS

Type: HEAT

Cailber/Length: mm122

Range, Minimum: m0

Range, Maximum: m1000

Projectile Weight: kg21.58 21.58

Muzzle Velocity: m/s740

Fuze Type: GPV-2 PIBD

↳*Ammunition (Option 3)*

Name: Frag-HE Rocket Assisted

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: mINA

Range, Maximum: 21900

Projectile Weight: kg21.76

Muzzle Velocity: m/sINA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M-45

Collimator: K-1

Fire Control Computer: No

Gun Display Unit: No

Notes:

The HM 40 (Shafie D-301) 122mm Towed Gun Howitzer is a Iranian version of the Russian 2A18 D-30 122mm Towed Gun Howitzer. The D-30, also known as the M1963, replaced the older 122-mm howitzer M-30 (M1938). The original D-30 was fielded in 1963 and the midlife product improvements occurred in the mid to late 1970's. The original D-30 is in use with at least 50 different countries. The 2A18M D-30A and D-30M are midlife product improvements of the D-30 that are currently in production by the Gosudarstvennoe Unitarnoe Predpriatie Zavod 9 [Vysokodispersnye Metallicheskiye Poroshki AO]. The D-30 features a unique three-trail carriage, a conspicuous boxy shield for the recuperator above the tube, and a small protective shield between the wheels. The gun has a semiautomatic, vertically sliding, wedge-type breechblock. It is towed muzzle-first by a truck or armored tractor, at speeds up to 80 kilometers per hour, with its trails folded under the barrel. The D-30 can be recognized by its unique three-trail carriage, the conspicuous box-like shield for the recoil-recuperator mechanism mounted above the tube, the multi-baffle muzzle brake, and the small protective shield fitted between the wheels. Early models of the D-30 had a multi-baffle muzzle brake while the D-30M has a double-baffle muzzle brake. The gun has a semiautomatic, vertically-sliding, wedge-type breechblock. It can be towed by a truck (Ural-375 or ZIL-131) or armored tractor at speeds up to 80 krn/hr. It is towed muzzle-first by a large lunette just under the muzzle brake with its trails folded under the barrel. Distinctive features of the D-30 include its low mobile mounting and above-barrel recoil system. The three-legged mobile mount is unusual for field artillery, with stabilizers that are clamped together for towing and deployed when in action. A large tow linkage is fixed to the muzzle; in transport the barrel serves as a trail. Similar mounts were a feature of several 76-mm pre-war (1931–1935) universal (both field and anti-aircraft) guns designed by Leningrad's Kirov Plant (L-1, L-2 and L-3). Other examples were the 1939 French 47SA39 APX, and 1943 German 105-mm light field howitzers designs by Skoda and Krupp; neither entered service. The Bofors 105 mm L28 Light Field Howitzer 4140 was similarly arranged with four legs and did enter Swedish service. The 1930s-designed British 2-pdr. anti-tank gun was another piece featuring a three-legged mounting.

Compared to the M-30, the new howitzer had a significantly longer 35 calibre gun barrel, just short of being a gun-howitzer by Soviet definition. Like other guns of the period, it had a high efficiency muzzle brake; this improved muzzle velocity by 175 m/s to a total of 650 m/s for HE, and raised maximum range by 3,500 m beyond the similar M-30. Maximum range was 2 km better than the 76 mm M1942 at 15.3 km. Weight increased by 650 kg over the M-30, to 3,150 kg; the D-30 is over twice the weight of the 76mm M1942. Accuracy improved, with mean error at about 10 km dropping from 35 m with the M-30 to just 21 m. Effective stabilisation length is a fundamental aspect of a gun mount, and legs 120° apart need to be longer than those with a smaller angle. The D-30's design minimises this problem in several ways. Trunnions are close to the ground, as a result of placing the recoil system and cradle above the barrel. The trunnions are also at the very rear of the breech; this maximises the recoil space when firing at higher elevation angles. Their rearward position also pushes the recoiling element forward on the mount, maximizing relative rearward span of the stabilizers and so stability during recoil. Additionally there is a very efficient muzzle brake, which absorbs about half the recoil. There is no mechanism to reduce recoil length as the angle of elevation increases. Some of the design decisions have a price. The muzzle brake produces about twice the overpressure in the area around the gun that is acceptable to Western armies, and is the reason it is often seen being fired with a long lanyard, which reduces rate of fire. Furthermore, the maximum elevation angle is restricted to 18° (early versions) or 22° (later versions) when the breech is over a trail leg. This is enforced by a mechanical cam that prevents the piece firing for about 60% of the total top traverse, and limits range to about 12 km, with full maximum range only possible in the central arc of about 48° between each pair of legs. The extreme rearward location of the trunnions means the elevating mass is unbalanced, requiring a strong balancing mechanism to enable manual elevation. To do this, the D-30 uses compression balancing gears. A central jack is powered by hand-operated hydraulics. This jack is lowered while the wheels are raised to permit two of the stabiliser legs to be swung 120° rearwards. The mounting is then lowered and the ends of the legs spiked to the ground. This mounting provides for quick traversing to fire in any direction. The pair of large tires are suspended on a single trailing arm; maximum towing speed is 60 km/h on the road. As was normal in Soviet designs, the tyres were filled with foam. Initially, the D-30 had no brakes and no seat for the layer—non-essential luxuries. A sliding block breech was adopted instead of the M-30's pre-1914 screw pattern, giving a slight increase in the rate of fire. It is a semi-automatic vertical sliding block breech, with a tied jaw; the block moves down to open and opens automatically ejecting the empty cartridge case as the recuperator forces the gun tube back into battery after a round is fired. The design is closely related to those of breeches on other Soviet post–World War II guns and howitzers. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale. The elevation leveling bubble is mounted on the dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Soviet 122 mm howitzers used different ammunition to 122 mm guns, although there was some compatibility. In the case of ammunition for the D-30, the standard 122 mm howitzer shell weight of 21.8 kg was retained, with a metal cartridge case holding variable propelling charges. Cartridge and shell are loaded separately; this means that the shells have to be hand-rammed by a man to the right of the breech with a ramming rod. The D-30 could fire the older M-30 ammunition; however, new shells were also introduced, eventually including a rocket assisted projectile with a range of 21.9 km. The M-30's range of propelling charges, comprising base and eight increments, was replaced by a new set comprising base and four increments; single base propellant was retained. A more effective High Explosive (HE) shell was developed, as well as smoke, illumination and chemical filled projectiles. In keeping with Soviet doctrine, the anti-tank role is important; there is a HEAT shell capable of penetrating 460 mm of steel armour plate. The maximum rate of fire of the D-30 is 6–8 rounds per minute, and about 75 rounds per hour. There is disagreement as to whether this maximum rate of fire is achievable for indirect fire. Based on reloading speeds of similar guns using separate charges, solo re-laying, and given a stable emplacement, semi-automatic breech and no long lanyard, (examples are the 25-pdr. and 105mm L118), and assuming concurrent lay adjustment during reloads, then it probably is when in the hands of a competent detachment. However, 5-6 rounds per minute may be more realistic with a poorly trained gun crew. The D-30 is noted for simplicity of maintenance by its users; reputedly there are no special tools, all jobs can be done with a wrench and large hammer. However, like any other gun, routine maintenance is essential, and western troops in Afghanistan have reported Afghan manned D-30s having problems with shells sticking in the barrel due to lack of cleaning. A location chosen for emplacement of the D-30 should be as level as reasonably possible. Firstly, the carriage is raised via an internal hydraulic jack located under the cradle of the gun. Once the gun is at the required height, the wheels are raised via the wheel lifting lever; this allows the two split stabilizer legs to be separated from the mono stabiliser leg and brought rearward into firing configuration. The legs are then locked in place with locking pins. The carriage is lowered via the hydraulic jack so that the legs touch the ground; integral stakes are then hammered into the ground. At this point, the gun is ready for direct fire using the OP4 direct fire sight, or can be orientated and have its position fixed via the aiming circles for subsequent indirect fire using the Pantel sight.

2B16 Nona-K Russian 120mm Towed Combination Gun





Tiers:

1 2 **3** 4

System

Alternative Designation : Nona-K

Carriage: Split Trail, 2-wheel torsion bar suspension

Crew : ea5

Displacement Time : min2

Emplacement Time : min2

Dimensions

Height, Overall: m1.7

Length, Chassis Overall: m5.66

Length, Chassis Overall Firing: INA

Length, Chassis Overall Travel: m5.9

Width, Firing: INA

Width, Overall: INA

Width, Travel: m1.79

Weight, Combat: mt1.1

Automotive

Fording Depth : m1.5

Speed, Maximum Cross-Country: INA

Towing Speed, Maximum Off-Road: km/h35.0

Towing Speed, Maximum On-Road: km/h80.0

Main Gun Weapon System

↳*System*

Name: 2A51

Type: Mortar

Cailber/Length : mm120.0

Breech Type: Vertical sliding wedge

Length, Barrel : 24.2 Caliber

Loader Type: Semi-automatic

Muzzle Brake Type: Multi baffle

Rate of Fire, Burst : rd/min8.0

Rate of Fire, Normal : rd/min6.0

Rate of Fire, Sustained : rd/min4.0

Maximum Elevation: deg+80

Minimum Elevation: deg-10

Traverse Range: deg60.0

Traverse, Left : deg30.0

Traverse, Right : deg30.0

Main Gun Ammunition

↳*Ammunition (Option 1)*

Name: 3VOF49

Type: Frag-HE

Cailber/Length : mm120.0

Fuze Type: PD and Proximity

Muzzle Velocity : INA

Range : m15-8,850

Weight : kg19.8

↳*Ammunition (Option 2)*

Name: BK-19

Cailber/Length : mm120.0

Type: HEAT

Fuze Type: PD and Proximity

Muzzle Velocity : m/s560.0

Range : m40-1,000

Weight : kg13.2

↳*Ammunition (Option 3)*

Name: OF-50

Type: Frag-HE

Cailber/Length : mm120.0

Fuze Type: B35 PD

Muzzle Velocity : m/s367.0

Range : m1,700-12,800

Weight : kg19.8

↳*Ammunition (Option 4)*

Name: Kitilov-2

Type: Laser-Guided Projectile

Cailber/Length : mm120.0

Fuze Type: PD

Muzzle Velocity : INA

Range : m500-9000

Weight : kg25.0

↳*Ammunition (Option 5)*

Name: OF-843B

Type: Frag-HE mortar

Cailber/Length : mm120.0

Fuze Type: PD and Proximity

Muzzle Velocity : INA

Range : m450-7000

Weight : INA

Fire Control System

Collimator: K-1

Direct Fire: DF channel in the sight

Indirect Fire: MP46M Panoramic Telescope

Protection

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

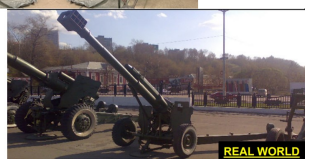
Notes:

2B16 Nona-K is a 120mm towed gun based on the 120mm Nona gun which also served as the basis for the 2S9 Nona-S and 2S23 Nona-SVK self-propelled guns. Nona-K combines the capabilities of a gun, a mortar, and a howitzer into a single weapon system that can effectively engage troops, fortifications, and armored vehicles. To do so, this artillery system is capable of firing HE-fragmentation, shaped-charge Rocket Assisted Projectiles (RAPs), 120mm HE-fragmentation, illuminating, smoke and incendiary mortar rounds including those designed for NATO's 120mm mortars. The Russian Army has deployed Nona-K gun

systems within motorized infantry battalions. Its effectiveness as been deemed similar to standard 152/155mm HE-fragmentation howitzer ammunition. The Nona-M1 is a special version designed for use by Russian airborne troops. It was introduced in late 2011 and is capable of hitting targets at ranges between 200 and 12,000 meters.

JRTC VISMOD: 2B16 Nona-K Russian 120mm Towed Combination Gun





Tiers:



System

Alternative Designation : Nona-K

Carriage: Split Trail, 2-wheel torsion bar suspension

Crew : ea5

Displacement Time : min2

Emplacement Time : min2

Dimensions

Height, Overall: m1.7

Length, Chassis Overall: m5.66

Length, Chassis Overall Firing: INA

Length, Chassis Overall Travel: m5.9

Width, Firing: INA

Width, Overall: INA

Width, Travel: m1.79

Weight, Combat: mt1.1

Automotive

Fording Depth : m1.5

Speed, Maximum Cross-Country: INA

Towing Speed, Maximum Off-Road: km/h35.0

Towing Speed, Maximum On-Road: km/h80.0

Main Gun Weapon System

↳*System*

Name: 2A51

Type: Mortar

Cailber/Length : mm120.0

Breech Type: Vertical sliding wedge

Length, Barrel : 24.2 Caliber

Loader Type: Semi-automatic

Muzzle Brake Type: Multi baffle

Rate of Fire, Burst : rd/min8.0

Rate of Fire, Normal : rd/min6.0

Rate of Fire, Sustained : rd/min4.0

Maximum Elevation: deg+80

Minimum Elevation: deg-10

Traverse Range: deg60.0

Traverse, Left : deg30.0

Traverse, Right : deg30.0

Main Gun Ammunition

↳*Ammunition (Option 1)*

Name: 3VOF49

Type: Frag-HE

Cailber/Length : mm120.0

Fuze Type: PD and Proximity

Muzzle Velocity : INA

Range : m15-8,850

Weight : kg19.8

↳*Ammunition (Option 2)*

Name: BK-19

Cailber/Length : mm120.0

Type: HEAT

Fuze Type: PD and Proximity

Muzzle Velocity : m/s560.0

Range : m40-1,000

Weight : kg13.2

↳*Ammunition (Option 3)*

Name: OF-50

Type: Frag-HE

Cailber/Length : mm120.0

Fuze Type: B35 PD

Muzzle Velocity : m/s367.0

Range : m1,700-12,800

Weight : kg19.8

↳*Ammunition (Option 4)*

Name: Kitilov-2

Type: Laser-Guided Projectile

Cailber/Length : mm120.0

Fuze Type: PD

Muzzle Velocity : INA

Range : m500-9000

Weight : kg25.0

↳*Ammunition (Option 5)*

Name: OF-843B

Type: Frag-HE mortar

Cailber/Length : mm120.0

Fuze Type: PD and Proximity

Muzzle Velocity : INA

Range : m450-7000

Weight : INA

Fire Control System

Collimator: K-1

Direct Fire: DF channel in the sight

Indirect Fire: MP46M Panoramic Telescope

Protection

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

Notes:

2B16 Nona-K is a 120mm towed gun based on the 120mm Nona gun which also served as the basis for the 2S9 Nona-S and 2S23 Nona-SVK self-propelled guns. Nona-K combines the capabilities of a gun, a mortar, and a howitzer into a single weapon system that can effectively engage troops, fortifications, and armored vehicles. To do so, this artillery system is capable of firing HE-fragmentation, shaped-charge Rocket Assisted Projectiles (RAPs), 120mm HE-fragmentation, illuminating, smoke and incendiary mortar rounds including those designed for NATO's 120mm mortars. The Russian Army has deployed Nona-K gun

systems within motorized infantry battalions. Its effectiveness as been deemed similar to standard 152/155mm HE-fragmentation howitzer ammunition. The Nona-M1 is a special version designed for use by Russian airborne troops. It was introduced in late 2011 and is capable of hitting targets at ranges between 200 and 12,000 meters.

M1977 (A407) Romanian 100mm Towed Anti-Tank Gun




Tiers:



Variants:

- **M1975:** used the horizontal sliding wedge breech lock.
- **M1977:** used the vertical sliding wedge breech lock.
- **M2002:** modernized version of M1977 with a FCS TAT-100. Adaptations:
- **A 308:** tank gun used for TR-77 and TR-85 main battle tanks.
- **A 430:** 100 mm gun used for ship turrets.

System

Alternative Designation: M1977; A407
Type: 100mm Towed Anti-Tank Gun
Crew: 8
Carriage: INA
Elevation: −5°/+37°
Traverse: 27°30' left and right
Rate of Fire: 7 to 15 rounds per minute
Muzzle Velocity: 900 m/s for HE 1400 m/s for APFSDS-T
Maximum Firing Range: 20.600 m (HE) 4.000 m (AP) 3.000 m (HEAT)
Effective Firing Range: 1.040 m for AP 1.728 m for APFSDS-T
Sights: mechanical sight, panoramic sight, optical sight, collimator
Emplacement Time: INA
Displacement Time: INA
Note: The gun can be towed with the DAC 665T truck and has a maximum road speed of 60 km/h on road and 30 km/h off-road.

Dimensions

Length: 9.250 m
Barrel Length: 4.630 m
Width: 2.250 m

Height: 1.530 m

Weight, Combat: 3,150 kg

Ammunition

Name: INA

Type: Rifle

Caliber: 100 mm

Shell: 100 x 695 mmR

Basic Load: INA

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The A407 100mm anti-tank gun M1977 is a Romanian rifled 100-mm anti-tank gun which serves as the main towed anti-tank gun of the Romanian Land Forces from 1975 until present. Versions of the M1977 gun were installed on main battle tanks (TR-77 and TR-85) and ship turrets on river monitors. The A407 100mm anti-tank gun was the first artillery piece designed in Romania after World War II. The first variant of the gun, the M1975 (M stands for Model) had a semi-automatic horizontal sliding wedge type breech lock. The second variant, M1977, had a more practical vertical sliding wedge breech block. The M1977 can be also used as a field gun at brigade level, as it has a maximum range of 20.6 kilometers. After 1992, the M1977 anti-tank guns were modernized with improved optical sights. The gun can be towed with the DAC 665T truck and has a maximum road speed of 60 km/h on road and 30 km/h off-road

M101A1 American 105mm Towed Howitzer





Tiers:



Variants:

- **M101:** The original production model had the M2A1 carriage and the M2A1 model gun, which had a straight barrel.
- **M101A1:** This is covered in the main entry. It has a M2A2 carriage (which differs from the M2A1 chiefly in the amount of shielding) and the M2A2 gun, which has a thickened muzzle.
- **German M101 modification:** It features a longer barrel with single-baffle muzzle brake, new breech ring and new sights. Maximum range is 15,420 yds (14,100 m).
- **M101/33 Upgrade:** This was proposed by RDM (De Rotterdamsche Droogdok Maatschappij BV) Defence Engineering of Rotterdam, Netherlands. It features a longer barrel of 33 calibers; progressive twist rifling increasing from 1 in 35 to 1 in 18 over the first 9 ft 2 in (2.974 m) and holding 1 in 18 over last 12 in (306 mm); and a slotted muzzle brake. The loaded weight increases to 5,247 lb (2,380 kg). In March 1994, RDM was awarded a US$13.75 million contract by the Canadian army to upgrade 96 M101 howitzers to the M101/33 standard. The contract included two options, one for an additional 29 howitzers, and another for an additional 60. The first upgraded howitzers were shipped back to Canada in late 1995 with the entire batch of 96 to be completed in 1998. It was also trialed in Indonesia and Malaysia. In 1994, a single model of a Brazilian M101 was upgraded by RDM with a 37-caliber barrel from the Royal Ordnance L118 Light Gun. At the time, Brazil had a requirement for up to 80 upgraded M101s.
- **M101/LG1 Upgrade:** Giat Industries has developed an upgrade for the M101 that replaces the 23-caliber barrel of the M101 with the 30-caliber barrel used by Giat's LG1 Mk II 105-mm Light Gun. The upgrade allows the M101 to fire new Giat HE extended-range base-bleed ammunition out to 17,500 m (10.9 miles). Giat was awarded a contract by the Philippines in July 1996 to modify 12 M101A1s with the newer barrel. An order for the rest of the Philippines inventory of M101s was seen as possible. Thailand reportedly ordered 300 upgraded kits for its stock of M101s.

System

Alternative Designation: M101A1
Type: 105mm Towed Howitzer
In Service: 1964-Present
Crew: 8
Carriage: split trail, post-war designation of M2A1 on carriage M2A2
Displacement Time: Less than 2 Minutes
Emplacement Time: Less than 2 Minutes

Dimensions

Length, Overall: 5.99 m
Barrel Length: 2.57 m
Rifling Length: 1.98 m

Width, Firing: 3.66 m

Width, Traveling: 2.16 m

Height: 1.57 m

Ground Clearance: 356 mm

Weight: 2,258 kg

Howitzer

↳*System*

Name: M101A1

Type: Towed Howitzer

Caliber: 105mm

Carriage: split trail, split trail, post-war designation of M2A1 on carriage M2A2

Bore: 105-mm/23-cal M2A1 or M2A2, rifled (barrel has a life of 20,000 rounds)

Rifling: 1 in 20 constant twist, 36 grooves

Elevation: -5 deg to 66 deg (-89 mils to 1,156 mils)

Traverse: 23 deg (409 mils) to each side

Breech Type: horizontal sliding wedge

Recoil System: hydropneumatic

Rate of Fire, Sustained: 3 rds/min

Rate of Fire, Maximum: 10 rds/min

↳*Ammunition (Option 1)*

Name: M548

Type: HERA

Caliber: mm105mm

Length: 830mm

Weight: 17.46 kg

Muzzle Velocity: 548 mps

Maximum Range: 14,600 m

↳*Ammunition (Option 2)*

Name: M546

Type: APERS-T

Caliber: 105mm

Length: 867mm

Weight: 17.35kg

Muzzle Velocity: 549 mps

Maximum Range: 11,600 m

↳*Ammunition (Option 3)*

Name: INA

Type: HE, GB, HD, WP, HC, ILLUM

Caliber: 105mm

Length: Varies

Weight: Varies

Muzzle Velocity: 472.4 mps

Maximum Range: 11,270 m

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

M101A1 – upgraded version, introduced in 1964. It has a modified carriage with a different shield. The M101A1 105mm Light Howitzer, Towed is a general purpose, light field artillery weapon consisting of a cannon, 105mm howitzer (M2A2); recoil mechanism, M2 series; and carriage, 105mm Howitzer, M2A2. It can be used for direct or indirect fire. The cannon consists of a tube assembly, breech ring, and locking ring. The cannon is mounted on the recoil sleigh assembly. The firing mechanism is a continuous pull (self cocking) type activated by pulling a lanyard. The cannon is single-loaded, air-cooled and uses semi-fixed ammunition. The carriage is of the single axle and split trail type. The trails are divided at emplacement, but are drawn together and locked during travel. A drawbar is provided for securing to a prime mover. The carriage consists of an equilibrator, shield, elevating mechanism, cradle, gear, elevating arcs, traversing mechanism, top carriage, wheels, and trails. The recoil mechanism is a constant hydropneumatic type shock absorber that decreases the energy of the recoil gradually and so avoids violent movement of the cannon or carriage. It is installed in the cradle of the carriage.

M-56A1 Serbian 105mm Towed Howitzer





Tiers:



Variants:

- **M-56:** The M-56 Howitzer is a 105mm artillery gun from Serbia. It is comparable to the German 10.5 cm leFH 18 and the American M101 howitzer.

System

Alternative Designation: M-56A1
Type: 105mm Howitzer
Crew: 7
Carriage: Split Tail
Displacement Time: Less than 2 Minutes
Emplacement Time: Less than 2 Minutes

Dimensions

Length: INA
Barrel Length: 3500mm
Width: INA
Height: INA
Weight, Combat: 2,370 kg

Howitzer

↳*System*

Name: M-56A1
Type: 105mm Towed Howitzer
Caliber: mm105
Elevation: -9 to +65 degrees
Rate of Fire: 6-8 rds/min
Maximum Firing Range: M-56 with Special charge: 13.1 km (8.1 mi) M56-A1 33 caliber HE-ER BB: 18.1 km (11.2 mi)

30km with 52 caliber gun and HE ERFB/BB projectile

Buzzle Brake: Double

Maximum Range: up to 18.5 km

Minimum Range: 2,000m

Horizontal Limits: 462 thousandths

↳*Ammunition*

Name: INA

Type: Cased Charge

Caliber: mm105

Shell: separate loading, cased charge

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

MTI developed the M56A1 version, with a longer 33 caliber barrel designed to last for at least 18,000 shots, with a stronger breechblock, with recoil systems that allow it to fire modern rounds up to 18 km and a hydro-pneumatic balancer. The M-56A1 and M09 Soko Self-propelled artillery are offered by Yugoimport and the M-56 by BNT TMiH in Bosnia. The M-56 Howitzer is a 105mm artillery gun from Serbia. It is comparable to the German 10.5 cm leFH 18 and the American M101 howitzer. The gun's design is based on the M101 and leFH 18. The gun's initial model was the SH-1, designed by the Military Technical Institute Belgrade, Yugoslavia, in 1951. It was produced by Crvena Zastava in Kragujevac, now Zastava Arms. Second prototype, also developed by Military Technical Institute Belgrade, in 1955 designated as SH-2 was basis for serial M-56. Serial production started in 1956 Bratstvo Novi Travnik because prior to that in 1945 decision was made by communist government of Socialist Federal Republic of Yugoslavia to move factories from Serbia to other parts of newly formed Yugoslavia in order to develop their industries. Because of that decision in 1951 Zastava Arms factory, then called Crvena Zastava, was partially dissembled (including complete Crvena Zastava factory artillery program with calibers over 20 mm) and together with 250 experts was transferred to Bosnia into new Bratstvo Novi Travnik factory from then Socialist Republic of Serbia to Socialist Republic of Bosnia and Herzegovina to help in Bosnia development at cost of Serbia who in that time was heavy industrialized and had educated technical staff. The original production version was 28 caliber with a maximum range of 13 km.

D-20 (Export) North Korean 152mm Towed Gun-Howitzer



Tiers:

1 2 3 4

Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Family: D-20
Type: 152mm Towed Gun-Howitzer
Manufactuer: Artillery Plant Number 9, Yekaterinburg
In Service: 1947-Present
Crew: ea8
Emplacement Time: min2.5
Displacement Time: min2.5

Dimensions

Length, Firing: m8.69
Length, Travel: m8.10
Width, Firing: m2.32
Width, Traveling: INA
Height, Overall: m2.52
Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck
Towing Speed, Road: km/h60
Towing Speed, Off Road: km/h30

Gun-Howitzer System

↳*Cannon*

Type: Cannon
Cailber/Length: mm152
Length, Barrel: m5.195
Rate of Fire, Burst: rd/min5-6
Rate of Fire, Normal: INA
Rate of Fire, Sustained: rd/min1
Loader Type: Manual
Breech Type: Vertical semi-automatic sliding-wedge
Muzzle Brake Type: Double flared
Traverse Range: deg58
Traverse, Left: deg29
Traverse, Right: deg29
Maximum Elevation: deg+45
Minimum Elevation: deg-5
Maximum Effective Range: km17.4
Sights: PG1M indirect sight and OP4M direct fire sight.
Recoil: hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32
Type: Frag-HE
Cailber/Length: 152mm
Weight: kg(OF25) 43.56
Range, Minimum: m4,600
Range: m17,400
Muzzle Velocity: m/s655
Fuze Type: V-90 PD

↳*Ammunition (Option 2)*

Name: BP-540
Type: HEAT
Cailber/Length: mm152
Weight: kg27
Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96

Type: Frag-HE

Cailber/Length: mm152

Weight: kg(OF-64) 43.56

Range, Minimum: INA

Range, Maximum: m24,400

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M

Collimator: K-1

Notes:

The 152 mm gun-howitzer M1955, also known as the D-20, (Russian: 152-мм пушка-гаубица Д-20 обр. 1955 г.) is a manually loaded, towed 152 mm artillery piece, manufactured in the Soviet Union during the 1950s. It was first observed by the west in 1955, at which time it was designated the M1955. Its GRAU index is 52-P-546. The D-20 has a 34 calibre (5.195 m) barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breech, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breech. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breech. The breech has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 58° and the vertical elevation range is −5° to 45°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in the centre for traverse before towing the gun. Large spades are permanently fixed close to the end of each trail; these are hinged and it appears that the gun can be fired with them up or down depending on the terrain, but they are always up when the gun is towed. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on the ground. When the gun is brought into action, the pivot jack is folded down and adjusted to be on the ground. If a large traverse is required, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in the centre for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period, the gun has a shield, including a folding piece below the cradle support. The centre section of the upper shield slides both up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defence against machine gun fire. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M) in a mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale, coupled to an elevation leveling bubble mounted on dial sight mount.

The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Like most Soviet artillery, the gun fires separate ammunition using metal cartridge cases that also provide obturation. The ammunition is interchangeable with that used with other 152 mm guns, although the more modern ones also have a third, much larger cartridge. The D-20 uses two types of cartridge; one has a base charge and up to five increments, the other is a single 'super' charge cartridge. The standard shell weight is 44 kg with a muzzle velocity of 655 m/s, but some projectiles are more or less than this. The basic shell is HE-Fragmentation, other projectiles include smoke, illuminating, chemical and probably incendiary. Later projectiles include bomblet, anti-personnel mine, flechette, Krasnopol precision munition, communications jammer, and extended range HE using rocket assistance (RAP). The normally maximum range is 17.4 km, RAP being greater. Two direct-fire anti-tank projectiles have been used, HEAT and APHE, the latter being 5.2 kg heavier and with a lower muzzle velocity. The maximum rate of fire is usually stated as five rounds/minute, and 65 rounds/hour sustained. In Soviet service, the unit of fire was 60 rounds. The detachment was either 8 or 10 men, probably differing between armies and the time period. In Soviet service, the 5,700 kg gun was usually towed by a URAL-375 6×6 truck or, in some regions, an AT-S or AT-L medium tractor.

D-20 Russian 152mm Towed Gun-Howitzer




Tiers:



Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Family: D-20
Type: 152mm Towed Gun-Howitzer
Manufactuer: Artillery Plant Number 9, Yekaterinburg
In Service: 1955-Present
Crew: ea8
Emplacement Time: min2.5
Displacement Time: min2.5

Dimensions

Length, Firing: m8.69
Length, Travel: m8.10
Width, Firing: m2.32
Width, Traveling: INA
Height, Overall: m2.52
Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck
Towing Speed, Road: km/h60
Towing Speed, Off Road: km/h30

Gun-Howitzer System

↳*Cannon*

Type: Cannon
Cailber/Length: mm152
Length, Barrel: m5.195
Rate of Fire, Burst: rd/min5-6
Rate of Fire, Normal: INA
Rate of Fire, Sustained: rd/min1
Loader Type: Manual
Breech Type: Vertical semi-automatic sliding-wedge
Muzzle Brake Type: Double flared
Traverse Range: deg58
Traverse, Left: deg29
Traverse, Right: deg29
Maximum Elevation: deg+45
Minimum Elevation: deg-5
Maximum Effective Range: km17.4
Sights: PG1M indirect sight and OP4M direct fire sight.
Recoil: hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32
Type: Frag-HE
Cailber/Length: 152mm
Weight: kg(OF25) 43.56
Range, Minimum: m4,600
Range: m17,400
Muzzle Velocity: m/s655
Fuze Type: V-90 PD

↳*Ammunition (Option 2)*

Name: BP-540
Type: HEAT
Cailber/Length: mm152
Weight: kg27
Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96

Type: Frag-HE

Cailber/Length: mm152

Weight: kg(OF-64) 43.56

Range, Minimum: INA

Range, Maximum: m24,400

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M

Collimator: K-1

Notes:

The 152 mm gun-howitzer M1955, also known as the D-20, (Russian: 152-мм пушка-гаубица Д-20 обр. 1955 г.) is a manually loaded, towed 152 mm artillery piece, manufactured in the Soviet Union during the 1950s. It was first observed by the west in 1955, at which time it was designated the M1955. Its GRAU index is 52-P-546. The D-20 has a 34 calibre (5.195 m) barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breech, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breech. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breech. The breech has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 58° and the vertical elevation range is −5° to 45°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in the centre for traverse before towing the gun. Large spades are permanently fixed close to the end of each trail; these are hinged and it appears that the gun can be fired with them up or down depending on the terrain, but they are always up when the gun is towed. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on the ground. When the gun is brought into action, the pivot jack is folded down and adjusted to be on the ground. If a large traverse is required, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in the centre for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period, the gun has a shield, including a folding piece below the cradle support. The centre section of the upper shield slides both up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defence against machine gun fire. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M) in a mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale, coupled to an elevation leveling bubble mounted on dial sight mount.

The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Like most Soviet artillery, the gun fires separate ammunition using metal cartridge cases that also provide obturation. The ammunition is interchangeable with that used with other 152 mm guns, although the more modern ones also have a third, much larger cartridge. The D-20 uses two types of cartridge; one has a base charge and up to five increments, the other is a single 'super' charge cartridge. The standard shell weight is 44 kg with a muzzle velocity of 655 m/s, but some projectiles are more or less than this. The basic shell is HE-Fragmentation, other projectiles include smoke, illuminating, chemical and probably incendiary. Later projectiles include bomblet, anti-personnel mine, flechette, Krasnopol precision munition, communications jammer, and extended range HE using rocket assistance (RAP). The normally maximum range is 17.4 km, RAP being greater. Two direct-fire anti-tank projectiles have been used, HEAT and APHE, the latter being 5.2 kg heavier and with a lower muzzle velocity. The maximum rate of fire is usually stated as five rounds/minute, and 65 rounds/hour sustained. In Soviet service, the unit of fire was 60 rounds. The detachment was either 8 or 10 men, probably differing between armies and the time period. In Soviet service, the 5,700 kg gun was usually towed by a URAL-375 6×6 truck or, in some regions, an AT-S or AT-L medium tractor.

M777 British 155mm Towed Howitzer





Tiers:



Variants:

- **M777:** gun with optical fire control
- **M777A1:** digitization upgrades with the addition of an on-board power source, satellite global positioning, inertial navigation, radio, Gun Display Unit (GDU) and Section Chief Assembly (SCA).
- **M777A2:** Block 1A software upgrade. Addition of an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to enable Excalibur and precision munition compatibility.
- **M777ER:** Experimental upgrade created by the Extended Range Cannon Artillery (ERCA) project modified with a 52-caliber barrel, adding 1.8 m (5.9 ft) to the cannon and less than 450 kilograms (990 lb) to the overall system, extending range from 30 to 70 km (19 to 43 mi); concept only

System

Alternative Designation: M777
Type: Towed Howitzer
Crew: 7+1
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: Combat: 10.7 m (35 ft 1 in) Travel: 9.5 m (31 ft 2 in)
Barrel Length: 5.08 m
Weight: 4,200 kg

Main Gun

↳*System*

Name: M777
Type: Towed Howitzer
Caliber: mm155
Carriage: Split trail
Elevation: 0° to +71.7°
Traverse: INA
Rate of Fire: Normal: 2 rpm Maximum: 5 rpm
Muzzle Velocity: Charge 8S: 827 m/s (2713.25 ft/s)
Effective Firing Range: 24-40 km

↳*Ammunition (Option 1)*

Name: M107
Type: Projectile
Caliber: mm155
Length: 605.3 mm
Diameter: 154.71 mm
Weight as Fired: 43.2 kilograms
Fuzes: PD M51A5, M728 family, M557, M572, M739, M564, M577, M582, M732
Explosive Content: NT 6.86 kilograms
Effective Firing Range: 24 km
Note: The M107 155mm projectile was the standard 155mm high explosive (HE) projectile for howitzers of the US Army and US Marine Corps. A bursting round with fragmentation and blast effects, the M107 is being superseded in the US military by the M795.

↳*Ammunition (Option 2)*

Name: M795
Type: Projectile
Caliber: mm155
Length: 605.3 mm
Diameter: 154.89 mm
Weight as Fired: 46.7 kg
Fuzes: INA
Explosive Content: TNT: 10.8 kg with a charge liner OR IMX-101(IMX was adopted by the Army; Marines still use TNT)
Effective Firing Range: 22.5 km
Note: The M795 155mm projectile is the US Army and US Marine Corps' standard 155mm high explosive (HE) projectile for howitzers. It is a bursting round with fragmentation and blast effects. The M795 is designed to be a more lethal,

longer range version of the M107. A welded band replaces the swaged rotating band of the M107, allowing the M795 to be fired with M119 or M203 propelling charges, increasing range by 6,000 meters. The explosive payload was also improved, as was the fragmentation pattern, giving 30% higher lethality.

Fire Control

Name: INA

Computerized FCS: The M777 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly.

Direct Fire: No

Indirect Fire: Yes

Collimator: INA

Notes:

The M777 howitzer is a towed 155 mm artillery piece. It succeeded the M198 howitzer in the United States Marine Corps and United States Army in 2005. The M777 is also used by the ground forces of Australia, Canada, India and Saudi Arabia. It made its combat debut in the War in Afghanistan. The M777 is manufactured by BAE Systems' Global Combat Systems division. Prime contract management is based in Barrow-in-Furness in the United Kingdom as well as manufacture and assembly of the titanium structures and associated recoil components. Final integration and testing of the weapon is undertaken at BAE's facility in Hattiesburg, Mississippi. The M777 began as the Ultralight Field Howitzer (UFH), developed by Vickers Shipbuilding and Engineering's (VSEL) Armaments Division in Barrow-in-Furness, United Kingdom. VSEL was bought by BAE Systems after the UFH prototypes had been manufactured and demonstrated, consequently BAE became responsible for future design refinements and re-named the gun 'M777'. Upon taking-over responsibility for the weapon BAE to a large degree 'americanised' the construction and assembly through its US-based BAE Systems Land and Armaments group. The M777 now uses about 70% US-built parts including the gun barrel manufactured at the Watervliet Arsenal. With a weight of 4,200 kg (9,300 lb), the M777 is 41% lighter than the 7,154 kg (15,772 lb) M198 howitzer it replaces. Much of the weight reduction is due to the extensive use of titanium. The M777 can be transported by helicopter sling-load, transporter aircraft such as the C-130, or towed by air-braked vehicles weighing over 2.5 tonnes (2.8 short tons), such as the FMTV and MTVR. The minimal gun crew required is five, compared to a previous nine. The M777 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly. The Canadian M777 in conjunction with the traditional "glass and iron sights/mounts" also uses a digital fire control system called the Digital Gun Management System (DGMS) produced by Leonardo MW with components of the Indirect Fire Control Software Suite (IFCSS) built by the Firepower team in the Canadian Army Land Software Engineering Centre. The Leonardo MW portion of the system, known as LINAPS, had been proven previously through earlier fielding on the British Army Royal Artillery's L118 Light Gun The Digital Fire Control System will be powered by a unique new design of rotary hybrid-electric engine designed and manufactured by Liquid Piston. The M777 may be combined with the M982 Excalibur GPS-guided munition, which allows accurate fire at a range of up to 40 km (25 mi). This almost doubles the area covered by a single battery to about 1,250 km2 (480 sq mi). Testing at the Yuma Proving Ground by the US Army placed 13 of 14 Excalibur rounds, fired from up to 24 kilometres (15 mi), within 10 m (33 ft) of their target, suggesting a circular error probable of 5 m (16 ft). In June 2012, Golf Battery, 2nd Battalion, 11th Marines, out of Camp Pendleton, California, dropped the M982 Excalibur round on insurgents at a range of 36 km (22 mi) in Helmand Province, Afghanistan. This marked the longest operational shot in the history of the M777 howitzer, and the longest operational tube artillery shot in history for the Marine Corps. In 2014 the US military began fielding several upgrades to its M777 howitzers including new liquid crystal display units, software updates, improved power systems, and muzzle sensors for onboard ballistic computing. Future upgrades include a touchscreen Chief Section Display, a new Mission System Computer, and a digital radio. In May 2017, the US Army revealed it was buying the Swedish BONUS round as an interim system as a result of the required phasing out of cluster munitions from artillery shells, complying with policy to achieve less than 1% unexploded ordnance from non-unitary explosives; the BONUS has two sensor-fused munitions deployed by a 155 mm carrier projectile that scan the ground for targets and fire explosively formed penetrators down from the air. The system has been tested from the M777 howitzer.

M1937 (ML-20) Russian 152mm Towed Howitzer-Gun





Tiers:

1 2 3 4

Variants:

- **ML-20 with bag loading:** ML-20 with bag loading – In 1937 the Main Artillery Department decided, for economic reasons, to modify medium caliber guns to use bag loading instead of cased loading. An experimental ML-20 piece was built in 1939; the trials were unsuccessful.
- **ML-20SM:** ML-20SM – Modified ML-20S with identical ballistics. muzzle brake was removed. The gun was mounted in the experimental ISU-152 model 1945, of which only one unit was built.
- **BL-20:** BL-20 – ML-20 with cast breech and wedge breechblock. Was developed by OKB-172 (sharashka of the NKVD) in 1946.
- **ML-20 with M-46-type carriage:** ML-20 with M-46-type carriage – ML-20 with a modified carriage, resembling in construction a carriage of the M-46 130 mm gun. In 1950 an experimental piece was built and tested.
- **52 H 88-37 –:** 152 H 88-37 – A Finnish modernization program
- **152 mm haubico-armata wz. 37/85:** 152 mm haubico-armata wz. 37/85 – A Polish modernization, tires from KrAZ-255B truck, new compressed air cylinder and automotive lighting increased the road speed of the towed gun from 20 to 50 km/h and allowed the gun to be towed on public roads.

System

Alternative Designation: M1937; ML-20

Type: Towed 152mm Howitzer-Gun

Manufacturer: Design bureau of No. 172 Plant, headed by F. F. Petrov

In Service: 1937-Present

Crew: INA

Carriage: Split trail

Displacement Time: minutes2

Emplacement Time: minutes2

Dimensions

Length: m8.18

Barrel Length: m4.24

Width: m2.35

Height: m2.27

Weight, Combat: kg7,270

Weight, Travel: kg7,930

Main Weapon System

↳*System*

Name: M1937 (ML-20)

Type: 152mm Towed Howitzer-Gun

Caliber: mm152

Breech: Interrupted screw

Recoil: hydro-pneumatic

Rate of Fire: 3-4 rounds per minute

Maximum Firing Range: km17.23

Maximum Elevation: deg+65

Minimum Elevation: deg-2

Traverse Range: deg58

Traverse Right: deg29

Traverse Left: deg29

↳*Ammunition (Option 1)*

Name: BR-540

Type: APHE

Caliber: mm152

Weight: kg48.8

Muzzle Velocity: m/s600

Maximum Range: m4,000

↳*Ammunition (Option 2)*

Name: BP-540

Type: HEAT

Caliber: mm152

Weight: kg27.44

Muzzle Velocity: m/s680

Maximum Range: m3,000

↳*Ammunition (Option 3)*

Name: OF-540

Type: HE-Fragmentation, steel

Caliber: mm152

Weight: kg43.6

Muzzle Velocity: m/s655

Maximum Range: m17,230

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The 152 mm howitzer-gun M1937 (ML-20) (Russian: 152-мм гаубица-пушка обр. 1937 г. (МЛ-20)), is a Soviet heavy gun-howitzer. The gun was developed by the design bureau of the plant no 172, headed by F. F. Petrov, as a deep upgrade of the 152-mm gun M1910/34, in turn based on the 152-mm siege gun M1910, a pre-World War I design by Schneider. It was in production from 1937 to 1946. The ML-20 saw action in World War II, mainly as a corps / army level artillery piece of the Soviet Army. Captured guns were employed by Wehrmacht and the Finnish Army. Post World War II, the ML-20 saw combat in numerous conflicts during the mid to late twentieth century. The ML-20 was officially classified as howitzer-gun, i.e. an artillery system which combines characteristics of a howitzer and (to lesser extent) of a gun and therefore can be used in both roles. This universality was achieved by wide range of elevation angles and by using separate loading with 13 different propellant loads. The gun was fitted with both telescopic sight for direct fire and panoramic sight for an indirect one. For ballistic calculations and meteorological corrections a special mechanical device was developed. The device, called meteoballistic summator, consisted of a specialized slide rule and a pre-calculated table. After World War II similar devices were introduced for other types of guns. The barrel was either monobloc or built-up. Some sources indicate that a third type—with loose liner—also existed. To soften recoil, a large slotted muzzle brake was fitted. The breechblock was of interrupted screw type, with forced extraction of cartridge during opening. A safety lock prevented opening of the breechblock before the shot; if there was a need to remove a shell, the lock had to be disabled. To assist loading when the barrel was set to high elevation angle, the breach was equipped with cartridge holding mechanism. The gun was fired by pulling a trigger cord. The recoil system consisted of a hydraulic buffer and hydro-pneumatic recuperator. Each held 22 litres of liquid. Pressure in the recuperator reached 45 Bar. The carriage was of split trail type, with shield and balancing mechanism, leaf spring suspension and steel wheels with rubber tires (some early production pieces received spoked wheels with solid tires from M1910/34). During transportation the barrel was usually retracted. The gun could also be towed with the barrel in its normal position, but in this case the transportation speed was limited, about 4–5 km/h (compared to 20 km/h with barrel pulled back). The gun could be set up for combat in 8–10 minutes. The carriage, designated 52-L-504A, was also used in the 122-mm gun model 1931/37 (A-19). This gun was also mounted in some Tank-Destroyers employed during WWII like the ISU-152 and SU-152. The ML-20 was one of the most successful Soviet artillery pieces of World War II. Its characteristics positioned it between classical short-range howitzers and special long-range guns. Compared to the former, the ML-20 has better range (e.g. the German 15 cm sFH 18 had range of 13.3 km), which often allowed it to shell positions of enemy artillery while remaining immune to enemy fire. Its advantage over the latter was in weight and cost, and therefore in mobility and production rate. For example, the German 15 cm K 39 with range of 24.7 km weighed 12.2 tons and only 61 pieces were built; of the excellent 17 cm K 18 (23.4 t, 29.6 km) 338 pieces were manufactured; lighter 10.5 cm sK 18 (5.6 t, 19.1 km) was more common (2,135 pieces) but its 15 kg shell was much less powerful than a 44 kg shell of ML-20. German attempts to produce an analogue to the ML-20 were unsuccessful. The 15 cm sFH 40 was never produced due to construction defects; the 15 cm sFH 42 had insufficient range and only 46 pieces were built. In 1943 and 1944 Wehrmacht announced requirements for a 15 cm howitzer with a range of 18 km, but none reached production. Of other guns with more or less similar characteristics, there were French 155 mm guns model 1917 and 1918 with longer range, but some 3.5 tons heavier (as was the US 155 mm Long Tom). The Czechoslovakian howitzer K4 (used by Germans as 15 cm sFH 37(t)) was about 2 tons lighter, but with range more than 2 km shorter and only 178 pieces were built. The British BL 5.5 inch (140 mm) Medium Gun probably had the closest characteristics; weight slightly over six tons and range of 18,100 yd (16,600 m) with an 82 lb (37 kg) shell. The main shortcomings of the ML-20 were its weight and limited mobility. As the experience of the ML-15 project suggests, the gun could be made somewhat lighter and more suitable for high-speed transportation. The use of a muzzle brake can be seen as a minor flaw: while softening the recoil and thus allowing the use of a lighter carriage, a muzzle brake has the disadvantage of redirecting some of the gases that escape the barrel toward the ground, where they can raise dust, potentially revealing the gun position. But when the ML-20 was developed, muzzle brakes were already a common design element in artillery pieces of that class.

M114 American 155mm Towed Howitzer





Tiers:

1 2 3 4

Variants:

- **M114A2:** This is the standard M114 fitted with the longer barrel of the newer M198.
- **M114/39:** This was an upgrade developed by RDM (De Rotterdamsche Droogdok Maatschappij BV) Defense Engineering in Rotterdam, Netherlands. Longer barrel (39 calibers vs. 23) with increased rifling twist from 1 in 25 calibers to 1 in 20, a three-port muzzle brake, larger-capacity equilibrators, revised recoil system inclu ding new metering and recoil rods, maximum elevation increase to 70-deg (1,245 mils) and a greater barrel-chamber volume. The gun carriage was modified to handle the increased forces. Firing weight is 16,755 lb (7,600 kg); traveling length is 32 ft 10 in (10.0 m).
- **Modified M114 (Israel):** This version was developed as a private venture by Soltam of Israel.
- **155-mm M65 Howitzer:** This is a South Korean conversion of the M114A1 (see separate database entry).
- **M114 (Iran):** The variant is an Iranian upgraded M114 with an M114/39 barrel designated the HM41.

System

Alternative Designation: M114, M114A
Type: 155mm Towed Howitzer
Family: M114
Manufacturer: Rock Island Arsenal (US)
In Service: 1941-Present
Crew: ea11
Displacement Time: INA
Emplacement Time: INA
Carriage: Split trail

Dimensions

Length, Traveling: m7.32
Length, Barrel: m3.78
Width: m2.44
Height: m1.80
Ground Clearance: mm229
Weight, FIring: kg5,800

Weight, Traveling: kg5,760

Automotive Requirement

Prime Mover: 6x6 or 8x8 truck

Communications

Primary: INA

Howitzer System

↳*Howitzer*

Name: M114 155mm Howitzer

Type: mm155

Length, Barrel: m3.78

Breech Type: Stepped thread, interrupted screw

Loader Type: Manual

Muzzle Brake Type: INA

Bore Type: 155-mm/23-cal rifled

Maximum Elevation: deg+65

Minimum Elevation: deg-2

Traverse Range: deg49

Traverse Right: deg25

Traverse Left: deg24

Recoil System: Hydro-pneumatic

Maximum Effective Range: m14,600

Rate of Fire, first 30 seconds: 2 rounds, 1st 1/2 min

Rate of Fire, first 4 minutes: 8 rounds, 1st 4 min

Rate of Fire, first 10 minutes: 16 rounds, 1st 10 min

Sustained Rate of Fire: 40 rds/hr

↳*Ammunition (Option 1)*

Name: M449

Type: HE-APERS

Caliber: mm155

Projectile Length: mm698

Projectile Weight: kg43.09

Muzzle Velocity: m/s563

Basic Load: INA

Shell Type: Separate-loading bagged charge

↳*Ammunition (Option 2)*

Name: M107

Type: HE

Caliber: mm155

Projectile Length: mm607

Projectile Weight: kg42.91

Muzzle Velocity: 5623

Basic Load: INA

Shell Type: Separate-loading bagged charge

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Protection

Note: This system provides no protection for the crew

Notes:

The M114 155mm howitzer, which was replaced by the M198, is a towed weapon first produced in 1942 as medium artillery. The weapon uses NATO standard 155mm ammunition, with a range of about 14,000m, and was used during World War II, in Korea, and in Viet Nam. Until recently they were in service with the National Guard. It was the U.S. Army and Marine Corps' principal 155mm howitzer until the introduction of the M198 in the early 1980s. It was exported to many other countries as well.

M1931 (A-19) Russian 122mm Towed Gun



Tiers:

1 2 3 4

Variants:

- **A-19S:** Slightly modified variant of A-19 for use in ISU-122 self-propelled gun.
- **D-25:** In 1943 a tank gun based on the A-19 was developed for the new Iosif Stalin tank, in particular because the existing 85 mm tank gun utilized in the early prototypes was deemed insufficient; the resulting prototype was the IS-122. There were, however, safety concerns as the muzzle brake on the gun exploded, nearly killing the attending Marshal Kliment Voroshilov. The fact caused some initial resistance to the adoption of the gun, but Stalin supported the decision to arm the tank named after him with a 122 mm gun. The gun was redesigned to address the safety issue and the resulting weapon was named D-25, analogous to the earlier D-5T 85mm gun.
- **D-25T:** tank gun variant (T stands for tankovaya, 'tank' adj.) . In the last days of November 1943, Fyodor Petrov's artillery design team tried the D-25 122 mm corps gun on a mounting used for the D-5T 85 mm tank gun against a captured German Panther tank. Tests took place in the Kubinka proving grounds (about 60 km west of Moscow). Firing from a distance of 1200 m, the round pierced the front glacis, made its way through the engine block and penetrated the rear plate too. After the overwhelming success of this trial, necessary adaptations were made during the following weeks, and the model was accepted as the D-25T on 31 December 1943. Production started immediately, to equip the IS-2 tank.
- **D-25S:** variant for use in late production ISU-122 self-propelled gun (S for samokhodnaya, 'self-propelled'). The variant of ISU-122 armed with this gun was designated ISU-122S.
- **152 H 88-31:** A Finnish modernization, involving the upgrading of the caliber to 152 mm.
- **122 mm armata wz. 1931/37/85:** A Polish modernization.

System

Alternative Designation: M1931; M1937; A-19
Type: 122mm Towed Gun
Caliber: 122mm
Crew: 9
Carriage: Split trail
Breech: interrupted screw
Recoil: hydro-pneumatic
Elevation: -2° to 65°
Traverse: 58°
Rate of Fire: 3-4 rounds per minute
Muzzle Velocity: 806 m/s
Maximum Firing Range: 20.4 km

Emplacement Time: Under 5 Minutes

Displacement Time: Under 5 Minutes

Dimensions

Length: 8.725 m

Barrel Length: Bore: 5.4 m (17 ft 9 in) L/45 Overall: 5.6 m (18 ft 4 in) L/46.3

Width: 2.345 m

Height: 2.27 m

Weight, Combat: 7,117 kg

Weight, Traveling: 7,907 kg

Ammunition

↳*Ammunition (Option 1)*

Name: BR-471

Type: APHE

Caliber: 122mm

Projectile Weight: 25 kg

Muzzle Velocity: 800 m/s

Maximum Range: 4,000 m

Armor Penetration: INA

↳*Ammunition (Option 2)*

Name: OF-471H

Type: HE-Fragmentation, gun

Caliber: 122mm

Projectile Weight: 25 kg

Muzzle Velocity: 800 m/s

Maximum Range: 4,000 m

Armor Penetration: INA

↳*Ammunition (Option 3)*

Name: H-462

Type: Chemical, howitzer

Caliber: 122mm

Projectile Weight: 21.8 kg

Muzzle Velocity: 705 m/s

Maximum Range: 19,800 m

Armor Penetration: INA

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

122 mm corps gun M1931/37 (A-19) (Russian: 122-мм корпусная пушка обр. 1931/1937 гг. (А-19)) was a Soviet field gun developed in late 1930s by combining the barrel of the 122 mm gun M1931 (A-19) and the carriage of the 152 mm howitzer-gun M1937 (ML-20). The gun was in production from 1939 until 1946. It saw action in World War II (primarily with corps and RVGK artillery of the Red Army) and remained in service for a long time after the end of the war. Vehicle-mounted variants of the gun were fitted to the IS-2 and IS-3 tanks of the Iosif Stalin series of tanks and the ISU-122 self-propelled gun. In 1936 the Red Army adopted the 122 mm gun M1931, also known as A-19. Unlike earlier ordnance pieces used by the Red Army, it had split trail carriage with suspension, and consequently improved mobility and traverse. The carriage of M1931 had a number of shortcomings though. The elevation mechanism was slow and unreliable; solid-tired wheels hindered mobility to some extent; there were technological problems in carriage production. Soon after the M1931, the Red Army received another artillery piece in form of the 152 mm howitzer-gun M1937 (ML-20), developed at the No. 172 Plant, under F. F. Petrov. This led to an upgrade of the M1931, handled also by Petrov's design bureau. The barrel of the M1931 was placed on the carriage of a ML-20. The improved gun successfully underwent trials in September–October 1938 and on 29 April 1939 was adopted as 122 mm corps gun M1931/37. Unusually, the new variant, like the old one, was referred to as A-19. The M1931/37 was manufactured by the Barrikady Plant in Stalingrad (1939–41), No. 172 Plant (1941–46). The number of M1931/37s manufactured can be estimated at about 2,450, not including those mounted on vehicles. Like barrel of late production M1931, the barrel of the M1931/37 was of loose liner construction, and consisted of liner, jacket and screwed-upon breech. The breechblock was of interrupted screw type, similar in construction to that of the 152 mm howitzer M1910/37. Recoil system consisted of hydraulic recoil buffer and hydro-pneumatic recuperator, both located inside the cradle under the barrel. The gun had split trail carriage adapted from the 152 mm howitzer-gun M1937 (ML-20). The carriage was fitted with leaf spring suspension and metal wheels with pneumatic tires. The carriage also featured an equilibrator. The shield gave the crew some protection from small arms and shell fragments. The M1931/37 was transported as a single piece, with barrel pulled back. It was permitted to tow the gun with barrel in its normal position, but for short distances only and with speed of no more than 4–5 km/h. Several types of artillery tractors were used: S-2 Stalinets-2, Komintern and, from 1943, Ya-12.

D-30 Russian 122mm Towed Gun Howitzer







Tiers:



Variants:

- **2A18M or D-30M:** new double baffle muzzle brake, square central base plate, towing lunette assembly.
- **2A18M-1 or D-30M-1:** with semi-automatic loader. Prototype.
- **D-30A:** modified recoil system, new muzzle brake
- **2S1 Gvozdika s:** self-propelled version.
- **Type 85 or D-30-2:** Chinese self-propelled version of the D-30.
- **D-30-3:** Chinese upgrade of the Type 56 85 mm field gun with 122 mm weapon.
- **Type 86, variously, Type 83, Type 96:** Chinese licence-production or derivative of the D-30.
- **D30 RH M-94:** Croatian built version, new muzzle brake, redesigned trail, improved hydraulic brake.
- **D 30-M:** Egyptian licence version of the D-30.
- **SPH 122:** Self-propelled version, mounted on a modified M-109 chassis.
- **T-122:** Self-propelled version, mounted on a modified T-34 chassis.
- **HM 40:** Iranian version.
- **Shafie D-30I or HM-40:** Iranian version.
- **D-30J:** Yugoslav version of the D-30 - heavily modified version based on license designed by Military Technical Institute Belgrade
- **Saddam:** Iraqi designation of Yugoslavia D-30J produced on license bought from Yugoslavia.
- **D-30JA1:** Improved Serbian version - further development of D-30J.
- **Sora 122mm:** Self-propelled version of D-30J
- **M-91 "Mona":** Yugoslav variant with the 100 mm ordnance of the MT-12. Prototype only.
- **Khalifa-1:** Sudanese licensed version of the D-30.

System

Alternative Designation: 122-mm D-30A Lyagushka
Manufacturer: PJSC «Plant № 9»
Crew: 5 (section of 6)
Displacement Time: min3.5
Emplacement Time: min1.5

Dimensions

Length, Chassis Overall Travel: m5.4
Height, Travel: m1.6
Width, Travel: m1.9
Weight, Combat: mt3.2

Automotive

Prime Mover: MT-LB, Ural-4320

Maximum Towing Speed, Road: km/h60

Maximum Towing Speed, Off-Road: km/h25

Fording Depth: m0.5

Armament

Name: 2A18M cannon

Caliber, Type, Name: mm122

Barrel Length: cal38

Rate of Fire – Burst: rpm8

Rate of Fire – Normal: rpm6

Rate of Fire – Sust: rpm4

Loader Type: Semi- Automatic

Breech Type: Vertical Sliding Wedge

Muzzle Brake Type: Multi-baffle

Maximum Elevation: deg+70

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Ammunition

↳*Ammunition (Option 1)*

Name: OF-81

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: m1000

Range, Maximum: m15300

Projectile Weight: kg21.76

Muzzle Velocity: m/s680

Fuze Type: RGM-2 PD

↳*Ammunition (Option 2)*

Name: HEAT-FS

Type: HEAT

Cailber/Length: mm122

Range, Minimum: m0

Range, Maximum: m1000

Projectile Weight: kg21.58

Muzzle Velocity: m/s740

Fuze Type: GPV-2 PIBD

↳***Ammunition (Option 3)***

Name: Frag-HE Rocket Assisted

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: INA

Range, Maximum: 21900

Projectile Weight: kg21.76

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M-45

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Notes:

The D-30, also known as the M1963, replaced the older 122mm howitzer M-30 (M1938). The original D-30 was fielded in 1963 and the midlife product improvements occurred in the mid to late 1970's. The original D-30 is in use with at least 50 different countries. The 2A18M, D-30A and D-30M are midlife product improvements of the D-30 that are currently in production. The D-30 features a unique three-trail carriage, a conspicuous boxy shield for the recuperator above the tube, and a small protective shield between the wheels. The gun has a semiautomatic, vertically sliding, wedge-type breech-block. It is towed muzzle-first by a truck or armored tractor, at speeds up to 80 kilometers per hour, with its trails folded under the barrel. Distinctive features of the D-30 include its low mobile mounting and above-barrel recoil system. The three-legged mobile mount is unusual for field artillery, with stabilizers that are clamped together for towing and deployed when in action. A large tow linkage is fixed to the muzzle; in transport the barrel serves as a trail. Similar mounts were a feature of several 76-mm pre-war (1931–1935) universal (both field and anti-aircraft) guns designed by Leningrad's Kirov Plant (L-1, L-2 and L-3). Other examples were the 1939 French 47SA39 APX, and 1943 German 105-mm light field howitzers designs by Skoda and Krupp; neither entered service. The Bofors 105 mm L28 Light Field Howitzer 4140 was similarly arranged with four legs and did enter Swedish service. The 1930s-designed British 2-pdr. anti-tank gun was another piece featuring a three-legged mounting. Compared to the M-30, the new howitzer had a significantly longer 35 caliber gun barrel, just short of being a gun-howitzer by Soviet definition. Like other guns of the period, it had a high efficiency muzzle brake; this improved muzzle velocity by 175 m/s to a total of 650 m/s for HE, and raised maximum range by 3,500 m beyond the similar M-30. Maximum range was 2 km better than the 76 mm M1942 at 15.3 km. Weight increased by 650 kg over the M-30, to 3,150 kg; the D-30 is over twice the weight of the 76mm M1942. Accuracy improved, with mean error at about 10 km dropping from 35 m with the M-30 to just 21 m. Effective stabilization length is a fundamental aspect of a gun mount, and legs 120° apart need to be longer than those with a smaller angle. The D-30's design minimizes this problem in several ways. Trunnions are close to the ground, as a result of placing the recoil system and cradle above the barrel. The trunnions are also at the very rear of the breech; this maximizes the recoil space when firing at higher elevation angles. Their rearward position also pushes the recoiling element forward on the mount, maximizing relative rearward span of the stabilizers and so stability during recoil. Additionally there is a very efficient

muzzle brake, which absorbs about half the recoil. There is no mechanism to reduce recoil length as the angle of elevation increases. Some of the design decisions have a price. The muzzle brake produces about twice the overpressure in the area around the gun that is acceptable to Western armies, and is the reason it is often seen being fired with a long lanyard, which reduces rate of fire. Furthermore, the maximum elevation angle is restricted to 18° (early versions) or 22° (later versions) when the breech is over a trail leg. This is enforced by a mechanical cam that prevents the piece firing for about 60% of the total top traverse, and limits range to about 12 km, with full maximum range only possible in the central arc of about 48° between each pair of legs. The extreme rearward location of the trunnions means the elevating mass is unbalanced, requiring a strong balancing mechanism to enable manual elevation. To do this, the D-30 uses compression balancing gears. A central jack is powered by hand-operated hydraulics. This jack is lowered while the wheels are raised to permit two of the stabilizer legs to be swung 120° rearwards. The mounting is then lowered and the ends of the legs spiked to the ground. This mounting provides for quick traversing to fire in any direction. The pair of large tires are suspended on a single trailing arm; maximum towing speed is 60 km/h on the road. As was normal in Soviet designs, the tires were filled with foam. Initially, the D-30 had no brakes and no seat for the layer—non-essential luxuries. A sliding block breech was adopted instead of the M-30's pre-1914 screw pattern, giving a slight increase in the rate of fire. It is a semi-automatic vertical sliding block breech, with a tied jaw; the block moves down to open and opens automatically ejecting the empty cartridge case as the recuperator forces the gun tube back into battery after a round is fired. The design is closely related to those of breeches on other Soviet post–World War II guns and howitzers. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale. The elevation leveling bubble is mounted on the dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Soviet 122 mm howitzers used different ammunition to 122 mm guns, although there was some compatibility. In the case of ammunition for the D-30, the standard 122 mm howitzer shell weight of 21.8 kg was retained, with a metal cartridge case holding variable propelling charges. Cartridge and shell are loaded separately; this means that the shells have to be hand-rammed by a man to the right of the breech with a ramming rod. The D-30 could fire the older M-30 ammunition; however, new shells were also introduced, eventually including a rocket assisted projectile with a range of 21.9 km. The M-30's range of propelling charges, comprising base and eight increments, was replaced by a new set comprising base and four increments; single base propellant was retained. A more effective High Explosive (HE) shell was developed, as well as smoke, illumination and chemical filled projectiles. In keeping with Soviet doctrine, the anti-tank role is important; there is a HEAT shell capable of penetrating 460 mm of steel armor plate. The maximum rate of fire of the D-30 is 6–8 rounds per minute, and about 75 rounds per hour. There is disagreement as to whether this maximum rate of fire is achievable for indirect fire. Based on reloading speeds of similar guns using separate charges, solo re-laying, and given a stable emplacement, semi-automatic breech and no long lanyard, (examples are the 25-pdr. and 105mm L118), and assuming concurrent lay adjustment during reloads, then it probably is when in the hands of a competent detachment. However, 5-6 rounds per minute may be more realistic with a poorly trained gun crew. The D-30 is noted for simplicity of maintenance by its users; reputedly there are no special tools, all jobs can be done with a wrench and large hammer. However, like any other gun, routine maintenance is essential, and western troops in Afghanistan have reported Afghan manned D-30s having problems with shells sticking in the barrel due to lack of cleaning. A location chosen for emplacement of the D-30 should be as level as reasonably possible. Firstly, the carriage is raised via an internal hydraulic jack located under the cradle of the gun. Once the gun is at the required height, the wheels are raised via the wheel lifting lever; this allows the two split stabilizer legs to be separated from the mono stabilizer leg and brought rearward into firing configuration. The legs are then locked in place with locking pins. The carriage is lowered via the hydraulic jack so that the legs touch the ground; integral stakes are then hammered into the ground. At this point, the gun is ready for direct fire using the OP4 direct fire sight, or can be orientated and have its position fixed via the aiming circles for subsequent indirect fire using the Pantel sight.

M-56 Serbian 105mm Towed Howitzer







Tiers:



Variants:

- **M56A1:** MTI developed the M56A1 version, with a longer 33 caliber barrel designed to last for at least 18,000 shots, with a stronger breechblock, with recoil systems that allow it to fire modern rounds up to 18 km and a hydro-pneumatic balancer. The M-56A1 and M09 Soko Self-propelled artillery are offered by Yugoimport and the M-56 by BNT TMiH in Bosnia.

System

Alternative Designation: M-56
Type: 105mm Howitzer
Crew: 7
Carriage: Split Tail
Displacement Time: Less than 2 Minutes
Emplacement Time: Less than 2 Minutes

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: Between 2,190 kg

Howitzer

System

Name: M-56
Type: 105mm Towed Howitzer
Caliber: mm105
Elevation: -9 to +65 degrees
Rate of Fire: 6-8 rds/min
Maximum Firing Range: M-56 with Special charge: 13.1 km (8.1 mi) M56-A1 33 caliber HE-ER BB: 18.1 km (11.2 mi) 30km with 52 caliber gun and HE ERFB/BB projectile
Buzzle Brake: Double
Maximum Range: up to 14 km
Minimum Range: 2,000m
Horizontal Limits: 462 thousandths

↳*Ammunition*

Name: INA
Type: Cased Charge
Caliber: mm105
Shell: separate loading, cased charge

Fire Control

Name: INA
Computerized FCS: No
Direct Fire: Yes
Indirect Fire: Yes
Collimator: INA

Notes:

The M-56 Howitzer is a 105mm artillery gun from Serbia. It is comparable to the German 10.5 cm leFH 18 and the American M101 howitzer. The gun's design is based on the M101 and leFH 18. The gun's initial model was the SH-1, designed by the Military Technical Institute Belgrade, Yugoslavia, in 1951. It was produced by Crvena Zastava in Kragujevac, now Zastava Arms. Second prototype, also developed by Military Technical Institute Belgrade, in 1955 designated as SH-2 was basis for serial M-56. Serial production started in 1956 Bratstvo Novi Travnik because prior to that in 1945 decision was made by communist government of Socialist Federal Republic of Yugoslavia to move factories from Serbia to other parts of newly formed Yugoslavia in order to develop their industries. Because of that decision in 1951 Zastava Arms factory, then called Crvena Zastava, was partially dissembled (including complete Crvena Zastava factory artillery program with calibers over 20 mm) and together with 250 experts was transferred to Bosnia into new Bratstvo Novi Travnik factory from then Socialist Republic of Serbia to Socialist Republic of Bosnia and Herzegovina to help in Bosnia development at cost of Serbia who in that time was heavy industrialized and had educated technical staff. The original production version was 28 caliber with a maximum range of 13 km.

↳

M-46 (Type 59) Russian 130mm Towed Gun





Tiers:



Variants:

- **M-47:** This is a 152 mm field gun (Russian: 152-мм пушка М-47 обр. 1953 г.) that was developed alongside the M-46. The M-47 had a range of 20,470 m and was far less successful than its 130 mm counterpart. Only a small number was built between 1954 and 1957. Externally, the M-46 and M-47 are virtually identical, except for the calibre.
- **Type 59:** This is a licensed version of the M-46.
- **Type 59-1:** This is a combination of the 130 mm ordnance of the Type 59 with the carriage of the Type 60 (D-74 copy). The result is a gun with the same range as the M-46, but with a much lower weight of 6.3 t. The M59-1M is the Egyptian licence version. For the export market, a version with APU and redesigned carriage was developed. Also for the export market, a self-propelled variant, based on the Type 83 SPH was designed.
- **Type GM-45:** For the export market, NORINCO (China North Industries Corporation) developed this upgrade package where the original barrel of the Type 59 is replaced by the 155/45 mm ordnance of the WA 021. The Type GM-45 has a maximum range of 39 km when ERFB-BB ammunition is used.
- **SP-130 "Catapult":** Indian-designed self-propelled version, mounted on the hull of the Vijayanta tank.
- **Metamorphosis IOB M46 FG:** Another 155 mm upgrade (45 Calibre) of the 300 M-46, this one designed by Ordnance Factory Board (OFB). The upgraded M-46 has a range of 39 km. India's Ministry of Defence (MoD) has awarded an INR2 billion (US$27.2 million) contract on 25 October 2018 to the state-owned Ordnance Factory Board (OFB) to upgrade 300 of the Indian Army's (IA's) Soviet-era 130 mm/52 calibre M-46 field guns to 155 mm/45 calibre in a bid to augment its firepower.
- **M-46S:** This is an upgrade of an existing M-46 or Type 59, carried out by Soltam Systems Ltd. The original barrel is replaced by a new model of 155/45mm (western ammunition) for a range of 25.8 (HE) to 39 km (ERFB-BB). A 39-calibre barrel is optional. In March 2000, Soltam won a contract worth $47,524,137 for upgrading 180 M-46s to M-46S standard (Indian designator: 155/45mm (E1) Soltam). A follow-on deal for 250 retrofit kits was optioned for. In 2005, after only 40 howitzers were modified, the M-46S programme was terminated due to a fatal barrel explosion.
- **M46/84:** This is a conversion that involved replacing the original 130 mm barrel with a new 155/45 mm barrel or 152 mm barrel. With ERFB-BB ammunition, this version has a range of 38,600 m and with M05 152 mm range exceeds 40 km.
- **A412:**
- **:** License-built Chinese Type 59-1 with D-20 carriage. In Romanian Army service, the A412 is known as the 130 mm towed gun M1982 (Romanian: Tun calibrul 130-mm tractat M1982). The A412 was also exported.

System

Alternative Designation: M-46 (Type 59) Russian 130mm Towed Gun
Type: Towed Gun
Crew: 8 men
Carriage: Split-trail
Displacement Time: minutes3 - 4
Emplacement Time: minutes3 - 4

Maximum Range of Fire: 27.15 km

Maximum Rate of Fire: 7 - 8 rpm

Elevation Range: - 2.5 to + 45 degrees

Traverse Range: 50 degrees

Dimensions

Length (in travelling order): m11.73

Length (in combat order): 11.1 m

Barrel Length: 7.15 m

Width (in travelling order): m2.45

Height: m2.55

Weight, Combat: kg7.7

Gun Bore: 130mm

Ammunition

Name: INA

Type: 130 x 846 Separate-loading charge and projectile

Caliber: 130

Basic Load: INA

:

:

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The 130 mm towed field gun M-46 (Russian: 130-мм пушка М-46) is a manually loaded, towed 130 mm artillery piece, manufactured in the Soviet Union in the 1950s. It was first observed by the west in 1954. There is also a Chinese copy, called the Type 59.When first seen by the West, it was given the provisional designation "M1954", for the year it was first identified by NATO. For many years, the M-46 was one of the longest range artillery systems around, with a range of more than 27 km. (16.7 mi)

Type 87 Chinese twin-25mm Towed Anti-Aircraft Artillery





Tiers:

1 2 **3** 4

System

Alternative Designation: Type 87
Type: Twin-25mm Towed Anti-Aircraft Artillery
Crew: 5
Carriage: INA
Displacement Time: minutesUnder 2
Emplacement Time: minutesUnder 2

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: 1,500 kg

Automotive Requirement

Prime Mover: INA

Main Weapon System

↳*System*

Name: Type 87
Type: Twin-25mm Towed Anti-Aircraft Artillery
Caliber: 25mm
Barrel Length: INA
Weight: INA
Elevation: 90 Deg
Traverse: 360 Deg

Depression: - 10 Deg

Firing Range: 3,200 M

Muzzle Velocity: 1,050 M/s

Rate of Fire: 600 rounds per minute

↳*Ammunition*

Type: Rifle

Caliber: mm25

Cartridge: INA

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Notes:

Type 87 25mm Twin AAA Developed by the No. 456 Factory and the No. 152 Factory, the Type 87 Anti-Aircraft Gun System had impressive firepower. Despite initial technical problems, the Type 87 went through improvements for increased barrel life and accuracy. The Type 87 was also guided by a laser course director and computer for accuracy. It fired HE and API ammunition and is said to be comparable to many other anti-aircraft guns in the world.

AH-4 Chinese 155mm Towed Lightweight Gun / Howitzer




Tiers:



Variants:

- **SH-11:** Self propelled artillery piece based upon an 8x8 armored personnel carrier and uses a modified 155mm/L39 round. First seen in public in 2018.
- **AHS-4:** 3 ton version designed to use in mountain warfare

System

Alternative Designation: AH-4
Type: 155mm Howitzer
Crew: 7
Carriage: split trail
Displacement Time: min2
Emplacement Time: min3
Maximum Effective Range: m25,000

Dimensions

Length, Travelling: m9.5
Length, Ready to Fire: m10.2
Weight, Combat: kg4,500

Automotive Requirement

Towing Vehicle: 6x6 or 4x4
Speed limit, Road: kp/h70
Speed limit, Cross Country: kp/h25
Primary Air Lift Aircraft: Z-18A

Communications

Radio: INA

Protection

Note: This artillery piece has no organic protection.

Cannon

:

↳*System*

Name: AH-4

Type: Howitzer

Breech Type: INA

Caliber / Length: 155mm / 39 caliber

Muzzle Velocity: INA

Max Range, Standard Round: m25,000

Max Range, RAP: m40,000

Barrel Length: INA

Max Elevation: degrees72

Min Elevation: degrees-3

Traverse Range: degrees44

Traverse Left: degrees22

Traverse Right: degrees22

Rate of Fire, Burst: rpm4

Rate of Fire, Sustain: rpm2

Carriage: 2 sub assemblies, the body and the saddle. The body includes 2 forward stabilizers and 2 split trails fitted with self digging spades and dampers.

↳*Ammunition*

Weight of Round: kg46..7

ERFB-HB/HE: m25,000

ERFB-BB/HE: INA

ERFB-BB-RA/HE: m40,000

HE: INA

HE-Frag: INA

Smoke: INA

Incendiary: INA

FASCAM: INA

Laser Guided Munitions:

GP155 (Chinese copy of the Krasnopol): INA

GP155B (Chines copy of the Excalibur): INA

GP155G (GS1): INA
Smart anti-armor projectile (Chines copy of the Bonus): INA
GP 6:
Range: m25,000
Probability of hit: %90

Fire Control

Name: INA
Computerized FCS: INA
Direct Fire: INA
Indirect Fire: INA
Collimator: INA

Notes:

The AH-4 is a Chinese clone of the US, M777, lightweight towed howitzer. It is intended mainly for export. The AH-4, was revealed in 2014. Soon after its introduction this howitzer reportedly received its first export order from Middle-East. Can fire all of the western made 155mm/39 caliber rounds. The towed AH4 howitzer is a Chinese artillery system manufactured by Norinco. Its main characteristic is that it has been designed to be lightweight, which allows greater tactical mobility. The weight of 4,500 kg, compared to a traditional system that can weigh 18,000 kg, allows the system to be airlifted via heavy-lift helicopters like the CH-47 or Mi-26, or transport aircraft like a C-130 or Y-8. Also, as a modern howitzer system, it possesses a range of engagement of up to 40 km using rocket-assisted projectiles. Because of its weight, the AH4 can be used in mountain warfare, which traditionally had to use pack howitzers like the OTO Melara Mod 56.

GHN-45 Candadian 155mm Towed Howitzer





Tiers:

1 2 **3** 4

System

Alternative Designation: NA
Crew: ea6
Prime Mover: 10 ton 6x6 truck / tractor
Emplacement Time: min4
Displacement Time: min4
Rate of Fire: rpm7

Dimensions

Length, Chassis Overall Firing: m11.53
Length, Chassis Overall Travel: m9.06
Height, Overall: m2.15
Width, Firing: m9.93
Width, Travel: m2.5
Weight, Combat: mt8.9
Weight w/ APU: mt11

Automotive

Engine Type: Air-Cooled Diesel
Engine Power: hp125
Range, Cruising: km150
Speed, Maximum On: 35
Speed, Maximum Off: INA
Towing Speed, Maximum On: 90
Towing Speed, Maximum Off: 50
Fording Depth: m.6

Armament

↳*Cannon*

Cailber/Length: mm155
Length, Barrel: cal45
Rate of Fire, Burst: rd/min7
Rate of Fire, Normal: rd/min3
Rate of Fire, Sustained: rd/min2
Loader Type: Semi-Automatic
Breech Type: Interrupted Screw
Muzzle Brake Type: Multi-Baffle
Traverse, Left: deg30
Traverse, Right: deg40
Traverse, Total: deg70
Elevation Total (-/+): deg-5/+72

Ammunition

↳*Ammunition 1*

Cailber/Length: mm155
Type: Frag-HE
Name: SN-101
Range, Minimum: INA
Range, Maximum: m25,100
Projectile Weight: kg42.3
Muzzle Velocity: m/s897
Fuze Type: PD

↳*Ammunition 2*

Cailber/Length: mm155
Type: HE
Name: mERFB
Range, Minimum: INA
Range, Maximum: m/s39,600
Projectile Weight: kg45.4
Muzzle Velocity: m/s895
Fuze Type: PD

Communications

Note: There is no communication system associated with this cannon

Fire Control System

Indirect Fire: Digital Panoramic Telescope

Direct Fire: Trunnion mounted telescopic

Collimator: INA

Fire Control Computer: None

Gun Display Unit: None

Protection

Note: This system provides no protection for itself or its crew

Notes:

The GHN-45 is an improved version of the GC 45 155-mm howitzer that was developed by South Africa. This version was developed by Austria, and about 600 have been made. It is an example of a towed howitzer that can be fitted with an auxiliary power unit (APU) that offers some limited ability to self-propel the gun and to enable automated reloading. Its longer barrel also provides it a greater maximum range than that of the M777, but it is also a significantly heavier weapon at 27,300 pounds. The Auxiliary Power Unit (APU), combined with the tandem walking-beam suspension, gives the GHN-45 excellent self-propelled mobility over short distances. The four wheels are all powered and give the gun excellent traction over most terrain. But, the APU serves purposes other than mobility. It provides power to open and close the trails, raise and lower the trail wheels, and raise and lower the firing platform. However, there is no power traverse or elevation. The GHN-45 also includes an optional chain system (reducing the ground pressure) to improve cross-country mobility in deep, muddy, or sandy terrain. The GHN-45 A1 includes reliability modifications and performance improvements. The GHN-45 is fully compatible with NATO standard 155-mm ammunition.

Type 54 Chinese 76mm Towed Field Gun




Tiers:

1 2 3 4

Variants:

- **ZiS-3 (M1942):** Russian Version

System

Alternative Designation: Type 54
Type: 76mm Towed Field Gun
Crew: 7
Carriage: Split trail
Displacement Time: minutesUnder 2
Emplacement Time: minutesUnder 2

Dimensions

Length: INA
Barrel Length: 3.4 m
Width: 1.6 m
Height: 1.37 m
Weight, Combat: combat: 1,116 kg (2,460 lbs) travel: 2,150 kg (4,730 lbs)

Main Weapon System

↳*System*

Name: Type 54
Type: Towed Field Gun
Caliber: mm76
Breech: Semi-automatic vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Split trail

Elevation: −5° to +37°

Traverse: 54°

Rate of Fire: up to 25 rounds per minute

Maximum Firing Range: 13.29 km

↳*Ammunition*

Type: Rifle

Caliber: mm76

Shell: Fixed QF 76.2 × 385 mm. R

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The Type 54 76mm Towed Field Gun is a Chinese version of the Russian ZiS-3 (M1942) 76mm Towed Field Gun. The 76-mm divisional gun ZiS-3 (M1942) (Russian: 76-мм дивизионная пушка обр. 1942 г. (ЗиС-3)) was a Soviet 76.2 mm divisional field gun used during World War II. ZiS was a factory designation and stood for Zavod imeni Stalina ("factory named after Stalin"), the honorific title of Artillery Factory No. 92, which first constructed this gun. Artillery Factory No. 92 began designing the ZiS-3 at the end of 1940. The ZiS-3 combined the light carriage from the 57 mm ZiS-2 anti-tank gun and the powerful 76.2 mm barrel from the F-22USV, the previous divisional field gun. The addition of a muzzle brake reduced recoil and prevented damage to the light carriage upon firing. Producing a ZiS-3 cost only a third of the time and two-thirds of the money of a F-22USV by making greater use of casting, stamping and welding. V. G. Grabin, the chief designer of Soviet medium caliber guns, initiated the gun's development without state approval, and the prototype was hidden from the state. Marshal Grigory Kulik, commander of Soviet artillery, had ordered a halt to the production of light 45 mm anti-tank guns and 76.2 mm divisional field guns in the belief that they were inadequate; the Soviets overestimated the armour protection of the latest German heavy tanks from propaganda about the Neubaufahrzeug multi-turreted prototype tank. The beginning of the Great Patriotic War revealed that the pre-war 76 mm guns overmatched German armour; in some cases even 12.7 mm DShK machine guns were adequate. Most of the 76 mm guns were lost early in the war; some captured examples armed German Panzerjäger self-propelled guns. Marshal Kulik ordered the F-22USV back into production. At Artillery Factory No. 92, Grabin put the ZiS-3 into mass production in December 1941. The factory's ZiS-3 stockpile grew and went unused as the Red Army refused to accept the guns without the usual acceptance trials. Grabin convinced the army to issue the guns for impromptu testing at the front, where it proved superior to existing divisional ield guns. A subsequent demonstration impressed Joseph Stalin, who praised the weapon as "a masterpiece of artillery systems design." The ZiS-3 underwent an official five-day acceptance trial in February 1942, and was then accepted into service as divisional field gun model 1942 (full official name). Grabin worked to increase production at Artillery Factory No. 92. Conveyor assembly lines admitted the use of low-skilled labour without significant quality loss. Experienced laborers and engineers worked on complicated equipment and served as brigade leaders; they were replaced on the production line by young factory workers who were exempt from conscription, producing a new generation of skilled labourers and engineers. More than 103,000 ZiS-3s were produced by the end of the war, making it the most numerous Soviet field gun during the war. Mass production of the ZiS-3 ceased after the war. It was replaced by the 85 mm D-44 divisional field gun. The D-44 had better anti-armour capabilities, but inferior mobility due to its increased weight. The Finns captured 12 units, and designated them 76 K 42. At least one ZiS-3 was produced at the Reșița Works in Reșița, Romania, during 1943. This Romanian-produced copy was tested against several Romanian-designed prototypes as well as some foreign models, until eventually one of the Romanian prototypes was selected for production as the Tunul antitanc DT-UDR 26, cal. 75 mm, md. 1943, commonly shortened to 75 mm Reşiţa Model 1943. This gun had the muzzle brake, split-trail carriage and recoil/firing mechanisms of the ZiS-3. At least 375 DT-UDR guns were produced by Romania, including three prototypes.

M102 American 105mm Towed Howitzer




Tiers:

1 2 3 4

System

Alternative Designation: M102
Type: 105mm Towed Howitzer
In Service: 1962-Present
Crew: 8
Carriage: Box trail
Displacement Time: Less than 2 Minutes
Emplacement Time: Less than 2 Minutes

Dimensions

Length, Overall: Travel: 6.40 m (21 ft)
Barrel Length: 32 calibres
Width: Travel: 1.96 m (6 ft 5 in)
Height: Travel: 1.59 m (5 ft 3 in)
Weight: 1,496 kg

Howitzer

↳*System*

Name: M102
Type: Towed Howitzer
Caliber: mm105
Action: Vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Box trail
Elevation: −5° to +75°

Traverse: 360°

Rate of Fire: Maximum: 10 rpm Normal: 3 rpm

Maximum Firing Range: 15.1 km (9.4 miles) with rocket-assisted projectile

Effective Firing Range: 11.5 km (7.1 miles)

↳*Ammunition*

Type: Projectile

Caliber: mm105mm

Shell: 105×372R

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The M102 is a light, towable 105 mm howitzer used by the United States Army in the Vietnam War, the First Gulf War, and the Iraq War. The 105 mm howitzer M102 is a lightweight towed weapon, which has a very low silhouette when in the firing position. The M102 howitzer fires a 33 lb (15 kg) projectile of semi fixed ammunition and at charge 7 will fire 11,500 meters. It has a muzzle velocity of 494 metres per second (1,620 ft/s). The maximum rate of fire is 10 rounds per minute for the first 3 minutes, with a sustained rate of 3 rounds per minute. A roller tire attached to the trail assembly of the M102 permits the weapon to be rotated 6,400 mils (360 degrees) around a firing platform, which provides the pivot for the weapon. It can be elevated from −89 mils (−5 degrees) to a maximum of 1,333 mils (75 degrees). The panoramic telescope has a four power, fixed focus optical system, with 178 mils field of view. It contains dry nitrogen gas to retard fogging and condensation. The parallax shield used during boresighting protects the lens. The trails are made of aluminum alloy. They are a single box trail in wishbone shape, and serve three purposes: mobility; stability; and stowage of section equipment. The lunette is the towing pintle that allows the weapon to be connected to the vehicle. When towing, vehicle has a fixed or seized tow pintle; remove the lock plate located under the lunette. The drawbar has two positions: lowered for travel and raised for firing. There are two lifting brackets to connect slings to when the howitzer is being lifted by helicopter. A third bracket is located on front yoke. The carriage handles are used by crew members to lifting and shifting the howitzer during loading, unloading, and emplacing the howitzer. The firing platform attaches to the howitzer lower carriage by using a socket and a locking handle. The eight holes are for the stakes needed to stake the howitzer in position. Platform stakes are issued in three sizes. There are four 15 in (38 cm) stakes issued for use in frozen or rocky terrain, and are normally issued only where needed, such as extremely cold areas. There are eight 24 in (61 cm) stakes issued, and are used for hard packed ground. Four 38 in (0.97 m) stakes are issued for use in soft ground. The first production versions were displayed with a muzzle brake, most likely to allow long range 105 mm rounds to be fired, but was discontinued before shipment to Vietnam.

PLL-01 (WAC-21) Chinese 155mm Towed Artillery







Tiers:



Variants:

- **AH-1:** AH-1 is an improved version of the PLL-01, manufactured in China by NORINCO. It has a more powerful auxiliary power unit, consisting of an air-cooled diesel engine, developing 110 hp. This howitzer has a maximum auto-propulsion speed of 20 km/h. Reportedly, the AH1 is in service with Ethiopia.
- **AH-2:** AH2 is a 52-caliber version of the AH1 towed howitzer. It has a longer range.
- **GM-45:** Same cannon fit onto a lighter carriage. This allows the system to be easier to maneuver but provides less stability to the system.

System

Alternative Designation: Type 89, W88, W89, W890, AH-2, WAC-21
Crew: ea6
Displacement Time: min1.5
Emplacement Time: min1.5
Range with standard ammunition: km24
Range with ERFB: km30
Range with ERFB-BB: km39
Minimum Range: m5,400

Dimensions

Length (in Travelling Order): m7
Length (in Combat Order): m11.4
Width (in Travelling Order): m2.5
Width (in Combat Order): m9.3

Height: INA

Weight, Combat: tons9.5

Automotive Requirement

Prime Mover: 6 x 6 Truck

Towing Speed, Maximum On: km/h90

Cross-Country Towing Speed: km/h50

↳*Auxiliary Power Unit*

Engine: 493Q diesel

Engine Power: hp77

Auto-propulsion Speed: km/h18

Auto-propulsion Range (on roads): km80-100

Armament & Ammo

:

↳*Cannon*

Type: mm155

Caliber / Length: 45

Breech Type: INA

Muzzle Velocity, Max: m/s903

Max Range: km39

Min Range: m5,400

Armor Penetration: INA

Fuse Type: INA

Barrel Length: INA

Loader Type: Semi-Automatic

Muzzle Brake Type: Multi-slotted

Max Elevation: degrees72

Min Elevation: degrees-5

Traverse Range: degrees70

Traverse Left: deg35

Traverse Right: deg35

Rate of Fire, Burst: rounds4

Rate of Fire, Sustain: rounds2

Rate of Fire, Normal: INA

ERFB/HE: Yes

ERFB-BB/HE: Yes

ERFB-BB/RA: Yes

ERFB/WP: Yes

ERFB/Illumination: Yes

ERFB/Smoke: Yes

ERFB-BB/Cargo: Yes

Laser Guided Munitions: Yes

Fire Control System

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Collimator: Yes

Gun Display Unit: Yes

Protection

Armor Roof: None

Armor, Front: None

Armor, Side: None

NBC Protection: No

Smoke Equipment: INA

Notes:

The PLL-01 howitzer is fitted with auxiliary power unit which is a small air-cooled 77 hp diesel engine. It is installed in a fairing carried atop the front of the carriage. The power unit is used for self-movement once the howitzer is in position. It also assists emplacement and displacement of the howitzer. This feature significantly reduced the stress on the crew. A single crew member can jack the gun in 90 seconds. Also it takes slightly less time to emplace and displace, compared to conventional towed artillery pieces. The PLL-01 uses Extended Range, Full Bore (ERFB) ammunition, which has a much longer range than typical howitzer ammunition thanks to improved aerodynamics. The PLL-01 can also fire all standard NATO 155 mm ammunition.

Type 54-1 Chinese 122mm Towed Howitzer




Tiers:



Variants:

- **Type 70 self-propelled howitzer:** Tracked vehicle equipped with the Type 54-1 gun.

System

Alternative Designation: Type 54-1
Country of Origin: China
Type: Towed 122mm Howitzer
Crew: 8
Carriage: Split trail
Displacement Time: less than 2 minutes
Emplacement Time: less than 2 minutes

Dimensions

Length, Traveling: 19 ft 4 in (5.9 m)
Barrel Length: 9 ft 2 in (2.8 m) overall
Width, Traveling: 6 ft 7 in (2.0 m)
Height, Traveling: 5 ft 11 in (1.8 m)
Height, to axis of Bore: 3 ft 11 in (1.2 m)
Weight: 5,500 lb (2,500 kg)

Howitzer

↳*System*

Name: Type 54-1
Type: Towed 12mm Howitzer
Caliber: mm122
Breech: Interrupted screw

Recoil: Hydro-pneumatic

Carriage: Split trail

Elevation: 61 deg/-3 deg

Traverse: 49°

Rate of FIre: 5-6 rounds per minute

Maximum Firing Range: 11,800 m

Minimum Firing Range: 5,350 m

↳*Ammunition (Option 1)*

Name: BP-460A

Type: HEAT

Caliber: mm122

Shell: 122 x 284mm .R loading charge and projectile.

Shell Weight: INA

Maximum Range: 2,000 m

↳*Ammunition (Option 2)*

Name: OF-462

Type: HE-Frag, steel (1,000 fragments to hit personnel in radius of 30 meters)

Caliber: mm122

Shell: 122 x 284mm .R loading charge and projectile.

Shell Weight: 21.76 kg

Maximum Range: 11,720

↳*Ammunition (Option 3)*

Name: H-462

Type: Chemical

Caliber: mm122

Shell: 122 x 284mm .R loading charge and projectile.

Shell Weight: 21.8 kg

Maximum Range: 11,800 m

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The Type 54-1 is the Chinese version of the Russian 122-mm M-30 (M1938) towed howitzer. It is virtually identical to the original, apart from its short gun tube with no muzzle brake. It is thought to be the first large-caliber artillery weapon manufactured in China. The gun has a hydraulic buffer and hydropneumatic recuperator recoil system. It has a split rail carriage and hinged screw breech mechanism. A gun shield is provided. The Type 54-1 is typically towed by a 6 x 6 vehicle. The weapon is fitted with a Type 58 panoramic sight, weighing 2.7 lb (1.2 kg) with a magnification of 3.7x and a 10-deg field of view; it also has a Type 58 collimator sight with a 10-deg field of view. The system uses a variable nine-charge propellant system and can fire at least four types of projectiles: high-explosive, smoke, illumination and incendiary. A leaflet shell containing 24 lb (11 kg) of leaflets can also be used. China has also developed a prototype 122-mm cargo round with six layers of high-explosive anti-tank bomblets.

ZiS-2 (M1943) Russian 57mm Towed Anti-Tank Gun





Tiers:

1 2 3 4

System

Alternative Designation: ZiS-2; M1943
Type: 57mm Towed Anti-Tank Gun
Crew: 7
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: 7.03 m
Barrel Length: bore: 3.95 m
Width: 1.7 m
Height: 1.37 m
Weight, Combat: 1,250 kg

Main Weapon System

↳*System*

Name: ZiS-2
Type: Towed Anti-Tank Gun
Caliber: 57 mm

Breech: Semi-automatic vertical sliding-wedge

Recoil: Hydro-pneumatic

Carriage: Split trail

Elevation: -5° to 25°

Traverse: 56°

Rate of Fire: 25 rpm cyclic 10 rpm practical

Muzzle Velocity: 1,000 m/s

Maximum Firing Range: 8.4 km

↳*Ammunition*

Type: Rifle

Caliber: mm57

Shell: Fixed QF 57×480 mmR (AP)

Basic Load: INA

Ammunition Types: APHE; APCBC; AP; APCR; Fragmentation; Canister

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Notes:

The ZiS-2 (Russian: ЗиС-2) was a Soviet 57-mm anti-tank gun used during World War II. The ZiS-4 was a version of the gun meant to be installed in tanks. ZiS stands for Zavod imeni Stalina (Russian Завод имени Сталина, "Factory named after Stalin"), the official title of Artillery Factory No. 92, which produced the gun first. In the beginning of 1940 the design office of V. G. Grabin received a task from the Artillery Department to develop a powerful anti-tank gun. The head of this department Marshal Kulik and its subordinates estimated that the use of heavily armoured tanks by the USSR in the Winter War would not have gone unnoticed in Nazi Germany and would lead to the development of similar fighting machines there. There is also a chance that the department was influenced by the German propaganda about the experimental multi-turreted "supertank" NbFz, ie. heavier armour was attributed to this vehicle than it actually carried. Therefore, Grabin and his office were guided by the characteristics of their own domestic heavy tank KV-1 with 40–75 mm armour. In the opinion of the designers the optimal calibre in this case was 57 mm. The velocity and mass of the armour-piercing 57 mm projectile allowed it to attain sufficient kinetic energy to penetrate up to 90 mm of armour RHA while keeping the gun sufficiently light, mobile and easy to conceal. However, the decision also had a downside: this calibre was a new one to the Red Army so the manufacturing of the projectile had to be started from scratch. Development started in May 1940 and in the beginning of 1941 the gun was adopted as 57-mm anti-tank gun model 1941 (ZiS-2) (Russian: 57-мм противотанковая пушка образца 1941 года (ЗиС-2)). Production began on 1 June 1941, but on 1 December 1941 it was stopped by Marshals N. N. Voronov and G. L. Govorov, their explanation being that ZiS-2 shells penetrated straight through weakly-armoured German tanks from one side to the other without doing much damage internally. Other possible reasons for the decision were the high cost of the gun and problems with shell production. By that time 371 pieces had been built. The production lines were switched to manufacturing of the ZiS-3 76.2 mm divisional gun while Soviet anti-tank artillery received cheaper 45 mm guns. Some anti-tank regiments also received the ZiS-3 which was able to defeat any German vehicle until late 1942. Appearance of the heavy Tiger I and then the Panther changed the balance in favour of the Germans. 45 mm guns model 1942 could only pierce the side armour of the Panther while the ZiS-3 managed to penetrate the sides from a greater distance. Against the Tiger the ZiS-3 was effective only from the side at close range (up to 300 m) and 45 mm pieces were nearly helpless. A more powerful gun was needed and on 15 June 1943 the ZiS-2 once again entered service as 57-mm anti-tank gun model 1943. Until 1945 9,645 units were produced. It is a automated-action gun with vertical block breech. When firing the block opens and closes automatically, the loader only has to put a round into the

receiver. Due to this feature the rate of fire can reach 25 rounds per minute. The Split-trail carriage with gunshield was shared with the ZiS-3 divisional gun. The carriage has coil spring suspension, which allows towing with a speed of up to 50 km/h (31 mph) on highways, 30 km/h (19 mph) on unpaved roads and 10 km/h (6.2 mph) off-road. The gun can also be attached to a limber and towed by a team of six horses. ZiS-2s are equipped with PP1–2 panoramic sight.

AH-2 Chinese 155mm Towed Artillery



Tiers:



Variants:

- **AH-1:** AH-1 is an improved version of the PLL-01, manufactured in China by NORINCO. It has a more powerful auxiliary power unit, consisting of an air-cooled diesel engine, developing 110 hp. This howitzer has a maximum auto-propulsion speed of 20 km/h. Reportedly, the AH1 is in service with Ethiopia.
- **AH-2:** AH2 is a 52-caliber version of the AH1 towed howitzer. It has a longer range.
- **GM-45:** Same cannon fit onto a lighter carriage. This allows the system to be easier to maneuver but provides less stability to the system.

System

Alternative Designation: AH-1/AH-1A
Crew: ea6
Displacement Time: min1.5
Emplacement Time: min1.5
Range with standard ammunition: km24
Range with ERFB: km30
Range with ERFB-BB: km39
Minimum Range: m5,400

Dimensions

Length (in Travelling Order): m7
Length (in Combat Order): m11.4
Width (in Travelling Order): m2.5
Width (in Combat Order): m9.3
Height: INA
Weight, Combat: tons14
Turning Radius: m7

Automotive Requirement

Prime Mover: 6 x 6 Truck

Towing Speed, Maximum On: km/h90

Cross-Country Towing Speed: km/h50

↳*Auxiliary Power Unit (APU)*

Engine: 493Q diesel

Engine Power: hp110

Auto-propulsion Speed: km/h20

Auto-propulsion Range (on roads): km80-100

Maximum Range without Refuelling: km100

Armament & Ammo

Note: The AH-2 has a 52 caliber barrel, compared to the AH-1, which has a 45 caliber barrel.

↳*Cannon*

Type: mm155

Caliber / Length: 45

Breech Type: The difference between the AH1 and the AH1A is a conventional screw breechblock on the AH1 and a laterally sliding wedge breechblock on the AH1A.

Muzzle Velocity, Max: m/s903

Max Range (ERFB HB projectile): km32

Max Range (BB projectile): km41

Max Range (BB RA projectile): km53

Armor Penetration: INA

Fuse Type: INA

Barrel Length: INA

Loader Type: Semi-Automatic

Muzzle Brake Type: Multi-slotted

Max Elevation: deg72

Min Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

ERFB-BB/HE: Yes

Rate of Fire, Burst: rounds4

Rate of Fire, Sustain: rounds2

Rate of Fire, Normal: INA

SP Capable: Yes

Pneumatic Rammer: Yes

ERFB/HE: Yes

ERFB-BB/RA: Yes

ERFB/WP: Yes

ERFB/Illumination: Yes

ERFB/Smoke: Yes

ERFB-BB/Cargo: Yes

Laser Guided Munitions: Yes

Fire Control System

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: Yes

Collimator: Yes

Gun Display Unit: Yes

Protection

Armor Roof: None

Armor, Front: None

Armor, Side: None

NBC Protection: No

Smoke Equipment: INA

Notes:

AH2 is a 52-caliber version of the AH1 towed howitzer.

M777A2 British 155mm Towed Howitzer





Tiers:

1 2 3 4

Variants:

- **M777:** gun with optical fire control
- **M777A1:** digitization upgrades with the addition of an on-board power source, satellite global positioning, inertial navigation, radio, Gun Display Unit (GDU) and Section Chief Assembly (SCA).
- **M777A2:** Block 1A software upgrade. Addition of an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to enable Excalibur and precision munition compatibility.
- **M777ER:** Experimental upgrade created by the Extended Range Cannon Artillery (ERCA) project modified with a 52-caliber barrel, adding 1.8 m (5.9 ft) to the cannon and less than 450 kilograms (990 lb) to the overall system, extending range from 30 to 70 km (19 to 43 mi); concept only

System

Alternative Designation: M777A2
Type: Towed Howitzer
Crew: 7+1
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: Combat: 10.7 m (35 ft 1 in) Travel: 9.5 m (31 ft 2 in)
Barrel Length: 5.08 m
Weight: 4,200 kg

Main Weapon System

↳*System*

Name: M777A2

Type: Towed Howitzer

Caliber: mm155

Carriage: Split trail

Elevation: 0° to +71.7°

Traverse: INA

Rate of Fire: Normal: 2 rpm Maximum: 5 rpm

Muzzle Velocity: Charge 8S: 827 m/s (2713.25 ft/s)

Effective Firing Range: 24-40 km

↳*Ammunition (Option 1)*

Name: M107

Type: Projectile

Caliber: mm155

Length: 605.3 mm

Diameter: 154.71 mm

Weight as Fired: 43.2 kilograms

Fuzes: PD M51A5, M728 family, M557, M572, M739, M564, M577, M582, M732

Explosive Content: NT 6.86 kilograms

Effective Firing Range: 24 km

Note: The M107 155mm projectile was the standard 155mm high explosive (HE) projectile for howitzers of the US Army and US Marine Corps. A bursting round with fragmentation and blast effects, the M107 is being superseded in the US military by the M795.

↳*Ammunition (Option 2)*

Name: M795

Type: Projectile

Caliber: mm155

Length: 605.3 mm

Diameter: 154.89 mm

Weight as Fired: 46.7 kg

Fuzes: INA

Explosive Content: TNT: 10.8 kg with a charge liner OR IMX-101(IMX was adopted by the Army; Marines still use TNT)

Effective Firing Range: 22.5 km

Note: The M795 155mm projectile is the US Army and US Marine Corps' standard 155mm high explosive (HE) projectile for howitzers. It is a bursting round with fragmentation and blast effects. The M795 is designed to be a more lethal,

longer range version of the M107. A welded band replaces the swaged rotating band of the M107, allowing the M795 to be fired with M119 or M203 propelling charges, increasing range by 6,000 meters. The explosive payload was also improved, as was the fragmentation pattern, giving 30% higher lethality.

↳*Ammunition (Option 3)*

Name: M982 Excalibur
Type: Projectile
Caliber: mm155
Length: 996 mm
Diameter: 155 mm
Weight: 48 kg
Warhead: PBXN-9
Guidance System: GPS, inertial navigation
Accuracy: 5-20 m
Effective Firing Range: 40 km

Fire Control

Name: INA
Computerized FCS: The M777A2 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly.
Direct Fire: No
Indirect Fire: Yes
Collimator: INA

Notes:

M777A2 – Block 1A software upgrade. Addition of an Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) to enable Excalibur and precision munition compatibility. The M777 howitzer is a towed 155 mm artillery piece. It succeeded the M198 howitzer in the United States Marine Corps and United States Army in 2005. The M777 is also used by the ground forces of Australia, Canada, India and Saudi Arabia. It made its combat debut in the War in Afghanistan. The M777 is manufactured by BAE Systems' Global Combat Systems division. Prime contract management is based in Barrow-in-Furness in the United Kingdom as well as manufacture and assembly of the titanium structures and associated recoil components. Final integration and testing of the weapon is undertaken at BAE's facility in Hattiesburg, Mississippi. The M777 began as the Ultralight Field Howitzer (UFH), developed by Vickers Shipbuilding and Engineering's (VSEL) Armaments Division in Barrow-in-Furness, United Kingdom. VSEL was bought by BAE Systems after the UFH prototypes had been manufactured and demonstrated, consequently BAE became responsible for future design refinements and re-named the gun 'M777'. Upon taking-over responsibility for the weapon BAE to a large degree 'americanised' the construction and assembly through its US-based BAE Systems Land and Armaments group. The M777 now uses about 70% US-built parts including the gun barrel manufactured at the Watervliet Arsenal. With a weight of 4,200 kg (9,300 lb), the M777 is 41% lighter than the 7,154 kg (15,772 lb) M198 howitzer it replaces. Much of the weight reduction is due to the extensive use of titanium. The M777 can be transported by helicopter sling-load, transporter aircraft such as the C-130, or towed by air-braked vehicles weighing over 2.5 tonnes (2.8 short tons), such as the FMTV and MTVR. The minimal gun crew required is five, compared to a previous nine. The M777 uses a digital fire-control system similar to that found on self-propelled howitzers such as the M109A6 Palladin to provide navigation, pointing and self-location, allowing it to be put into action quickly. The Canadian M777 in conjunction with the traditional "glass and iron sights/mounts" also uses a digital fire control system called the Digital Gun Management System (DGMS) produced by Leonardo MW with components of the Indirect Fire Control Software Suite (IFCSS) built by the Firepower team in the Canadian Army Land Software Engineering Centre. The Leonardo MW portion of the system, known as LINAPS, had been proven previously through earlier fielding on the British Army Royal Artillery's L118 Light Gun The Digital Fire Control System will be powered by a unique new design of rotary hybrid-electric engine designed and manufactured by Liquid Piston. The M777 may be combined with the M982 Excalibur GPS-guided munition, which allows accurate fire at a range of up to 40 km (25 mi). This almost doubles the

area covered by a single battery to about 1,250 km2 (480 sq mi). Testing at the Yuma Proving Ground by the US Army placed 13 of 14 Excalibur rounds, fired from up to 24 kilometres (15 mi), within 10 m (33 ft) of their target, suggesting a circular error probable of 5 m (16 ft). In June 2012, Golf Battery, 2nd Battalion, 11th Marines, out of Camp Pendleton, California, dropped the M982 Excalibur round on insurgents at a range of 36 km (22 mi) in Helmand Province, Afghanistan. This marked the longest operational shot in the history of the M777 howitzer, and the longest operational tube artillery shot in history for the Marine Corps. In 2014 the US military began fielding several upgrades to its M777 howitzers including new liquid crystal display units, software updates, improved power systems, and muzzle sensors for onboard ballistic computing. Future upgrades include a touchscreen Chief Section Display, a new Mission System Computer, and a digital radio. In May 2017, the US Army revealed it was buying the Swedish BONUS round as an interim system as a result of the required phasing out of cluster munitions from artillery shells, complying with policy to achieve less than 1% unexploded ordnance from non-unitary explosives; the BONUS has two sensor-fused munitions deployed by a 155 mm carrier projectile that scan the ground for targets and fire explosively formed penetrators down from the air. The system has been tested from the M777 howitzer.

ZiS-3 (M1942) Russian 76mm Towed Field Gun




Tiers:

1 2 3 4

Variants:

- **Type 54:** Chinese Version

System

Alternative Designation: ZiS-3; M1942
Type: 76mm Towed Field Gun
Crew: 7
Carriage: Split trail
Displacement Time: minutesUnder 2
Emplacement Time: minutesUnder 2

Dimensions

Length: INA
Barrel Length: 3.4 m
Width: 1.6 m
Height: 1.37 m
Weight, Combat: combat: 1,116 kg (2,460 lbs) travel: 2,150 kg (4,730 lbs)

Main Weapon System

↳*System*

Name: ZiS-3
Type: Towed Field Gun
Caliber: mm76
Breech: Semi-automatic vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Split trail

Elevation: −5° to +37°

Traverse: 54°

Rate of Fire: up to 25 rounds per minute

Maximum Firing Range: 13.29 km

↳*Ammunition*

Type: Rifle

Caliber: mm76

Shell: Fixed QF 76.2 × 385 mm. R

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The 76-mm divisional gun M1942 (ZiS-3) (Russian: 76-мм дивизионная пушка обр. 1942 г. (ЗиС-3)) was a Soviet 76.2 mm divisional field gun used during World War II. ZiS was a factory designation and stood for Zavod imeni Stalina ("factory named after Stalin"), the honorific title of Artillery Factory No. 92, which first constructed this gun. Artillery Factory No. 92 began designing the ZiS-3 at the end of 1940. The ZiS-3 combined the light carriage from the 57 mm ZiS-2 anti-tank gun and the powerful 76.2 mm barrel from the F-22USV, the previous divisional field gun. The addition of a muzzle brake reduced recoil and prevented damage to the light carriage upon firing. Producing a ZiS-3 cost only a third of the time and two-thirds of the money of a F-22USV by making greater use of casting, stamping and welding. V. G. Grabin, the chief designer of Soviet medium caliber guns, initiated the gun's development without state approval, and the prototype was hidden from the state. Marshal Grigory Kulik, commander of Soviet artillery, had ordered a halt to the production of light 45 mm anti-tank guns and 76.2 mm divisional field guns in the belief that they were inadequate; the Soviets overestimated the armour protection of the latest German heavy tanks from propaganda about the Neubaufahrzeug multi-turreted prototype tank. The beginning of the Great Patriotic War revealed that the pre-war 76 mm guns overmatched German armour; in some cases even 12.7 mm DShK machine guns were adequate. Most of the 76 mm guns were lost early in the war; some captured examples armed German Panzerjäger self-propelled guns. Marshal Kulik ordered the F-22USV back into production. At Artillery Factory No. 92, Grabin put the ZiS-3 into mass production in December 1941. The factory's ZiS-3 stockpile grew and went unused as the Red Army refused to accept the guns without the usual acceptance trials. Grabin convinced the army to issue the guns for impromptu testing at the front, where it proved superior to existing divisional ield guns. A subsequent demonstration impressed Joseph Stalin, who praised the weapon as "a masterpiece of artillery systems design." The ZiS-3 underwent an official five-day acceptance trial in February 1942, and was then accepted into service as divisional field gun model 1942 (full official name). Grabin worked to increase production at Artillery Factory No. 92. Conveyor assembly lines admitted the use of low-skilled labour without significant quality loss. Experienced laborers and engineers worked on complicated equipment and served as brigade leaders; they were replaced on the production line by young factory workers who were exempt from conscription, producing a new generation of skilled labourers and engineers. More than 103,000 ZiS-3s were produced by the end of the war, making it the most numerous Soviet field gun during the war. Mass production of the ZiS-3 ceased after the war. It was replaced by the 85 mm D-44 divisional field gun. The D-44 had better anti-armour capabilities, but inferior mobility due to its increased weight. The Finns captured 12 units, and designated them 76 K 42. At least one ZiS-3 was produced at the Reșița Works in Reșița, Romania, during 1943. This Romanian-produced copy was tested against several Romanian-designed prototypes as well as some foreign models, until eventually one of the Romanian prototypes was selected for production as the Tunul antitanc DT-UDR 26, cal. 75 mm, md. 1943, commonly shortened to 75 mm Reşiţa Model 1943. This gun had the muzzle brake, split-trail carriage and recoil/firing mechanisms of the ZiS-3. At least 375 DT-UDR guns were produced by Romania, including three prototypes.

Type 58 Chinese 14.5mm Towed Anti-Aircraft Gun




Tiers:



Variants:

- **ZPU-2:** Russian Version
- **PKM-2:** PKM-2 – Polish-built version.

System

Alternative Designation: Type 58
Type: 14.5mm Towed Anti-Aircraft Gun
Crew: 5
Carriage: INA
Displacement Time: minutes5
Emplacement Time: minutes5

Dimensions

Length, Traveling: m3.54
Barrel Length: m1.36
Width: m1.92
Height: m1.83
Weight, Traveling: kg560
Weight, Firing: kg522
Ground Clearance: m0.27

Cannon

↳*System*

Name: ZPU-2
Type: two Model KPV machine guns mounted on a two-wheel carriage.
Barrels: 2

Bore: 14.5-mm; fitted w/flash hiders

Muzzle Velocity: m/s955

Maximum Effective Anti-Aircraft Range: m2,000

Maximum Effective Ground Range: m1,000

Max Elevation: deg90

Min Elevation: deg-15

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Cyclic Rate of Fire: 1,100 rds/min

↳*Ammunition (Option 1)*

Name: BS.41

Type: API

Caliber: mm14.5

Basic Load: INA

Core: Tungsten carbide core

Projectile Weight: 64.4 g

Muzzle Velocity: m/s1,000

Armor Penetration: Armor-penetration at 500 m (550 yd) is 32 mm (1.3 in) of RHA at 90 degrees.

↳*Ammunition (Option 2)*

Name: BZT

Type: API-T

Caliber: 14.5

Basic Load: INA

Core: Steel Core

Projectile Weight: 59.56 g

Muzzle Velocity: m/s1,005

Tracer Burns: Tracer burns to at least 2,000 m (2,200 yd).

↳*Ammunition (Option 3)*

Name: ZP

Type: I-T (Instantaneous Incendiary)

Caliber: mm14.5

Basic Load: INA

Core: INA

Projectile Weight: 60.0 g
Note: I-T (ZP) – "Instantaneous Incendiary" bullet with internal fuze, incendiary in tip, tracer container in base.

Fire Control

Name: INA
Computerized FCS: No
Direct Fire: Yes
Indirect Fire: Yes

Notes:

The Type 58 Chinese 14.5mm Towed Anti-Aircraft Gun is a Chinese version of the Russian ZPU-2 The ZPU-2 consists of two Model KPV machine guns mounted on a two-wheel carriage. The ZPU-2 was introduced in 1949 and is a twin version of the ZPU-1 basic Soviet 14.5MM machine gun. The ZPU-2 was used in Korea and considered a dangerous opposition in Vietnam. The Type 58 is the Chinese version, while the individual KPV machine guns as the Type 56. The twin ZPU-2 has appeared on two different two-wheeled carriages. The earlier model has larger fenders and a double tubular tow bar. In firing position the crew removes the wheels, and the weapon rests on a three-point platform. The later model, which is lighter in weight, has smaller fenders, a tighter single tow bar, and a tower silhouette. When in firing position the wheels are raised, but not removed. A very similar carriage is used for the twin 23mm automatic antiaircraft gun ZU-23, although the ammunition boxes, barrels and flash hiders are distinctly different. The ZPU-2 was used in the 1970s by some Warsaw Pact armies and by security elements such as the East German Workers' militia. All weapons in this series fire the API (BS 41) projectiles weighing 64.4 grams having a muzzle velocity of 1000 meters per second which will penetrate 32 mm of armour. This is a Chinese-produced version of the later production Soviet model. It no longer serves in China, but is in service in third world nations. The Type 58 differs from the ZPU-2 in several aspects: weight, 1,234 lb (560 kg); elevation/depression, -15 deg to 90 deg; effective anti-aircraft range, 6,561 ft (2,000 m); and effective ground range, 1,093 yd (1,000 m). The Type 58 has a muzzle velocity of 3,264 fps (995 mps) and a combined cyclic rate of fire of 1,100 rounds/min.

D-44 Russian 85mm Towed Artillery Gun





Tiers:

1 2 3 **4**

System

Alternative Designation: D-44
Type: 85mm Towed Artillery Gun
Family: INA
Crew: 8
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m8.34
Barrel Length: m4.7
Width: m1.78
Height: m1.42
Weight, Combat: kg1,725

Main Weapon System

↳*System*

Name: D-44
Caliber: mm85

Breech: Semi-automatic vertical sliding-wedge

Recoil: Hydro-pneumatic

Carriage: Split trail

Rate of Fire: up to 20 rounds per minute (burst)

Effective Firing Range: 1,150 m (1,257 yds) (HVAP-T)

Maximum Firing Range: m15.65

Max Elevation: deg+35

Min Elevation: deg-7

Traverse Range: deg54

Traverse Right: deg27

Traverse Left: deg27

Sights: OP-2-7 w/5.5X Magnification

↳*Ammunition*

Name: O-365K

Shell: Fixed QF 85×629 mm. R

Caliber: mm85

Muzzle Velocity: m/s1,030

Basic Load: INA

Projectile Weight: kg9.5

Maximum Range: m15,650

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The 85-mm divisional gun D-44 (Russian: 85-мм дивизионная пушка Д-44) was a Soviet divisional 85-mm calibre field artillery gun used in the last action of World War II. It was designed as the replacement for the 76 mm divisional gun M1942 (ZiS-3). The gun is no longer in front-line service with the Russian Ground Forces, although some 200 of the Chinese Type 56 variant are still in service with the Pakistan Army. Wartime service included use by communist forces during the Vietnam War and by Arab forces during their conflicts with Israel. The design of the D-44 started in 1943 at the design bureau of No.9 factory "Uralmash" and production began in 1944. Its GRAU code was 52-P-367. The SD-44 was a 1950s variant with an auxiliary propulsion unit and ammunition box for 10 rounds, with 697 issued to the airborne forces (VDV) from 1954. The D-44N was a 1960s variant with an APN 3-7 infra-red illumination device for night combat. China received D-44s during the Korean War and began manufacturing a copy, the Type 56, in the early 1960s. Finally, the Polish Army has equipped some of their D-44 guns with electrical subsystems in the early 1980s and designated them D-44M and D-44MN. The barrel was developed from that of the T-34-85 tank and was capable of firing 20–25 high-explosive (HE), armor-piercing, and high-explosive antitank (HEAT) projectiles per minute. Subcaliber BR-365P HVAP-T (high velocity armor-piercing-tracer) projectiles were capable of penetrating 100 mm of armor at 1000 meters at a ninety-degree obliquity, and the BR-367P HVAP-T projectile penetrates 180 mm of armor under the same conditions. The post-war round O-365K HE weighed 9.5 kg and packed 741 grams of TNT as its bursting charge,

while the BK-2M HEAT-FS (fin-stabilized) projectile can penetrate 300 mm of armor. The HEAT round for the Type 56 has a maximum range of 970 meters and will penetrate 100 mm of armor at an angle of 65 degrees.

D-74 Russian 122mm Towed Gun





Tiers:

1 2 3 **4**

System

Alternative Designation: D-74
Type: 122mm Towed Gun
Crew: 7~9
Carriage: Split-trail
Displacement Time: minutesunder 2
Emplacement Time: minutesunder 2

Dimensions

Length: 9.875 m
Barrel Length: 6.45 m
Width: 2.35 m
Height: 2.7 m
Weight: 5,620 kg

Main Weapon System

↳*System*

Name: D-74
Type: Towed Gun
Caliber: mm122

Breech: Semi-automatic vertical sliding-wedge

Recoil: Hydro-pneumatic

Carriage: Split-trail

Elevation: +45/−5 degree

Traverse: 45 degree

Rate of Fire: Maximum: 8–10 rpm

Muzzle Velocity: 885 m/s

Maximum Firing Range: 24 km

Effective Firing Range: Indirect: 23.9 km (15 mi) Direct: 1,080 m (1,181 yds)

↳*Ammunition*

Type: Rifle

Caliber: mm122

Shell: Separate loading charge and projectile

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The 122mm D-74 towed gun is a Soviet-built gun. Developed in the late 1950s it provided direct and indirect fire for the Soviet Army. Today it is in reserve units with the Russian Army. It is in active service with the Egyptian Army and the Pakistani Army. The 122 mm (originally 48 lines) calibre has been in Russian service since the early 20th century. After World War II the Soviet Union developed two new long range guns to replace existing 122 mm and 152 mm guns such as 122 mm gun M1931 (A-19), 122 mm gun M1931/37 (A-19), 152 mm gun M1910/30 and 152 mm gun M1935 (Br-2). The two new guns were the 122 mm D-74 and the 130 mm M-46. The D-74 design was probably initiated in the late 1940s and it was first seen in public in 1955. It was designed by the well established design bureau at Artillery Plant No. 9 in Sverdlovsk (now Motovilikha Plants in Yekaterinburg), led by the eminent artillery designer Fëdor Fëdorovich Petrov who was also responsible for several World War II and later artillery designs. The design team also developed the 152 mm gun howitzer D-20 at much the same time, and both D-74 and D-20 use the same carriage. Both the 122 mm D-74 and 130 mm M-46 entered Soviet service, but the heavier shell and greater range of the M-46 meant that it outlasted the D-74. The D-74 has a 52 calibre barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breach, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breach. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breach. The breach has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 60° and the vertical elevation range in -5° to 50°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in centre for traverse before towing the gun. There are small spades at the end of each trail leg, and fittings for large spades that are carried on the side of each trail leg. The large spades are used on soft ground and are fitted to the trail ends via have a pintle in the same way as the similar spades on M-46. These spades are the main difference from the D-20 carriage. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on

the ground. When the gun is brought into action the pivot jack is folded down and adjusted to be on the ground. If the requires large traverse, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in centre for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period the gun has a shield, including a folding piece below the cradle support. The centre section of the upper shield both slides up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defence against machine gun fire. The non-reciprocating sights are designed for one-person laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M), an angle of sight scale, and a range drum for the single charge engraved with the range (distance) scale, coupled to an elevation levelling bubble mounted on dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. The gun fires separate ammunition using a metal cartridge case that also provides obturation. The ammunition is different to that used with 122 mm howitzers. There is a single charge without increments. The shell weight is 25 kg with a muzzle velocity of 900 m/s although the slightly lighter APHE shell has a higher muzzle velocity. Maximum rate of fire is usually stated as six rounds per minute. The detachment was either eight or nine men, probably differing between armies and period. In Soviet service the 5,600 kg gun was usually towed by a URAL-375 6×6 truck, AT-S or AT-L medium tractor in some regions.

Type 56 Chinese 85mm Towed Artillery Gun




Tiers:

1 2 3 4

System

Alternative Designation: Type 56
Type: 85mm Towed Artillery Gun
Family: INA
Crew: 8
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m8.34
Barrel Length: m4.7
Width: m1.78
Height: m1.42
Weight, Combat: kg1,725

Main Weapon System

↳*System*

Name: Type 56
Caliber: mm85
Breech: Semi-automatic vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Split trail
Rate of Fire: up to 20 rounds per minute (burst)
Effective Firing Range: 1,150 m (1,257 yds) (HVAP-T)

Maximum Firing Range: m15.65

Max Elevation: deg+35

Min Elevation: deg-7

Traverse Range: deg54

Traverse Right: deg27

Traverse Left: deg27

Sights: OP-2-7 w/5.5X Magnification

↳*Ammunition*

Name: O-365K

Shell: Fixed QF 85×629 mm. R

Caliber: mm85

Muzzle Velocity: m/s1,030

Basic Load: INA

Projectile Weight: kg9.5

Maximum Range: m15,650

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Notes:

The Type 56 85mm Towed Artillery Gun is a Chinese version of the Russian D-44 85mm Towed Artillery Gun, The 85-mm divisional gun D-44 (Russian: 85-мм дивизионная пушка Д-44) was a Soviet divisional 85-mm caliber field artillery gun used in the last action of World War II. It was designed as the replacement for the 76 mm divisional gun M1942 (ZiS-3). The gun is no longer in front-line service with the Russian Ground Forces, although some 200 of the Chinese Type 56 variant are still in service with the Pakistan Army. Wartime service included use by communist forces during the Vietnam War and by Arab forces during their conflicts with Israel. The design of the D-44 started in 1943 at the design bureau of No.9 factory "Uralmash" and production began in 1944. Its GRAU code was 52-P-367. The SD-44 was a 1950s variant with an auxiliary propulsion unit and ammunition box for 10 rounds, with 697 issued to the airborne forces (VDV) from 1954. The D-44N was a 1960s variant with an APN 3-7 infra-red illumination device for night combat. China received D-44s during the Korean War and began manufacturing a copy, the Type 56, in the early 1960s. Finally, the Polish Army has equipped some of their D-44 guns with electrical subsystems in the early 1980s and designated them D-44M and D-44MN. The barrel was developed from that of the T-34-85 tank and was capable of firing 20–25 high-explosive (HE), armor-piercing, and high-explosive antitank (HEAT) projectiles per minute. Subcaliber BR-365P HVAP-T (high velocity armor-piercing-tracer) projectiles were capable of penetrating 100 mm of armor at 1000 meters at a ninety-degree obliquity, and the BR-367P HVAP-T projectile penetrates 180 mm of armor under the same conditions. The post-war round O-365K HE weighed 9.5 kg and packed 741 grams of TNT as its bursting charge, while the BK-2M HEAT-FS (fin-stabilized) projectile can penetrate 300 mm of armor. The HEAT round for the Type 56 has a maximum range of 970 meters and will penetrate 100 mm of armor at an angle of 65 degrees.

Type 96 Chinese 122mm Towed Gun / Howitzer





Tiers:



Variants:

- **6x6 Wheeled SP Variant:** China's Poly Technologies firm has developed a self-propelled version of the Type 96. In the new configuration, the upper part of the howitzer is removed from the standard two-wheel carriage and installed on the rear of a 6 x 6 cross-country truck chassis. The vehicle can carry a crew of five in the four-door cab. Up to 40 rounds of separate-loading 122-mm ammunition are stored in lockers at each side of the cab's rear. The upper part of the weapon fires to the rear and stabilizers are deployed on each side of the vehicle before firing. The system takes about 90 seconds to activate and can be rapidly deployed to a new position to avoid counter-battery fire. The complete system has a combat weight of 36,400 lb (16,500 kg), with a maximum road speed of 53 mph (85 kph) and a range of 370 mi (600 km). Ref: Military Periscope, April 2015

System

Alternative Designation: PL96
Crew: 5 (section of 6)
Displacement Time: min3.5
Emplacement Time: min1.5

Dimensions

Length, Chassis Overall Travel: m5.4
Height, Travel: m1.6
Width, Travel: m1.9
Weight, Combat: mt3.2

Armament

Caliber, Type, Name: mm122
Barrel Length: cal38
Rate of Fire – Burst: rpm8
Rate of Fire – Normal: rpm6
Rate of Fire – Sust: rpm4
Loader Type: Semi- Automatic
Breech Type: Vertical Sliding Wedge

Muzzle Brake Type: Multi-baffle

Maximum Elevation: deg+70

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Ammunition

↳*Ammunition (Option 1)*

Name: OF-81

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: m1,000

Range, Maximum: m15,300

Projectile Weight: kg21.76

Muzzle Velocity: m/s680

Fuze Type: PD

↳*Ammunition (Option 2)*

Type: HEAT

Cailber/Length: mm122

Range, Minimum: m0

Range, Maximum: m15,300

Projectile Weight: kg21.58

Muzzle Velocity: m/s740

Fuze Type: GPV-2 PIBD

↳*Ammunition (Option 3)*

Name: Frag-HE Rocket Assisted

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: INA

Range, Maximum: 18,000

Projectile Weight: kg21.76

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: INA
Direct Fire: INA
Collimator: INA
Fire Control Computer: None
Gun Display Unit: None

Notes:

The Chinese 122mm Type 96 towed howitzer is based on the Russian D-30 (See D-30 WEG page for more detail) weapon system. It is almost identical to the Russian model, but with minor changes likely to meet local manufacturing requirements. The howitzer is equipped with a Type PG-1M panoramic sight with a magnification of 4x and a 10-degree field of view; Type OP4M telescopic sight with a magnification of 5.5x and 11-degree field of view; and a Type K-1 indicator with a 10-degree field of view. The gun has a multi-baffle muzzle brake. The Type 96 can fire standard 122mm high-explosive (HE) rounds, as well as a Chinese-developed long-range HE projectile that uses a special charge. This round has a range of 59,100 ft (18,000 m). The long-range round is longer and has a more aerodynamic body. It can also fire two NORINCO-developed cargo rounds. In Chinese service, the Type 96 is generally towed by a 6 x 6 cross-country truck that also carries the howitzer crew and ready-use ammunition. Ref: Military Periscope, April 2015

Type 59 Chinese 130mm Towed Gun





Tiers:



Variants:

- **M-47:** This is a 152 mm field gun (Russian: 152-мм пушка М-47 обр. 1953 г.) that was developed alongside the M-46. The M-47 had a range of 20,470 m and was far less successful than its 130 mm counterpart. Only a small number was built between 1954 and 1957.
- **Type 59-1:** This is a combination of the 130 mm ordnance of the Type 59 with the carriage of the Type 60 (D-74 copy). The result is a gun with the same range as the M-46, but with a much lower weight of 6.3 t.
- **Type GM-45:** For the export market, NORINCO (China North Industries Corporation) developed this upgrade package where the original barrel of the Type 59 is replaced by the 155/45 mm ordnance of the WA 021.
- **SP-130 "Catapult":** Indian-designed self-propelled version, mounted on the hull of the Vijayanta tank.
- **M-46S:** This is an upgrade of an existing M-46 or Type 59, carried out by Soltam Systems Ltd. The original barrel is replaced by a new model of 155/45mm (western ammunition) for a range of 25.8 (HE) to 39 km (ERFB-BB). A 39-calibre barrel is optional. In March 2000, Soltam won a contract worth $47,524,137 for upgrading 180 M-46s to M-46S standard (Indian designator: 155/45mm (E1) Soltam).
- **M46/84:** This is a conversion that involved replacing the original 130 mm barrel with a new 155/45 mm barrel or 152 mm barrel. With ERFB-BB ammunition, this version has a range of 38,600 m and with M05 152 mm range exceeds 40 km
- **A412:** License-built Chinese Type 59-1 with D-20 carriage.

System

Alternative Designation: Type 59
Manufactuer: MOTZ
In Service: 1954-Present
Crew: ea8
Displacement Time: min7
Emplacement Time: min6
Prime Mover: AT-S, KrAZ-255

Dimensions

Length, Firing: m11.10

Length, Travel: m11.73

Width, Travel: m2.45

Width, Firing: INA

Height, Overall: m2.5

Weight, Combat: mt8.45

Main Weapon System

↳*System*

Name: Type 59

Type: 130mm Towed Gun

Length, Barrel: 52 cal

Breech Type: Horizontal sliding wedge

Maximum Elevation: deg+45

Minimum Elevation: deg-2.5

Loader Type: Manual

Muzzle Brake Type: Multi-perforated (pepper pot)

Rate of Fire, Burst: 8 rd/min

Rate of Fire, Normal: 6 rd/min

Rate of Fire, Sustained: 4 rd/min

Traverse Range: deg50

Traverse Left: deg25

Traverse Right: deg25

↳*Ammunition (Option 1)*

Name: OF44

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m22,500

Range, Minimum: INA

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Ammunition (Option 2)*

Name: BR-482

Cailber/Length: mm130

Type: APC-T

Range, Maximum Indirect Fire: m11,140

Range, Minimum: m0

Weight: kg33.49

Muzzle Velocity: INA

Fuze Type: DBR BD

↳*Ammunition (Option 3)*

Name: OF43

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m27,500

Range, Minimum: mINA

Muzzle Velocity: m/s930

Fuze Type: V-429 PD

↳*Ammunition (Option 4)*

Name: OF43

Type: Frag-HE

Cailber/Length: mm130

Weight: kg33.4

Range, Maximum Indirect Fire: m38,000

Range, Minimum: INA

Muzzle Velocity: m/s940

Fuze Type: ML-5 PD

Fire Control System

Indirect Fire: PG-1 PANTEL

Direct Fire: OP 4-35

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Notes:

The Type 59 130mm Towed Gun is a Chinese version of the Russian M-46 (M1954) 130mm Towed Gun The 130mm towed field gun M-46 (Russian: (130мм пушка М-46) is a manually loaded, towed 130mm artillery piece, manufactured in the Soviet Union in the 1950s. It was first observed by the west in 1954. There is also a Chinese copy, called the Type 59. For many years, the

M-46 was one of the longest range artillery systems around, with a range of more than 27 km. The M-46 was developed from the M-36 130 mm naval gun used on ships and for coast defense. It is a true gun, being unable to fire much above 45° and having a long barrel and a single propelling charge. In contrast, most Western field guns of this period had a dual high and low angle fire capability, a gun-howitzer. It has a 39 caliber barrel with a tied jaw horizontal sliding-block breach and 'pepperpot' muzzle brake. The latter is not notably efficient, but subjective reports suggest that it is quite effective in reducing muzzle flash. The hydro-pneumatic recoil system comprises a buffer below the barrel and a recuperator above the barrel. The long barrel enables a substantial propelling charge by providing more length in which to achieve 'all-burnt' and hence projectile acceleration space and thus achieve its 930 m/s muzzle velocity. The barrel is mounted on a split-trail carriage, with deep box section trails and foam filled road wheels on the ground when firing and 50° of top traverse. The small shield protects little more than the sights, possible including from the effects of muzzle blast, and some protection from machine gun fire in anti-tank engagements. The gun has long and robust trails to provide stability when firing, a large detachable spade is fitted to the end of each when the gun is brought into action. Non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (a dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum engraved with the range (distance) scale, coupled to a mounted elevation leveling bubble. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. An APN-3 was later provided for direct fire at night in place of the day telescope. For travel, the gun is towed via a two-wheeled limber fitted to the end of the closed trails, with the spades removed and carried on each trail. Simple jacks on the trails just behind the main wheels are used to lift and support the closed trails so that the limber can be connected. The barrel and recuperator are pulled back between the closed trails and locked in a travelling position. There is a large bicycle chain arrangement on the right trail for this, and a compressed air cylinder, charged by the gun firing, is used to bring the barrel forward when the gun is brought back into action. It takes about four minutes to bring the gun into action, the normal detachment is eight strong. Propelling charges are in metal cartridge cases and loaded separately from the projectile. Projectiles originally included HE fragmentation, Armour Piercing solid shot, smoke, illuminating and chemical. HE shells weigh some 33 kg. Illuminating shells have a substantially lower muzzle velocity. APHE and extended range shells were introduced later. Maximum rate of fire is probably 6-7 rounds/minute, and about 70 rounds/hour. The standard Soviet unit of fire was 80 rounds.

M-30 (M1938) Russian 122mm Towed Howitzer





Tiers:



Variants:

- **M-30S:** Slightly modified variant; was used as the main armament of the SU-122 assault gun.
- **U-11:** A gun with identical ballistics, but equipped with a more compact recoil mechanism for easier mounting in vehicles. It was tried on the experimental SU-122M and rejected due to insufficient reliability. A variant of the same gun was also mounted on the experimental Obiekt 234 tank, also known as Iosif Stalin no. 2 (not to be confused with the IS-2).
- **D-6:** Another vehicle mounted gun with identical ballistics. It was used on the experimental SU-122-III and, like the U-11, proved unreliable.
- **Type 54:** China Licence version.
- **Type 54-1:** Slightly improved version.
- **Wz.1938/1985:** Existing Wz.1938 that was fitted with a castor wheel, PGO-9H sight and a second firing mechanism for direct fire.
- **M-30M:** In the 1980s Romanian Army M-30s were upgraded with new, larger pneumatic wheels, new brakes, a new optical sight for direct fire and a second height sighting mechanism for anti-tank combat. These upgraded howitzers were designated M-30M.

System

Alternative Designation: M-30; M1938
Country of Origin: Russia
Type: Towed 122mm Howitzer
In Service: 1939-Present
Crew: 8
Carriage: Split trail
Displacement Time: less than 2 minutes
Emplacement Time: less than 2 minutes

Dimensions

Length: 5.9 m (19 ft 4 in) (with limber)
Barrel Length: bore: 2.67 m (8 ft 9 in) L/21.9 overall: 2.8 m (9 ft 2 in) L/23 (without breech block)
Width: 1.98 m (6 ft 6 in)
Height: 1.82 m (6 ft)
Weight: combat: 2,450 kg (5,401 lbs) travel: 3,100 kg (6,834 lbs)

Howitzer

↳*System*

Name: M-30
Type: Towed 12mm Howitzer
Caliber: mm122
Breech: Interrupted screw
Recoil: Hydro-pneumatic
Carriage: Split trail
Elevation: -3° to 63.5°
Traverse: 49°
Rate of FIre: 5-6 rounds per minute
Maximum Firing Range: 11.8 km (7.33 mi)

↳*Ammunition (Option 1)*

Name: BP-460A
Type: HEAT
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: INA
Maximum Range: 2,000 m

↳*Ammunition (Option 2)*

Name: OF-462
Type: HE-Frag, steel (1,000 fragments to hit personnel in radius of 30 meters)
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: 21.76 kg
Maximum Range: 11,720

↳*Ammunition (Option 3)*

Name: H-462
Type: Chemical
Caliber: mm122
Shell: 122 x 284mm .R loading charge and projectile.
Shell Weight: 21.8 kg
Maximum Range: 11,800 m

Fire Control

Name: INA
Computerized FCS: No
Direct Fire: Yes
Indirect Fire: Yes
Collimator: INA

Notes:

The 122 mm howitzer M1938 (M-30) was a Soviet 121.92 mm (4.8 inch) howitzer. The weapon was developed by the design bureau of Motovilikha Plants, headed by F. F. Petrov, in the late 1930s, and was in production from 1939 to 1955. The M-30 saw action in World War II, mainly as a divisional artillery piece of the Red Army (RKKA). Captured guns were also employed later in the conflict by the German Wehrmacht and the Finnish Army. Post World War II the M-30 saw combat in numerous conflicts of the mid- to late twentieth century in service of other countries' armies, notably in the Middle East. The barrel of the M-30 was of built-up construction and consisted of a liner, jacket and breech. The breechblock was of interrupted screw type, with forced cartridge case extraction. The gun was equipped with a hydraulic recoil buffer and hydropneumatic recuperator. A panoramic sight was used for both indirect and direct fire. The M-30 had a modern split trail carriage with leaf spring suspension and steel wheels with rubber tires. It was usually towed by vehicle without a limber. The carriage allowed for a towing speed of up to 50 km/h on paved road and up to 35 km/h on gravel or dirt roads, although the gun could also be moved by a team of six horses, in which case a limber was used. When the trails were swung open the suspension locked automatically . In an emergency it was possible to shoot in a "single trail" mode, at the price of a drastically reduced traverse (1°30'). The time required to set the gun up for combat was about 1–1.5 minutes. The carriage of the M-30 was later used for the D-1 152 mm howitzer. In the M-30, RKKA units finally received a modern divisional howitzer which successfully combined increased firepower and better mobility with reliability and ease of use. A summary of its employment by the Red Army was provided by Marshal G. F. Odintsov, who said "Nothing can be better". The long post-war employment of the howitzer is additional testimony to its combat and operational utility and effectiveness. It is hard to compare the M-30 directly with contemporary foreign guns since the artillery of France, Germany and United States employed in similar roles was either the much smaller 105 mm (Great Britain used the even smaller—87.6 mm—25 pounder gun-howitzer) or much larger 150 to 155 mm caliber guns. Howitzers of similar calibers existed but most of those were World War I era pieces, such as the Vickers 114 mm howitzer used by the Finnish Army. Naturally, 150 mm howitzers were more powerful, but much heavier than the M-30; while 105 mm pieces were lighter but their smaller shells contained less explosive. The most direct German equivalent was the 10.5 cm leFH 18 light howitzer. Weighing 1985 kg, it had a maximum elevation of 42°, muzzle velocity of 470 m/s and maximum range of 10,675 m. In the upgraded leFH 18/40 version, muzzle velocity was improved to 540 m/c, elevation to 45° and range to 12,325 m. About equal in range, the German howitzer had a less powerful HE shell and its smaller maximum elevation made it less effective against dug-in troops, although it also weighed some 400 kg less than M-30. Both guns were well suited for mass production with 16.887 M-30s and 15.388 leFH 18 built in 1941–45.

→→Self-Propelled Gun/Howitzer Artillery Systems

Type 05 (PLZ-05) Chinese 155mm Self-Propelled Howitzer (SPH)




Tiers:



Variants:

- **PLZ-52:** The PLZ-52 is a 155mm / 52 caliber tracked self-propelled howitzer similar in appearance to the PLZ-45, but based on a slightly different hull. Having a gross vehicle weight of 43 tonnes, the PLZ-52 features a new power pack, which consists of a diesel engine developing 1,000 hp at 2,300 rpm coupled to a fully automatic transmission. This gives a maximum road speed of up to 65 km/h and an operational range up to 450 km.[6] The PLZ-52 howitzer has a maximum firing range of 53 km (with ERFB-BB-RA projectiles), maximum firing rate of eight rounds per minute, a burst firing rate of three rounds per fifteen seconds, and a multiple-round simultaneous impact capability of four rounds.
- **PLZ-04:** Self-propelled howitzer with a 54 caliber barrel and apparently offered for export.
- **Command post vehicle:** This appears to be based on a different six-wheeled hull with a raised crew compartment to the rear of the drivers and commanders position at the front left side of the hull.

System

Alternative Designation: PLZ-05, Type 05
Manufacturer: NORINCO
Status: In service
Type: 155mm Self-Propelled Howitzer
Family: PLZ Family
Crew: ea4
Chassis: Tank
Displacement Time: INA
Emplacement Time: INA
Maximum Effective Range: km55
Integrated Day Periscopes: ea3
Passive Night Periscope: ea1
Note:: The PLZ-05 was built to replace the Type 83 152mm Self Propelled Howitzer

Dimensions

Length, Gun Forward: m12

Length, Hull: m6

Width: m3.38

Height: m3.55

Weight, Combat: tons35

Ground Pressure: INA

Automotive

Engine Name: 8V150

Engine Type: Cooled turbocharged diesel

Engine Power: hp800

Power to Weight Ratio: hp/ton23.25

Suspension: Torsion Bar

Forward Gears: 6

Reverse Gears: 1

Cruising Range: km550

Speed, Maximum Road: km/h55

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Fording Depth: m1.2

Vertical Step: m0.8

Trench: m2.8

Communications

↳***TBR-142***

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: PLZ-05

Type: 155mm Self-Propelled Howitzer

Barrel: 52 Caliber

Charge System: Bi-modular charge system (MCS)

Extractor Type: Fume Extractor

Muzzle Break: Yes, Slotted Muzzle Brake

Projectile Handling System: Automatic ammunition handing system

Max Rate of Fire: rds/min10

Sustain Rate of Fire: rds/min9

Time the Max Rate of Fire can be Sustained: 3 rounds in 15 seconds

Four round Multiple Round Simultaneous Impact (MRSI) capability.: Yes

Max Elevation: deg+65

Min Elevation: deg-3

Traverse Range: deg360

Range Finder Type: Laser

Muzzle Velocity Radar: Equipped

↳*Ammunition (Option 1)*

Type: WS-35

Caliber: mm155

Muzzle Velocity: INA

Fuse Adapter: Yes

Basic Load: 30 Total of any projectile combination

Maximum Firing Range: km100

Armor Penetration: Yes

Projectile Weight: kg18

Guidance System: Beidou Navigation Satellite System

Inertial Guidance: Yes

Accuracy: m40

↳*Ammunition (Option 2)*

Type: Extended Range Full Bore - Base Bleed - Rocket Assisted (ERFB-BB-RA) projectile

Caliber: mm155

Manufacturer: NORINCO

Muzzle Velocity: INA

Basic Load: 30 Total of any projectile combination

Maximum Firing Range: km58

Armor Penetration: Yes

Note: The PLZ-05 can also fire ERFB high-explosive, ERFB-BB high-explosive, ERFB white phosphorous, ERFB smoke, ERFB illumination, incendiary and cargo.

Coaxial Weapon System

↳*System*

Name: QJG89

Type: mm12.7

Length, Total: mm2,119

Length, Barrel: mm1,003

Diameter: INA

Weight (Gun Only): kg18.5

Weight (Tripod Only): kg17.5

Time the Max Rate of Fire can be Sustained:

Max Rate of Fire: rds/min450-600

Sustain Rate of Fire: rds/min500-550

Sights: Iron/Optical

Action: Gas

Fire Selector: 0-F

Stock: Fixed

↳*Ammunition*

Type: Ball

Caliber: mm12.7x108

Muzzle Velocity: m/s825

Basic Load: INA

Effective Firing Range (vs. Air): m1,500

Effective Firing Range (vs. Ground): m2,000

Armor Penetration: INA

Magazine: Belt, fed 50 Rounds

Operation: Hybrid direct impingement and short recoil

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Remote Fire Capable: Yes

Direct Fire: Yes

Indirect Fire: Yes

Laser/fibre optic Enabled: Yes

Land Navigation: Yes

Protection

Hull Armor: Rolled homogeneous plate armor (RHA), Protection against small arms and shell splinters.

Turret Armor: Rolled homogeneous plate armor (RHA), Protection against small arms and shell splinters.

Applique Armor: Available

Explosive Reactive Armor: No

Active Fire Suppression System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: two banks of four electrically fired smoke dischargers on each side.

Grenade Launchers: 2 sets of 4-barrel grenade launchers

Note: The PLZ-05 is a rear-line artillery support vehicle that is not meant to be on the front lines of the battlefield.

Notes:

The PLZ-05 was designed and manufactured by the China North Industries Group Corporation (CNGC), better known as Norinco. According to most reports, its development started in the mid-1990s, as a further development of the PLZ-45, an export version which already saw combat. The first prototype was completed in 2003 and it seems to have been accepted into service in 2005, at least according to its official denomination. It was also revealed during the 2005 Beijing International Aviation Exhibition. However, this model only entered service with the PLA around 2007.

M109A6 Paladin American 155mm Self-Propelled Howitzer





Tiers:

1 **2** 3 4

Parent:

M109 American 155mm Self-Propelled Howitzer

Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the

integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30 seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.

- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88 (M109A1) are known as respectively PzHb 79/95 and PzHb 88/95
- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
- **K55/K55A1:** K55/K55A1 are South Korean variants of the M109A2 , originally named KM109A2 with additional domestic augmentations, license-produced by Samsung Techwin. They are fitted with M178 155 mm 39 caliber gun, NBC protection, automatic fire extinguishing system, and a modified ammunition reception module for K56 automatic ammunition resupply vehicle. The Performance Improvement Program variant, K55A1, is a complete domestic overhaul of the K55 which is further augmented by Samsung Thales with modern digital ballistic computers, multifunctional data display and controllers, GPS navigation and target acquisition system, wireless datalink equipment, and upgraded fire control storage battery and power supply unit, to closely match the US military's modernization of the Paladin into next-generation standard. Many improved technologies of the South Korean K9 Thunder were retrofitted on the K55A1. 1,040 howitzers of these variants were produced.
- **M109A7:** The newest M109 version for U.S. service is the M109A7, formerly known as the M109A6 Paladin Integrated Management (PIM). The M109A7 shares common components with the Bradley Fighting Vehicle such as the engine, transmission, and tracks. This creates commonality with other systems and maximizes cost-savings in production, parts inventory, and maintenance personnel. The M109A7's on-board power systems harness technologies originally developed for the Non-Line-of-Sight Cannon; the electric drive is faster than the previous hydraulic system, and the automatic rammer more consistently rams the round into the gun for consistent velocities and better accuracy. It features a 600-volt on-board power system to accommodate additional armor and future networking technologies as they become ready. The M109A7 can sustain a one-round per-minute rate of fire and a maximum rate of fire of four rounds per-minute.

System

Alternative Designation: M109A6 Paladin

In Service: 1997-Present

Type: Self-Propelled Howitzer

Crew: ea4

Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.

Displacement Time: INA

Emplacement Time: According to United Defense, the Paladin can move from road march to firing status in one minute. Response time while in firing position is less than 30 seconds. These reaction times give Paladin a true "shoot-and-scoot" capability. The Paladin's travel lock, a front-mounted bracket that steadies the long barrel during vehicle movement, has

been modified to enable remote operation.

Note #1: The Paladin consists of 1,900 parts. Major components include a low-heat rejection engine from Detroit Diesel; Honeywell navigation/positioning system; and an Alliant Techsystems automatic fire-control system (AFCS).

Dimensions

Length, with Rear Box: 6.81 m

Length, Gun Forward: 9.68 m

Width, with ADMG: 3.24 m

Width, over Side Boxes: 3.92 m

Height, Overall: 3.62 m

Height, Top of MG Mount: 3.27 m

Weight: 63,600 lb (28,848 kg)

Ground Pressure: 13.53 lb/sq in (0.95 kg/cm sq)

Track, Length on Ground: 3.96 m

Automotive

Engine Name: 1 x DDC 8V-71T 568-cu in (9.3-liter) liquid-cooled, turbo-charged two-stroke V-8 diesel/JP8

Engine Type: V-8 diesel

Engine Power: hp440 hp

Power-to-Weight Ratio: 15.25 hp/metric ton

Transmission: Allison ATD-XTG 411-2A (A3) or 411-4 with quick disconnect powershift crossdrive, 4 forward and 2 reverse gears

Range: km344

Speed, Maximum Road: km/h64

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Side Slope: %30

Gradient: %60

Vertical Step: m0.53

Trench: m1.83

Fording Depth: m1.07

Fuel Capacity: 133 gal (503 liters)

Suspension: torsion bar, 7 road wheels, front drive, rear idler, no return rollers (all models except PIM). An upgraded suspension has longer torsion bars and hydro pneumatic bump stops to handle the greater vehicle weight.

Note: The M109A5 offers upgraded components providing greater durability. It has a higher horsepower low heat rejection (LHR) engine and an improved transmission for increased performance.

Main Gun

Note: The elevation/equilibrium cylinder and turret traverse clutch assembly are redesigned to prevent failures.

↳*System*

Name: M284 39 cal/155mm Rifled Howitzer fitted with Muzzle Brake and Fume Extractor
Type: Howitzer
Caliber: 155mm
Length: INA
Barrel Length: INA
Weight: INA
Cannon Groves: 48
Rifling: right-hand rifling with constant, 8.93-deg twist
Breech Type: Welin-step thread
Recoil System: hydropneumatic
Elevation: -3/+75 deg (-53/+1,333 mils)
Traverse: 360 deg (6,400 mils)
Maximum Firing Range: 14.6 km
Maximum Rate of Fire: 1 rd/min first hour, 4 rd in first 3 min max
Sustained Rate of Fire: 2 rpm
Note #1: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.
Note #2: The cab has a rear bustle rack which provides an increased ammunition stowage capacity.
Note #3: The M109A5 share commonality with all of the other M109 family members and fires all NATO-standard 155-mm ammunition.

↳*Ammunition (Option 1)*

Name: M549A1
Type: HERA
Caliber: mm155mm
Length: 33.7 in (858 mm)
Weight: 95.9 lb (43.54 kg)
Basic Load: 39 rounds including 2 Copperhead
Maximum Range: 30,000 m
Response Time: 60 seconds

↳*Ammunition (Option 2)*

Name: M712
Type: Copperhead
Caliber: mm155
Length: 54.0 in (1,372 mm)
Weight: 140.0 lb (63.50 kg)

Basic Load: 39 rounds including 2 Copperhead

Maximum Range: 14,000 m

Response Time: 60 seconds

↳*Ammunition (Option 3)*

Name: M864

Type: DPICM

Caliber: 155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 39 rounds including 2 Copperhead

Maximum Range: 22,100 m

Response Time: 60 seconds

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 500

Fire Control

Name: Alliant Techsystems automatic fire-control system (AFCS).

Computerized FCS: Yes, The AFCS has a ballistic computer/weapon controller, power conditioner and an inertial reference navigation systems/dynamic reference unit based on the modular azimuth positioning system (MAPS) using ring laser gyro on-board land navigation. The AFCS permits 0.6 mi. (1 km) separation between vehicles, improving gun battery survivability.

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Note: It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device.

Protection

Hull Armor: 5083 aluminum with composite spall liners and supplemental armor.

Turret Armor: INA, The turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.

Applique Armor: DuPont Kevlar armor has been added to the Paladin, forming an inner lining of the cab, roof and crew compartment sides. Rolled homogeneous steel armor is fitted over the driver's compartment and on the rear of the bustle.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: MCS system

Smoke Equipment: No

Fire Suppression: Automatic. Improved protection also includes the segmentation of hydraulic lines and the use of a Halon fire-suppression system. The hydraulic system, which is distributed in the A3, has been centralized in the Paladin. The Halon system is intended to snuff out internal fires in less than 0.25 sec. In addition, a microclimate cooling system has been added to improve the working environment and protect against the effects of nuclear, biological and chemical (NBC) warfare. Projectile stowage has been placed lower in the hull to reduce threat of secondary explosions from counter-battery fires.

Notes:

The M109A6 Paladin is a further upgrade of the M109 self-propelled howitzer, which was introduced in early 1960s. This M109A6 Paladin self-propelled howitzer entered service with the US Army in 1991. Production ceased in 1999. A total of 950 artillery systems were built for the US Army. Export operators are Israel and Taiwan. With the cancellation of Crusader and NLOS-C programmes the US Army will continue to rely on the M109A6 Paladin artillery system, until it will be upgraded to the M109A7 standard. The M109A6 has a larger turret than its predecessor. It is armed with the M284 155 mm/L39 howitzer, fitted with a semi-automatic loading system. Maximum range of fire is 24 km with standard projectiles and 30 km with rocket-assisted projectiles. Maximum rate of fire is 4 rounds per minute. Sustained rate is one round every three minutes. Some of the US Army M109A6 Paladins were fitted with modification kits to fire M982 Excalibur extended-range precision guided projectiles. The Excalibur is GPS-guided and has a maximum range of 40 km. The Paladin can stop and fire the first round in under 60 seconds. Brief redeployment time allows to avoid counter-battery fire and gives shoot-and-scoot capability. Secondary armament consists of a roof-mounted 12.7 mm heavy machine gun. Some vehicles were fitted with 40 mm automatic grenade launcher in place of machine gun. The M109A6 is fitted with an automatic fire control system with an integrated navigation and inertial positioning system. It is also fitted with a muzzle reference system. Armor of the M109A6 Paladin provides protection against small arms fire and artillery shell splinters. Vehicle is fitted with NBC protection system. Turret is fitted with Kevlar anti-spall lining.

PLL-09 (Type 09) Chinese 122mm Self-Propelled Howitzer (SPH)







Tiers:



Variants:

- **ZBL-09:** ZBL-09 or Type 07P is a wheeled infantry armoured fighting vehicle designed and manufactured by the Chinese Defense Company NORINCO China North Industries Corp. The ZBD-09 was presented for the first during the military parade in Beijing for the 60th anniversary of the Chinese army (PLA), the 01 October 2009. The ZBD-09 was based to the chassis of the VN1 8x8 wheeled chassis.

System

Alternative Designation: PLL-09, Type 09
Manufactuerer: NORINCO
Type: 122mm Self-Propelled Howitzer (SPH)
Family: PLL Family
Crew: ea3-4
Chassis: based on a ZBL-09 Snow Leopard armored personnel carrier chassis
Displacement Time: minINA
Emplacement Time: minINA
Maximum Effective Range (Road): km800
Maximum Effective Range (Howitzer): km27

Dimensions

Length: m8
Width: m3
Height: m3

Weight, Combat: tons21

Ground Pressure: kg/mINA

Automotive

Engine Name: Deutz BF6M1015C

Engine Type: Diesel

Engine Power: hp440

Cruising Range: km800

Speed, Maximum Road: km/h62

Speed, Average Cross: km/h50

Speed Maximum Swim: km/h6-8

Gradient: %60

Side Slope: %40

Vertical Step: m0.55

Trench: m1.8

Fording Depth: mAmphibious

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: Type 96 Howitzer
Type: 122mm Self-Propelled Howitzer (SPH)
Length, Barrel: 32 Caliber
Loader Type: Semi-automatic loader
Max Rate of Fire: rds/min6-8
Sustain Rate of Fire: rds/min6
Time the Max Rate of Fire can be Sustained: rds/minINA
Muzzle Brake Type: INA
Max Elevation: deg+70
Min Elevation: deg-3
Traverse Range: deg360
Range Finder Type: Laser

↳*Ammunition (Option 1)*

Type: High Explosion (HE)
Caliber: mm122
Projectile Weight: kg14-22
Diameter: mm39.2
Fuse Type: INA
Muzzle Velocity: m/s690
Basic Load: 40 Rounds total of any 122mm combination projectiles
Maximum Effective Range: km18-27
Armor Penetration: Yes, up to 85mm of conventional steel armour

↳*Ammunition (Option 2)*

Type: HE Hollow Base Projectile
Caliber: mm122
Weight: kg21.76
Diameter: mm39.2
Muzzle Velocity: m/s725
Fuse Type: INA
Basic Load: 40 Rounds total of any 122mm combination projectiles
Maximum Effective Range: km18
Armor Penetration: Yes, up to 85mm of conventional steel armour

↳*Ammunition (Option 3)*

Type: HE Base Bleed (BB) Projectile
Caliber: mm122
Weight: kg22.5
Diamter: mm39.2
Muzzle Velocity: m/s730
Fuse Type: INA
Basic Load: 40 Rounds total of any 122mm combination projectiles
Maximum Effective Range: km22
Armor Penetration: Yes, up to 85mm of conventional steel armour

↳*Ammunition (Option 4)*

Type: HE BB Rocket-Assist Projectile Type BEE2
Caliber: mm122
Weight: kgINA
Diameter: mm39.2
Muzzle Velocity: m/sINA
Fuse Type: INA
Basic Load: 40 Rounds total of any 122mm combination projectiles
Maximum Effective Range: km27
Armor Penetration: Yes, up to 85mm of conventional steel armour

Coaxial Weapon System

↳*System*

Name: Type 54 (DShKM copy)
Type: Anti-Aircraft Machine Gun
Max Rate of Fire:
Sustain Rate of Fire:
Time the Max Rate of Fire can be Sustained:
Range Finder Type: Iron/Optics
Armor Shield: Yes
Traverse Range: deg360
Elevation: deg90

↳*Ammunition*

Type: 1120 Rounds: APDS (Tungsten Core); API, API-T,

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: ea500

Effective Range: m2,000

Armor Penetration: Yes, API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: INA

Computerized FCS: Yes

Digital Ballistic Computer: Yes

Digital Battlefield Management System: Yes, standard

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Indirect Fire Support: Yes

Protection

Front Arc Armor: Welded steel hull, Front arc can withstand 12.7mm armor piercing rounds.

All Around Armor: Welded steel hull, Protection from 7.62mm armor-piercing rounds.

Automatic Fire Suppression Systems: Yes

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, 12 Smoke Grenades on Turret

IR Signature: INA

Notes:

The PLL-09 is a Chinese 122 mm self-propelled howitzer. Currently this howitzer is widely used by the China's army. This artillery system is also used by China's marines. The PLL-09 provides indirect fire support for rapid deployment brigades. These Chinese brigades are similar in concept to the US Stryker brigades. These military units are equipped with lightly armored, but highly mobile 8x8 armored personnel carriers of all variants. Each rapid reaction brigade has numerous armored vehicles of all variants, including armored personnel carriers, reconnaissance vehicles, 105 mm fire support vehicles, command vehicles, engineer vehicles, and some other specialized vehicles. These brigades can be briefly redeployed over significant distances. Also the PLL-09 SPH has good cross-country mobility and is capable of keeping pace with main battle tanks.

Caesar French 155mm Self-Propelled Howitzer (SPH)






Tiers:



System

Alternative Designation: Caesar 8x8 French 155mm Self-Propelled Howitzer (SPH)

Manufacturer: Nexter Systems

Type: Self-Propelled Howitzer (SPH)

Family: Caesar Family of SPH

Crew: ea4

Chassis: Mercedes-Benz (6 × 6) truck

Displacement Time: min1

Emplacement Time: min1

Dimensions

Length: m12.3

Width: m2.8

Height: m3.1

Weight, Combat: tons17.7

Ground Pressure: kg/mINA

Automotive

Engine Name: 366 LA 6

Engine Type: Diesel

Engine Power: hp400

Cruising Range: km600

Speed, Maximum Road: km/h100

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg40

Side Slope: deg30

Vertical Step: m0.6

Trench: m2.1

Fording Depth: m1.2

Ground Clearance: m0.40

Fuel Capacity: liters230

Communications

Radio: Thales PR4G radios

Main Gun

↳*System*

Name: 155 mm/L52 howitzer

Type: mm155

Breech Type: Screw breech block

Length, Barrel: 52 calibers

Loader Type: Manual

Max Rate of Fire: rds/min6

Rate of Fire Burst: rds/min3

Rate of Fire Sustained: rds/min6

Muzzle Brake Type: Double baffle

Max Elevation: deg+72

Min Elevation: deg-4

Traverse Range: deg34

Traverse Left: deg17

Traverse Right: deg17

Maximum Firing Range: km42-55

Charge System: Conventional Bag Charges or the Modular Charge System (MCS)

Top Charge System (TCS): Yes

Top Charge Modules (TCM): Yes

Bottom Charge System (BCS): Yes

Bottom Charge Modules (BCM): Yes, 2 each

Note: In addition to firing the standard French Army LU122 high-explosive base bleed (BB) and Hollow Base (HB) projectile CAESAR has also fired the Rheinmetall Denel Munitions Velocity enhanced Long range Artillery Projectile (VLAP) which achieved a maximum range of 58 km.

↳*Ammunition (Option 1)*

Type: Frag-HE, Extended Range Full-Bore/Base Bleed

Caliber: mm155

Muzzle Velocity: m/s895

Fuse Type: PD

Basic Load: 18 Total of any 155mm projectile combination

Minimum Effective Range: m4,500

Maximum Effective Range: m35,000 ERFB, 42,000 ERFB-BB m

Penetration: INA

Projectile Weight: kg43.7

↳*Ammunition (Option 2)*

Type: Ogre, Cargo (DPICM) with 63 submunitions

Caliber: mm155

Muzzle Velocity: m/s897

Fuse Type: Proximity on submunitions

Basic Load: 18 Total of any 155mm projectile combination

Minimum Effective Range: m4,500

Maximum Effective Range: m35,000

Penetration: mm90

Projectile Weight: kg43.1

Coaxial Weapon System

↳*System*

Name: M2 HB Anti-Aircraft Machine Gun

Type: mm12.7

In Service: 1933-Present

Manufacturer: Current: General Dynamics, Fabrique Nationale

Proliferation: Over 3 Million

Max Rate of Fire (M2HB Version): 450-600

Max Rate of Fire (AN/M2 Version): 750-850

Max Rate of Fire (AN/M3 Version): 1,200-1,300

Weight (Gun Only): kg38

Weight (Gun and Tripod): kg58

Length (Total): mm1,654

Length (Barrel): mm1,143

Action: Short recoil-operated

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Muzzle Velocity: m/s450-1,200
Basic Load: ea2,000
Effective Range: km1,800-2,000

Fire Control

Name: FAST-Hit computer FCS with Sagem Signal 30 and GPS navigation, aiming, and command net combined. In French forces, it will link to the Atlas artillery C2 net.
Computerized FCS: Yes
Thermal Sight Vehicle Commander: No
Thermal Sight Gunner: No
Main Gun Stabilization: Yes, large spade is hydraulically lowered at the rear to provide a more stable firing platform
Data System: SAFRAN SIGMA 30 onboard Reference Package/Position Data System (RP/PDS)
GPS: Yes
Muzzle Velocity Radar: RDB4 muzzle velocity radar
Fire Control System: CS 2002-G onboard fire-control computer
3-D Display: Yes
Ammunition Status Management System (ASMS): Yes
Ammunition Resupply Management System (ARMS): Yes
Gun Status Management System (GSMS): Yes
Note: The system can fire six 155mm projectiles in under 2 minutes

Protection

Hull Armor: INA
Turret Armor: INA
Applique Armor: mmAvailable
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: No
Smoke Equipment: INA
IR Signature: INA

Notes:

The CAESAR 8x8 self-propelled howitzer was developed by Nexter. Sometimes this artillery system is referred as CAESAR 2.

The acronym CAESAR stands for CAmion Equipe d'un Systeme d'ARtillerie, or truck equipped with an artillery system. It is based on the original CAESAR, which first appeared back in 1994 and was the first mass produced truck-mounted howitzer. Prototype of the CAESAR with 8x8 configuration was revealed in 2015. The new artillery system, which emerged more than 20 years after its predecessor, is based on an 8x8 chassis. Gun of the new artillery system remains without significant changes, however weapon control systems have been updated. So the CAESAR 8x8 can shoot faster and is more accurate than its predecessor. In 2017 Denmark selected this artillery system to replace their old M109 howitzers that are in service since 1965.

Boxer RCH 155 German Self-Propelled Howitzer





Tiers:



System

Alternative Designation: Boxer RCH 155 German Self-Propelled Howitzer

Type: PzH 2000 Howitzer

Caliber: mm155

Chassis: 8x8

Crew: ea2

Emplacement Time: INA

Displacement Time: INA

Dimensions

Length (gun forward): m10.5

Barrel Length: INA

Width: m2.99

Height: m3.5

Weight, Combat: t35

Automotive

Engine Name: MTU V8 199 TE20

Engine Type: Diesel

Engine Power: hp711

Cruising Range: km1050

Speed, Maximum Road: km/h103

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Fording Depth, without Preparation: m1.2

Fording Depth, with Preparation: m1.2

Trench: m2

Main Weapon System

↳*System*

Name: Artillery Gun Module

Type: Howitzer

Length, Barrel: mm52 calibers

Weight: INA

Muzzle Velocity: INA

Maximum Rate of Fire: rds/min6-8

Maximum Elevation: deg65

Minimum Elevation: deg-2.5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: km30/40/50

Effective Firing Range: INA

Sights: INA

Note #1: A total of 30 rounds of ammunition are carried for the main gun. A lifting system is installed at the front of the turret. It allows the crew to reload magazine from outside of the vehicle. This artillery system can be adapted for a lighter gun, such as a shorter 155 mm/L39 or even 105 mm gun.

↳*Ammunition (Option #1)*

Name: INA

Type: Standard NATO projectiles

Caliber: mm155

Shell: INA

Basic Load: 30 rounds

Armor Penetration: INA

Note #1: Maximum range of fire is 30 km

↳*Ammunition (Option #2)*

Name: INA

Type: Bleed projectile

Caliber: mm155

Shell: INA

Basic Load: 30 rounds

Armor Penetration: INA

Note #1: Maximum range of fire is 40 km

↳***Ammunition (Option #3)***

Name: South African VLAP

Type: Rock-assisted projectile

Caliber: mm155

Shell: INA

Basic Load: 30

Armor Penetration: INA

Note #1: Maximum range of fire is 50 km

Fire Control System

Name: INA

Computerized FCS: Yes. It receives target data via radio or datalink. The gun is automatically laid using the fire control data. This howitzer is aimed and fired by the crew remotely from the cab. Though in case of emergency or failure this artillery system can be loaded and fired manually. It takes approximately 30 seconds to open fire. Out of action time is also as short as 30 seconds. After firing the last round vehicle can leave its position in order to avoid counter-battery fire.

Main Gun Stabilization: INA

Direct Fire: Yes

Indirect Fire: Yes

:

:

Protection

Hull Armor: Vehicle hull has a modular hull armor with special ceramic mix. The triple hull floor is shaped for maximum protection against anti-tank mines and improvised explosive devices

Turret Armor: The turret is made of lightweight aluminum armor and provides protection only against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Vehicle is fitted with NBC protection system for the crew

Smoke Equipment: INA

Note #1:: This artillery system has low radar and acoustic signatures, making it harder to detect.

Note #2:: The front arc can withstand hits from 30 mm projectiles.All-round protection is against 12.7 mm rounds. Damaged armor slabs can be easily replaced in field condition.

Notes:

In April 2014, Krauss-Maffei Wegmann decided to integrate the artillery gun module (AGM) onto the Boxer armored vehicle, with the system making an appearance at Eurosatory in June 2014. The Boxer has to prove it can deal with recoil forces without stabilization, but stabilization concepts can be added if needed to retain shoot and scoot and 360 degree firing capability. The Boxer-AGM system could be used as an upgrade option for countries with existing boxer fleets. Test firings were completed in 2014. Firing trials with the turret traversed front and to its sides were carried out at WTD 41 proving ground and were successful without the use of stabilizers. The trials also demonstrated the ability to fire an 8-round burst and redeploy under 90 seconds, and carry out multi-round simultaneous impact missions. The combination of the Boxer vehicle with AGM became known as Remote Controlled Howitzer 155 (RCH 155) due to the turret module being remote controlled. Additionally, a remote weapons station with a .50 caliber machine gun has been fitted on the roof.

M110A2 American 203mm Self-Propelled Howitzer (SPH)




Tiers:



Parent:

M110 American 203mm Self-Propelled Howitzer (SPH)

Variants:

- **M110A1:** M110A1, improved variant of the M110, fitted with a longer M201 203 mm/L37 howitzer. It entered service in 1971. Maximum range of fire was increased to 27 km. This self-propelled howitzer fires newly developed rocket-assisted, cluster projectiles, nuclear and chemical projectiles.

System

Alternative Designation: M110A2
Type: Self Propelled Howitzer
Manufacturer: General Motors Corp.
In Service: 1980-Present
Family: M110 Series
Crew: ea5 (commander, driver, 3 gunners)
Resupply Vehicle: + 8 in the associated M548 ammunition resupply vehicle.
Chassis: chassis identical to the M110's
Displacement Time: min1
Emplacement Time: min1
Note: Support crew of 8 men are carried by an escorting armored personnel carrier, which also transports ammunition for this SPH.

Dimensions

Length, with Gun Forward: m10.72
Length, Hull: m5.72
Barrel Length: m8.36
Width: m3.15
Height (To the Top of the Barrel): m3.15

Weight, Combat: tons31.2

Weight, Unloaded: tons28.1

Ground Pressure: 0.76 kg/sq cm

Length of Track on the Ground: m3.94

Track Width: m0.39

Automotive

Engine Name: 1 x Detroit Diesel 8V-71T Engine

Engine Type: Detroit Diesel 8V-71T 569-cu in (9.32-liter) liquid-cooled, 2-stroke, turbocharged V-8 diesel

Engine Power: hp805

Power-to-Weight Ratio: 14.28 hp/metric ton

Cruising Range: km523

Speed, Maximum Road: km/h55

Speed, Average Cross: 15

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.3

Fording Depth: m1.2

Fuel Capacity: liters1,137

Suspension: torsion bar, 5 roadwheels, front drive, last road wheel acts as rear idler, shock absorber on each roadwheel, no return rollers ability to lock suspension out when firing rear-mounted hydraulic spade for bracing firing platform.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note #2: The M110A2 can fire zone 9 projectiles.

↳*System*

Name: M201 Howitzer, 203mm Howitzer

Type: mm203

Length, Barrel: m8.24

Breech Type: Interrupted Screw

Recoil Type: hydro-pneumatic

Max Rate of Fire: 2+ rd/min

Normal Rate of Fire: 1 rd/2 min

Muzzle Brake Type: Double-baffle muzzle brake

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

Maximum Range: km32.2

↳*Ammunition (Option 1)*

Type: M650

Type: HERA (Charge 9)

Caliber: mm203

Projectile Length: mm1,116

Projectile Weight: kg90.78

Muzzle Velocity: m/s710

Maximum Effective Range: m30,000

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 2)*

Name: M509

Type: DPICM

Caliber: mm203

Projectile Length: mm1,115

Projectile Weight: kig96.6

Muzzle Velocity: m/s711

Maximum Effective Range: m22,500

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 3)*

Name: M106

Type: HE

Caliber: mm203

Projectile Length: mm871

Projectile Weight: kg92.53

Muzzle Velocity: m/s711

Maximum Effective Range: m22,900

Basic Load: ea2

Fuse Type: INA

Note: The M110 can also fire the following types of 203mm projectiles: M404 HE, M426 CHEM.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Infrared night-vision equipment

Thermal Sight Gunner: Infrared night-vision equipment

Main Gun Stabilization: Yes, The large spade at the rear is required for the massive recoil.

Direct Fire Telescope: Direct Dire Elbow Telescope

Protection

Hull Armor: 20-mm maximum (estimated)

Turret Armor: 20-mm maximum (estimated)

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Note: This artillery system carries no defensive armament, except individual weapons carried by the crew.

Notes:

The M110A2 is the largest available self-propelled howitzer in the Army's inventory. It is deployed in division artillery of general support battalions and in separate corps- and Army-level battalions. Missions include general support, counter battery fire, and suppression of enemy air defense systems. The M110A2 is a self-propelled heavy artillery cannon with a crew of 12. Designed to be part of a common family of weapons utilising the same chassis components, the M107 and M110 were essentially the same vehicle mounting different barrels. This full-tracked, self-propelled artillery weapon that fires a 200-pound, eight-inch diameter projectile. The shell leaves the muzzle at a velocity of 2,300 feet per second and can travel more than 18 miles.

G6 Rhino South African 155mm Self-Propelled Howitzer (SPH)





Tiers:



Variants:

- **G6 M1A3:** exported UAE version
- **G6-52:** (23 litre chamber)
- **G6-52 extended range:** (25 litre chamber)
- **Al-Majnoon::** licensed Iraqi version Reduced crew to 3–5; can fire projectile up to 67 km at a rate of fire of eight rounds/minute; increased off-road speeds to nearly 70 km/h; implemented multiple rounds simultaneous impact (MRSI) technology and can land six (G6-52L variant) or five (G6-52) rounds simultaneously at targets up to 25 km away; and is currently undergoing extensive trials.
- **G6 Marksman:** British SPAAG version, combining the G6's base vehicle with the Marksman turret.[

System

Alternative Designation: G6 Rhino, G6
Manufacturer: Denel Land Systems (turret) Land Systems OMC (chassis)
Type: Self-Propelled Howitzer (SPH)
Family: G6
Crew: ea6
Chassis: Purpose built 6x6 wheeled
Displacement Time: min1
Emplacement Time: min1

Dimensions

Length: m9.2
Width: m3.40
Height: m3.20

Weight, Combat: tons46

Ground Pressure: kg/mINA

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp518

Cruising Range: km700

Speed, Maximum Road: km/h90

Speed, Average Cross: km/h30

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.45

Trench: m1

Fording Depth: m1

Transmision: Automatic

Note: The driver of the G6 Rhino can select either fully automatic or semi-automatic drive

Communications

Gun Intercom System.: Yes

Radio: UHF/VHF frequency-hopping system

Radio Name: INA

Radio Range: km50

Main Gun

↳*System*

Name: G5 155mm Howitzer

Type: 155mm Howitzer

Manufacturer: Denel Land Systems

Length, Barrel: m6.97

Weight: kg13,750

Width: m3.3

Height: m2.1

Loader Type: Semi-automatic loading system, with a fume extractor

Muzzle Brake Type: INA

Breech Type: Semi-automatic interrupted screw

Max Rate of Fire: rds/min3

Max Elevation: deg+75

Min Elevation: deg-3

Traverse Range: deg180

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range (Base Bleed): km40

Maximum Firing Range (Standard): km30

Maximum Firing Range (VLAP): km50

Feed System: Breech-loaded

Barrel-Cooling Fan: Yes

Note #1: The G6 Rhino is compatible with all NATO 155 mm ammunition

Note #2: Denel Land Systems reported that in 2001 that the G6 Rhino was outfitted with new Velocity enhanced Long range Artillery Projectile VLAP, which extends it's Maximum Effective Range out to 53.6km

↳*Ammunition (Option 1)*

Type: High Explosive (HE)

Caliber: mm155

Muzzle Velocity: m/s937

Shell Type: High Explosive

Projectile Weight: kg47.6

Basic Load: 47 Total of any 155mm Combination

Maximum Effective Range: km24

↳*Ammunition (Option 2)*

Type: Extended Range Full Bore (ERFB)

Caliber: mm155

Length: mm938

Weight: kg45.54

Muzzle Velocity: m/s897

Basic Load: 47 Total of any 155mm Combination

Maximum Effective Range: km30

↳*Ammunition (Option 3)*

Type: Extended Range Full Bore, Hollow Base, Base Bleed (ERFB-HB-BB)

Caliber: mm155

Length: mm938

Weight: kg47.6

Muzzle Velocity: m/s903

Basic Load: 47 Total of any 155mm Combination

Maximum Effective Range: km39

Coaxial Weapon System

↳*System*

Name: 12.7mm M2 Browning Heavy Machine Gun

Type: mm12.7

Max Rate of Fire (M2HB Version): rds/min450-600

Max Rate of Fire (AN/M2 Version): rds/min750-850

Max Rate of Fire (AN/M3 Version): rds/min1,200-1,300

In Service: 1933-Present

Manufacturer: Current: General Dynamics, Fabrique Nationale (

Proliferation: Over 3 Million

Muzzle Velocity: 890

Weight (Gun Only): kg38

Weight (Gun and Tripod): kg58

Length (Total): mm1,654

Length (Barrel): mm1,143

Action: Short recoil-operated

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 0.50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s450-1,300 (See Weapon info)

Basic Load: ea800

Effective Range: km1,800-2,000

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, Type INA

Thermal Sight Gunner: Yes, Type INA

Main Gun Stabilization: INA

Indirect Fire: Digital Panoramic Telescope

Direct Fire: Trunnion Mounted Telescope

Ammunition System: Yes

Meteorological Station: Yes

Muzzle Velocity Analyser: Yes, Muzzle Velocity Radar System (MVRS)

Artillery Helmet Radio Communications System: Yes

Gun System: Gun Management System (GMS)

Gun Display Unit (GDU): Yes

Navigation System: Yes, Laying and Navigation System (LNS)

Ammunition Display Unit (ADU): Yes

Ring Laser Gyro (RLG) Inertial Unit: Yes

Fibre Optic Gyro (FOG) Inertial Unit: Available

Distance Transmitting Unit (DTU): Yes

Global Positioning System (GPS): Yes

Note: Denel Land Systems reported that in 2001 that the G6 Rhino was outfitted with new Velocity enhanced Long range Artillery Projectile VLAP, which extends it's Maximum Effective Range out to 53.6km

Protection

Hull Armor: all-welded steel armour, protection from small arms fire and shell splinters

Turret Armor: all-welded steel armour, protection from small arms fire and shell splinters

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, 81 mm electrically operated grenade launchers which fire smoke grenades.

IR Signature: INA

Double Armored Floor: Yes

Bullet Proof Windows: Yes

Firing Ports: Yes, each side

Thermal Warning Device (TWD): Yes

Notes:

The G6, sometimes denoted as the G6 Rhino, is a South African mine-protected self-propelled howitzer. It was developed as a turreted, self-propelled variant of the G5 howitzer series, mating the gun to a six-wheeled armored chassis. Design work on the G6 began in the late 1970s to replace the obsolescent Sexton being retired from service with the artillery regiments of the South African Army. Serial production commenced between 1988 and 1999. At the time of its introduction, the G6 was considered one of the most mobile self-propelled howitzers in service. Its chassis was engineered to be mine-resistant and blast proof, allowing it to survive multiple TM-46 detonations during trials. The G6 was conceived as a wheeled rather than a tracked vehicle for this purpose, as well as to allow it to deploy long distances by road without consuming excessive quantities of fuel or requiring a tank transporter.

2S19M1 (Msta-SM1) Russian 152mm Self-Propelled Howitzer (SPH)





Tiers:



Parent:

2S19 Msta Russian Self-Propelled Howitzer (SPH)

Variants:

- **152 mm howitzer 2A65:** a towed version of the same gun.
- **1K17 Szhatie -:** a "laser tank" armed with a battery of lasers meant to disable optoelectronic systems; uses Msta-S chassis and turret.
- **2S33 "Msta-SM":** Improved version. Prototype.
- **2S19M1 (2000):** Improved version with automatic laying system and Glonass.
- **2S19M2 "Msta-SM2" (2013):** mproved version currently in production equipped with a new automatic fire control system which increases the rate of fire. Digital electronic maps are now available which significantly speeds up the terrain orientation in difficult geographical conditions and allows performing faster and more efficiently firing missions.
- **2S19M1-155 (2006):** 155mm export version of the 2S19M1, fitted with an L/52 gun with a range of 40+ km.
- **2S27 "Msta-K":** Wheeled variant (K = kolyosnij), based on a 8x8 truck chassis. There were several different prototypes, including one based on a KrAZ-ChR-3130 and two based on the Ural-5323 (with and without turret).
- **2S30 "Iset":** Improved version, prototype only.
- **2S35 "Koalitsiya-SV" -:** Project for a new artillery system for the Russian land forces (SV = sukhoputniye voyska). Early prototypes consisted of a 2S19 chassis with modified turret, fitted with an over-and-under dual autoloaded 152mm howitzer. Development of this variant was abandoned in favour of an entirely new artillery system using the same designation

System

Alternative Designation: 2S19M1 (Msta-SM1)
Estimated out of service date: 2038
Manufacturer: Uraltransmash
Type: Self-propelled howitzer
Family: Msta-S 2S19 family
Crew: ea5
Chassis: Modified T-72
Displacement Time: min1.5
Emplacement Time: min1.5
Navigation System: Yes, GNSS

Dimensions

Length: m7.15

Width: m3.38

Height: m2.99

Weight, Combat: tons42

Ground Pressure: kg/mINA

Automotive

Engine Name: V84-A

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h25

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.85

Trench: m2.8

Fording Depth (Without Preparation): m1.2

Fording Depth (With Preparation): m5

Suspension: torsion bar

Auxiliary Power: AP-18D system

Communications

Primary: R-173M

Secondary: R-168-25UE-2 Radio

Intercom: 1V116 intercom

Main Gun

↳*System*

Name: 152 mm 2A64 Long Barrel Gun

Type: mm152

Breech Type: Vertical sliding wedge

Manufacturer: Motovilikha Plants

Length, Barrel: 7,200m L/47

Weight: kg6,800

Loader Type: Automated

Max Rate of Fire: rds/min8

Sustain Rate of Fire: rds/min3-4

Muzzle Brake Type: Double baffle

Max Elevation: deg+68

Min Elevation: deg-3

Traverse Range: deg360

Range Finder Type: INA

Central Bore Evacuator: Yes

Travel Lock: Yes

TZM-K 2F66-1 Capable: Yes

Note # 1: Engage a target within 30 seconds of receiving target coordinates,

Note # 2: the 2S19 to fire all 152 mm howitzer ammunition in the Russian inventory, including those rounds designed for very old Soviet weapons such as the D-20.

↳*Ammunition (Option 1)*

Type: 152-mm Frag-HE, OF-72

Caliber: mm152

Muzzle Velocity: m/s864

Fuse Type: RGM-2 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m24,700

Complete Projectile Weight (OF-45): kg43.56

↳*Ammunition (Option 2)*

Type: 152-mm Frag-HEAT, BP-540

Caliber: mm152

Muzzle Velocity: m/s655

Fuse Type: GPV-3 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m27,000

Complete Projectile Weight: kg27

↳*Ammunition (Option 3)*

Type: 152-mm Frag-HE BB, OF-91

Caliber: 152

Muzzle Velocity: m/s828

Fuse Type: KZ-88 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m29,000

Complete Projectile Weight (OF-61): kg42.86

Note: The 2S19 can fire the additional 152mm projectiles: 9K25 Krasnopol guided projectile and the 3-RB-30 radio jamming round

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: mm12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Max Rate of Fire: rds/min700-800

Weight (Gun Only): kg25

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7 mm

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: Kapustnik-B 1V126 fire control system,

Computerized FCS: Yes

Modernised Gun Control Equipment: 2E46M.

Automated Fire Control System: 1V168 ASUNO-S (Success)

Grot-B GLONASS Receiver: Yes

Thermal Sight Vehicle Commander: Yes, PZU-5 or PZU-7 sight

Thermal Sight Gunner: Yes, Panoramic 1P22 sight and 1P23 direct fire set

Main Gun Stabilization: Yes, self-orientating gyro stabilisation system

Indirect Fire: 1P22 Panoramic Telescope (PANTEL)

Direct Fire: 1P23

Collimator: K-1

Ballistic Computer: Yes

Traverse: Semi-Automatic

Artillery Command and Control System: 1V12M Falstet artillery command and control system

Note # 1: Returns the barrel to its firing line automatically after every shot

Note # 2: conduct fire missions at the maximum rate of fire by day or night and in all weather conditions whether the target can be seen or not.

Protection

Hull Armor: mmClassified

Turret Armor: mmClassified

Armor Material: Rolled homogeneous armour that is further protected by Combination-K armour.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Built-in bulldozer blade: Yes

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM)

Smoke Equipment: Yes, via the exhaust manifold

Grenade Launcher: Yes, six 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Grenade Range: m200-300

Grenade Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade

Automatic fire suppression systems.: Yes

Camouflage system: Yes, Накидка or cape camouflage system

Camouflage IR Reduction: %30

Notes:

2S19M1 (2000) - Improved version with automatic laying system and Glonass. Upgrade to the 2S19 Msta-s. The 2S19 "Msta-S" (Russian: Мста, after the Msta River) is a 152.4 mm self-propelled howitzer designed by Russia/Soviet Union, which entered service in 1989 as the successor to the 2S3 Akatsiya. The vehicle is based on the T-80 tank hull, but is powered by the T-72's diesel engine.

PCL-09 Chinese 122mm Self-Propelled Howitzer





Tiers:



Variants:

- **CS/SH1:** Export version of the PCL-09
- **PLL-09:** Self-propelled howitzer, based on ZBL-09 8x8 armored personnel carrier chassis. It was adopted alongside the PCL-09. The PLL-09 is more mobile due to its chassis. It is capable of keeping pace with main battle tanks. Also this artillery system is fully amphibious and can ford water obstacles afloat.

System

Alternative Designation: PCL-09 Chinese 122mm Self-Propelled Howitzer
Type: Howitzer
Caliber: mm122
Chassis: Shaanxi 6x6 Military Truck
Crew: ea5
Emplacement Time: 1.5 - 2.5 minutes
Displacement Time: 1.5 - 2.5 minutes
Note #1: A complete PCL-09 battery comprises of around 6 truck-mounted howitzers, and a battery command post vehicle. The regiment of the PCL-09 consists of a couple of batteries, and also includes one battalion command post vehicle, one meteorological radar, one artillery locating radar and some reconnaissance vehicles.

Dimensions

Length: m8
Barrel Length: 38 calibers
Width: m3
Height: 2.1 m without turret
Weight, Combat: t16.5

Automotive

Engine Name: Wei Chai WD615.77
Engine Type: Diesel
Engine Power: hp280

Cruising Range: km86

Speed, Maximum Road: km/h85

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %67

Side Slope: %30

Vertical Step: m0.5

Fording Depth, without Preparation: m1.2

Fording Depth, with Preparation: m1.2

Trench: m0.5

Main Weapon System

↳*System*

Name: A version Soviet D-30 field howitzer

Type: Howitzer

Length, Barrel: mm38

Weight: INA

Muzzle Velocity: INA

Maximum Rate of Fire: rds/min6-8

Maximum Elevation: deg70

Minimum Elevation: deg3

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

Maximum Firing Range: km18-27

Effective Firing Range: INA

Sights: INA

↳*Ammunition (Option #1)*

Name: INA

Type: HE-FRAG

Caliber: mm122

Shell: INA

Basic Load: 40 rounds

Armor Penetration: INA

Maximum firing range: 18 km

Note #1: This system is separate-loaded ammunition with projectiles and their charges

↳*Ammunition (Option #2)*

Name: INA
Type: Extended-range projectile
Caliber: 122 mm
Shell: INA
Basic Load: 40 rounds
Armor Penetration: INA
Maximum firing range: 22 Km

↳*Ammunition (Option #3)*

Name: INA
Type: Rocket assisted projectile
Caliber: 122 mm
Shell: INA
Basic Load: 40 rounds
Armor Penetration: INA
Maximum firing range: 27 km
Note #1: The PCL-09 is also capable of firing 122 mm laser-guided projectiles. These are based on Russian Kitolov projectile technology.

Fire Control System

Name: INA
Computerized FCS: Yes, the PCL-09 is fitted with a computerized fire control system, navigation, positioning and targeting systems. It receives target information from artillery command post vehicle.
Main Gun Stabilization: Large spades and stabilizing jacks are lowered to the ground prior to firing. These provide a more stable firing platform.
Direct Fire: INA
Indirect Fire: Yes
Digital Battlefield Management System: Yes
:

Protection

Hull Armor: It seems that this artillery system carries no defensive armament
Turret Armor: INA
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Chinese Army has followed the global shift and embraced the concept of a lighter, more mobile ground force. This is showcased by the adoption of such battlefield elements as the PCL-09, a 6x6 wheeled, self-propelled, artillery-carrying vehicle capable of delivering various warhead types at range. The system is believed to have appeared in or around 2009 and was publicly showcased in 2010 military exercises. The Chinese Army fields about six PCL-09 trucks per battery with these being assigned several accompanying support vehicles (radar director, Command Post, etc.). Like other weapons of this kind, the PCL-09 is used as a ranged solution capable of supplying ground forces with fire support. The mobile nature of the vehicle allows the weapon to be relocated, fired, and relocated once again in short order. Prior to firing, support legs at the center of the chassis are lowered into the earth to help absorb the inherently violent recoil of such a weapon.

2S35-1 Koalitsiya-SV-KSh Russian 152mm Self Propelled Howitzer (SPH)




Tiers:

1 2 3 4

Parent:

2S35 Koalitsiya-SV Russian Self Propelled Howitzer (SPH)

System

Alternative Designation: 2S35-1 Koalitsiya-SV KSh

Manufacturer: Burevestnik Central Scientific Research Institute

Type: Self Propelled Howitzer (SPH)

Family: 2S35

Crew: ea3

Chassis: The KamAZ-6560 is a heavy-duty military truck.

Chassis Configuration: 8x8

Estimated Service Life: years30

Emplacement Time: min1.5

Displacement Time: minless than 1

Note: This artillery system can be seen as a less expensive and more mobile alternative to the tracked version.

Dimensions

Length (Truck Only): m10.3

Width (Truck Only): m2.5

Height (Truck Only): m3.27

Weight, Combat: tons48-55

Ground Pressure: kg/mINA

Note: Chassis is based off the The KamAZ-6560

Automotive

Engine Name: KamAZ-740.35

Engine Type: Diesel

Engine Power: hp400

Cruising Range: km1,000

Speed, Maximum Road: km/h90

Speed, Maximum Off-Road: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2.0

Fording Depth: m1.8

Communications

Name: R-168-25U-2

Type: VHF

Quantity: ea2

Frequency: 30-180 MHz

Capabilities: FH Voice Data Retrans

Maximum Range: 25-40 km

Mount Type: Vehicle

Length: mm205

Width: mm175

Height: mm95

Weight: kg3

Main Gun

↳*System*

Name: 152 mm/L52 2A88 Howitzer

Type: mm152

Breech Type: Vertical sliding wedge

Length, Barrel: mmINA

Loader Type: Automated with a pneumatic rammer

Max Rate of Fire: rds/min16

Normal Rate of Fire: rds/min12

Muzzle Brake: Double baffle

Recoil System: Yes

Bore Evacuator: Yes

Max Elevation: deg+70

Min Elevation: deg-7

Traverse Range: deg360

Maximum Firing Range (Precision-Guided Rounds): km80

Maximum Firing Range (Standard Rounds): km40

Time to Fully Reload: min15

Ignition System: Microwave ignition system

Note: The Koalitsiya-SV KSh is also capable of firing older Krasnopol precision guided munitions with a range of 20 km.

↳*Ammunition (Option 1)*

Type: 152-mm Frag-HE, OF-72

Caliber: mm152

Muzzle Velocity: m/s864

Fuse Type: RGM-2 PD

Basic Load: ea65 Total Rounds of any 152mm combination projectile

Effective Range: km24

Projectile Weight: kg43

↳*Ammunition (Option 2)*

Type: 152-mm Frag-HEAT, BP-540

Caliber: mm152

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

Basic Load: 65 Total Rounds of any 152mm combination projectile

Maximum Effective Range: km27

Complete Projectile Weight: kg27

↳*Ammunition (Option 3)*

Type: 152-mm Frag-HE BB, OF-91

Caliber: mm152

Muzzle Velocity: m/s828

Fuze Type: KZ-88 PD

Basic Load: 65 Total Rounds of any 152mm combination projectile

Maximum Effective Range: km29

Complete Projectile Weight (OF-61): kg42.86

Note: The 2S19 can fire the additional 152mm projectiles: 9K25 Krasnopol guided projectile and the 3-RB-30 radio jamming round

Coaxial Weapon System

↳*System*

Name: 12.7×108mm ZiD Kord Remote weapon station
Type: mm12.7
Manufacturer: V.A. Degtyarev Plant
In Service: 1998-Present
Length: mm1,980
Max Rate of Fire: rds/min650-600
Sustain Rate of Fire: rds/min550-600
Action: Gas-operated, rotating bolt
Feed System: 50-round linked belt
Sights: Iron Sights with two sighting options, known as CAM and CAM1
CAM 1 Capability: TV/IR camera and a laser rangefinder
CAM 2 Capability: TV camera, Thermal Camera and laser rangefinder
Variants: 6P50-1, 6P50-2, 6P50-3, 6P49
Note: Remote weapon cocking capability

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: mm12.7×108
Muzzle Velocity: m/s860
Basic Load: ea2,500
Effective Range: m2,000

Fire Control

Name: INA
Computerized FCS: Yes, with Automatic targeting and charge selection system.
Thermal Sight Vehicle Commander: Yes, CAM 1 (TV/IR camera, Thermal Camera and a laser rangefinder)
Thermal Sight Gunner: Yes, CAM 2 (TV/IR camera, Thermal Camera and a laser rangefinder)
Main Gun Stabilization: INA
Multiple Round, Simultaneous Impact (MRSI) Capable: Yes
Direct Fire: Yes
Indirect Fire: Yes
Radars: ea2
Radar Type: Doppler

Protection

Hull Armor: mmcomposite laminate design up to 200 mm thick
Turret Armor: mmcomposite laminate design up to 200 mm thick. The Turret is not heavily Armored
Applique Armor: Available
Explosive Reactive Armor: Available, the Kontakt-V Explosive Reactive Armour.
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: Yes, can dig 12 m × 5.5 m × 1.5 m entrenchment in sandy soil within 12 to 15 minutes.
NBC Protection: Reported to be the GO-27 PRKhR (NBC) System
Fire Suppression System: Reported to be the Raduga-2 Fire Suppression System
Smoke Equipment: Yes, 2 bundles of 902B Tucha smoke grenade launchers
Smoke Grenade Range: m250-300
Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade
IR Signature: INA

Notes:

The 2S35-1 Koalitsiya-SV KSh is a new Russian 152mm Self-Propelled Howitzer. Developed by JSC Central Research Institute Burevestnik, the 2S35-1 Koalitsiya-SV KSh is mounted on an 8x8 KAMAZ-6560 truck chassis and has the same turret and fires the same ordinance as its predecessor the 2S35-1 Koalitsiya-SV. With a maximum range of up to 70 kilometers using precision-guided projectiles, and 40 kilometers using standard projectiles, the 2S35-1 Koalitsiya-SV KSh is an extremely mobile self-propelled howitzer system. The 2S35-1 Koalitsiya-SV KSh can fire a variety of 152mm projectiles ranging from: Anti-Tank projectiles; Jammer carrying projectiles, Cluster projectiles, Rocket-Assisted projectiles; standard projectiles, and HE-FRAG projectiles.

SH-2 Chinese 122mm Self Propelled Howitzer (SPH)





Tiers:



Variants:

- **SH1:** The SH-1 self-propelled howitzer was developed by NORINCO for the export market. Development of this artillery system commenced in 2002. It was modeled after a French CASEAR. This Chinese artillery system was first revealed in 2007. Details of this artillery system were released at the same time as were details of the smaller SH-2 122 mm truck-mounted howitzer. Pakistan acquired a total of 90 SH-1 truck-mounted howitzers. Deliveries were completed between 2012 and 2013. This artillery system is also in service with Myanmar. The SH-1 was aimed mainly at export as Chinese army does not use this system.
- **SH3:** The WMZ322 is a 122mm tracked self-propelled howitzer designed and manufactured by the Chinese Defense Company NORINCOP (North Industries Corporation). First information about this artillery systems was released in 2005, but NORINCO has never published technical details about the product. According some Chinese military sources, the WMZ322 is proposed for the export under the name of SH-3.

System

Alternative Designation: SH2

Manufacturer: NORINCO

Type: 122mm Self Propelled Howitzer (SPH)

Family: INA

Crew: ea5

Chassis: Truck Mounted, 6 × 6 cross-country chassis

Displacement Time: min50

Emplacement Time: min2

Maximum Effective Range (Road): km600

Maximum Effective Range (Howitzer): m27,000

Add on Parts: different communications equipment, tactical direction and fire distribution, positioning, orientation and navigation systems, and an automatic gun-laying ability.

Dimensions

Length: m8.5

Width: m2.5

Height: m2.9

Weight, Combat: tons11.5

Ground Pressure: kg/mINA

Automotive

Engine Name: INA

Engine Type: Supercharged, water-cooled, diesel engine

Engine Power: hp160

Cruising Range: km600

Speed, Maximum Road: km/h90

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Fording Depth: mINA

Ground Clearance: mINA

Steering: front and rear axles

Central Tire Pressure Regulation System: Available

Communications

↳***TBR-142***

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: Type-96 (122 mm) towed howitzer

Type: 122mm Self Propelled Howitzer (SPH)

Breech Type: INA

Length, Barrel: 32 Calibers

Loader Type: INA

Max Rate of Fire: rds/min6-8

Sustain Rate of Fire: rds/min6

Time the Max Rate of Fire can be Sustained: sec50

Muzzle Brake Type: Fume Extractor and Muzzle Brake

Max Elevation: deg-1

Min Elevation: deg+79

Traverse Range: kmINA

Traverse Left: deg60

Traverse Right: deg60

Range Finder Type: Laser Guided

Note: The SH2 can fire Chinese and Russian 122mm Projectiles, to include the GP122 laser-homing projectile which has a maximum range of 5 to 14 km.

↳*Ammunition (Option 1)*

Type: High Explosion (HE)

Caliber: 22mm/35cal

Muzzle Velocity: m/s690

Fuse Type: INA

Basic Load: ea24 total of any projectile combination

Effective Range: m18,000 (High Explosive - HE)

Armor Penetration: Yes, up to 85mm of conventional steel armour

Weight: kg21.76

Diamter: mm39.2

↳*Ammunition (Option 2)*

Type: HE Hollow Base Projectile

Caliber: mm122

Muzzle Velocity: m/s725

Fuse Type: INA

Basic Load: 24 total of any projectile combination

Effective Range: m18,000

Armor Penetration: Yes, up to 85mm of conventional steel armour

Weight: kg21.76

Diameter: mm39.2

↳*Ammunition (Option 3)*

Type: HE Base Bleed (BB) Projectile

Caliber: mm122

Muzzle Velocity: m/s730

Fuse Type: INA

Basic Load: 24 total of any projectile combination

Effective Range: m22,000

Armor Penetration: Yes, up to 85mm of conventional steel armour

Weight: kg22.5

Diameter: mm39.2

↳*Ammunition (Option 4)*

Type: HE BB Rocket-Assist Projectile Type BEE2

Caliber: mm122

Muzzle Velocity: m/sINA

Fuse Type: INA

Basic Load: 24 total of any projectile combination

Effective Range: m27,000

Armor Penetration: Yes, up to 85mm of conventional steel armour

Weight: INA

Diameter: mm39.2

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Two hydraulically operated stabilisers

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

Protection

Hull Armor: All-steel frame

Turret Armor: All-steel frame

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Available

Bullet-Proof Windows: Front and Sides

Notes:

The SH2 is a wheeled self-propelled howitzer designed and manufactured by the Chinese Defence Company Norinco. The SH2 artillery system was first unveiled at the Abu Dhabi International Defence Exhibition in 2007 (IDEX 2007) held between 18 and 22 February, and is being actively prompted to the export market. The lightweight and high-mobility features of this artillery system may be of special appeal to the PLA airborne force and marine corps. The SH2 has demonstrated superior performance under all weather conditions and a wide range of altitude, and it can be equipped with special gear as per mission requirement.

M1977 North Korean 122mm Self-Propelled Howitzer



Tiers:

1 2 **3** 4

System

Alternative Designation: M1977
Type: 122mm Self-Propelled Howitzer
Chassis: The M1977 self-propelled howitzer is based on an M1973 armored personnel carrier chassis, which is sometimes referred as VT-323.
Crew: 8-9
Emplacement Time: Under 3 minutes
Dsiplacement Time: Under 3 minutes

Dimensions

Length: 5.5 m
Width: 2.9 m
Height: 2.7 m
Weight, Combat: 16 tons

Automotive

Engine Name: Deutz BF8L413F
Engine Type: Diesel
Engine Power: hp320
Cruising Range: km400
Speed, Maximum Road: km/h60
Speed, Average Cross: INA
Speed Maximum Swim: km/h5
Gradient: %60
Side Slope: %30
Vertical Step: 0.6 m

Trench: 2 m

Fording Depth: Amphibious

Note: The M1977 self-propelled howitzer is fully amphibious. Even though rear-mounted waterjets of the M1973 armored personnel carrier were removed, this vehicle is propelled on water by its tracks. It can ford inland waterways such as lakes and rivers.

Main Weapon System

↳*System*

Name: The Soviet D-30 122 mm/L38 Howitzer

Type: Howitzer

Caliber: 122mm

Length, Barrel: 38 calibers

Maximum Firing Range: 21,9 km

Maximum Rate of Fire: 6-8 rpm

Elevation: 0-70 deg

Traverse: INA

↳*Ammunition*

Name: INA

Type: Projectile

Caliber: mm122

Projectile Weight: 14.08 - 21.76 kg

Basic Load: INA

Armor Penetration: A High-Explosive (HE) projectile penetrates a 180 mm steel armor plate.

Note #1: This North Korean artillery system uses an ordnance of the Soviet D-30 towed howitzer.

Note #2: The Soviet D-30 122 mm/L38 towed howitzer was created in the late 1950s and eventually proved to be a successful weapon. It was exported to numerous countries, including the North Korea. Maximum range of fire is 15.3 km with a standard High-Explosive Fragmentation (HE-FRAG) projectile and 21.9 km with rocket-assisted projectile.

Auxiliary Weapon System

Note: There is no information available about the type of auxiliary Weapon Systems are mounted on the M1977.

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: Yes, two large stabilizing spades are lowered to the ground at the rear.

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: The tracked chassis is lightly armored and has enclosed sides, but open top. It provides some degree of protection from small arms fire and artillery shell splinters. In traveling order the open top can be covered with bows and canvas cover.

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No, This artillery system has no defensive armament, except firearms of its crew members.

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1977 is a North Korean 122 mm self-propelled howitzer. Its actual designation is unknown. The M1977 designation was allocated by a US Department of Defense. Number in the designation denotes the year when this system was observed by US intelligence. This North Korean artillery system was adopted in the mid 1970s and is widely used to this day. As far as it is known the M1974 was not exported outside North Korea.

Type 83 Chinese 152mm Self-Propelled Howitzer (SPH)





Tiers:

1 2 3 4

Variants:

- **Type 89 Multiple Launch Rocket System:** Type 89 multiple launch rocket system. It is based on the same tracked armored chassis. This artillery rocket system was revealed in 1999. It is speculated that this system entered service in the late 1990s and was not offered for export. It replaced in service the ageing Type 70 130 mm artillery rocket systems.
- **425-mm mine-clearing system:** This is a basic vehicle with a limited-traverse launcher that has two cradles, each holding a large rocket with a range of 875-1,090 yds (800-1,000 m). When the rocket lands, it explodes -- clearing an area 140 yds (130 m) long by 13-24 yds (12-22 m) wide. The mine-clearance vehicle's combat weight is 59,525 lb (27,000 kg); it is is 23 ft 6 in (7.16 m) long and 10 ft 6 in (3.20 m) tall. Its launcher elevation range is -5 degrees to 45 degrees; traverse is 90 degrees to each side. The vehicle has a crew of five. The mine-clearing rocket weighs 1,675 lb (760 kg) and the warhead -- which is 15 ft 5 in (4.70 m) long -- accounts for 1,320 lb (600 kg) of that total weight.
- **Type 89 Tank Destroyer:** The Type 89 is a tank destroyer based on the hull of the Type 83. It features a 120-mm smoothbore anti-tank gun in a new turret.
- **Trench Digger:** A trench digger has been developed based on the hull of the Type 83 self-propelled howitzer. The vehicle, fitted with a front-mounted dozer blade, can dig between 8,830 cubic ft (250 cubic m) to 10,590 cubic ft (300 cubic m) of earth per hour using a digging machine carried over the rear of the hull. A crew of three operates the digger from a raised cab at the front of the vehicle. The trench digger has a combat weight of 66,140 lb (30,000 kg). The vehicle is no longer offered for export by NORINCO.

System

Alternative Designation: None
Date of Introduction: 1984
Manufacturer: NORINCO
Proliferation: China: 78
Type: 152mm Gun-Howitzer
Family: INA
Crew: 5 (commander, driver, gunner, 2 loaders)
Chassis: Type 83
Displacement Time: min1
Emplacement Time: min1
Maximum Effective Range: km17.2 - 28
Note: The Type 83 has been supplemented by the newer and more capable PLZ05 and will eventually be replaced.

Dimensions

Length (Hull): m6.41

Length (Gun Foward): m7.01

Width: m3.24

Height (Turret Top): m2.68

Height (Overall): m3.50

Weight, Combat: mt30

Ground Pressure: kg/m0.68

Automotive

Engine Name: Deutz Type 12150L

Engine Type: liquid cooled diesel

Engine Power: hp520

Fuel: liters885

Cruising Range: km450

Speed, Maximum Road: km/h55

Speed, Average Cross: km/h35

Towed Speed: km/h60

Speed Maximum Swim: Not Amphibious

Fording Depth: m1.3

Wheel Base: Tracked chassis, 6 roadwheels, drive sprocket front, idler rear, 4.61 m length, 0.48 m width, 2.62 m track

Carriage: Split Trail

Trench Digger Capable: Yes, capable of digging 250m to 300m

Fording without Preparation: m1.3

Gradient: %60

Side Slope: %40

Vertical Obstacle (Forward): m0.7

Trench: m2.5

Communications

Radio Type: 889D Radio Set

Intercom System: Type 803

↳***TBR-142***

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: Type 66, Type 83 (152mm Howitzer)

Type: Self-propelled artillery, 152mm Howitzer

Manufacturer: NORINCO

Status: n service. Production complete. No longer marketed.

Breech Type: Semi-automatic sliding wedge breech

Length: m9.8

Width: m3.24

Height: m3.50

Loader Type: No ammunition handling system

Max Rate of Fire: rds/min8

Sustain Rate of Fire: rds/min8

Time the Max Rate of Fire can be Sustained: INA

Maximum Range: km30

Minumum Range: km10

Muzzle Brake Type: Double Baffle muzzle brake

Max Elevation: deg+65

Min Elevation: deg-5

Traverse Range: m15,600

Traverse Left: deg24

Traverse Right: deg26

Range Finder Type: Panoramic

Axis of Fire: m1.4

↳*Ammunition (Option 1)*

Type: 152mm HE Projectile

Alternative Designation: Type 83

Caliber: mm152

Length: mm703

Weight: kg48

Muzzle Velocity: m/s655

Effective Range: km17.2

Basic Load: 30 rounds total any combination of 152mm Rounds.

Fuse Type: RGM-2, RGM-2m, D-1U, V-90

Charge Type: Full

Armor Penetration: Yes

Minimum Distance of Jammer Deliver: km4

Maximum Distance of Jammer Deliver: km16.9

Minimum Distance of Detachment Above Target: km1.6

Operation Range: m700

Explosive Filling: kg16.4

Weight of Jammer: kg3.8

Normal Recoil: mm910

Maximum Recoil: mm950

↳*Ammunition (Option 2)*

Type: 152mm HE-FRAG Projectile

Model: OF-540

Caliber: 152mm

Length: mm703

Weight: kg43.6

Muzzle Velocity: m/s655

Effective Range: km17.2

Basic Load: 30 rounds total any combination of 152mm Rounds.

↳*Ammunition (Option 3)*

Type: 152mm Cargo Projectile

Model: INA

Caliber: mm152

Length: mm835

Weight: kg43.6

Muzzle Velocity: m/s655

Effective Range: km17

Basic Load: 30 rounds total any combination of 152mm Rounds.

↳*Ammunition (Option 4)*

Type: BB-HE Projectile

Model: INA

Caliber: mm152

Length: mm874

Weight: kg43.6

Muzzle Velocity: m/s660

Effective Range: km22

Basic Load: 30 rounds total any combination of 152mm Rounds.

↳*Ammunition (Option 5)*

Type: BB-RA/HE Projectile

Model: INA

Caliber: mm152

Length: mm873

Weight: kg43.5

Muzzle Velocity: m/s674

Effective Range: km28

Basic Load: 30 rounds total any combination of 152mm Rounds.

↳*Ammunition (Option 6)*

Type: Jamming

Model: INA

Caliber: mm152

Length: mm713

Weight: kg43.6

Muzzle Velocity: m/s655

Effective Range: kg17.2

Basic Load: 30 rounds total any combination of 152mm Rounds.

Coaxial Weapon System

↳*System*

Name: Type 54 (DShKM)
Type: 12.7 mm Type 54 Heavy Machine Gun
Proliferation: over 1 Million
Length (Total): mm1,625
Barrel Length: mm1,070
Weight (Gun Only): kg34
Weight (On Wheeled Mounting): kg157
Action: Gas-Operated, Flapper Locking
Feed System: 50 Round Belt
Sights: Iron/Optical
Max Rate of Fire: Ina
Sustain Rate of Fire: rds/m600
Time the Max Rate of Fire can be Sustained: INA
Range Finder Type: INA
Turret: Single seat and located at the rear of the vehicle
Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: Heavy machine gun and anti-materiel rifle cartridge
Caliber: mm12.7x108
Muzzle Velocity: m/s850
Basic Load: 1,200
Effective Range: m2000-2,500
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes
Thermal Sight Gunner: Yes
Main Gun Stabilization: Yes
Range, Day Sight: INA
Range, Thermal Sight: INA
Indirect Fire: Yes, Panoramic

Direct Fire: Yes, Type CS-43 (with x5.5 Magnification)

Direct Fire Maximum Range: m1,1170

Sight: Type 58 Panoramic Sight

Sight Magnification: x3.7

Collimator: Type 58

Protection

Hull Armor: Armored Steel (Protection from shell splinters and small arms)

Turret Armor: Armored Steel (Protection from shell splinters and small arms)

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

IR Signature: INA

Notes:

The Type 83 152mm SP howitzer is capable of firing all standard types of 152mm rounds. The main armament cannon is based on the Chinese 152mm towed Type 66 mounted on a vehicle hull similar to the Russian 152mm SP gun-howitzer 2S3. The crew communicates with each other using the Type 803 intercom system. There are reports of the Type 83 being equipped with an anti-tank rocket launcher referred to as the Type 40. However, it is suspected that the rocket launcher is really the 40mm anti-tank rocket launcher Type 69-1 (an upgraded variant of the Russian RPG-7). Variants of this system are based on the Type 66, Chinese copy of the D-20 howitzer 425mm mine-clearing rocket launcher Type 462: 2-round rocket launcher for use in clearing minefields. 120mm SP anti-tank gun: the AT gun is fitted with a 120mm smoothbore, mounted inside a turret on a Type 83 gun-howitzer chassis Other ammunition types: HE-I, illumination, smoke

2S3M1 Russian 152mm Self-Propelled Howitzer (SPH)





Tiers:



Parent:

2S3 Akatsiya (M1973) Russian 152mm Self-Propelled Howitzer (SPH)

Variants:

- **2S3 (SO-152):** Basic variant, developed in 1968. Produced in 1970–1975. Two modifications used D-11 and D-11M howitzers.
- **2S3M (SO-152M):** Equipped with a mechanized drum-type stowage for 12 rounds, the amount of hatches in rear armored plates of the hull and the turret was reduced, the configuration of those hatches was changed, antenna of R-123 radio set was transferred on a turret top. Ammunition was increased from 40 to 46 rounds (usually consists of 42 OF-540 and OF-25 HE-Frag projectiles, and of 4 BP-540 HEAT-FS projectiles). Much more powerful OF-29 HE-Frag projectiles and OF-38 Krasnopol laser-guided rocket-assisted projectiles were developed for SO-152M. The modernized howitzer has a designator 2A33. Produced in 1975–1987.
- **2S3M1 (SO-152M1):** Equipped with a command data acquisition and display equipment, and with a new SP-538 sight. OF-38 Krasnopol laser-guided rocket-assisted projectiles were added to standard ammunition. Produced in 1987–1993. All 2S3s and 2S3Ms were modernized to 2S3M1 level.
- **2S3M2 (SO-152M2):** Modernized variant equipped with an automatic fire control system, a satellite navigational system, and smoke grenade launchers. Developed in 2000.
- **2S3M2-155:** An export-oriented variant of 2S3M2 equipped with a new 155 mm M-385 howitzer. Developed in 2000.
- **2S3M3:** An experimental variant of 2S3M2 equipped with a further improved fire control system and a modernized howitzer 2A33M that can fire ordnance of a more powerful 2A65 howitzer that equips the 2S19.

System

Alternative Designation: 2S3M1 (SO-152M1)
Manufacturer: Uraltransmash
Type: Self-propelled gun
Crew: ea4
Chassis: Object 123 tracked chassis

Family: 2S3 Family

Displacement Time: min3

Emplacement Time: min3

Dimensions

Length (Overall): m9.48

Length (Hull): m7.765

Width: m3.25

Height: m3.05

Weight, Combat: kg27,800

Ground Clearance: m0.45

Track Width: mm480

Length of track on ground:: m4.94

Ground pressure: psi8.39 psi

Automotive

Engine Name: V-59

Engine Type: Diesel

Engine Power: hp520

Power to Weight Ratio: hp/ton17.3

Transmission: Mechanical two-gear transmission

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Setp: m0.7

Trench: m3

Time to dig Trench: min20-40

Fording Depth: m1

Fuel Capacity: liters830

Suspension: Torsion bar

Communications

Primary Radio: R-123 radio set

Intercom: R-124 intercom

Data Terminal: Yes

Main Gun

↳*System*

Name: 152.4mm D-22 howitzer L/27

Type: mm152 mm howitzer

Breech Type: INA

Length, Barrel: m5.195

Loader Type: semi-automatic

Max Rate of Fire: rds/min3-4

Sustain Rate of Fire: rds/min1

Rapid Fire: rds/min4

Breech Type: rds/minsemi-automatic vertical wedge breechblock and an ejector

Muzzle Brake Type: double-baffle muzzle brake,

Max Elevation: deg+60

Min Elevation: deg-4

Traverse Range: deg360

Loading Carousel: Yes, which makes the weapon fire faster than the S23 Akatsiya (M1973)

Bore Evacuator: Yes, Behind the muzzle brake

Fume Extractor: Yes

Traveling Lock: Gun barrel traveling lock

↳*Ammunition (Option 1)*

Type: OF-540 HE-Frag

Caliber: mm152

Muzzle Velocity: m/s655

Fuse Type: RGM-2 fuze

Basic Load: 40 Total, any combination of Russian 152mm Projectiles

Maximum Effective Range: km20,550

Projectile Weight: kg43.56

Warhead Weight: kg7.76

Maximum Range: km18.5

↳*Ammunition (Option 2)*

Type: OF-25 HE-Frag

Caliber: mm152

Maximum Range: km23,900

Basic Load: 40 Total, any combination of Russian 152mm Projectiles

Projectile Weight: kg43.56

Note: The 2S3 Akatsiya can fire the following 152mm Projectiles: BP-540 HEAT-FS (sight distance is 3 km, 250 mm armor penetration), Br-540B and Br-540 AP-T (115–120 mm armor penetration at a 1000 m), OF-38 Krasnopol laser-guided rocket-assisted projectiles, S1 illuminating, ZH3 smoke, nuclear projectiles (with explosive capacity of 2 kt). Secondary armament consists of a remotely controlled 7.62 mm PKT tank machine gun on commander's cupola for anti-aircraft defence and self-defence at close range.

Coaxial Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,000

Effective Range (Iron Sights): m100-1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: INA

Computerized FCS: Yes, automatic Fire Display

Thermal Sight Vehicle Commander: Yes, PG-4 sight and IP-5 sight

Thermal Sight Gunner: Yes, OP5-38 gunner's telescope

Main Gun Stabilization: INA

Indirect Fire: PG-4 Panoramic Telescope (PANTEL)

Direct Fire: OP 5-38

Collimator: K-1

Commander Cupola Range: deg360

Searchlight: OU-3K infra-red/white light searchlight

Protection

Hull Armor: mm15

Turret Armor: mm20

Applique Armor: mAvailable

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Yes

NBC Protection: Yes, Automatic CBRN defense system with filtration unit

Smoke Equipment: No

Fire Suppression System: Yes

Notes:

2S3M1 (SO-152M1) – Equipped with a command data acquisition and display equipment, and with a new SP-538 sight. OF-38 Krasnopol laser-guided rocket-assisted projectiles were added to standard ammunition. Produced in 1987–1993. All 2S3s and 2S3Ms were modernized to 2S3M1 level.

M110A1 American 203mm Self-Propelled Howitzer (SPH)






Tiers:

1 2 3 4

Parent:

M110 American 203mm Self-Propelled Howitzer (SPH)

Variants:

- **M110A2:** improved variant of the M110A1. It entered service in 1978 and was fitted with double muzzle brake. Maximum range of fire was increased to 29 km.

System

Alternative Designation: M110A1
Manufacturer: General Motors Corp.
In Service: 1977-Present
Family: M110 Series
Crew: ea5 (commander, driver, 3 gunners)
Resupply Vehicle: + 8 in the associated M548 ammunition resupply vehicle.
Chassis: chassis identical to the M110's
Displacement Time: min1
Emplacement Time: min1
Note: Support crew of 8 men are carried by an escorting armored personnel carrier, which also transports ammunition for this SPH.

Dimensions

Length, with Gun Forward: m10.72
Length, Hull: m5.72
Barrel Length: m8.36
Width: m3.15
Height (To the Top of the Barrel): m3.15
Weight, Combat: tons31.2

Weight, Unloaded: tons28.1

Ground Pressure: 0.76 kg/sq cm

Length of Track on the Ground: m3.94

Track Width: m0.39

Automotive

Engine Name: 1 x Detroit Diesel 8V-71T Engine

Engine Type: Detroit Diesel 8V-71T 569-cu in (9.32-liter) liquid-cooled, 2-stroke, turbocharged V-8 diesel

Engine Power: hp805

Power-to-Weight Ratio: 14.28 hp/metric ton

Cruising Range: km523

Speed, Maximum Road: km/h55

Speed, Average Cross: 15

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.3

Fording Depth: m1.2

Fuel Capacity: liters1,137

Suspension: Torsion bar, 5 road wheels, front drive, last road wheel acts as rear idler, shock absorber on each road wheel, no return rollers ability to lock suspension out when firing rear-mounted hydraulic spade for bracing firing platform.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note 1: The M110A1 carries only 2 rounds. Ammunition is carried by escorting armored personnel carrier.

Note 2: M110A1 can fire only up to charge 8.

↳*System*

Name: M201 Howitzer, 203mm Howitzer

Type: mm203

Length, Barrel: m8.24

Breech Type: Interrupted Screw

Recoil Type: Hydro-pneumatic

Max Rate of Fire: 2+ rd/min

Normal Rate of Fire: 1 rd/2 min

Muzzle Brake Type: No Muzzle Break, which allows the M110A1 to fire further than the M110.

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳*Ammunition (Option 1)*

Type: M650

Type: HERA

Caliber: mm203

Projectile Length: mm1,116

Projectile Weight: kg90.78

Muzzle Velocity: m/s710

Maximum Effective Range: m30,000

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 2)*

Name: M509

Type: DPICM

Caliber: mm203

Projectile Length: mm1,115

Projectile Weight: kig96.6

Muzzle Velocity: m/s711

Maximum Effective Range: m22,500

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 3)*

Name: M106

Type: HE

Caliber: mm203

Projectile Length: mm871

Projectile Weight: kg92.53

Muzzle Velocity: m/s713

Maximum Effective Range: m21,300

Basic Load: ea2

Fuse Type: INA

Note: The M110 can also fire the following types of 203mm projectiles: M404 HE, M426 CHEM.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Infrared night-vision equipment

Thermal Sight Gunner: Infrared night-vision equipment

Main Gun Stabilization: INA

Direct Fire Telescope: Direct Dire Elbow Telescope

Protection

Hull Armor: 20-mm maximum (estimated)

Turret Armor: 20-mm maximum (estimated)

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Note: This artillery system carries no defensive armament, except individual weapons carried by the crew.

Notes:

The M110A1 American 203mm Self-Propelled Howitzer (SPH), is a variant of the M110 American 203mm Self-Propelled Howitzer. Versions of the M110 with the longer barrel are the M110A1 (no muzzle brake) and the M110A2 (fitted with muzzle brake). In 1977, the first M110A1s entered service; these were armed with the longer 8" howitzer M201. The M201 allowed greater range over the shorter M2A2 howitzer. The M110A1s had been limited to zone 8 of the M188A1 propelling charge, but the muzzle brake alleviated excessive recoil forces and allowed the howitzer to fire zone 9, which permitted greater range. The M110A1 replaced both the M110 and M107, which were phased out of service with the US Army in Europe by 1980. It then cost less than USD100,000 to convert the M107/M110 to the M110A1/M110A2 standard.

M-1978 Koksan North Korea 170mm Self-Propelled Gun (SPG)







Tiers:



Variants:

- **M-1989:** he M1989 self-propelled gun was developed as a successor to the previous M1978 Koksan. Designation of this vehicle has been allocated by the US Department of Defense. Number in the designation indicates the year it was first observed by the US intelligence. A key requirement for this artillery system was the capability of reaching Seoul from the north of the demilitarized zone. North Korea placed a great emphasis on artillery firepower, because of its air force limited ground attack capability.

System

Alternative Designation: M1978 Koksan, M1978 SPG Koksan
In Service: 1978-Present
Manufacturer: Second Machine Industry Bureau, North Korea
Type: 170mm Self-Propelled Gun (SPG)
Family: Koksan, “Juche-Po” self-propelled guns family
Crew: ea4 (Driver, commander, gunner, loader)
Chassis: modified Chinese Type 59 medium tank chassis (copy of the Soviet T-54A)
Displacement Time: minless than 10
Emplacement Time: minless than 20
Note #1: Ammunition resupply vehicles are required to be assigned in the location of the M1978

Dimensions

Length: m14.9
Width: m3.27

Height: m3.1

Weight, Combat: tons40

Ground Pressure: INA

Automotive

Engine Name: V-59

Engine Type: V-12 multi fuel

Engine Power: hp520

Cruising Range: km300

Speed, Maximum Road: km/h40

Speed, Average Cross: km/h10

Speed Maximum Swim: Not Amphibious

Gradient: deg40

Side Slope: deg20

Vertical Step: m1

Trench: m2.5

Fording Depth: m1.2

Communications

Radio: R-123M

Main Gun

↳*System*

Name: Unidentified 170mm gun

Type: mm170

Breech Type: Screw-type breech mechanism

Length, Barrel: mmINA

Loader Type: Manual

Max Rate of Fire: per 5 min1-2

Rate of Fire, Burst: rds/min1

Muzzle Brake Type: Multi slotted muzzle brake

Fume Extractor: No

Max Elevation: INA

Min Elevation: INA

Traverse Range: deg20

Traverse Left: deg10

Traverse Right: deg10

Maximum Firing Range: km40-60

Power Rammer: More than Likely

↳*Ammunition (Option 1)*

Type: HE FRAG

Caliber: mm170

Muzzle Velocity: INA

Basic Load: INA

Maximum Effective Range: km40

↳*Ammunition (Option 2)*

Type: Rocket Assisted HE FRAG

Caliber: mm170

Muzzle Velocity: INA

Basic Load: INA

Maximum Effective Range: km60

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes, infra-red night vision equipment

Thermal Sight Gunner: Yes, infra-red night vision equipment

Main Gun Stabilization: Yes, Two large spades that are lowered to the ground manually before firing

Indirect Fire: Range drum

Direct Fire: INA

Collimator: K-1

Fire Control Computer: No

Fun Display Unit: No

Protection

Hull Armor: Open-mounted, providing no armored protection

Turret Armor: Open-mounted, providing no armored protection

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, smoke screen by injecting diesel fuel into the exhaust outlet

IR Signature: INA

Notes:

The M-1978 Koksan is a 170mm self-propelled gun of North Korean design and manufacture. Very little information is available due to the secretive nature of the North Korean government. The designations M-1978 and Koksan were given to the type by American military analysts, as they first became aware of it in that year in Koksan, North Korea. What is known is that it is a 170mm (~6.69") self-propelled gun of the open turret type. It was first seen publicly during a military parade in 1985. At least one example has been acquired by the United States.

Type 89 (PLZ-89) Chinese 122mm Self-Propelled Howitzer







Tiers:



Variants:

- **SH3:** Is an improved version of the Type 89, developed for export. It can be seen as a China's newly-built equivalent to the Soviet 2S1 Gvosdika. It offers greater mobility, improved fire control system and delivers greater firepower than the 2S1 or the Type 89 self-propelled howitzers. The SH3 has been exported to Rwanda.
- **PLZ-07:** Is a successor of the Type 89. This artillery system is widely used by the China's army. It utilizes a similar 122 mm howitzer, but has a new tracked chassis. It has greater mobility, improved fire control system and delivers greater firepower than its predecessor. This artillery system was adopted by the Chinese army in the late 2000s and is fielded in large numbers.
- **PLZ-07B:** Is a version of the PLZ-07, developed for China's marine corps. This artillery system is fully-amphibious and can be launched at sea from amphibious assault ships and swim over short distances to shore.

System

Alternative Designation: Type 89; PLZ-89
Type: 122mm Self-Propelled Howitzer
Crew: ea5
Chassis: The Type 89 uses a tracked chassis
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: 6.5 m
Width: 3.4 m
Height: 2 m
Weight, Combat: 20 t

Automotive

Engine Name: 12V150L12

Engine Type: Diesel

Engine Power: hp450

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: The Type 89 can be fitted with floatation kit for amphibious operation. Once the kit is fitted it can ford water obstacles such as lakes and rivers.

Gradient: %60

Side Slope: %30

Vertical Step: 0.8 m

Tench: 2.5 m

Fording, without Preparation: 1 m

Fording, with Preparation: Amphibious

Main Weapon System

↳*System*

Name: L32 Howitzer

Type: Howitzer

Caliber: 122 mm

Barrel Length: 32 calibers

Barrel Weight: INA

Elevation: INA

Traverse: 360 deg

Maximum Firing Range: 18 - 21 km

Maximum Rate of Fire: 6 - 8 rpm

Note: This artillery system is compatible with Chinese and Russian 122 mm ammunition.

↳*Ammunition*

Type: Projectile

Caliber: mm32

Basic Load: INA

Coaxial Weapon System

↳*System*

Name: QJC88

Type: Heavy Machine Gun

Caliber: 12.7mm

Date of Introduction: 1985

Manufacturer: Norinco

Proliferation: China: INA

In Service: 1985-Present

Length: 1.5 m

Barrel Length: 1 m

Height: INA

Weight: 18.5 kg plus 15.5 kg mount

Fire Selector: 0-F

Action: Gas operated, open bolt

Rate of Fire: 540 - 600 rpm

Muzzle Velocity: 850 m/s

Maximum Firing Range: INA

Magazine: Belt fed, 50 rounds

Sights: Iron sights, optional optical sights

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7x108mm Soviet

Basic Load: 2,000

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Main Gun Stabilization: Yes

Protection

Hull Armor: Armor of the Type 89 provides protection against small arms fire and artillery shell splinters.

Turret Armor: Armor of the Type 89 provides protection against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Type 89/PLZ-89 is a 122 mm self-propelled howitzer used by the People's Liberation Army of China to replace Type 85 and Type 70 122 mm self-propelled howitzer. PLZ-89 was first unveiled to the public during 1999 National Day military parade. Since the late 1970s a number of 122 mm self-propelled howitzers were developed in China to meet Chinese Army requirements. The PLA required mobile artillery system to provide medium- to long-range indirect fire support for motorized infantry and armored troops and capable of keeping pace with them. However none of them could meet these requirements. The Type 89, also known as the PLZ89, self-propelled howitzer was developed in late 1980s. It was Chinese attempt to develop indigenous SPH with similar capabilities to the Soviet 2S1 Gvosdika. The Type 89 is currently in service with Chinese Army and Marines. Several hundred of these artillery systems were built. The Type 89 SPH is armed with a 122 mm / L32 howitzer. It is a variant of the towed Type 86 (W-86), which in turn is a copy of the Soviet D-30 towed howitzer. The Type 89 is fitted with a semi-automatic loader. This artillery system is compatible with Chinese and Russian 122 mm ammunition. Maximum range of fire is 18 km using standard HE projectile and 21 km with extended-range projectiles. Vehicle is fitted with a computerized fire control system. Secondary armament consists of a roof-mounted 12.7-mm machine gun. Armor of the Type 89 provides protection against small arms fire and artillery shell splinters. Vehicle is fitted with an NBC protection and automatic fire suppression systems. The Type 89 uses a tracked chassis, developed from the Type 77 amphibious armored personnel carrier. Vehicle is powered by the 12V150L12 diesel engine, developing 450 hp. The Type 89 can be fitted with flotation kit for amphibious operation. Gun for PLZ-89 is mounted on a tracked chassis which developed from Type 77 amphibious armored personnel carrier and the main armament is derived from the Type 86 (W-86) 122 mm / 32 caliber towed howitzer, which itself is a Chinese copy of the Russian D-30 122 mm howitzer. PLZ-89 carries 40 rounds inside the turret and it can fire all types of Chinese and Russian 122 mm rounds. The gun is equipped with semi-automatic loader with maximum rate of fire of 6~8 rounds/min and fire accuracy is achieved by a digital fire-control system and a roof-mounted electro-optical sighting for day/night operations. The five crew members are protected by collective anti-NBC systems and automatic fire suppression. The howitzer can swim with the assistance of certain floating devices.

M1974 North Korea 152mm Self-Propelled Gun-Howitzer System






Tiers:

1 2 3 4

System

Alternative Designation: M1974

Type: 152mm Self-Propelled Gun-Howitzer

Crew: ea8 ~ 9 men

Chassis: Lightly armored tracked chassis.

Displacement Time: INA

Emplacement Time: min3

Dimensions

Length, Hull: m6.3

Length, Gun Foward: m6.5

Width: m2.6

Height: m2.6

Weight, Combat: tons25

Automotive

Engine Name: A-650

Engine Type: Diesel

Engine Power: hp300

Cruising Range: km500

Speed, Maximum Road: km/h45

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: 0.8

Trench: 2.85

Fording Depth, without Preperation: m1.1

Fording Depth, with Preperation: m1.5

Main Gun

↳*System*

Name: INA

Type: 152 mm Gun-Howitzer

Caliber: mm152

Barrel Length: INA

Breech Type: emi-automatic semi-automatic sliding wedge breech

Weight: INA

Maximum Firing Range: 17.4 km

Maximum Range of Fire: 4-6 rounds per minute

Maximum Elevation: deg+45

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

↳*Ammunition*

Name: INA

Type: Projectile

Caliber: mm152

Projectile Weight: 43.56 kg

Basic Load: INA

Armor Penetration: INA

Note: The M1974 is compatible with all standard 152 mm ammunition of the D-20 gun-howitzer. It fires fragmentation, High-Explosive Fragmentation (HE-FRAG), High Explosive (HE), concrete-busting, and illumination rounds.

Secondary Weapon System

Note: There is no information about the secondary Weapon System onboard the M1974

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes, Two large stabilizing spades are lowered to the ground at the rear before firing.

Protection

Hull Armor: Armor of the M1974 provides some degree of protection for its crew against small arms fire and artillery shell splinters.

Turret Armor: INA

Applique Armor: Optional

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The M1974 is a North Korean 152 mm self-propelled gun-howitzer. Its actual designation is unknown. The M1974 designation was allocated by a US Department of Defense. Number in the designation denotes the year when this system was observed by US intelligence. This North Korean artillery system was adopted in the 1970s and is widely used to this day. As far as it is known the M1974 was not exported outside North Korea. This artillery system combines a modified version of the Soviet D-20 towed gun-howitzer, mounted on a lightly armored tracked chassis. North Korea manufactured these Soviet howitzers under license. The M1974 can be seen as a North Korean attempt to create a self-propelled artillery system, somewhat equivalent to the Soviet 2S3 Akatsiya. Though the North Korean artillery system was inferior in many respects. North Korea produced many examples of self-propelled artillery systems by mating existing towed artillery pieces with various chassis. In many cases these North Korean artillery systems resemble various equivalent Soviet or Chinese systems. The D-20 152 mm/L26 gun-howitzer was created during the early 1950s and was one of the most prolific artillery pieces ever. Today it is no longer a modern weapon. It can not match performance of modern 155 mm howitzers used by NATO countries and non-NATO allies, such as Japan and South Korea. Still though the D-20 made its name as a solid, reliable and devastating weapon. It is still used by a number of countries. For some reason the North Korean license-produced version of the D-20, as well as ordnance of the M1974 has a different muzzle brake than that of the D-20 towed gun-howitzer. The M1974 is compatible with all standard 152 mm ammunition of the D-20 gun-howitzer. It fires fragmentation, High-Explosive Fragmentation (HE-FRAG), High Explosive (HE), concrete-busting, and illumination rounds. It is also capable of launching Krasnopol laser-guided projectiles, as well as nuclear rounds. Though it is unknown if North Korea obtained any of these rounds from its allies. Maximum range of fire with HE-FRAG round is 17.4 km. The HE round penetrates 250 mm steel plate at a range of 3 km. This artillery system has a semi-automatic semi-automatic sliding wedge breech, which improves rate. Maximum rate of fire is around 4 to 6 rounds per minute. This artillery system is operated by a crew of 8 or 9 soldiers. The crew prepares the M1974 for firing within around 3 minutes from traveling. Two large stabilizing spades are lowered to the ground at the rear before firing. This self-propelled artillery system is based on a lightly armored tracked chassis. Most likely that it is a heavily modified Soviet ATS-59G artillery tractor. The ATS-59G is powered by a 39-liter A-650 diesel engine, developing 300 hp. Actually it is a standard engine of a T-55 medium tank, developing 520 hp. However the ATS-59G has a rate reduced, which reduced the power to 300 hp in order to extend service life of the engine. The M1974 artillery system has a maximum road range of around 350 km on internal fuel and around 500 km with auxiliary fuel tanks. The same lightly armored tracked chassis is used by other North Korean artillery systems, including an M1975 130 mm self-propelled gun, M1981 122 mm self-propelled gun and unidentified 100 mm anti-tank gun. Armor of the M1974 provides some degree of protection for its crew against small arms fire and artillery shell splinters. The gun-howitzer retains its original splinter shield. Though top of the superstructure is opened. In traveling order it can be covered with bows and canvas cover. This artillery system has no defensive armament, except firearms of its crew members.

AUF1 155mm French Self-Propelled Gun (SPG)





Tiers:

1 2 **3** 4

Variants:

- **AUF1T:** Fitted with the "Sagem Cita 20" inertial navigation system as well as a 20-24 HP gas turbine auxiliary power unit (APU)
- **AUF2:** Created in the 90s, based on the AMX-30B2 chassis, 70 of which were bought by the French Army.

System

Alternative Designation: GCT, GCT 155
Crew: ea4
Chassis: Modified AMX-30

Dimensions

Weight, Combat: mt42
Chassis Length, Overall: m10.25
Height, Overall: m3.25
Width, Overall: m3.15

Automotive

Engine Type: Hispano-Suiza HS110, water-cooled, multi fuel
Engine Power: hp720
Range, Cruising: km450
Speed, Maximum On: 60
Speed, Maximum Cross: 40

Speed, Maximum, Swim: NA

Fording Depth: m2.1

Emplacement Time: min1-2

Displacement Time: min1-2

Armament (Cannon)

Caliber: 155mm

Type: Cannon

Barrel Length: cal40

Rate of Fire - Burst: rpm8

Rate of Fire - Normal: rpm6

Rate of Fire - Sust: rpm2-3

Loader Type: Autoloader

Breech Type: Vertical sliding wedge

Muzzle Brake Type: Double baffle

Traverse: deg360 left, right, and total

Elevation: deg-4 / +66

Vehicle Commander's Weapon

Name: M2HB

Type: Heavy machine gun

Caliber: .50 (12.7x99)

Mount Type: Cupola AA mount

Direct Fire Range: m7,400

Max Effective Range: m1,000

Fire on Move: Yes

Rate of Fire: 450-500 cyclic

Ammunition

↳*Ammunition 1*

Caliber: 155mm

Type: Frag-HE

Name: OE-155-56/69

Range, Minimum: m9,600

Range, Maximum: m23,000

Projectile Weight: kg43.75

Muzzle Velocity: m/s810

Fuze Type: PD

↳*Ammunition 2*

Caliber: 155mm

Type: Frag-HE

Name: RAP H3

Range, Minimum: mINA

Range, Maximum: m31,500

Projectile Weight: kgINA

Muzzle Velociy: m/s830

Fuze Type: PD

Fire Control System

Indirect Fire: M589 Optical Goniometer

Direct Fire: INA

Collimator: INA

Fire Control Computer: None

Gun Display Unit: ATILA Fire Direction System

Protection

Armor, Turret Front: Yes, thickness INA

Armor Turret, Top: Yes, thickness INA

Armor Hull: Yes, thickness INA

Self Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 4 Grenade Launchers

Communication

Radio: TRC 559 (VHF-FM)

Notes:

The AUF1 is a French self-propelled gun vehicle currently in use by the armies of France, Saudi Arabia, Iraq, and Kuwait. It replaced the Mk F3 155mm in French army service. The AUF1 primary advancement is that it incorporates and provides full armor and nuclear-biological-chemical (NBC) protection for its crew of four, while the Mk F3 155mm offered no protection and could carry only two of its four crew members. The AUF1 saw combat with the Iraqi Army in the Iran–Iraq War. A four-man gun crew can reload the AUF1 in 15 minutes. A two-man gun crew can reload the AUF1 in 20 minutes. The AUF1T is fitted with the "Sagem Cita 20" inertial navigation system as well as a 20-24 HP gas turbine auxiliary power unit (APU). The production ended in 1995, and the 155 GCT (standing for “Grande Cadence de Tir”, which can be translated to High Rate of Fire), like its predecessor, was largely exported to Iraq, Kuwait and Saudi Arabia, with 427 built in total. The 155 GCT saw service during the Iran-Iraq war, the invasion of Kuwait, both Gulf wars and in Yugoslavia.

PLZ-45 (Type 88) Chinese 155mm Self-Propelled Howitzer (SPH)







Tiers:



System

Alternative Designation: PLZ-45, Type 88

Manufacturer: NORINCO

Type: 155mm Self-Propelled Howitzer (SPH)

Expected Out of Service Date: 2040

Status: In Production

Family: PLZ

Crew: ea5

Chassis: Turreted tracked chassis.

Displacement Time: INA

Emplacement Time: INA

Day Periscopes: ea2

Cruising Range (Road): km450

Maximum Effective Range (Howitzer): m50,000

Note: A standard PLZ-45 battalion consists of 3 batteries, each with 6 PLZ-45 self-propelled howitzers (SPH) and 6 PCZ-45 ammunition support vehicles (ASV). Each battery has a battery command post and 3 battery reconnaissance vehicles (BRV), both of which are based on the Type 85 APC. These are supported by W653A armored recovery vehicles, 704-1 artillery locating and fire correction radar, 702-D meteorological radar, and fire support maintenance vehicles

Dimensions

Length: m10.5

Width: m3.3

Height: m2.6

Weight, Combat: tons33

Automotive

Engine Name: Deutz BF12 L413FC

Engine Type: Turbocharged air-cooled diesel engine

Engine Power: hp525

Cruising Range: km450

Speed, Maximum Road: km/h55

Speed, Average Cross: km/h50

Speed Maximum Swim: Not Amphibious

Suspension: Torsion Bar

Fording Depth: mINA

Ground Clearance: m0.45

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: PLZ-45

Type: 155mm Self-Propelled Howitzer (SPH)

Loader Type: semi-automatic loader

Max Rate of Fire: rds/min5

Sustain Rate of Fire: rds/min2

Time the Max Rate of Fire can be Sustained: INA

Projectile Laying System: Automatic

Max Elevation: deg+72

Min Elevation: deg-3

Traverse Left (Normal Operations): def30

Traverse Right (Normal Operations): deg30

Traverse: deg360

Range Finder Type: Inertial direction-finder

Control Type: Electric and hydraulically operated rammer enabled projectiles

Muzzle Velocity Measuring Device: Yes

Note: The PLZ-45 can also fire NATO 155mm M107 Projectiles.

↳*Ammunition (Option 1)*

Type: High Explosive (HE)

Caliber: mm155

Muzzle Velocity: m/s937

Basic Load: 30 Total of any combination projectiles

Maximum Effective Range: km24

Armor Penetration: Yes

↳*Ammunition (Option 2)*

Type: Extended Range Full Bore (ERFB)

Caliber: mm155

Length: mm938

Weight: kg45.54

Muzzle Velocity: m/s897

Basic Load: 30 Total of any combination projectiles

Maximum Effective Range: km30

Armor Penetration: Yes

↳*Ammunition (Option 3)*

Type: Extended Range Full Bore, Hollow Base, Base Bleed (ERFB-HB-BB)

Caliber: mm155

Length: mm938

Weight: kg47.6

Muzzle Velocity: m/s903

Basic Load: 30 Total of any combination projectiles

Maximum Effective Range: km39

Armor Penetration: Yes

↳*Ammunition (Option 4)*

Type: ERFB-WP

Caliber: mm155

Length: mm938

Weight: kg47.9

Muzzle Velocity: m/s795.5

Basic Load: 30 Total of any combination projectiles

Maximum Effective Range: km25

Armor Penetration: Yes

↳*Ammunition (Option 5)*

Type: ERFB lll

Caliber: mm155

Length: mm940

Weight: kg45.8

Muzzle Velocity: m/s789.2

Basic Load: ea30 Total of any combination projectiles

Maximum Effective Range: km24

Armor Penetration: Yes

↳*Ammunition (Option 6)*

Type: ERFB BE

Caliber: mm155

Length: mm940

Weight: kg45.7

Muzzle Velocity: m/s974.5

Basic Load: 30 Total of any combination projectiles

Maximum Effective Range: km26

Armor Penetration: Yes

Coaxial Weapon System

↳*System*

Name: W-85 Heavy Machine Gun

Type: 12.7mm Heavy Machine Gun

Caliber: mm12.7x108

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min550

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Iron/Optical

Basic Load: 1000 (50 round belts)

Feed System: Belt

Operation: Gas Operated, Open Belt

Traverse: deg360

Elevation: deg+90

↳*Ammunition*

Type: Type 54 Round

Caliber: mm12.7x108

Muzzle Velocity: m/s850

Basic Load: ea480

Effective Range: km2.5

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: Yes

Fire-Control Calculator (FCC): Enabled

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, two spades can be lowered at the rear of the hull, one either side and in line with the track

Automatic Laying System: Yes

Optical sighting system: Yes

Navigation System: Yes

GPS Receiver: Yes

Direct Fire: Yes

Indirect Fire: Yes

Automatic Fire Suppression Systems: Yes

Protection

Hull Armor: All-welded steel armor that can withstand small arms fire and shelling

Turret Armor: All-welded steel armor that can withstand small arms fire and shelling

Applique Armor: No

Explosive Reactive Armor: No, the PLZ-45 is not intended to be stationed near the front lines of the battlefield

Active Protection System: Yes, explosion detection

Active Fire Suppression System: Yes

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Grenade Launchers: Yes, 2 sets of 4-barrel grenade launchers

Notes:

The PLZ-45 or Type 88 is a 155mm self-propelled howitzer developed by Norinco in the 1990s for the export market. It is based on Norinco's Type 89 (PLL01) 155mm/45-calibre towed gun-howitzer. The PLZ-45 self-propelled howitzer is used by the People's Liberation Army of China, People's National Army (Algeria), Kuwaiti Army and Saudi Arabian Army. Operated by a crew of five (commander, gunner, two loaders and a driver), the PLZ-45 is armed with a 155mm, 45-calibre main gun, with a semi-automatic loader and an electrically controlled and hydraulically operated ram that enables projectile loading to take place at any angle of elevation with the charge being loaded manually. The turret has an elevation of +72 to -3 degrees with 360 degree traverse. Secondary weapons include a roof-mounted W-85 heavy machine gun and two sets of four-barrel smoke grenade launchers on the turret's side. Ammunition is stored at the rear of the turret. A total of 30 rounds for the gun-howitzer and 480 rounds for the machine gun are carried on board. 24 howitzer rounds are carried in the loader and 6 rounds on the right side below the loader. The fire-control system of the PLZ-45 includes an automatic laying system, optical sighting system, gun orientation and navigation system, and a GPS receiver.

SH-1 Chinese 155mm Self Propelled Howitzer (SPH)




Tiers:



Variants:

- **SH2:** The SH2 is a wheeled self-propelled howitzer designed and manufactured by the Chinese Defence Company Norinco. The SH2 artillery system was first unveiled at the Abu Dhabi International Defence Exhibition in 2007 (IDEX 2007) held between 18 and 22 February, and is being actively prompted to the export market. The lightweight and high-mobility features of this artillery system may be of special appeal to the PLA airborne force and marine corps. The SH2 has demonstrated superior performance under all weather conditions and a wide range of altitude, and it can be equipped with special gear as per mission requirement. It is equipped with a digitised information system, which includes a gunner's terminal and digitised tactical radio so the system can be seamlessly integrated into a C4ISR system. It also has an autonomous navigation and orientation system, digital command-and-control, and FCS. There are a number of other recent Chinese SP artillery systems, tracked and wheeled, that have the same SH designator: SH2 - 122 mm (6 × 6) SP artillery system. SH3 - 122 mm full tracked SP artillery system. The PLA have introduced the 122 mm full tracked SP howitzer called the PLZ-07.This is very similar to the first system but had a different hull and suspension. SH5 - 105 mm (6 × 6) SP artillery system.
- **SH3:** 122 mm full tracked SP artillery system. The PLA have introduced the 122 mm full tracked SP howitzer called the PLZ-07.This is very similar to the first system but had a different hull and suspension.
- **SH5:** 05 mm (6 × 6) SP artillery system.

System

Alternative Designation: PCL-09 or CS/SH1 (Chinese export name)

Manufacturer: NORINCO

Type: 155mm Self Propelled Howitzer (SPH)

Family: SH Series

Crew: ea6

Chassis: 6x6 truck, with the SH1 built on the rear of the WS5252 (6 × 6) cross-country truck chassis

Displacement Time: min50

Emplacement Time: min1

Cruising Range (Road): km600

Maximum Effective Range (Howitzer): m53,000

Add on Parts: Yes, Navigation, positioning and targeting systems.

Dimensions

Length: m9.6

Width: m2.6

Height: m3.5

Weight, Combat: mt22.5

Ground Pressure: kg/mINA

Automotive

Engine Name: WD615.44

Engine Type: Water-cooled, Supercharged Diesel

Engine Power: hp315

Transmission: Automatic

Cruising Range: km600

Speed, Maximum Road: km/h90

Speed, Average Cross: km/h75

Ground Clearance: mm400

Speed Maximum Swim: Not Amphibious

Fording Depth (Without Preperation): m1.2

Central Tire Pressure System: Yes

Wheelbase: m3.45 + 1.45

Track: m2.056

Angle of Approach: deg32

Angle of Departure: deg36

Gradient: deg58

Side Slope: deg40

Verttical Obstacle (Fowards): m0.4

Trench: m0.7

Turning Radius: m11

Power Steering: Yes

Communications

↳***TBR-142***

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: PLZ-05 or the Type 05

Type: 155mm Self Propelled Howitzer (SPH)

Breech Type: American Style

Length, Barrel: 52 calibers

Loader Type: All standard 155mm NATO Projectiles

Max Rate of Fire: rds/min4-6

Sustain Rate of Fire: rds/min4

Time the Max Rate of Fire can be Sustained: min1

Muzzle Brake Type: Yes

Powered Elevation: Yes

Max Elevation: deg+70

Min Elevation: deg-3

Powered Traverse: Yes

Traverse Left: deg20

Traverse Right: deg20

Range Finder Type: Laser

Flick Rammer: Yes

Charge Zone: 10

Precision-Guided Munitions: Capable to Fire

Note: SH1 can fire all NATO-standard 155mm artillery projectiles and charges.

↳*Ammunition*

Type: 155 mm HE ERFB RA/BB very long range artillery projectile (VLAP-Rocket Assistance/Base Bleed)

Caliber: mm155

Muzzle Velocity: m/s925

Fuse Type: INA

Basic Load: 20 total in combination of projectiles

Effective Range: km53 (with Rocket Assisted V-LAP)

Maximum Range: km56

Armor Penetration: INA

Rocket Motor Total Impulse of: Ns6,500

Rocket Motor Propellant Charge Weight:: kg3

Rocket Motor Specific Impulse: Ns/kg2,170

Projectile Total Weight: kg48

Warhead Weight: kg30

↳***Ammunition Variants***

HE ERFB: Available

HE ERFB-BB: Available

ERFB-BB cargo: Available

ERFB Illuminating: Available

ERFB Smoke Base Ejection: Available

ERFB White Phosphorous: Available

Coaxial Weapon System

↳***System***

Name: QJZ-89 or Type 89

Type: 12.7mm Heavy Machine Gun

Manufacturer: NORINCO

Cartridge: mm12.7x108

Length, Total: mm2,119

Length, Barrel: mm1,003

Weight (Gun Only): kg17.5

Weight, (Tripod Only): kg8.5

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min450-600

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: Iron/Optical

Action: Gas/Recoil

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: INA

Max Effective Range: m1,600

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: Yes, Gunner, aimer and loader are all provided with their own flat panel displays (FPD) displays.

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: large spade lowered to the ground to provide a stable firing position

Range, Day Sight: INA

Range, Thermal Sight: INA

Laser Observation Post: Yes

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: Protection against small arms fire and artillery shell splinters

Turret Armor: Protection against small arms fire and artillery shell splinters

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Available

Notes:

The SH1 is a wheeled, self-propelled, 155mm howitzer designed and manufactured by the Chinese Defense Company, Norinco. Compared with other similar artillery systems, the SH1 has advantages such as a high mobility, greater fire-power, fast hit capability, modular design, and cost-effectiveness. The SH1 was presented for the first time to the public at the Defense Exhibition in Dubai, IDEX 2010.

Raad-2M Iranian 155mm Self-Propelled Howitzer (SPH)






Tiers:



Parent:

Raad-2 (Thunder 2) Iranian 155mm Self-Propelled Artillery

System

Alternative Designation: Raad-2M

In Service: 1997-Present

Manufacturer: Defense Industries Organization

Type: Self-Propelled Howitzer

Family: Raad Series

Crew: 5 (commander, gunner, driver, 2 loaders)

Chassis: chassis is based on the Chinese WZ-501/503 series, itself a copy of the Russian BMP-1 series.

Displacement Time: INA

Emplacement Time: Less than 1 min

Dimensions

Length: m9.14

Width: m3.38

Height to Turret Roof: m2.60

Height to Top of Roof-Mounted Weapon: m3.47

Height, Axis of Fire: m2.24

Weight, Combat: kg36,000

Ground Pressure: kg/sq cm0.67

Automotive

Engine Name: 5TDF

Engine Type: Water-cooled Diesel

Engine Power: hp700

Power-to-Weight Radio: 19 hp/ton

Cruising Range: km450

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h45

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Obstacle: m0.80

Trench: m2.40

Fording Depth (Without Preparation): m1.2

Transmission: SPAT 1200 transmission

Communications

Digital Communications: Yes

VHF Capable: Yes

HF Capable: Yes

Main Gun

↳*System*

Name: 1 x HM44 155-mm/39-cal howitzer

Type: mm155

Breech Type: Screw breech mechanism

Length, Barrel: 39 Calibers

Max Rate of Fire: rds/min4

Recuperator: Hydropneumatic recuperator

Brake Type: hydraulic recoil brake.

Fume Extractor: Yes

Muzzle Break Type: Double Baffle Muzzle Break

Max Elevation: deg+75

Min Elevation: deg-3

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Effective Firing Range: km30

Barrel Life: 5,000 when firing Charge 8

↳***Ammunition (Option 1)***

Name: M107

Type: High Explosive (HE)

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Effective Range: km18.1

Note: The Raad-2 can also fire 155mm Smoke, HE Base Bleed, and Illuminating Projectiles.

↳***Ammunition (Option 1)***

Name: INA

Type: Base Bleed HE

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Maximum Effective Range: km24

↳***Ammunition (Option 1)***

Name: INA

Type: Charge 2

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Maximum Effective Range: m3,000

Coaxial Weapon System

↳***System***

Name: M2 Browning .50 Caliber Machine Gun

Type: Machine Gun

In Service: 1933-Present

Proliferation: +3 Million

Weight, Gun: kg83.78

Weight, Gun with Tripod and T&E: kg127.87

Length: mm1,654

Barrel Length: mm1,143

Action: Short recoil-operated

Rate of Fire: rds/min450-600

Effective Firing Range: m1,800

Maximum Effective Firing Range: m7,400

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s890

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: passive night-driving periscope

Main Gun Stabilization: Yes, When deployed in the firing position two spades are lowered either side of the hull rear of Thunder-2 to provide a more stable firing platform.

Indirect Fire: indirect fire sight is fitted in the turret roof

Direct Fire: The direct-fire sight is parallel to the main 155-mm cannon

GPS: Yes

Navigation: Yes

Gunner's Control Panel and Display: Yes

Commander's Control Panel and Display: Yes

Automatic Gunlaying System: Yes

Protection

Hull Armor: mm20

Turret Armor: all-welded steel armor, providing protection from small-arms fire and shell splinters

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Automatic Firefighting System: Yes

Air-Conditioner: Yes

Notes:

In early September 1997 it was reported that Iran had successfully tested a locally built rapid fire mobile field gun known as Raad-2 (Thunder-2). It uses a turret that has a similar layout to the M109A1, 155mm/39-cal self-propelled howitzer. The Iranian Defense Industries Organization claimed that the 155 mm HM44 howitzer manufactured by the Hadid facility of the Iranian Defense Industries Organization had a high firing rate and accuracy. It was described as being able to fire five rounds per minute. The gun's range was reported as 30km (19mi), and it also includes features such as a laser range-finder and a semi-automatic loading system. The gun looks exactly like 155mm/39-cal M185 gun from M109A1 and is fitted with a double baffle muzzle brake, fume extractor, screw breech mechanism, hydro-pneumatic recuperator and a hydraulic recoil brake. It uses the Iranian-made Boragh APC chassis, a conversion of the either the Russian BMP-1 or Chinese Type 86 (WZ-501) IFV. It was described as being able to move with a speed of 70km/h (43mph) on the battlefield.

Type 70-I Chinese 122mm Self Propelled Artillery







Tiers:



Variants:

- **Type 85:** The Type 85 self-propelled 122mm howitzer has a turretless design, based on the YW531H APC chassis. It has the Soviet D-30 howitzer. The maximum range of fire is 21 km. The Type 85 is a significant improvement to its predecessor, however it still lacks gun enclosure.

System

Alternative Designation: NA
Type: Self Propelled Howitzer
Chassis: Based on the Type 63-I (YW531 / Type B531) APC
Crew: ea6-7
Emplacement Time: INA
Displacement Time: INA

Dimensions

Length: m5.6
Width: m3.07
Height: m2.69
Weight, Combat: tons15.3

Automotive

Engine Name: 6150L
Engine Type: Diesel

Engine Power: hp260

Cruising Range: km450

Speed, Maximum Road: km/h56

Speed, Average Cross: INA

Speed Maximum Swim: INA. Can be fitted with a swim kit. Propulsion is provided by the track rotation.

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Fording Depth: m1

Main Weapon System

↳*System*

Name: Type 54

Type: Howitzer

Caliber: mm122

Maximum Rate of Fire: rds/min6

Maximum Elevation: deg63

Minimum Elevation: deg-2.5

Traverse Range: deg45

Traverse Left: INA

Traverse Right: INA

Maximum Firing Range: km11.8

Sights: Basic

Direct Fire Capable: Yes

Basic Load: rounds40

↳*Ammunition*

Note: Compatible with 122mm projectiles of the M-30. The Type 70-I is also capable of direct firing.

Auxiliary Weapon System

↳*System*

Type: 7.62mm Machine Gun

Fire Control System

Note: There is no fire control system. Basic sights are used for aiming the cannon.

Protection

Hull Armor: INA
Turret Armor: INA
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: INA
Smoke Equipment: INA

Notes:

It is estimated that no more than 200 Type 70-Is were ever manufactured. It was build to fill a gap in self propelled artillery in the Chinese army. It is believed that the Soviet Union assisted in the development and manufacture of the Type 70-I because of the use of the Type 54 cannon which is similar to the M1938 / M-30. The vehicle has no roof and thus no overhead protection for the crew of 6-7 soldiers.

M109A3 American 155mm Self-Propelled Howitzer





Tiers:



Parent:

M109 American 155mm Self-Propelled Howitzer

Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the

integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30 seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.

- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88 (M109A1) are known as respectively PzHb 79/95 and PzHb 88/95
- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
- **K55/K55A1:** K55/K55A1 are South Korean variants of the M109A2 , originally named KM109A2 with additional domestic augmentations, license-produced by Samsung Techwin. They are fitted with M178 155 mm 39 caliber gun, NBC protection, automatic fire extinguishing system, and a modified ammunition reception module for K56 automatic ammunition resupply vehicle. The Performance Improvement Program variant, K55A1, is a complete domestic overhaul of the K55 which is further augmented by Samsung Thales with modern digital ballistic computers, multifunctional data display and controllers, GPS navigation and target acquisition system, wireless datalink equipment, and upgraded fire control storage battery and power supply unit, to closely match the US military's modernization of the Paladin into next-generation standard. Many improved technologies of the South Korean K9 Thunder were retrofitted on the K55A1. 1,040 howitzers of these variants were produced.
- **M109A7:** The newest M109 version for U.S. service is the M109A7, formerly known as the M109A6 Paladin Integrated Management (PIM). The M109A7 shares common components with the Bradley Fighting Vehicle such as the engine, transmission, and tracks. This creates commonality with other systems and maximizes cost-savings in production, parts inventory, and maintenance personnel. The M109A7's on-board power systems harness technologies originally developed for the Non-Line-of-Sight Cannon; the electric drive is faster than the previous hydraulic system, and the automatic rammer more consistently rams the round into the gun for consistent velocities and better accuracy. It features a 600-volt on-board power system to accommodate additional armor and future networking technologies as they become ready. The M109A7 can sustain a one-round per-minute rate of fire and a maximum rate of fire of four rounds per-minute.

System

Alternative Designation: M109A3

In Service: 1980-Present

Type: Self-Propelled Howitzer

Crew: ea6 (commander, gunner, 3 loaders, driver)

Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.

Displacement Time: INA

Emplacement Time: INA

Note: This variant has an improved M178 mounting, boresight alignment driver and selected RAM and safety kits, which included a fuel system air purge; driver's instrument panel; bustle/rack; propellant stowage; torsion bar; counter-recoil

buffer; and upper recoil cylinder. The designation also applies to retrofitted models.

Dimensions

Length, Hull: 6.19 m
Length, Gun Forward: 9.12 m
Width: 3.28 m
Height: 3.28 m
Weight: 24,948 kg
Ground Pressure: 0.83 kg/cm sq

Automotive

Engine Name: 1 x General Motors 8V-71T 569-cu in (9.32-liter) liquid-cooled, turbo-charged 2-stroke V-8 diesel
Engine Type: V-8 diesel
Engine Power: hp405 hp at 2,300 rpm
Power-to-Weight Ratio: 16.23 hp/ton
Transmission: Allison ATD-XTG 411-2A (A3) or 411-4 with quick disconnect powershift crossdrive, 4 forward and 2 reverse gears
Range: km354
Speed, Maximum Road: km/h56
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Side Slope: %30
Gradient: %60
Vertical Step: m0.53
Trench: m1.83
Fording Depth: m1.07
Fuel Capacity: 135 gal (511 liters)
Suspension: torsion bar, 7 road wheels, front drive, rear idler, no return rollers (all models except PIM)

Main Gun

↳*System*

Name: M185 155 mm/L39 howitzer
Type: Howitzer
Caliber: 155mm
Length: INA
Barrel Length: INA
Weight: INA
Cannon Groves: 48

Rifling: right-hand rifling with constant, 8.93-deg twist

Breech Type: Welin-step thread

Recoil System: hydropneumatic

Elevation: -3/+75 deg (-53/+1,333 mils)

Traverse: 360 deg (6,400 mils)

Maximum Firing Range: 14.6 km

Maximum Rate of Fire: 1 rd/min first hour; 4 rd in first 3 min max

Sustained Rate of Fire: 2 rpm

Note #1: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.

Note #4: The cab has a rear bustle rack which provides an increased ammunition stowage capacity.

↳*Ammunition (Option 1)*

Name: M864

Type: DPICM

Caliber: mm155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 22,000 m

Response Time: 11 min

↳*Ammunition (Option 2)*

Name: M483A1

Type: HE

Caliber: mm155

Length: 35.4 in (899 mm)

Weight: 102.5 lb (46.49 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 17,740 m

Response Time: 11 min

↳*Ammunition (Option 3)*

Name: M718

Type: RAAMS Long

Caliber: 155mm

Length: 30.7 in (781 mm)

Weight: 103.0 lb (46.71 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 17,740 m

Response Time: 11 min

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 500

Fire Control

Name: INA

Computerized FCS: Fire-control equipment includes an elbow telescope M118C for direct fire with a magnification of 4x and 10-degree field of view; panoramic telescope M117 for indirect fire and gunner's quadrant M1A1.

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Note: It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device.

Protection

Hull Armor: light alloy aluminum to protect against small-arms fire and shell splinters
Turret Armor: INA, the turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.
Applique Armor: INA
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: INA
NBC Protection: none fitted
Smoke Equipment: INA
Fire Suppression: INA

Notes:

M109A3 (1980) The M109A3 is a depot converted M109A1 incorporating the 27 mid-life improvements. The operational characteristics of the M109A3 are virtually identical to the M109A2. Some M109A3s have three contact arm assemblies: all M109A2 have five contact arm assemblies. This variant has an improved M178 mounting, boresight alignment driver and selected RAM and safety kits, which included a fuel system air purge; driver's instrument panel; bustle/rack; propellant stowage; torsion bar; counter-recoil buffer; and upper recoil cylinder. The designation also applies to retrofitted models.

Type 07 (PLZ-07) Chinese 122mm Self Propelled Howitzer (SPH)



Tiers:

1 **2** 3 4

Variants:

- **SH3:** Is a forerunner of the PLZ-07. It is a similar 122 mm self-propelled howitzer, which was developed mainly for export. It emerged a couple of years before the PLZ-07. Known operators of the SH3 include Rwanda.
- **PLZ-07B:** Is an amphibious self-propelled howitzer, used by China's marine corps. This artillery system is fully amphibious. It has a boat-like hull for improved floatation and is fitted with a trim vane. Though it uses the same turret as the PLZ-07. On water this artillery system is propelled by two waterjets. The PLZ-07B can be launched at sea from amphibious assault ships and swim over short distances to shore.

System

Alternative Designation: INA
Type: Self-propelled howitzer
Family: PLZ-07 Family
Crew: ea5
Chassis: Modified Chassis of the Type 97 Infantry Fighting Vehicle
Displacement Time: INA
Emplacement Time: INA
Maximum Effective Range: km500
Amphibouis: No
Note: The PLZ-07 was developed to replace the older 122mm self-propelled howitzer in service with the PLA, which inlcude the Type 89, Type 85, and Type 70/70-1 Systems.

Dimensions

Length: m6.66
Width: m3.28
Height: m2.5
Weight, Combat: kg24,500
Ground Pressure: INA

Automotive

Engine Name: BF8M1015CP

Engine Type: Diesel

Engine Power: hp600

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h55

Speed Maximum Swim: INA

Suspension: Torsion Bar

Track Support: Rollers on each side

Fording Depth: m1

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Communications

↳***TBR-142***

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: PLZ-07
Type: mm122
Loader Type: Semi-automatic
Length, Barrel: 32 Caliber
Max Rate of Fire: rds/min6-8
Sustain Rate of Fire: rds/min6
Time the Max Rate of Fire can be Sustained: INA
Muzzle Brake Type: INA
Max Elevation: deg+70
Min Elevation: deg-3
Traverse Range: deg360
Range Finder Type: Laser
Ammo Compatible: Russia and China

↳*Ammunition (Option 1)*

Type: Standard High Explosive (HE)
Caliber: mm122
Diameter: mm39.2
Muzzle Velocity: m/s690
Fuse Type: INA
Basic Load: 40 Total of any combination of projectiles
Maximum Firing Range: km18
Armor Penetration: Yes, up to 85mm of conventional steel armour
Projectile Weight: kg14-22

↳*Ammunition (Option 2)*

Type: Base Bleed
Caliber: mm122
Diameter: mm39.2
Muzzle Velocity: 730
Fuse Type: INA
Basic Load: 40 Total of any combination of projectiles
Maximum Firing Range: km22
Armor Penetration: Yes, up to 85mm of conventional steel armour

↳*Ammunition (Option 3)*

Type: HE BB Rocket-Assist Projectile Type BEE2
Caliber: mm122
Diameter: mm39.2
Muzzle Velocity: INA
Fuse Type: INA
Basic Load: 40 Total of any combination of projectiles
Maximum Firing Range: km27
Armor Penetration: Yes, up to 85mm of conventional steel armour

Vehicle Commander's Weapon System

↳*System*

Name: QJC88
Type: 12.7mm Anti-Aircraft Machine Gun
Caliber: mm12.7 x 108
Max Rate of Fire: rds/min500-600
Time the Max Rate of Fire can be Sustained: INA
Feed System: Belt
Sights: Iron/Optical
Operation: Gas Operated, Open Belt
Traverse: deg360
Elevation: deg90
Note: There is no overhead protection for the Gunner.

↳*Ammunition*

Type: Type 54 Round
Caliber: mm12.7
Muzzle Velocity: m/s850
Basic Load: ea1000 (50 Round Belts)
Effective Range: km2.5
Armor Penetration: Yes

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

Protection

Hull Armor: High hardness armor steel, which protections the vehicle from small arms firing and shell splinters.

Turret Armor: High hardness armor steel, which protections the vehicle from small arms firing and shell splinters.

Applique Armor: Yes

Explosive Reactive Armor: INA

Active Protection System: Yes, Automatic Fire Suppression System

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, two lines of four smoke grenade launchers are mounted to each side of the turret.

IR Signature: INA

Day/Night Driving Vision: Yes

Notes:

The Type 07 / PLZ-07 is a Chinese tracked self-propelled howitzer armored vehicle designed and manufactured by the China North Industries Group Corporation (NORINCO). The PLZ-07 self-propelled howitzer was presented for the first time to the public during the military parade in Beijing for the 60th anniversary of the Chinese army (PLA), 01 October 2009. The PLZ-07 has been in service with PLA (People's Liberation Army), Chinese Army. The PLZ-07 was developed to replace the older 122 mm self-propelled howitzers in service with the People's Liberation Army, which include the Type 89, Type 85 and Type 70/70-1 systems.

2S7 Pion Russian 203mm Self-Propelled Gun (SPG)




Tiers:

1 2 3 4

Variants:

- **2S7M Malka:** An improved variant, which entered service in 1983, that improved the gun's fire control systems, increased the rate of fire from 1.5 to 2.5 rds/min to 2.5 rounds per minute, and increased the ammunition load to eight projectiles
- **BTM-4 Trench Digger:** INA

System

Alternative Designation: 2S7 Pion; M-1975 (NATO designation)
Type: 203mm Self-Propelled Gun (SPG)
Manufacturer: INA
Family: S27
In Service: 1976-Present
Crew: ea7
Chassis: Obiekt 216
Displacement Time: min3-5
Emplacement Time: min5-6

Dimensions

Length (Gun Forward): m13.1
Length (Hull Forward): m10.5
Width: m3.38
Height: m3
Weight, Combat: tonsmt46
Ground Pressure: INA

Automotive

Engine Name: V-46-1 Diesel
Engine Type: Diesel

Engine Power: hp750

Cruising Range: km500

Speed, Maximum Road: km/h51

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg40

Side Slope: deg20

Vertical Step: m0.7

Trench: m2.5

Fording Depth: m1.2

Transmission: Manual

Communications

Primary: R-123M radio system

Secondary: R-173 radio system

Crew Communcation System: 1V116 crew communication system

Main Gun

↳*System*

Name: 2A44, 203mm Cannon

Type: 203mm Self-Propelled Gun (SPG)

Length, Barrel: 56.2 Caliber

Weight, Barrel: kg7,800

Barrel Life: rounds450

Max Rate of Fire: rds/min1.5

Effective Firing Range: km37.5-55

Travel Lock: Manually operated travel lock

Max Elevation: deg+60

Min Elevation: deg-0

Traverse Range: deg30

Traverse Left: deg15

Traverse Right: deg15

Loader Type: Load Assisting System

Muzzle Brake: No

Fume Extractor: No

Breech Mechansim: Two-cycle screw type

Recoil Braking: Hydraulic

Recuperation: Pneumatic

Note #1: The 2S7 can fire ordinary and rocket-assisted HE-FRAG projectiles, chemical and nuclear projectiles. A standard HE-FRAG projectile,

Note #2: Regular Rates of Fire: eight rounds in five minutes; 15 rounds in 10 minutes; 24 rounds in 20 minutes; 30 rounds in 30 minutes; 40 rounds in 60 minutes.

↳*Ammunition (Option 1)*

Type: HE FRAG

Caliber: mm203

Muzzle Velocity: m/s960

Basic Load: ea8

Projectile Weight: kg110

Filler Weight: kg17.8

Charge Weight: kg44

Maximum Range: km37.5

↳*Ammunition (Option 2)*

Type: RAP

Caliber: mm203

Muzzle Velocity: INA

Basic Load: ea8

Projectile Weight: kg103

Filler Weight: kg13.8

Charge Weight: kg44

Maximum Range: km47.5

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: No

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, a large recoil spade lowered to the ground, provides stability at all angles and charges.

Collimator: K-1

Telescope: PG-1M panoramic day telescope

Indirect Fire: Yes

Direct Fire: Yes, using the OP4M-87 telescope.

Protection

Hull Armor: All-welded steel armor (10mm thickness), which provides protection against small arms fire and shell splinters.
Turret Armor: INA
Applique Armor: No
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade (Dozer blade): Yes
NBC Protection: INA
Smoke Equipment: INA
Note: Additionally, the 2S7 can carry a Russian Strela-2 man-portable SAM system

Notes:

The 2S7 Pion ("peony") or Malka is a Soviet self-propelled 203mm heavy artillery. "2S7" is its GRAU designation. It was identified for the first time in 1975 in the Soviet Army and so was called M-1975 by NATO (the 2S4 Tyulpan also received the M-1975 designation), whereas its official designation is SO-203 (2S7). Its design is based on a T-80 chassis carrying an externally mounted 2A44 203 mm gun on the hull rear.

Archer (FH77BW L52) Swedish 155mm Self-Propelled Gun






Tiers:



System

Alternative Designation: The Archer Artillery System, or Archer - FH77BW L52, or Artillerisystem 08
Type: 155mm Self-Propelled Gun
Crew: 4; In case of emergency this artillery system can be operated by a crew of only 2 men (driver and one operator). The Archer artillery system is operated remotely from the cab.
Chassis: The Archer artillery system is mounted on a commercially available Volvo A30D 6x6 articulated hauler chassis.
Displacement Time: less than 30 seconds
Emplacement Time: less than 30 seconds

Dimensions

Length: m14.1
Width: m3.0
Height: m3.9
Weight, Combat: 30 tons
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: hp340
Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.9

Fording: m1.2

Main Gun

↳*System*

Name: 1× FH 77 derived 155-mm/52-calibre howitzer

Type: Howitzer

Caliber: 155mm

Barrel Length: 8.06

Barrel Weight: 11,500 kg

Maximum Firing Range: 30 - 60 km

Maximum Rate of Fire: 8 - 9 rpm

Elevation: INA

Traverse: 360 degrees

↳*Ammunition*

Type: Projectile

Caliber: mm155

Shell: 155 mm NATO

Basic Load: INA

Note: The vehicle carries 21 155mm projectiles in the fully automatic magazine. Reloading the magazine from the accompanying munitions carrier takes about 10 minutes using the purpose-built lifting device. The howitzer can use NATO modular charges or Bofors Uniflex 2 modular charges. The Uniflex 2IM modular charge system consists of two sizes of combustible charge cases; one full-size and one half-size case, both filled with the same type of insensitive guanylurea dinitramide [fr] (GuDN) propellant. The modular charge system allows several increments of charge to be available and increases the gun system's multiple rounds simultaneous impact (MRSI) capability and good range overlap between the increments. With BAE Bofors/Nexter Bonus rounds the range is 35 km. The range of the gun is extended to 60 km with the precision-guided Raytheon/Bofors XM982 Excalibur round. The Excalibur shell is corrected in flight towards a pre-programmed trajectory by a GPS guidance system. For armoured vehicles, the Bofors 155 Bonus is used.

Auxiliary Weapon System

Note: There is also a LEMUR remotely-controlled weapon station, armed with a 12.7 mm heavy machine gun for self-defense and smoke grenade dischargers.

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: Yes

Protection

Hull Armor: Cab and ordnance of the Archer is protected against 7.62 mm armor-piercing rounds and artillery shell fragments. It also withstands mine blasts equivalent to 6 kg of TNT.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Automatic Fire Suppression System: Yes

Notes:

The Archer Artillery System, or Archer - FH77BW L52, or Artillerisystem 08 is an international project aimed at developing a next-generation self-propelled gun system for Sweden and Norway. The heart of the system is a fully automated 155 mm/L52 gun howitzer and a M151 Protector remote controlled weapon station mounted on a modified 6×6 chassis of the Volvo A30D, all-terrain articulated hauler. The crew and engine compartment is armoured and the cab is fitted with bullet and fragmentation- resistant windows. Aside from this, the system consists of an ammunition resupply vehicle, a support vehicle, BONUS and the M982 Excalibur guided projectile. The project began its life in 1995 as earlier studies for a self-propelled system based on the FH 77. Further test systems received the designation FH 77BD and FH 77BW. By 2004, two prototypes had been ordered based on a lengthened version of the FH 77B mounted on a modified Volvo Construction Equipment A30D articulated haul truck (6x6). In 2008, Sweden ordered a first batch of seven units, while Norway ordered one. In August 2009, Norway and Sweden ordered 24 Archers each, in a cooperative deal. The Howitzer was developed for the Swedish armed forces following a contract awarded to Bofors (now BAE Systems Bofors) in 2003 by Försvarets Materielverk (FMV), the Swedish defence acquisition agency to build two demonstrator howitzers. The prototype FH77 BW L52 self-propelled howitzers entered firing trials in Sweden in 2005 and 2006. In September 2006, the FMV placed a contract for detailed design work on Archer and, in January 2007, a contract for the next development phase. The Swedish Army has a requirement for 24 systems (two battalions). Following In September 2008, the Swedish government approved the final development and procurement of the Archer artillery system. In November 2008, Sweden and Norway signed a co-operative agreement for the development of the Archer system and, in January 2009, awarded BAE Systems a contract to complete development of the artillery system with the exception of the remote weapon system which is made by Kongsberg Defence & Aerospace. A final prototype is scheduled for completion by September 2009, which is expected to be followed by a contract for 48 systems – 24 for Sweden and 24 for Norway. Archer was planned to enter service in 2011 but was delayed until October 2013. This because of unforeseen technical problems. The Swedish Army received its first four pre-serial production FH-77 BW L52 Archer systems on 23 September 2013, and the first guns finally entered service on 1 February 2016. The Norwegian government withdrew from the project in December 2013. The vehicle platform is a modification of the Volvo A30D 6×6 articulated all-terrain hauler vehicle. The vehicle cabin and engine compartment are fully armoured and the cab is fitted with bullet and fragmentation-proof windows. The cabin seats up to four personnel. The howitzer is operated by three or four crew. The system also includes a munition carrier consisting of a removable, modified standard container mounted on a ballistic-proofed all-terrain lorry. The unit cost is approximately $4,500,000.

M109A1 American 155mm Self-Propelled Howitzer





Tiers:



Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30

seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.

- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88 (M109A1) are known as respectively PzHb 79/95 and PzHb 88/95
- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
- **K55/K55A1:** K55/K55A1 are South Korean variants of the M109A2 , originally named KM109A2 with additional domestic augmentations, license-produced by Samsung Techwin. They are fitted with M178 155 mm 39 caliber gun, NBC protection, automatic fire extinguishing system, and a modified ammunition reception module for K56 automatic ammunition resupply vehicle. The Performance Improvement Program variant, K55A1, is a complete domestic overhaul of the K55 which is further augmented by Samsung Thales with modern digital ballistic computers, multifunctional data display and controllers, GPS navigation and target acquisition system, wireless datalink equipment, and upgraded fire control storage battery and power supply unit, to closely match the US military's modernization of the Paladin into next-generation standard. Many improved technologies of the South Korean K9 Thunder were retrofitted on the K55A1. 1,040 howitzers of these variants were produced.
- **M109A7:** The newest M109 version for U.S. service is the M109A7, formerly known as the M109A6 Paladin Integrated Management (PIM). The M109A7 shares common components with the Bradley Fighting Vehicle such as the engine, transmission, and tracks. This creates commonality with other systems and maximizes cost-savings in production, parts inventory, and maintenance personnel. The M109A7's on-board power systems harness technologies originally developed for the Non-Line-of-Sight Cannon; the electric drive is faster than the previous hydraulic system, and the automatic rammer more consistently rams the round into the gun for consistent velocities and better accuracy. It features a 600-volt on-board power system to accommodate additional armor and future networking technologies as they become ready. The M109A7 can sustain a one-round per-minute rate of fire and a maximum rate of fire of four rounds per-minute.

System

Alternative Designation: M109A1

In Service: 1970-Present

Type: Self-Propelled Howitzer

Crew: ea6

Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.

Displacement Time: INA

Emplacement Time: INA

Note: The first M109A1 conversion kits became available in early 1972 and the first examples, converted from standard models, became operational in 1973.

Dimensions

Length, Hull: 6.19 m

Length, Gun Forward: 9.04-m

Width: 3.15 m

Height: 3.28 m

Weight: 24,070 kg

Automotive

Engine Name: Detroit Diesel 8V71T Diesel

Engine Type: Diesel

Engine Power: hp450

Range: km390

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.53

Trench: m1.83

Fording Depth: m1.07

Fuel Capacity: 135 gal (511 liters)

Main Gun

↳*System*

Name: M185 155 mm/L39 howitzer

Type: Howitzer

Caliber: 155mm

Length: INA

Barrel Length: INA

Weight: INA

Cannon Groves: 48

Rifling: right-hand rifling with constant, 8.93-deg twist

Breech Type: Welin-step thread

Recoil System: hydropneumatic

Elevation: -3/+75 deg (-53/+1,333 mils)

Traverse: 360 deg (6,400 mils)

Maximum Firing Range: 14.6 km

Maximum Rate of Fire: 4 rpm

Sustained Rate of Fire: 2 rpm

Note #1: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.

Note #2: This version mounts the longer M185 155-mm gun and incorporated elevation, traversing and suspension improvements.

Note #3: Other improvements include a more efficient muzzle brake, improved load assisting system and improved suspension. Maximum range of fire is 18.1 km with standard HE-FRAG projectile and 24 km with rocket-assisted projectile. IT is also capable of launching M712 Copperhead laser-guided rounds. These rounds are intended to engage high-value hostile targets, such as tanks, armored vehicles, artillery systems, radars, observation posts and so on. Most original M109 artillery systems were upgraded to this standard.

↳*Ammunition (Option 1)*

Name: M712

Type: Copperhead

Caliber: mm155

Length: 54.0 in (1,372 mm)

Weight: 140.0 lb (63.50 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

↳*Ammunition (Option 2)*

Name: M864

Type: DPICM

Caliber: 155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

↳*Ammunition (Option 3)*

Name: M718

Type: RAAMS Long

Caliber: 155mm

Length: 30.7 in (781 mm)

Weight: 103.0 lb (46.71 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 500

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Protection

Hull Armor: The M109’s protection consists of up to 32 millimeters of armor, which is only effective against small arms and grenade/artillery fragments.

Turret Armor: INA, the turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: none fitted

Smoke Equipment: INA

Fire Suppression: INA

Notes:

M109A1 M109A1: variant with an improved gun—the M185 155 mm/L39 howitzer. This artillery system was introduced in 1970 and deliveries commenced in 1973. Other improvements include a more efficient muzzle brake, improved load assisting system and improved suspension. Maximum range of fire is 18.1 km with standard HE-FRAG projectile and 24 km with rocket-assisted projectile. IT is also capable of launching M712 Copperhead laser-guided rounds. These rounds are intended to engage high-value hostile targets, such as tanks, armored vehicles, artillery systems, radars, observation posts and so on. Most original M109 artillery systems were upgraded to this standard The M109 is an American 155 mm turreted self-propelled howitzer, first introduced in the early 1960s to replace the M44. It has been upgraded a number of times, most recently to the M109A7. The M109 family is the most common Western indirect-fire support weapon of maneuver brigades of armored and mechanized infantry divisions. The M109 has a crew of four: the section chief/commander, the driver, the gunner, and the ammunition handler/loader. The chief or gunner aims the cannon left or right (deflection) and up and down (quadrant). The British Army replaced its M109s with the AS-90. Several European armed forces have or are currently replacing older M109s with the German PzH 2000. Upgrades to the M109 were introduced by the U.S. (see variants below) and by Switzerland (KAWEST). With the cancellation of the U.S. Crusader and Non-Line-of-Sight Cannon, the M109A6 ("Paladin") will remain the principal self-propelled howitzer for the U.S. for the foreseeable future until the new M1299 will enter service. First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters. The widely used M109 carries a 155-mm howitzer and is the principal self-propelled artillery support for U.S. Army divisions. It is a large tracked vehicle with a fully traversable turret and prominent bustle. Early variants had a short, 23-caliber barrel. Later versions, including the M109A6 Paladin, have a 39-caliber barrel. The M109 has a crew of six: commander, gunner, driver and three ammunition members. The hull is made of all-welded aluminum armor, which protects against small-arms fire and shell splinters. The driver is seated at the front left of the hull, with the powerpack to the right and the turret at the rear. The driver is provided with a single-piece hatch cover that opens to the left, with three M45 day periscopes in front. These can be covered with small metal flaps to prevent damage. One of the day periscopes can be replaced by a passive night-vision periscope. The Detroit Diesel Model 8V-71T engine is coupled to an Allison Transmission XTG-411-4A cross-drive transmission. The all-welded aluminum armor turret at the rear of the hull has a square hatch in each side that opens to the rear and twin doors in the turret rear. The commander is seated on the right side of the turret and has a cupola that can be traversed through 360 deg, a single-piece hatch cover that opens to the rear and an M27 day periscope. A .50-cal M2 heavy-barrel machine gun is pintle-mounted on the front of the cupola. The gunner is seated on the left side of the turret and has a square single-piece hatch cover that opens to the right. The twin doors at the rear of the turret are provided for ammunition resupply. Mounted at the rear of the hull on each side of the hull door is a large spade that is manually lowered to the ground before firing. They are normally deployed only when firing top charges. The torsion bar suspension on either side consists of seven dual rubber-tired road wheels with the drive sprocket at the front and the idler at the rear. There are no track-return rollers. The tracks are of a single-pin, center-guide type with replaceable rubber pads. The M109 is fitted with night-vision equipment, but does not have nuclear, biological and chemical (NBC) warfare protection. The vehicle can be fitted with an amphibious kit consisting of nine air bags, four on each side of the hull and one at the front. The bags are inflated from the vehicle, which can then propel itself across rivers on its tracks at a maximum speed of 4 mph (6 kmh). The main armament is a 155-mm M126 howitzer in an M127 mount with a fume extractor and large muzzle brake. The recoil system is hydropneumatic and the breech block is of the Welin-step thread type. Gun elevation and depression and turret traverse are hydraulic with manual controls for emergency use. Fire-control equipment includes an elbow telescope M118C for direct fire with a magnification of 4x and 10-deg field of view; panoramic telescope M117 for indirect fire and gunner's quadrant M1A1 . The M109 Paladin self-propelled Howitzer, first produced in 1963 and improved upon numerous times over the past 40 years, is currently slated for a comprehensive overhaul. The M109 PIM upgrade shares many common components of the Bradley Fighting Vehicle, allowing for more commonality with other Army vehicle systems and maximizing production savings, parts inventory and maintenance personnel while avoiding component obsolescence. The PIM modernization effort is a significant upgrade of the M109A6 Paladin which includes buying back Space, Weight, and Power - Cooling. While the self-propelled howitzer's cannon will remain unchanged, the PIM will sport a brand new chassis, engine, transmission, suspension, steering system, to go along with an upgraded electric ramming system.

2S3 Akatsiya (M1973) Russian 152mm Self-Propelled Howitzer (SPH)




Tiers:



Variants:

- **2S3 (SO-152):** Basic variant, developed in 1968. Produced in 1970–1975. Two modifications used D-11 and D-11M howitzers.
- **2S3M (SO-152M):** Equipped with a mechanized drum-type stowage for 12 rounds, the amount of hatches in rear armored plates of the hull and the turret was reduced, the configuration of those hatches was changed, antenna of R-123 radio set was transferred on a turret top. Ammunition was increased from 40 to 46 rounds (usually consists of 42 OF-540 and OF-25 HE-Frag projectiles, and of 4 BP-540 HEAT-FS projectiles). Much more powerful OF-29 HE-Frag projectiles and OF-38 Krasnopol laser-guided rocket-assisted projectiles were developed for SO-152M. The modernized howitzer has a designator 2A33. Produced in 1975–1987.
- **2S3M1 (SO-152M1):** Equipped with a command data acquisition and display equipment, and with a new SP-538 sight. OF-38 Krasnopol laser-guided rocket-assisted projectiles were added to standard ammunition. Produced in 1987–1993. All 2S3s and 2S3Ms were modernized to 2S3M1 level.
- **2S3M2 (SO-152M2):** Modernized variant equipped with an automatic fire control system, a satellite navigational system, and smoke grenade launchers. Developed in 2000.
- **2S3M2-155:** An export-oriented variant of 2S3M2 equipped with a new 155 mm M-385 howitzer. Developed in 2000.
- **2S3M3:** An experimental variant of 2S3M2 equipped with a further improved fire control system and a modernized howitzer 2A33M that can fire ordnance of a more powerful 2A65 howitzer that equips the 2S19.

System

Alternative Designation: 2S3 Akatsiya, SO-152 (CO-152), Designated M1973 by the U.S. Army

Manufacturer: Uraltransmash

Type: Self-propelled gun

Crew: ea4-6

Chassis: Object 123 tracked chassis

Family: 2S3 Family

Displacement Time: min3

Emplacement Time: min3

Note: The 2S3 is a Tier 2 weapon because it has been identified as one of the top 52 pieces of Russian Military Equipment.

Dimensions

Length (Overall): m8.4

Length (Hull): m7.765

Width: m3.25

Height: m3.05

Weight, Combat: kg27,500

Ground Clearance: m0.45

Track Width: mm480

Length of track on ground:: m4.94

Ground pressure: psi8.39

Automotive

Engine Name: V-59

Engine Type: Diesel

Engine Power: hp520

Power to Weight Ratio: hp/ton17.3

Transmission: Mechanical two-gear transmission

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Setp: m0.7

Trench: m3

Time to dig Trench: min20-40

Fording Depth: m1

Fuel Capacity: liters830

Suspension: Torsion bar

Communications

Primary Radio: R-123 radio set

Intercom: R-124 intercom

Main Gun

↳*System*

Name: 152.4mm D-22 howitzer L/27

Type: Howitzer

Breech Type:

Length, Barrel: m5.2

Loader Type: Semi-automatic

Max Rate of Fire: rds/min3-4

Sustain Rate of Fire: rds/min1

Rapid Fire: rds/min4

Breech Type: Semi-automatic vertical wedge breechblock and an ejector

Muzzle Brake Type: Double-baffle muzzle brake

Max Elevation: deg+60

Min Elevation: deg-4

Traverse Range: deg360

Projectile Carousel: Automatically revolves 30 deg

Bore Evacuator: Yes, behind the muzzle brake

Fume Extractor: Yes

Traveling Lock: Gun barrel traveling lock

↳*Ammunition (Option 1)*

Type: OF-540 HE-Frag

Caliber: mm152

Muzzle Velocity: m/s655

Fuse Type: RGM-2 fuze

Basic Load: 46 Total, any combination of Russian 152mm Projectiles

Maximum Effective Range: km17.4

Projectile Weight: kg43.56

Warhead Weight: kg7.76

Maximum Range: km18.5

↳*Ammunition (Option 2)*

Type: OF-25 HE-Frag

Caliber: mm152

Maximum Range: km18.5

Basic Load: 46 Total, any combination of Russian 152mm Projectiles

Projectile Weight: kg43.56

Note: The 2S3 Akatsiya can fire the following 152mm Projectiles: BP-540 HEAT-FS (sight distance is 3 km, 250 mm armor penetration), Br-540B and Br-540 AP-T (115–120 mm armor penetration at a 1000 m), OF-38 Krasnopol laser-guided rocket-assisted projectiles, S1 illuminating, ZH3 smoke, nuclear projectiles (with explosive capacity of 2 kt). Secondary armament consists of a remotely controlled 7.62 mm PKT tank machine gun on commander's cupola for anti-aircraft defence and self-defence at close range.

Coaxial Weapon System

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Muzzle Velocity: m/s825

Basic Load: ea1,000

Effective Range (Iron Sights): m100-1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, PG-4 sight

Thermal Sight Gunner: Yes, OP5-38 gunner's telescope

Main Gun Stabilization: INA

Indirect Fire: PG-4 Panoramic Telescope (PANTEL)

Direct Fire: OP 5-38

Collimator: K-1

Commander Cupola Range: deg360

Searchlight: OU-3K infra-red/white light searchlight

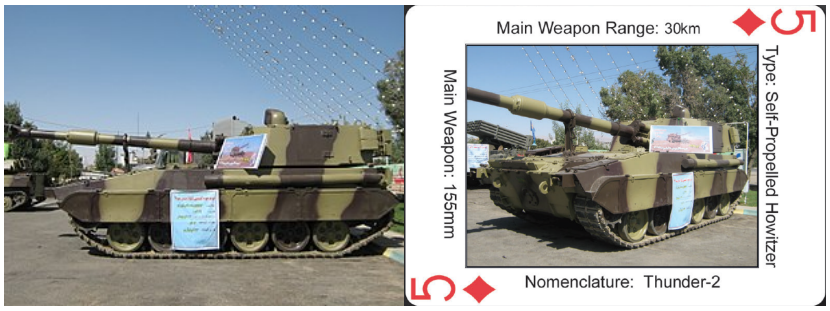
Protection

Hull Armor: mm15
Turret Armor: mm20
Applique Armor: mAvailable
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: Yes
NBC Protection: Yes, Automatic CBRN defense system with filtration unit
Smoke Equipment: No
Fire Suppression System: Yes

Notes:

2S3 Akatsiya SO-152 (CO-152) is a Soviet 152.4 mm self-propelled gun developed in 1968. It was a response to the American 155 mm M109. The development started in 1967 according to the Resolution of the Council of Ministers of the Soviet Union from July 4, 1967. In 1968 the SO-152 was completed and in 1971 entered service. Its GRAU designation is 2S3 (2C3). The fighting vehicle also received the additional designation Akatsiya (Акация), which is Russian for acacia.The Akatsiya is armed with a 152.4 mm howitzer based on the Soviet 152.4 mm D-20 howitzer and is sometimes confused with the M109 self-propelled artillery. The artillery system was developed at the design bureau No. 9 of Sverdlovsk. The factory designation of the howitzer is D-22 and the GRAU designation, 2A33. The chassis was developed by Uraltransmash. The driver's and engine-transmission compartments are located in the front part of a hull, the fighting compartment with rotatory turret in middle and rear parts of the hull. The armor is welded rolled steel. The SPG is equipped with an R-123 radio set, an R-124 intercom, an automatic CBRN defense system with filtration unit and fire-fighting equipment. The V-59 12-cylinder four-stroke water-cooled diesel engine connects to a mechanical two-gear transmission. The gear box is combined into one block with a planetary steering gear. The 2S3 has self-entrenching equipment which allows it to prepare a trench within 20–40 min. The crew consists of 4–6 men: a driver, a gunner, a loader, a commander, and two ammunition bearers, which are positioned to the rear of the vehicle feeding rounds through two hatches in the hull rear when in masked firing position.

Raad-2 (Thunder-2) Iranian 155mm Self-Propelled Howitzer (SPH)



Tiers:

1 **2** 3 4

Variants:

- **Raad-2M:** Raad-2 upgraded with a Ukrainian-made 5TDF engine instead of a V-8 Diesel engine.

System

Alternative Designation: Raad-2, Thunder 2
In Service: 1997-Present
Manufacturer: Defense Industries Organization
Type: Self-Propelled Howitzer
Family: Raad Series
Crew: 5 (commander, gunner, driver, 2 loaders)
Chassis: chassis is based on the Chinese WZ-501/503 series, itself a copy of the Russian BMP-1 series.
Displacement Time: INA
Emplacement Time: Less than 1 min

Dimensions

Length: m9.14
Width: m3.38
Height to Turret Roof: m2.60
Height to Top of Roof-Mounted Weapon: m3.47
Height, Axis of Fire: m2.24
Weight, Combat: kg36,000
Ground Pressure: 0.67 kg/sq cm

Automotive

Engine Name: V-84MS V12 diesel
Engine Type: Diesel
Engine Power: hp840

Power-to-Weight Radio: 23 hp/ton

Cruising Range: km450

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h45

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Obstacle: m0.80

Trench: m2.40

Fording Depth (Without Preparation): m1.2

Transmission: SPAT 1200 transmission

Communications

Digital Communications: Yes

VHF Capable: Yes

HF Capable: Yes

Main Gun

↳*System*

Name: 1 x HM44 155-mm/39-cal howitzer

Type: mm155

Breech Type: screw breech mechanism

Length, Barrel: 39 Calibers

Max Rate of Fire: rds/min4

Recuperator: Hydropneumatic recuperator

Brake Type: Hydraulic recoil brake.

Fume Extractor: Yes

Muzzle Break Type: Double Baffle Muzzle Break

Max Elevation: deg+75

Min Elevation: deg-3

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Effective Firing Range: km30

Barrel Life: 5,000 when firing Charge 8

Ammunition (Option 1)

Name: M107

Type: High Explosive (HE)

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Effective Range: km18.1

Note: The Raad-2 can also fire 155mm Smoke, HE Base Bleed, and Illuminating Projectiles.

↳*Ammunition (Option 2)*

Name: INA

Type: Base Bleed HE

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Maximum Effective Range: km24

↳*Ammunition (Option 3)*

Name: INA

Type: Charge 2

Caliber: 39 Caliber

Muzzle Velocity: INA

Basic Load: 30 total of any combination of 155mm Projectiles

Maximum Effective Range: m3,000

Vehicle Commander's Weapon

↳*System*

Name: M2 Browning .50 Caliber Machine Gun

Type: Machine Gun

In Service: 1933-Present

Proliferation: +3 Million

Weight, Gun: kg83.78

Weight, Gun with Tripod and T&E: kg127.87

Length: mm1,654

Barrel Length: mm1,143

↳**Action:** Short recoil-operated

Rate of Fire: rds/min450-600

Effective Firing Range: m1,800

Maximum Effective Firing Range: m7,400

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Muzzle Velocity: m/s890

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Passive night-driving periscope

Main Gun Stabilization: Yes, When deployed in the firing position two spades are lowered either side of the hull rear of Thunder-2 to provide a more stable firing platform.

Indirect Fire: Indirect fire sight is fitted in the turret roof

Direct Fire: The direct-fire sight is parallel to the main 155-mm cannon

GPS: Yes

Navigation: Yes

Gunner's Control Panel and Display: Yes

Commander's Control Panel and Display: Yes

Automatic Gunlaying System: Yes

Protection

Hull Armor: mm20

Turret Armor: All-welded steel armor, providing protection from small-arms fire and shell splinters

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Automatic Firefighting System: Yes

Air-Conditioner: Yes

Notes:

The 155mm Raad-2 (Thunder 2) is a domestically developed self-propelled howitzer system in Iranian army service. The system uses components from other domestic armored vehicle programs to simplify logistics and training. The Raad-2 resembles the U.S. M109A2 self-propelled howitzer in appearance. A large number of these vehicles were supplied to Iran prior to the revolution in 1979. It has a crew of five: commander, driver, gunner and two ammunition loaders. In early September 1997 it was reported that Iran had successfully tested a locally built rapid fire mobile field gun known as Raad-2 (Thunder-2). It uses a turret that has a similar layout to the M109A1 155mm/39-cal self-propelled howitzer. The Iranian Defense Industries Organization claimed that the 155 mm HM44 howitzer manufactured by the Hadid facility of the Iranian Defense Industries Organization had a high firing rate and accuracy. It was described as being able to fire five rounds per minute. The gun's range was reported as 30 km (19 mi), and it also includes features such as a laser range-finder and a semi-automatic loading system. The gun looks exactly like 155mm/39-cal M185 gun from M109A1 and is fitted with a double baffle muzzle brake, fume extractor, screw breech mechanism, hydro-pneumatic recuperator and a hydraulic recoil brake. It uses the Iranian-made Boragh APC chassis, a conversion of the either the Russian BMP-1 or Chinese Type 86 (WZ-501) IFV. It was described as being able to move with a speed of 70 km/h (43 mph) on the battlefield.

M110 Iranian 203mm Self-Propelled Howitzer (SPH)





Tiers:

1 2 3 4

Variants:

- **M110A1:** Improved variant of the M110, fitted with a longer M201 203 mm/L37 howitzer. It entered service in 1971. Maximum range of fire was increased to 27 km. This self-propelled howitzer fires newly developed rocket-assisted, cluster projectiles, nuclear and chemical projectiles.
- **M110A2:** Improved variant of the M110A1. It entered service in 1978 and was fitted with double muzzle brake. Maximum range of fire was increased to 29 km.

System

Alternative Designation: M110

Manufacturer: General Motors Corp.

In Service: 1961-Present

Family: M110 Series

Crew: 5 (commander, driver, 3 gunners)

Resupply Vehicle: Required as M110 can only carry 2 rounds on board. M548 ammunition resupply vehicle is the primary option.

Chassis: Same universal tracked chassis as the M107 175 mm self-propelled gun.

Displacement Time: min1

Emplacement Time: min1

Note: Support crew of 8 men are carried by an escorting armored personnel carrier, which also transports ammunition for this SPH.

Dimensions

Length, with Gun Forward: m10.72

Length, Hull: m5.72

Barrel Length: m8.24

Width: m3.15

Height (To the Top of the Barrel): m3.15

Weight, Combat: tons31.2

Weight, Unloaded: tons28.1

Ground Pressure: kg/sq cm0.76

Length of Track on the Ground: m3.94

Track Width: m0.39

Automotive

Engine Name: 1 x Detroit Diesel 8V-71T Engine

Engine Type: Detroit Diesel 8V-71T 569-cu in (9.32-liter) liquid-cooled, 2-stroke, turbocharged V-8 diesel

Engine Power: hp805

Power-to-Weight Ratio: 14.28 hp/metric ton

Cruising Range: km523

Speed, Maximum Road: km/h55

Speed, Average Cross: 15

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.3

Fording Depth: m1.2

Fuel Capacity: liters1,137

Suspension: Torsion bar, 5 road wheels, front drive, last road wheel acts as rear idler, shock absorber on each road wheel, no return rollers ability to lock suspension out when firing rear-mounted hydraulic spade for bracing firing platform.

Communications

Primary Radio: INA

Secondary Radio: INA

Main Gun

Note: The M110 carries only 2 rounds. Ammunition is carried by escorting armored personnel carrier.

↳*System*

Name: M201A1 Howitzer, 203mm Howitzer

Type: mm203

Length, Barrel: m8.24

Breech Type: Interrupted Screw

Recoil Type: Hydro-pneumatic

Max Rate of Fire: 2+ rd/min

Normal Rate of Fire: 1 rd/2 min

Muzzle Brake Type: Double-baffle muzzle brake

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳***Ammunition (Option 1)***

Type: M650

Type: HERA

Caliber: mm203

Projectile Length: mm1,116

Projectile Weight: kg90.78

Muzzle Velocity: m/s710

Maximum Effective Range: m30,000

Basic Load: ea2

Fuse Type: INA

↳***Ammunition (Option 2)***

Name: M509

Type: DPICM

Caliber: mm203

Projectile Length: mm1,115

Projectile Weight: kig96.6

Muzzle Velocity: m/s711

Maximum Effective Range: m22,500

Basic Load: ea2

Fuse Type: INA

↳***Ammunition (Option 3)***

Name: M106

Type: HE

Caliber: mm203

Projectile Length: mm871

Projectile Weight: kg92.53

Muzzle Velocity: m/s713

Maximum Effective Range: m21,300

Basic Load: ea2

Fuse Type: INA

Note: The M110 can also fire the following types of 203mm projectiles: M404 HE, M426 CHEM.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Infrared night-vision equipment

Thermal Sight Gunner: Infrared night-vision equipment

Main Gun Stabilization: INA

Protection

Hull Armor: 20mm maximum (estimated)

Turret Armor: 20mm maximum (estimated)

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Note: This artillery system carries no defensive armament, except individual weapons carried by the crew.

Notes:

The self-propelled M-110 8-inch [203 mm] howitzer first entered service with the US Army in 1963. Many of these units have been exported to other countries, such as Iran. The vehicle itself transports only two projectiles and five men, while the remainder of the ammunition and the crew is on board a tracked M548. The M-110 Howitzer fires a 200-pound projectile out to almost 17 kilometers (16,800-meters). Designed to be part of a common family of weapons utilising the same chassis components, the M107 and M110 were essentially the same vehicle mounting different barrels. The hull of the M110 is identical to that of the M107 and is made of all-welded armour and high-tensile alloy steel with the driver at the front of the hull on the left, the engine to his right and the main armament at the rear. The M107 self-propelled 175-mm. gun and the M110 8-inch howitzer had identical carriages but different tubes. The 175-mm. gun fired a 174-pound projectile almost 33 kilometers. This impressive range made it a valuable weapon for providing an umbrella of protection over large areas. The 8-inch howitzer fired a 200-pound projectile almost 17 kilometers, plus being the most accurate weapon in the field artillery. The 8-inch howitzer was found with most division artilleries, and both the 8-inch howitzer and 175-mm. gun were with field force artillery. At field force the proportion of 8-inch and 175-mm. weapons varied. Since the weapons had identical carriages, the common practice was to install those tubes that best met the current tactical needs. One day a battery might be 175mm.; a few days later it might be half 175-mm. and half 8-inch.

2S35 Koalitsiya-SV Russian 152mm Self Propelled Howitzer (SPH)





Tiers:

1 2 3 4

Variants:

- **S35-1 Koalitsiya-SV-KSh:** The Koalitsiya-SV KSh is a new Russian self-propelled howitzer. It uses the ordnance of the 2S35 Koalitsiya-SV, but is based on 8x8 military truck chassis. A prototype of this artillery system was ready by 2013. Public pictures of this artillery system first appeared in 2017. The Koalitsiya-SV KSh is a very capable artillery system. Since the early 1980s Soviets developed a 152 mm howitzer, based on an 8x8 wheeled chassis. It was known as the 2S21 Msta-K. A couple of prototypes were built, however this artillery system never reached production and the program was cancelled in 1987. It was a failure mainly because at that time Soviets had no suitable trucks to carry this howitzer, that would have sufficient payload capacity, be powerful enough and could withstand the violent recoil. The new 2S35-1 Koalitsiya-SV KSh can be seen as an evolution of the 2S21 Msta-K. The 2S35-1 Koalitsiya-SV KSh utilizes the unmanned turret with 152 mm ordnance of the 2S35 Koalisiya-SV self-propelled howitzer. It is based on a modified KamAZ-6560 military truck with 8x8 configuration. This artillery system can be seen as a less expensive and more mobile alternative to the tracked version. Though it looses to tracked version in terms of off-road mobility and armor protection. It is planned that this truck-mounted howitzer will be mainly used by units, that are equipped with wheeled combat vehicles, while the tracked version will be used by units equipped with tracked combat vehicles.

System

Alternative Designation: 2S35 Koalitsiya-SV

Manufacturer: Burevestnik Central Scientific Research Institute

Type: Self Propelled Howitzer (SPH)

Family: 2S35

Crew: ea3

Chassis: Modified T-90

Estimated Service Life: years30

Note: The S35 Koalitsiya-SV is a a next-generation system capable of providing overmatch in a modern battle space

Dimensions

Length: m9.63

Width: m3.78

Height: m2.2

Weight, Combat: tons48-55

Ground Pressure: kg/mINA

Note: The 2S35 chassis is based off of the T-90 MBT

Automotive

Engine Name: V92-S2

Engine Type: Diesel

Engine Power: hp1,000

Cruising Range: km800

Speed, Maximum Road: km/h65

Speed, Maximum Off-Road: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.8

Fording Depth: m2.1

Fuel Capacity: liters1,200

Suspension: Torsion bars have been upgraded with 45KhNGMFA-3 steel that permits greater operating stress

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: 152 mm/L52 2A88 Howitzer
Type: mm152
Breech Type: Vertical sliding wedge
Length, Barrel: INA
Loader Type: Automated with a pneumatic rammer
Max Rate of Fire: rds/min16
Normal Rate of Fire: rds/min12
Muzzle Brake: Double baffle
Recoil System: Yes
Bore Evacuator: Yes
Max Elevation: deg+70
Min Elevation: deg-7
Traverse Range: deg360
Maximum Firing Range (Precision-Guided Rounds): km80
Maximum Firing Range (Standard Rounds): km40
Time to Fully Reload: min15
Ignition System: Microwave ignition system

↳*Ammunition (Option 1)*

Type: 152-mm Frag-HE, OF-72
Caliber: mm152
Muzzle Velocity: m/s864
Fuse Type: RGM-2 PD
Basic Load: ea65 Total Rounds of any 152mm combination projectile
Effective Range: km24
Projectile Weight: kg43

↳*Ammunition (Option 2)*

Type: 152-mm Frag-HEAT, BP-540
Caliber: mm152
Muzzle Velocity: m/s655
Fuze Type: GPV-3 PD
Basic Load: 65 Total Rounds of any 152mm combination projectile
Maximum Effective Range: km27

Complete Projectile Weight: kg27

↳*Ammunition (Option 3)*

Type: 152-mm Frag-HE BB, OF-91

Caliber: mm152

Muzzle Velocity: m/s828

Fuze Type: KZ-88 PD

Basic Load: 65 Total Rounds of any 152mm combination projectile

Maximum Effective Range: km29

Complete Projectile Weight (OF-61): kg42.86

Note: The 2S19 can fire the additional 152mm projectiles: 9K25 Krasnopol guided projectile and the 3-RB-30 radio jamming round

Coaxial Weapon System

↳*System*

Name: 12.7×108mm ZiD Kord Remote weapon station

Type: mm12.7

Manufacturer: V.A. Degtyarev Plant

In Service: 1998-Present

Length: mm1,980

Max Rate of Fire: rds/min650-600

Sustain Rate of Fire: rds/min550-600

Action: Gas-operated, rotating bolt

Feed System: 50-round linked belt

Sights: Iron Sights with two sighting options, known as CAM and CAM1

CAM 1 Capability: TV/IR camera and a laser rangefinder

CAM 2 Capability: TV camera, Thermal Camera and laser rangefinder

Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

Note: Remote weapon cocking capability

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7×108

Muzzle Velocity: m/s860

Basic Load: ea2,500

Effective Range: m2,000

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes, CAM 1 (TV/IR camera, Thermal Camera and a laser rangefinder)

Thermal Sight Gunner: Yes, CAM 2 (TV/IR camera, Thermal Camera and a laser rangefinder)

Main Gun Stabilization: INA

Multiple Round, Simultaneous Impact (MRSI) Capable: Yes

Direct Fire: Yes

Indirect Fire: Yes

Radars: ea2

Radar Type: Doppler

Protection

Hull Armor: Composite laminate design up to 200mm thick

Turret Armor: Composite laminate design up to 200mm thick. The Turret is not heavily Armored

Applique Armor: Available

Explosive Reactive Armor: Available, the Kontakt-V Explosive Reactive Armour.

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: Yes, can dig 12m × 5.5m × 1.5m entrenchment in sandy soil within 12 to 15 minutes.

NBC Protection: Reported to be the GO-27 PRKhR (NBC) System

Fire Suppression System: Reported to be the Raduga-2 Fire Suppression System

Smoke Equipment: Yes, 2 bundles of 902B Tucha smoke grenade launchers

Smoke Grenade Range: m250-300

Smoke Screen: 30m wide and 10m high for 60 seconds per grenade

IR Signature: INA

Notes:

The 2S35 Koalitsiya is a self-propelled howitzer designed and manufactured in Russia by Ural Vagon Zavod (UVZ) to provide the Russian Ground Troops with its next generation of field artillery systems. It is a successor to the 2S19 Msta-S. It is also intended to replace ageing Russian 152 mm artillery systems. Currently it is one of the most capable howitzers in the world. The first demonstration was conducted in 2006. It used a number of components from the previous 2S19 Msta-S.

Panzerhaubitze 2000 (PzH 2000) German 155mm Self-Propelled Howitzer





Tiers:



System

Alternative Designation: Panzerhaubitze 2000; PzH 2000

Type: 155mm Self-Propelled Howitzer

Manufacturer: Germany; Company: INA

Crew: ea5 (commander, driver, gunner, and two loaders)

Chassis: Wegmann supplied both the chassis, sharing some components with the Leopard 2, and the turret for the gun. The system has superb cross-country performance because of its use of continuous tracks and considerable protection in the case of counter-fire.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length, Overall: 11.67 m

Length, Hull: 7.30 m

Length, Barrel Overhang: 3.30 m

Height: 3.06 m

Width, Including Skirts: 3.58 m

Width, Over Track: 3.37 m

Track Width: 0.55 m

Track Length on Ground: 4.81 m

Ground Clearance: 0.44 m

Weight, Combat: 55,000 kg

Ground Pressure: 0.98 kg/sq cm

Load Class: MLC 60

Automotive

Engine Name: 1 x MTU MT881 Ka-500 8-cylinder direct-injection supercharged diesel

Engine Type: Diesel

Engine Power: hp1,000

Power-to-Weight Ratio: 18 hp/ton

Power Pack: 736 kW

Transmission: Renke HSWL 284 C; 4 forward and 2 reverse gears; integrated steering and clutch

Suspension: torsion bar; seven double-tire road wheels; front drive sprocket, rear idler, track return rollers

Road Speed: 60 km/h

Cross-Country Speed: 45 km/h

Range: 420 km

Gradient: %50

Side Slope: %25

Vertical Obstacle: 1.00 m

Trench: 3.00 m

Fording: 1.50 m

Main Weapon System

↳*System*

Name: 1 x Rheinmetall Industrie AG 155-mm L52 howitzer

Type: Self-Propelled Howitzer

Caliber: 155mm

Barrel Length: INA

Weight: INA

Elevation: -2.5/65 deg (-44/+1,156 mils)

Traverse: 360 deg (6,400 mils)

Range: 30 km with standard NATO projectiles, 40 km) with assisted projectiles

Rate of Fire: 3 rounds in 9.2 sec, 8 rounds in 42.9 sec, 10 rounds in 59.6 sec, 20 rounds in 2 min 10 sec

Resupply Rate: 60 complete rounds and 288 charges by 2 crew members in 10 min 50 sec

↳*Ammunition*

Type: 288 MTLS charges or equivalent bagcharges

Caliber: mm155

Shell: INA

Basic Load: 60 rounds, 288 MTLS charges or equivalent bagcharges

Coaxial Weapon System

System

Name: MG3

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Date of Introduction: 1959

Manufacturer: Rheinmetall License-built by: Beretta, MKEK, Ellinika Amyntika Systimata, Defense Industries Organization, Military Industry Corporation, Pakistan Ordnance Factories, General Dynamics Santa Bárbara Sistemas

In Service: 1959-Present

Proliferation: over 1 Million

Length: 1,225 mm (48.2 in) 1,097 mm (43.2 in) (without stock)

Barrel Length: 565 mm

Weight: 11.5 kg (25.35 lb) 27.5 kg (61 lb) (mounted on tripod)

Action: Recoil-operated, roller locked

Rate of Fire: 1,000–1,300 rpm

Muzzle Velocity: 820 m/s

Maximum Firing Range: 600 m (1,969 ft) (bipod) 1,200 m (3,937 ft) (tripod mounted) 3,000 m (9,843 ft) (gun carriage) 3,750 m (12,303 ft) (terminal

Effective Firing Range: 200–1,200 m sight adjustments

Feed System: 50-round non-disintegrating DM1 belt (can be combined in a drum); 100-round disintegrating DM6/M13 belt

Sights: Open tangent iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Basic Load: 1,000 rounds

Fire Control

Name: INA

Computerized FCS: Yes

Main Gun Stabilization: Yes

Range Finder: GUI terminal controlled, laser backup

Navigation: autonomous navigation and fire control

Protection

Hull Armor: steel; crew and ammunition protection from 14.5-mm AP, artillery fragments and bomblets

↳**Turret Armor:** INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: Yes

Smoke Equipment: 4 x 76-mm smoke grenade dischargers on each side of hull

Notes:

The Panzerhaubitze 2000 ("armoured howitzer 2000"), abbreviated PzH 2000, is a German 155 mm self-propelled howitzer developed by Krauss-Maffei Wegmann (KMW) and Rheinmetall for the German Army. The PzH 2000 is one of the most powerful conventional artillery systems deployed in the 2010s. It is capable of a very high rate of fire; in burst mode it can fire three rounds in nine seconds, ten rounds in 56 seconds, and can—depending on barrel heating—fire between 10 and 13 rounds per minute continuously. The PzH 2000 has automatic support for up to 5 rounds of Multiple Rounds Simultaneous Impact (MRSI). The replenishment of shells is automated. Two operators can load 60 shells and propelling charges in less than 12 minutes. PzH 2000 has also been selected by the armies of Italy, Netherlands, Greece, Lithuania and Croatia, and more orders are probable[citation needed] as many NATO forces replace their M109 howitzers. In 1986 Italy, the United Kingdom and Germany agreed to terminate their existing development of the PzH 155-1 (SP70) programme, which had run into reliability problems and had design defects, notably being mounted on a modified tank chassis. A new Joint Ballistics Memorandum of Understanding (JBMOU) for a 52 calibre barrel (based on a UK proposal) to replace 39 calibre was nearing agreement. German industry was asked for proposals to build a new design with gun conforming to the JBMOU. Of the proposed designs, Wegmann's was selected. Wegman eventually won a contract in 1996 for 185 to be delivered to Germany's rapid reaction force, followed by another 410 for the main force. Wegmann and Krauss-Maffei, the two main German military tracked vehicle designers, merged in 1998 to form KMW. Rheinmetall designed the 155 mm 52-calibre JBMOU compliant gun, which is chromium-lined for its entire 8 metre length and includes a muzzle brake on the end. The gun uses a new modular charge system with six charges (five identical), which can be combined to provide the optimal total charge for the range to the target, as well as the conventional bagged charge systems. Primer is loaded separately via a conveyor belt, and the entire loading, laying and clearing is completely automated. The maximum range of the gun is 30–36 km with the standard DM121 Boattail round, about 40–47 km with base bleed rounds, and 67 km with M2005 V-LAP assisted projectiles. In April 2006 a PzH 2000 shot assisted shells (Denel V-Lap) over a distance of 56 km with a probable maximum range of over 60 km. The gun can also fire the SMArt 155 artillery round, which is used by Germany and Greece. Wegmann supplied both the chassis, sharing some components with the Leopard 2, and the turret for the gun. The system has superb cross-country performance because of its use of continuous tracks and considerable protection in the case of counter-fire. The turret includes a phased array radar on the front glacis for measuring the muzzle velocity of each round fired. Laying data can be automatically provided via encrypted radio from the battery fire direction centre. A lighter, more air-portable version, using the gun in a module fitted to a lighter chassis, has been developed by KMW. It is called the Artillery Gun Module. In December 2013, Raytheon and the German Army completed compatibility testing for the M982 Excalibur extended range guided artillery shell with the PzH 2000. Ten Excaliburs were fired at ranges from 9 to 48 kilometers. Shells hit within three meters of their targets, with an average miss distance of one meter at 48 km. The Excalibur may be accepted by the German Army in 2014. A PzH 2000 L52 gun fired a shell to a range of 67 km at the Alkantpan test range in South Africa on 6 November 2019.

M1992 North Korean 30mm Self-Propelled Anti-Aircraft Gun



Tiers:

1 2 3 4

System

Alternative Designation: M1992

Type: 30mm Self-Propelled Anti-Aircraft Gun

Chassis: This self-propelled anti-aircraft gun is based on the ZSU-23-4 Shilka chassis.

Crew: ea4

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length, Fun Forward: INA

Length, Hull: 6.5 m

Width: 3.1 m

Height: 3.6 m

Weight, Combat: 20 tons

Automotive

Engine Name: V-6P1

Engine Type: Diesel

Engine Power: hp280

Cruising Range: km450

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: 1.1 m

Trench: 2.8 m

Fording Depth: 1 m

Main Weapon System

↳*System*

Name: INA

Type: 2 x 30mm Gun

Caliber: 30mm

Barrel Length: INA

Weight: INA

Maximum Slant Range: 3 km

Maximum Firing Range: 3.5 km

Rate of Fire: 1 600 rpm

Elevation: - 5 to + 85 degrees

Traverse: 360 degrees

↳*Ammunition*

Type: HEI-T Rounds

Caliber: mm30

Shell: INA

Projectile Weight: INA

Basic Load: INA

Coaxial Weapon System

Machine Gun: Name and Type: INA

Fire Control

Name: INA

Computerized FCS: Yes, from the ZSU-23-4

FIre Target Radar: Yes, from the ZSU-23-4

Tracking Range: 6-10 km

Main Gun Stabilization: Yes

Protection

Hull Armor: Thin armor of the ZSU-23-4 provides only limited protection against small arms fire and artillery shell splinters. It has been reported that sides of this vehicle can be penetrated by standard Soviet 7.62x39 mm rounds fired from assault rifle. Though front arc withstands this ammunition.

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

This self-propelled anti-aircraft gun is based on the ZSU-23-4 Shilka chassis. This vehicle was first observed in 1992. It was developed as a replacement for the older twin 37 mm SPAAG. It is worth mentioning that in the 1980s North Korea produced a significant amount of self-propelled artillery, mating towed artillery tubes with chassis already in service. Unlike most North Korean adaptations, the M1992 may have improved performance over the original type. This anti-aircraft artillery system was produced in quantity, however it is unknown how many of them were built.

2S5 Giatsint-S Russian 152mm Self-Propelled Gun (SPG)



Tiers:



Variants:

- **2A36 Giatsint-B:** The 2A36 Giatsint-B is a towed artillery piece that utilises the ordnance from the 2S5 Giatsint-S. It is designed to be used to provide brigades with fire support as part of an artillery formation. The distinctive system has four wheels: two on each side of the gun carriage.

System

Alternative Designation: 2S5 Giatsint-S
Type: Self-Propelled Howitzer (SPH)
Family: 2S5
Crew: ea5-6
Displacement Time: minLess than 2
Emplacement Time: minLess than 2
Transportation (Rail): Spora-80 or larger
Transportation (Air): An-124 aircraft or similar class plane
Note: The 2S5 Giatsint-S is rated a Tier 2 because it has been identified as one of the top 52 pieces of Russian Equipment.

Dimensions

Length (Gun Forward): m8.95
Length (Hull): m7
Width: m3.25
Height: m2.6
Weight, Combat: tons28.2

Automotive

Engine Name: V-59
Engine Type: Diesel
Engine Power: hp520

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m3

Fording Depth: m1

Communications

Primary: R-123

Secondary: R-173

Amplifier: UM-3 Power Amplifier

Main Gun

↳*System*

Name: 152 mm/L54 Gun (Turretless)

Type: mm152

Breech Type: Breech ring, breech mechanism is the semi-automatic horizontal loading type

Length, Barrel: 54 calibers

Loader Type: semi-automatic loading system

Max Rate of Fire: rds/min5-6

Muzzle Brake Type: Five-part multi slotted muzzle brake

Max Elevation: deg+58

Min Elevation: deg-2.5

Traverse Range: deg30

Traverse Left: deg15

Traverse Right: deg15

Maximum Firing Range: km33

Recoil Braking: Hydraulic

Travelling Lock: Yes

Recuperation: Pneumatic

Note: Russian sources say, a battery of 2S5s can have 40 projectiles in the air before the first projectile lands on the enemy position.

↳*Ammunition (Option 1)*

Type: HE-FRAG Projectiles

Caliber: mm152

Muzzle Velocity: m/s942

Basic Load: 30 Total (Any Combination)

Maximum Effective Range: km24.8

Minimum Effective Range: 8,600

Projectile Weight: kg46

↳*Ammunition (Option 2)*

Type: HEAT Projectiles Rocket Assisted Projectile (RAP)

Caliber: mm152

Muzzle Velocity: INA

Basic Load: 30 Total (Any Combination)

Maximum Effective Range: km33

Minimum Effective Range: m8,600

Projectile Weight: kg48

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,500

Maximum Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 2S5

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes, D726-45 and PG-1M sights

Thermal Sight Gunner: Yes, D726-45 and PG-1M sights

Main Gun Stabilization: Yes, pneumatic rod type with an extra spring mechanism

Collimator: K-1

Spotlight: Luch-S71M spotlight

Protection

Hull Armor: mm13

Turret Armor: mm12

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes

Note: A shoulder-launched surface-to-air missile is carried inside the vehicle for protection against helicopters and low-flying aircraft.

Notes:

Development of the 2S5 Giatsint, 152mm self-propelled gun began in 1968 alongside with the 2A36 Giatsint-B towed gun of the same caliber. Both guns have similar ballistics and use the same ammunition. The 2S5 entered service with the Soviet Army in 1976. Production commenced the same year and ceased in the early 1990s. Currently it is in service with Russia, Belarus and Ukraine. The 2S5 Giatsint was only exported to Finland, locally designated as the 152 TELAK 91. The 2S5 Giatsint is fitted with a turretless 152 mm/L54 gun. This gun is completed with load assisting system. Maximum rate of fire is 5 - 6 rounds per minute. The Giatsint fires ordinary and rocket-assisted HE-FRAG projectiles, HEAT, cluster and smoke projectiles. Maximum range of fire with ordinary HE-FRAG projectile is 28.4 km, and up to 33 km with rocket assisted projectile. Some sources claim that the 2S5 is capable of firing 0.1-2 kT nuclear projectiles. Full ammunition load consists of 60 rounds, however only 30 of them are carried by the Giatsint. Other rounds are carried by the re-supply vehicle. It takes 3 minutes to prepare this artillery system for firing.

SH-3 (WMZ322) Chinese 122mm Self-Propelled Howitzer







Tiers:



Variants:

- **Type 89:** The Type 89/PLZ-89 is a 122 mm self-propelled howitzer used by the People's Liberation Army of China to replace Type 85 and Type 70 122 mm self-propelled howitzer. PLZ-89 was first unveiled to the public during 1999 National Day military parade.
- **PLZ-07:** is a successor of the Type 89. This artillery system is widely used by the China's army. It utilizes a similar 122 mm howitzer, but has a new tracked chassis. It has greater mobility, improved fire control system and delivers greater firepower than its predecessor. This artillery system was adopted by the Chinese army in the late 2000s and is fielded in large numbers.
- **PLZ-07B i:** is a version of the PLZ-07, developed for China's marine corps. This artillery system is fully-amphibious and can be launched at sea from amphibious assault ships and swim over short distances to shore.

System

Alternative Designation: SH-3
Type: 122mm Self-Propelled Howitzer
Crew: ea5
Chassis: The SH-3 uses a new chassis, which is based on the Type 89 chassis, but has numerous improvements.
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: 6.6 m
Width: 3.28 m
Height: 2.5 m
Weight, Combat: 24.5 t

Automotive

Engine Name: BF8M1015CP

Engine Type: Diesel

Engine Power: hp590

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: The SH-3 can be fitted with floatation kit for amphibious operation. Once the kit is fitted it can ford water obstacles such as lakes and rivers.

Gradient: %60

Side Slope: %30

Vertical Step: 0.8 m

Tench: 2.5 m

Fording, without Preparation: 1 m

Fording, with Preparation: Amphibious

Main Weapon System

↳*System*

Name: L32 Howitzer

Type: Howitzer

Caliber: 122 mm

Barrel Length: 32 calibers

Barrel Weight: INA

Elevation: INA

Traverse: 360 deg

Loader Type: The SH-3 is fitted with a semi-automatic loader.

Maximum Firing Range: 18 - 21 km

Maximum Rate of Fire: 6 - 8 rpm

Note: This artillery system is compatible with Chinese and Russian 122 mm ammunition.

↳*Ammunition*

Type: Projectile

Caliber: mm32

Basic Load: INA

Note: This artillery system is compatible with standard Chinese and Russian 122 mm ammunition. It fires separate-loaded ammunition. NORINCO developed a whole family of 122 mm ammunition.

Coaxial Weapon System

↳*System*

Name: QJC88
Type: Heavy Machine Gun
Caliber: 12.7mm
Date of Introduction: 1985
Manufacturer: Norinco
Proliferation: China: INA
In Service: 1985-Present
Length: 1.5 m
Barrel Length: 1 m
Height: INA
Weight: 18.5 kg plus 15.5 kg mount
Fire Selector: 0-F
Action: Gas operated, open bolt
Rate of Fire: 540 - 600 rpm
Muzzle Velocity: 850 m/s
Maximum Firing Range: INA
Magazine: Belt fed, 50 rounds
Sights: Iron sights, optional optical sights

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: 12.7x108mm Soviet
Basic Load: 2,000

Fire Control

Name: INA
Computerized FCS: INA
Thermal Sight Vehicle Commander: INA
Main Gun Stabilization: Yes

Protection

Hull Armor: Armor of the SH-3 provides protection against small arms fire and artillery shell splinters.
Turret Armor: Armor of the SH-3 provides protection against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The SH-3 (WMZ322) is a 122-mm tracked self-propelled howitzer designed and manufactured by the Chinese defense company NORINCO (North Industries Corporation). The first information about these artillery system was published in 2005, but NORINCO never officially provided technical information about this product. According to some Chinese military sources, WMZ322 is offered for export under the name SH3. WMZ322 has high mobility and firepower, which is provided by a computerized fire control system. WMZ322 is in the service of the Chinese army. In November 2017, the office of the President of Rwanda, Paul Kagame, published a photo on his Flickr account, which showed SH-3, which participated in military exercises in Rwanda, code-named "Hard Punch II". Layout and protection The layout of the WMZ322/SH3 is very similar to the PLZ-89, especially in terms of the turret design, most of the differences in the suspension. Another feature of WMZ322 is that the driver is in the front left part of the hull, but the PLZ-89 has two hatches, the driver is in the same place, and the commander's seat is behind him. The WMS322 has a crew of five peoples. The turret is installed in the rear part of the hull, it has one door, rear located. The hull and the turret provide protection from small arms firing and fragments of artillery shells. Mobility The WMZ322/SH3 is powered by a Deutz BF8M 1015CP water cooled diesel engine with a power of 450 hp. It provides a maximum speed of 60 km/h and a maximum range of up to 500 km. On the sides there are six paired rubberised road wheels, having a torsion suspension, sprocket wheels in front, guide wheels at the rear and three supporting rollers. Armament WMZ322/SH3 is equipped with a turret very similar to PLZ-89, an older version of the 122-mm Chinese-made tracked self-propelled howitzer. It uses the same type of main armament that consists of one Type 89 122/32-mm cal howitzer borrowed from a Type 85 towed howitzer that has a box screen for a recoil mounted above the barrel and a muzzle brake. The gun is equipped with a semi-automatic loading system that provides a rate of fire from 6 to 8 rounds per minute. The maximum range of standard ammunition is 18 km, for EFRB (Extend Range Full Bore) - up to 22 km and 27 km - for projectiles with Rocket Assisted Projectiles (RAP). The vehicle has ammunition total of 40 rounds. The 12.7-mm machine gun is mounted on the roof of the turret, near the commander's hatch. On the sides of the turret there are also four smoke grenade launchers. Equipment Standard equipment WMZ322/SH3 includes a infrared night vision device, a meteorological sensor, a NBC protection, an automatic fire-extinguishing system and a GPS navigation system. WMZ322 is also equipped with an automatic fire control system that includes a digital ballistic computer, an optical sight for day and night vision and a laser range finder installed at the top of the turret.

M1981 North Korean 122mm Self-Propelled Gun







Tiers:

1 2 **3** 4

System

Alternative Designation: M-1981
Type: 122mm Self-Propelled Gun
Chassis: This self-propelled artillery gun is based on a lightly armored tracked chassis. The same chassis was used for the North Korean M1974 self-propelled gun-howitzer. Most likely that it is a heavily modified Soviet ATS-59G artillery tractor.
Crew: ea8-9
Emplacement Time: under 3 minutes
Displacement Time: under 3 minutes
Note: he M1981 can be seen as a North Korean attempt to create a self-propelled artillery system, somewhat equivalent to the Soviet 2S1 Gvosdika and to improve mobility and protection of their D-74 towed guns.

Dimensions

Length, Hull: 6.3 m
Length, Gun Forward: 8 m
Width: 2.6 m
Height: 2.6 m
Weight, Combat: 25 tons

Automotive

Engine Name: A-650
Engine Type: Diesel

Engine Power: hp300

Cruising Range: km500

Speed, Maximum Road: km/h45

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Fording Depth, without Preparation: m1.1

Fording Depth, with Preparation: m1.5

Main Weapon System

↳*System*

Name: This self-propelled artillery system is armed with an ordnance of the D-74 122 mm/L52 gun.

Type: 122mm Gun

Caliber: 122mm

Barrel Length: 52 calibers

Maximum FIring Range: 24 km

Maximum Rate of Fire: 7 rpm

Elevation: 0-45 deg

Traverse: INA

↳*Ammunition*

Name: INA

Type: Projectile

Caliber: mm122

Projectile Weight: 27.3 kg

Basic Load: INA

Armor Penetration: An AP-T round penetrates 185 mm of rolled homogenous steel armor at a range of 1 000 m

Types of Ammunition: The North Korean artillery system fires High-Explosive Fragmentation (HE-FRAG), Armor-Piercing Tracer (AP-T) and concrete-busting rounds.

Auzillary Weapon System

Note: No information available as to the type of Auxiliary Equipment

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: Yes, Two large stabilizing spades are lowered to the ground at the rear before firing.

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: mmArmor of the M1981 provides some degree of protection for its crew against small arms fire and artillery shell splinters. The gun retains its original splinter shield. Though top of the superstructure is opened and completely unprotected. In traveling order it can be covered with bows and canvas cover. This artillery system has no defensive armament, except firearms of its crew members.

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1981 is a North Korean 122 mm self-propelled gun. Its actual designation is unknown. The M1981 is provisional designation, allocated by a US Department of Defense. Number in the designation denotes the year when this system was first observed by US intelligence. This North Korean artillery system was adopted in the late 1970s or early 1980s and is used to this day. As far as it is known the M1981 was not exported outside the North Korea.

M109 American 155mm Self-Propelled Howitzer





Tiers:



Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30 seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.
- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88

(M109A1) are known as respectively PzHb 79/95 and PzHb 88/95

- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
- **K55/K55A1:** K55/K55A1 are South Korean variants of the M109A2 , originally named KM109A2 with additional domestic augmentations, license-produced by Samsung Techwin. They are fitted with M178 155 mm 39 caliber gun, NBC protection, automatic fire extinguishing system, and a modified ammunition reception module for K56 automatic ammunition resupply vehicle. The Performance Improvement Program variant, K55A1, is a complete domestic overhaul of the K55 which is further augmented by Samsung Thales with modern digital ballistic computers, multifunctional data display and controllers, GPS navigation and target acquisition system, wireless datalink equipment, and upgraded fire control storage battery and power supply unit, to closely match the US military's modernization of the Paladin into next-generation standard. Many improved technologies of the South Korean K9 Thunder were retrofitted on the K55A1. 1,040 howitzers of these variants were produced.
- **M109A7:** The newest M109 version for U.S. service is the M109A7, formerly known as the M109A6 Paladin Integrated Management (PIM). The M109A7 shares common components with the Bradley Fighting Vehicle such as the engine, transmission, and tracks. This creates commonality with other systems and maximizes cost-savings in production, parts inventory, and maintenance personnel. The M109A7's on-board power systems harness technologies originally developed for the Non-Line-of-Sight Cannon; the electric drive is faster than the previous hydraulic system, and the automatic rammer more consistently rams the round into the gun for consistent velocities and better accuracy. It features a 600-volt on-board power system to accommodate additional armor and future networking technologies as they become ready. The M109A7 can sustain a one-round per-minute rate of fire and a maximum rate of fire of four rounds per-minute.

System

Alternative Designation: M109

In Service: 1963-Present

Type: Self-Propelled Howitzer

Crew: ea6

Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length, Hull: 6.19 m

Length, Gun Forward: 9.12 m

Width: 3.15 m

Height: 3.28 m

Weight: 24.07 t

Automotive

Engine Name: Detroit Diesel 8V71T Diesel

Engine Type: Diesel

Engine Power: hp450

Range: km390

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.53

Trench: m1.83

Fording Depth: m1.07

Fuel Capacity: 135 gal (511 liters)

Main Gun

↳*System*

Name: M126 155mm/L23 Howitzer.

Type: Howitzer

Caliber: 155mm

Length: INA

Barrel Length: INA

Weight: INA

Cannon Groves: 48

Rifling: right-hand rifling with constant, 8.93-deg twist

Breech Type: Welin-step thread

Recoil System: hydropneumatic

Elevation: -3/+75 deg (-53/+1,333 mils)

Traverse: 360 deg (6,400 mils)

Maximum Firing Range: 14.6 km

Maximum Rate of Fire: 4 rpm

Sustained Rate of Fire: 2 rpm

Note: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.

↳*Ammunition (Option 1)*

Name: M712

Type: Copperhead

Caliber: mm155

Length: 54.0 in (1,372 mm)

Weight: 140.0 lb (63.50 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

↳*Ammunition (Option 2)*

Name: M864

Type: DPICM

Caliber: 155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

↳*Ammunition (Option 3)*

Name: M718

Type: RAAMS Long

Caliber: 155mm

Length: 30.7 in (781 mm)

Weight: 103.0 lb (46.71 kg)

Basic Load: 28 Rounds Total of any Combination Projectiles

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

Ammunition

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 500

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Protection

Hull Armor: The M109’s protection consists of up to 32 millimeters of armor, which is only effective against small arms and grenade/artillery fragments.

Turret Armor: INA, the turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: none fitted

Smoke Equipment: INA

Fire Suppression: INA

Notes:

The M109 is an American 155 mm turreted self-propelled howitzer, first introduced in the early 1960s to replace the M44. It has been upgraded a number of times, most recently to the M109A7. The M109 family is the most common Western indirect-fire support weapon of maneuver brigades of armored and mechanized infantry divisions. The M109 has a crew of four: the section chief/commander, the driver, the gunner, and the ammunition handler/loader. The chief or gunner aims the cannon left or right (deflection) and up and down (quadrant). The British Army replaced its M109s with the AS-90. Several European armed forces have or are currently replacing older M109s with the German PzH 2000. Upgrades to the M109 were introduced by the U.S. (see variants below) and by Switzerland (KAWEST). With the cancellation of the U.S. Crusader and Non-Line-of-Sight Cannon, the M109A6 ("Paladin") will remain the principal self-propelled howitzer for the U.S. for the foreseeable future until the new M1299 will enter service. First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters. The widely used M109 carries a 155-mm howitzer and is the principal self-propelled artillery support for U.S. Army divisions. It is a large tracked vehicle with a fully traversable turret and prominent bustle. Early variants had a short, 23-caliber barrel. Later versions, including the M109A6 Paladin, have a 39-caliber barrel. The M109 has a crew of six: commander, gunner, driver and three ammunition members. The hull is made of all-welded aluminum armor, which protects against small-arms fire and shell splinters. The driver is seated at the front left of the hull, with the powerpack to the right and the turret at

the rear. The driver is provided with a single-piece hatch cover that opens to the left, with three M45 day periscopes in front. These can be covered with small metal flaps to prevent damage. One of the day periscopes can be replaced by a passive night-vision periscope. The Detroit Diesel Model 8V-71T engine is coupled to an Allison Transmission XTG-411-4A cross-drive transmission. The all-welded aluminum armor turret at the rear of the hull has a square hatch in each side that opens to the rear and twin doors in the turret rear. The commander is seated on the right side of the turret and has a cupola that can be traversed through 360 deg, a single-piece hatch cover that opens to the rear and an M27 day periscope. A .50-cal M2 heavy-barrel machine gun is pintle-mounted on the front of the cupola. The gunner is seated on the left side of the turret and has a square single-piece hatch cover that opens to the right. The twin doors at the rear of the turret are provided for ammunition resupply. Mounted at the rear of the hull on each side of the hull door is a large spade that is manually lowered to the ground before firing. They are normally deployed only when firing top charges. The torsion bar suspension on either side consists of seven dual rubber-tired road wheels with the drive sprocket at the front and the idler at the rear. There are no track-return rollers. The tracks are of a single-pin, center-guide type with replaceable rubber pads. The M109 is fitted with night-vision equipment, but does not have nuclear, biological and chemical (NBC) warfare protection. The vehicle can be fitted with an amphibious kit consisting of nine air bags, four on each side of the hull and one at the front. The bags are inflated from the vehicle, which can then propel itself across rivers on its tracks at a maximum speed of 4 mph (6 kmh). The main armament is a 155-mm M126 howitzer in an M127 mount with a fume extractor and large muzzle brake. The recoil system is hydropneumatic and the breech block is of the Welin-step thread type. Gun elevation and depression and turret traverse are hydraulic with manual controls for emergency use. Fire-control equipment includes an elbow telescope M118C for direct fire with a magnification of 4x and 10-deg field of view; panoramic telescope M117 for indirect fire and gunner's quadrant M1A1 . The M109 Paladin self-propelled Howitzer, first produced in 1963 and improved upon numerous times over the past 40 years, is currently slated for a comprehensive overhaul. The M109 PIM upgrade shares many common components of the Bradley Fighting Vehicle, allowing for more commonality with other Army vehicle systems and maximizing production savings, parts inventory and maintenance personnel while avoiding component obsolescence. The PIM modernization effort is a significant upgrade of the M109A6 Paladin which includes buying back Space, Weight, and Power - Cooling. While the self-propelled howitzer's cannon will remain unchanged, the PIM will sport a brand new chassis, engine, transmission, suspension, steering system, to go along with an upgraded electric ramming system.

Type 07B (PLZ 07B) Chinese Amphibious Self Propelled Artillery






Tiers:



System

Alternative Designation: PLZ-07B, ZBD05 Self-Propelled Howitzer

Manufacturer: Norinco

Family: ZBD-2000

Crew: ea5

Dimensions

Length: m9.5

Width: m3.36

Height: m3.04

Weight, Combat: tons25

Ground Pressure: INA

Automotive

Engine Name: INA

Engine Type: Four-stroke turbocharged water-cooled diesel

Engine Power (Land): hp500

Engine Power (Sea): hp1,577

Transmission: Machanical

Cruising Range (Land): km500

Cruising Range (Sea): INA, estimates have it going as far as 2/3 of it's land range.

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h40

Speed, Maximum Swim: kts25

Maximum Distance at Sea: km90

Tracks: Tracks are supported by two return rollers located between the first and last pairs of road wheels.

Suspension: Hydropneumatic

Wheels: 6, unevenly-spaced road wheels per side

Gradient: %60

Side Slope: %30

Vertical Obstacle: m0.6

Trench: m2.9

Fording Depth: Amphibious

Sea State Capable: Sea State 4

Buoyancy Reserve: Yes

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Main Gun

↳*System*

Name: Version of the PL96

Type: mm122

Caliber: 38

Rate of Fire: rds/min6-8

Maximum Firing Range: km27 with RAP

Traverse Range: deg360

Maximum Elevation: deg70

Minimum Elevation: deg-3

Basic Load: rounds40

Loader: Semi-Automatic

↳*Ammunition*

Note: Can fire all Chines and Russian 122mm artillery ammunition. Maximum range of fire is 18 km with standard High Explosive Fragmentation (HE-FRAG) projectile, 22 km with extended-range projectile and 27 km with rocket assisted projectile.

Basic Load: 40

Commander's Weapon System

↳*System*

Name: QJZ-89 or Type 89

Type: 12.7mm Heavy Machine Gun

Manufacturer: NORINCO

Length, Total: mm2,119

Length, Barrel: mm1,003

Weight (Gun Only): kg17.5

Weight, (Tripod Only): kg8.5

Max Rate of Fire: rds/min600

Sustain Rate of Fire: rds/min400-600

Action: Gas/Recoil

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: mm12.7x108

Basic Load: ea1,200

Max Effective Range: m1,600

Fire Control

Name: BMS System

Computerized FCS: Yes

Thermal Vehicle Commander: Yes

Thermal Gunner: Yes

Main Gun Stabilization: Yes

3D Map of the OE: Yes, Standard

Satellite Navigation System: BeiDou Satellite

Battle Management System: Yes

Navigation System: BeiDou satellite navigation system,

Protection

Hull Armor Type: Hull is of aluminium base armour protected by composite appliqué armour.

Hull Armor: mm30

Sides and Rear Armor: mm14.5

Turret Armor: INA

Applique Armor: Yes

Explosive Reactive Armor: INA

Active Protection System: Yes

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, 8 Total, 4 on each side 76mm

Bow Blade: Yes

Belly Plate: Yes

Self-Sealing Fuel Tank: Yes, capable of stopping a 25 mm APFSDS round at 2,000 m.

Automatic Fire Suppression Device.: Yes

Notes:

This version of the ZBD-2000 family is fitted with a rear-mounted turret with a 122mm cannon. The Type 07B combines the cannon and fire-control system from the Type 07B howitzer with the ZBD-2000 hull. The weapon enables longer range fire support farther inshore with heavier ammunition, including laser-guided rounds. The ZBD-2000 is a family of Chinese tracked amphibious assault vehicles. They are designed for beach assault missions and to accompany infantry as ground forces move inland. The vehicle resembles the (now cancelled) U.S. Expeditionary Fighting Vehicle (EFV). The vehicle has a boat-shaped hull with six road wheels and lead return rollers. A welded turret is mounted over the middle of the hull. The commander and gunner sit inside the turret, with the driver at the front, to the left of the engine. The driver has a single-piece hatch cover that opens to the rear. It can be locked in the vertical position with at least three day periscopes providing observation to the frontal arc. The middle periscope can be replaced by a passive periscope for driving at night. The ZBD-2000 is propelled in the water by a pair of waterjets. Speeds of up to 28 mph (45 kph) can be achieved. The vehicle utilizes hydraulically actuated bow and transom flaps, which are designed to aid the vehicle's hull skimming. The vehicle is able to travel more than 6 mi (10 km) over the water. The vehicle has all-welded armor over the hull and turret, providing protection against 25-mm armor-piercing rounds over the frontal arc and all-round protection against 7.62-mm armor-piercing rounds.

PLZ-52 Chinese 155 mm self-propelled howitzer





Tiers:

1 2 3 4

System

Alternative Designation: PLZ-52 Chinese 155 mm self-propelled howitzer Jump to: navigation, search
Type: Self-Propelled Howitzer
Caliber: mm152
Chassis: Armored Tracked
Crew: ea4-5 men
Emplacement Time: INA
Displacement Time: INA

Dimensions

Hull Length: m6
Length (gun forward): m12
Barrel Length: 52 calibers
Width: m3.6
Height: m3
Weight: kg35

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: hp1000
Cruising Range: kmINA
Speed, Maximum Road: km/h70
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %30

Vertical Step: m0.8

Fording Depth, without Preparation: m1.2

Fording Depth, with Preparation: m1.2

Main Weapon System

↳*System*

Name: INA

Type: 155 mm Howitzer

Length, Barrel: mm155

Weight: kg43-48

Muzzle Velocity: m/sINA

Maximum Rate of Fire: rds/minup to 53

Maximum Elevation: deg65

Minimum Elevation: deg-3

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Firing Range: km53

Effective Firing Range: INA

Sights: INA

Ammunition

Name: INA

Type: Howitzer round

Caliber: mm155

Basic Load: INA

Armor Penetration: INA

Projectile weight: kg43 - 48

Main gun load: 30 - 40 rounds

Machine gun load: 500 rounds

High-Explosive Fragmentation (HE-FRAG) projectile: 30 km

Extended-range projectile: 40 km

Fire Control System

Name: INA

Computerized FCS: Yes

Main Gun Stabilization: INA

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: Protection against small arms and shell splinters

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The PLZ-52 is a Chinese self-propelled howitzer. It is similar in appearance to the PLZ-45, however it packs a heavier punch. It was first unveiled in 2014. Currently it is among the most capable artillery systems in the world. However the PLZ-52 is aimed mainly at export customers, rather than Chinese army. The PLZ-52 is capable of firing Chinese precision guided projectiles. In the 1990s China obtained a Russian Krasnopol laser-guided projectile technology and production license. Later it successfully developed its own precision guided munitions.

M109A5 American 155mm Self-Propelled Howitzer





Tiers:



Parent:

M109 American 155mm Self-Propelled Howitzer

Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the

integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30 seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.

- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88 (M109A1) are known as respectively PzHb 79/95 and PzHb 88/95
- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
- **K55/K55A1:** K55/K55A1 are South Korean variants of the M109A2 , originally named KM109A2 with additional domestic augmentations, license-produced by Samsung Techwin. They are fitted with M178 155 mm 39 caliber gun, NBC protection, automatic fire extinguishing system, and a modified ammunition reception module for K56 automatic ammunition resupply vehicle. The Performance Improvement Program variant, K55A1, is a complete domestic overhaul of the K55 which is further augmented by Samsung Thales with modern digital ballistic computers, multifunctional data display and controllers, GPS navigation and target acquisition system, wireless datalink equipment, and upgraded fire control storage battery and power supply unit, to closely match the US military's modernization of the Paladin into next-generation standard. Many improved technologies of the South Korean K9 Thunder were retrofitted on the K55A1. 1,040 howitzers of these variants were produced.
- **M109A7:** The newest M109 version for U.S. service is the M109A7, formerly known as the M109A6 Paladin Integrated Management (PIM). The M109A7 shares common components with the Bradley Fighting Vehicle such as the engine, transmission, and tracks. This creates commonality with other systems and maximizes cost-savings in production, parts inventory, and maintenance personnel. The M109A7's on-board power systems harness technologies originally developed for the Non-Line-of-Sight Cannon; the electric drive is faster than the previous hydraulic system, and the automatic rammer more consistently rams the round into the gun for consistent velocities and better accuracy. It features a 600-volt on-board power system to accommodate additional armor and future networking technologies as they become ready. The M109A7 can sustain a one-round per-minute rate of fire and a maximum rate of fire of four rounds per-minute.

System

Alternative Designation: M109A5
In Service: 1993-Present
Type: Self-Propelled Howitzer
Crew: ea5 (chief of section, gunner, assistant gunner, No. 1 cannoneer and driver)
Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.
Displacement Time: INA
Emplacement Time: INA
Note: This variant has an improved M178 mounting, boresight alignment driver and selected RAM and safety kits, which included a fuel system air purge; driver's instrument panel; bustle/rack; propellant stowage; torsion bar; counter-recoil

buffer; and upper recoil cylinder. The designation also applies to retrofitted models.

Dimensions

Length, Hull: 6.19 m

Length, Gun Forward: 9.12 m

Width: 3.28 m

Height: 3.28 m

Weight: 55,000 lb (24,948 kg)

Ground Pressure: INA

Automotive

Engine Name: 1 x General Motors 8V-71T LHR, 9310cc, 2-cycle diesel

Engine Type: V-8 diesel

Engine Power: hp440 hp

Power-to-Weight Ratio: 17.96 hp/ton

Transmission: Allison ATD-XTG 411-4A, 4 forward and 2 reverse gears

Range: km354

Speed, Maximum Road: km/h56

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Side Slope: %30

Gradient: %60

Vertical Step: m0.53

Trench: m1.83

Fording Depth: m1.07

Fuel Capacity: 135 gal (511 liters)

Suspension: torsion bar, 7 road wheels, front drive, rear idler, no return rollers (all models except PIM). The suspension system has been strengthened and an external NATO power receptacle allows the M109A5 to be electrically powered by the M992 field artillery ammunition support vehicle (FAASV).

Note: The M109A5 offers upgraded components providing greater durability. It has a higher horsepower low heat rejection (LHR) engine and an improved transmission for increased performance.

Main Gun

Note: The elevation/equilibrium cylinder and turret traverse clutch assembly are redesigned to prevent failures.

↳*System*

Name: M284 39 cal/155mm Rifled Howitzer fitted with Muzzle Brake and Fume Extractor

Type: Howitzer

Caliber: 155mm

Length: INA

Barrel Length: INA

Weight: INA

Cannon Groves: 48

Rifling: right-hand rifling with constant, 8.93-deg twist

Breech Type: Welin-step thread

Recoil System: hydropneumatic

Elevation: -3/+75 deg (-53/+1,333 mils)

Traverse: 360 deg (6,400 mils)

Maximum Firing Range: 14.6 km

Maximum Rate of Fire: 1 rd/min first hour, 4 rd in first 3 min max

Sustained Rate of Fire: 2 rpm

Note #1: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.

Note #2: The cab has a rear bustle rack which provides an increased ammunition stowage capacity.

Note #3: The M109A5 share commonality with all of the other M109 family members and fires all NATO-standard 155-mm ammunition.

↳*Ammunition (Option 1)*

Name: M864

Type: DPICM

Caliber: mm155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 34 Rounds Total of any Combination Projectiles

Maximum Range: 22,000 m

Response Time: 11 min

↳*Ammunition (Option 2)*

Name: M483A1

Type: HE

Caliber: mm155

Length: 35.4 in (899 mm)

Weight: 102.5 lb (46.49 kg)

Basic Load: 34 Rounds Total of any Combination Projectiles

Maximum Range: 17,740 m

Response Time: 11 min

↳*Ammunition (Option 3)*

Name: M718
Type: RAAMS Long
Caliber: 155mm
Length: 30.7 in (781 mm)
Weight: 103.0 lb (46.71 kg)
Basic Load: 34 Rounds Total of any Combination Projectiles
Maximum Range: 17,740 m
Response Time: 11 min

Auxiliary Weapon System

↳*System*

Name: M2 Browning
Type: Heavy Machine Gun
Caliber: 12.7mm
Length: 1,654 mm
Barrel Length: 1,143 mm
Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)
Action: Short recoil-operated
Rate of Fire: 450–600 rounds/min
Muzzle Velocity: 890 m/s
Maximum Firing Range: 7,400 m
Effective Firing Range: 1,800 m
Feed System: Belt-fed (M2 or M9 links)
Sights: INA

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: .50 BMG (12.7×99mm NATO)
Basic Load: 500

Fire Control

Name: INA
Computerized FCS: Fire-control equipment includes an elbow telescope M118C for direct fire with a magnification of 4x and 10-degree field of view; panoramic telescope M117 for indirect fire and gunner's quadrant M1A1.

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Note: It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device.

Protection

Hull Armor: maximum 20-mm light alloy aluminum, small-arms and artillery fragment protection

Turret Armor: INA, The turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: ventilated face Piece System (VFPS)

Smoke Equipment: INA

Fire Suppression: CO2 fire extinguisher system in crew and engine compartments

Notes:

M109A5 (1993) The M109A5 is a modified M109A4 it consists of two major improvements: a new M284 cannon and a new M182 gun mount. These improvements provide the M109A5 with greater range and allow for sustained fire for prolonged periods of time. Over 950 existing M109s have been rebuilt as the M109A6 Paladin. The Paladin configuration is achieved through extensive modifications to existing M109A2/A3 vehicle hulls and the subsequent introduction of an entirely new turret structure. The remaining M109 howitzer fleet has received the M109A5 upgrade, which included some of the same automotive and crew NBC protection improvements as well as the Paladin's M284 cannon and M182 gun mount. A requirements survey was forwarded to authorized security assistance customer countries on 10 February 2003 , advising of the availability of Long Supply M109A5 self-propelled (SP) 155mm howitzers at a reduced price. The howitzers are available for immediate sale to countries addressed in the survey. These countries were determined by Defense Security Cooperation Agency, Commerce and State Department review. Upon receiving acknowledgement of interest from a foreign customer addressed in the message, allocations will be made, as received, on a "case by case basis." Allocations may be constrained by the number of available assets remaining and it is possible that all howitzers may be committed. The M109A5, 155mm SP medium howitzer is a vehicle that provides armored combat support, is air transportable, internally loaded, and has excellent ground mobility. The M109A5's main armament is the 39-caliber, M284 cannon, which has a maximum range of 23,500 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The cab of the M109A5 rotates in a full 360-degree circle, allowing operation of both its primary (the 155mm cannon assembly) and secondary (the M2 heavy barrel caliber 50 machine gun or MK19 40mm Grenade Launcher) armament in any direction. The system is capable of both direct (line of sight) and indirect (out of the line of sight) firing. The vehicles have a cruising range of 220 miles at speeds up to 35 miles per hour. The M109A5 howitzer gives the customer the maximum flexibility to tailor modifications to meet desired missions requirements. It can accommodate future technology and is economical to purchase, operate, and maintain. The M109 family of howitzers continues to be improved to generate additional operational capabilities and cost savings for the customer. It continues to be backed by the extensive life-cycle sustainment support of the weapon's proponent. The M109A5 howitzers can be brought to a Fully Mission Capable (FMC) Standard prior to delivery for an additional cost. This option can be achieved at the current storage facility prior to shipment. This Program ensures that all of the howitzer's systems and subsystems are fully operational and standards are met in accordance to the Operational Preventative Maintenance Checks and Services (PMCS) of 10/20 Manuals. Oil samples will be taken and analyzed from the engines, transmissions, and hydraulic systems to ensure that these systems are in good shape and do not have any detectable problems. The traversing, elevation, fire control, rammer, personnel heater, gun mount, and cannon systems will be checked for proper operation and repaired as needed. All of the replenishers, recuperators, and fire control nitrogen charges will be checked and re-charged as needed. The fire extinguishers will be checked for proper load to ensure that they are fully charged and ready for operation. If the customer plans to use the vehicle

with the VIC-1 intercom system, it will be checked to ensure proper operation. The outside of the vehicle will be repainted according to the customer's color requirements, and the inside of the crew compartment will be painted as needed. The fuel system will be flushed and any contaminants will be removed from it. New batteries will be installed in all of the vehicles, and all track pads with less than 50 percent of life remaining will be replaced. Finally, the vehicles will be driven two miles as a road test to ensure that they have no mobility problems and each vehicle will have a minimum of 50 gallons of fuel in their tanks for ease of loading and off-loading them during shipping. This proposed repair program is designed to ensure that the customer receives a good-looking, fully operational howitzer for as little cost as possible. If the customer desires additional upgrade component replacement (new 8V71T-91 Series Engines; overhauled/modified XTG-411-4 Transmissions; new T154 track, etc.), their requirements can be easily added to the Scope of Work (SOW) for the repair program and the customer would have to pay for these additional requirements. Further, thirty percent of the M109A5 Howitzers have a restriction on either the Breech Block or Breech Ring; however, these items can be replaced at an additional cost. If the customer selects one of these vehicles during the JVI, the Rough Order of Magnitude (ROM) for these items will be provided at that time.

Sholef Israeli 155mm Self-Propelled Howitzer





Tiers:

1 2 **3** 4

System

Alternative Designation: Self-Propelled Howitzer
Type: Self-Propelled
Crew: ea4
Chassis: Merkava Mk.1
Displacement Time: INA
Emplacement Time: INA

Dimensions

Hull Length: m3.49
Width: m3.72
Length (gun forward): m13.5
Height: m3.49
Weight, Combat: ton45

Automotive

Engine Name: Continental AVDS 9AR 1790
Engine Type: Diesel
Engine Power: hp1 200 hp
Cruising Range: km500
Speed, Maximum Road: km/h60
Fording Depth With Preparation: m2.4
Fording: m1.38
Gradient: 60%

Main Gun

↳*System*

Name: Sholef
Type: 155mm Self Propelled Howitzer
Breech Type: semi-automatic wedge
Length, Barrel: 52 Calibers
Loader Type: Automatic computerised loading system,
Max Rate of Fire: rds/min9
Muzzle Brake Type: Double-baffle
Max Elevation: deg70
Min Elevation: deg-5
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180

↳*Ammunition*

Type: Separate loading propellant / projectile
Caliber: mm155 mm
Muzzle Velocity: Varies by propellant
Basic Load: 75 Projectiles/60 Complete Rounds
Effective Range: km45
Note: Projectile Standard 155mm NATO

Coaxial Weapon System

Note: 1 ring mount 7.62mm or 12.7mm for Anti-Aircraft/Anti-Infantry

Fire Control

Name: INA
Computerized FCS: yes
Direct Fire While Moving: the weapon is stabilized and can actually be used for direct-fire while the vehicle is moving

Protection

Hull Armor: The hull has the same ballistic protection as the Merkava Mk.1
Turret Armor: The armor on the turret is sufficient to defeat small arms fire, shell splinters, blast overpressure, and most heavy machine gun rounds
NBC Protection: Over Pressure
Note: The armor is augmented by spall liners, and the same overpressure NBC system as the Merkava Mk.1 is fitted

Notes:

The Slammer (Sholef) is a 155mm self-propelled howitzer variant of the Merkava with automatic loading system. The gun has a

range of 40+ km with ERFB-BB. Two prototypes appeared in 1984 and 1986 but didn't entered production. The Slammer is a heavily armored artillery gun mounted on a modified Merkava Mk 1 chassis. Many of these vehicles are Merkava Mk 1 that were retired after the Merkava Mk 2 and Merkava Mk 3 came into service. The Slammer has a long 52-caliber gun barrel that allows +10% range. Reload speed may be decreased to 1 for one minute every 10 minutes through use of an automatic loader. Ammunition racks are large. The Slammer is ready for autonomous operation (without an FDC) if the target's location is known within 15 seconds of a halt, using GPS, inertial navigation, and an internal fire control computer. The Slammer is also capable of direct fire on the move.

M1992 North Korean 130mm Self-Propelled Gun System





Tiers:



System

Alternative Designation: M1992

Type: 130mm Self-Propelled Gun System

Crew: ea5

Chassis: The M1992 is uses a new tracked chassis, which is based on a North Korean tank chassis.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Ground Pressure: INA

Note: The M1992 is uses a new tracked chassis, which is based on a North Korean tank chassis.

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: 0.8

Trench: 2.5

Fording: 1.2

Main Weapon System

↳*System*

Name: The M1992 is armed with an unidentified gun

Type: Gun

Caliber: 130mm

Barrel Length: INA

Maximum Firing Range: 24 km

Maximum Rate of Fire: 4-5

Elevation: INA

Traverse: INA

↳*Ammunition*

Type: Projectile

Caliber: mm130

Projectile Length: INA

Projectile Weight: INA

Basic Load: INA

Types of Ammunition: The M1992 fires High-Explosive Fragmentation (HE-FRAG), Armor-Piercing (AP) and illumination rounds.

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: INA

Protection

Hull Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1992 is a North Korean self-propelled gun. This artillery system was first observed by US intelligence in 1992. Its actual designation is unknown. The provisional designation, the M1992, was allocated by the US Department of Defense. Number in the designation indicates the year it was first observed. The M1992 was produced in large numbers. It is currently in service with the North Korean army

M-1989 Koksan North Korean 170mm Self-Propelled Gun (SPG)





Tiers:

1 2 **3** 4

Parent:

M-1978 Koksan North Korea 170mm Self-Propelled Gun (SPG)

Variants:

- **M-1978:** The M-1978 Koksan is a 170 mm self-propelled gun of North Korean design and manufacture. Very little information is available due to the secretive nature of the North Korean government. The designations M-1978 and Koksan were given to the type by American military analysts, as they first became aware of it in that year in Koksan, North Korea.

System

Alternative Designation: M-1978 / M1989 (KOKSAN)
In Service: 1989-Present
Manufacturer: Second Machine Industry Bureau, North Korea
Type: 170mm Self-Propelled Gun (SPG)
Family: Koksan, “Juche-Po” self-propelled guns family
Crew: ea4 (Driver, commander, gunner, loader)
Chassis: Modified Chinese Type 59 medium tank chassis (copy of the Soviet T-54A) with an added cab at the front
Displacement Time: less than 10
Emplacement Time: less than 20
Note: Ammunition resupply vehicles are required to be assigned in the location of the M1978

Dimensions

Length: m14.9
Width: m3.27
Height: m3.1
Weight, Combat: tons40
Ground Pressure: kg/mINA

Automotive

Engine Name: V-59
Engine Type: V-12 multi fuel
Engine Power: hp520
Cruising Range: km300
Speed, Maximum Road: km/h40
Speed, Average Cross: km/h10
Speed Maximum Swim: Not Amphibious
Gradient: deg40
Side Slope: deg20
Vertical Step: m1
Trench: m2.5
Fording Depth: m1.2

Communications

Radio: R-123M

Main Gun

↳*System*

Name: 170mm Soviet Coastal Gun
Type: mm170
Breech Type: Screw-type breech mechanism
Length, Barrel: mmINA
Loader Type: Manual
Max Rate of Fire: per 5 min1-2
Rate of Fire, Burst: rds/min1
Muzzle Brake Type: Multi slotted muzzle brake
Fume Extractor: No
Max Elevation: INA
Min Elevation: INA
Traverse Range: deg20
Traverse Left: deg10
Traverse Right: deg10
Maximum Firing Range: km40-60
Power Rammer: Most likely

Ammunition (Option 1)

Type: HE FRAG

Caliber: mm170

Muzzle Velocity: INA

Basic Load: 12 total of 170mm Projectiles

Maximum Effective Range: km40

↳*Ammunition (Option 2)*

Type: Rocket Assisted HE FRAG

Caliber: mm170

Muzzle Velocity: INA

Basic Load: 12 total of 170mm Projectiles

Maximum Effective Range: km60

Fire Control

Name: INA

Computerized FCS: Yes, There is a upgraded FCS compared to the M-1978, but there is very little information on North Korea Equipment

Thermal Sight Vehicle Commander: Yes, infra-red night vision equipment

Thermal Sight Gunner: Yes, infra-red night vision equipment

Main Gun Stabilization: Yes, Two large spades that are lowered to the ground manually before firing

Indirect Fire: Range drum

Direct Fire: INA

Collimator: K-1

Fire Control Computer: No

Fun Display Unit: No

Protection

Hull Armor: Open-mounted, providing no armored protection for its assumed 4-6 crew members.

Turret Armor: Open-mounted, providing no armored protection for its assumed 4-6 crew members.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, smoke screen by injecting diesel fuel into the exhaust outlet

IR Signature: INA

Notes:

The M-1978 (KOKSAN) 170mm self propelled (SP) gun, of North Korean design and manufacture, is probably mounted on a T-54 chasis, a Chinese Type 59 hull or a T62 Chassis [most sources tend towards the Type 59 tank chassis, the CHICOM derivative of the T-54]. The 170mm gun has no superstructure, and it has 2 large spades at the rear. The 170mm (~6.69") gun itself is a previously unknown type, possibly Russian coastal-defence or ex-naval weapon. The M-1978 Koksan gun was first noted publicly in a parade in 1985. The Koksan is named after the city in North Korea where it was first seen by the West in 1978. The M-1978 version carried no on-board ammunition supply

M109A2 American 155mm Self-Propelled Howitzer





Tiers:



Variants:

- **M109:** First produced in 1963. It had a 23 caliber 155 mm M126 gun in an M127 Howitzer Mount, and carried 28 rounds of 155 mm ammunition. It was also armed with a .50cal M2HB machine gun with 500 rounds of ammunition. Easily identified by its short barrel and a double baffle muzzle brake with a large fume extractor just behind it. Maximum range of 14,600 meters.
- **M109A1:** Replaced the M126 gun with a longer barreled, 39 caliber M185 gun, increasing maximum range to 18,100 meters.
- **M109A2:** Incorporated 27 Reliability, Availability, and Maintainability (RAM) mid-life improvements. Most notably, the long barreled 155 mm M185 cannon in the new M178 gun mount, ballistic protection for the panoramic telescope, counterbalanced travel lock, and the ability to mount the M140 alignment device. Stowage of 155mm rounds increased from 28 to 36 rounds; .50cal ammunition remained at 500 rounds. During M109A2 production, a slightly simplified version was also produced for export. This had minor internal changes and deleted the hull flotation feature. These were designated M109A1B.
- **M109A3 and M109A3B:** M109A1s and M109A1Bs rebuilt to M109A2 standard respectively. Some A3s feature three contact arm assemblies, while all A2s have five.
- **M109A4:** M109A2s and M109A3s improved with Nuclear, Biological, and Chemical / Reliability, Availability, and Maintainability (NBC/RAM) improvements, including air purifiers, heaters, and Mission Oriented Protective Posture (MOPP) gear. The traversing mechanism's clutch is hydraulic, as compared to the electric mechanism on previous M109s, and features a manual override in the event of an electrical failure. The A4 also adds an additional hydraulic filter, for a total of two. Also included is an improvement to the engine starting equipment, greatly improving the ability to start in an emergency. Ammunition amounts remain the same as two previous models.
- **M109A5:** Replaces the 155 mm M185 cannon in an M178 mount with a 39-caliber 155 mm M284 cannon in an M182 mount, giving the A5 a maximum range of 22,000 meters with unassisted projectiles and 30,000 meters with Rocket Assisted Projectiles (RAP Rounds). The vehicle can carry 36 complete rounds of ammunition and has a 440 hp engine instead of the standard 405 hp engine.
- **M109A5+:** Various manufacturers have upgraded the fire control and other components of the M109A5. BAE Systems in York PA recently delivered 12 M109A5+ vehicles to Chile and 32 for Brazil.
- **M109A6 "Paladin":** Overall product improvement in the areas of survivability, RAM, and armament. This includes increased armor, a redesigned internal arrangement for safer ammunition and equipment storage, engine and suspension upgrades, and product improvement of the M284 cannon and M182A1 mount. The greatest difference is the integration of an inertial navigation system, sensors detecting the weapons' lay, automation, and an encrypted digital communication system, which utilizes computer controlled frequency hopping to avoid enemy electronic warfare and allow the howitzer to send grid location and altitude to the battery fire direction center (FDC). The battery FDCs in turn coordinate fires through a battalion or higher FDC. This allows the Palladin to halt from the move and fire within 30 seconds with an accuracy equivalent to the previous models when properly emplaced, laid, and safed—a process that required several minutes under the best of circumstances. Tactically, this improves the system's survivability by allowing the battery to operate dispersed by pairs across the countryside and allowing the howitzer to quickly displace between salvos, or if attacked by indirect fire, aircraft, or ground forces. Ammunition storage is increased from 36 to 39 155 mm rounds.
- **M109 "KAWEST":** This Swiss improved version produced by Ruag incorporates a new Swiss-designed L47 155 mm gun with an increased firing range of up to 36 km. It features inertial navigation system coupled with a new gun-laying system and more ammunition storage(40 rounds, 64 charges). The KAWEST (lit. Kampfwertsteigerung = upgrade of combat capabilities) requires only 6 crew members instead of 8, and is able to fire 3-round bursts within 15 seconds or maintain a constant firing rate of over one round per minute.[9][10] Upgraded Swiss PzHb (Panzerhaubitze) 79 and 88

(M109A1) are known as respectively PzHb 79/95 and PzHb 88/95

- **M109L52:** Jointly developed by the Dutch firm RDM and the German firm Rheinmetall, the M109L52 was first revealed in 2002. The main improvement was replacing the M126 series gun with the longer 52-caliber cannon from the PzH 2000, thus the MTLS ammunition of the PzH 2000 can be used. In addition, improvements to the loading system were made. This resulted in an increase of the rate of fire to 9–10 rds/min from the original 3 rds/min, and this high rate of fire can be sustained for up to 2 minutes. A total of 35 rounds can be carried.
- **M109A3GNM:** The current version in service with the Norwegian Army's Artilleribataljonen. 126 M109Gs were acquired from West Germany between 1969–1971. They were then upgraded to the M109A3GN configuration during the latter half of the 1980s. In 2006, there were still 56 M109A3GNs in the Army's inventory, meaning that at least 70 SPGs had been scrapped after the end of the Cold War. 14 of the M109A3GNs received additional upgrades in 2007, and were designated M109A3GNM. The upgrade includes, among other things, new intercom and new navigation and positioning systems. The M109A3GNMs are currently the only SPGs that remain in active service with the remainder of the M109s having been put in storage.
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System

Alternative Designation: M109A2

Date of Introduction: 1978

Proliferation: M109A2: About 836 were produced for the U.S. Army and Army National Guard. Austria [152] (M109A2/A3/A5Oe) Bahrain [20] (M109A5) Brazil [73] (37 M109A3, 36 M109A5+) Chile [36] (24 M109A3, 12 M109A5) Djibouti [10] (M109L) Denmark [24] (M109) Egypt [368] (164 M109A2, 204 M109A5) Germany [288] (M109A3G) Greece [195] (M109A1/A2/A3GEA1/A5) Iran [180] (M109) Iraq [2] (M109A1/A2) Israel [350] (M109A1/A2) Italy [124] (M109L) Jordan [253] (M109A1/A2) Kuwait [23] (M109A3) Latvia [47] (M109A5Oe) Libya [14] (M109) Morocco [127] (84 M109A1/A1B, 43 M109A2) Norway [54] (M109A3GN) Pakistan [430] (200 M109A2, 230 M109A5) Peru [12] (M109A2) Portugal [20] (6 M109A2, 14 M109A5) Saudi Arabia [110] (M109A1B/A2) South Korea [1,040] (M109A2 [K55/K55A1]) Spain [96] (M109A1/A5) Switzerland [200] (PzHb-66/74/79/88 [M109U]) Taiwan [225] (M109A2/A5) Thailand [20] (M109A2) United Arab Emirates [125] (M109A3) USA [1,594] (M109A1/A2/A6/A7)

In Service: 1978-Present

Type: Self-Propelled Howitzer

Crew: 6 (commander, gunner, 3 loaders, driver)

Chassis: The M108 and M109 shared a common chassis (along with the M113 APC), but the M109 was heavier and had a larger gun. The M108 proved unsuccessful, mainly due to its overly light gun.

Displacement Time: INA

Emplacement Time: INA

Note: Major changes from the M109A1 include a redesigned rammer and improved recoil mechanism, engine operation warning devices, a redesigned hatch and door latches, an improved hydraulic system and a bustle designed to carry an additional 22 rounds of ammunition.

Dimensions

Length, Hull: 6.19 m
Length, Gun Forward: 9.12 m
Width: 3.28 m
Height: 3.28 m
Weight: 24,948 kg
Ground Pressure: 0.83 kg/cm sq

Automotive

Engine Name: 1 x General Motors 8V-71T 569-cu in (9.32-liter) liquid-cooled, turbo-charged 2-stroke V-8 diesel
Engine Type: V-8 diesel
Engine Power: 405 hp at 2,300 rpm
Power-to-Weight Ratio: 16.23 hp/ton
Transmission: Allison ATD-XTG 411-2A (A3) or 411-4 with quick disconnect powershift crossdrive, 4 forward and 2 reverse gears
Range: km354
Speed, Maximum Road: km/h56
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Side Slope: %30
Gradient: %60
Vertical Step: m0.53
Trench: m1.83
Fording Depth: m1.07
Fuel Capacity: 135 gal (511 liters)
Suspension: torsion bar, 7 road wheels, front drive, rear idler, no return rollers (all models except PIM)

Main Gun

↳*System*

Name: M185 155 mm/L39 howitzer
Type: Howitzer
Caliber: 155mm
Length: INA
Barrel Length: INA
Weight: INA
Cannon Groves: 48
Rifling: right-hand rifling with constant, 8.93-deg twist

Breech Type: Welin-step thread

Recoil System: hydropneumatic

Elevation: -3/+75 deg (-53/+1,333 mils)

Traverse: 360 deg (6,400 mils)

Maximum Firing Range: 14.6 km

Maximum Rate of Fire: 1 rd/min first hour; 4 rd in first 3 min max

Sustained Rate of Fire: 2 rpm

Note #1: This self-propelled artillery system is supported by an associated M992 armored ammunition supply vehicle. It is based on the same tracked chassis as the M109.

Note #2: This version mounts the longer M185 155-mm gun and incorporated elevation, traversing and suspension improvements.

Note #3: Other improvements include a more efficient muzzle brake, improved load assisting system and improved suspension. Maximum range of fire is 18.1 km with standard HE-FRAG projectile and 24 km with rocket-assisted projectile. IT is also capable of launching M712 Copperhead laser-guided rounds. These rounds are intended to engage high-value hostile targets, such as tanks, armored vehicles, artillery systems, radars, observation posts and so on. Most original M109 artillery systems were upgraded to this standard.

Note #4: The cab has a rear bustle rack which provides an increased ammunition stowage capacity.

↳*Ammunition (Option 1)*

Name: M864

Type: DPICM

Caliber: 155mm

Length: 35.3 in (898 mm)

Weight: 103.2 lb (43.80 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 22,000 m

Response Time: 11 min

↳*Ammunition (Option 2)*

Name: M483A1

Type: HE

Caliber: mm155

Length: 35.4 in (899 mm)

Weight: 102.5 lb (46.49 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 17,740 m

Response Time: 11 min

↳*Ammunition (Option 3)*

Name: M718

Type: RAAMS Long

Caliber: 155mm

Length: 30.7 in (781 mm)

Weight: 103.0 lb (46.71 kg)

Basic Load: 36 Rounds Total of any Combination Projectiles

Maximum Range: 17,740 m

Response Time: 11 min

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 500

Fire Control

Name: INA

Computerized FCS: Fire-control equipment includes an elbow telescope M118C for direct fire with a magnification of 4x and 10-degree field of view; panoramic telescope M117 for indirect fire and gunner's quadrant M1A1.

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: Yes

Night Vision Devices: Yes

Note: It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device.

Protection

Hull Armor: light alloy aluminum to protect against small-arms fire and shell splinters

Turret Armor: INA, the turret takes up the rear. On top of the turret, there is a small cupola, from which the commander operates. This cupola is also fitted with a 12.7 mm (.50) M2HB heavy machine gun.

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: none fitted

Smoke Equipment: INA

Fire Suppression: INA

Notes:

The M109A2 is a new production weapon which incorporated 27 mid-life improvements to the M109A1. The improvements provide for increased Reliability, Availability, and Maintainability (RAM) and safety characteristics as well as enhanced operational capabilities. Major changes from the M109A1 include a redesigned rammer and improved recoil mechanism, engine operation warning devices, a redesigned hatch and door latches, an improved hydraulic system and a bustle designed to carry an additional 22 rounds of ammunition. The M109A2 has the long tube M185 cannon installed in the M178 gun mount. The cab has a rear bustle rack which provides an increased ammunition stowage capacity. It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device. The M109A2 entered production at BMY Combat Systems in 1978, with first deliveries made early in 1979. The first production quantity of 103 vehicles was with FY77 funding. M109A2 pro 36 M109A2s were produced for the National Guard using FY82 funds.

M107 American 175mm Self-Propelled Gun (SPG)





Tiers:



Variants:

- **M110:** this is basically the same chassis, mounting a 203 mm howitzer instead of a 175 mm gun. Because both the M107 and M110 are fully-modular and thier weapons are easily interchangeable, M107s frequently became M110s - and vice-versa - in armies that operated both weapons.

System

Alternative Designation: M107

Type: Self-Propelled Gun (SPG)

Manufacturer: FMC Corp., Bowen-McLaughlin-York, General Motors Corp.

In Service: 1962-1984 (United States) The M107 is still in service in some armies.

Family: M107

Crew: 5 + 8 men

Chassis: M107/M110 chassis

Displacement Time: INA

Emplacement Time: min3

Resupply Truck: The remainder of the crew (8 x Soldiers) rode in accompanying M548 tracked cargo carriers or M992 FAASVs, some of which carried additional ammunition and supplies.

Dimensions

Length, Gun Forward: m11.25

Length, Hull: m3.45

Width: m3.15

Height: m3.47

Weight, Combat: tons28.2

Ground Pressure: 0.82kg/cm²

Automotive

Engine Name: General Motors 8V71T

Engine Type: Diesel

Engine Power: hp345

Maximum Range: km720

Speed, Maximum Road: km/h56

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.36

Fording Depth: m1

Fuel Capacity: liters1,100

Communications

Primary: INA

Main Gun

Note: The dominant recognition feature of the M107 is its 175 mm gun, which is thin, extremely long, and has a bull barrel. The gun sits atop a carriage in a slot that allows the tube to recoil rearward. This carriage is attached to a rotating mount at rear of the chassis, while the front of the carriage is attached to a pair of tall, narrow gun carriage cheeks by a pair of long pneumatic struts.

↳*System*

Name: M113 or M113A1 Gun

Type: mm175

Weapon Mount: M158 mount

Breech Type: Welin-step thread

Length, Barrel: 60 calibers

Loader Type: Manual

Maximum Rate of Fire: 2 rds/min

Normal Rate of Fire: 1 rd/2 min

Maximum Firing Range: km40

Muzzle Brake Type: No Muzzle Brake

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

Barrel Life: 700 to 1 200 rounds

Recoil System: Hydropneumatic

Recoil Length: 711-1,778 mm

Fume Extractor: No

↳*Ammunition (Option 1)*

Name: M437A1

Type: HE

Caliber: mm175

Projectile Length: mm867

Projectile Weight: kg66.78

Muzzle Velocity: m/s914

Fuse Type: INA

Basic Load: 2 projectiles stored on the vehicle, with a Ammo resupply truck and 8 Soldiers positioned nearby.

↳*Ammunition (Option 2)*

Name: M437A2

Type: HE

Caliber: mm175

Projectile Length: mm867

Projectile Weight: kg66.87

Muzzle Velocity: m/s913

Fuse Type: INA

Basic Load: 2 projectiles stored on the vehicle, with a Ammo resupply truck and 8 Soldiers positioned nearby.

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: Infrared night vision devices

Thermal Sight Gunner: Infrared night vision devices

Main Gun Stabilization: Yes, hydraulically deployable spade.

Sights: M115 panoramic sight

Protection

Hull Armor: 20-mm (estimated) for the driver only

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Yes, the hydraulically deployable spade can be used as a dozer blade.

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The M107 175mm self-propelled gun was used by the U.S. Army from the early 1960s through to the late 1970s. It was part of a family of self-propelled artillery that also included the M110. It was intended to provide long-range fire support in an air-transportable system. It was exported to several other countries including Germany, South Korea, Spain, Greece, Iran, Israel, Italy, the Netherlands, the United Kingdom, and Turkey. The M107's combat history in U.S. service was limited to the Vietnam War; it also saw extensive combat use in Israeli service. The M107 shared many components with, and in many cases was replaced by, later versions of the M110 8-inch howitzer. Although withdrawn from U.S. service in the late 1970s, it continues in service with some armies as of 2019. Video: https://www.youtube.com/watch?v=r8InZPRmQMU

2S19 Msta Russian 152mm Self-Propelled Howitzer (SPH)



Tiers:



Variants:

- **152 mm howitzer 2A65:** A towed version of the same gun.
- **1K17 Szhatie -:** A "laser tank" armed with a battery of lasers meant to disable optoelectronic systems; uses Msta-S chassis and turret.
- **2S33 "Msta-SM":** Improved version. Prototype.
- **2S19M1 (2000):** Improved version with automatic laying system and Glonass.
- **2S19M2 "Msta-SM2" (2013):** Improved version currently in production equipped with a new automatic fire control system which increases the rate of fire. Digital electronic maps are now available which significantly speeds up the terrain orientation in difficult geographical conditions and allows performing faster and more efficiently firing missions.
- **2S19M1-155 (2006):** 155mm export version of the 2S19M1, fitted with an L/52 gun with a range of 40+ km.
- **2S27 "Msta-K":** Wheeled variant (K = kolyosnij), based on a 8x8 truck chassis. There were several different prototypes, including one based on a KrAZ-ChR-3130 and two based on the Ural-5323 (with and without turret).
- **2S30 "Iset":** Improved version, prototype only.
- **2S35 "Koalitsiya-SV" -:** Project for a new artillery system for the Russian land forces (SV = sukhoputniye voyska). Early prototypes consisted of a 2S19 chassis with modified turret, fitted with an over-and-under dual autoloaded 152mm howitzer. Development of this variant was abandoned in favour of an entirely new artillery system using the same designation

System

Alternative Designation: 2S19M1 Msta-S

Estimated out of service date: 2038

Manufacturer: Uraltransmash

Type: Self-propelled howitzer

Family: Msta-S 2S19 family

Crew: ea5

Chassis: Modified T-72

Displacement Time: min1.5

Emplacement Time: min1.5

Navigation System: Yes, GNSS

Note: The 2S19 is rated a Tier 2 because it has been identified as one of the top 52 pieces of Russian Equipment.

Dimensions

Length: m7.15

Width: m3.38

Height: m2.99

Weight, Combat: tons42

Ground Pressure: kg/mINA

Automotive

Engine Name: V84-A

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h25

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.85

Trench: m2.8

Fording Depth (Without Preparation): m1.2

Fording Depth (With Preparation): m5

Suspension: Torsion bar

Auxiliary Power: AP-18D system

Communications

Primary: R-173M

Intercom: 1V116 intercom

Main Gun

↳*System*

Name: 152 mm 2A64 Long Barrel Gun

Type: mm152

Breech Type: Vertical sliding wedge

Manufacturer: Motovilikha Plants

Length, Barrel: 7,200m L/47

Weight: kg6,800

Loader Type: Automated

Max Rate of Fire: rds/min8

Sustain Rate of Fire: rds/min3-4

Muzzle Brake Type: Double baffle

Max Elevation: deg+68

Min Elevation: deg-3

Traverse Range: deg360

Range Finder Type: INA

Central Bore Evacuator: Yes

Travel Lock: Yes

TZM-K 2F66-1 Capable: Yes

Note # 1: Engage a target within 30 seconds of receiving target coordinates,

Note # 2: the 2S19 to fire all 152 mm howitzer ammunition in the Russian inventory, including those rounds designed for very old Soviet weapons such as the D-20.

↳*Ammunition (Option 1)*

Type: 152-mm Frag-HE, OF-72

Caliber: mm152

Muzzle Velocity: m/s864

Fuse Type: RGM-2 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m24,700

Complete Projectile Weight (OF-45): kg43.56

↳*Ammunition (Option 2)*

Type: 152-mm Frag-HEAT, BP-540

Caliber: mm152

Muzzle Velocity: m/s655

Fuse Type: GPV-3 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m27,000

Complete Projectile Weight: kg27

↳*Ammunition (Option 3)*

Type: 152-mm Frag-HE BB, OF-91

Caliber: 152

Muzzle Velocity: m/s828

Fuse Type: KZ-88 PD

Basic Load: 50 Total Rounds of any 152mm combination projectile

Maximum Effective Range: m29,000

Complete Projectile Weight (OF-61): kg42.86

Note: The 2S19 can fire the additional 152mm projectiles: 9K25 Krasnopol guided projectile and the 3-RB-30 radio jamming round

Coaxial Weapon System

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)
Type: 12.7mm Anti-Aircraft Machine Gun
Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia
Max Rate of Fire: rds/min700-800
Weight (Gun Only): kg25
Weight (On Tripod): kg41
Weight (50-Round Belt): kg11
Length (Total): mm1,560
Action: Gas Operated
Feed System: 50-Round Belt
Sights: Iron Sights

↳*Ammunition*

Type: Rifle
Caliber: mm12.7 mm
Cartridge: 12.7×108mm
Muzzle Velocity: m/s845
Basic Load: ea500
Effective Firing Range (vs. Air Targets): m1,500
Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Name: Eectric and mechanical control system designated 2Eh46
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes, PZU-5 or PZU-7 sight
Thermal Sight Gunner: Yes, Panoramic 1P22 sight and 1P23 direct fire set
Main Gun Stabilization: Yes, via the 2Eh46
Indirect Fire: 1P22 Panoramic Telescope (PANTEL)
Direct Fire: 1P23
Collimator: K-1
Ballistic Computer: Yes
Traverse: Semi-Automatic

Artillery Command and Control System: 1V12M Falstet artillery command and control system

Note: Returns the barrel to its firing line automatically after every shot

Protection

Hull Armor: INA

Turret Armor: INA

Armor Material: Rolled homogeneous armour that is further protected by Combination-K armour.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Built-in bulldozer blade: Yes

NBC Protection: Yes, System Sensor Radiation Device and chemical intelligence (PRRM)

Smoke Equipment: Yes, via the exhaust manifold

Grenade Launcher: Yes, six 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade

Grenade Range: m200-300

Grenade Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade

Automatic fire suppression systems.: Yes

Camouflage system: Yes, Накидка or cape camouflage system

Camouflage IR Reduction: %30

Notes:

The 2S19 "Msta-S" (Russian: Мста, after the Msta River) is a 152.4 mm self-propelled howitzer designed by Soviet Union, which entered service in 1989 as the successor to the 2S3 Akatsiya. The vehicle is based on the T-80 tank hull, but is powered by the T-72's diesel engine. The Msta is a modern howitzer designed for deployment either as an unarmored towed gun, or to be fitted in armored self-propelled artillery mountings. Current production of the towed model is designated Msta-B, while the self-propelled model is the Msta-S (also known by the GRAU index 2S19). Development of the 2S19 started in 1980 under the project name Ferma. The prototype was known as Ob'yekt 316. The 2S19's standard equipment consists of a semi-automatic laying system 1P22, an automatic loader, an NBC protection system, passive night vision device for the driver, a wading kit, a dozer blade, a smoke generator and 81mm smoke launchers, 1V116 intercom system and a 16 kW generator AP-18D. In 2008 the Russian armed forces ordered an improved model with an automated fire control system. The 2A64 ordnance of the 2S19 can fire the following types of ammunition, among others: HE (24.7 km), HEAT-FS, HE-BB (28.9 km), HERA (36 km), smoke, chemical, tactical nuclear, illumination and cargo (ICM).The laser-guided round “Krasnopol” (of the 9K25 system) can also be launched, as well as the shorter "Krasnopol-M” which fits into the automatic loader. Msta-S howitzers were used by Russian Army to deliver artillery strikes against Chechen separatists during the Second Chechen War. Msta-S howitzers have also been used in the War in Donbass by the Ukrainian Army as well as pro-Russian separatists who captured one machine during the conflict.

M110 American 203mm Self-Propelled Howitzer (SPH)







Tiers:



Variants:

- **M110A1:** improved variant of the M110, fitted with a longer M201 203 mm/L37 howitzer. It entered service in 1971. Maximum range of fire was increased to 27 km. This self-propelled howitzer fires newly developed rocket-assisted, cluster projectiles, nuclear and chemical projectiles.
- **M110A2:** improved variant of the M110A1. It entered service in 1978 and was fitted with double muzzle brake. Maximum range of fire was increased to 29 km.

System

Alternative Designation: M110
Type: Main Battle Tank
Manufacturer: General Motors Corp.
In Service: 1961-Present
Family: M110 Series
Crew: 5 (commander, driver, 3 gunners)
Resupply Vehicle: + 8 in the associated M548 ammunition resupply vehicle.
Chassis: same universal tracked chassis as the M107 175 mm self-propelled gun.
Displacement Time: min1
Emplacement Time: min1
Note: Support crew of 8 men are carried by an escorting armored personnel carrier, which also transports ammunition for this SPH.

Dimensions

Length, with Gun Forward: m10.72

Length, Hull: m5.72

Barrel Length: m8.24

Width: m3.15

Height (To the Top of the Barrel): m3.15

Weight, Combat: tons31.2

Weight, Unloaded: tons28.1

Ground Pressure: 0.76 kg/sq cm

Length of Track on the Ground: m3.94

Track Width: m0.39

Automotive

Engine Name: 1 x Detroit Diesel 8V-71T Engine

Engine Type: Detroit Diesel 8V-71T 569-cu in (9.32-liter) liquid-cooled, 2-stroke, turbocharged V-8 diesel

Engine Power: hp805

Power-to-Weight Ratio: 14.28 hp/metric ton

Cruising Range: km523

Speed, Maximum Road: km/h55

Speed, Average Cross: 15

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2.3

Fording Depth: m1.2

Fuel Capacity: liters1,137

Suspension: Torsion bar, 5 road wheels, front drive, last road wheel acts as rear idler, shock absorber on each roadwheel, no return rollers ability to lock suspension out when firing rear-mounted hydraulic spade for bracing firing platform.

Communications

Primary Radio: INA

Main Gun

Note: The M110 carries only 2 rounds. Ammunition is carried by escorting armored personnel carrier.

↳*System*

Name: M201A1 Howitzer, 203mm Howitzer

Type: mm203

Length, Barrel: m8.24

Breech Type: Interrupted Screw

Recoil Type: Hydro-pneumatic

Max Rate of Fire: 2+ rd/min

Normal Rate of Fire: 1 rd/2 min

Muzzle Brake Type: Double-baffle muzzle brake

Max Elevation: deg+65

Min Elevation: deg-2

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳*Ammunition (Option 1)*

Type: M650

Type: HERA

Caliber: mm203

Projectile Length: mm1,116

Projectile Weight: kg90.78

Muzzle Velocity: m/s710

Maximum Effective Range: m30,000

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 2)*

Name: M509

Type: DPICM

Caliber: mm203

Projectile Length: mm1,115

Projectile Weight: kig96.6

Muzzle Velocity: m/s711

Maximum Effective Range: m22,500

Basic Load: ea2

Fuse Type: INA

↳*Ammunition (Option 3)*

Name: M106

Type: HE

Caliber: mm203

Projectile Length: mm871

Projectile Weight: kg92.53

Muzzle Velocity: m/s713

Maximum Effective Range: m21,300

Basic Load: ea2

Fuse Type: INA

Note: The M110 can also fire the following types of 203mm projectiles: M404 HE, M426 CHEM.

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Infrared night-vision equipment

Thermal Sight Gunner: Infrared night-vision equipment

Main Gun Stabilization: INA

Protection

Hull Armor: 20-mm maximum (estimated)

Turret Armor: NA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Note: This artillery system carries no defensive armament, except individual weapons carried by the crew.

Notes:

The self-propelled M-110 8-inch [203 mm] howitzer first entered service with the US Army in 1963. The vehicle itself transports only two projectiles and five men, while the remainder of the ammunition and the crew is on board a tracked M548. The M-110 Howitzer fired a 200-pound projectile out to almost 17 kilometers (16,800-meters). Designed to be part of a common family of weapons utilising the same chassis components, the M107 and M110 were essentially the same vehicle mounting different barrels. The hull of the M110 is identical to that of the M107 and is made of all-welded armour and high-tensile alloy steel with the driver at the front of the hull on the left, the engine to his right and the main armament at the rear. The M107 self-propelled 175-mm. gun and the M110 8-inch howitzer had identical carriages but different tubes. The 175-mm. gun fired a 174-pound projectile almost 33 kilometers. This impressive range made it a valuable weapon for providing an umbrella of protection over large areas. The 8-inch howitzer fired a 200-pound projectile almost 17 kilometers, plus being the most accurate weapon in the field artillery. The 8-inch howitzer was found with most division artilleries, and both the 8-inch howitzer and 175-mm. gun were with field force artillery. At field force the proportion of 8-inch and 175-mm. weapons varied. Since the weapons had identical carriages, the common practice was to install those tubes that best met the current tactical needs. One day a battery might be 175mm.; a few days later it might be half 175-mm. and half 8-inch.

M1975 North Korean 130mm Self-Propelled Gun





Tiers:

1 2 **3** 4

System

Alternative Designation: M1975
Type: Self-Propelled Gun
Chassis: This artillery system combines a modified version of a Soviet SM-4-1 130 mm towed coastal defense gun, mounted on a lightly armored tracked chassis.
Crew: ea9
Emplacement Time: less than 3 min
Deplacement Time: less than 3 min

Dimensions

Hull Length: 6.3 m
Length, Gun Forward: 7.8 m
Width: 2.6 m
Height: 2.6 m
Weight, Combat: tons25

Automotive

Engine Name: A-650
Engine Type: Diesel
Engine Power: hp300
Cruising Range: km500

Speed, Maximum Road: km/h45

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Fording Depth, without Preparation: m1.1

Fording Depth, with Preparation: m1.5

Main Weapon System

↳*System*

Name: INA

Type: Rifled Gun

Caliber: 130 mm

Barrel Length: INA

Maximum Firing Range: 27 km

Maximum Rate of Fire: 8 rpm

Sustained Rate of Fire: 1 rpm

Elevation: 0 - 45 deg

Traverse: INA

↳*Ammunition*

Name: INA

Type: Projectile

Caliber: mm130

Projectile Weight: 30 kg

Basic Load: INA

Armor Penetration: INA

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: Yes

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: Armor of the M1975 provides some degree of protection for its crew against small arms fire and artillery shell splinters. The gun retains its original splinter shield. Though top of the superstructure is opened. In traveling order it can be covered with bows and canvas cover.

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1975 is a North Korean 130 mm self-propelled gun. Its actual designation is unknown. The M1975 designation was allocated by a US Department of Defense. Number in the designation denotes the year when this system was first observed by US intelligence. This North Korean artillery system was adopted in the 1970s and is widely used to this day. As far as it is known the M1975 was not exported outside North Korea.

→Rocket Artillery Systems

→→Light Rocket Systems (Up to 50 km)

M-1985 North Korean 240mm Multiple Rocket Launcher



Tiers:



Variants:

- **Fadjr 3:** Fadjr 3 is an Iranian artillery rocket system, similar to the M1985. Iran have taken delivery of 9 M1985 artillery rocket systems from North Korea, based on the Isuzu 6x6 truck. It is understood that production technology has also been transferred to Iran. Iranian-built vehicles were based on a commercially available Mercedes-Benz truck chassis with 6x6 configuration. Production reportedly commenced in the 1990s.
- **M1991:** a more powerful North Korean artillery rocket system, fitted with 22 tubes for 240 mm rockets.

System

Alternative Designation: M-1985; M1985
Type: Multiple Rocket Launcher
Crew: ea5
Chassis: The M1985 MLRS is based on a Japanese Isuzu 6x6 truck. The same chassis is used for the North Korean 122 mm MLRS. This launcher pack can be also adapted to any suitable cross-country truck.
Displacement Time: 2
Emplacement Time: 2
Note: The M1985 is supported by a reloading vehicle, which carries one complete reload and is fitted with a crane. Reloading would normally be carried out well away from the firing position, to avoid counter-battery fire. A typical battery of the M1985 consists of five launching vehicles.

Dimensions

Length: m10.5
Width: m3.3
Height: m2.6
Weight, Empty: tons15

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Operational Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.2

Fording Depth: m1.2

Launcher

↳*System*

Name: M1985

Type: Multiple Rocket Launcher

Loader Type: Manual

Number of Tubes: ea12

Maximum Elevation: INA

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Time to Fire Each Rocket: This artillery system can launch one rocket every 4 or 8 seconds.

Time to Fire all 12 Rockets: 48 to 96 seconds

↳*Ammunition*

Name: INA

Type: HE-FRAG

Caliber: mm240

Fuse Type: INA

Rocket Weight: kg407

Rocket Length: mmINA

Warhead Weight: kg90

Maximum Range: km43

Basic Load: 24

Armor Penetration: INA

Other Ammunition Types: Other types of warheads exist, including incendiary, smoke and chemical.

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Position Location System: INA

Note: Four manually-operated stabilizing jacks have to be lowered, prior to the rockets being launched.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1985 is a multiple launch rocket system, developed in the North Korea. It was first observed by US intelligence in 1985. Number in the designation indicates the year it was first observed. This artillery system was produced in quantity. According to some reports, North Korea has about 200 of these launchers in service. Large numbers of these systems are located north of the demilitarized zone and are targeted towards South Korea. The DPRK has about 500 various long-range artillery systems within range of Seoul. This artillery system has been exported to Iran. Despite simplistic appearance the M1985 is a very capable system. At the time of its introduction it was one of the most capable artillery rocket systems in the world. In some cases it even outperformed a contemporary Soviet Uragan and a US M270 MLRS. This artillery rocket system is intended to engage important enemy targets, such as concentrations of troops and armored vehicles, command posts, artillery batteries, radar sites, airfields, as well as other important targets. Range of this system allows to strike targets behind enemy lines. This rocket system can also engage hostile warships. The M1985 has 12 launching tubes for 240 mm unguided spin-stabilized rockets. The type is easily identified by its two rows of 6 tubes. A standard HE-FRAG warhead weights 90 kg and contains 45 kg of high explosives. Other types of warheads exist, including incendiary, smoke and chemical. It is claimed that maximum range of fire is 43 km. Operator can launch all rockets in full salvo, or just individual rocket manually. This artillery system can launch one rocket every 4 or 8 seconds. So it takes 48 to 96 seconds to launch all 12 rockets. Four manually-operated stabilizing jacks have to be lowered, prior to the rockets being launched. Elevation and traverse controls are also manually-operated. Vehicle can leaves firing position within 2 minutes. The M1985 MLRS is based on a Japanese Isuzu 6x6 truck. The same chassis is used for the North Korean 122 mm MLRS. This launcher pack can be also adapted to any suitable cross-country truck. Behind the vehicle cabin there is another cabin for the crew. This artillery rocket system is operated by a crew of around 5 men. The forward control cab accommodates 3 crew members, while the rest are seated in the rear cab. The M1985 is supported by a reloading vehicle, which carries one complete reload and is fitted with a crane. Reloading would normally be carried out well away from the firing position, to avoid counter-battery fire. A typical battery of the M1985 consists of five launching vehicles.

9A53-G Tornado Russian 122mm Multiple Rocket Launcher





Tiers:



Variants:

- **BM-21-1:** Launch vehicles are mounted on a family of Ural-4320 truck chassis
- **2B17 or also BM-21-1:** This upgrade was presented for the first time in 2003 and was developed by Motovilikha Plants from Perm. The system is fitted with a satellite navigation system NAP SNS, automated fire control system ASUNO, APP laying system and can fire a new generation of rockets with a range of 40 km (25 mi). The truck is the Ural-43201.
- **9P138 "Grad-1"::** lighter 36-round version, mounted on a six-by-six ZIL-131 chassis. The vehicle with supporting equipment (rockets, transporter 9T450 and re-supply truck 9F380) is referred to as complex 9K55. The 9P138 can only use "short-range" rockets with a range of 15 km (9.3 mi). It used to be known in the West as BM-21b or M1976.
- **BM-21V "Grad-V":** (NATO designation M1975): Developed for Soviet airborne troops in 1969. A GAZ-66B four-by-four truck chassis is fitted with a 12-round 122 mm rocket launcher. The vehicle is sturdy enough to be air-dropped. Parts of the vehicle such as the canvas cab roof can be taken off or folded down to reduce its size during transit. Like the BM-21, the BM-21V has stabilizing jacks on the rear of the vehicle for support when firing. The launch vehicle has the industrial index of 9P125.
- **9A51 "Prima":** 50-round launcher on a Ural-4320 5t chassis. The vehicle together with fire control equipment, the ammunition transporter TZM 9T232M and the new rocket 9M53F is referred to as complex
- **"Grad-P Light portable rocket system":** he complete system comprises a 9P132 [vi] single-round man-portable launcher (it can be reloaded and used again), a 9M22M 122 mm high-explosive fragmentation rocket and a fire control panel. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.
- **BM-21PD "Damba":** 40-round launcher mounted on Ural-375D or 43201 truck chassis. Developed for protection of naval bases against underwater infiltrations, uses special ammunition PRS-60 (Protivodiversionnyi Reaktivnyi Snaryad). The vehicle together with ammunition transporter is referred to as complex DP-62 "Damba".
- **A-215 "Grad-M":** 22-round naval version, entered service in 1978.
- **9K51M "Tornado-G":** an advanced version of the original BM-21 vehicle with sophisticated fire control system, satellite navigation, and automatic target aiming.
- **BM-21A "BelGrad":** This is a modernized version, based on a MAZ-631705 6×6 truck with 425 hp diesel engine TMZ-8424. Between the cab and the launcher there is another pack of 40 rockets. The system was evaluated from 1997 and entered service in 2001.

System

Alternative Designation: Tornado-G
Manufacturer: INA
In Service: 2012-Present
Type: 122mm Multiple Launch Rocket System
Family: Tornado Series
Crew: ea2

Chassis: Ural-4320

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.5

Height: m3.1

Weight, Combat: tons14

Ground Pressure: INA

Automotive

Engine Name: YaMZ-238M2

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km650

Speed, Maximum Road: km/h85

Speed, Maximum Off-Road: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Communications

Primary: R-123M

Secondary: INA

Launcher

↳*System*

Name: Tornado-G

Caliber: mm122

Type: Multiple Rocket Launcher

Number of Tubes: 40

Maximum Firing Range: 40 km

Full Salvo Duration: 20 sec

Reloading Time: 7 minutes

Elevation: INA

Traverse: INA

Nite:

↳*Ammunition (Option 1)*

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳*Ammunition (Option 2)*

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳*Ammunition (Option 3)*

Name: Type 90A

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Fire Control

Name: INA

Computerized FCS: Yes, the vehicle is fitted with modern fire control system.

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: Protection from small Arms and Shell Splinters.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Tornado-G multiple launch rocket system (MLRS) is designed and manufactured by SPLAV Scientific Production Enterprise, a company based in Russia. It is an upgraded variant of the BM-21 Grad MLRS. The new rocket system is intended for use by the armed forces of Russia and foreign countries. Meant to replace the age-old BM-21 Grad launch system, the new MLRS will provide improved tactical capabilities over its predecessor. The Tornado-G rocket system is designed to destroy enemy fortifications and artillery systems with a high degree of precision. Equipped with automated targeting and navigation systems, the MLRS offers superior target engagement capabilities. The Tornado-G was demonstrated during the ARMY 2018 international defence exhibitions held in August 2018 in Kubinka, Russia. It also took part in the Victory Day Parade 2018 held in Saint Petersburg, Russia, in May 2018. SPLAV rolled out an upgraded version of rockets with enhanced warhead capabilities to be used on Tornado-G MLRS in August 2018.

SR-5 Chinese Guided Multiple Launch Rocket System (GMLRS)



Tiers:

1 **2** 3 4

System

Alternative Designation: INA

Manufacturer: NORINCO

Type: Guided Multiple Launch Rocket System (GMLRS)

Family: INA

Crew: ea3

Chassis: Similar to TA 5310 (6 × 6) cross-country chassis

Displacement Time: min5

Emplacement Time: min1

Maximum Effective Range Rocket: km70

Add on Parts: Yes

Note: After the SR5 has fired the vehicle will normally redeploy to another position for rapid reloading and to avoid counter battery fire.

Dimensions

Length: mINA

Width: mINA

Height: mINA

Weight, Combat: kg25,000

Ground Pressure: kg/mINA

Automotive

Engine Name: Deutz Diesel

Engine Type: Diesel

Engine Power: hp517

Layout: 6x6

Cruising Range: km600

Speed, Maximum Road: km/h85

Speed, Average Cross: km/hINA

Amphibious: INA

Power Steering: Yes, Front Wheels

Central Tire Pressure Regulation System: Yes

Fording Depth: m1.2

Gradient: deg60

Side Slope: deg30

Vertical Setp: m0.6

Trench: m0.6

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Limited Capability

Amplifier: Available

Physical Conditions Limitations: Terrain and Weather favorable

Main Gun

↳*System*

Name: SR5

Type: 220mm Self-Propelled Rocket Launcher

Breech Type: INA

Length, Barrel: mmINA

Loader Type: INA

Max Rate of Fire: rds/minINA

Sustain Rate of Fire: Two pods can be loaded onto the launcher in 5 minutes

Time the Max Rate of Fire can be Sustained: min10

Muzzle Brake Type: INA

Max Elevation: deg+60

Min Elevation: deg0

Traverse Range: kmINA

Traverse Left: deg70

Traverse Right: deg70

Turret Traverse: deg140

Range Finder Type: GPS/INS laser

Turntable-Mounted Launching System: Yes

Note: The lunacher can be loaded with two pods of surface-to-surface rockets, either six 220mm or 20 122mm Rockets.

↳*Ammunition (Option 1)*

Name: Fire Dragon (BRE7) 40

Type: Hight Explosive Unguided Rockets

Caliber: mm122

Guidance System: GPS/INS laser terminal guidance system

Fuse Type: Radio Proximity Fuze

Basic Load: ea40 (2x20 Optional)

Effective Range: km30 to 50

Armor Penetration: Yes

Circular Error of Probability: 25 m at a minimum range of 20 km and maximum range of 40 km

Length, Total: mm3,040

Launch Weight: kg74

Warhead Weight: kg18

Warhead Type: Steel Ball HE

Leathal Warhead: m60

↳*Ammunition (Option 2)*

Name: King Dragon 60 (GR1)

Type: Laser Terminal Guided Rocket

Caliber: mm220

Guidance System: GPS/INS laser terminal guidance system

Muzzle Velocity: m/sINA

Basic Load: ea12 (2 x 6 Optional)

Max Effective Range: km70

Min Effective Range: km25

Armor Penetration: Yes

GPS Unit: Yes

CEP (At ranges of up to 70 km): m3

Length, Total: mm4,400

Launch Weight: kg300

Fire Control

Name: SR5

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

Displacement Time: minute1

Emplacement Time: minute5

Protection

Hull Armor: mmINA

Turret Armor: mmINA

Applique Armor: mmINA

Explosive Reactive Armor: No

Active Protection System: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: Yes

Notes:

The SR5 is a Guided Multiple Launch Rocket System (GMLRS) designed and manufactured in China by the Company NORINCO (China North Industries Corporation). It is a universal launching platform adopting such technologies as canister launching, automatic loading and common-frame rocket launching. Featuring intensive and accurate firepower, high level of automation, rapid reaction and excellent maneuverability, the weapon can realize common-frame launching of 122mm and 220mm guided/unguided rockets to achieve a highly efficient combination of surface suppression and precision strikes. The SR-5 GMLRS was unveiled for the first time to the public with a scale model showed at Eurosatory defense exhibition in June 2012. The vehicle is now in service in the Chinese army since 2013. The Venezuela has ordered a total of 18 SR5 in 2012 and 6

vehicles were delivered in 2014 to Venezuelan Armed Forces.

BM-24 (Katyusha) Russian 240mm Multiple Rocket Launcher



Tiers:



Variants:

- **BM-24 (8U31):** Basic model, mounted on a ZiS-151 chassis.
- **BM-24M (2B3):** Modified model, mounted on a ZIL-157 chassis
- **BM-24T:** Tracked model, mounted on an AT-S chassis
- **Israeli upgraded variant:**

System

Alternative Designation: BM-24
Type: Multiple Rocket Launcher
Family: INA
Crew: ea6
Chassis: ZiS-151 chassis
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m6.7
Width: m2.3
Height: m2.91
Weight, Combat: kg9,200
Ground Pressure: INA

Automotive

Engine Name: 1 x Zil-151
Engine Type: Gasoline Fueled Engine
Engine Power: hp109
Maximum Range: km430
Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Weapon System

↳*System*

Name: M-24FUD Rockets

Types: HE, Smoke, Chemical

Shell Weight: kg18.4

Maximum Effective Range: km10.6

Launch Tubes: 12

Basic Load: 12

Max Elevation: degINA

Min Elevation: degINA

Traverse Range: degINA

Traverse Left: degINA

Traverse Right: degINA

Note: Two jacks were set against the soil before shooting to discharge the back axles springs and to stabilize the platform.

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: Yes

Position Location System: INA

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The BM-24 is a multiple rocket launcher designed in the Soviet Union. It is capable of launching 240mm rockets from 12 launch tubes. Versions of the BM-24 have been mounted on the ZIL-151 6x6 Truck chassis and the AT-S tracked artillery tractor, forming the BM-24T from the latter. Production began out of Automotive Factory no. 2 in 1947 Moscow. Israel operated one battalion, consisting of vehicles captured from Egypt in the Six-Day War. The battalion took part in the Yom Kippur War and the 1982 Lebanon War. The Soviet Army was equipped with BM-24 after WWII. The BM-24 multiple launch rocket system fired the powerful M-24F 240mm rockets, each carrying 27,4 kg of the explosive. In addition to the M-24F, the system could also fire the M-24FUD, having the lighter 18,4 kg shell, but with a longer 10600m range. The MS-24 and MS-24D, loaded with P-35 poison-gas, were also available. The system had 12 launch tubes located on a rotary frame, disposed on a stub pole at the vehicle rear. The lining and turning mechanisms were hand driven. The cabin and fuel tanks were protected from rocket's exhaust by steel skin plates. Two jacks were set against the soil before shooting to discharge the back axles springs and to stabilize the platform. The 95 hp engine permitted the BM-24 to reach a speed 55km/h on the highway and to have a range of up to 600 km.

Kung Feng VI Taiwanese 117mm Multiple Launch Rocket System





Tiers:



Variants:

- **Kung Feng I:** Prototype only. Never entered service.
- **Kung Feng II:** Prototype only. Never entered service.
- **Kung Feng III:** 126mm x 40 round launcher mounted on trailer.
- **Kung Feng IV Army:** 126mm x 40 (2x20 round) launcher mounted on CM-21 APC used by the ROC Army.
- **Kung Feng IV Marines:** 126mm x 40 (2x20 round) launcher mounted on LVTP-5 used by the ROC Marines.[
- **Kung Feng V:** Experimental version that did not enter service.
- **Kung Feng VI:** 117mm x 45 round launcher mounted on M52A1 truck. 2 types of rockets, A version carries either HE warhead or WP. B version came with air burst fuse and 6,400 6.4mm size steel balls, covering 30,000 sq meters.
- **Kung Feng Sea:** Naval version, mounted on destroyers to launch ECM chaff.

System

Alternative Designation: Kung Feng VI
Type: Multiple launch rocket system
Crew: ea6
Chassis: M52A1 military truck.
Displacement Time: INA
Emplacement Time: INA
Reload Time: Rockets are reloaded manually by the crew within 15 minutes. Reload rockets are carried by escorting truck.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel

Engine Power: INA

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: 0.5 m

Trench: 0.5 m

Fording: 0.5 m

Main Weapon System

↳*System*

Name: Kung Feng VI

Type: Multiple launch rocket system

Number of Rocket Cells: 45

Full Salvo Duration: 23 sec

Reload Time: 15 min

Elevation: INA

Traverse: INA

↳*Ammunition*

Type: Rocket

Rocket Caliber: 117 mm

Rocket Length: 1.80 m

Rocket Weight: 60 kg

Rocket Maximum Range: 15 km

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Kung Feng (Chinese: □□; pinyin: Gōngfēng; literally: 'worker bee') MLR series is a family of multiple rocket launcher systems used by the Republic of China (Taiwan). Of these weapon systems, the latest variant is the Kung Feng VI, which commenced development in 1975, and was formally revealed to the public during the Taiwan National Day Parade in 1981. The Kung Feng IV features two compartments of 20 launchers, adding to a total of 40 launchers altogether, and is able to fire all rockets within 16 seconds. Its 126mm rockets weigh 24.4 kilograms, are 0.91 metres long, and have a range of 10,500 metres. The Kung Feng VI resembles the Soviet BM-21 Grad, albeit with a smaller diameter size and greater number of launcher tubes. Each of the 45 117mm launcher tubes houses an A-type rocket, and the tubes are capable of firing all rockets within 22.5 seconds, with a destructive area of 800 by 600 metres. The A-type rockets are 2.166 metres long, weigh 42.64 kilograms, have a maximum range of 15,000 metres, and can be fitted with either high explosive or white phosphorus payloads. The Kung Feng IV began development in 1960 and was completed in 1975, and were placed atop M113 armored vehicles. Towed and self-propelled variants of the Kung Feng IV entered service in 1972 and 1976 respectively; the towed variants were initially attached to the chemical weapons artillery division. Because the Kung Feng IV launchers were comparatively small, they were modified to be placed atop various different vehicles, such as the M151 jeep and LVTP5-RL. By the year 2000, only the LVTP5-RL variants of the marine corps were in service. During the 1970s, the earlier developmental models of the Kung Feng VI rocket launchers only had a range of 10 kilometres, which made them less effective than the older Kung Feng IV launchers. Unsatisfied with the range of the launchers being inferior to that of those from other countries, chief of staff of the artillery forces Hau Pei-tsun requested that the Academia Sinica research and development division increase the range of the rockets to 22 kilometres, and develop designs that allow for the implementation of cluster bombs and airburst fuses. This development led to the B-type rockets which were completed but never entered service. As other countries further continued to improve their rocket systems, with post-Cold War 122mm rocket models pushing beyond ranges of 20 kilometres, the weapons development of the ROC armed forces gradually fell behind. Within the development process, the Kung Feng VI was initially planned to be placed on top of an M42 Duster chassis, however due to difficulties in procurement the M113 chassis was used instead, which was unable to properly bear the weight of the rocket system. Henceforth, the ROC army gave up on the prospects of implementing the Kung Feng VI on caterpillar tracks, and began working on placing them on M809 five tonne wheeled trucks, in addition to implementing the FAC-202R fire control apparatus in order to improve precision. The ROC armed forces quickly retired its Kung Feng IV launchers and replaced them with the newer VI model as it entered service, however at the same time the launchers were incapable of fast reloading and had no dedicated transport trailer. Upon firing, it took soldiers 15 minutes to manually load the next rockets before the Kung Feng VI could fire again. Because the Kung Feng VI had logistical requirements greater than that of non-traditional artillery units, not many units were manufactured. As of present the Kung Feng VI is still in service, however there are plans for the units to be mass-replaced by the Thunderbolt-2000 systems.

M1985 North Korean 122mm Multiple Rocket Launcher (MRL)




Tiers:

1 2 3 4

Variants:

- **BM-21-1:** Launch vehicles are mounted on a family of Ural-4320 truck chassis
- **2B17 or also BM-21-1:** This upgrade was presented for the first time in 2003 and was developed by Motovilikha Plants from Perm. The system is fitted with a satellite navigation system NAP SNS, automated fire control system ASUNO, APP laying system and can fire a new generation of rockets with a range of 40 km (25 mi). The truck is the Ural-43201.
- **9P138 "Grad-1"::** lighter 36-round version, mounted on a six-by-six ZIL-131 chassis. The vehicle with supporting equipment (rockets, transporter 9T450 and re-supply truck 9F380) is referred to as complex 9K55. The 9P138 can only use "short-range" rockets with a range of 15 km (9.3 mi). It used to be known in the West as BM-21b or M1976.
- **BM-21V "Grad-V":** (NATO designation M1975): Developed for Soviet airborne troops in 1969. A GAZ-66B four-by-four truck chassis is fitted with a 12-round 122 mm rocket launcher. The vehicle is sturdy enough to be air-dropped. Parts of the vehicle such as the canvas cab roof can be taken off or folded down to reduce its size during transit. Like the BM-21, the BM-21V has stabilizing jacks on the rear of the vehicle for support when firing. The launch vehicle has the industrial index of 9P125.
- **9A51 "Prima":** 50-round launcher on a Ural-4320 5t chassis. The vehicle together with fire control equipment, the ammunition transporter TZM 9T232M and the new rocket 9M53F is referred to as complex
- **"Grad-P Light portable rocket system":** he complete system comprises a 9P132 [vi] single-round man-portable launcher (it can be reloaded and used again), a 9M22M 122 mm high-explosive fragmentation rocket and a fire control panel. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.
- **BM-21PD "Damba":** 40-round launcher mounted on Ural-375D or 43201 truck chassis. Developed for protection of naval bases against underwater infiltrations, uses special ammunition PRS-60 (Protivodiversionnyi Reaktivnyi Snaryad). The vehicle together with ammunition transporter is referred to as complex DP-62 "Damba".
- **A-215 "Grad-M":** 22-round naval version, entered service in 1978.
- **9K51M "Tornado-G":** an advanced version of the original BM-21 vehicle with sophisticated fire control system, satellite navigation, and automatic target aiming.
- **BM-21A "BelGrad":** This is a modernized version, based on a MAZ-631705 6×6 truck with 425 hp diesel engine TMZ-8424. Between the cab and the launcher there is another pack of 40 rockets. The system was evaluated from 1997 and entered service in 2001.

System

Alternative Designation: M1985
Manufacturer: Splav State Research and Production Enterprise
In Service: 1963-Present
Type: 122mm Multiple Launch Rocket System
Family: BM-21 Series
Crew: ea5 (8 with 9K51 Complex)

Chassis: Ural 375-D 6x6 wheeled

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.4

Height: m3.09

Weight, Combat: tons13.7

Ground Pressure: kg/mINA

Automotive

Chassis: Ural 375-D 6x6 wheeled

Engine Name: ZIL-375

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h75

Speed, Maximum Off-Road: km/h35

Speed Maximum Swim: km/hNo Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.5

Communications

Primary: R-123M

Secondary: INA

Launcher

↳*System*

Name: 9P132

Type: mm122

Number of Tubes: ea40

Full Salvo: seconds20

Single Rocket Interval: se.5 seconds per rocket

Reloading Time: min7

Max Elevation: deg+55

Min Elevation: deg0

Traverse Range: deg172

Traverse Left: deg102

Traverse Right: deg70

Maximum Effective Firing Range: km21

Minimum Effective Firing Range: km1.6

Loader Type: Manual

Launcher Drive: Electric

↳***Ammunition (Option 1)***

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳***Ammunition (Option 2)***

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳***Ammunition (Option 3)***

Name: Type 90A (Chinese)

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Note: The BM-21 can fire the following additional ammo: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: None

Turret Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The M1985 122mm Multiple Rocket Launcher (MRL) is a North Korean version of the Russian BM-21 122mm Multiple Rocket Launcher (MRL). MRL 122 mm M1985: This is a more modern version, based on an Isuzu 6×6 truck and probably with a 40-round reload-pack mounted between the cab and the launcher The BM-21 "Grad" (Russian: БМ-21 "Град", lit. 'hail') is a Soviet truck-mounted 122 mm multiple rocket launcher. The weapons system and the M-21OF rocket which it fires evolved in the early 1960s and saw their first combat use in March 1969 during the Sino-Soviet border conflict. BM stands for boyevaya mashina (Russian: боевая машина – combat vehicle), and the nickname grad means "hail". The complete system with the BM-21 launch vehicle and the M-21OF rocket is designated as the M-21 field-rocket system. The complete system is more commonly known as a Grad multiple rocket launcher system. In NATO countries the system (either the complete system or the launch vehicle only) was initially known as M1964. Several other countries have copied the Grad or have developed similar systems. The M-21 field rocket system with a BM-21 launch vehicle (122 mm multiple rocket launcher (MRL) system) entered service with the Soviet Army in 1963 to replace the aging 140 mm BM-14 system. The launch vehicle consists of a Ural-375D six-by-six truck chassis fitted with a bank of 40 launch tubes arranged in a rectangular shape that can be turned away from the unprotected cab. The vehicle is powered by a water-cooled V-8 180 hp gasoline engine, has a maximum road speed of 75 km/h (47 mph), road range of up to 750 kilometers (470 mi), and can cross fords up to 1.5 m (4 ft 11 in) deep. The original vehicle together with supporting equipment (including the re-supply truck 9T254 with 60 rockets) is referred to by the GRAU index

"9K51"; the launcher itself has the industrial index of "2B5". In 1976, the BM-21 was mounted on the newer Ural-4320 six-by-six army truck. The three-member crew can emplace the system and have it ready to fire in three minutes. The crew can fire the rockets from the cab or from a trigger at the end of a 64-meter (210 ft) cable. All 40 rockets can be away in as little as 20 seconds, but can also be fired individually or in small groups in several-second intervals. A PG-1M panoramic telescope with K-1 collimator can be used for sighting. The BM-21 can be packed up and ready to move in two minutes, which can be necessary when engaged by counter-battery fire. Reloading is done manually and takes about 10 minutes. Each 2.87-meter (9 ft 5 in) rocket is slowly spun by rifling in its tube as it exits, which along with its primary fin stabilization keeps it on course. Rockets armed with high explosive-fragmentation, incendiary, or chemical warheads can be fired 20 kilometers (12 mi). Newer high explosive and cargo (used to deliver anti-personnel or antitank mines) rockets have a range of 30 kilometers (19 mi) and more. Warheads weigh around 20 kilograms (44 lb), depending on the type. The number of rockets that each vehicle is able to quickly bring to bear on an enemy target makes it effective, especially at shorter ranges. One battalion of eighteen launchers is able to deliver 720 rockets in a single volley. The system has lower precision than typical artillery and cannot be used in situations that call for pinpoint accuracy. It relies on a large number of shells dissipating over an area for a certain hit rate on specific targets. Nonetheless, because of the short warning time for the impact of the whole volley, the BM-21 is still considered an effective weapon.

BM-21 Grad Russian 122mm Multiple Rocket Launcher (MRL)




Tiers:



Variants:

- **BM-21-1:** Launch vehicles are mounted on a family of Ural-4320 truck chassis
- **2B17 or also BM-21-1:** This upgrade was presented for the first time in 2003 and was developed by Motovilikha Plants from Perm. The system is fitted with a satellite navigation system NAP SNS, automated fire control system ASUNO, APP laying system and can fire a new generation of rockets with a range of 40 km (25 mi). The truck is the Ural-43201.
- **9P138 "Grad-1"::** lighter 36-round version, mounted on a six-by-six ZIL-131 chassis. The vehicle with supporting equipment (rockets, transporter 9T450 and re-supply truck 9F380) is referred to as complex 9K55. The 9P138 can only use "short-range" rockets with a range of 15 km (9.3 mi). It used to be known in the West as BM-21b or M1976.
- **BM-21V "Grad-V":** (NATO designation M1975): Developed for Soviet airborne troops in 1969. A GAZ-66B four-by-four truck chassis is fitted with a 12-round 122 mm rocket launcher. The vehicle is sturdy enough to be air-dropped. Parts of the vehicle such as the canvas cab roof can be taken off or folded down to reduce its size during transit. Like the BM-21, the BM-21V has stabilizing jacks on the rear of the vehicle for support when firing. The launch vehicle has the industrial index of 9P125.
- **9A51 "Prima":** 50-round launcher on a Ural-4320 5t chassis. The vehicle together with fire control equipment, the ammunition transporter TZM 9T232M and the new rocket 9M53F is referred to as complex
- **"Grad-P Light portable rocket system":** he complete system comprises a 9P132 [vi] single-round man-portable launcher (it can be reloaded and used again), a 9M22M 122 mm high-explosive fragmentation rocket and a fire control panel. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.
- **BM-21PD "Damba":** 40-round launcher mounted on Ural-375D or 43201 truck chassis. Developed for protection of naval bases against underwater infiltrations, uses special ammunition PRS-60 (Protivodiversionnyi Reaktivnyi Snaryad). The vehicle together with ammunition transporter is referred to as complex DP-62 "Damba".
- **A-215 "Grad-M":** 22-round naval version, entered service in 1978.
- **9K51M "Tornado-G":** an advanced version of the original BM-21 vehicle with sophisticated fire control system, satellite navigation, and automatic target aiming.
- **BM-21A "BelGrad":** This is a modernized version, based on a MAZ-631705 6×6 truck with 425 hp diesel engine TMZ-8424. Between the cab and the launcher there is another pack of 40 rockets. The system was evaluated from 1997 and entered service in 2001.

System

Alternative Designation: BM-21 Grad
Manufacturer: Splav State Research and Production Enterprise
In Service: 1963-Present
Type: 122mm Multiple Launch Rocket System
Family: BM-21 Series
Crew: ea5 (8 with 9K51 Complex)

Chassis: Ural 375-D 6x6 wheeled

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.4

Height: m3.09

Weight, Combat: tons13.7

Ground Pressure: kg/mINA

Automotive

Chassis: Ural 375-D 6x6 wheeled

Engine Name: ZIL-375

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h75

Speed, Maximum Off-Road: km/h35

Speed Maximum Swim: km/hNo Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.5

Communications

Primary: R-123M

Secondary: INA

Launcher

↳*System*

Name: 9P132

Type: mm122

Number of Tubes: ea40

Full Salvo: seconds20

Single Rocket Interval: se.5 seconds per rocket

Reloading Time: min7

Max Elevation: deg+55

Min Elevation: deg0

Traverse Range: deg172

Traverse Left: deg102

Traverse Right: deg70

Maximum Effective Firing Range: km21

Minimum Effective Firing Range: km1.6

Loader Type: Manual

Launcher Drive: Electric

↳***Ammunition (Option 1)***

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳***Ammunition (Option 2)***

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳***Ammunition (Option 3)***

Name: Type 90A (Chinese)

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Note: The BM-21 can fire the following additional ammo: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: None

Turret Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The BM-21 "Grad" is a Soviet truck-mounted 122 mm multiple rocket launcher. The weapons system and the M-21OF rocket which it fires evolved in the early 1960s and saw their first combat use in March 1969 during the Sino-Soviet border conflict. BM stands for boyevaya mashina (Russian: боевая машина – combat vehicle), and the nickname grad means "hail". The complete system with the BM-21 launch vehicle and the M-21OF rocket is designated as the M-21 field-rocket system. The complete system is more commonly known as a Grad multiple rocket launcher system. In NATO countries the system (either the complete system or the launch vehicle only) was initially known as M1964. Several other countries have copied the Grad or have developed similar systems. The M-21 field rocket system with a BM-21 launch vehicle (122 mm multiple rocket launcher (MRL) system) entered service with the Soviet Army in 1963 to replace the aging 140 mm BM-14 system. The launch vehicle consists of a Ural-375D six-by-six truck chassis fitted with a bank of 40 launch tubes arranged in a rectangular shape that can be turned away from the unprotected cab. The vehicle is powered by a water-cooled V-8 180 hp gasoline engine, has a maximum road speed of 75 km/h (47 mph), road range of up to 750 kilometers (470 mi), and can cross fords up to 1.5 m (4 ft 11 in) deep. The original vehicle together with supporting equipment (including the re-supply truck 9T254 with 60 rockets) is referred to by the GRAU index "9K51"; the launcher itself has the industrial index of "2B5". In 1976, the BM-21 was mounted on the newer Ural-4320 six-by-six army truck. The three-member crew can emplace the system and have it ready to fire in three minutes. The crew can fire the rockets from the cab or from a trigger at the end of a 64-meter (210 ft) cable. All 40 rockets can

be away in as little as 20 seconds, but can also be fired individually or in small groups in several-second intervals. A PG-1M panoramic telescope with K-1 collimator can be used for sighting. The BM-21 can be packed up and ready to move in two minutes, which can be necessary when engaged by counter-battery fire. Reloading is done manually and takes about 10 minutes. Each 2.87-meter (9 ft 5 in) rocket is slowly spun by rifling in its tube as it exits, which along with its primary fin stabilization keeps it on course. Rockets armed with high explosive-fragmentation, incendiary, or chemical warheads can be fired 20 kilometers (12 mi). Newer high explosive and cargo (used to deliver anti-personnel or antitank mines) rockets have a range of 30 kilometers (19 mi) and more. Warheads weigh around 20 kilograms (44 lb), depending on the type. The number of rockets that each vehicle is able to quickly bring to bear on an enemy target makes it effective, especially at shorter ranges. One battalion of eighteen launchers is able to deliver 720 rockets in a single volley. The system has lower precision than typical artillery and cannot be used in situations that call for pinpoint accuracy. It relies on a large number of shells dissipating over an area for a certain hit rate on specific targets. Nonetheless, because of the short warning time for the impact of the whole volley, the BM-21 is still considered an effective weapon.

9A51 Prima Russian 122mm Multiple Rocket Launcher System





Tiers:



System

Alternative Designation : 9A51
Cailber/Length : mm122
Crew : ea3
Displacement Time : min3
Emplacement Time : min3
Launch Rate, Full Salvo Time : 50 rounds in 30 seconds
Launch Rate, Singl Rocket Interval: 0.6 seconds per rocket (est)
Launcher Name: Prima
Reload Time: min10

Dimensions

Combat Weight: mT13.9
Chassis Length, Overall: m7.35
Width: m2.5
Height: m2.5

Automotive

Chassis: Ural 4320
Drive Formula: 6x6
Engine Type: KAMAZ-740, 210 hp, diesel engine
Fording Depth : m1.5
Range, Cruising : km990
Speed, Maximum Cross-Country: INA
Speed, Maximum Off-Road: km/h40
Speed, Maximum On-Road: km/h85

Fording Depth: m1.5

Trench Clearance: mUp to 1.2

Vertical Step: m0.55

Side Slope: %30

Gradient: %30

Armament

Caliber: mm122

Quantity, Tubes : ea50

Reload Time : min10

Traverse, Left : deg58

Traverse, Right : deg58

Elevation: deg0 to 55

Loader Type: Transloader, crane hoist

Munition

Available Warheads: Can fire all rockets developed for the BM-21 Grad including cluster rockets with anti-tank or anti-personnel submunitions.

↳*Munition 1*

Name: 9M53F

Caliber/Length : mm122

Type: Frag-HE

Fuze Type: Proximity

Length, Rocket : m3.03

Maximum Velocity : INA

Range, Maximum : m21,000

Range, Minimum : m5,000

Weight : kg70

Warhead Weight: kg26

Communications

↳*Radio*

Name: R-173M FM-VHF

Fire Control Systems

Collimator: K-1

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Protection

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

Notes:

The Prima multiple launch rocket system is an improvement of the BM-21 Grad. It was adopted by the Soviet Army in 1988, however due to budget cuts, only a small number of these artillery systems were ever produced. Some sources claim that it is also in service with Kazakhstan. The Prima MLRS is also referred to as the 9K59, the launching vehicle is 9A51. It has 50 tubes for 122mm rockets. The older Grad has 40 tubes. It can fire all of the rockets developed for the BM-21 Grad, including cluster rockets with anti-tank or anti-personnel sub-munitions. Furthermore, new and more effective rockets have been developed for this system. The new 9M53F rocket with a separable HE-FRAG warhead is standard for this artillery system. The maximum range of fire is 21km. This and other new rockets can also be fired from improved Grad launchers. Rockets can be launched directly from the driver's cab or remotely from the vehicle. A full salvo of the Prima has 7-8 times better coverage and it spends 4-5 times less time in its firing position compared to the Grad.

Type 90 Chinese 122mm Multiple Launch Rocket System







Tiers:



Variants:

- **Type 90A:** This is an improved version. The major upgrades include the ability to launch all types of 122-mm unguided rockets to a maximum range of 25 mi (40 km), including high-explosive and high-explosive incendiary weapons, and the installation of a new computerized fire-control system with a GPS and north -finding device for greater accuracy. The panoramic sight on the left side of the launcher is retained for manual laying. A third improvement is a high level of automation for the operator. The command post vehicle can control a number of Type 90A systems by remote control.
- **Type 90B:** This is the latest variant of the system. The Type 90B system features a reconnaissance vehicle, as well as mobility and reliability improvements. Emplacement and displacement time is seven minutes. A standard Type 90B battalion would consist of three WZ 551 6 x 6 reconnaissance vehicles; battalion command vehicle based on a Mercedes-Benz 4 x 4 chassis; meteorological radar on two Steyr 4 x 4 vehicles; two Steyr 4 x 4 maintenance vehicles, one for mechanical and one for electronic maintenance; and three missile batteries.

System

Alternative Designation: Type 90
Type: Multiple Launch Rocket System
Caliber: 122mm
Chassis: Tiema SC2030 6 x 6 truck
Crew: INA
Displacement Time: Less than 10 min
Emplacement Time: Less than 10 min
Type 90 Battalion comprises: A typical Type 90 multiple launch rocket system battalion comprises the battalion headquarters and three firing units (companies). The battalion headquarter is equipped with: *A battalion command truck; *3 reconnaissance APC; *A meteorological radar truck; *A mechanical maintenance truck; *A electronic maintenance truck Each firing unit is equipped with: *A company command truck; *6 rocket launch trucks *6 reloading trucks

Dimensions

Length, Traveling: 9.84 m
Width, Traveling: 2.50 m
Height, Traveling: 3.25 m
Weight, Combat: 20,000 kg
Ground Clearance: 0.41 m

Automotive

Engine Name: INA
Engine Type: Air-Cooled Diesel
Engine Power: hp300
Cruising Range: km600
Speed, Maximum Road: km/h85
Speed, Average Cross: km/hINA
Speed Maximum Swim: Not Amphibious
Fording Depth: 0.90 m
Turning Radius: 12.00 m

Main Weapon System

↳*Launcher*

Name: INA
Type: The electrically powered launcher has four rows of 10 tubes mounted above each other on a rotating cradle assembly.
Elevation: 0% to +55%
Traverse: +/-102 deg
Azimuth Range: -102% to +1-2%
Stabilizers: The truck is equipped with two hydraulically operated stabilisers at rear which are lowered in preparation for the rocket launch.
Modes: The rocket launcher can be operated in manual, semi-automatic, or automatic modes. The electrical firing system fires the rockets in either single or in salvo with 0.5 seconds interval.
Operation: The launcher can be operated inside the driver's cab or remotely outside the vehicle.
Rate of Fire: 40 rds in 18-20 sec
Reloading Rack: The reloading rack located in front of the launcher can load the launcher in under 3 minutes.
Cover: The truck is equipped with a hydraulically operated foldable canvas cover, which covers the launcher and the reloading rack when the truck is in travelling mode.
Note: The vehicle is fitted with slope and gradient sensors, launcher elevation and and azimuth sensors, as well as GPS and computerised fire control system to ensure higher firing accuracy.

Missile

Rocket Type: The free rocket used by the WS-1 and WS-1B consists of the warhead and fuse, an FG-42/43 rocket motor and the tail section. The FG-42/43 rocket motor is a single chamber, solid rocket motor with an advanced hydroxy-terminated polybutadine (HTPB) composition rocket propellant. The rocket of the WS-2 system features four control surfaces in the middle section of the rocket for terminal guidance.

Warhead Type: The rocket can be fitted with various types of warheads including anti-armour/personnel submunition, blasting, fuel air explosive (FAE), and high-explosive (HE). The ZDB-2 blasting warhead is loaded with steel balls and prefabricated fragments. The SZB-1 submunition warhead is designed to destroy large area targets such as armour formation and infantry troops. When the SZB-1 submunition warhead detonates, around 500 bullets are expelled under high pressure.

Maximum Range: 40 km

Basic Load: 40 Rounds

Fire Control

Name: INA

Computerized FCS: Yes, The launcher is controlled by computer through a man-machine interface. Another interface connects to a battalion central command system. Instructions can be input directly from the interface or manually through push-buttons.

Direct Fire: Yes

Indirect Fire: Yes

Position Location System: Yes

Automatic Operating and Laying System: The automatic operating and laying system consists of five main subsystems: an HJ-1 mini-computer; launcher direction-finder (which requires less than 3 sec to display the launcher's magnetic azimuth angle); longitudinal and transversal slope sensors; launcher assembly elevation and traverse positi on sensors; and a special vehicle power supply interface unit.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 90 is the second-generation truck-mounted 122mm 40-tube multiple launch rocket system developed by China North Industries Group Corporation (NORINCO) in the mid-1990s as a successor to the Type 81 122mm rocket system. The Type 90 has been promoted by NORINCO to the export market, but has yet received any order. The improved Type 90B was first revealed in 2004. The Chinese Type 90 122mm MLRS system utilizing/based on the Russian BM-21 Grad's launcher. The vehicle was developed as the replacement for the older Type 81, which it too had the same BM-21 Grad's launcher and entered PLA service around the early 1990's. The vehicle is based on the 2629 6X6 military truck, which is longer than the Type 81's. The increased length means that the vehicle can mount a reloading mechanism which contains a rack of 40 spare rockets. This is able to reload the launcher in a reported time of 3 minutes and allows the vehicle to remain in the fight for longer before having to withdraw to reload. The Type 90 fires 122mm fin-stabilised free rockets to a minimum range of 10~12km and a maximum range of 20~40km depending on the rocket type. The rocket can be fitted with various types of warheads including anti-armour/personnel sub-munitions, blasting, fuel air explosive (FAE), and high-explosive (HE). The PLA developed the Type 81 122mm 40-tube multiple launch rocket system based on the Soviet BM-21 Grad in the early 1980s. In the mid-1990s NORINCO revealed a new 122mm rocket system design known as Type 90. The biggest difference on the Type 90 is the reload

pack carrying 40 spare rockets, which can reload the rocket launcher within 3 minutes after the first launch, providing additional firepower with quick turnarounds. The launcher is mounted on the improved North-Benz 2629 6X6 truck, which possesses better performance compared to the Yanan SX2150 truck used by the Type 81. The Type 90 is also supported by a large formation of ground equipment including a battery command truck, rocket reloading trucks, reconnaissance APC, meteorological radar, and maintenance vehicles. Greater firing accuracy is ensured by the use of a computerized fire-control system integrated with GPS on the improved Type 90B. The weapon system could deliver intensive fire-power over a distance of 40km within a very short period. The weapon was designed to engage large area targets such as armour formation, airport, weapon storages, etc. NORINCO has developed a range of warheads for different purposes.

Haseb Iranian 107mm Multiple Rocket Launcher (MRL)



Tiers:



Variants:

- **Type 63 for mountain/airborne warfare:** This variant can be disassembled into manpack loads
- **Type 63 -1:** This variant's launcher is modified to four rows of three tubes; it has smaller road wheels. Tube construction is cast aluminum. The weight of the Type 63 -1 is reduced by 300 lb (136 kg) and it has a covered crew cabin.
- **Type 81:** This variant is a Type 63 on a turntable mounted on rear bed of 4 x 4 truck.
- **Iraqi 107-mm MRS:** The version is an Iraqi copy of the Type 63
- **South African 107-mm MRS:** South African 107-mm MRS
- **VTT-323:** The VTT-323 is the North Korean designation for the weapon.
- **107MM SP MRL 18 M1992:** North Korea Version
- **107MM SP MRL 24 M1992:** North Korea Version

System

Alternative Designations: Hasab

Proliferation: Bosnia-Herzegovina [28] Burkina Faso [4] Cambodia [N/A] Burma (Myanmar) [30] China [54] Democratic Republic of the Congo [12] Iran [600 Fajr (or Fadjr) 1] Libya [N/A] Nicaragua [33] North Korea [N/A] Sudan [477] Syria [200] Vietnam [360] Zimbabwe [16]

Manufacturer: State Factory 847

In Service: 1963-Present

Crew: ea5

Emplacement Time: INA

Displacement Time: INA

Dimensions

Length: m2.90

Width: m1.65

Height: m0.91

Tire Size: 126 mm x 406 mm

Weight, Combat: kg602

Automotive

Prime Mover: 4X4 or 6x6 Truck

Multiple Rocket Launcher

↳*Launcher*

Name: Hasab

Type: Multiple Rocket Launcher

Caliber: 107mm

Number of Tubes: ea12

Maximum Elevation: deg+57

Minimum Elevation: deg-3

Traverse Range: deg32

Traverse Right: deg16

Traverse Left: deg16

Reload Time: 3 minutes

Carriage: Split trail

↳*Ammunition (Option 1)*

Name: INA

Type: HE Projectile

Length: m0.84

Width: 170mm

Weight, Total: kg18.80

Warhead Type: HE

Warhead Weight: kg8.33

Maximum Range: m8,500

Maximum Velocity: m/s372

↳*Ammunition (Option 2)*

Name: INA

Type: Incendiary Projectile

Length: m0.92

Width: 170mm

Weight, Total: kg18.74

Warhead Type: Incendiary

Warhead Weight: kg7.54

Maximum Range: m7,885

Maximum Velocity: m/s383

Fire Control

Name: Hasab

Computerized FCS: No

Sights: Optical

Notes:

The Haseb Iranian 107mm Multiple Rocket Launcher (MRL) is a Iranian version of the Russian Type 63 The Type 63 multiple rocket launcher is a towed, 12-tube, 107mm rocket launcher produced by the People's Republic of China in the early 1960s and later exported and manufactured globally. Although no longer serving with active infantry units, the Type 63 is still in People's Liberation Army service with specialized formations such as mountain infantry units and special forces detachments. The Type 63 was widely used in the PLA until the late 1980s. It was adopted as the successor of the Type 50-5 of 102mm. China has also developed a Type 63 multiple rocket launcher of 130mm. The RPU-14 is a Soviet 140mm MRL of similar design to the Type 63. The launcher's 12 tubes are arranged in three removable rows of four each, mounted on a single-axle carriage with rubber tires. The Type 63 originally fired an 18.8 kilogram rocket (Type 63-2) with a 1.3 kilogram warhead.Ammunition for the Type 63 was later improved (Type 75 and Type 81 series), although the overall weight of the rocket remained the same. A fixed amount of propellant is contained in the rocket motor. The steel-cased rocket is stabilized with spin imparted by six angled nozzles in its base. Type 63 rockets may be launched without the launcher; improvised firing can employ tubing, rails or even dirt berms. The Type 63 was distributed on the basis of six per infantry regiment, or 18 per infantry division. For airborne and mountain units the lighter Type 63-I was developed. Both the Type 63 and its copies can be mounted on different kinds of armoured and unarmoured vehicles, for example the MT-LB, the Safir, the Mamba, the RG-32 Scout, the GAZ-66 and the M113.

Type 79 Chinese 305mm Anti-Tank Mine Laying Multiple Rocket Launcher



Tiers:



System

Alternative Designation: NA

Type: MRL Anti-Tank Mine Layer

Manufacturer: NORINCO began the project. It is unknown who completed the project.

Crew: INA

Passenger Capacity: NA

Maximum Effective Range: m2,600

Doctrinal Employment Consideration: Each Type 79 is deployed with 3 others to form a firing battery

Prime Mover: CA-30A, 6x6 truck

Weather Considerations: Can be used in temperatures from -40 degrees to +40 degrees Celsius

Mine Laying System

Type: Multiple-Rocket Launcher

Caliber: mm305

Number of Rockers per Salvo: 8

Rail System: Welded tubular steel launcher assembly frame

Reloading System: INA

Mines per Rocket: 10 (Type 69 plastic AT mines)

Maximum Area Covered by Full Battery Salvo: 600m x 350m

Time Required to Launch a Full Salvo: sec14

Elevation Range of Launcher: +4 - +50 degrees

Traverse Range: 95 degrees left and 45 degrees right

Muzzle Velocity: 185 m/s

Dimensions

Length: m6.44

Width: m2.27

Height: m2.93

Weight, Combat: Approximately 8,780kg

Automotive

Engine Name: Jiefang 120

Engine Type: 5.5 liter diesel, 16 cylinder

Engine Power: hp95

Speed, Maximum Road: km/h40

Rockets

↳*Type 79 Mine Laying Rocket*

Caliber: mm305

Range: m2,600

Propellant: Solid

Mine Payload: 10 (Type 69 plastic AT mines)

Rocket Weight with Motor: 233kg

Fire Control

Guidance: Rockets have no guidance system

Protection

Cab: Steel blast shutters over the cab windows

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Type 79 mine-laying rocket system, consisted of a tubular, welded steel launcher assembly frame mounted on the bed of a CA-30A 6 x 6 truck. The eight-round launcher could traverse 95 degrees left and 45 degrees right, with an elevation ranging from +4 degrees to +50 degrees. The sighting system was located on the left side of the launcher. Each rocket shell carried 10 Type 69 plastic anti-tank mines. A typical battery of four launchers was capable of laying down a minefield measuring 650m x 350m. Production of the missile and truck chassis has been completed. The missile production was started by Norinco, but finished by another company, presumably Chinese. The system is no longer reported in service with the People's Liberation Army (PLA). Ref; Military Periscope, July 2014.

Hadid HM20 Iranian 122mm Multiple Launch Rocket System (MLRS)




Tiers:



Variants:

- **Note:** 122 mm rocket launcher system can be mounted on a variety 6x6 vehicles such as MAN, Mercedes-Benz and more

System

Alternative Designation: Hadid HM20, Hadid
Type: 122mm Multiple Rocket Launcher (MRL)
Manufacturer: Aerospace Industries Organisation (AIO)
In Service: 1980s-Present
Family: Hadid
Crew: INA
Chassis: Mercedes-Benz 2624 (6 × 6) truck chassis
Displacement Time: INA
Emplacement Time: INA

Dimensions (Chassis: Mercedes-Benz 2624, 6x6 truck)

Length: m10.4
Width: m2.5
Height: m3.3
Weight, Combat: tons15

Automotive (Chassis: Mercedes-Benz 2624, 6x6 truck)

Engine Name: Mercedes-Benz, model: INA
Engine Type: Diesel
Engine Power: INA
Cruising Range: km600
Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m1

Communications

Primary: INA

Rocket System

↳*Launcher*

Name: INA

Type: mm122

Guidance System: unguided rockets

Basic Load: ea40

Full Salvo: 20 seconds

Firing Operations: the firing operations conducted either from the vehicle cab or from a ground position situated at a safe distance from the launcher.

Reloadidng: Manually

Sighting System: The sighting system is mounted on the left side of the launcher at the rear.

Maximum Elevation: deg+55

Minimum Elevation: deg-1

Traverse Range: deg174

Traverse Left: INA

Traverse Right: INA

Note: The launcher assembly has two banks of 20 122 mm barrels in a side-by-side 4 × 5 row arrangement and is mounted on a rotating cradle fitted to the rear of the truck

↳*Rocket (Option 1)*

Name: Arash 1

Type: Rocket Artillery

Caliber: mm122

Length: 2.815

Basic Load: Any combination of 122mm Arash series projectile.

Muzzle Velocity: m/s710

Maximum Range: km21.5

↳*Rocket (Option 2)*

Name: Arash 2

Type: Rocket Artillery

Caliber: mm122

Length: m2.815

Basic Load: Any combination of 122mm Arash series projectile.

Muzzle Velocity: m/s1050

Maximum Range: km30

↳*Rocket (Option 3)*

Name: Arash 3 (Noor Rocket)

Type: Rocket Artillery

Caliber: mm122

Length: m2.050

Basic Load: Any combination of 122mm Arash series projectile.

Muzzle Velocity: m/s720

Maximum Range: km18

↳*Rocket (Option 4)*

Name: Arash 4

Type: HE Fragmentation Rocket Artillery

Caliber: mm122

Length: m2.890

Basic Load: Any combination of 122mm Arash series projectile.

Muzzle Velocity: INA

Maximum Range: km40

Fire Control

Name: INA

Computerized FCS: Yes

Direct Fire: INA

Indirect Fire: Yes

Position Location System: INA

Protection

Hull Armor: Protection from small arms fire and projectile splinters.

Turret Armor: Protection from small arms fire and projectile splinters.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The 122mm HADID rocket launcher system is a 40-round launcher assembly system mounted on the rear of a Mercedes-Benz 2624 (6 × 6) truck chassis. These chassis are also used for the Fadjr 333mm (4-round) and Fadjr 240mm (12-round) artillery rocket systems that are covered in a separate entry. The technology has certain operational characteristics that are similar to the NORINCO (China North Industries Corporation) 122mm (40-round) Type 81 MRS and the Russian 122mm (40-round) BM-21 systems, both of which are covered in detail in a separate entry.

Type 74 Chinese 284mm Anti-Tank Mine Multiple Rocket Launcher



Tiers:



System

Alternative Designation: NA

Type: MRL Anti-Tank Mine Layer

Manufacturer: NORINCO

Crew: 6 (2 ride in cap; 4 behind the cab)

Passenger Capacity: NA

Maximum Effective Range: m3,500

Doctrinal Employment Consideration: Each Type 74 is deployed with 3 others to form a firing battery

Prime Mover: CA-30A, 6x6 truck

Mine Laying System

Type: Multiple-Rocket Launcher

Caliber: mm284

Number of Rockers per Salvo: 10

Rail System: 5 rails that can launch 2 rockets each (one on top and one on bottom)

Reloading System: Manual (requires 4 people)

Mines per Rocket: 10

Maximum Area Covered by Full Salvo: 700m x 500m

Time Required to Launch a Full Salvo: sec15

Elevation Range of Launcher: +7 - + 48 degrees

Traverse Range: 90 degrees total

Dimensions

Length: m6.44

Width: m2.27

Height: m2.93

Weight, Combat: Approximately 8,780kg

Automotive

Engine Name: Jiefang 120

Engine Type: 5.5 liter diesel, 16 cylinder

Engine Power: hp95

Speed, Maximum Road: km/h40

Rockets

↳*Option 1*

Name: Type 69 or 70

Caliber: mm284

Range: m1,500

Propellant: Liquid

Mine Payload: 10

:

↳*Option 2*

Name: Type 85

Caliber: mm284

Range: m3,500

Propellant: Solid

Mine Payload: 10

:

Fire Control

Guidance: Rockets have no guidance system

Protection

Cab: Steel blast shutters over the cab windows

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Type 74 284-mm multiple rocket launcher fires heavy rockets that plant anti-tank mines. The system, mounted on the bed of a 6 x 6-wheel CA-30A truck, elevates and traverses a row of five rails. Each I-beam rail is 4.0 m long and holds a rocket above and below the rail. Each rocket carries 10 Type 69 or Type 70 plastic-case anti-tank mines. To lay a minefield covering 400 sq m, a battery of four Type 74 launchers fires a salvo of rockets each, planting 400 mines. All 10 rockets can be launched in 15 seconds. Note: NORINCO developed a newer solid propellant, 284 mm Type 85 mine-laying rocket shell. This has a maximum range of 3,500 m and contains 10 anti-tank mines. A complete battery salvo (4 launchers) has a laying zone of 700 × 500 m. The unguided solid propellant rockets are 2.6m long and weigh 156kg at launch. The vehicle cab is fitted with steel shutters that can be closed over the cab windows for blast protection. It accommodates two of the six crew members; the other four ride on an open bench seat behind the cab. Small stabilizing jacks are dropped from the rear of the truck bed to steady the vehicle during firing. The launcher entered service in the mid-1970s. It is no longer in production. There have been no known exports and NORINCO has ceased marketing the system, according to Jane's Armour and Artillery for Feb. 18, 2003. There are no known Type 74s in Chinese military service; the CA-30A truck utilized is obsolescent and no longer in production. However, it is possible that launchers could be fitted on a newer chassis in the future. Ref: Military Periscope, July 2014

Type 89 (PZH 89) Chinese 122mm Multiple Rocket Launcher







Tiers:



Variants:

- **Type 81:** The Type 81 is a 40-round launcher on 6 x 6 CQ261 Hong Yan truck chassis with 200-hp engine. The range for this system is 30 km. It is in service in China.
- **Type 83:** This is a 24-round launcher (two rounds of 12 tubes) on smaller 6 x 6 truck chassis.
- **Type 90:** Type 90 is similar to Type 81. It also has 40-round launcher on 6 x 6 truck -- in this case, the Tiema SC 2030 with 300-hp engine. The launcher can fire all 40 rockets in less than 20 seconds following two minutes for bringing the launcher into action. The HJ-1 computer is the core of the fully automatic mode, which also incorporates sensors for launcher elevation and azimuth, vehicle tilt and direction. Reload takes less than three minutes.

System

Alternative Designation: PHZ 89; PHZ89
Crew: ea5
Elevation Range: degrees0 - +55
Full Salvo Duration: sec20
Traverse Range: 66 degrees to the right and 102 degrees to the left
Reloading: The vehicle carries an additional 40 rockets for a basic load of 80
Reload Time: min2
Chassis: Type 83, 152mm howitzer

Dimensions

Length, Hull: m6.85
Length, Overall: m7.18
Width: m3.15

Height, Hull Top: m1.47

Height, Overall: m3.18

Weight, Combat: kg29,900

Ground Pressure: kg/m.68 kg/sq cm

Automotive

Engine Name: 12150L

Engine Type: Diesel

Engine Power: hp520

Cruising Range: km450

Speed, Maximum Road: km/h55

Speed, Average Cross: km/h32

Fording Depth: m1.3

Gradient: %60

Obstacle, Vertical: m0.7

Obstacle, Trench: m2.6

Launcher

↳*System*

Rocket Caliber: mm122

Number of Tubes: ea40

↳*Ammunition General and HE Frag*

Warhead Weight: kg19.25

Rocket Weight: kg66.88

Rocket Length: m2.87

Maximum Range: m20,580

Warhead Type: 4,100 steel balls dispersed by 6kg of RDX explosive filler

Note: All warheads (except mine-laying and Type 84 mine-laying) have extended-range versions that can achieve a range of 30km

↳*HE incendiary: HE and 6,000 incendiary pellets, 20.58km range*

↳*HE cargo: 39 bomblets with 110-m armor penetration, 20.58km range*

↳*HE fragmentation incendiary: HE and 3,400 steel balls, 20.58km range*

↳*Mine-laying: six anti-tank or 96 anti-personnel mines, 15km range*

Type 84 mine-laying: eight anti-tank or 128 anti-personnel mines, 7km range.

↳***High-explosive (HE): blast effect, 20.58-km range***

Fire Control and Sensors

Computerized FCS: Yes, can receive firing data from higher HQ
Indirect Fire: INA
Position Location System: INA
Driver: Has WG501 day and TYG-1 night periscopes
Gunner: Has Type 66-1 direct fire sight and 2 periscopes (Type 59 tank and Type 84 panoramic)
Commander: Has WG501 day periscope

Protection

Armor: Steel
NBC Protection: Yes
Smoke Equipment: INA

Notes:

The Chinese self-propelled 122mm multiple rocket launcher (MRL) is a well-armored tracked vehicle that carries a 40-tube array. The vehicle chassis is based on the Type 83 152mm self-propelled gun/howitzer. It appears very similar to the Soviet-designed BM-21 system. The MRL chassis is a low, tank-like hull with six unevenly spaced road wheels. The engine is located under the right side of the shallow glacis with the vehicle's driver under the left side. The rest of the crew is housed in an armored compartment at the rear, under the launcher. The crew compartment has two large vision blocks on each side and a rear door. On top of the hull, in place of the Type 83's large gun turret, the MRL has an elevating, traversable mount with four rows of 10 tubes. Salvo fire of all 40 rockets takes less than 20 seconds; the rockets can also be fired singly. Ahead of the launcher is a large automatic-reload magazine with an additional 40 rockets. The type was classified in 1989, although the 122mm, 40-round, rocket launcher is almost identical to the Russian 122mm BM-21 introduced in the 1960s. It is no longer marketed or produced. The MRL remains in service. Approximately 250 systems were produced, according MilitaryFactory.com (Feb. 28, 2016). Late model Type 89s have been modified to include a cover for the 40-round rocket pack. Additionally, the left rear side layer of the launcher has a fully enclosed and armored compartment. Ref: Military Periscope May 2017

↳

BM-27 Uragan Russian 220mm Multiple Rocket Launch (MRL)





Tiers:



Variants:

- **9P140 Uragan:** Standard variant on ZIL-135 truck
- **Uragan-1M:** Variant presented to the public in 2007; all processes are automated. Can also fire the 300 mm rockets of the BM-30 Smerch system. Reloading is simplified by substituting barrels; can be fitted with two banks of 6 300 mm launch tubes or 15 220 mm launch tubes. Deliveries to the Russian Army started as of September 2016
- **9A53 Uragan-U:** Successor with 2 × 15 launch tubes; presented in 2009 on 8×8 MZKT-7930. Thanks to its modular assembly the BM-30 Smerch and BM-21 Grad rockets can also be fired.
- **Bastion-03:** Prototype by Ukrainian company AvtoKrAZ, presented in 2010. Installed on a 6×6 truck type KrAZ-63221RA.

System

Alternative Designation: BM-27 Uragan, 9K57, BM-22, M1977

Type: 220mm Multiple Launch Rocket System

Chassis/Carriage: ZIL-135LM 8x8 wheeled

Manufacturer: Splav State Research and Production Enterprise

In Service: 1975-Present

Crew: ea4

Displacement Time: min3

Emplacement Time: min3

Note: The system consists of launch vehicles and transport/loaders, which enable the system to be reloaded. The system is not designed to withstand a lot of punishment, and is typically used to deliver a decisive strike before relocating.

Automotive

Engine Name: two(2) x ZIL-375

Engine Type: 2 each -, 8 cylinder, 4-stroke gasoline engines

Engine HP: hp2 x 180

Fording Depth: m1.2

Range, Cruising: km500

Speed, Maximum On: 65

Speed, Maximum Cross: 40

Speed, Maximum Off Road: km/hINA

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.9

Trench: m2

Fording: m1.2

Dimensions

Length: m9.63

Width: m2.8

Height: m3.23

Weight, Combat: tons20

Communications

Primary: R-108M Radio

Amplifier: UM-3 power amplifier

Main Gun Weapon System

↳*Launch System*

Name: 9K57 System

Type: Multiple Launch Rocket System

Caliber: mm220

Chassis: 9P140 Vehicle

Number of Tubes: ea16

Effective Firing Range: km35

Full Salvo Duration: 9/20 seconds

Reloading Time: min15-20

Maximum Elevation: deg+55

Minimum Elevation: deg0

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

Main Gun Stabilizer: Yes

Launch Mode: Single Fire or Salvo Fire

Single Launch Mode Time to Fire: seconds8.8

Salvo Launch Mode Time to Fire (16 Rockets): seconds20

↳*Ammunition (Option 1)*

Name: 9M27F

Type: HE FRAG

Caliber: mm220

Rocket Weight: kg100

Explosive Weight: kg51.9

Maximum Effective Range: km35

Minimum Effective Range: km10

Penetration: 8 meters wide and 3 meters deep

↳*Ammunition (Option 2)*

Name: 9M27K

Type: Cluster warhead

Caliber: mm220

Maximum Effective Range: km35

Minimum Effective Range: km10

Note: The 9M27K contains 30 9N210 dual-purpose fragmentation bomblets. Each submunition generates 370 to 400 2-g preformed fragments.

↳*Ammunition (Option 3)*

Name: 9M27K2

Type: Anti-tank mines

Caliber: mm220

Maximum Effective Range: km35

Minimum Effective Range: km10

Warhead Type: 9N218K2

Note: 9N218K2 warhead, which contains 24 PTM-1 or PTM-1G scatterable anti-tank mines. Designed to break tracks.

Fire Control Systems

FCS Name: Kapustnik-B automated fire-control system (FCS)

Collimator: K-1

Indirect Fire: PG-1M PANTEL

Direct Fire Capable: Yes

Sights: D726-45 Sight and the PG-1M Sight

Spotlight: Luch-S71M spotlight

Protection

Armor: Unarmoured

Land Navigation: No

Smoke Equipment: No

NBC Protection: No

Notes:

The BM-27 Uragan is a self-propelled multiple rocket launcher system designed in the Soviet Union. It began its service with the Soviet Army in the late 1970s, and was its first modern spin and fin stabilized heavy multiple rocket launcher. The BM-27 Uragan is capable of launching 220mm rockets from 16 launch tubes mounted on the rear of a ZIL-135 8x8 chassis. This vehicle is extremely similar to that used in the FROG-7 free flight rocket system. It has two gasoline engines that power its 20 tons to a maximum speed of 65 kilometers per hour. One engine drives the four wheels on the left of the truck, while the other engine drives the four wheels on the right. The ZIL-135 has eight wheel drive, but only the front and rear axles are used for steering. It has a maximum cruising range of 500 kilometers.

BM-11 North Korean 122mm Multiple Rocket Launcher (MRL)




Tiers:

1 2 3 4

Variants:

- **BM-21-1:** Launch vehicles are mounted on a family of Ural-4320 truck chassis
- **2B17 or also BM-21-1:** This upgrade was presented for the first time in 2003 and was developed by Motovilikha Plants from Perm. The system is fitted with a satellite navigation system NAP SNS, automated fire control system ASUNO, APP laying system and can fire a new generation of rockets with a range of 40 km (25 mi). The truck is the Ural-43201.
- **9P138 "Grad-1"::** lighter 36-round version, mounted on a six-by-six ZIL-131 chassis. The vehicle with supporting equipment (rockets, transporter 9T450 and re-supply truck 9F380) is referred to as complex 9K55. The 9P138 can only use "short-range" rockets with a range of 15 km (9.3 mi). It used to be known in the West as BM-21b or M1976.
- **BM-21V "Grad-V":** (NATO designation M1975): Developed for Soviet airborne troops in 1969. A GAZ-66B four-by-four truck chassis is fitted with a 12-round 122 mm rocket launcher. The vehicle is sturdy enough to be air-dropped. Parts of the vehicle such as the canvas cab roof can be taken off or folded down to reduce its size during transit. Like the BM-21, the BM-21V has stabilizing jacks on the rear of the vehicle for support when firing. The launch vehicle has the industrial index of 9P125.
- **9A51 "Prima":** 50-round launcher on a Ural-4320 5t chassis. The vehicle together with fire control equipment, the ammunition transporter TZM 9T232M and the new rocket 9M53F is referred to as complex
- **"Grad-P Light portable rocket system":** he complete system comprises a 9P132 single-round man-portable launcher (it can be reloaded and used again), a 9M22M 122 mm high-explosive fragmentation rocket and a fire control panel. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.
- **BM-21PD "Damba":** 40-round launcher mounted on Ural-375D or 43201 truck chassis. Developed for protection of naval bases against underwater infiltrations, uses special ammunition PRS-60 (Protivodiversionnyi Reaktivnyi Snaryad). The vehicle together with ammunition transporter is referred to as complex DP-62 "Damba".
- **A-215 "Grad-M":** 22-round naval version, entered service in 1978.
- **9K51M "Tornado-G":** an advanced version of the original BM-21 vehicle with sophisticated fire control system, satellite navigation, and automatic target aiming.
- **BM-21A "BelGrad":** This is a modernized version, based on a MAZ-631705 6×6 truck with 425 hp diesel engine TMZ-8424. Between the cab and the launcher there is another pack of 40 rockets. The system was evaluated from 1997 and entered service in 2001.

System

Alternative Designation: BM-11
Manufacturer: Splav State Research and Production Enterprise
In Service: 1963-Present
Type: 122mm Multiple Launch Rocket System
Crew: ea5 (8 with 9K51 Complex)
Chassis: URAL-375D or a Japanese truck.

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.4

Height: m3.09

Weight, Combat: tons13.7

Ground Pressure: kg/mINA

Automotive

Chassis: Ural 375-D 6x6 wheeled

Engine Name: ZIL-375

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h75

Speed, Maximum Off-Road: km/h35

Speed Maximum Swim: km/hNo Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.5

Communications

Primary: R-123M

Secondary: INA

Launcher

↳*System*

Name: 9P132

Type: mm122

Number of Tubes: ea40

Full Salvo: seconds20

Single Rocket Interval: 0.5 seconds per rocket

Reloading Time: min7

Max Elevation: deg+55

Min Elevation: deg0

Traverse Range: deg172

Traverse Left: deg102

Traverse Right: deg70

Maximum Effective Firing Range: km21

Minimum Effective Firing Range: km1.6

Loader Type: Manual

Launcher Drive: Electric

↳*Ammunition (Option 1)*

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳*Ammunition (Option 2)*

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳*Ammunition (Option 3)*

Name: Type 90A (Chinese)

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Note: The BM-21 can fire the following additional ammo: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: None

Turret Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The BM-11 is a North Korean version of the Russian BM-21 The BM-21 "Grad" (Russian: БМ-21 "Град", lit. 'hail') is a Soviet truck-mounted 122 mm multiple rocket launcher. The weapons system and the M-21OF rocket which it fires evolved in the early 1960s and saw their first combat use in March 1969 during the Sino-Soviet border conflict. BM stands for boyevaya mashina (Russian: боевая машина – combat vehicle), and the nickname grad means "hail". The complete system with the BM-21 launch vehicle and the M-21OF rocket is designated as the M-21 field-rocket system. The complete system is more commonly known as a Grad multiple rocket launcher system. In NATO countries the system (either the complete system or the launch vehicle only) was initially known as M1964. Several other countries have copied the Grad or have developed similar systems. The M-21 field rocket system with a BM-21 launch vehicle (122 mm multiple rocket launcher (MRL) system) entered service with the Soviet Army in 1963 to replace the aging 140 mm BM-14 system. The launch vehicle consists of a Ural-375D six-by-six truck chassis fitted with a bank of 40 launch tubes arranged in a rectangular shape that can be turned away from the unprotected cab. The vehicle is powered by a water-cooled V-8 180 hp gasoline engine, has a maximum road speed of 75 km/h (47 mph), road range of up to 750 kilometers (470 mi), and can cross fords up to 1.5 m (4 ft 11 in) deep. The original vehicle together with supporting equipment (including the re-supply truck 9T254 with 60 rockets) is referred to by the GRAU index "9K51"; the launcher itself has the industrial index of "2B5". In 1976, the BM-21 was mounted on the newer Ural-4320 six-by-six army truck. The three-member crew can emplace the system and have it ready to fire in three minutes. The crew can fire the rockets from the cab or from a trigger at the end of a 64-meter (210 ft) cable. All 40 rockets can be away in as little as 20 seconds, but can also be fired individually or in small groups in several-second intervals. A PG-1M panoramic telescope with K-1

collimator can be used for sighting. The BM-21 can be packed up and ready to move in two minutes, which can be necessary when engaged by counter-battery fire. Reloading is done manually and takes about 10 minutes. Each 2.87-meter (9 ft 5 in) rocket is slowly spun by rifling in its tube as it exits, which along with its primary fin stabilization keeps it on course. Rockets armed with high explosive-fragmentation, incendiary, or chemical warheads can be fired 20 kilometers (12 mi). Newer high explosive and cargo (used to deliver anti-personnel or antitank mines) rockets have a range of 30 kilometers (19 mi) and more. Warheads weigh around 20 kilograms (44 lb), depending on the type. The number of rockets that each vehicle is able to quickly bring to bear on an enemy target makes it effective, especially at shorter ranges. One battalion of eighteen launchers is able to deliver 720 rockets in a single volley. The system has lower precision than typical artillery and cannot be used in situations that call for pinpoint accuracy. It relies on a large number of shells dissipating over an area for a certain hit rate on specific targets. Nonetheless, because of the short warning time for the impact of the whole volley, the BM-21 is still considered an effective weapon.

M-1993 North Korean 122mm Multiple Rocket Launcher (MRL)






Tiers:



Variants:

- **RM-70:** Basic model, as described.
- **RM-70/85:** Unarmored version of the RM-70, based on the Tatra T815 VPR9 8x8.1R truck with 265 hp engine T3-930-51. Combat weight: 26.1 t. Sometimes called RM-70M.
- **RM-70/85M:** Modernised vehicle with new fire control and navigation equipment, can use a new type of rocket with a range of 36 km. Slovakia has ordered 50 upgrade packages.
- **RM-70 Modular:** In December 2000, the Slovak Ministry of Defense and Delta Defence started the RM-70 Modular German-Slovak modernization project. RM-70 Modular allows this artillery system to launch either twenty-eight 122mm rockets, or six 227mm rockets as used on the M270 MLRS. This way the system became fully NATO interoperable. The truck cabin is entirely armored. The Slovak Republic signed for 26 upgraded artillery systems with the first one delivered on May 20, 2005. RM-70 Modular is being offered as an upgrade for RM-70 owners.
- **Vz.92 "Križan" VMZ:** Engineer vehicle, based on the Tatra T815 36.265 with a lightly armoured cabin. The vehicle comes in different configurations, the standard being a 40-round rocket launcher (for "Kuš" and "Krizhna-R" rockets), a mechanical mine layer for anti-tank mines (PT Mi-U or PT Mi-Ba-III) and two dispensers for anti-personnel mines (PP Mi-S1).
- **RM-70 Vampire:** Upgraded version integrated on a Tatra T-815-7 truck chassis powered by a Tatra T3C V8 engine with 270 kW of output, coupled with a Tatra 10 TS 210 N gearbox, with semi-automatic Tatra Norgen drive system and an additional gearbox Tatra 2.30TRS. It has a range of around 1,000 km (620 mi) and a top speed of 90 km/h (56 mph) with an armored and NBC-protected crew cabin.
- **LRSV-122 M-96 "Tajfun":** Modified version with 4 rows of 8 launch tubes on an unarmoured Tatra T813 truck. Like the M-77 Oganj and the Chinese Type 90A, the launcher and reloading pack are covered by a collapsible awning for protection and camouflage when traveling. Combat weight: 23.5 t. Only a very small number was built.

System

Alternative Designation: M-1993

Type: 122mm Multiple Rocket Launcher (MRL)

Crew: ea4-6

Mission: Main role of this artillery rocket system is to engage area targets, such as concentrations of troops and armored vehicles, artillery batteries, and other targets.

Chassis: The RM-70 uses chassis of the Tatra 813 8x8 truck.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length: 8.8 m

Width: 2.5 m

Height: 2.9 m

Weight, Combat: 33.7 t

Automotive

Engine Name: Tatra T-930-3

Engine Type: Diesel

Engine Power: hp270

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m1.5

Fording: m1.4

Fuel: 400 liters

Main Weapon System

↳*System*

Name: M-1993

Type: Multiple launch rocket system

Caliber: 122

Number of Tubes: 40

Firing Range: 21

Full Salvo: 20 seconds

Reloading Time: 2 minutes

Elevation: +50 deg

Traverse: 125 deg left, 70 deg right

↳*Ammunition (Option 1)*

Type: Long Rocket

Caliber: mm122

Rocket Length: 3.23 m

Rocket Weight: 77.0 kg

Warhead Weight: 19.4 kg

Basic Load: 80

Maximum Range: 20 km

↳*Ammunition (Option 1)*

Type: Short Rocket

Caliber: mm122

Rocket Length: 1.91 m

Rocket Weight: 45.8 kg

Warhead Weight: 19.4 kg

Basic Load: 80

Maximum Range: 11 km

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: Vehicle has an armored cab. It provides protection against small arms fire and artillery shell splinters.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M-1993 122mm Multiple Rocket Launcher is a North Korean version of the Czechoslovakian RM-70. The RM-70 (raketomet vzor 1970) multiple rocket launcher is a Czechoslovakian army version and heavier variant of the BM-21 Grad multiple rocket launcher, providing enhanced performance over its parent area-saturation rocket artillery system that was introduced in 1971 (the NATO designation is M1972). RM-70 was developed in Czechoslovakia as a successor for the RM-51, achieving initial operational capability with its Army in 1972. The launcher was being produced in Dubnica nad Váhom (Slovakia). Originally, it was sold to East Germany. After the Soviet Union collapse and the split of Czechoslovakia into the Czech Republic and Slovak Republic, it was sold to several states in Africa, America, Asia and Europe. RM-70 replaced the Ural-375D 6x6 truck by a Tatra T813 "Kolos" 8x8 truck as carrier platform for the 40-round launcher. The new carrier vehicle provides enough space for carrying 40 additional 122mm rockets pack for reload. Nevertheless, RM-70 performance remains near the same as Grad even in terms of vehicle's speed and range. This rocket launcher can fire both individual rounds and volleys, principally by means of indirect fire. It is designed for concentrated fire coverage of large areas (up to 3 hectares in one volley) by high explosive fragmentation shells. The fire is robust with almost 256 kg of explosives used in one volley of 40 rockets. The rockets used are either the original Soviet 9M22 and 9M28, or locally developed models. These are the JROF with a range of 20.75 km, the JROF-K with a range of 11 km, the "Trnovnik" with 63 HEAT-bomblets and with a range of 17.5 km, the "Kuš" with five PPMI-S1 anti-personnel mines or the "Krizhna-R" with 4 anti-tank mines PTMI-D and with a range of 19,450 m. The vehicle is provided with a central tyre pressure regulation system (to allow its adaptation to the nature of the traversed ground), a headlight with white light on the forward cab roof and, if necessary, with a snow plough SSP 1000 or a dozer blade BZ-T to arrange its own emplacement or to remove obstacles.

Type 63 Chinese 107mm Multiple Rocket Launcher (MRL)




Tiers:



Variants:

- **Type 63 for mountain/airborne warfare:** This variant can be disassembled into manpack loads
- **Type 63 -1:** This variant's launcher is modified to four rows of three tubes; it has smaller road wheels. Tube construction is cast aluminum. The weight of the Type 63 -1 is reduced by 300 lb (136 kg) and it has a covered crew cabin.
- **Type 81:** This variant is a Type 63 on a turntable mounted on rear bed of 4 x 4 truck.
- **Iraqi 107-mm MRS:** The version is an Iraqi copy of the Type 63
- **South African 107-mm MRS:** South African 107-mm MRS
- **VTT-323:** The VTT-323 is the North Korean designation for the weapon.
- **107MM SP MRL 18 M1992:** North Korea Version
- **107MM SP MRL 24 M1992:** North Korea Version

System

Alternative Designations: None
Manufacturer: State Factory 847
In Service: 1963-Present
Crew: ea5
Emplacement Time: INA
Displacement Time: INA

Dimensions

Length: m2.90
Width: m1.65
Height: m0.91
Tire Size: 126 mm x 406 mm
Weight, Combat: kg602

Automotive

Prime Mover: 4X4 or 6x6 Truck

Multiple Rocket Launcher

↳*Launcher*

Name: Type 63

Type: Multiple Rocket Launcher

Caliber: 107mm

Number of Tubes: ea12

Maximum Elevation: deg+57

Minimum Elevation: deg-3

Traverse Range: deg32

Traverse Right: deg16

Traverse Left: deg16

Reload Time: 3 minutes

Carriage: Split trail

↳*Ammunition (Option 1)*

Name: INA

Type: HE Projectile

Length: m0.84

Width: 170mm

Weight, Total: kg18.80

Warhead Type: HE

Warhead Weight: kg8.33

Maximum Range: m8,500

Maximum Velocity: m/s372

↳*Ammunition (Option 2)*

Name: INA

Type: Incendiary Projectile

Length: m0.92

Width: 170mm

Weight, Total: kg18.74

Warhead Type: Incendiary

Warhead Weight: kg7.54

Maximum Range: m7,885

Maximum Velocity: m/s383

Fire Control

Name: Type 63

Computerized FCS: No

Sights: Optical

Notes:

The Multi-Barrel Rocket Launcher (MBRL) has 12 tubes arranged in three lines of four tubes each. All the tubes are parallel to each other and mounted co-axially on a cradle. Ammunition used with the MBRL is in the form of Rocket which consists of one piece. Warhead is attached with rocket motor. A fixed amount of propellant is contained in the rocket motor. The rocket is stabilized with a slow spin. The Type 63 (12-round) MRS is mounted on a rubber-tire split pole type carriage, while the Type 63-I is a packed model for airborne and mountain units. The Type 85 is a single manportable tripod-mounted launcher tube for use by special forces units. The NORINCO Type 81 (12-round) is mounted on a 4X4 truck, with a enlarged cab to accommodate the crew of four and 12 reload rounds. The vehicle suspension is locked for firing, and the entire system can be dismounted from the vehicle and placed on a tow carriage. The launcher can be fired from the cab or from a remote position. Several variants of North Korean design and manufacture are known to exist [which are evidently without a formal designation in the open literature], in addition to the basic configuration of 12 launch tubes in array of 3 rows of 4 tubes. Two other North Korean self-propelled versions exist: one with 18 tubes and one with 24 tubes. As with the Chinese variants, the North Korean 12-tube launcher can also be can be towed or mounted on a 4 leg stand, or mounted on any suitable wheeled or tracked vehicle. The Type 63 HE-Fragmentation Spin-Stabilized Rocket is an electrically initiated, rocket incorporating a high-explosive fragmentation warhead. It is normally fired from a trailer- or truck-mounted multiple launcher, but may also be fired from single-tube launchers mounted on small boats. It is a barrage weapon used against personnel and material. Rockets of early manufacture are painted battleship gray or dark green; later rockets are olive drab. The bourrelets and nozzle plate are unpainted. Markings, stenciled in black and providing manufacturing data and nomenclature, may vary on individual rockets. Setscrews lock the adapter to the warhead and the adapter and nozzle plate to the rocket motor. The nozzle closure screws over the base of the nozzle plate. A hole in the center of the nozzle closure is crimped around an insulated stud in the center of the initiator assembly, thus waterproofing the base of the rocket motor. The initiator assembly electrical contact is exposed through the center of the insulated stud. The nozzles are canted to provide spin. The Type 63-2 Rocket is an 18.8-kilogram (41.5-pound) rocket containing a main charge of TNT weighing 1.3 kilograms (2.9 pounds). The rocket is olive drab with black markings. The warhead is made of metal. The 107mm spin stabilized incendiary rocket contains an unknown amount of White Phosphorous (WP). The rocket is painted olive drab with black markings. The warhead is made of metal.

Type 90B Chinese 122mm Self-Propelled Multiple Launch Rocket System




Tiers:



Variants:

- **Type 90:** Standard Version
- **Type 90A:** able to fire unguided rockets, new computerised fire control, command post can lay and control Type 90A launchers units by remote control.

System

Alternative Designation: INA
Type: 122mm Multiple Rocket Launcher
Expected out of Service Date: 2060
Manufacturer: NORINCO
Chassis: Mercedes-Benz 6x6 truck chassis
Crew: ea5
Displacement Time: minutesINA
Emplacement Time: minutesINA
TIme Required to Reload: minutesThe electrical firing system fires the rockets either singly or in a salvo with 0.5 second between rounds.
Maximum Effective Range: km40
Type 90B Battalion: Three reconnaissance vehicles based on the NORINCO WZ 551 (6 × 6) armoured personnel carrier chassis. Battalion command vehicle based on a Mercedes-Benz (4 × 4) truck chassis. Meteorological radar based on two Steyr (4 × 4) truck chassis. Maintenance vehicles based on Steyr (4 × 4) truck chassis, one would be for mechanical maintenance and the other for electronic maintenance.
Type 90B (Batteries, 3ea): Battery command vehicle on Mercedes-Benz (4 × 4) truck chassis. Six 122 mm rocket launchers on Mercedes-Benz (6 × 6) truck chassis. Six 122 mm rocket resupply vehicles based on Mercedes-Benz (6 × 6) truck chassis.

Dimensions

Length: m9.135
Width: m2.495
Height: m3.028
Weight, Combat: tons23

Automotive

Chassis: Mercedes-Benz 6x6 truck chassis
Engine Name: INA
Engine Type: INA
Engine Power: hpINA
Cruising Range: km800
Speed, Maximum Road: km/h85
Speed, Average Cross: km/h80
Speed, Maximum Swim: km/hNot Amphibious
Fording Depths: mNot Amphibious
Running Gear: Wheeled
Layout: 6x6
Amphibious: No
Gradiant: %60
Side Slope: %30
Longitudinal and Transversal Slope Sensor: Yes
Gradient Sensors: Yes

Communications

↳*TBR-142 VHF Radio*

VHF FM Transceiver: Yes, TBR-142(I)
VHF Range: km1 to 50
Megahertz: MHz40.000 to 59.975
Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source
Dimensions: mm217x135x58
Weight: kg2.7
Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna
Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance Units
Control Device: TBR-142(II)
Multi-function Field Phone: TBR-142(IIID)
Anti-Aircraft Control Unit: TBR-142(IIIG)
ZXY88-200 C2 Capable: Yes
Messaging: Capability – Limited
Amplifier: Available
Physical Conditions: Terrain and Weather favorable

Main Weapon System

↳*System*

Name: NORINCO 122mm (40-round) Multiple Rocket Launcher
Type: 122mm Multiple Rocket Launcher
Breach Type: INA
Length, Total: mm2.75 to 3.03
Length, Barrel: mmINA
Dimeter: mINA
Number of Tubes: ea10
Launch Rate, full Salvo: 40 rockets can be loaded in less than 3 minutes.
Launch Rate, one missile: The electrical firing system fires the rockets either singly or in a salvo with 0.5 second between rounds.
Rate of Fire: 40 rds in 18-20 seconds
Loader Type: Automatic
Max Elevation: deg55
Min Elevation: deg0
Traverse Range: degINA
Traverse Left: deg102° (1813 mils) (left and right)
Traverse Right: deg102° (1813 mils) (left and right)
Traverse Arc: deg204
Armament Front: +55° (978 mils) / 0° (0 mils)
Azimuth Range: deg-102 to +102
Stabilisers: two hydraulically operated stabilisers
Automatic Reloading System: consists of a elevator, rack and feeder with three modes of control

↳*Ammunition (Option 1)*

Name: Fire Dragon 40
Type: High Explosive (HE) 122mm Rocket
Caliber: mm122
Muzzle Velocity: m/sINA
Fuse Type: Radio Proximity Fuze
Weight, Launch: kg74
Weight, Warhead: kg18
Warhead Type: Steel Ball HE
Lethal Warhead: m60
Rocket Length: mm3,040

Min Range: km20

Max Range: km40

Basic load: ea40

Circular Error of Probability (CEP): m25

Armor Penetration: Yes

Inertial Navigation System (INS): Yes

Global Positioning System (GPS) guidance system: Yes

Variants: High Explosive (HE), High-efficiency HE containing steel balls for greater fragmentation effect, High-efficiency HE Incendiary (HEI), Cargo containing anti-personnel/anti-tank sub-munitions, Mine containing anti-tank mines. The rockets can also be launched by other 122 mm multiple rocket systems.

Fire Control

Name:

Computerized FCS: Yes, The launcher is controlled by the computer through man/machine interaction

Direct Fire: Yes

Indirect Fire: No

Position Location System: Differential GPS

Automatic Operational and Laying Device: Yes

Awning Device: Semi-Automatic Collapsible

Fire Control Position: Inside the driver's cab or remotely outside the vehicle

Launcher Direction Finder/Display: Yes

Launcher Assembly Elavation Sensor: Yes

Traverse Position Sensors: Yes

Vehicle-Launcher Power Interface.: Yes

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosie Armor: No

Active Protection System: INA

NBC Protection: INA

Smoke Equipment: No

Notes:

The Type 90B is the second generation of Type 90 series MLRS (Multiple Launch Rocket System) of 122mm caliber. The weapon system is designed and manufactured by the Chinese Defense Company NORINCO. The first version of Type 90 MLRS was unveiled in the mid-1990s, followed by the Type 90B in 2004. The 122 mm Type 90B multiple launch rocket system is a mobile fire support system for the destruction of a variety of targets by means of multiple barrages of up to 40 rockets at a time. The Type 90B is able to be in combat position, to fire and leave its firing position in less than 7 minutes. A typical Type 90 multiple

launch rocket system battalion comprises the battalion headquarters and three firing units (companies). The battalion headquarter is equipped with: A battalion command truck; 3 reconnaissance APC; A meteorological radar truck; A mechanical maintenance truck; A electronic maintenance truck Each firing unit is equipped with: A company command truck; 6 rocket launch trucks 6 reloading trucks

Type 90A Chinese 122mm Multiple Launch Rocket System



Tiers:



Variants:

- **Type 90:** The Type 90 mounts a 40-round launcher on a Tiema SC2030 6X6 truck. The truck also carries a reload pack of 40 additional rockets; the launcher to be reloaded within 3 minutes.
- **Type 90B:** This is the latest variant of the system. The Type 90B system features a reconnaissance vehicle, as well as mobility and reliability improvements. Emplacement and displacement time is seven minutes. A standard Type 90B battalion would consist of three WZ 551 6 x 6 reconnaissance vehicles; battalion command vehicle based on a Mercedes-Benz 4 x 4 chassis; meteorological radar on two Steyr 4 x 4 vehicles; two Steyr 4 x 4 maintenance vehicles, one for mechanical and one for electronic maintenance; and three missile batteries.

System

Alternative Designation: Type 90A
Type: Multiple Launch Rocket System
Caliber: 122mm
Chassis: modified Mercedes-Benz 6 x 6 chassis, designated Tienna CX 2200
Crew: INA
Displacement Time: Less than 7 min
Emplacement Time: Less than 7 min
Type 90A Battalion comprises: A typical Type 90A battalion consists of a 6 x 6 battalion command vehicle, three 4 x 4 forward observation post vehicles and three missile batteries. Each battery consists of a command vehicle, six rocket launchers, six resupply vehicles and a maintenance vehicle.
Note: The command post vehicle can control a number of Type 90A systems by remote control.

Dimensions

Length, Traveling: 9.84 m
Width, Traveling: 2.50 m
Height, Traveling: 3.25 m
Weight, Combat: 20,000 kg
Ground Clearance: 0.41 m

Automotive

Engine Name: INA
Engine Type: Air-Cooled Diesel
Engine Power: hp300
Cruising Range: km600
Speed, Maximum Road: km/h85
Speed, Average Cross: km/hINA
Speed Maximum Swim: Not Amphibious
Fording Depth: 0.90 m
Turning Radius: 12.00 m

Main Weapon System

↳*Launcher*

Name: INA
Type: The electrically powered launcher has four rows of 10 tubes mounted above each other on a rotating cradle assembly.
Elevation: 0% to +55%
Traverse: +/-102 deg
Azimuth Range: -102% to +1-2%
Stabilizers: The truck is equipped with two hydraulically operated stabilisers at rear which are lowered in preparation for the rocket launch.
Modes: The rocket launcher can be operated in manual, semi-automatic, or automatic modes. The electrical firing system fires the rockets in either single or in salvo with 0.5 seconds interval.
Operation: The launcher can be operated inside the driver's cab or remotely outside the vehicle.
Rate of Fire: 40 rds in 18-20 sec
Reloading Rack: The reloading rack located in front of the launcher can load the launcher in under 3 minutes.
Cover: The truck is equipped with a hydraulically operated foldable canvas cover, which covers the launcher and the reloading rack when the truck is in travelling mode.
Note: The vehicle is fitted with slope and gradient sensors, launcher elevation and and azimuth sensors, as well as GPS and computerised fire control system to ensure higher firing accuracy.

↳*Missile*

Rocket Type: The free rocket used by the WS-1 and WS-1B consists of the warhead and fuse, an FG-42/43 rocket motor and the tail section. The FG-42/43 rocket motor is a single chamber, solid rocket motor with an advanced hydroxy-terminated polybutadine (HTPB) composition rocket propellant. The rocket of the WS-2 system features four control surfaces in the middle section of the rocket for terminal guidance.
Warhead Type: The rocket can be fitted with various types of warheads including anti-armour/personnel submunition, blasting, fuel air explosive (FAE), and high-explosive (HE). The ZDB-2 blasting warhead is loaded with steel balls and prefabricated fragments. The SZB-1 submunition warhead is designed to destroy large area targets such as armour formation and infantry troops. When the SZB-1 submunition warhead detonates, around 500 bullets are expelled under high pressure.
Maximum Range: 40 km

Basic Load: 40 Rounds

Fire Control

Name: INA

Computerized FCS: Yes, The launcher is controlled by computer through a man-machine interface. Another interface connects to a battalion central command system. Instructions can be input directly from the interface or manually through push-buttons.

Direct Fire: Yes

Indirect Fire: Yes

Position Location System: Yes

Automatic Operating and Laying System: The automatic operating and laying system consists of five main subsystems: an HJ-1 mini-computer; launcher direction-finder (which requires less than 3 sec to display the launcher's magnetic azimuth angle); longitudinal and transversal slope sensors; launcher assembly elevation and traverse positi on sensors; and a special vehicle power supply interface unit.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 90A is an upgrade of the Type 90. The 40-round launcher is mounted on a Tienna XC2200 6×6 truck, has improved fire control, and a battery may be remotely controlled by a command vehicle. It is manufactured by Norinco

Type 81 Chinese 122mm Multiple Rocket Launcher (MRL)




Tiers:

1 2 **3** 4

System

Alternative Designation: Type 81
Type: Multiple Rocket Launcher
Caliber: 122mm
Manufacturer: NORINCO
Crew: 6 (2 ride in cap; 4 behind the cab)
Passenger Capacity: NA
Maximum Effective Range: m3,500
Prime Mover: CA-30A, 6x6 truck

Dimensions

Length: m6.44
Width: m2.27
Height: m2.93
Weight, Combat: Approximately 8,780kg

Automotive

Engine Name: Jiefang 120
Engine Type: 5.5 liter diesel, 16 cylinder
Engine Power: hp95
Speed, Maximum Road: km/h40

Main Weapon System

Type: Multiple-Rocket Launcher
Caliber: mm122
Number of Rockers per Salvo: 10

Rail System: 5 rails that can launch 2 rockets each (one on top and one on bottom)

Reloading System: Manual (requires 4 people)

Mines per Rocket: 10

Maximum Area Covered by Full Salvo: 700m x 500m

Time Required to Launch a Full Salvo: sec15

Elevation Range of Launcher: +7 - + 48 degrees

Traverse Range: 90 degrees total

Rockets

↳*Option 1*

Name: Type 69 or 70

Caliber: mm284

Range: m1,500

Propellant: Liquid

Mine Payload: 10

:

↳*Option 2*

Name: Type 85

Caliber: mm284

Range: m3,500

Propellant: Solid

Mine Payload: 10

:

Fire Control

Guidance: Rockets have no guidance system

Protection

Cab: Steel blast shutters over the cab windows

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Type 81 is a self-propelled 122 mm multiple rocket launcher (SPMRL) produced by the People's Republic of China for the People's Liberation Army Ground Force. It is a variant of the Soviet BM-21 Grad. The Type 81 was the first in a family of Chinese self-propelled 122 mm rocket launchers. The spin-stabilized rocket fired by the Type 81 may be armed with a high explosive warhead or a steel fragmentation warhead.

M-1991 North Korean 240mm MRLS





Tiers:



Variants:

- **Juche 100:** Upgraded version of standard M1991. Range of 60km.

System

Alternative Designations: INA
Crew: 2 + 4
Chassis/Carriage: Chinese Howo 6x6
Maximun Range: m60,000
Minimum Range: INA

Dimensions

Chassis Length Overall: m10.45
Width: m2.54
Height: m3.34
Combat Weight: mt14

Automotive (HOWO 6x6 Chinese Military Truck)

Engine Type: 96C Diesel
Engine Power: hp350
Cruising Range: INA
Fording Depths: INA

Maximum Road Speed: INA

Maximum Off Road Speed: INA

Cross Country Speed: INA

Maximum Swim Speed: NA

Maximum Fording Depth: INA

Armament

Caliber, Type, Name: 240mm, MRLS

Number of tubes: 22 (2 rows of 8, 1 row of 6)

Loader Type: Transloader, crane hoist

Reload Time: min10

Launch Rate, Full Salvo: sec45

Launch Rate, Single Salvo: INA

Traverse Left: INA

Traverse Right: INA

↳***Munition (Option 1)***

Caliber: 240mm

Muzzle Velocity: INA

Fuze Type: INA

Basic Load: rockets22

Maximum Range: km60

Minimum Range: INA

Armor Penetration: INA

Warhead Types: HE, smoke, incendiary, and chemical warhead capabilities.

Warhead Weight: kg90

Rocket Weight: kg407

Fire Control

Direct Fire: NA

Fire Control Computer: No

Position Location System: No

Note:: Rockets have no guidance system

Protection

Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The M1991 is a 240mm Multiple Rocket Launcher System (MRLS) uses by the North Korean Armed Forces. The vehicle was first seen in 1991 and received the name of M-1991 which indicates the year that it was first observed by United States intelligence. The system fires the same 240 mm calibre unguided rockets as the M1985 and has similar HE, smoke, incendiary and chemical warhead capabilities. The M-1991 is only used by the North Korean army. In February 2012, North Korea announced an upgrade the previous model of its 240-millimeter rocket launchers, and named them 'Juche 100 Guns,' after the North's primary ideology of self-reliance. North Korea is expected to unveil the Juche 100 to the public during a massive military parade on April 15, 2012, during the 100th birthday of the North's founder Kim Il-sung. M1991 Multiple Rocket launcher System is assigned to MRLS battalions comprising three batteries, each of five 240 mm MRLS'.

RM-70 Czechoslovakian 122mm Multiple Rocket Launcher (MRL)




Tiers:

1 2 3 4

Variants:

- **RM-70:** Basic model, as described.
- **RM-70/85:** Unarmored version of the RM-70, based on the Tatra T815 VPR9 8x8.1R truck with 265 hp engine T3-930-51. Combat weight: 26.1 t. Sometimes called RM-70M.
- **RM-70/85M:** Modernised vehicle with new fire control and navigation equipment, can use a new type of rocket with a range of 36 km. Slovakia has ordered 50 upgrade packages.
- **RM-70 Modular:** In December 2000, the Slovak Ministry of Defense and Delta Defence started the RM-70 Modular German-Slovak modernization project. RM-70 Modular allows this artillery system to launch either twenty-eight 122mm rockets, or six 227mm rockets as used on the M270 MLRS. This way the system became fully NATO interoperable. The truck cabin is entirely armored. The Slovak Republic signed for 26 upgraded artillery systems with the first one delivered on May 20, 2005. RM-70 Modular is being offered as an upgrade for RM-70 owners.
- **Vz.92 "Križan" VMZ:** Engineer vehicle, based on the Tatra T815 36.265 with a lightly armoured cabin. The vehicle comes in different configurations, the standard being a 40-round rocket launcher (for "Kuš" and "Krizhna-R" rockets), a mechanical mine layer for anti-tank mines (PT Mi-U or PT Mi-Ba-III) and two dispensers for anti-personnel mines (PP Mi-S1).
- **RM-70 Vampire:** Upgraded version integrated on a Tatra T-815-7 truck chassis powered by a Tatra T3C V8 engine with 270 kW of output, coupled with a Tatra 10 TS 210 N gearbox, with semi-automatic Tatra Norgen drive system and an additional gearbox Tatra 2.30TRS. It has a range of around 1,000 km (620 mi) and a top speed of 90 km/h (56 mph) with an armored and NBC-protected crew cabin.
- **LRSV-122 M-96 "Tajfun":** Modified version with 4 rows of 8 launch tubes on an unarmoured Tatra T813 truck. Like the M-77 Oganj and the Chinese Type 90A, the launcher and reloading pack are covered by a collapsible awning for protection and camouflage when traveling. Combat weight: 23.5 t. Only a very small number was built.

System

Alternative Designation: RM-70

Type: 122mm Multiple Rocket Launcher (MRL)

Crew: ea4-6

Mission: Main role of this artillery rocket system is to engage area targets, such as concentrations of troops and armored vehicles, artillery batteries, and other targets.

Chassis: The RM-70 uses chassis of the Tatra 813 8x8 truck.

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length: 8.8 m

Width: 2.5 m

Height: 2.9 m

Weight, Combat: 33.7 t

Automotive

Engine Name: Tatra T-930-3

Engine Type: Diesel

Engine Power: hp270

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m1.5

Fording: m1.4

Fuel: 400 liters

Main Weapon System

↳*System*

Name: RM-70

Type: Multiple launch rocket system

Caliber: 122

Number of Tubes: 40

Firing Range: 21

Full Salvo: 20 seconds

Reloading Time: 2 minutes

Elevation: +50 deg

Traverse: 125 deg left, 70 deg right

↳*Ammunition (Option 1)*

Type: Long Rocket

Caliber: mm122

Rocket Length: 3.23 m

Rocket Weight: 77.0 kg

Warhead Weight: 19.4 kg

Basic Load: 80

Maximum Range: 20 km

↳***Ammunition (Option 1)***

Type: Short Rocket

Caliber: mm122

Rocket Length: 1.91 m

Rocket Weight: 45.8 kg

Warhead Weight: 19.4 kg

Basic Load: 80

Maximum Range: 11 km

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: Vehicle has an armored cab. It provides protection against small arms fire and artillery shell splinters.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The RM-70 (raketomet vzor 1970) multiple rocket launcher is a Czechoslovakian army version and heavier variant of the BM-21 Grad multiple rocket launcher, providing enhanced performance over its parent area-saturation rocket artillery system that was introduced in 1971 (the NATO designation is M1972). RM-70 was developed in Czechoslovakia as a successor for the RM-51, achieving initial operational capability with its Army in 1972. The launcher was being produced in Dubnica nad Váhom (Slovakia). Originally, it was sold to East Germany. After the Soviet Union collapse and the split of Czechoslovakia into the Czech Republic and Slovak Republic, it was sold to several states in Africa, America, Asia and Europe. RM-70 replaced the Ural-375D 6x6 truck by a Tatra T813 "Kolos" 8x8 truck as carrier platform for the 40-round launcher. The new carrier vehicle provides enough space for carrying 40 additional 122mm rockets pack for reload. Nevertheless, RM-70 performance remains near the same as Grad even in terms of vehicle's speed and range. This rocket launcher can fire both individual rounds and volleys, principally by means of indirect fire. It is designed for concentrated fire coverage of large areas (up to 3 hectares in one volley) by high explosive fragmentation shells. The fire is robust with almost 256 kg of explosives used in one volley of 40 rockets. The rockets used are either the original Soviet 9M22 and 9M28, or locally developed models. These are the JROF with a range of 20.75 km, the JROF-K with a range of 11 km, the "Trnovnik" with 63 HEAT-bomblets and with a range of 17.5 km, the "Kuš" with five PPMI-S1 anti-personnel mines or the "Krizhna-R" with 4 anti-tank mines PTMI-D and with a range of 19,450 m. The vehicle is provided with a central tyre pressure regulation system (to allow its adaptation to the nature of the traversed ground), a headlight with white light on the forward cab roof and, if necessary, with a snow plough SSP 1000 or a dozer blade BZ-T to arrange its own emplacement or to remove obstacles.

M-1985 North Korean 122mm Multiple Rocket Launcher (MRL)



Tiers:

1 2 3 4

System

Alternative Designation: M-1985

Type: 122mm Multiple Launch Rocket System

In Service: 1985-Present

Crew: ea5

Chassis: North Korean produced launcher mounted on an Isuzu truck.

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.4

Height: m3.09

Weight, Combat: tons13.7

Ground Pressure: kg/mINA

Automotive

Chassis: North Korean produced launcher mounted on an Isuzu truck.

Engine Name: INA

Engine Type: INA

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: INA

Speed, Maximum Off-Road: INA

Speed Maximum Swim: km/hNo Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Main Weapon System

↳*System*

Name: 9P132

Type: mm122

Number of Tubes: ea40

Full Salvo: seconds20

Single Rocket Interval: se.5 seconds per rocket

Reloading Time: min7

Max Elevation: deg+55

Min Elevation: deg0

Traverse Range: deg172

Traverse Left: deg102

Traverse Right: deg70

Maximum Effective Firing Range: km21

Minimum Effective Firing Range: km1.6

Loader Type: Manual

Launcher Drive: Electric

↳*Ammunition (Option 1)*

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳*Ammunition (Option 2)*

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳***Ammunition (Option 3)***

Name: Type 90A (Chinese)

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Note: The BM-21 can fire the following additional ammo: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: None

Turret Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The M-1985 122mm multiple rocket launcher (MRL) is a 40 round, North Korean produced launcher mounted on an Isuzu truck. MRL 122 mm M1985: This is a more modern version, based on an Isuzu 6×6 truck and probably with a 40-round reload-pack mounted between the cab and the launcher

Lynx Israeli Multiple Rocket Launcher (MRL)







Tiers:

1 **2** 3 4

Variants:

- **Azerbaijan Lynx:** Indigenous MRL/missile TEL with Lynx launcher on 8x8 Kamaz-6350 truck. With autonomous FCS, it launches 122 / 160 mm rockets, or EXTRA ballistic missiles
- **Naiza:** Kazakh import/production MRL with Lynx for LAR-160 on Kamaz truck
- **LAROM:** Romanian 2-module MRL can launch 122-mm Grad or LAR-160 rockets

System

Alternative Designations: NA

Crew: 3-6

Chassis/Carriage: Various to include helicopters

Primary Components: Transporter-erector-launcher (TEL) and Mobile Command Post (MCP) van. Reload Modules will be trans-loaded at a TL point from a trans-loader truck with four modules, to service two launchers

Operational Range: Missile dependent. The LAR-160 has a max range of 45km. See other missile data in "Ammunition"

Reload Time: mins5

Time Required to Launch All Rockets: secsLess than 60

Dimensions

Height: INA

Length: INA

Width: INA

Weight: INA

Automotive Performance

Note: Dependent on users choice of platform

Ammunition

↳*LAR 160*

Minimum Indirect Fire Range (km): 10

Maximum Indirect Fire Range (km): 45

Warhead Weight (kg): 110

Rocket Length (m): 3.48

Rocket Diameter (mm): 160

Maximum Velocity (m/s): 1022

Warhead options: Frag-HE/PD or DPICM with time-fuze dispense

Note: The LAR-160 Rocket is a modern free flight, fin-stabilized, solid propellant, surface-to-surface 160mm artillery rocket packed in a launch pod.

↳*GRADLAR*

Description: Israeli upgrade package with improved FCS converts MRLs for modules of 122-mm Grad rockets and 21-45 km range. Any type of Grad 122-mm rocket can be used.

↳*LAR-160 or LAR*

Description: 160-mm rocket (13 per module) with a 45-km range. The warhead is a canister; to carry Frag-HE, sub-munitions, or any 155-mm round

↳*AccuLAR*

Description: ACCULAR is an autonomous, surface-to-surface GPS guided rocket based on IMI's LAR-160 artillery rocket. The missile has a range of 14-40 km, a diameter of 160 mm, a length of 3995 mm and a hit accuracy CEP of 10 meters. The missile's guidance and navigation is performed by a Flight Computer (FC), which includes a GPS. The IMI jet thruster kit controls the missile by establishing a trajectory correction for precise target engagement. Range – 40 km Hit Accuracy – 10 meters CEP Navigation – GPS Warhead – 35 kg Number of Rockets/POD – 11

↳*EXTRA (Extended Range Artillery)*

Description: The 300mm ballistic missile (4/launch module) ranges 150 km with a 10-m CEP. It has a 120-kg payload, and flies a ballistic trajectory, corrected with GPS. Various warheads are offered.

↳*Delilah*

Description: This cruise missile has a length of 3.2 m, weighing 230 kg. It cruises at Mach 0.3-0.7, and 8,600 m altitude. It can be launched from ships, aircraft, and the Lynx ground launcher (GL) to 250 km, with programmable guidance, and multiple waypoints. Delilah-GL has launch assist. Air, ship, and helicopter versions are offered. The missile uses GPS homing, or can loiter and use a CCD/FLIR seeker to home to target.

Fire Control

Collimator: INA

Fire Control Computer: Yes. System uses a modern C3I suite. The launcher is operated by a computerized fire-control system, which is fully integrated with the ACCS, so enabling each one to operate as a one-gun battery

Position Location System: GPS navigation

Additional Notes: Guided Rockets and missiles on Lynx and other MRLs/TELs can use the Trajectory Correction System (TCS). TCS can control >12 rockets/missiles equipped for Inertial/GPS guidance, vs 12 separate targets. Accuracy is 10 m. India tested TCS on the Pinaka MRL, and uses it in the recently tested Prahaar SRBM.

Protection

Note: Platform dependent

Notes:

Lynx is a multiple rocket launcher system developed and manufactured by Israel Military Industries (IMI) and used by Israel Defense Forces and other countries (Lynx is both the launcher module which can fit on various mounts, and the name of the Israeli launcher-vehicle system). It can be configured to carry a variety of rockets in two sealed pod containers: 40 (2 pods x 20 rockets each) 122mm Grad rockets; or 26 (2x13) 160mm LAR-160 or ACCULAR rockets; or eight (2x4) 306mm EXTRA rockets; or four (2x2) Predator Hawk tactical ballistic missiles; or two (2x1) Delilah missiles. The Lynx's sophisticated fire control system has been designed to automatically identify the sealed pod container rocket to set firing properties accordingly. The Lynx can be mounted on several different types of prime movers to include the AMX-13, helicopters, and the HMMWV. Note: The LAR (Light Artillery Rocket) family of systems includes launchers for any rocket regardless of length, diameter, weight, range or payload designed to meet load-carrying capacity. It is flexible, supporting 8, 10, or 13 rockets in 1 or 2 sealed launch pod containers.

M77 Oganj Yugoslav 128mm Multiple Rocket Launcher (MRL)







Tiers:



System

Alternative Designation : M-77 Oganj
Cailber/Length : mm128
Chassis/Carriage: Modified FAP-2026 BDS/AV 6x6 wheeled
Crew : ea5
Displacement Time : min2
Emplacement Time : min3

Dimensions

Height: m3.1
Length, Chassis Overall: m8.4
Width: m2.5
Weight: mt22

Automotive

Engine Type: Model 2F/002A, 200 hp water-cooled, 8-cylinder diesel engine
Fording Depth Unprepared: m1.2
Range, Cruising : km600
Speed, Maximum Off-Road: km/h35.0
Speed, Maximum On-Road: km/h80.0

Gradient: %60

Side Slope: %30

Vertical Step: m~0.5

Trench: m.75

Fording: m1.2

Communications

↳*Radio*

Name: R-123M

Armament

↳*Weapon 1*

Quantity, Tubes : ea32.0

Launcher Type: Rocket

Loader Type: Hydraulic

Launcher Drive: Electric

Launch Rate, Full Salvo Time: rd/sec32/25.6

Launch Rate, Single Rocket Interval: 8

Elevation : deg-0/+50

Reload Time : 2 min

Traverse : deg360

Traverse, Left : deg180

Traverse, Right : deg180

Ammunition

↳*Ammunition 1*

Type: DPICM

Length, Rocket : m2.6

Caliber/Length : mm128

Fuze Type: PD

Maximum Velocity : INA

Range, Maximum Indirect Fire : m20,600

Range, Minimum : m1,000

Warhead Type: Frag-HE

Weight : kg20

Fire Control Systems

Collimator: K-1

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Protection

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

Notes:

The M77 is configured and operated in the same manner as the Czechoslovakian 122mm (40 round) multiple rocket launcher RM-70. The launcher is mounted over the rear axles with the reloader located behind the cab. During reloading, the launcher is rotated to the rear, two hydraulic cylinders raise the reloader, and then the rockets are pushed into the launcher. Unlike the RM-70, the M77 uses hydraulic cylinders rather than a sprocket and chain drive mechanism. The modified FAP2026 truck has four hydraulically emplaced firing jacks to provide firing stability. The rockets can be fired from inside the cab or with a remote-firing device. The M77 MRL is capable of mounting an antiaircraft machine gun for protection.

BM-1 Russian (Type 85, Chinese) 107mm Single Launch Surface to Surface Rocket System







Tiers:

1 2 3 4

System

Alternative Designation: PRL-81 (Egypt), Type 85, Katyusha
Displacement Time: INA
Emplacement Time: INA
Time Required to Reload: INA
Maximum Effective Range: m8,500

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg41.3
Weight, Empty: kg22.5

Launcher

↳*Ammunition*

Type: Fire and Forget Rocket
Caliber: mm107
Muzzle Velocity: INA
Stabilization: Spin-Stabilized
Warhead Type: HE-Frag or Incendiary
Initiation: Electric
Fuse Type: Impact or Precision Delayed
Warhead Weight: Warhead is mated to the body
Effective Range: km8.5
Basic Load: NA
Armor Penetration: INA
Arming Mechanism: Spinning
Accuracy: Within 336m x 160m

Fire Control

Note:: INA, however appears to use direct lay or iron sights with range indicators

Notes:

The BM-1 is a Russian made, Single Launch Rocket System and is a single man-portable, tripod-mounted, launcher tube for 107 mm rockets which is designed for use by commando, guerrilla or special forces units. There is very little information available about this system however, photos and host nation news articles confirm their existence and use by guerrilla forces. The Type 85 is a Chinese made, single, man-portable tripod-mounted launcher tube for use by special forces units. The name “Katyusha” (Russian translation: “Little Katy”) was originally used by Soviet soldiers during World War II to refer to 82 mm and 132 mm rockets used by USSR forces. Today, however, reporters and analysts alike use the term for most of Hezbollah’s unguided artillery rockets fired from or designed for multiple rocket launchers (MRLs). According to a 2006 report, Hezbollah was estimated to hold between 7,000-8,000 107 mm and 122 mm Katyusha rockets, although this number has increased since.

2K6 Luna (FROG-5) Russian Artillery Rocket System





Tiers:



Variants:

- **FROG 3:** with 3R9 missile
- **FROG-7:** From 1965, the 2K6 Luna was replaced by the far more successful 9K52 Luna-M, which was known in the West as the FROG-7.

System

Alternative Designation: 2K6 Luna; FROG-5
Type: Artillery Rocket System
Family: 2K6 Luna
Crew: ea5
Chassis: 2P16 TEL
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: tons18
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: INA
Cruising Range: INA
Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Weapon System

↳*Launcher*

Name: SPU 2P16 (Ob'yekt 160)

Type: TEL

Weight: tons18

↳*Missile System*

Name: 3R10 Missile (FROG-5)

Type: Short-Range Ballistic Missile

Engine: RDTT 3Zh6

Length: INA

Diameter: INA

Weight: INA

Guidance System: Ballistic

Maximum Effective Range: km45

Warhead Type: High Explosive, Nuclear

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: INA

Turret Armor: NA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The 2K6 Luna (Russian: Луна; English: moon) is a Soviet short-range artillery rocket complex. Luna rockets are solid-fuel, unguided and spin-stabilized. "2K6" is its GRAU designation. Its NATO reporting names are FROG-3 (with 3R9 missile) and FROG-5 (with 3R10 missile). From 1965, the 2K6 Luna was replaced by the far more successful 9K52 Luna-M, which was known in the West as the FROG-7. The Luna system was developed in NII-1 from 1953, under the supervision of N. P. Mazurov. Luna followed the earlier designs 2K1 Mars and 2K4 Filin. While NII-1 was responsible for the rocket, the launch and transporter-loader vehicles were designed by TsNII-58. The initial system name was S-125A "Pion". In 1957 the prototypes of the launch vehicle (SPU S-123A on Ob'yekt 160 chassis), the transloader (TZM S-124A on Ob'yekt 161 chassis) and the 3R5 rocket were ready for evaluations. These were carried out in 1958 in Kapustin Yar and in 1959 in the Transbaikal Military District. As a result of these evaluations, it was decided to abandon the TZM, to improve the SPU and to redesign the rocket. This led to the development of the 3R9 and 3R10 rockets. The decision to start series production was taken on 29 December 1959. The first five systems were ready in January 1960 after which the state acceptance trials were carried out until March of that same year. In 1960 the Luna system entered service with the Soviet Army where it remained until 1982. From 1960 till 1964, a total of 432 SPU 2P16s were produced. In the first year alone, 80 launch vehicles and 365 rockets were finished. he missile complex consisted of: * the launch vehicle SPU 2P16 (Ob'yekt 160), based on a modified PT-76B chassis with return rollers and fitted with a launch rail, elevation mechanism, stabilizing jacks and a generator. Combat weight was 18 t; * the rocket 3R9 with conventional HE warhead 3N15 and with a range of 12 to 44.6 km, * the rocket 3R10 with a 400 kg nuclear warhead 3N14 and with a range of 10 to 32.1 km; * a 2U663 missile transporter, based on the ZiL-157V, with 2 missiles; * a 2U662 vehicle to transport and store nuclear warheads; * a mobile crane ADK K52 (on MAZ-502), ADK K61 (on MAZ-200) or 9T31 (on Ural-375); * sets of maintenance vehicles PRTB-1, 2U659 etc.; * control and command vehicle PU-2 and * a training set with training rocket PV-65 or 3R11 with training warhead 3N16. There have been a couple of variants of the launch vehicle, for example the 2P21, also known as Br-226-II, on ZiL-134 8x8 truck, but these never entered service.

M1985 North Korean 240mm Multiple Launch Rocket System




Tiers:



Variants:

- **Fadjr 3:** Is an Iranian artillery rocket system, similar to the M1985. Iran have taken delivery of 9 M1985 artillery rocket systems from North Korea, based on the Isuzu 6x6 truck. It is understood that production technology has also been transferred to Iran. Iranian-built vehicles were based on a commercially available Mercedes-Benz truck chassis with 6x6 configuration. Production reportedly commenced in the 1990s.
- **M1991:** A more powerful North Korean artillery rocket system, fitted with 22 tubes for 240 mm rockets.

System

Alternative Designation: M1985
Type: 240mm Multiple launch rocket system
Crew: ea5
Chassis: The M1985 MLRS is based on a Japanese Isuzu 6x6 truck. The same chassis is used for the North Korean 122 mm MLRS. This launcher pack can be also adapted to any suitable cross-country truck.
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m10.5
Width: m3..3
Height: m2.6
Weight, Combat: 15 tons
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: INA
Range: km600
Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.2

Fording: m1.2

Main Weapon System

↳*System*

Name: M1985

Type: Multiple launch rocket system

Number of Tubes: 12

Firing Range: 43 km

Full Salvo Duration: 48 - 96 s

Reloading Time: INA

↳*Ammunition*

Type: Spin-Stabilized Rocket

Caliber: mm240

Rocket Length: INA

Rocket Weight: 407 kg

Warhead Weight: 90 kg

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Main Gun Stabilization: Four manually-operated stabilizing jacks have to be lowered, prior to the rockets being launched.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The North Koreans have produced two different 240mm rocket launchers, the 12 round M-1985 and 22 round M-1991. The M-1985 rocket pack is easily identified as it has 2 rows of 6 tubes and is mounted on a cab behind engine chassis. The M-1991 is mounted on a cab over engine chassis. Both launch packs could be adapted to any suitable heavy cross-country truck. In the fall of 1993, in a conversation with the Deputy Assistant Secretary of the Army (Research and Technology), the Commander-in-Chief, Combined Forces Command (CINC CFC) stated that the North Korean 240mm Multiple Rocket Launchers (MRLs) posed a significant psychological and political threat to South Korea and the CFC. This weapon poses a significant threat, in that a very large number of 240mm MRLs are poised north of the demilitarized zone (DMZ) and are targeted toward South Korean urban areas and military targets. According to some reports, the DPRK has about 200 of these launchers in service. North Korea continues to improve its military. Highlighting these enhancements is an ambitious program to improve ground forces capabilities. A key component of this initiative involves the deployment of large numbers of long-range 240mm multiple rocket launcher systems and 170mm self-propelled guns to hardened sites located near the Demilitarized Zone. According to one report, a South Korean security analyst suggested that DPRK artillery pieces of calibers 170mm and 240mm "could fire 10,000 rounds per minute to Seoul and its environs." North Korea has about 500 long-range artillery tubes within range of Seoul, and the total rate of fire of thjese artillery pieces would be between 2,000 and 4,000 rounds per minute. The DPRK's two hundred 240mm MRLs fire either 12 or 22 rounds, providing a maximum single salvo of no more than 4,400 rounds. These launchers can fire a first strike of many thousands of missiles and return in a few minutes to protected caves or to alternate firing positions. The MRLs move out from underground facilities (UGFs), fire from preplanned firing positions, and return to the UGFs. Examination of the available data on the UGF sites suggests that a number of possible "exit and return" methods for the MRLs may be possible. In this case, the launchers move directly from the firing points to the UGFs. This procedure makes it difficult to target the launchers, because once they fire it only takes 75 seconds to return to their UGFs. The MRLs can fire their complete set of rockets in 44 seconds. Data from the Joint Precision Strike Demonstration Project Office indicates that the crew then needs two minutes to lower the launcher, raise the stabilizing pads, and quickly return to the UGF. This gives a total exposure time of 164 seconds. However, it is possible that the MRLs could displace faster than the JSPD case or that they might take longer.

RT-2000 (Thunderbolt-2000) Taiwanese 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Multiple Rocket Launcher (MRL)





Tiers:



System

Alternative Designation: RT-2000; Thunderbolt-2000

Type: Taiwanese 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Multiple Rocket Launcher (MRL)

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Chassis: M977 HEMTT Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: 9,979 kg

Dimensions

Length: 10.17 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 5.33 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in

(254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Main Weapon System

Note: RT-2000 (Thunderbolt-2000) Taiwanese 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Multiple Rocket Launcher (MRL) can mount a Mk 15 MRL, Mk 30 MRL, or a Mk 45 MRL.

↳*Mk 15 (Option 1)*

Name: Mk 15

Type: Multiple Rocket Launcher

Caliber: mm117

Basic Load: 60 Rounds

Effective Fire: 15 km

↳*Mk 30 (Option 2)*

Name: Mk 30

Type: Multiple Rocket Launcher

Caliber: mm180

Warhead Types: HE; AP/AM cluster warhead

Basic Load: 30 Rounds

Effective Fire: 30 km

↳*Mk 45 (Option 3)*

Name: Mk 45

Type: Multiple Rocket Launcher

Caliber: mm227

Basic Load: 12 Rounds

Effective Fire: 45 km

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Thunderbolt-2000 (Chinese: □□2000; pinyin: Léitíng 2000; RT/LT-2000) is a wheeled MLRS system used by the Republic of China (Taiwan) Army. It was created with the intention of attacking enemy forces when disembarking from sea. The prototype of the Thunderbolt-2000 weapon system was originally placed on the chassis of a M977 Heavy Expanded Mobility Tactical Truck. The production model utilises MAN HX81 8x8 wheeled trucks instead, with the first order batch including 57 launchers and 54 ammunition carriers/reloaders or local production of the same version. The LT-2000 was scheduled to enter service with all 3 main army groups in Taiwan from 2010, with each army group's artillery corps receiving 1 battalion of RT/LT-2000, featuring 3 companies/batteries with 6 RT/LT-2000 launchers each. The original CSIST LT-2000 prototype battery is in service with Kinmen Command, deployed there since mid-2000. Munitions: The LT/RT-2000 uses three types of munitions: Mk15 (60 rounds, 3 pods of 20 round each, 15 km range), Mk30 (27 rounds, 3 pods of 9 rounds each, 30 km range) and Mk45 (12 rounds, 2 pods of 6 rounds each, 45 km range). While the Mk15 is the 117 mm rockets used by the Kung Feng VI that carries 6,400 6.4mm size steel balls, the Mk30 rocket is a bit larger than the Mk15 at 180mm caliber and can carry either 267 rounds of M77 Dual Purpose Improved Conventional Munitions (DPICM) bomblets or 18,300 8mm size steel balls with range of 30 km. And Mk45 larger than the Mk30 at 227mm caliber as it can carry either 518 rounds of M77 bomblets or 25,000 8mm steel balls with range of 45 km. Other types of munitions also being developed by CSIST/ROC (Taiwan) Army, including FAE bomblets.

RM-70 Vampir Czechoslovakian 122mm Multiple Rocket Launcher (MRL)







Tiers:



Variants:

- **RM-70:** Basic model, as described.
- **RM-70/85:** Unarmored version of the RM-70, based on the Tatra T815 VPR9 8x8.1R truck with 265 hp engine T3-930-51. Combat weight: 26.1 t. Sometimes called RM-70M.
- **RM-70/85M:** Modernised vehicle with new fire control and navigation equipment, can use a new type of rocket with a range of 36 km. Slovakia has ordered 50 upgrade packages.
- **RM-70 Modular:** In December 2000, the Slovak Ministry of Defense and Delta Defence started the RM-70 Modular German-Slovak modernization project. RM-70 Modular allows this artillery system to launch either twenty-eight 122mm rockets, or six 227mm rockets as used on the M270 MLRS. This way the system became fully NATO interoperable. The truck cabin is entirely armored. The Slovak Republic signed for 26 upgraded artillery systems with the first one delivered on May 20, 2005. RM-70 Modular is being offered as an upgrade for RM-70 owners.
- **Vz.92 "Križan" VMZ:** Engineer vehicle, based on the Tatra T815 36.265 with a lightly armoured cabin. The vehicle comes in different configurations, the standard being a 40-round rocket launcher (for "Kuš" and "Krizhna-R" rockets), a mechanical mine layer for anti-tank mines (PT Mi-U or PT Mi-Ba-III) and two dispensers for anti-personnel mines (PP Mi-S1).
- **RM-70 Vampire:** Upgraded version integrated on a Tatra T-815-7 truck chassis powered by a Tatra T3C V8 engine with 270 kW of output, coupled with a Tatra 10 TS 210 N gearbox, with semi-automatic Tatra Norgen drive system and an additional gearbox Tatra 2.30TRS. It has a range of around 1,000 km (620 mi) and a top speed of 90 km/h (56 mph) with an armored and NBC-protected crew cabin.
- **LRSV-122 M-96 "Tajfun":** Modified version with 4 rows of 8 launch tubes on an unarmoured Tatra T813 truck. Like the M-77 Oganj and the Chinese Type 90A, the launcher and reloading pack are covered by a collapsible awning for protection and camouflage when traveling. Combat weight: 23.5 t. Only a very small number was built.

System

Alternative Designation: RM-70 Vampir

Type: 122mm Multiple Rocket Launcher (MRL)

Crew: ea4

Mission: Main role of this artillery rocket system is to engage area targets, such as concentrations of troops and armored vehicles, artillery batteries, and other targets.

Chassis: The RM-70 Vampir is based on a Tatra T815-7 heavy high mobility truck chassis.

Displacement Time: INA

Emplacement Time: INA

Note: It takes around 2 minutes to reload all 40 launch tubes. This integral reloading system significantly increases firepower of the vehicle, as the single RM-70 Vampir launcher vehicle can rapidly launch two salvos. The launch tubes can be also reloaded manually by the crew within around 7 minutes. Reloading usually takes remotely from the firing position, in order to avoid counter battery fire.

Dimensions

Length: 9.97 m
Width: 2.5 m
Height: INA
Weight, Combat: 25.89 t

Automotive

Engine Name: Tatra T3C
Engine Type: Diesel
Engine Power: hp360
Cruising Range: km1,000
Speed, Maximum Road: km/h85
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %40
Vertical Step: m0.6
Trench: m2
Fording: m1.5

Main Weapon System

↳*System*

Name: RM-70 Vampir
Type: Multiple launch rocket system
Caliber: 122
Number of Tubes: 40
Firing Range: 20 km
Full Salvo: 30 seconds
Reloading Time: 2 minutes

↳*Ammunition*

Type: HE Rocket
Caliber: mm122
Rocket Length: 2.87 m
Rocket Weight: 66.35 kg
Warhead Weight: 18.4 kg
Basic Load: 40

Types of Warheads: Rockets with various warheads are available, including incendiary, smoke, illumination warheads. Also there are cluster warheads with anti-tank or anti-personnel submunitions, as well as specialized warheads

Fire Control

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

RM-70 Vampir, a multiple launch rocket system (MLRS) developed by Excalibur Army, is an upgraded version of the RM-70 122 MLRS. The rocket launching system is intended to strike a range of enemy targets, including infantrymen, artillery units, motorised infantry, tanks, and other combat vehicles. The first Vampir prototype was developed in the first half of 2015 and gunnery tests were successfully conducted in October 2015. The MLRS was on display at IDEX 2017 held in February. RM-70 Vampire - Upgraded version integrated on a Tatra T-815-7 truck chassis powered by a Tatra T3C V8 engine with 270 kW of output, coupled with a Tatra 10 TS 210 N gearbox, with semi-automatic Tatra Norgen drive system and an additional gearbox Tatra 2.30TRS. It has a range of around 1,000 km (620 mi) and a top speed of 90 km/h (56 mph) with an armored and NBC-protected crew cabin.

Fajr-3 Iranian 240mm Multiple Rocket Launcher (MRL)







Tiers:



Variants:

- **Fadjr-5:** Fadjr 5 is a larger and more powerful version of the Fadjr 3. It has 4 launch tubes for 333 mm artillery rockets. It was developed in the 1990s.

System

Alternative Designation: Fadjr-3, Fajr-3
Type: Intermediate-Range Multiple Launch Rocket System (MLRS)
Manufacturer: Shahid Bagheri Industrial Group
Family: Fadjr
In Service: 1996-Present
Crew: ea5
Chassis: Mercedes-Benz 2624 truck chassis
Displacement Time: min2
Emplacement Time: min2
Reload: One dedicated resupply vehicle with a crane.
Note: At the time of its introduction it was one of the most capable artillery rocket systems in the world.

Dimensions

Length: m10.5
Width: m3.3
Height: m2.6

Weight, Combat: tons15

Ground Pressure: INA

Automotive

Engine Name: Mercedes-Benz, Model: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Off-Road: km/h25

Speed Maximum Swim: INA

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m1

Communications

Primary: INA

Rocket System

Note: This artillery rocket system is intended to engage important enemy targets, such as concentrations of troops and armored vehicles, command posts, artillery batteries, radar sites, airfields, as well as other important targets.

↳*Rocket Launcher*

Name: INA

Launcher Type: Tube Launcher

Control Type: Manual

Length: m10

Width: m2.5

Height: m3.34

Diameter: mm240

Weight: kg15,000

Number of Tubes: ea12

Firing Range: km43

Basic Load: 24, the Fadjr-3 carries one complete reload.

One Rocket Launch: every 4-8 seconds

Full Salvo Duration: 48 - 96 seconds

Reload Time: 12-15 min

Maximum Elevation: deg+57

Minimum Elevation: deg0

Traverse Range: deg190

Traverse Left: deg90

Traverse Right: deg100

Note: Other types of warheads exist, including incendiary, smoke and chemical.

↳***Rocket***

Name: INA

Type: Intermediate-Range Multiple Launch Rocket

Caliber: mm240

Length: 5.2

Diameter: mm240

Weight: kg407

Warhead Type: HE-FRAG Warhead

Warhead Weight: kg85

Firing Range: km43

Guidance System: Unguided spin-stabilized rockets

Burn Time: 4 seconds

Speed: m/s930

Fire Control

Name: INA

Computerized FCS: The US Army reports that the Fajr-3 has no fire-control system, while Iran's Defense Industries Organization reports that the Fajr-3 has a computer system with indigenous software that can calculate range and azimuth.

Ballistic Computer: Yes

Direct Fire: No

Indirect Fire: Yes

Position Location System: INA

Rocket Stabilizer: Yes, Stabilizer jacks are lowered to the ground and windows are covered prior to launch in order to protect the crew from debris created by the rocket engines.

Protection

Hull Armor: Unarmored

Turret Armor: Unarmored

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

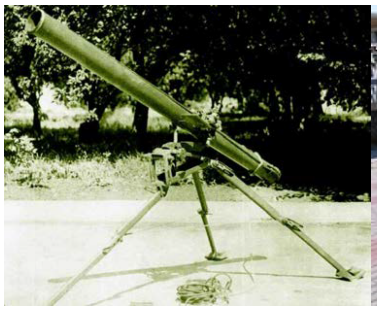
NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Fajr-3 (rarely Fadjr-3) is an Iranian heavy 240mm intermediate-range multiple rocket launcher. The Fajr-3 is a license-built copy, with slight modifications, of a North Korean MRL called the M-1985. The Fajr-3 was introduced in the 1990s and has since been exported to Hamas and Hezbollah. The Fajr-3 launcher fires twelve 5.2 meter long, 240 millimeter-calibre Fajr-3 artillery rockets, with a range of 43 kilometres, weighing 407 kilograms each and carrying 90-kilogram fragmentation warheads with 45 kg of high explosive (HE). Fajr means 'dawn' in Arabic.

9P132 Russian 122mm One-Round Rocket Launcher





Tiers:



System

Alternative Designation : DKZ-66, BM-21P, Grad-P, 9K510
Cailber/Length : mm122
Crew : 4-5 (includes ammunition bearers)
Displacement Time : min2
Emplacement Time : min2.5
Launch Rate: 1 round per minute
Launcher Name: Grad-P

Dimensions

Height: m1.5
Length: m2.5
Width: m1.5
Weight: kg55
Loaded Weight: kg101

Armament

Loader Type: Manual
Quantity, Tubes : ea1
Reload Time : sec40
Traverse : deg14
Traverse, Left : deg7
Traverse, Right : deg7
Rate of Fire: rpm1
Elevation: +10/+40°

Munitions

↳*Munition 1*

Name: 9M22M
Type: Frag-HE
Cailber: mm122
Fuze Type: PD
Maximum Velocity : m/s450
Range, Maximum Effective Range: km3
Range, Maximum: km10.8
Weight : kg46
Projectile Length with Fuze: m1.9

↳*Munition 2*

Name: 9M42
Type: Illuminating Rocket Projectile
Caliber/Length : mm122
Fuze Type: INA
Maximum Velocity : INA
Maximum Indirect Fire Range : km5
Range, Minimum Effective : km1
Weight : INA
Length, Rocket : m1.9

Fire Control Systems

Collimator: K-1
Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Notes:

The 9P132 is a lightweight, man-portable, rocket launching system used by guerrilla, special purpose forces, or other light forces. The 9P132 is only effective as a harassment or interdiction weapon. The 9P132 is broken down for man-pack transport into two one-man loads – the tube, AKA “Grad-P” (27 kg) and the tripod sight assembly with a remote firing device (28 kg). The tripod legs fold for ease of handling. Each 9M22M rocket is broken down into two one-man loads for transport. It takes approximately two minutes for assembly of the rocket. When assembled, the launcher has three course elevation positions, with the final elevation set by means of an elevation screw. The crew uses an electrical remote control with an electrical impulse generator and battery to fire the launcher. The 9P132 is incapable of firing the 9-foot version rockets of the BM-21 and similar 122mm systems. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.

M2008 North Korean 122mm Multiple Rocket Launcher (MRL)





Tiers:



Variants:

- **BM-21-1:** Launch vehicles are mounted on a family of Ural-4320 truck chassis
- **2B17 or also BM-21-1:** This upgrade was presented for the first time in 2003 and was developed by Motovilikha Plants from Perm. The system is fitted with a satellite navigation system NAP SNS, automated fire control system ASUNO, APP laying system and can fire a new generation of rockets with a range of 40 km (25 mi). The truck is the Ural-43201.
- **9P138 "Grad-1"::** lighter 36-round version, mounted on a six-by-six ZIL-131 chassis. The vehicle with supporting equipment (rockets, transporter 9T450 and re-supply truck 9F380) is referred to as complex 9K55. The 9P138 can only use "short-range" rockets with a range of 15 km (9.3 mi). It used to be known in the West as BM-21b or M1976.
- **BM-21V "Grad-V":** (NATO designation M1975): Developed for Soviet airborne troops in 1969. A GAZ-66B four-by-four truck chassis is fitted with a 12-round 122 mm rocket launcher. The vehicle is sturdy enough to be air-dropped. Parts of the vehicle such as the canvas cab roof can be taken off or folded down to reduce its size during transit. Like the BM-21, the BM-21V has stabilizing jacks on the rear of the vehicle for support when firing. The launch vehicle has the industrial index of 9P125.
- **9A51 "Prima":** 50-round launcher on a Ural-4320 5t chassis. The vehicle together with fire control equipment, the ammunition transporter TZM 9T232M and the new rocket 9M53F is referred to as complex
- **"Grad-P Light portable rocket system":** he complete system comprises a 9P132 [vi] single-round man-portable launcher (it can be reloaded and used again), a 9M22M 122 mm high-explosive fragmentation rocket and a fire control panel. The system was developed in the middle of the 1960s for Soviet special units and was used by Vietnamese forces at war with the US, under the designation DKZ-B. It was not accepted for regular service with the Russian Army, but it was and is still popular with paramilitary and guerrilla forces.
- **BM-21PD "Damba":** 40-round launcher mounted on Ural-375D or 43201 truck chassis. Developed for protection of naval bases against underwater infiltrations, uses special ammunition PRS-60 (Protivodiversionnyi Reaktivnyi Snaryad). The vehicle together with ammunition transporter is referred to as complex DP-62 "Damba".
- **A-215 "Grad-M":** 22-round naval version, entered service in 1978.
- **9K51M "Tornado-G":** an advanced version of the original BM-21 vehicle with sophisticated fire control system, satellite navigation, and automatic target aiming.
- **BM-21A "BelGrad":** This is a modernized version, based on a MAZ-631705 6×6 truck with 425 hp diesel engine TMZ-8424. Between the cab and the launcher there is another pack of 40 rockets. The system was evaluated from 1997 and entered service in 2001.

System

Alternative Designation: M2008

Manufacturer: North Korea; Company: INA

In Service: 1963-Present

Type: 122mm Multiple Launch Rocket System

Family: BM-21 Series

Crew: ea5 (8 with 9K51 Complex)

Chassis: Ural 375-D 6x6 wheeled

Displacement Time: min3

Emplacement Time: min2

Dimensions

Length: m7.35

Width: m2.4

Height: m3.09

Weight, Combat: tons13.7

Ground Pressure: kg/mINA

Automotive

Chassis: Ural 375-D 6x6 wheeled

Engine Name: ZIL-375

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h75

Speed, Maximum Off-Road: km/h35

Speed Maximum Swim: km/hNo Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.5

Communications

Primary: R-123M

Secondary: INA

Launcher

↳***System***

Name: 9P132

Type: mm122

Number of Tubes: ea40

Full Salvo: seconds20

Single Rocket Interval: se.5 seconds per rocket

Reloading Time: min7

Max Elevation: deg+55

Min Elevation: deg0

Traverse Range: deg172

Traverse Left: deg102

Traverse Right: deg70

Maximum Effective Firing Range: km21

Minimum Effective Firing Range: km1.6

Loader Type: Manual

Launcher Drive: Electric

↳*Ammunition (Option 1)*

Name: 9M22U

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km20.4

Minimum Effective Range: km0.5

Warhead Weight: 18.4 kg (M21OF)

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD)

↳*Ammunition (Option 2)*

Name: 9M28F

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km15

Minimum Effective Range: km1.5

Warhead Weight: kg21

Rocket Length: m2.87

Maximum Velocity: INA

Fuze Type: MRV-U (PD) or AR-6 (proximity)

↳*Ammunition (Option 3)*

Name: Type 90A (Chinese)

Type: FRAG-HE

Caliber: mm122

Maximum Effective Range: km32.7

Minimum Effective Range: km12.7

Warhead Weight: kg18.3

Rocket Length: m2.75

Maximum Velocity: INA

Fuze Type: PD

Note: The BM-21 can fire the following additional ammo: Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: INA

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Position Location System: No

Collimator: K-1

Protection

Hull Armor: None

Turret Armor: None

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The M2008 is a North Korean Variant of the BM-21 and has the same characteristics and capabilities as the BM-21. The BM-21 "Grad" is a Soviet truck-mounted 122 mm multiple rocket launcher. The weapons system and the M-21OF rocket which it fires evolved in the early 1960s and saw their first combat use in March 1969 during the Sino-Soviet border conflict. BM stands for boyevaya mashina (Russian: боевая машина – combat vehicle), and the nickname grad means "hail". The complete system with the BM-21 launch vehicle and the M-21OF rocket is designated as the M-21 field-rocket system. The complete system is more commonly known as a Grad multiple rocket launcher system. In NATO countries the system (either the complete system or the launch vehicle only) was initially known as M1964. Several other countries have copied the Grad or have developed similar systems. The M-21 field rocket system with a BM-21 launch vehicle (122 mm multiple rocket launcher (MRL) system)

entered service with the Soviet Army in 1963 to replace the aging 140 mm BM-14 system. The launch vehicle consists of a Ural-375D six-by-six truck chassis fitted with a bank of 40 launch tubes arranged in a rectangular shape that can be turned away from the unprotected cab. The vehicle is powered by a water-cooled V-8 180 hp gasoline engine, has a maximum road speed of 75 km/h (47 mph), road range of up to 750 kilometers (470 mi), and can cross fords up to 1.5 m (4 ft 11 in) deep. The original vehicle together with supporting equipment (including the re-supply truck 9T254 with 60 rockets) is referred to by the GRAU index "9K51"; the launcher itself has the industrial index of "2B5". In 1976, the BM-21 was mounted on the newer Ural-4320 six-by-six army truck. The three-member crew can emplace the system and have it ready to fire in three minutes. The crew can fire the rockets from the cab or from a trigger at the end of a 64-meter (210 ft) cable. All 40 rockets can be away in as little as 20 seconds, but can also be fired individually or in small groups in several-second intervals. A PG-1M panoramic telescope with K-1 collimator can be used for sighting. The BM-21 can be packed up and ready to move in two minutes, which can be necessary when engaged by counter-battery fire. Reloading is done manually and takes about 10 minutes. Each 2.87-meter (9 ft 5 in) rocket is slowly spun by rifling in its tube as it exits, which along with its primary fin stabilization keeps it on course. Rockets armed with high explosive-fragmentation, incendiary, or chemical warheads can be fired 20 kilometers (12 mi). Newer high explosive and cargo (used to deliver anti-personnel or antitank mines) rockets have a range of 30 kilometers (19 mi) and more. Warheads weigh around 20 kilograms (44 lb), depending on the type. The number of rockets that each vehicle is able to quickly bring to bear on an enemy target makes it effective, especially at shorter ranges. One battalion of eighteen launchers is able to deliver 720 rockets in a single volley. The system has lower precision than typical artillery and cannot be used in situations that call for pinpoint accuracy. It relies on a large number of shells dissipating over an area for a certain hit rate on specific targets. Nonetheless, because of the short warning time for the impact of the whole volley, the BM-21 is still considered an effective weapon.

→→Medium Rocket Systems (Up to 100 km)

BM-30 Smerch Russian 300mm Multiple Launch Rocket System




Tiers:



Variants:

- **Smerch-M:** mproved version of the Smerch with new navigation and targeting systems and capable of launching extended-range rockets. This system is referred as 9A52-2. It is compatible with new extended-range rockets, that can reach up to 90 km. Recently it has been reported that Russia developed further improved 300 mm rockets with a maximum range of 120 km.
- **9A52-2T Smerch:** variant based on the Tatra 10x10 chassis. It was designed in Russia for the Indian MoD. This rocket system is in service with the Indian Army.
- **9A52-4 Tornado i:** is lighter variant of the Smerch, based on KamAZ 8x8 truck. It has a six-pack launcher pod for 300 mm rockets. So the 9A52-4 has half the firepower of the Smerch. The whole launcher pod is replaced after all rockets are fired. This system is compatible with 90 km rockets
- **Uragan-1M i:** is a new Russian artillery rocket system, that might become a replacement for the ageing Uragan and Smerch systems. It was first publicly revealed in 2016. The Uragan-1M carries two launching pods for 300 mm or 220 mm rockets. These rocket pods are interchangeable with those of the 9A52-4 Tornado system. Launcher vehicle is based on an MZKT-7930 high-mobility chassis with 8x8 configuration.
- **PHL 03:** is a Chinese copy of the Smerch. It was adopted by the Chinese army in 2004-2005. It incorporates newer technologies, as well as indigenous Chinese rockets with a maximum range of 130 km. China developed a number of indigenous versions of this artillery rocket system.
- **Olha:** is a Ukrainian version of the Smerch, which uses newly developed missiles, possibly with extended range. The Oliha uses the same launcher vehicle of the Smerch. It was planned that tests of this system will be completed in 2018 and production will commence.

System

Alternative Designation: 9A52-2 Smerch-M
Type: Multiple Launch Rocket System
Manufacturer: Splav State Research and Production Enterprise
In Service: 1987-Present
Family: 9A52 Series
Crew: ea3
Chassis: MAZ-543M 8x8 wheeled
Displacement Time: min3
Emplacement Time: min3
Note: At the time it was the most powerful multiple launch artillery rocket system in the world. Even today, after more than 30 years of service, it remains one of the deadliest systems of this type. Currently Russian Army operates just over 100 of

these artillery rocket systems.

Dimensions

Length: m12

Width: m3.05

Height: m3.05

Weight, Combat: tons43.7

Ground Pressure: kg/mINA

Automotive

Engine Name: D12A-525A

Engine Type: V-12 Diesel

Engine Power: hp525

Cruising Range: km850-900

Speed, Maximum Road: km/h60

Speed, Off Road: km/h35

Speed Maximum Swim: km/h

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.1

Communications

Primary: R-123M

Launcher

↳ ***System***

Name: 9A52, 300mm Launcher

Type: 300mm

Number of Tubes: 12 (3 rows of 4 tubes)

Launch Rate: INA

Full Salvo Time: 12 rounds in 38 seconds

Single Rocket Interval: 3 seconds per rocket

Loader Type: Manual

Reload Time: minutes36

Launcher Drive: Electric

Maximum Elevation: deg+55

Minimum Elevation: deg-0

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳*Ammunition (Option 1)*

Name: 9M55F

Type: FRAG-HE

Caliber: mm300

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg258

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

↳*Ammunition (Option 2)*

Name: 9M55K

Type: DPICM

Caliber: 300mm

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg235

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

↳*Ammunition (Option 3)*

Name: 9M55K1

Type: Sensor-fuzed (MOTIV-3M)

Caliber: 300mm

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg233

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

Note: Additional Ammunition Types include: Smoke, Incendiary, Chemical, Leaflet, Fuel Air Explosive (FAE), R-90

expendable miniature UAV (experi-mental)

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Collimator: K-1

Protection

Hull Armor: No

Turret Armor: No

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

The BM-30 Smerch 9A52 is a russian made heavy multiple rocket launcher. The BM-30 is designed and manufactured by the Russian Company Splav State Research and Production Association, Tula, Russia, which also manufactures the Uragan, Grad and Prima rocket launchers. The BM-30 Smerch 9A52 was first seen by the West in 1983, and it entered in the Russian army in 1987. The BM-30 Smerch 9K58 is designed to counter tactical missile systems, army aviation at staging airstrips, as well as rocket, artillery and mortar battalions and batteries, command post, and manpower concentration areas. A Smerch unit is typically composed of six launchers and six transloaders. Now it is used by Russian, Ukraine, Belarus, Kuwait, and United Arab Emirates, Indian and Chinese armed forces.At the time it was the most powerful multiple launch artillery rocket system in the world. Even today, after more than 30 years of service, it remains one of the deadliest systems of this type. Currently Russian Army operates just over 100 of these artillery rocket systems.

9A52-4 Tornado Russian 300mm Multiple Rocket Launcher




Tiers:

1 2 3 4

Variants:

- **9A52-4 Tornado:** The 9A52-4 Tornado system is a lightweight rocket launcher. There are two other systems; a modular MLRS based on the MZKT-79306 truck, which can carry two BM-27 Uragan or BM-30 Smerch launcher modules, and one based on the Kamaz 6x6 truck. The "Tornado-G" system is an upgrade package for the existing BM-21 Grad. The Russian government ordered 36 new "Tornado-G" based on the Kamaz 6x6 chassis, instead of the old systems based on the Ural-4320 truck.
- **9A53-G Tornado:** 9A53-G Tornado (2x15 1x40 122mm Upgraded BM-21 Grad Multiple Rocket Launcher Module, based on a Kamaz Truck or on a Ural-4320).
- **9A53-U Tornado:** 9A53-U Tornado (2x8 2x6 220mm Upgraded BM-27 Uragan Multiple Rocket Launcher Modules, based on a MZKT-79306).
- **9A53-S Tornado:** 9A53-S Tornado (2x6 2x4 300mm Upgraded BM-30 Smerch Multiple Rocket Launcher Modules, based on a MZKT-79306).

System

Alternative Designation: 9A52-4 Tornado
Type: Multiple Rocket Launcher
Family: Tornado
Crew: ea2
Chassis: KamAZ-63501
Displacement Time: min3
Emplacement Time: min2
Note: The 9152-4 Tornado comes in a 15 Barrel, 122mm Rocket Launcher; a 8 Barrel 220mm Rocket Launcher; and a 6 Barrel 300mm Rocket Launcher.

Dimensions

Length: m11.2
Width: m2.5
Height: m3.15
Weight, Combat: kg24.65

Automotive

Engine Name: KamAZ-740.50.360

Engine Type: Diesel

Engine Power: hp360

Range: km1,000

Speed, Maximum Road: km/h95

Speed, Average Cross: INA

Speed Maximum Swim: km/hNot Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: 0.6

Trench: 1.4

Fording: 1.75

Launcher

Note: The 9152-4 Tornado comes in a 15 Barrel, 122mm Rocket Launcher; a 8 Barrel 220mm Rocket Launcher; and a 6 Barrel 300mm Rocket Launcher.

↳*System*

Name: 9A52-4 Tornado

Type: Multiple Rocket Launcher

Caliber: 122mm

Barrels: 15

Maximum Firing Range: 90 km

Note: The 9A52-4 can launch rockets singularly, by a partial ripple or by a full salvo, which can cover an area of 32 hectares. A full salvo can be fired within 20 seconds. The 9A52-4 launching vehicle can be reloaded within 8 minutes. Launcher pods are designed for use with 122-mm and 220-mm rockets.

↳*Ammunition (Option 1)*

Name: 9M55K Rocket

Type: Cluster munition, anti-personnel

Caliber: mm122

Length: 7.6 m

Weight: 800 kg

Warhead Weight: 243 kg

Submunition: 72 × 1.75 kg, each with 96 fragments (4.5 g each)

Self Destruct Time: 110 s

Maximum Range: 70 km

Minimum Range: 20 km

Basic Load: 15

↳*Ammunition (Option 2)*

Name: 9M55K1 Rocket
Type: Cluster munition, self-guided anti-tank
Caliber: 122mm
Length: 7.6 m
Weight: 800 kg
Warhead Weight: 243 kg
Submunition: 5 × 15 kg
Self Destruct Time: INA
Maximum Range: 70 km
Minimum Range: 20
Basic Load: 15

↳*Ammunition (Option 3)*

Name: 9M55K4
Type: Cluster munition, AT minelets.
Caliber: 122mm
Length: 7.6 m
Weight: 800 kg
Warhead Weight: 243 kg
Submunition: 25 × 5 kg mines
Self Destruct Time: 24 hour
Maximum Range: 70 km
Minimum Range: 20 km
Basic Load: 15

Fire Control

Name: INA
Computerized FCS: Yes
Direct Fire: No
Indirect Fire: Yes
Note: The weapons system is equipped with an automated laying and fire control system, along with an autonomous satellite navigation and positioning system. Positioning and firing data are exchanged between the launch vehicle and the command vehicle.

Protection

Hull Armor: Protection from small arms and shell splinters
Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

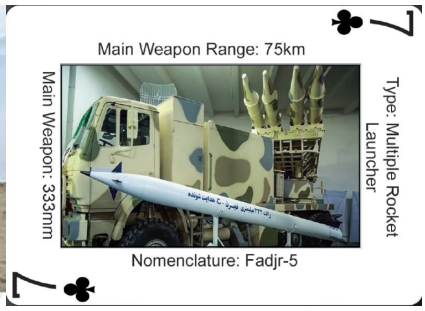
Notes:

The 9A52-4 Tornado is Russia's newest universal multiple rocket launcher. It was designed as a lightweight and universal version of the BM-30 Smerch, dubbed 9A52-2. It was first unveiled in 2007 as a more strategically and tactically mobile launcher, albeit at the expense of a slight reduction in firepower. This model is aimed at replacing the previous generation of Russian multiple rocket launchers, including BM-21 Grad, BM-27 Uragan and BM-30 Smerch. Currently the sole operator is Russian Ground Forces. A version will be approved for export. The 9A52-4 Tornado system is based on the chassis of the KamAZ-63501 8x8 military truck, which provides good tactical mobility. It is equipped with a single container with six launcher tubes for 300-mm rockets, which can fire all current Smerch rockets, including HE-FRAG, incendiary, thermobaric, cluster with anti-personnel or anti-tank mines. Cluster rounds may also carry self-targeting anti-tank munitions. The 800 kg standard rocket has a maximum range of 90 km. A range and direction correction system provides better accuracy compared to its predecessors. The 9A52-4 can launch rockets singularly, by a partial ripple or by a full salvo, which can cover an area of 32 hectares. A full salvo can be fired within 20 seconds. The 9A52-4 launching vehicle can be reloaded within 8 minutes. Launcher pods are designed for use with 122-mm and 220-mm rockets. The weapons system is equipped with an automated laying and fire control system, along with an autonomous satellite navigation and positioning system. Positioning and firing data are exchanged between the launch vehicle and the command vehicle.

Fadjr-5 Iranian 333mm Multiple Launch Rocket System (MLRS)







Tiers:



Variants:

- **Fadjr 5C:** Fadjr 5C is a new version unveiled in 2017. It uses 300 mm guided rockets similar to those of the Chinese SY-300. These have a range of up to 130 km. These rockets are accurate out to 200 meters using inertial guidance system, and out to 50 meters, using inertial guidance system with satellite navigation update. Due to significantly increased range and accuracy the Fadjr-5C is even more deadlier. It looks like the same launcher vehicle can use a mix of older 333 mm unguided rockets and new 300 mm guided rockets.

System

Alternative Designation: Fadjr-5, Fajr-5
Type: 333 mm Long-Range Multiple Launch Rocket System (MLRS)
Manufacturer: Iran
In Service: 1990s-Present
Family: Fadjr
Crew: ea5
Chassis: Mercedes-Benz 2631 truck chassis
Control Cab: The forward control cab accommodates 3 crew members, while the rest are seated in the rear cab.
Displacement Time: INA
Emplacement Time: INA
Reload Truck: Reload rockets are carried by escorting military truck, fitted with a crane.
Note: The Fajr is among the deadliest artillery rocket systems in the world.

Dimensions

Length: m10.4
Width: m2.5
Height: m3.3
Weight, Combat: tons15

Automotive

Engine Name: Mercedes-Benz, model: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: km600

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m1

Communications

Primary: INA

Rocket System

Note: This artillery rocket system is designed to engage important enemy targets, such as concentrations of troops and armored vehicles, command posts, artillery batteries, radar sites, airfields, as well as other important targets.

↳*Launcher*

Name: INA

Type: Tube Launcher

Number of Tubes: 4

Full Salvo: seconds12-32

Reloading Time: INA

Maximum Range of Fire: km75

Warhead Types: High explosive fragmentation, incendiary, smoke and cluster warheads.

↳*Rocket (Option 1)*

Name: INA

Type: Basic Rocket, One-Stage Rocket

Caliber: mm333

Weight: kg907

Warhead Weight: kg175

Warhead Type: Fragmentation high explosive

Firing Range: km75

Guidance System: Unguided artillery rockets

Fragmentation Radius: m500

Maximum Range of Fire: km75

Burn Time: 5.3 Seconds

Shelf Life: 15 years

↳***Rocket (Option 2)***

Name: INA

Type: Two-Stage Rocket

Length: m9.4

Diameter: mm561

Fin Type: Fixed

Maximum Range: km180

Maximum Altitude: km85

Warhead Type: INA

Warhead Weight: kg175

Fragmentation Radius: m500

Burn Time: INA

Shelf Life: 15 years

Fire Control

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire on the Move: No

Balistic Computer: Yes

Main Gun Stabilization: Yes, four hydraulically operated stabilizers are lowered to the ground before firing.

Note: The rockets can be launched from within the crew cab, or up to 1 km remotely from the vehicle.

Protection

Hull Armor: protection from small arms fire and projectile splinters

Turret Armor: protection from small arms fire and projectile splinters

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Fajr-5 ("Dawn") is an Iranian 333mm long-range multiple launch rocket system (MLRS). The Fajr-5 was developed during the 1990s and has since been exported to various armed actors in the Middle East. The Fajr is among the deadliest artillery rocket systems in the world. The Fajr-5 launcher fires four 6.48 meter long, 333mm, Fajr-5 artillery rockets, with a range of 75 kilometers (50 mi), weighing 915 kilograms each and carrying 175kg fragmentation warheads with 90kg of high explosive (HE). Most Fajr-5 rockets are unguided; in 2017 Iran introduced a variant, the Fajr-5C, which adds GPS guidance. The Fajr-5 is primarily used by the Iranian Army Ground Force to attack large, fixed, high-value targets, like airfields and military bases. In addition, the system is also used by anti-Israel militant and terrorist groups to target Israeli population centers. Finally, the system has a niche role in use by the IRGC-N as an unguided anti-ship rocket system for the Persian Gulf.

9K52 Luna-M (FROG-7) Russian Medium-Range Artillery Rocket System





Tiers:



Variants:

- **9M21B:** Nuclear-armed variant, fitted with a 500 kg (1,213-lb) warhead.
- **9M21G:** This variant is fitted with a 390 kg (860-lb) warhead.
- **Laith-90:** Iraqi version with increased range (90 km) and submunition warhead.

System

Alternative Designation: 9K52 Luna-M; NATO: FROG-7
Type: Medium-Range Artillery Rocket System
Family: 9K52
Crew: ea4
Launcher Chassis: 9P113 transporter Erector Launcher (TEL) based on the 8 x 8 BAZ-135 missile launcher
Displacement Time: min5
Emplacement Time: min5

Dimensions (9P113 transporter Erector Launcher)

Length, Vehcile: m9.30
Length, with Missile: m10.80
Width: m2.80
Height: m3.50
Weight, Combat: kg23,000
Ground Pressure: INA

Automotive (9P113 transporter Erector Launcher)

Engine Name: INA
Engine Type: 2 x V-8 Gasoline Engine
Engine Power: hp90
Maximum Range: km400

Speed, Maximum Road: km/h70-75

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %30

Vertical Obstacle: m0.70

Trench: m2.60

Fording Depth: m0.60

Main Weapon System

↳*Transporter Erector Launcher (TEL)*

Name: 9P113 transporter Erector Launcher (TEL)

Maximum Elevation: INA

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Note: The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based).

↳*Missle*

Trans: 9M21 Rockets

Type:

Length: m9.0

Diameter: m0.55

Engine: 1 x large solid-fuel rocket surrounded by a ring of 18 much smaller nozzles

Guidance System: Unguided, spin-stabilized

Radar: RMS-1 End Tray** meteorological in launch unit

Maximum Range: km70

Minimum Range: km12

Time into Action, Pre Surveyed: 15 to 30 min

Time into Action, Reload: 20 min

CEP: 380-400 m

Warhead Types: conventional: 1,212 lb (550 kg) HE chemical: 457 lb (216 kg) of agent nuclear: 200 kT estimated

Fire Control

Name: INA

Computerized FCS: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

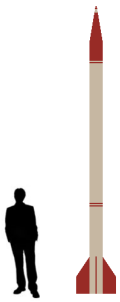
Notes:

The 9K52 Luna-M (Russian: Луна; English: moon, NATO reporting name FROG-7) is a Soviet short-range artillery rocket system. It fires unguided and spin-stabilized 9M21 rockets. "FROG" is an acronym for "Free Rocket Over Ground". The 9M21 rockets are mounted on a wheeled 9P113 transporter erector launcher (TEL) based on the ZIL-135 8x8 army truck. The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based). The 9M21 has a range up to 70 km and a CEP (circular error probable) between 500 m and 700 m. The road mobile rocket has a 550 kg warhead and is capable of delivering high explosive, nuclear, or chemical warheads. The FROG-7 was the latest addition to the "Free Rocket Over Ground" family of unguided, spin-stabilized, short-range (battlefield support) artillery rockets. The rocket was of conventional single-stage design, with a cylindrical warhead of the same diameter as the rocket body, giving it a cleaner, more modern appearance than its predecessors. The FROG-7 has a range of 70 km and a 550 kg warhead, and an impact area of approximately 2.8 km long by 1.8 km wide. The FROG-7 was capable of delivering HE, nuclear, or chemical warheads. The FROG-7 gave the Soviet division commander a deep interdiction/penetration nuclear threat. The FROG-7A was first introduced in 1965 as a replacement for earlier FROG variants, some of which had been in service since the mid-1950s. The FROG-1 and -2 were obsolete. The FROG-3, -4, and -5 variants, mounted on a non-amphibious version of the PT-76 light tank chassis, were obsolete in the USSR, but were still found in other Warsaw Pact armies at the end of the Cold War. The FROG-5 was still used as a training rocket, and the FROG-6 was a dummy rocket used for training purposes only. The FROG-7B, introduced in 1968, was essentially the same rocket as the FROG-7A but with a longer warhead section. Missiles of all modifications had the largest body diameter of 544 mm, the length of missiles of modifications 9M21B, F, E was 8960 mm, missiles of modifications 9M21B1 and E1 were 9400 mm. The speed of the rocket was about 1200 m/s. The FROG-7 was replaced by the SS-21 tactical ballistic missile which had greater range (120 km) as well as probable improvements in reaction time, missile reliability, accuracy, and handling characteristics. Since the SS-21 was mounted on a six-wheeled TEL similar to the SA-8/GECKO SAM system, it has improved cross-country capability and was probably amphibious. Like the SA-8, it probably has an air filtration and overpressure system for-collective chemical and biological protection. The SS-21 was first deployed in 1976 in the USSR and was reported in GSFG in 1981. The FROG-7 (9K52 Luna), the final version of the FROG family, was an unguided, spin-stabilized, short-range, battlefield support artillery rocket. The range of the FROG-7A rocket was 70 km with a CEP of 500 to 700 meters. It was fitted with either a 450 kg HE, 450 kg nuclear, or 36 kg chemical warheads. The improved FROG-7B carries a cargo warhead for delivering bomblets or mines. In addition to improvements in the rocket which give it greater range, a new transport-launch vehicle using a wheeled chassis has been developed based on the ZIL-135 [BAZ-135] 8x8 truck. This wheeled transporter erector launcher (TEL) carries one rocket and a crane. It incorporates a number of improvements in rocket handling such as the on-board crane. Reload missiles were placed on the TEL by that vehicle's own hydraulically operated crane on the right side of the launcher rail. A very similar vehicle was also used with the FROG-7 system to transport the reserve rockets. The earlier FROG'S used semitrailers towed by ZIL-157V tractor trucks, and needed crane trucks for reloading of the transport-launch vehicles. Preparation for firing can take 15 to 30 minutes depending on the situation. A typical FROG-7 battalion was equipped with two firing batteries each with two TELs and a D-band RMS (END TRAY) long-range meteorological radar. The cruising range of the transporter-erector-launcher vehicle was 400 km. The FROG-7 TEL vehicle provides no NBC protection for the crew. The single-rail launcher has limited traverse. In 1961, the Luna complex was adopted by the Soviet Army, which included the 2P16 tracked launcher, based on the amphibious tank PT-76, as well as 3P10 and 3P9 missiles with nuclear and high-explosive fragmentation warheads. Even before the Luna complex entered service with the Decree of the Council of Ministers of the USSR of 02.17.1961, work began on the development of its modernized version with an increased firing range. These works culminated in the creation of a virtually new tactical complex, which received the designation 9K52 "Luna-M". For this complex, a 9M21 rocket was created, a new launcher and a transport vehicle on a ZIL-135LM wheeled chassis. The first launch of the 9M21 rocket took place on December 27, 1961, and the 9K52 Luna-M complex was put into serial production and into service entered in 1964. Serial production was carried out at the Barricades factory. The advantage of the 9K52 Luna-M complex over its predecessor was that the control unit had its own hydro-mechanical crane with a lifting capacity of 3 tons (see photo on the side , above) This made it possible to abandon the semi-trailer transport vehicle, which transported two spare missiles and a self-propelled crane for reloading missiles. The 9P113 launcher provided highway speeds of up to 60 km / h, due to the use of

the wheelbase, the tremors and overloads of the warhead were significantly reduced (for the Luna complex, the maximum speed was theoretically up to 40 km / h, but already at a speed of 16 18 km / h on dirt roads there were overloads, unacceptable for a nuclear warhead). Both the 9P113 launcher and the 9T29 transport vehicle have very high cross-country ability. They were capable of overcoming steep slopes up to 30 ° and fords up to 1.2 m deep. The 9P113 installation was capable of performing at least 200 9M21 missile launches. To lock the launcher during the launch of the rocket, four swing-out supports with screw jacks were used. PU 9P113 has a hydraulically driven device for setting the guide to the position for launching the rocket, as well as the necessary equipment for prelaunch and launch. There were also communications equipment, navigation and orientation equipment, power supply and life support systems. 9M21 unguided single-stage solid-fuel rocket was designed to destroy manpower, military equipment, firearms and defensive structures located in the tactical depth of enemy defense. The missile was designed in several versions, different warheads: 9M21B with a nuclear warhead 9N32, 9M21F with a high-explosive fragmentation warhead 9N18F, 9M21G with a chemical warhead 9N18G and even 9M21D with a propaganda warhead 9N18A. High-explosive fragmentation warhead 9N18F contained 200 kg of highly active explosive TGA-40/60 and gave at least 15,000 fragments. In 1969, the 9N18K was put into service with a 420 kg fragmentation warhead containing 42 warheads weighing 7.5 kg each and providing for the defeat of manpower over an area of several hectares. Since the 9H32 warheads in nuclear equipment required constant temperature control to ensure a given yield, and there was no internal heating system in the warheads of the Luna-M, the 9P113 launcher and the 9T29 transport vehicle included electric heating cases designed for maintaining the temperature of nuclear warheads in a given temperature regime. On the cover itself was a temperature sensor, which provided the on and off heating spirals, depending on temperature. The number of thermal covers coincided with the number of missiles transported (for 9P113 - 1, for 9T29 - 3). To ensure the heating of the main engine during long-term parking without starting the marching engines, a gas unit was included in these units. The 9M21 missile part consists of three engines, a launch, a main cruise and a "crank" [spin stabilization] engine. All solid-fuel engines. Various missile flight ranges were achieved by using brake flaps, as well as by changing the elevation angle at launch trajectories. The starting engine was placed around the nozzle of the main engine. It works while the rocket moves along the guides of the launcher. The ignition of the charge of the starting engine was produced by the gases of the main engine, penetrating through special holes. The charge of the starting engine was made of single-channel cylindrical checkers of gunpowder RSI-60, arranged in a circle in three rows. The main (sustainer) engine provides a given range of missile flight. It works only on the active part of the trajectory, and then the flight takes place by inertia. The charge of the main engine consists of single-channel cylindrical blocks made of NMF-2 nitroglycerin (ballistic) gunpowder. The armored ends of the checkers hold the charge in the combustion process, provides centering of the rocket. The powder charge was divided in length into two parts. Each part was held in the chamber of the rocket engine with its diaphragms, which approximately halves the load at the attachment points. The operation of the solid propellant rocket motor was significantly affected by the initial temperature of the charge, which ultimately affects the magnitude of the engine thrust. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. The rocket engine was started by applying an electrical impulse through the onboard connector to the squibs, the initiation of which leads to ignition of the igniter from granular smoke powder, which, in turn, ignite the powder charge of the main engine. The rotation engine serves to compensate for the moment arising due to the eccentricity of the thrust vector, and was located in the region of the center of mass of the rocket. The engine nozzles through curved gas ducts were brought to the side surface of the rocket, the thrust vectors of the engine of rotation were directed tangentially to the surface of the body and create a torque. The crank engine runs on RSI-60 gunpowder, the operating time was ~ 0.4 s, it turns on after the rocket leaves the guides. In the tail part of 9M21 stabilizers were installed to ensure a stable flight of the rocket along the trajectory. When calculating the data for launching a 9M21 rocket, weather conditions were taken into account, namely the direction and average wind speed at altitude. To do this, the starter battery has a meteorological station, which makes several shots vertically up from a ballistic gun. In the direction and distance of the bullets (daytime with a red ribbon, nighttime - glowing) from the point of the shot, the direction and average wind speed were calculated. To prevent the unauthorized use of nuclear weapons, all launchers capable of launching rockets in nuclear equipment were equipped with code-blocking devices. In 9K52TS launchers, which did not involve the use of warheads in nuclear equipment, there were no code blocking devices. PU 9K52TS was not equipped with thermal covers. The 9M21 missiles were also supposed to be equipped with the 9K53 Luna-MB complex. The development of the Luna-MB complex was started by Decree of the Council of Ministers of 02/05/1962. The 9P114 launcher, which was created on the basis of a wheeled vehicle, allowing landing by Mi-6 or Mi-10 helicopters, was used in this complex. Work on the Luna-MB complex reached the stage of testing prototypes. However, quite a few difficulties were encountered, the main one of which was the need for a preliminary topographic and geodetic reference of the launch position, as well as the large “sailing” of the Mi-10 helicopter with the 9P114 launcher on the external sling. As a result, in 1965, work on this complex was discontinued. A significant drawback of the Luna-M complex was the low accuracy of firing, even the use of a nuclear warhead did not provide guaranteed destruction of well-targeted point targets such as a command post, etc. In this regard, according to the Decree of the Council of Ministers of July 20, 1966, the development of the Luna-3 rocket, equipped with a simplified control system, was begun. It was assumed that the circular probable deviation (CVO) of the new missile at a range of 70km would not exceed 500m. However, the flight tests conducted in

1968-1969 gave an even greater circular probable deviation compared to the prototype. The range corrector worked unsatisfactorily and the continuation of work on this OCD was deemed inappropriate. This complex became the most estensively deployed in the Soviet army, the peak of the deployment of combat vehicles of the complex occurred in 1986, when there were about 750 units in the troops. During the Cold War the most prominent short-range nuclear force [SNF] system at at the division level was the unguided free-rocket-over-ground (FROG), which in the Soviet Army was deployed in a battalion of four launchers. As of 1987 the Soviets were replacing FROGs with the more accurate, longer range SS-21s in some divisions opposite NATO. About 500 FROG and SS-21 launchers were opposite NATO. Another 215 FROG launchers were opposite China and in the Far East; some 100 were opposite Southwest Asia and eastern Turkey; and about 75 were in strategic reserve. Designed in 1968, a variant of the 9K52TS complex, designed for firing missiles with a high-explosive warhead, was widely exported to both Warsaw Pact and some non-Warsaw Pact nations. Armies of approximately 15 countries, including the armed forces of the Warsaw Pact, Cuba, Egypt, Iraq, Kuwait, Libya, the DPRK, and Yemen became its buyers. Laith, an Iraqi improved version of the FROG-7, had a 90 km range. The combat debut of the complex took place during the 1973 Arab-Israeli war. The Luna-M complex was used in a number of regional conflicts, including in Afghanistan, the Iran-Iraq war of 1980-88, and the Gulf War of 1991. The Syrian army began to use 9K52 Luna-M missile , also known under the NATO designation FROG-7, systems against terrorists. These systems, along with 9K72 Elbrus, for a long time formed the basis of the missile power of the Syrian army. The Soviet Union began delivering FROG-7 to its most faithful ally in the Middle East at the very beginning of the 70s. The Syrians quite successfully mastered this weapon.

Oghab Iranian 230mm Unguided Artillery Rocket



Tiers:



System

Alternative Designation: Oghab Missile
Type: 230mm Unguided Artillery Rocket
Manufacturer: Aerospace Industries Organization, Shahid Bagheri Industries
Warhead: Up to three
Engine: Solid-fuel rocket
Operational Range: 34–45 km
Maximum Speed: 750 m/s
Guidance System: None

Dimensions

Length: 4.82 m
Diameter: 23 cm
Weight, Combat: 360 kg

Notes:

The Iranian Oghab (Eagle) missile is an unguided 230 mm (9 in) artillery rocket with a range of 34–45 km (20–28 mi). It is spin-stabilized in flight but has a proven circular error probable in excess of 500 m (1,500 ft), making it a highly inaccurate weapon. It carries a 70 kg (150 lb) high explosive fragmentation warhead, though it may also be able to carry chemical warheads. According to US sources, a modified version has been developed that could be carried and fired from Iranian Air Force F-14 Tomcat and F-4 Phantom II aircraft. The launcher is an elevatable triple-rail launcher assembly fitted to a Mercedes-Benz LA 911B 4×4 truck chassis. The missile was developed from the Chinese Type-83 artillery rocket during the Iran–Iraq War, with the assistance of the People's Republic of China under an agreement signed in 1985. It entered service in 1986 and was immediately used in combat in an attack on the Iraqi city of Basra in December 1986. Around 260–270 Oghabs were reportedly fired during the war, though their effectiveness was limited. The missile's short range confined its use to attacks on Iraqi border cities and its lack of accuracy meant that Oghab attacks were far less effective than artillery barrages. The Oghab is used by the Iranian Army and the Revolutionary Guards. It is known to have been exported to Hezbollah.

9A53-S Tornado Russian 300mm Multiple Launch Rocket System



Tiers:



Variants:

- **Smerch-M:** mproved version of the Smerch with new navigation and targeting systems and capable of launching extended-range rockets. This system is referred as 9A52-2. It is compatible with new extended-range rockets, that can reach up to 90 km. Recently it has been reported that Russia developed further improved 300 mm rockets with a maximum range of 120 km.
- **9A52-2T Smerch:** variant based on the Tatra 10x10 chassis. It was designed in Russia for the Indian MoD. This rocket system is in service with the Indian Army.
- **9A52-4 Tornado:** is lighter variant of the Smerch, based on KamAZ 8x8 truck. It has a six-pack launcher pod for 300 mm rockets. So the 9A52-4 has half the firepower of the Smerch. The whole launcher pod is replaced after all rockets are fired. This system is compatible with 90 km rockets
- **Uragan-1M i:** is a new Russian artillery rocket system, that might become a replacement for the ageing Uragan and Smerch systems. It was first publicly revealed in 2016. The Uragan-1M carries two launching pods for 300 mm or 220 mm rockets. These rocket pods are interchangeable with those of the 9A52-4 Tornado system. Launcher vehicle is based on an MZKT-7930 high-mobility chassis with 8x8 configuration.
- **PHL 03:** is a Chinese copy of the Smerch. It was adopted by the Chinese army in 2004-2005. It incorporates newer technologies, as well as indigenous Chinese rockets with a maximum range of 130 km. China developed a number of indigenous versions of this artillery rocket system.
- **Olha:** is a Ukrainian version of the Smerch, which uses newly developed missiles, possibly with extended range. The Oliha uses the same launcher vehicle of the Smerch. It was planned that tests of this system will be completed in 2018 and production will commence.
- **9A53-G Tornado:** 9A53-G Tornado (2x15 1x40 122mm Upgraded BM-21 Grad Multiple Rocket Launcher Module, based on a Kamaz Truck or on a Ural-4320).
- **9A53-U Tornado:** 9A53-U Tornado (2x8 2x6 220mm Upgraded BM-27 Uragan Multiple Rocket Launcher Modules, based on a MZKT-79306).
- **9A53-S Tornado:** 9A53-S Tornado (2x6 2x4 300mm Upgraded BM-30 Smerch Multiple Rocket Launcher Modules, based on a MZKT-79306).

System

Alternative Designation: 9A53-S Tornado
Type: 300 mm Multiple Launch Rocket System
Manufacturer: NPO Splav
In Service: 2014-Present
Family: 9A52-4 Tornado
Crew: ea2
Chassis: MZKT-79306
Displacement Time: min3

Emplacement Time: min3

Dimensions

Length: m12.7

Width: m3.00

Height: m3.29

Weight, Combat: tons24.65

Ground Pressure: kg/mINA

Automotive

Engine Name: YaMZ-846

Engine Type: Diesel

Engine Power: hp500

Cruising Range: km1,000

Speed, Maximum Road: km/h70

Speed, Off Road: km/h35

Speed Maximum Swim: Not Amphibious

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.4

Communications

Primary: R-123M

Launcher

↳*System*

Name: 9A52, 300mm Launcher

Type: 300mm

Number of Tubes: 12 (3 rows of 4 tubes)

Launch Rate: INA

Full Salvo Time: 12 rounds in 38 seconds

Single Rocket Interval: 3 seconds per rocket

Loader Type: Manual

Reload Time: minutes20

Launcher Drive: Electric

Maximum Elevation: deg+55

Minimum Elevation: deg-0

Traverse Range: deg60

Traverse Left: deg30

Traverse Right: deg30

↳*Ammunition (Option 1)*

Name: 9M55F

Type: FRAG-HE

Caliber: mm300

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg258

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

↳*Ammunition (Option 2)*

Name: 9M55K

Type: DPICM

Caliber: 300mm

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg235

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

↳*Ammunition (Option 3)*

Name: 9M55K1

Type: Sensor-fuzed (MOTIV-3M)

Caliber: 300mm

Maximum Range: km70

Minimum Range: km20

Warhead Weight: kg233

Rocket Length: m7.6

Maximum Velocity: INA

Fuze Type: Electronic timing (ET)

Note: Additional Ammunition Types include: Smoke, Incendiary, Chemical, Leaflet, Fuel Air Explosive (FAE), R-90 expendable miniature UAV (experi-mental)

Fire Control

Name: INA

Computerized FCS: No

Direct Fire: No

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Collimator: K-1

Protection

Hull Armor: It provides protection for the crew against small arms fire and artillery shell splinters. This vehicle lacks any defensive armament.

Applique Armor: Avaialble

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Southern army District rocket unit stationed in the Astrakhan vicinity in south Russia has been completely rearmed with superior 9A53-S tornado-S multiple launch rocket systems (MLRS). The heavy release rocket structures unit with 1,000 servicemen and over one hundred gadgets of navy hardware, along with combating and transporter-loader automobiles of the twister-S multiple release rocket structures were fashioned in overdue 2018. at the end of the 2019 training session, one of the large unit’s formations became granted the surprise pressure title. The 9A53-S tornado is the maximum powerful and customary lengthy-variety multiple rocket launcher within the international. This model is aimed at replacing the preceding technology of Russian a couple of rocket launchers, along with BM-21 Grad, BM-27 Uragan and BM-30 Smerch. The 9A53-S machine is primarily based at the chassis of the MZKT-79306 eight×eight military truck, which gives proper tactical mobility. it is equipped with a 300mm Upgraded BM-30 Smerch multiple Rocket Launcher Modules, which could fireplace all cutting-edge Smerch rockets, together with HE-FRAG, incendiary, thermobaric, cluster with anti-personnel or anti-tank mines. Each unit comprises 12 launchers that can fire a salvo or single missiles. The firing range is 120 km and can be increased up to 200 km. Tornado-S considerably accelerates the missions. It needs several minutes to fire the whole round of munitions and one minute to abandon the firing position and escape a retaliation strike. The Tornado-S t is a fully automatic weapon with new precision munitions of a bigger range. They have homing warheads. The power is comparable to Tochka-U missiles. However, Tochka-U can fire one missile while Tornado-S a salvo.

WM-80 Chinese 273mm Multiple Rocket Launcher (MRL)





Tiers:



System

Alternate Designation: NA

Cailber/Length : mm273

Quantity, Tubes : 8 (2 rows of 4 tubes)

Chassis/Carriage: Taian TAS5380 8X8

Crew : ea5

Displacement Time : min3 to 5

Emplacement Time : min3 to 5

Reload Time : 5 to 8 min

Launch Rate, Full Salvo Time : 8 rounds in 5 seconds

Launch Rate, Single Rocket Interval: .5 seconds per rocket

Launcher Drive: Electric

Loader Type: Manual

Elevation : deg-20/+60

Traverse : deg40

Traverse, Right : deg20

Traverse, Left: deg20

Dimensions

Height: m3.3

Length, Chassis Overall: m9.55

Width: m3.06

Weight, Combat: mt34

Automotive

Prime Mover: Taian TAS5380 8X8

Engine Type: 525 hp air-cooled, diesel engine

Range, Cruising : km400

Speed, Maximum Cross-Country: INA

Speed, Maximum Off-Road: INA

Speed, Maximum On-Road: km/h70

Traversable Slope: degrees35

Communications

↳*Radio*

Name: INA

Note: Wire-link or radio communications systems can be used to communicate firing data

Munition

Rocket Caliber: mm273

Rocket Length: mm4,582

Rocket Weight: kg505

Warhead Weight: kg150

Circular Error Probable (CEP): 2% of range

Maximim Range: km80

Max Ord Alititude: m31,000 (at max range of 80km)

Minimum Range: km34

Max Time of Flight: sec165 (at max range of 80km)

Rocket Stabilization: The rocket is stabilized by tail fins and high-speed spin generated by a spin motor

High-Explosive (HE): The HE blast warhead contains 34kg of explosive that can be activated by a WJ-6A mechanical impact fuse or a MD-23A electronic proximity fuse

Submunitions: Contains 380 bomblets with a HEAT warhead

Armor Penetration: mmUp to 100

Fire Control System

Collimator: INA

Computerized: Yes

Note: There is also a standard optical sighting system on the left side of the launcher as an emergency back up. If required the rockets can also be launched by remote control away from the launcher.

Protection

NBC Protection: No

Self-Entrenching Blade: No

Smoke Equipment: No

Notes:

The WM-80 multiple launch rocket system was developed by China North Industries Group Corporation (NORINCO) based on the indigenous Type 83 273mm 4-tube artillery rocket system. The WM-80 did not enter PLA service, possibly due to the introduction of the more capable A-100 artillery rocket system. NORINCO has been promoting the weapon system to the export market and made one sale to Armenia in 1999. The WM-80 rocket system is composed of the multiple rocket launcher, the ammunition transporter/loader, fire command and control vehicles, and the maintenance vehicles. The fire command and control is composed of a brigade/regiment command vehicle, battalion command vehicle, surveillance/spotting radar, and meteorological radar. A total of six launcher vehicles and six resupply vehicles would be attached to each battery. The standard combat unit is considered to be the battalion with the customer choosing his own Table Of Equipment (TOE) if they so wish. Fire-control and command duties throughout the brigade are accomplished by use of an automatic distribution network. This consists of main computers located at the brigade, battalion and battery HQ command levels with various terminals and radio/wire communications links to automatically distribute the data as directed.

2K6 Luna (FROG-3) Russian Medium-Range Artillery Rocket System



Tiers:



Variants:

- **9M21B:** Nuclear-armed variant, fitted with a 500 kg (1,213-lb) warhead.
- **9M21G:** This variant is fitted with a 390 kg (860-lb) warhead.
- **Laith-90:** Iraqi version with increased range (90 km) and submunition warhead.

System

Alternative Designation: 2K6 Luna; NATO: FROG-3
Type: Medium-Range Artillery Rocket System
Description: . Its NATO reporting names are FROG-3 (with 3R9 missile) and FROG-5 (with 3R10 missile). From 1965, the 2K6 Luna was replaced by the far more successful 9K52 Luna-M, which was known in the West as the FROG-7.
Family: 9K52
Crew: ea5
Missile Complex: The missile complex consisted of 1. the launch vehicle SPU 2P16 (Ob'yekt 160), based on a modified PT-76B chassis with return rollers and fitted with a launch rail, elevation mechanism, stabilizing jacks and a generator. Combat weight was 18 t; 2. the rocket 3R9 with conventional HE warhead 3N15 and with a range of 12 to 44.6 km, 3. the rocket 3R10 with a 400 kg nuclear warhead 3N14 and with a range of 10 to 32.1 km; 4. a missile transporter 2U663 based on the ZiL-157V with 2 missiles; 5. a vehicle 2U662 to transport and store nuclear warheads; 6. a mobile crane ADK K52 (on MAZ-502), ADK K61 (on MAZ-200) or 9T31 (on Ural-375); sets of maintenance vehicles PRTB-1, 2U659 etc.; 7. control and command vehicle PU-2 and 8. a training set with training rocket PV-65 or 3R11 with training warhead 3N16.
Displacement Time: min5
Emplacement Time: min5

Dimensions (9P113 transporter Erector Launcher)

Length, Vehcile: m9.30
Length, with Missile: m10.80
Width: m2.80
Height: m3.50
Weight, Combat: kg23,000
Ground Pressure: INA

Automotive (9P113 transporter Erector Launcher)

Engine Name: INA
Engine Type: 2 x V-8 Gasoline Engine
Engine Power: hp90
Maximum Range: km400
Speed, Maximum Road: km/h70-75
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %30
Vertical Obstacle: m0.70
Trench: m2.60
Fording Depth: m0.60

Main Weapon System

↳*Transporter Erector Launcher (TEL)*

Name: 2P16 (PT-76-based)
Maximum Elevation: INA
Minimum Elevation: INA
Traverse Range: INA
Traverse Left: INA
Traverse Right: INA
Note: The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based).

↳*Missle*

Trans: 3R9 Missile
Type: Missile
Length: m9.0
Diameter: m0.55
Engine: 1 x large solid-fuel rocket surrounded by a ring of 18 much smaller nozzles
Guidance System: Unguided, spin-stabilized
Radar: RMS-1 End Tray** meteorological in launch unit
Maximum Range: km45
Minimum Range: km12
Time into Action, Reload: 20 min
CEP: 380-400 m
Warhead Types: High explosive, nuclear

Fire Control

Name: INA

Computerized FCS: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Russian FROG-3 [Free Rocket Over Ground], FROG-4, and FROG-5 are three variants of a single unguided, spin stabilized, solid fuel rocket. The 2K6 Luna (English: moon) is a Soviet short-range artillery rocket complex. Luna rockets were solid-fuel, unguided and spin-stabilized. "2K6" is its GRAU designation. Its NATO reporting names are FROG-3 (with 3R9 missile) and FROG-5 (with 3R10 missile). From 1965, the 2K6 Luna was replaced by the far more successful 9K52 Luna-M, which was known in the West as the FROG-7. One of the first Soviet tactical missile systems with unguided missiles equipped with nuclear warheads. Intended for manning missile divisions of tank and motorized rifle divisions, was to be used as a means of clearing in the offensive zone of the compound. It has been developed since 1953, launched in full-scale design since 1956, and has been tested since 1958, and entered service in 1960. The developer was the Moscow NII-1 (now the Moscow Institute of Heat Engineering, the creators of Topol, Yars and Maces). The Luna system was developed in NII-1 from 1953, under the supervision of N. P. Mazurov. Luna followed the earlier designs 2K1 Mars and 2K4 Filin. While NII-1 was responsible for the rocket, the launch and transporter-loader vehicles were designed by TsNII-58. The initial system name was S-125A "Pion". In 1957 the prototypes of the launch vehicle (SPU S-123A on Ob'yekt 160 chassis), the transloader (TZM S-124A on Ob'yekt 161 chassis) and the 3R5 rocket were ready for evaluations. These were carried out in 1958 in Kapustin Yar and in 1959 in the Transbaikal Military District. As a result of these evaluations, it was decided to abandon the TZM, to improve the SPU and to redesign the rocket. This led to the development of the 3R9 and 3R10 rockets. The decision to start series production was taken on 29 December 1959. The first 5 systems were ready in January 1960 after which the state acceptance trials were carried out until March of that same year. In 1960 the Luna system entered service with the Soviet Army where it remained until 1982. From 1960 till 1964, a total of 432 SPU 2P16s was produced. In the first year alone, 80 launch vehicles and 365 rockets were finished. The missile complex consisted of the launch vehicle SPU 2P16 (Ob'yekt 160), based on a modified PT-76B chassis with return rollers and fitted with a launch rail, elevation mechanism, stabilizing jacks and a generator. Combat weight was 18 t; the rocket 3R9 with conventional HE warhead 3N15 and with a range of 12 to 44.6 km, the rocket 3R10 with a 400 kg nuclear warhead 3N14 and with a range of 10 to 32.1 km; a missile transporter 2U663 based on the ZiL-157V with 2 missiles; a vehicle 2U662 to transport and store nuclear warheads; a mobile crane ADK K52 (on MAZ-502), ADK K61 (on MAZ-200) or 9T31 (on Ural-375); sets of maintenance vehicles PRTB-1, 2U659 etc.; control and command vehicle PU-2 and a training set with training rocket PV-65 or 3R11 with training warhead 3N16.

Laith-90 Iraqi Medium-Range Artillery Rocket System




Tiers:



Variants:

- **9M21B:** Nuclear-armed variant, fitted with a 500 kg (1,213-lb) warhead.
- **9M21G:** This variant is fitted with a 390 kg (860-lb) warhead.
- **Laith-90:** Iraqi version with increased range (90 km) and submunition warhead.

System

Alternative Designation: Laith-90
Type: Medium-Range Artillery Rocket System
Family: 9K52
Crew: ea4
Launcher Chassis: 9P113 transporter Erector Launcher (TEL) based on the 8 x 8 BAZ-135 missile launcher
Displacement Time: min5
Emplacement Time: min5

Dimensions (9P113 transporter Erector Launcher)

Length, Vehcile: m9.30
Length, with Missile: m10.80
Width: m2.80
Height: m3.50
Weight, Combat: kg23,000
Ground Pressure: INA

Automotive (9P113 transporter Erector Launcher)

Engine Name: INA
Engine Type: 2 x V-8 Gasoline Engine
Engine Power: hp90
Maximum Range: km400

Speed, Maximum Road: km/h70-75

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %30

Vertical Obstacle: m0.70

Trench: m2.60

Fording Depth: m0.60

Main Weapon System

↳*Transporter Erector Launcher (TEL)*

Name: 9P113 transporter Erector Launcher (TEL)

Maximum Elevation: INA

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Note: The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based).

↳*Missle*

Trans: 9M21 Rockets

Type:

Length: m9.0

Diameter: m0.55

Engine: 1 x large solid-fuel rocket surrounded by a ring of 18 much smaller nozzles

Guidance System: Unguided, spin-stabilized

Radar: RMS-1 End Tray** meteorological in launch unit

Maximum Range: km90

Minimum Range: km12

Time into Action, Pre Surveyed: 15 to 30 min

Time into Action, Reload: 20 min

CEP: 380-400 m

Warhead Types: conventional: 1,212 lb (550 kg) HE chemical: 457 lb (216 kg) of agent nuclear: 200 kT estimated

Fire Control

Name: INA

Computerized FCS: Yes

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Laith-90 is a variant of the Russian 9K52 Luna-M (NATO: FROG-7), that has a increased missile range of 90km. The 9K52 Luna-M (Russian: Луна; English: moon, NATO reporting name FROG-7) is a Soviet short-range artillery rocket system. It fires unguided and spin-stabilized 9M21 rockets. "FROG" is an acronym for "Free Rocket Over Ground". The 9M21 rockets are mounted on a wheeled 9P113 transporter erector launcher (TEL) based on the ZIL-135 8x8 army truck. The TEL features a large hydraulic crane used for reloading rockets from 9T29 transporters (also ZIL-135 based). The 9M21 has a range up to 70 km and a CEP (circular error probable) between 500 m and 700 m. The road mobile rocket has a 550 kg warhead and is capable of delivering high explosive, nuclear, or chemical warheads. The FROG-7 was the latest addition to the "Free Rocket Over Ground" family of unguided, spin-stabilized, short-range (battlefield support) artillery rockets. The rocket was of conventional single-stage design, with a cylindrical warhead of the same diameter as the rocket body, giving it a cleaner, more modern appearance than its predecessors. The FROG-7 has a range of 70 km and a 550 kg warhead, and an impact area of approximately 2.8 km long by 1.8 km wide. The FROG-7 was capable of delivering HE, nuclear, or chemical warheads. The FROG-7 gave the Soviet division commander a deep interdiction/penetration nuclear threat. The FROG-7A was first introduced in 1965 as a replacement for earlier FROG variants, some of which had been in service since the mid-1950s. The FROG-1 and -2 were obsolete. The FROG-3, -4, and -5 variants, mounted on a non-amphibious version of the PT-76 light tank chassis, were obsolete in the USSR, but were still found in other Warsaw Pact armies at the end of the Cold War. The FROG-5 was still used as a training rocket, and the FROG-6 was a dummy rocket used for training purposes only. The FROG-7B, introduced in 1968, was essentially the same rocket as the FROG-7A but with a longer warhead section. Missiles of all modifications had the largest body diameter of 544 mm, the length of missiles of modifications 9M21B, F, E was 8960 mm, missiles of modifications 9M21B1 and E1 were 9400 mm. The speed of the rocket was about 1200 m/s. The FROG-7 was replaced by the SS-21 tactical ballistic missile which had greater range (120 km) as well as probable improvements in reaction time, missile reliability, accuracy, and handling characteristics. Since the SS-21 was mounted on a six-wheeled TEL similar to the SA-8/GECKO SAM system, it has improved cross-country capability and was probably amphibious. Like the SA-8, it probably has an air filtration and overpressure system for-collective chemical and biological protection. The SS-21 was first deployed in 1976 in the USSR and was reported in GSFG in 1981. The FROG-7 (9K52 Luna), the final version of the FROG family, was an unguided, spin-stabilized, short-range, battlefield support artillery rocket. The range of the FROG-7A rocket was 70 km with a CEP of 500 to 700 meters. It was fitted with either a 450 kg HE, 450 kg nuclear, or 36 kg chemical warheads. The improved FROG-7B carries a cargo warhead for delivering bomblets or mines. In addition to improvements in the rocket which give it greater range, a new transport-launch vehicle using a wheeled chassis has been developed based on the ZIL-135 [BAZ-135] 8x8 truck. This wheeled transporter erector launcher (TEL) carries one rocket and a crane. It incorporates a number of improvements in rocket handling such as the on-board crane. Reload missiles were placed on the TEL by that vehicle's own hydraulically operated crane on the right side of the launcher rail. A very similar vehicle was also used with the FROG-7 system to transport the reserve rockets. The earlier FROG'S used semitrailers towed by ZIL-157V tractor trucks, and needed crane trucks for reloading of the transport-launch vehicles. Preparation for firing can take 15 to 30 minutes depending on the situation. A typical FROG-7 battalion was equipped with two firing batteries each with two TELs and a D-band RMS (END TRAY) long-range meteorological radar. The cruising range of the transporter-erector-launcher vehicle was 400 km. The FROG-7 TEL vehicle provides no NBC protection for the crew. The single-rail launcher has limited traverse. In 1961, the Luna complex was adopted by the Soviet Army, which included the 2P16 tracked launcher, based on the amphibious tank PT-76, as well as 3P10 and 3P9 missiles with nuclear and high-explosive fragmentation warheads. Even before the Luna complex entered service with the Decree of the Council of Ministers of the USSR of 02.17.1961, work began on the development of its modernized version with an increased firing range. These works culminated in the creation of a virtually new tactical complex, which received the designation 9K52 "Luna-M". For this complex, a 9M21 rocket was created, a new launcher and a transport vehicle on a ZIL-135LM wheeled chassis. The first launch of the 9M21 rocket took place on December 27, 1961, and the 9K52 Luna-M complex was put into serial production and into service entered in 1964. Serial production was carried out at the Barricades factory. The advantage of the 9K52 Luna-M complex over its predecessor was that the control unit had its own hydro-mechanical crane with a lifting capacity of 3 tons (see photo on the side , above) This made it possible to abandon the semi-trailer transport vehicle, which transported two spare missiles and a

self-propelled crane for reloading missiles. The 9P113 launcher provided highway speeds of up to 60 km / h, due to the use of the wheelbase, the tremors and overloads of the warhead were significantly reduced (for the Luna complex, the maximum speed was theoretically up to 40 km / h, but already at a speed of 16 18 km / h on dirt roads there were overloads, unacceptable for a nuclear warhead). Both the 9P113 launcher and the 9T29 transport vehicle have very high cross-country ability. They were capable of overcoming steep slopes up to 30 ° and fords up to 1.2 m deep. The 9P113 installation was capable of performing at least 200 9M21 missile launches. To lock the launcher during the launch of the rocket, four swing-out supports with screw jacks were used. PU 9P113 has a hydraulically driven device for setting the guide to the position for launching the rocket, as well as the necessary equipment for prelaunch and launch. There were also communications equipment, navigation and orientation equipment, power supply and life support systems. 9M21 unguided single-stage solid-fuel rocket was designed to destroy manpower, military equipment, firearms and defensive structures located in the tactical depth of enemy defense. The missile was designed in several versions, different warheads: 9M21B with a nuclear warhead 9N32, 9M21F with a high-explosive fragmentation warhead 9N18F, 9M21G with a chemical warhead 9N18G and even 9M21D with a propaganda warhead 9N18A. High-explosive fragmentation warhead 9N18F contained 200 kg of highly active explosive TGA-40/60 and gave at least 15,000 fragments. In 1969, the 9N18K was put into service with a 420 kg fragmentation warhead containing 42 warheads weighing 7.5 kg each and providing for the defeat of manpower over an area of several hectares. Since the 9H32 warheads in nuclear equipment required constant temperature control to ensure a given yield, and there was no internal heating system in the warheads of the Luna-M, the 9P113 launcher and the 9T29 transport vehicle included electric heating cases designed for maintaining the temperature of nuclear warheads in a given temperature regime. On the cover itself was a temperature sensor, which provided the on and off heating spirals, depending on temperature. The number of thermal covers coincided with the number of missiles transported (for 9P113 - 1, for 9T29 - 3). To ensure the heating of the main engine during long-term parking without starting the marching engines, a gas unit was included in these units. The 9M21 missile part consists of three engines, a launch, a main cruise and a "crank" [spin stabilization] engine. All solid-fuel engines. Various missile flight ranges were achieved by using brake flaps, as well as by changing the elevation angle at launch trajectories. The starting engine was placed around the nozzle of the main engine. It works while the rocket moves along the guides of the launcher. The ignition of the charge of the starting engine was produced by the gases of the main engine, penetrating through special holes. The charge of the starting engine was made of single-channel cylindrical checkers of gunpowder RSI-60, arranged in a circle in three rows. The main (sustainer) engine provides a given range of missile flight. It works only on the active part of the trajectory, and then the flight takes place by inertia. The charge of the main engine consists of single-channel cylindrical blocks made of NMF-2 nitroglycerin (ballistic) gunpowder. The armored ends of the checkers hold the charge in the combustion process, provides centering of the rocket. The powder charge was divided in length into two parts. Each part was held in the chamber of the rocket engine with its diaphragms, which approximately halves the load at the attachment points. The operation of the solid propellant rocket motor was significantly affected by the initial temperature of the charge, which ultimately affects the magnitude of the engine thrust. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. This factor can be eliminated by adjustments to the elevation angle of the guide before starting. In addition, the 9M21 rocket provides for the use of replaceable nozzle bushings, the liners of which have different diameters of the critical section. At elevated temperatures, bushings with a large critical section were used; at lower temperatures, vice versa. The rocket engine was started by applying an electrical impulse through the onboard connector to the squibs, the initiation of which leads to ignition of the igniter from granular smoke powder, which, in turn, ignite the powder charge of the main engine. The rotation engine serves to compensate for the moment arising due to the eccentricity of the thrust vector, and was located in the region of the center of mass of the rocket. The engine nozzles through curved gas ducts were brought to the side surface of the rocket, the thrust vectors of the engine of rotation were directed tangentially to the surface of the body and create a torque. The crank engine runs on RSI-60 gunpowder, the operating time was ~ 0.4 s, it turns on after the rocket leaves the guides. In the tail part of 9M21 stabilizers were installed to ensure a stable flight of the rocket along the trajectory. When calculating the data for launching a 9M21 rocket, weather conditions were taken into account, namely the direction and average wind speed at altitude. To do this, the starter battery has a meteorological station, which makes several shots vertically up from a ballistic gun. In the direction and distance of the bullets (daytime with a red ribbon, nighttime - glowing) from the point of the shot, the direction and average wind speed were calculated. To prevent the unauthorized use of nuclear weapons, all launchers capable of launching rockets in nuclear equipment were equipped with code-blocking devices. In 9K52TS launchers, which did not involve the use of warheads in nuclear equipment, there were no code blocking devices. PU 9K52TS was not equipped with thermal covers. The 9M21 missiles were also supposed to be equipped with the 9K53 Luna-MB complex. The development of the Luna-MB complex was started by Decree of the Council of Ministers of 02/05/1962. The 9P114 launcher, which was created on the basis of a wheeled vehicle, allowing landing by Mi-6 or Mi-10 helicopters, was used in this complex. Work on the Luna-MB complex reached the stage of testing prototypes. However, quite a few difficulties were encountered, the main one of which was the need for a preliminary topographic and geodetic reference of the launch position, as well as the large “sailing” of the Mi-10 helicopter with the 9P114 launcher on the external sling. As a result, in 1965, work on this complex was discontinued. A significant drawback of the Luna-M complex was the low accuracy of firing, even the use of a nuclear warhead did not provide guaranteed destruction of well-targeted point targets such as a command post, etc. In this regard, according to the Decree of the Council of Ministers of July 20, 1966, the development of the Luna-3 rocket, equipped with a simplified control system, was begun. It was assumed that the circular

probable deviation (CVO) of the new missile at a range of 70km would not exceed 500m. However, the flight tests conducted in 1968-1969 gave an even greater circular probable deviation compared to the prototype. The range corrector worked unsatisfactorily and the continuation of work on this OCD was deemed inappropriate. This complex became the most extensively deployed in the Soviet army, the peak of the deployment of combat vehicles of the complex occurred in 1986, when there were about 750 units in the troops. During the Cold War the most prominent short-range nuclear force [SNF] system at at the division level was the unguided free-rocket-over-ground (FROG), which in the Soviet Army was deployed in a battalion of four launchers. As of 1987 the Soviets were replacing FROGs with the more accurate, longer range SS-21s in some divisions opposite NATO. About 500 FROG and SS-21 launchers were opposite NATO. Another 215 FROG launchers were opposite China and in the Far East; some 100 were opposite Southwest Asia and eastern Turkey; and about 75 were in strategic reserve. Designed in 1968, a variant of the 9K52TS complex, designed for firing missiles with a high-explosive warhead, was widely exported to both Warsaw Pact and some non-Warsaw Pact nations. Armies of approximately 15 countries, including the armed forces of the Warsaw Pact, Cuba, Egypt, Iraq, Kuwait, Libya, the DPRK, and Yemen became its buyers. Laith, an Iraqi improved version of the FROG-7, had a 90 km range. The combat debut of the complex took place during the 1973 Arab-Israeli war. The Luna-M complex was used in a number of regional conflicts, including in Afghanistan, the Iran-Iraq war of 1980-88, and the Gulf War of 1991. The Syrian army began to use 9K52 Luna-M missile , also known under the NATO designation FROG-7, systems against terrorists. These systems, along with 9K72 Elbrus, for a long time formed the basis of the missile power of the Syrian army. The Soviet Union began delivering FROG-7 to its most faithful ally in the Middle East at the very beginning of the 70s. The Syrians quite successfully mastered this weapon.

→→Heavy Rocket Systems (up to 200 km)

PHL-03 Chinese 300mm Multiple Rocket Launcher (MRL)




Tiers:



Variants:

- **AR2:** Export variant that is similar to its parent
- **AR1:** Version of the PHL-03 with rearranged rocket tubes. It was developed especially for export. This artillery system has a total of 8 launch tubes, arranged in 2 pods with 4 rockets each. The pods are factory fitted and sealed. Once all of the rockets are launched the pods are removed and replaced. Such artillery rocket systems are faster to reload, easier to store, and easier to maintain.
- **AR1A:** Has a total of 10 launch tubes arranged in 2 pods of 5 rockets each
- **AR3:** Has 8 launch tubes for 370mm guided rockets. These are arranged in 2 pods with 4 rockets each. These guided rockets have a maximum range of 220km and have capabilities similar to that of a short range ballistic missile.

System

Alternative Designation: Type 03
Cailber/Length: mm300
Chassis/Carriage: Wanshan WS2400, 8 x 8
Crew: ea4
Displacement Time: min1
Emplacement Time: min3
Launch Rate, Full Salvo Time: rd/sec30
Range: km70-150
Number of Rockets: 12
Reload Time: min30

Dimensions

Height: m3
Length: m12
Width: m3
Weight: mt43

Automotive

Engine Type: Diesel

Engine Power: hp500

Fording Depth: m1

Range, Cruising: km650

Speed, Maximum On: 60

Maximum Grade / Slope: degrees60

Side Grade / Slope: degrees30

Vertical Step: m0.6

Maximum Trench Width: m2

Tire Inflation System: Yes

Missile

↳*System*

Caliber/Length: mm300

Length, Rocket: m7.3

Range, Minimum: km20

Range, Maximum: km130

Weight: kg840

Rocket Diameter: m0.3

Weight of Warhead: kg280

Fuel: Solid

Warheads available: Anti-armor and anti-personnel. Dual purpose with no less than 500 munitions. Anti-armor munitions are believed to be able to penetrate armor less than or equal to 50mm. DP munitions are believed to have a kill radius no less than 7m.

↳*Ammunition*

BRC3:

Warhead: Cluster munitions containing 623 submunitions

Range: km20-70

BRC4:

Warhead: 414 submunitions

Range: km60-103

BRE2:

Warhead: 190kg of Frag-HE

Range: km60-130

Fire Control System

Fire Control Computer: Digital

GPS: Yes (GLONASS)

Protection

NBC Protection: Yes

Smoke Equipment: No

Notes:

A replica of the Russian 9K58 Smerch. The PHL-03 MRL system consists of rockets, launch tube group, launch vehicles, command vehicle, and transport vehicle. A reload vehicle carries 12 rockets. A PHL-03 unit consists of a command vehicle, 4-6 launch vehicles, and 4-6 reload vehicles. The PHL-03 launcher can execute fire missions autonomously as each vehicle is equipped with GPS. The rockets are not guided however, the munitions are.

WS-3 Chinese 400mm Guided Multiple Launcher Rocket System



Tiers:



Variants:

- **WS-1:** 100 km of Maximum Range Version.
- **WS-1B:** 180 km of Maximum Range Version.
- **WS-2:** Guided MLRS with Range from 70 - 200 km Version.
- **WS-2B:** Upgraded version with Long Range Capacity.
- **WS-2C:** Upgraded version with GPS Guidance and 350 km Range.
- **WS-2D:** Upgraded version with GPS Guidance and 400 km range and ability to launch lethal unmanned aerial vehicles.
- **WS-3A:** Upgraded version of WS-3 with GPS/GLONASS

System

Alternative Designation: WS-3
Type: High-Precision Guided Multiple Launch Rocket System MGLRS
Crew: ea6
Chassis: TA5450 Cross-Country Truck
Displacement Time: min12
Emplacement Time: INA
Time Required to Reload: INA
Maximum Effective Range: km200
Rocket Launcher: mm400
Rounds: ea6
Note: The WS-3 system is externally very similar to the WS-2 launcher, although the rockets are reportedly more accurate. Their respective ranges are both 40-124 mi (70-200 km). Some sources suggest that the WS-3 may have a range of more than 190 mi (300 km).

Dimensions

Length (WS-3 Only): m7.15
Diameter (WS-3 Only): m10.40
Height: INA
Weight, (WS-3 Only): kg11.63

Automotive

NOTE: The WS-3 is mounted on a TA5450 Cross-Country Truck Chassis

Engine Name: Deutz Diesel

Engine Type: Diesel

Engine Power: hp517

Cruising Range: km800

Speed, Maximum Road: km/h80

Speed, Average Cross: km/h70

Cab: Air-conditioned forward control, fully enclosed, four-door cab and crew compartment to the rear.

Cab Seating: ea1-5

Gradient: %45

Side Slope: m0.6

Vertical Step: m2

Fording: m1.1

Variants to the TA5450 Cross Country Truck: Taian TA5350, Taian TA4360, Taian TA4410, Taian TA5690, Taian TA5801, Taian TA5920

Communications

Radio: INA

Main Gun

↳*System*

Name: WS-3

Type: Multiple Launch Rocket

Rocket Length: m7.15

Diameter: m0.40

Number of Tubes: ea6

Launch Rate, Single Rocket Interval: sec6

Loader Type: Three cells each of two rockets in sealed containers

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

↳*Ammunition*

Type: Rocket

Caliber: mm400

Muzzle Velocity: INA

Fuse Type: INA

Warhead Weight: kg200

Rocket length: m7.15

Rockets per Launch Truck: ea30-40

Max Range: km200

Min Range: km70

Basic Load: ea6

Armor Penetration: Yes

Accuracy (CEP): m300

Accuracy (with Strap-on GPS): m50

Available Warheads: HE, 540-Boblet Variant and Fuel-Air Explosive, Lethal Blasting, Cluster, And Blasting-Burning.

Fire Control

Name: WS-3

Computerized FCS: Yes

Inertial Navigation System: Yes

Direct Fire: Yes

Indirect Fire: INA

Collimator: INA

Position Location System: Yes

Hydraulic Stabilisers: 4 (two on each side)

Preparation Time: minless than 7

Navigation Controller: Yes

Antenna: GNSS

Amplifier: Low Noise

Actuator System: Yes

Onboard Battery: Yes

Power Distributor: Available

Onboard Cable and Flight Control Software: Available

Protection

Armor: mNo Armor Protection

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The WS-3 is a Chinese-made 400mm high-precision guided MLRS / MGLRS (Multiple Launch Rocket System) designed and manufactured by Poly Technologies, based in Beijing, China. The WS-3 was unveiled during the Zhuhai Air Show in 2008. The WS-3 MGLRS is equipped with GPS/INS integrtaed navigation syetm and full range of control equipment to improve the firing accuracy. The canister-launcher system is mounted on a high-mobile cross-country truck chassis with multiple functions of storage, transport and launch. The control system of the WS-3 is composed of navigation controller, GNSS antenna, low noise amplifier, actuator system, onboard battery, power distributor, onboard cable and flight control software. The WS-2 artillery system has a preparation time of less than 7 minutes

→→Super-Heavy Unguided Rocket Systems (more than 200 km)

Astros II Brazilian 127mm, 180mm, & 300mm Multiple Rocket Launcher





Tiers:



System

Alternative Designation: Astros II AV-LMU
Chassis/Carriage: Tectran 10-ton, 6x6 / Astros standard chassis AV-VBA 6×6
Crew: ea3
Displacement Time: INA
Emplacement Time: INA

Dimensions

Height: m2.6
Length, Chassis Overall: m8.0
Width: m2.4
Weight, Combat: mt20

Automotive (Astros standard chassis AV-VBA 6×6 / Tectran 10-ton, 6x6)

Engine Type: Mercedes, OM422, 8-cylinder, water-cooled, turbo-charged diesel
Engine Type: Diesel
Engine Power: hp280
Fording Depth: m1
Range, Cruising: 480
Speed, Maximum On: 90
Speed, Maximum Off: 40
Trench Crossing: m2.3
Vertical Obstacle: m1
Gradient: deg60
Side Slope: deg30

Armament

Caliber, Type, Name: 127mm, 180mm, and 300mm Astros

Loader Type: Manual

Number of Tubes: 127mm - 32 each, 180mm - 16 each, 300mm - 4 each

Reload Time: INA

Traverse: INA

Traverse, Left: INA

Traverse, Right: INA

Elevation: INA

Launch Rate (full): INA

Launch Rate (single): INA

Launcher Drive: Electric

Ammunition

↳*127mm Frag-HE, SS-30*

Range, Minimum: m9,000

Range, Maximum: m30,000

Warhead Weight: INA

Length, Rocket: m3.9

Other warheads for this rocket: None

↳*180mm, Frag-HE, SS-40*

Range, Minimum: m15,000

Range, Maximum: m35,000

Warhead Weight: INA

Length, Rocket: m4.2

Other warheads for this rocket: DPICM, HE-I, AT/AP Mines, Runway Denial

↳*300mm Frag-HE, SS-60*

Range, Minimum: m20,000

Range, Maximum: m60,000

Warhead Weight: INA

Length, Rocket: m5.6

Other warheads for this rocket: DPICM, HE-I, AT/AP Mines, Runway Denial

↳*300mm Frag-HE, SS-80*

Range, Minimum: m22,000

Range, Maximum: m90,000

Warhead Weight: INA

Rocket Length: m5.6

Other warheads for this rocket: DPICM, HE-I, AT/AP Mines, Runway Denial

↳***180 mm SS-AV-40 (under development)***

Range, Minimum: m15,000

Range, Maximum: m40,000

Number of Rockets per Launcher: 40

↳***450 mm SS-150***

Range, Minimum: m29,000

Range, Maximum: m150,000

Number of Rockets per Launcher: 4

↳***FOG MPM: Anti-tank, anti-fortification and anti-helicopter missile***

Range, Minimum: m5,000

Range, Maximum: m60,000

Number of Rockets per Launcher: INA

↳***AV-TM 300***

Range, Minimum: m30,000

Range, Maximum: m300,000

Number of Rockets per Launcher: 2

Communications

↳***Radio***

Name: INA

Fire Control System

Fire Control Computer: Field Guard or FILA

Collimator: None

Position Location System: No

Protection

NBC Protection: Likely

Self-entrenching Blade: No

Smoke Equipment: 6 smoke grenade launchers

Cab: Protected against small arms and artillery splinters

Notes:

The Astros (Artillery Saturation Rocket System) II is a modular multiple rocket launcher capable of firing three different caliber wrap-around fin rockets (for improved accuracy) using several types of warheads. The universal modules enable the system to accomplish fire missions with ranges from 9 to 90 kilometers. The Astros II system consists of the following vehicles: universal multiple launcher (AV-LMU), ammunition supply vehicle (AV-RMD), command and control vehicle/fire control unit (AVVCC), mobile workshops (for field maintenance), and the optional electronic fire control unit (AV-UCF). All of the Astros II vehicles use the Tectran Enginharia 10 ton, 6x6, wheeled vehicle chassis. A typical firing battery consists of six AV-LMU launchers, six AV-RMD ammunition supply vehicles, and one AV-VCC fire control unit. An AV-VCC command and control unit and two mobile workshops are found at battalion level. The battalion level AV-VCC can coordinate and direct fire missions for three Astros batteries. The AV-RMD ammunition supply vehicle carries two complete loads for each launcher.

→Anti-Tank Gun Systems

Type 73 Chinese 100mm Towed Anti-Tank Gun




Tiers:



Variants:

- **A407:** This artillery system was designed by Arsenal-Resita and is very similar to the MT-12. It can fire the same range of ammunition as the T-54/55 tank and has a maximum range of 2,200 m (HEAT) or 4,000 m (APC-T). Subversions are the A407M1 and the A407M2. In Romanian Army service, the A407 is known as the 100 mm anti-tank gun M1977 (Romanian: Tun antitanc calibrul 100-mm Model 1977) and is normally towed by the DAC 887R truck. It can also be towed with the DAC 665T truck. The Model 2002 is an improved version, fitted with the automatic fire control system TAT-100.
- **Type 73:** This appears to be a copy of the Soviet T-12.
- **Type 86:** This is a 100mm smoothbore anti-tank gun that has some similarities with the 85mm Type 56 (D-44). It fires ammunition of the fixed type, including the Type 73 HE, Type 73 HEAT, Type 73 APFSDS and Type 86 APFSDS to a maximum range of 1,800 m.
- **2A19 or T-12:** 2A19 or T-12 is a Soviet smoothbore 100-mm anti-tank gun, which served as the primary towed anti-tank artillery in the Soviet and Bulgarian armies from the early 1960s to the late 1980s.

System

Alternative Designation: 2A29
Type: Towed Anti-Tank Gun
In Service: 1961-Present
Crew: 6 (commander, driver, gunner, loader, 2 ammunition handlers)
Displacement Time: INA
Emplacement Time: INA
Note: Thanks to the redesigned carriage, which has a bigger wheel base, the MT-12 can be towed by the MT-LB, at speeds up to 60 km/h on road or 25 km/h cross-country.

Dimensions

Length: 9.16 m
Barrel Length: 8.48 m
Width: 1.795 m
Height: 1.565 m
Weight: 2,750 kg

Main Weapon System

↳*System*

Name: 2A19
Type: Towed Anti-Tank Gun
Caliber: mm100
Carriage: Transport: Ural-375D (6x6) On road: 60 km/h (37 mph) Off road: 15 km/h (9 mph)
Elevation: −10° to +20°
Traverse: 27° left or right
Rate of Fire: 14 rpm (max possible) 10 rpm (max likely) 4 to 6 rpm (typical)
Muzzle Velocity: See Ammunition Types
Maximum Firing Range: See Ammunition Types

↳*Ammunition*

Type: Projectile
Caliber: 100mm
Shell: Fixed QF 100 × 910 mmR
Basic Load: When the MT-LB is used as the transporter, 20 rounds are typically carried (10 APFSDS, 4 HE-Frag, 6 HEAT). Since the weapon is a smoothbore, all the ammunition is finned for accuracy during flight.
Ammunition Types: APFSDS BM-2 APFSDS projectile. 3BM-2 APFSDS-T Tungsten Round weight: 19.34 kg (42.6 lb) Projectile weight: 5.65 kg (12.5 lb) Muzzle velocity: 1,575 m/s (5,170 ft/s) Maximum range: 3,000 m (3,300 yd) Penetration: 230 mm at 500 m (9 in at 550 yd) 180 mm at 2,000 m (7 in at 2,200 yd) 140 mm at 3,000 m (5.5 in at 3,300 yd) 3BM23/3UBM10 APFSDS Round weight: 19.9 kg (44 lb) Projectile weight: 4.55 kg (10.0 lb) Muzzle velocity: 1,548 m/s (5,080 ft/s) Maximum range: 3,000 m (3,300 yd) Penetration: 225 mm at 1000 m (8.8 in at 1100 yd) HEAT 3BK16M/3UBK8 Round weight: 23.1 kg (51 lb) Projectile weight: 9.5 kg (21 lb) Muzzle velocity: 975 m/s (3,200 ft/s) Maximum range: 1,000 m (1,100 yd) Penetration: 400 mm (16 in) HE-FRAG 3OF12/3OF35 Round weight: 28.9 kg (64 lb) Projectile weight: 16.7 kg (37 lb) Muzzle velocity: 700 m/s (2,300 ft/s) Maximum range (indirect): 8,200 m (9,000 yd) Guided projectile 9K117 Kastet 3UBK10/3UBK10M Main article: 9M117 Bastion Beam riding laser guided projectile. Round weight: 24.5 kg (54 lb) Projectile weight: 17.6 kg (39 lb) Average speed: 300 m/s (980 ft/s) Range: 100–5,000 m (110–5,470 yd) Penetration: 550–600 mm (22–24 in)

Fire Control

↳*Fire Control System*

Name: INA
Computerized FCS: No
Direct Fire: Yes
Indirect Fire: Yes
Sights: The standard equipment consists of the panoramic PG-1M sight for indirect fire, and an OP4M-40U telescope for direct fire. The APN-5-40 or APN-6-40 are used for direct fire by night.

Notes:

Type 73 - This appears to be a copy of the Soviet T-12. 2A19 or T-12 is a Soviet smooth-bore 100-mm anti-tank gun, which

served as the primary towed anti-tank artillery in the Soviet and Bulgarian armies from the early 1960s to the late 1980s. The T-12 entered service in 1961, replacing the BS-3 100 mm field gun. It was typically deployed in the anti-tank units of armored and motor rifle regiments to protect flanks against counter-attacks during rapid advances. In 1970, it was replaced in production by the T-12A or MT-12 "Rapira", which features a new smooth-bore gun, the 100 mm 2A29 gun, as well as a redesigned carriage and gun shield to protect the crew from machine gun fire and shell splinters. Thanks to the redesigned carriage, which has a bigger wheel base, the MT-12 can be towed by the MT-LB, at speeds up to 60 km/h on road or 25 km/h cross-country. The 2A29R "Ruta" or MT-12R is a version with a RLPK-1 radar for engaging targets in a poor visibility environment (smoke/fog). From 1981, the gun could fire laser beam-riding guided missiles 9M117 Kastet (weapon system 9K116) and carried the new designator 2A29K "Kastet" or MT-12K. The weapon was planned to be superseded by the 2A45 Sprut-B 125 mm smooth bore anti-tank gun. Modern western tanks' frontal armor protection is in excess of what can be penetrated by a 100 mm gun from anything but point-blank range – even using the most modern APFSDS round. For a tank that can maneuver to take advantage of the enemy's weaknesses this is less of a problem – but for a weapon that is primarily defensive, this is a serious problem. Today, the T-12 is applied mostly in the role of ordinary artillery, using FRAG-HE shells. In 2017, the Algerian military displayed a locally developed variant mounted on a Mercedes-Benz Zetros truck. It includes four stabilization legs to absorb firing impacts. The gun requires a crew of six: commander, driver of the towing vehicle, gun layer, loader, and two ammunition crewmen. When the MT-LB is used as the transporter, 20 rounds are typically carried (10 APFSDS, 4 HE-Frag, 6 HEAT). Since the weapon is a smooth-bore, all the ammunition is finned for accuracy during flight. The standard equipment consists of the panoramic PG-1M sight for indirect fire, and an OP4M-40U telescope for direct fire. The APN-5-40 or APN-6-40 are used for direct fire by night. The gun can be fitted with the LO-7 ski gear for travel across snow or swampy ground.

2A19 (T-12) Russian 100mm Towed Anti-Tank Gun





Tiers:



Variants:

- **A407:** This artillery system was designed by Arsenal-Resita and is very similar to the MT-12. It can fire the same range of ammunition as the T-54/55 tank and has a maximum range of 2,200 m (HEAT) or 4,000 m (APC-T). Subversions are the A407M1 and the A407M2. In Romanian Army service, the A407 is known as the 100 mm anti-tank gun M1977 (Romanian: Tun antitanc calibrul 100-mm Model 1977) and is normally towed by the DAC 887R truck. It can also be towed with the DAC 665T truck. The Model 2002 is an improved version, fitted with the automatic fire control system TAT-100.
- **Type 73:** This appears to be a copy of the Soviet T-12.
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System

Alternative Designation: 2A29

Type: Towed Anti-Tank Gun

In Service: 1961-Present

Crew: ea6 (commander, driver, gunner, loader, 2 ammunition handlers)

Displacement Time: INA

Emplacement Time: INA

Note: Thanks to the redesigned carriage, which has a bigger wheel base, the MT-12 can be towed by the MT-LB, at speeds up to 60 km/h on road or 25 km/h cross-country.

Dimensions

Length: 9.16 m

Barrel Length: 8.48 m

Width: 1.795 m

Height: 1.565 m

Weight: 2,750 kg

Main Weapon System

↳*System*

Name: 2A19

Type: Towed Anti-Tank Gun

Caliber: mm100

Carriage: Transport: Ural-375D (6x6) On road: 60 km/h (37 mph) Off road: 15 km/h (9 mph)

Elevation: −10° to +20°

Traverse: 27° left or right

Rate of Fire: 14 rpm (max possible) 10 rpm (max likely) 4 to 6 rpm (typical)

Muzzle Velocity: See Ammunition Types

Maximum Firing Range: See Ammunition Types

↳*Ammunition*

Type: Projectile

Caliber: 100mm

Shell: Fixed QF 100 × 910 mmR

Basic Load: When the MT-LB is used as the transporter, 20 rounds are typically carried (10 APFSDS, 4 HE-Frag, 6 HEAT). Since the weapon is a smoothbore, all the ammunition is finned for accuracy during flight.

Ammunition Types: APFSDS BM-2 APFSDS projectile. 3BM-2 APFSDS-T Tungsten Round weight: 19.34 kg (42.6 lb) Projectile weight: 5.65 kg (12.5 lb) Muzzle velocity: 1,575 m/s (5,170 ft/s) Maximum range: 3,000 m (3,300 yd) Penetration: 230 mm at 500 m (9 in at 550 yd) 180 mm at 2,000 m (7 in at 2,200 yd) 140 mm at 3,000 m (5.5 in at 3,300 yd) 3BM23/3UBM10 APFSDS Round weight: 19.9 kg (44 lb) Projectile weight: 4.55 kg (10.0 lb) Muzzle velocity: 1,548 m/s (5,080 ft/s) Maximum range: 3,000 m (3,300 yd) Penetration: 225 mm at 1000 m (8.8 in at 1100 yd) HEAT 3BK16M/3UBK8 Round weight: 23.1 kg (51 lb) Projectile weight: 9.5 kg (21 lb) Muzzle velocity: 975 m/s (3,200 ft/s) Maximum range: 1,000 m (1,100 yd) Penetration: 400 mm (16 in) HE-FRAG 3OF12/3OF35 Round weight: 28.9 kg (64 lb) Projectile weight: 16.7 kg (37 lb) Muzzle velocity: 700 m/s (2,300 ft/s) Maximum range (indirect): 8,200 m (9,000 yd) Guided projectile 9K117 Kastet 3UBK10/3UBK10M Main article: 9M117 Bastion Beam riding laser guided projectile. Round weight: 24.5 kg (54 lb) Projectile weight: 17.6 kg (39 lb) Average speed: 300 m/s (980 ft/s) Range: 100–5,000 m (110–5,470 yd) Penetration: 550–600 mm (22–24 in)

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Sights: The standard equipment consists of the panoramic PG-1M sight for indirect fire, and an OP4M-40U telescope for

direct fire. The APN-5-40 or APN-6-40 are used for direct fire by night.

Notes:

2A19 or T-12 is a Soviet smoothbore 100-mm anti-tank gun, which served as the primary towed anti-tank artillery in the Soviet and Bulgarian armies from the early 1960s to the late 1980s. The T-12 entered service in 1961, replacing the BS-3 100 mm field gun. It was typically deployed in the anti-tank units of armoured and motor rifle regiments to protect flanks against counter-attacks during rapid advances. In 1970, it was replaced in production by the T-12A or MT-12 "Rapira", which features a new smoothbore gun, the 100 mm 2A29 gun, as well as a redesigned carriage and gun shield to protect the crew from machine gun fire and shell splinters. Thanks to the redesigned carriage, which has a bigger wheel base, the MT-12 can be towed by the MT-LB, at speeds up to 60 km/h on road or 25 km/h cross-country. The 2A29R "Ruta" or MT-12R is a version with a RLPK-1 radar for engaging targets in a poor visibility environment (smoke/fog). From 1981, the gun could fire laser beam-riding guided missiles 9M117 Kastet (weapon system 9K116) and carried the new designator 2A29K "Kastet" or MT-12K. The weapon was planned to be superseded by the 2A45 Sprut-B 125 mm smooth bore anti-tank gun. Modern western tanks' frontal armour protection is in excess of what can be penetrated by a 100 mm gun from anything but point-blank range – even using the most modern APFSDS round. For a tank that can manoeuvre to take advantage of the enemy's weaknesses this is less of a problem – but for a weapon that is primarily defensive, this is a serious problem. Today, the T-12 is applied mostly in the role of ordinary artillery, using FRAG-HE shells. In 2017, the Algerian military displayed a locally developed variant mounted on a Mercedes-Benz Zetros truck. It includes four stabilization legs to absorb firing impacts. The gun requires a crew of six: commander, driver of the towing vehicle, gun layer, loader, and two ammunition crewmen. When the MT-LB is used as the transporter, 20 rounds are typically carried (10 APFSDS, 4 HE-Frag, 6 HEAT). Since the weapon is a smoothbore, all the ammunition is finned for accuracy during flight. The standard equipment consists of the panoramic PG-1M sight for indirect fire, and an OP4M-40U telescope for direct fire. The APN-5-40 or APN-6-40 are used for direct fire by night. The gun can be fitted with the LO-7 ski gear for travel across snow or swampy ground.

BS-3 (M-1944) Russian 100mm Towed Anti-Tank Gun




Tiers:



Variants:

- **Type 59:** Chinese Variant

System

Alternative Designation: M-1944; BS-3
Type: Towed Anti-Tank Gun
Crew: 6-8
Carriage: Split trail
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m9.37
Width: m2.15
Barrel Length: Bore: 5.34 m (17 ft 6 in) L/53.5 Overall: 5.96 m (19 ft 7 in) L/59.6
Height: m1.5
Weight, Combat: kg3,650

Main Weapon System

↳*System*

Name: M-1944
Type: Towed Anti-Tank Gun
Caliber: mm100
Breech: Semi-automatic vertical sliding-wedge
Recoil: Hydro-pneumatic
Carriage: Split trail

Rate of Fire: 8 to 10 rpm

Muzzle Velocity: m/s900

Maximum Firing Range: km20

Maximum Elevation: deg+45

Minimum Elevation: deg-5

Traverse Range: deg58

Traverse Right: deg29

Traverse Left: deg29

↳*Ammunition*

Name: BR-412D

Type: APBC

Caliber: mm100

Projectile Weight: 15.6 kg

Basic Load: INA

Armor Penetration: Armor penetration (BR-412B, 30° degrees) 500 m : 190 mm (547 yds : 6.29 in) 1000 m : 170 mm (1,093 yds : 6 in)

Notes:

The 100 mm field gun M1944 (BS-3) (Russian: 100-мм полевая пушка обр. 1944 г. (БС-3)) was a Soviet 100 mm anti-tank and field gun. The gun was successfully employed in the late stages of World War II, and remained in service into the 1950s, being replaced in Soviet service by the T-12 antitank gun and the 85 mm antitank gun D-48 in 1955. The BS-3 was also sold to a number of other countries and in some of these countries the gun is still in service. A number of BS-3 pieces are still stored in Russian Ground Forces arsenals. Also, in 2012, at least 12 BS-3 guns are active with the 18th Machine Gun Artillery Division, located on the Kuril Islands, used as anti-ship and anti-landing guns. The BS-3 was based on the B-34 naval gun. The development team was led by V. G. Grabin. The gun was employed by light artillery brigades of tank armies (20 pieces along with 48 ZiS-3) and by corps artillery. In the Second World War the BS-3 was successfully used as a powerful anti-tank gun. It was capable of defeating any contemporary tank at long range, excluding the Tiger Ausf B: to destroy that heavy tank the gun needed to shoot at less than 1600 m from the target. The gun was also used as a field gun. Though in this role it was less powerful than the 122 mm A-19, as it fired a smaller round, the BS-3 was more mobile and had a higher rate of fire.

Type 86 Chinese 100mm Towed Anti-Tank Gun




Tiers:



Variants:

- **A407:** This artillery system was designed by Arsenal-Resita and is very similar to the MT-12. It can fire the same range of ammunition as the T-54/55 tank and has a maximum range of 2,200 m (HEAT) or 4,000 m (APC-T). Subversions are the A407M1 and the A407M2. In Romanian Army service, the A407 is known as the 100 mm anti-tank gun M1977 (Romanian: Tun antitanc calibrul 100-mm Model 1977) and is normally towed by the DAC 887R truck. It can also be towed with the DAC 665T truck. The Model 2002 is an improved version, fitted with the automatic fire control system TAT-100.
- **Type 73:** This appears to be a copy of the Soviet T-12.
- **Type 86:** This is a 100mm smoothbore anti-tank gun that has some similarities with the 85mm Type 56 (D-44). It fires ammunition of the fixed type, including the Type 73 HE, Type 73 HEAT, Type 73 APFSDS and Type 86 APFSDS to a maximum range of 1,800 m.
- **2A19 or T-12:** 2A19 or T-12 is a Soviet smoothbore 100-mm anti-tank gun, which served as the primary towed anti-tank artillery in the Soviet and Bulgarian armies from the early 1960s to the late 1980s.

System

Alternative Designation: Type 86
Type: Towed Anti-Tank Gun
In Service: 1961-Present
Crew: 6 (commander, driver, gunner, loader, 2 ammunition handlers)
Displacement Time: INA
Emplacement Time: INA
Note: Thanks to the redesigned carriage, which has a bigger wheel base, the MT-12 can be towed by the MT-LB, at speeds up to 60 km/h on road or 25 km/h cross-country.

Dimensions

Length: mm9,520
Barrel Length: 54.5 caliber
Width: mm2120
Height: mm1,840
Weight: 3,630 kg

Main Weapon System

↳*System*

Name: Type 86

Type: Towed Anti-Tank Gun

Caliber: mm100

Carriage: INA

Elevation: −4° to +38°

Traverse: 27° left or right

Rate of Fire: 14 rpm (max possible) 10 rpm (max likely) 4 to 6 rpm (typical)

Muzzle Velocity: 1,610 m/s. Also See Ammunition Types

Maximum Firing Range: 13,700 meters. Also See Ammunition Types

↳*Ammunition*

Type: Projectile

Caliber: 100mm

Shell: Fixed QF 100 × 910 mmR

Basic Load: When the MT-LB is used as the transporter, 20 rounds are typically carried (10 APFSDS, 4 HE-Frag, 6 HEAT). Since the weapon is a smoothbore, all the ammunition is finned for accuracy during flight.

Ammunition Types: The Type 86 fires the following types of 100 mm fixed ammunition: APFSDS Type 86 with a tungsten penetrator at a muzzle velocity of 1,610 m/s with an effective range of 1,800 m; when firing this round the maximum rate of fire is 4 to 5 rds/min APDS Type 73 with a tungsten penetrator at a muzzle velocity of 1,500 m/s with an effective range of 1,700 m HEAT Type 73 fin-stabilised projectile at a muzzle velocity of 1,010 m/s. APFSDS Type 73 with tungsten alloy penetrator with a maximum direct fire range of 1,700 m APFSDS Type 73 with the projectile having a length-to-diameter ratio of 13.3:1 and a maximum range in the direct fire role of 1,730 m HE Type 73 fin-stabilised projectile at a muzzle velocity of 900 m/s with a maximum range of 13,700 m. When firing these projectiles, the usual recoil length is between 1 and 1.14 m; maximum recoil length is 1.18 m. NORINCO is now marketing a 155 mm laser-guided artillery projectile and laser-guided (for example 105 mm) tank-launched projectiles. As far as it is known, no 100 mm laser-guided projectiles have been developed for this weapon. It is understood that these Chinese laser-guided anti-armour projectiles are based on Russian technology transfer.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: Yes

Sights: A night vision device for sighting purposes is available.

Notes:

The Type 86 is the 100mm towed antitank gun developed in the late 1980s based on the high-pressure 100mm smooth-bore gun technology and the two-wheel carriage of the Type 73 100mm towed antitank gun. NORINCO claimed that the Type 86 is

capable of penetrating the frontal armor of the basic variant T-72 at a distance of 2,000m, and later improved variants could penetrate the T-72 and T-80 fitted with explosive reactive armor (ERA). The gun also outperforms Western 105mm tank guns. The Type 86 is in service with PLA motorized infantry divisions as the primary antitank artillery weapon. Description The Type 86 ordnance is smooth-bore and features a distinctive slotted muzzle brake. The breech mechanism has a vertical sliding block and the sighting mechanism is mounted to the left of the gun. The carriage uses split trails with a castor wheel on the left trail leg to assist in bringing the gun into action. A shield with sloping sides is fitted with an opening for the sight on the left side. Although the Type 86 is primarily an anti-tank weapon it can be used for the indirect fire role, even though the potential maximum range is limited by the maximum gun elevation of +38°. Maximum rate of fire is quoted as 8 to 10 rds/min. A night vision device for sighting purposes is available.

→Sound Ranging System

Ballistic Missiles

→Close-Range Ballistic Missiles (CRBM) (50 km - 300 km)

→→Ground-Launched Ballistic Missiles (GLBM) (50 km - 300 km)

Naze'at 6-H Iranian Close Range Ballistic Missile



Tiers:



Variants:

- **Naze'at 10-H:** Improved version with a longer range rocket.

System

Alternative Designation: Naze'at 6-H , Naze'at 6
Date of Introduction: 1980
Proliferation: INA
Type: Surface to Surface Ballistic Missile / Long-Range Artillery Rocket
Family: Naze'at
Crew: INA
Chassis: INA
Displacement Time: INA
Emplacement Time: INA

Dimensions (Chassis)

Length: INA
Width: INA
Height: INA
Weight, Combat: INA
Ground Pressure: INA

Automotive (Chassis)

Engine Name: INA

Engine Type: INA

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth: INA

Communications

Primary: INA

Missile System

↳*Transporter, Erector, Launcher*

Name: INA

Type: Transporter erector launcher

Fire on the Move: No

↳*Missile*

Name: Naze'at 6-H rocket

Type: SS Ballistic Missile / Long-Range Artillery Rocket

Length: mm6,290

Diameter: mm356

Initial Weight: kg960

Propellant Weight: kg420

Propellant Type: Solid Hydroxyl-terminated polybutadiene

Warhead Weight: kg130

Maximum Range: km100

Minimum Range: km80

CEP: 500-1000 m

Average Action Time: 9 seconds

Specific Impulse: 240 seconds

Service Life: 7 Years

Speed: Mach 4-5

Fire Control

Note: No Guidance System however, TELs use GPS to set the launch site

Protection

Note (1): The TEL has no active or passive protection systems other than NBC

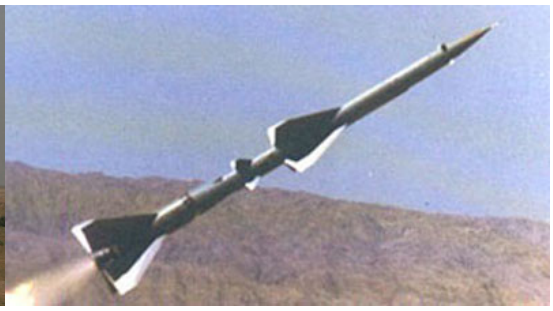
Note (2): The rocket has no counter measures

Notes:

The Naze'at 6-H is a Iranian close range ballistic missile (some classify it as rocket artillery) with a range of about 100 km. Like Iran's similar shaped Zelzal rockets, Naze'at rockets do not have a guidance system. The Naze'at 6-H is also widely known without the -H suffix, as the Naze'at 6. The Naze'at is launched from a transporter erector launcher (TEL) and carries a conventional warhead. It may be capable of carrying a chemical or biological warhead as well. A complete Naze'at system includes a TEL and communications vans, meteorological vans, and a GPS system for surveying the launch site. The reliability and accuracy of Naze'at rockets is assessed as poor as they have no guidance system.

Tondar-69 Iranian Surface to Surface Short Range Ballistic Missile





Tiers:



System

Alternate Designation: B610, CSS-8, M-7, Thunder 69

Country of Origin: China

Basing: TEL

Launch Platform(s): Towed TEL

Effective Range: km150

Circular Error Probability: m300

Dimensions

Length: m10.8

Missile Weight: kg2,650

Diameter: 0.65 m (first stage), 0.5 m (second stage)

Fin Span: INA

Payload

Warhead Type: Single

Warhead Options: Conventional and Nuclear

Nuclear Yield: INA

Conventional Warhead Weight: kg190

Conventional Warheads Available: HE

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Propulsion Characteristics

Engine: 2 Stage

Propellant: Solid for first stage, liquid for second

Speed: INA

Flight Ceiling: INA

Attack Altitude: NA

Fire Control

Guidance System: Inertial navigation system (INS) guidance with command updates

Notes:

The Iranian CSS-8 (M-7) is a short range, solid fueled, ballistic missile. It is believed Iran acquired 200 of the CSS-8 (M-7) from China in the late 1980s. Iran later renamed the system Tondar-69. Although the CSS-8 (M-7) entered into service in 1992, it may soon become obsolete as less than 100 of the missiles are in operation since only 20 tracked launcher vehicles are in service. Furthermore, the system is reported to have poor accuracy. Reports indicate that Iranian leaders were unsatisfied with the missile, with most pointing to its poor accuracy, as mentioned above, and light warhead. Iran subsequently began development of the Fateh-110 SRBM, which also uses solid-fuel.

Fateh-110 Iranian Surface to Surface Short Range Ballistic Missile (SRBM)







Tiers:



Variants:

- **The Fateh-110/I:** Has a maximum range of 200km (124 miles), and can carry a 650kg payload. It was declared operational in 2002.
- **The Fateh-110/II:** Has a range of 250km (155 miles), a payload of 450kg. Iran announced the development of this variant in 2004.
- **The Fateh-110/III:** Was announced in 2010 and designed to have more accuracy and a quicker launch time. It has a range of 300km, can carry a 650kgpayload.
- **The Fateh-110/IV:** Developed in 2012 and is designed to have precision targeting and has a guidance system. It also has a range of 300km, can carry a 650kg payload.
- **Zolfaghar:** On September 25, 2016, Iranian Defense Minister Hossein Dehghan announced that Iran's new Zolfaghar ballistic missile, a Fateh-110 variant, has a potential range of 700 km. The newest member of the Fateh-110 family of solid-fueled short-range ballistic missiles, Iran claims that Zolfaghar is equipped with a a sub-munition warhead. The Iranian Ministry of Defense released a video allegedly showing the Zolfaghar being fired and successfully hitting a small target. The authenticity of the video has not been verified.
- **Fateh-110 Anti-Ship Variants:** In 2014, the IRGC displayed two variants of the Fateh missile it called the Hormuz-1 and Hormuz-2. The Hormuz-1 is claimed to have anti-radiation capabilities for attacking radar systems, and in 2014, Iranian television broadcast images of commanders watching an attack on a target with radar antennae. The original claim was that Hormuz-2 was an anti-ship variant, but images of the missile suggested it had a similar radio frequency-transparent ray dome and not a window for an electro-optical infrared seeker, suggesting it is essentially the same as the Hormuz-1. Another anti-ship variant of the Fateh is the Khalij Fars, which does have the electro-optical seeker required to improve accuracy enough to potentially hit a moving target. Tehran claims that early version Khalij Fars entered service in 2008, but was not officially delivered to the Iranian military until a ceremony in March 2014. This ceremony featured Fateh missiles painted blue to suggest an anti-ship variant, but Iran put caps on the noses of the missile preventing verification of the EO/IR seekers. The Department of Defense did assess in the unclassified version of its 2014 report on the military power of Iran that it does possess an anti-ship ballistic missile capability.

System

Alternate Designation: Fateh-110, NP-110
Basing: Ground
Launch Platform(s): TEL

Effective Range: km300

Circular Error Probability: m100

Dimensions

Length: m8.86

Missile Weight: kg3,450

Diameter: m0.61

Fin Span: mINA

Payload

Warhead Type: Single

Warhead Options: HE, chemical, sub-munitions, nuclear

Nuclear Yield: mTINA

Conventional Warhead Weight: kg400-600

Conventional Warheads Available: HE, sub-munitions

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single stage

Propellant: Solid

Speed: Mach 3.5

Flight Ceiling: km27

Fire Control

Guidance System: GPS and Inertial Guidance System

Notes:

Prompted by its experience in the war with Iraq in the 1980s, Iran actively pursued a ballistic missile arsenal that had greater precision and accuracy. As part of this effort, Iran began developing the Fateh-110 in 1995 (Victorious-110; also known as the NP-110) . The Fateh-110 is a solid fueled short range ballistic missile. The missile is also capable of carrying nuclear or biological warheads. As a road mobile system, the Fateh-110 series can be launched from any location. Iran developed four variations of the Fateh-110. Iran successfully tested its first solid-fueled surface-to-surface missile, state-run Tehran radio reported 31 May 2001. The guided Fateh-110 missile was developed at the government-owned Aerospace Industries, the radio said, adding "Fateh-110, a super-modern surface-to-surface missile, functions with combined solid-fuel, is able to cause great damage and finds targets with accuracy. The missile is classified among Iran's most efficient missiles.

DF-11 Chinese Surface to Surface Short Range Ballistic Missile







Tiers:



Variants:

- **DF-11A (CSS-7 Mod 2):** Extended Range: 500-600 km Improved variant of the DF-11, the DF-11A offers an increased range, larger payload, and improved accuracy. Development began in 1993, and its existence was first reported in 1998. The DF-11A measures 8.5 m in length and weighs approximately 4,200 kg. It can carry a 500 kg payload over a reported range of 500-600 km. Front fins are not located on the warhead assembly like those on the first DF-11 variant. Chinese developers added satellite navigation, improving the missile's accuracy to 150-200 m CEP. Unconfirmed reports suggest that an optical correlation terminal guidance system was later fitted, which would further improve the accuracy to 20-30 m CEP. The DF-11A conducted its first test flight in 1997, and it entered service with the PLA Second Artillery Corps in 1999.
- **DF-11AZT:** 800kg payload, 600km range, 100m CEP

System

Alternate Designation: Dong Feng-11, M-11, CSS-7, "East Wind"
Country of Origin: China, People's Republic of China
Basing: Ground
Launch Platform(s): WS2400 8×8 TEL (Transporter, Erector, Launcher)
Effective Range: km300
Circular Error Probability: m200
Time Required from Travel to Ready to Fire: min5

Dimensions

Length: m7.5 m
Missile Weight: kg3,800
Diameter: m.8

Fin Span: mINA

Payload

Warhead Type: Single

Warhead Options: Nuclear, Conventional, Chemical

Nuclear Yield: kT350

Conventional Warhead Weight: kg500-800

Conventional Warheads Available: HE, sub-munitions, FAE (fuel-air explosive)

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single stage

Propellant: Solid

Speed: INA

Flight Ceiling: INA

Fire Control

Guidance System: Astro-inertial guidance (including ring-laser gyroscope) + Beidou (terminal radar)

Notes:

The Dong Feng-11 (DF-11) is a road-mobile, nuclear-capable, short-range ballistic missile (SRBM) developed by the People's Republic of China (PRC). A solid-fuel SRBM launched from a transporter erector launcher (TEL), the DF-11 can be launched with roughly 30 minutes of preparation and can reach ranges up to 300km. While the DF-11 has an estimated accuracy of 200m CEP, the PRC is reportedly working to increase its accuracy to 30 CEP by 2020 through the addition of Global Positioning System (GPS) and laser guidance systems.

Naze'at 10-H Iranian Close Range Ballistic Missile



Tiers:



Variants:

- **Naze'at 6-H:** Earlier version with less range compared to the Naze'at 10-H

System

Alternative Designation: Naze'at 10-H , Naze'at 10
Family: Naze'at
Crew: INA
Chassis: INA
Displacement Time: INA
Emplacement Time: INA

Dimensions (Chassis)

Length: INA
Width: INA
Height: INA
Weight, Combat: INA
Ground Pressure: INA

Automotive (Chassis)

Engine Name: INA
Engine Type: INA
Engine Power: INA
Cruising Range: INA
Speed, Maximum Road: INA
Speed, Average Cross: INA
Speed Maximum Swim: INA
Fording Depth: INA

Communications

Primary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Transporter Erector Launcher

Fire on the Move: No

↳*Missile*

Name: Naze'at 10-H rocket

Type: Long-Range Artillery Rocket

Length: mm8,020

Diameter: mm457

Initial Weight: kg1,830

Propellant Weight: kg865

Propellant Type: Solid Hydroxyl-terminated polybutadiene

Warhead Weight: kg230

Maximum Range: km125

Minimum Range: km110

CEP: <5% Max. range

Average Action Time: 10 seconds

Specific Impulse: 240 seconds

Service Life: 7 Years

Speed: Mach 5

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: No

Thermal Sight Gunner: No

Main Gun Stabilization: INA

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Naze'at 6-H and Naze'at 10-H (Persian: نازعات) are two Iranian long-range artillery rockets with ranges of about 100 km. The Naze'at 10-H is larger, more powerful, and has a longer range than the Nazeat 6-H. Like Iran's similar shaped Zelzal rockets, Naze'at rockets do not have a guidance system. Both systems are also widely known without the -H suffix, as the Naze'at 6 and Naze'at 10. The Naze'at 10 is launched from a transporter erector launcher (TEL) and carries a conventional warhead, and potentially a chemical or biological one. A complete Naze'at system includes a TEL and communications vans, meteorological vans, and a GPS system for surveying the launch site. Both Naze'at rockets have a closing velocity of mach 4-5. The reliability and accuracy of Naze'at rockets is assessed as poor.

OTR-21 Tochka (SS-21 Scarab) Russian Surface to Surface Short Range Ballistic Missile System







Tiers:



Variants:

- **Tochka-U (SS-21 Scarab-B),:** improved variant of the Tochka with a maximum range of 120 km. and improved CEP. It entered service in 1989.
- **SS-21 Scarab-C:** Its Russian designation is unknown. This missile system was developed in the 1990s. Range was increased to 185 km and CEP was further improved.
- **Oka (SS-23 Spider),:** essentially a longer version of the Tochka, with a maximum range of 480 km. The SS-23 Spider was eliminated due to the 1987 Intermediate-Range Nuclear Forces Treaty (or INF treaty) during the late 1980s.
- **KN-02,:** North Korean reversed-engineered and upgraded version of the Scarab-A, with a longer range and improved CEP.

System

Alternative Designation: OTR-21 Tockka; SS-21SS-21 Scarab; Scarab, Tochka, OTR-21, 9M79
Family: OTR-21
Type: Tactical Ballistic Missile System
Class: Short-range Ballistic Missile (SRBM)
Manufacturer: KBM (Kolomna)
In Service: 1976-Present
Crew: ea3
Chassis: BAZ-5921 6x6 mobile launcher vehicle
Displacement Time: minutes1.5
Emplacement Time: Less than 20 Min
Target Altitude Maximum: INA
Target Altitude Minimum: INA

Fire on the Move: INA

Probability of Kill: INA

Note #1: The main targets for this missile are airfields, command posts, support facilities, radars and air defense batteries, bridges and concentrations or troops and armored vehicles.

Note #2: The Tochka can carry conventional, nuclear or chemical warheads.

Dimensions

Length: m9.48

Width: m2.78

Height: m2.35

Weight, Combat: tons18.15

Ground Pressure: INA

Automotive

Engine Name: 5D20B-300

Engine Type: Diesel

Engine Power: hp300

Cruising Range: km650

Speed, Maximum Road: km/h60

Speed, Average Cross: km/h40

Speed Maximum Swim: km/h8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m1.2

Fording Depth: mAmphibious

Note: Vehicle is fitted with an NBC protection system and is fully amphibious. On water it is propelled by two waterjets.

Communications

Missile System (Transporter/Erector/Launcher)

Name: BAZ-5921 Mobile TEL Launch Platform

Launcher Unit: 9P129: Launcher unit

Transporter Loader: 9T218: transporter loader (TL)

Transport Vehicle: 9T222 (9T238): transport vehicle

Maintenance Vehicle: 9V844: maintenance vehicle

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Max Rate of Fire: INA

Note: The SS-21 Scarab can carry a number of tactical warhead types such as: 9N123F HE-fragmentation type, AA60 tactical nuclear, 9N123K carrier with 'smart' sub-munitions, and chemical, 9M79K with the 9N123K cluster warhead.

↳*Missile*

Type: Tactical Ballistic Missile

Missile Length: m6.4

Missile Diameter: m0.65

Missile Weight: kg2,000

Missile Velocity: 1.8 km/h (Mach 5.3)

Fuse Type: INA

Warhead Weight: kg480

Warhead Type: conventional, chemical, nuclear

Maximum Effective Range: km70

Minimum Effective Range: INA

Accuracy: m150

Guidance System: inertial guidance system

Circular Error Probable (CEP): m160

Engine Type: Single-stage Solid-fuel rocket 96kN

Fire Control

↳*Fire Control System*

Name: Classified

Computerized FCS: Yes

Direct Fire: INA

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: Yes

Protection

Hull Armor: INA

Turret Armor: No

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

OTR-21 Tochka (Russian: оперативно-тактический ракетный комплекс (ОТР) «Точка» ("point"); English: Tactical Operational Missile Complex "Tochka") is a Soviet tactical ballistic missile. Its GRAU designation is 9K79; its NATO reporting name is SS-21 Scarab. It is transported in a 9P129 vehicle and raised prior to launch. It uses an inertial guidance system. The OTR-21 forward deployment to East Germany began in 1981, replacing the earlier Luna-M series of unguided artillery rockets.

→→Air-Launched Ballistic Missiles (ALBM) (50 km - 300 km)

→→Vessel-Launched Ballistic Missiles (VLBM) (50 km - 300 km)

→→Submarine-Launched Ballistic Missiles (SLBM) (50 km - 300 km)

→→Multiple-Launch Platform Ballistic Missiles (MLPBM) (50 km - 300 km)

→Short-Range Ballistic Missiles (SRBM) (301 km - 1,000 km)

→→Ground-Launched Ballistic Missiles (GLBM) (301 km - 1,000 km)

Dong-Feng 15 (DF-15, M-9,CSS-6) Chinese Short-Range Ballistic Missile



Tiers:



Variants:

- **DF-15A:** At 10m, the DF-15A is slightly longer than the DF-15, and it also has a rounded nose shape. This variant is also more accurate at 30m to 45m CEP due to sectored control fins at the rear of the missile, GPS updates and a radar terminal correlation system, and flip-out control fins on the re-entry vehicle (RV). The payload is reportedly 600kg and a 2009 report indicated that its maximum range is 900km.
- **DF-15B:** This missile was first revealed publicly during an October 2009 military parade in Beijing. Similar to the DF-15A, the DF-15B has components that reportedly increase the accuracy including four stabilizing fins, improved terminal guidance, and an active radar seeker and laser range finder. The accuracy is estimated to be 5m to 10m CEP. Its range is reported to be between 50km and 800km depending on the payload.
- **DF-15C:** An unconfirmed report in 2007 claimed that the PRC is developing a third variant of the missile designed to strike hardened underground facilities. This bunker buster will host a deep-penetration warhead and is likely designed to attack hardened underground military targets in Taiwan.

System

Alternate Designation: Dong Feng-15, M-9, CSS-6, East Wind-15
Country of Origin: China, People's Republic of China
Basing: Ground
Launch Platform(s): TAS5450 or WS-2400 TEL launchers (Transporter, Erector, Launcher)
Effective Range: km600
Circular Error Probability: m300

Time Required to go from Travel to Ready to Fire: mins30

Dimensions

Length: m9.1

Missile Weight: kg6,200

Diameter: m1

Fin Span: INA

Payload

Warhead Type: Single

Warhead Options: HE, nuclear, chemical, sub-munitions, (Possibly electromagnetic pulse (EMP), Fuel-Air Explosive (FAE), and mine-laying)

Nuclear Yield: kT50 to 350

Conventional Warhead Weight: kg500

Conventional Warheads Available: HE, sub-munitions

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single

Propellant: Solid

Speed: INA

Flight Ceiling: INA

Fire Control

Guidance System: Inertial + Terminal radar/infrared imaging (See variants for the guidance system for each variant)

Notes:

The DF-15 (Dong Feng-15 / M-9 / CSS-6) is a short-range, road-mobile, solid-fueled ballistic missile developed and deployed by China. It has a maximum range of 900 km and can deliver a 500-750 kg payload, and can be equipped with a nuclear, chemical, conventional high explosive, or sub-munitions warhead. Additionally, it is possible, yet not confirmed, that the missile can be also be equipped with fuel-air explosive (FAE) or electromagnetic warheads. Depending on where the missiles are launched from within China, the DF-15A (900 km) has adequate range to strike Taiwan, the Korean Peninsula, and parts of northern India. It is believed that between 350-400 DF-15 missiles and 90-110 TEL launchers were operational in 2009 and that at least 30 missiles have been produced annually since.

SS-1C (Scud-B) Russian Surface to Surface Short Range Ballistic Missile



Tiers:



Variants:

- **Scud-A:** The first of the "Scud" series, designated R-11 (SS-1B Scud-A) originated in a 1951 requirement for a ballistic missile with similar performance to the German V-2 rocket. The R-11 was developed by engineer Viktor Makeev, who was then working in the OKB-1, headed by Sergey Korolev. It first flew on 18 April 1953, was fitted with an Isayev engine using kerosene and nitric acid as propellant. On 13 December 1953, a production order was passed with SKB-385 in Zlatoust, a factory dedicated to producing long-range rockets. In June 1955, Makeev was appointed chief designer of the SKB-385 to oversee the program and, in July, the R-11 was formally accepted into military service. The definitive R-11M, designed to carry a nuclear warhead, was accepted officially into service on 1 April 1958. The launch system was placed on an IS-2 chassis and received the GRAU designation 8K11; only 100 Scud-A launchers were built. The R-11M had a maximum range of 270 km, but when carrying a nuclear warhead, this was reduced to 150 km. Its purpose was strictly as a mobile nuclear strike vector, giving the Soviet Army the ability to hit European targets from forward areas, armed with a nuclear warhead with an estimated yield of 50 kilotons. A naval variant, the R-11FM (SS-N-1 Scud-A) was first tested in February 1955, and was first launched from a converted Project 611 (Zulu class) submarine in September of the same year. While the initial design was done by Korolev's OKB-1, the program was transferred to Makeev's SKB-385 in August 1955. It became operational in 1959 and was deployed onboard Project 611 and Project 629 (Golf Class) submarines. During its service, 77 launches were conducted, of which 59 were successful.
- **Scud-B:** The successor to the R-11, the R-17 (SS-1C Scud-B), renamed R-300 in the 1970s, was the most prolific of the series, with a production run estimated at 7,000. It served in 32 countries and four countries besides the Soviet Union manufactured copied versions. The first launch was conducted in 1961, and it entered service in 1964. The R-17 was an improved version of the R-11. It could carry nuclear, chemical, conventional or fragmentation weapons. At first, the Scud-B was carried on a tracked transporter erector launcher (TEL) similar to that of the Scud-A, designated 2P19, but this was not successful and a wheeled replacement was designed by the Titan Central Design Bureau, becoming operational in 1967. The new MAZ-543 vehicle was officially designated 9P117 Uragan. The launch sequence could be conducted autonomously, but was usually directed from a separate command vehicle. The missile is raised to a vertical position by means of hydraulically powered cranes, which usually takes four minutes, while the total sequence lasts about one hour.
- **Scud-C:** The Makeyev OKB also worked on an extended-range version of the R-17, known in the West as SS-1d Scud-C, that was first launched from Kapustin Yar in 1965. Its range was brought up to 500–600 km, but at the cost of a greatly reduced accuracy and warhead size. Eventually, the advent of more modern types in the same category, such as the TR-1 Temp (SS-12 Scaleboard), made the Scud-C redundant, and it apparently did not enter service with the Soviet armed forces.
- **Scud-D:** The R-17 VTO (SS-1e Scud-D) project was an attempt to enhance the accuracy of the R-17. The Central Scientific Research Institute for Automation and Hydraulics (TsNIAAG) began work on the project in 1968, but the first test launch was conducted only in September 1979. Development continued through the 1980s until the system was accepted into initial service as the 9K720 Aerofon in 1989. However, by this time, more advanced weapons were in use, such as the OTR-21 Tochka (SS-21) and the R-400 Oka (SS-23), and the Scud-D was not acquired by the Soviet armed forces. Instead it was proposed for export as an upgrade for Scud-B users, in the 1990s. Unlike previous Scud versions, the 9K720 had a warhead that separated from the missile's body, and was fitted with its own terminal guidance system. With a TV camera fitted in the nose, the system could compare the target area with data from an onboard computer library (DSMAC). In this way, it was thought to attain a circular error probable (CEP) of 50 m.
- **Hwasong-5/Shahab-1:** North Korea obtained its first Scud-Bs from Egypt in 1979 or 1980. These missiles were reverse engineered, and reproduced using North Korean infrastructure, including the 125 factory at Pyongyang, a research and development institute at Sanum-dong and the Musudan-ri Launch Facility. The first prototypes were completed in 1984, and designated Hwasong-5. They were exact replicas of the R-17Es obtained from Egypt. The first test flights occurred

in April 1984, but the first version saw only limited production, and no operational deployment, as its purpose was only to validate the production process. Production of the definitive version began at a slow rate in 1985. The type incorporated several minor improvements over the original Soviet design. The range was increased by 10 to 15 percent and it could carry High Explosive (HE) or cluster chemical warheads. Throughout the production cycle, until it was phased out in favour of the Hwasong-6 in 1989, the DPRK manufacturers are thought to have carried out small enhancements, in particular to the guidance system. In 1985, Iran acquired 90 to 100 Hwasong-5 missiles from North Korea. A production line was also established in Iran, where the Hwasong-5 was produced as the Shahab-1.

- **Hwasong-6/Shahab-2:** The Hwasong-6 was first test-flown in June 1990, and entered full-scale production the same year, or in 1991, until it was superseded by the Rodong-1. It features an improved guidance system, a range of 500 km, but saw its payload reduced to 770 kg, though the dimensions are identical to the original Scud. Due to difficulties in procuring MAZ-543 TELs, the North Koreans had to produce a local copy. By 1999, North Korea was estimated to have produced 600 to 1,000 Hwasong-6 missiles, of which 25 served for testing, 300 to 500 were exported, and 300 to 600 are used by the Korean People's Army. The Hwasong-6 was exported to Iran where it is known as the Shahab-2, and to Syria, where it is manufactured under license with Chinese assistance.[13] Also, according to SIPRI, 150 Scud-C were exported to Syria in 1991–96, 5 to Libya in 1999, 45 to Yemen in 2001–02.
- **Hwasong-7/Shahab-3:** The Rodong (also NoDong, Hwasong-7, or "Scud-C"), was the first North Korean missile to feature important modifications from the Scud design. Development began in 1988, and the first missile was launched in 1990, but it apparently exploded on its launch pad. A second test was carried out in May 1993 successfully. The main characteristics of the Rodong are a range of 1000 km and a CEP estimated at 2,000–4,000 m, giving the North Koreans the ability to strike Japan. The missile is substantially larger than the Hwasong series, and its Isayev 9D21 engine was upgraded with help from Makeyev OKB. Some assistance came also from China and Ukraine while a new TEL was designed using an Italian Iveco truck chassis and an Austrian crane. The rapidity with which the Rodong was designed and exported after just two tests came as a surprise for many Western observers, and led to some speculation that it was in fact based on a cancelled Soviet project from the Cold War period, but this has not been proven. Iran is known to have financed much of the Rodong program, and in return is allowed to produce the missile, as the Shahab-3. While the first prototypes may have been acquired as early as 1992, production began only in 2001, with assistance from Russia. The Rodong has also been exported to Egypt and Libya.
- **Hwasong-9/Scud-ER:** The Hwasong-9 [dubious – discuss] also called the Scud-ER (extended range), is essentially a North Korean modification of the Hwasong-6 that exchanges payload for greater range; estimates range from 700–800 km (430–500 mi) to as much as 995 km (618 mi) through a reduced payload of 450–500 kg (990–1,100 lb) and enlarging the fuel and oxidant tanks along with a slight enlargement of the fuselage. The missile is single-stage and road mobile employing an HE, submunition, chemical, or potentially miniaturized nuclear warhead with a CEP of 3 km (1.9 mi). Its range allows the North Korean military to strike anywhere on the Korean peninsula and threaten areas of Japan. Development of the Hwasong-9 reportedly began in 1991 and production started in 1994. Deployment began in 2003, intelligence imagery first observed it in 2005, and it was only first revealed publicly in 2007. Reports suggest Syria received Scud-ER missiles in 2000, giving them the ability to target all of Israel and southeastern Turkey, including Ankara; Syria reportedly converted its own Hwasong-6 production line in order to make the longer-range Hwasong-9. Scud-ER/Hwasong-9 demonstrated range of 1,000 km with 500 kg payload. South Korean and United States intelligence made assessment that missile can travel over 1,000 km, Japan previously rated its range at 1,000 km in 2015 white paper and considers to increase range estimate in 2016's white paper. The UN confirmed North Korea assisted Syria in development of manoeuvrable vehicle for "Scud D" since 2008. The UN also confirmed that the missile guidance and electronics were upgraded/improved.
- **Qiam 1:** Iran began development of the indigenous Qiam missile prior to 2010, when it was first publicly tested. It is developed from the Shahab-2/Hwasong-6. The Qiam 1 has a range of 750 km (470 mi) and 500 m (1,600 ft) (CEP) accuracy. The most noticeable difference from the Shahab-2 is a lack of fins—which could be used to reduce the missile's radar signature during ascent as fins reflect radar. Removing fins from a missile also reduces the structural mass, so the payload weight or missile range can be increased.[29][28] Without the fins and associated drag, the missile can be more responsive to changes in trajectory.[29] Iranian sources cite an improved guidance system on the missile, and analysts note that adjusting the missile's in-flight trajectory without fins requires a highly responsive guidance system. The Qiam 1's accuracy is also improved with the addition of a separable warhead. Other changes to the warhead include a "baby-bottle" shape, possibly to increase drag and thus stability during reentry at the expense of range, potentially increasing accuracy. The shape can also increase the terminal velocity of the warhead, making it harder to intercept. Deliveries began in either 2010 or 2011. The missile's first combat use was against ISIS militants on 18 June 2017. The Burkan 2-H used by the Houthis in Yemen is potentially related, or the Qiam 1 has potentially been used by that group.
- **Burkan-1:** The Houthi forces in Yemen unveiled the Burkan-1 (also spelled as Borkan 1 and Burqan 1) on 2 September 2016 when it was fired toward King Fahd International Airport. The missile's range is 800 kilometres (500 mi), greater than the Soviet-made Scud-B missiles the Houthi forces took control of in 2015. Missiles shot down mid-flight in October 2016 and July 2017 were claimed to target the holy city of Mecca by Saudi Arabia, while the Houthis claimed the targets were airports in the region
- **Burkan 2-H:** The Houthi forces in Yemen unveiled the Burkan 2-H (also spelled as Borkan H2 and Burqan 2H) when it was launched at Saudi Arabia on 22 July 2017. Analysts identify it as based on the Iranian Qiam 1/Scud-C,[47][36] Iranian Shahab-2/Scud-C, or Scud-D missile. Pictures indicate a "baby bottle" re-entry vehicle, like the Shahab-3 and Qiam 1 missiles. The missile's exact range is unknown, but is greater than 800 kilometres (500 mi). It has been

launched in July 2017, and a second launch was claimed on 4 November 2017, with the missile shot down over the Saudi Arabian capital, Riyadh.[39] According to the US State Department, the missile was actually an Iranian Qiam 1. Saudi Arabia's Ministry of Culture and Information also supplied the Associated Press with pictures from a military briefing of what it claimed were components from the intercepted missile bearing Iranian markings matching those on other pictures of the Qiam 1.

System

Alternate Designation: SS-1C; Scud-B

Country of Origin: Russia

Basing: Ground

Launch Platform(s): TEL

Engine: single-stage storable UDMH liquid propellant with RFNA oxidizer (Russian SG-02 Tonka 250)

Speed at Motor Cutoff: 2,865 knots (3,300 mph, 5,310 kmh, Mach 5.0)

Speed at Impact: >990 knots (1,140 mph, 1,835 kmh, Mach 1.5)

Maximum Range: 300 km

Pre-Launch Preparation: 2-4 hours

Time into Action: 1 hour from pre-surveyed site

Warhead: 5-80 kiloton nuclear; or conventional unitary blast fuel-air explosive; or 40 runway-penetrator submunitions with 410-ft (125-m) blast-damage radius; or 100 11-lb (5-kg) anti-personnel bomblets w/820-ft (250-m) blast-damage radius; or chemical warhead

Circular Error Probable (CEP): 450 m

Guidance System: simplified inertial guidance using three gyroscopes rocket-steered by small vanes on each fin extending into efflux

Dimensions

Missile Length: 11.25 m

Warhead Bay: 2.87 m

Missile Diameter: 0.88 m

Launch Weight: 5,900 kg

Nuclear Warhead Weight: 770-860 kg

Conventional Warhead Weight: 953 kg

Wheeled Launch Vehicle Length: m13.36

Wheeled Launch Vehicle Width: m3.02

Wheeled Launch Vehicle Height: m2.60

Wheeled Launch Vehicle Weight: kg37,400

Automotive

Wheeled Launch Vehicle Name: MAZ-543 8 x 8 Wheeled Launch Vehicle

Engine Name: 1 x D-12

Engine Type: liquid-cooled, V-12 diesel engine

Engine Power: 525 hp

Fuel Capacity: 800 liters
Maximum Road Speed: 55 kmh
Maximum Range: 650 km
Gradient: %30
Vertical Obstacle: 0.8 m
Trench: 3.4 m
Fording: 1.0 m

Notes:

The successor to the R-11, the R-17 (SS-1C Scud-B), renamed R-300 in the 1970s, was the most prolific of the series, with a production run estimated at 7,000. It served in 32 countries and four countries besides the Soviet Union manufactured copied versions. The first launch was conducted in 1961, and it entered service in 1964. The R-17 was an improved version of the R-11. It could carry nuclear, chemical, conventional or fragmentation weapons. At first, the Scud-B was carried on a tracked transporter erector launcher (TEL) similar to that of the Scud-A, designated 2P19, but this was not successful and a wheeled replacement was designed by the Titan Central Design Bureau, becoming operational in 1967. The new MAZ-543 vehicle was officially designated 9P117 Uragan. The launch sequence could be conducted autonomously, but was usually directed from a separate command vehicle. The missile is raised to a vertical position by means of hydraulically powered cranes, which usually takes four minutes, while the total sequence lasts about one hour.

SS-1D (Scud-C) Russian Surface to Surface Short Range Ballistic Missile



Tiers:



Variants:

- **Scud-A:** The first of the "Scud" series, designated R-11 (SS-1B Scud-A) originated in a 1951 requirement for a ballistic missile with similar performance to the German V-2 rocket. The R-11 was developed by engineer Viktor Makeev, who was then working in the OKB-1, headed by Sergey Korolev. It first flew on 18 April 1953, was fitted with an Isayev engine using kerosene and nitric acid as propellant. On 13 December 1953, a production order was passed with SKB-385 in Zlatoust, a factory dedicated to producing long-range rockets. In June 1955, Makeev was appointed chief designer of the SKB-385 to oversee the program and, in July, the R-11 was formally accepted into military service. The definitive R-11M, designed to carry a nuclear warhead, was accepted officially into service on 1 April 1958. The launch system was placed on an IS-2 chassis and received the GRAU designation 8K11; only 100 Scud-A launchers were built. The R-11M had a maximum range of 270 km, but when carrying a nuclear warhead, this was reduced to 150 km. Its purpose was strictly as a mobile nuclear strike vector, giving the Soviet Army the ability to hit European targets from forward areas, armed with a nuclear warhead with an estimated yield of 50 kilotons. A naval variant, the R-11FM (SS-N-1 Scud-A) was first tested in February 1955, and was first launched from a converted Project 611 (Zulu class) submarine in September of the same year. While the initial design was done by Korolev's OKB-1, the program was transferred to Makeev's SKB-385 in August 1955. It became operational in 1959 and was deployed onboard Project 611 and Project 629 (Golf Class) submarines. During its service, 77 launches were conducted, of which 59 were successful.
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accepted into initial service as the 9K720 Aerofon in 1989. However, by this time, more advanced weapons were in use, such as the OTR-21 Tochka (SS-21) and the R-400 Oka (SS-23), and the Scud-D was not acquired by the Soviet armed forces. Instead it was proposed for export as an upgrade for Scud-B users, in the 1990s. Unlike previous Scud versions, the 9K720 had a warhead that separated from the missile's body, and was fitted with its own terminal guidance system. With a TV camera fitted in the nose, the system could compare the target area with data from an onboard computer library (DSMAC). In this way, it was thought to attain a circular error probable (CEP) of 50 m.

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- **Hwasong-6/Shahab-2:** The Hwasong-6 was first test-flown in June 1990, and entered full-scale production the same year, or in 1991, until it was superseded by the Rodong-1. It features an improved guidance system, a range of 500 km, but saw its payload reduced to 770 kg, though the dimensions are identical to the original Scud. Due to difficulties in procuring MAZ-543 TELs, the North Koreans had to produce a local copy. By 1999, North Korea was estimated to have produced 600 to 1,000 Hwasong-6 missiles, of which 25 served for testing, 300 to 500 were exported, and 300 to 600 are used by the Korean People's Army. The Hwasong-6 was exported to Iran where it is known as the Shahab-2, and to Syria, where it is manufactured under license with Chinese assistance.[13] Also, according to SIPRI, 150 Scud-C were exported to Syria in 1991–96, 5 to Libya in 1999, 45 to Yemen in 2001–02.
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- **Hwasong-9/Scud-ER:** The Hwasong-9 [dubious – discuss] also called the Scud-ER (extended range), is essentially a North Korean modification of the Hwasong-6 that exchanges payload for greater range; estimates range from 700–800 km (430–500 mi) to as much as 995 km (618 mi) through a reduced payload of 450–500 kg (990–1,100 lb) and enlarging the fuel and oxidant tanks along with a slight enlargement of the fuselage. The missile is single-stage and road mobile employing an HE, submunition, chemical, or potentially miniaturized nuclear warhead with a CEP of 3 km (1.9 mi). Its range allows the North Korean military to strike anywhere on the Korean peninsula and threaten areas of Japan. Development of the Hwasong-9 reportedly began in 1991 and production started in 1994. Deployment began in 2003, intelligence imagery first observed it in 2005, and it was only first revealed publicly in 2007. Reports suggest Syria received Scud-ER missiles in 2000, giving them the ability to target all of Israel and southeastern Turkey, including Ankara; Syria reportedly converted its own Hwasong-6 production line in order to make the longer-range Hwasong-9. Scud-ER/Hwasong-9 demonstrated range of 1,000 km with 500 kg payload. South Korean and United States intelligence made assessment that missile can travel over 1,000 km, Japan previously rated its range at 1,000 km in 2015 white paper and considers to increase range estimate in 2016's white paper. The UN confirmed North Korea assisted Syria in development of manoeuvrable vehicle for "Scud D" since 2008. The UN also confirmed that the missile guidance and electronics were upgraded/improved.
- **Qiam 1:** Iran began development of the indigenous Qiam missile prior to 2010, when it was first publicly tested. It is developed from the Shahab-2/Hwasong-6. The Qiam 1 has a range of 750 km (470 mi) and 500 m (1,600 ft) (CEP) accuracy. The most noticeable difference from the Shahab-2 is a lack of fins—which could be used to reduce the missile's radar signature during ascent as fins reflect radar. Removing fins from a missile also reduces the structural mass, so the payload weight or missile range can be increased.[29][28] Without the fins and associated drag, the missile can be more responsive to changes in trajectory.[29] Iranian sources cite an improved guidance system on the missile, and analysts note that adjusting the missile's in-flight trajectory without fins requires a highly responsive guidance system. The Qiam 1's accuracy is also improved with the addition of a separable warhead. Other changes to the warhead include a "baby-bottle" shape, possibly to increase drag and thus stability during reentry at the expense of range, potentially increasing accuracy. The shape can also increase the terminal velocity of the warhead, making it harder to intercept. Deliveries began in either 2010 or 2011. The missile's first combat use was against ISIS militants on 18 June 2017. The Burkan 2-H used by the Houthis in Yemen is potentially related, or the Qiam 1 has potentially been

used by that group.

- **Burkan-1:** The Houthi forces in Yemen unveiled the Burkan-1 (also spelled as Borkan 1 and Burqan 1) on 2 September 2016 when it was fired toward King Fahd International Airport. The missile's range is 800 kilometres (500 mi), greater than the Soviet-made Scud-B missiles the Houthi forces took control of in 2015. Missiles shot down mid-flight in October 2016 and July 2017 were claimed to target the holy city of Mecca by Saudi Arabia, while the Houthis claimed the targets were airports in the region
- **Burkan 2-H:** The Houthi forces in Yemen unveiled the Burkan 2-H (also spelled as Borkan H2 and Burqan 2H) when it was launched at Saudi Arabia on 22 July 2017. Analysts identify it as based on the Iranian Qiam 1/Scud-C,[47][36] Iranian Shahab-2/Scud-C, or Scud-D missile. Pictures indicate a "baby bottle" re-entry vehicle, like the Shahab-3 and Qiam 1 missiles. The missile's exact range is unknown, but is greater than 800 kilometres (500 mi). It has been launched in July 2017, and a second launch was claimed on 4 November 2017, with the missile shot down over the Saudi Arabian capital, Riyadh.[39] According to the US State Department, the missile was actually an Iranian Qiam 1. Saudi Arabia's Ministry of Culture and Information also supplied the Associated Press with pictures from a military briefing of what it claimed were components from the intercepted missile bearing Iranian markings matching those on other pictures of the Qiam 1.

System

Alternate Designation: SS-1D, SCUD-C

Country of Origin: Russia

Basing: Ground

Launch Platform(s): TEL

Effective Range: km500

Circular Error Probability: m550

Time Required to go from Travel to Ready to Fire: INA

Note: The Scud-C has longer range, but is less accurate than the Scud-B and was deployed in fewer numbers.

Dimensions

Length: m11.25

Missile Weight: kg6,400

Diameter: m0.88

Fin Span: INA

Payload

Warhead Type: Single

Warhead Options: Conventional, Chemical

Nuclear Yield: NA

Conventional Warhead Weight: kg600

Conventional Warheads Available: HE

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single

Propellant: Liquid

Speed: INA

Fire Control

Guidance System: Inertial

Notes:

The Makeyev OKB also worked on an extended-range version of the R-17, known in the West as SS-1d Scud-C, that was first launched from Kapustin Yar in 1965. Its range was brought up to 500–600 km, but at the cost of a greatly reduced accuracy and warhead size. Eventually, the advent of more modern types in the same category, such as the TR-1 Temp (SS-12 Scaleboard), made the Scud-C redundant, and it apparently did not enter service with the Soviet armed forces.

Iskander (SS-26 Stone) Russian Surface to Surface Short Range Ballistic Missile




Tiers:



Variants:

- **Note::** Early TEL variant (SPU 9P78) has one missile. The TELs can launch launch R-500 cruise missiles.
- **Iskander-E::** Export variant TEL with shorter range (280km). This missile was developed to comply with missile technology control regime which is no longer in effect.
- **Iskander-M::** Domestic TEL and missile with 400+km range.
- **Iskander-K::** Cruise missile only TEL with launcher assembly adapted to mount 6 each R-500 (3M14?) cruise missiles.

System

Alternative Designation: SS-26 Stone, SS-X-26, Stone, Tender, 9M720, 9M723, 9M723-1
Manufacturer: Votkinsk Plant State Production Association (Votkinsk) – missiles Production Association Barricades (Volgograd) – ground equipment KBM (Kolomna) – developer of the system
In Service: 2006-Present
Class: Short-Range Ballistic Missile (SRBM)
Chassis: MAZ-7930 (8x8)
Primary Components: Transporter-Erector-Launcher (TEL) and command vehicle: rear support includes a transport and loading vehicle (9T250E), maintenance vehicle, mobile test and repair station, data preparation post, and life support vehicle. The system can also be linked into an integrated fires command (IFC).
Crew: ea3
Payload: kg480-700
Note: At the time of its introduction it was considered the most advanced missile of its kind.

Dimensions (Launcher)

Length: m13.7
Width: m3.51
Height: m3.45
Combat Weight: tons40
Number Of Missiles: ea2

Automotive (Transporter Erector Launcher)

Engine Name: YaMZ-846

Engine Type: Diesel

Engine Power: hp500

Chassis: MAZ-7930 (8x8)

Range, Cruising: km1,000

Speed, Maximum Road: km/h70

Gradient: deg45

Side Slope: deg30

Speed, Maximum Swim: km/hNot Amphibious

Vertical Step: m-0.6

Trench: m2

Fording Depth: m1.4

Communications

Primary: Receiver R-174/GRR-5

Main Weapon System

↳*Missile Launching System*

Name: Transporter-erector-launcher vehicle (chassis of 8×8 MZKT-79306 ASTROLOG truck)

Type: Ballistic Missile and Cruise Missile Launcher

Maximum Launch Range: km500

Minimum Launch Range: km20

Direct Fire: Yes

Indirect Fire: No

Time to Launch: up to 4 min from highest readiness, up to 16 min from march

Interval Between Launches: less than one minute

Operating Temperature: −50 °C to +50 °C

Service Life: years10

Note: The mobility of the Iskander launch platform makes a launch difficult to prevent.

↳*Missiles*

Name: 9M723K1

Type: solid-propellant single-stage guided missiles

Basic Load: ea2

Engine: Single-stage solid propellant

Target Type: Independently

Warhead Weight: kg480–700

Warhead Types: thermonuclear weapon, High explosive fragmentation, submunition, penetration, fuel-air explosive,

EMP
Optically Guided Warhead: Yes
Operational Range: km400-500
Speed: m/s2,000
Burn Out Velocity: Mach 5.9 *Hypersonic)
Guidance System: Inertial guidance, optical DSMAC
Accuracy: m5-7
Moving Target Capable: Yes
Boost Phase: Yes, Thrust Vector Control (TVC)
Circular Error Probable (CEP): m5-7
Turning Capability: during flight it can maneuver at different altitudes and trajectories and can turn at up to 20 to 30 G to evade anti-ballistic missiles
Note #1: The missiles can be re-targeted during flight in the case of engaging mobile targets
Note #2: in flight, the missile follows a quasi-ballistic path, performing evasive maneuvers in the terminal phase of flight and releasing decoys in order to penetrate missile defense systems.

Protection

Armor Protection: None
NBC Protection: Yes
Countermeasures: Off-road mobility to concealed launch point, autonomous and passive operation at launch point. Missile non-ballistic trajectory in ascent conceals vehicle/launch point location. Missile reentry vehicle has decoys, and possible final-phase maneuver. With IR homing, jamming is ineffective. Final phase is most likely non-ballistic pitch-over into a dive.

Notes:

The Iskander (Western reporting name SS-26 Stone) short-range ballistic missile is a successor to the Oka (SS-23 Spider), which was eliminated under the Intermediate-Range Nuclear Forces (INF) treaty. It was first launched in 1996 and was initially designated by the West as the SS-X-26. At the time of its introduction it was considered the most advanced missile of its kind. The Iskander-M missile system was officially adopted by the Russian Army in 2006. This system can use different types of missiles. In 2013 it was reported that 5 types of missiles were already developed for Iskander, and 3 more missiles were still being developed. As of 2017 Russian Army reportedly operates 112 of these missile systems. At least one launcher was deployed in Syria. In 2016 Iskander-E ballistic missiles were delivered to Armenia. Some countries, including China and South Korea introduced their own clones of the Iskander. Ukraine is currently developing an equivalent system.

R-17 Elbrus (R-300 Scud B) Russian Short-Range Ballistic Missile




Tiers:



Variants:

- **SS-1D or Scud-C:** SS-1D or Scud-C, an extended-range version. It had a maximum range of 500-600 km. However warhead size and accuracy were greatly reduced. It was not adopted by the Soviet Army, as a more capable TR-1 Temp (Western reporting name SS-12 or Scaleboard) was selected
- **9K720 Aerofon (SS-1E or Scud-D):** 9K720 Aerofon (SS-1E or Scud-D). It had a warhead that separated from the missile body. Missile was also fitted with terminal guidance system and was much more accurate and had a CEP of 50 m. The systems was not acquired by the Soviet Army. As at the time more advanced ballistic missiles, such as the Tochka (SS-21 Scarab) were used. Instead in the 1990s it was proposed for export customers as an upgrade for their Scud-B systems.
- **Barkan-1:** Barkan-1 is a Yemeni version of the "Scud" series. Yemeni modifications resulted in an 800 km range.
- **Hwasong-6:** Hwasong-6 is a North Korean variant of the "Scud". It was introduced in 1991. The Hwasong-6 has a range of 500 km. It is also launched using a TEL, and has been exported to several other nations, some of which produce it under license.

System

Alternate Designation: the R-17 (SS-1C Scud-B), renamed R-300 in the 1970s
Basing: Ground
Launch Platform(s): TEL, MAZ-543A (8x8)
Chassis: The Scud-B is based on a MAZ-543A heavy high-mobility wheeled chassis.
Crew: 8
Effective Range: km300
Circular Error Probability: m450
Emplacement TIme: min4
Displacement Time: INA
Note: Each launcher vehicle is escorted by a whole host of support vehicle. It is escorted by reloading vehicle, fuel tanker, crane, command vehicle, positioning vehicle, and some other support vehicles. Also there is a vehicle which carries warhead for the missile. During the cold war Scuds were also escorted by decontamination vehicles.

Dimensions (Chassis: MAZ-543A)

Length: m12
Width: m3
Height: m3.5

Weight: tons37.4

Automotive (Chassis: MAZ-543A)

Engine Name: D12A-525

Engine Type: Diesel

Engine Power: hp525

Maximum Range: km450

Maximum Road Speed: km/h45

Maximum Off-Road Speed: km/h15

Gradient: %60

Vertical Step: m0.6

Side Slope: %30

Trench: m2.0

Fording Depth: m1.3

Missile System

↳*Launcher*

Name: 9P117 Uragan

Type: Transporter Erector Launcher (TEL)

Launch Sequence: The launch sequence could be conducted autonomously, but was usually directed from a separate command vehicle.

Note #1: The missile is raised to a vertical position by means of hydraulically powered cranes, which usually takes four minutes, while the total sequence lasts about one hour.

Note #2: carry nuclear, chemical, conventional or fragmentation weapons.

↳*Missile*

Name: R-17 Elbrus (SCUD-B)

Type: Short-Range Ballistic Missile

Length: m11.6

Diameter: m0.8

Engine: Liquid Fuel

Missile Weight: tons0.98

Warhead Type: These missiles have nuclear (100 kT), high explosive (1 016 kg), chemical (985 kg) and thermobaric warheads.

Maximum Range of Fire: km300

Minimum Range of Fire: km50

CEP: m450

Launch to Target Time: within 5 minutes

Guidance System: Inertial Guidance

Note: By modern standards this missile is inaccurate. Its CEP is about 450 m.

Fire Control

Guidance System: Inertial guidance system, IR homing

Notes:

The Scud is a mobile, Russian-made, short-range, tactical ballistic surface-to-surface (hence the nomenclature abbreviation SS) missile system. The SCUD-series guided missiles are single-stage, short-range ballistic missiles using storable liquid propellants. The Scud is derived from the World War II-era German V-2 rocket. Unlike the FROG series of unguided missiles, the SCUDs have movable fins. Warheads can be HE, chemical, or nuclear, and the missile, launched vertically from a small platform, has a range of 300 km. Unsophisticated gyroscopes guided the missile only during powered flight - which lasts about 80 seconds. Once the rocket motor shut down, the entire missile with the warhead attached coasted unguided to the target area. Consequently, Scuds had notoriously poor accuracy, and the farther they flew, the more inaccurate they became. SCUD missiles are found in SSM (SCUD) brigades at front/army level. The SCUD series of missiles gave the Soviet front and army commanders an integral nuclear weapons capability. Non-nuclear variants of the SCUD missiles have been exported to both Warsaw Pact and non-Warsaw Pact nations. The longer range SCUD B, also known as SS-1c, can be distinguished by the one meter greater length of the missile and the presence of two air bottles on the side of the superstructure in place of the single bottle used for the "SCUD A" missile. The SCUD B used unsymmetrical dimethylhydrazine (UDMH), a more powerful (and toxic) fuel than the kerosene used on the SCUD A, which required an engine redesign. They were transported originally on a heavy-tracked vehicle based on the JS heavy-tank chassis. This vehicle serves also as an erector and launcher for the missiles. The SCUD-B was introduced on the JS-3 tracked chassis in 1961 and appeared on the MAZ-543 wheeled chassis in 1965. The "SCUD B" missile has appeared on a new transporter-erector-launcher based on the MAZ-543 (8x8) truck. The introduction of this new powerful cross-country wheeled vehicle gave this missile system greater road mobility, reduces the number of support vehicles required, and still preserves a great choice in selecting off-road firing positions. The same basic chassis also has been used for the transporter-erector-launcher for the "SCALEBOARD" surface-to-surface guided missile. In the early 1980s, the SCUD-B was replaced by the SS-23, which has greatly improved range (500 km), increased accuracy, and reduced reaction and refire times. At launch, a basic Scud contains about 3,500 kilograms (7,700 pounds) of IRFNA and about 1,000 kilograms (2,200 pounds) of fuel. Most of the IRFNA and fuel is used within the first 80 seconds of flight when the missile is gaining enough speed to reach its target. When this speed is reached, the Scud is designed to shut off its engine by shutting off the propellant tanks (a fuel tank and an oxidizer tank). The unused propellants—roughly 150 kilograms (330 pounds) of RFNA and 50 kilograms (110 pounds) of fuel—remain on board for the remainder of the flight. In the early 1970s, the Soviet Army sought a replacement for the 9K72 Elbrus (SS-1C `Scud B') system, which had a very slow reaction time [around 90 minutes to prepare and fire] and its poor accuracy when using conventional warheads. The replacement system, codename 9K714 Oka [SS-23 Spider], was developed by KB Mashinostroyenia (Machine Industry Design Bureau) in Kolomna. This system was phased out in compliance with the INF Treaty in the late 1980s. Russia’s TBM inventory is limited to thousands of SS-1c/Scud B and SS-21/Scarab SRBMs as a result of the Intermediate Nuclear Force (INF) Treaty, which required the elimination of the FSU’s extensive stocks of MRBMs. A second SCUD-followon effort began in the form of the SS-26, which apparently entered service by 1999. The SS-26 SRBM is expected to be both a replacement for the SS-1c/Scud B and an export. By the early 1990s, the `Scud' system was unquestionably obsolete and many of the 9P117 launcher vehicles were retired due to age.

→→Air-Launched Ballistic Missiles (ALBM) (301 km - 1,000 km)

→→Vessel-Launched Ballistic Missiles (VLBM) (301 km - 1,000 km)

→→Submarine-Launched Ballistic Missiles (SLBM) (301 km - 1,000 km)

→→Multiple-Launch Platform Ballistic Missiles (MLPBM) (301 km - 1,000 km)

→Medium-Range Ballistic Missiles (MRBM) (1,001 km - 3,000 km)

→→Ground-Launched Ballistic Missiles (GLBM) (1,001 km - 3,000 km)

Shahab-3B Iranian Surface to Surface Medium Range Ballistic Missile



Tiers:



Variants:

- **Shahab-3C and D:** Little is known about Shahab-3C and Shahab-3D. From what can be gathered, the missiles have an improved precision, navigation system, and a longer range. The missiles were indigenoulys developed, and are being mass-produced. Iran has a production capacity of 70 units per year.

System

Alternate Designation: Meteor-3, Shooting Star-3
Country of Origin: Iran
Basing: Ground
Launch Platform(s): TEL or silo
Proliferation: Not proliferated
Effective Range: km1,300
Circular Error Probability: m50

Dimensions

Length: m16.6
Missile Weight: kg~16,000

Diameter: m1.25 or 1.38

Fin Span: mINA

Payload

Warhead Type: Multiple or Single

Warhead Options: Multiple: Cluster munition warheads in new models, each warhead can target different destinations. Single: Nuclear, HE, chemical, or sub-munitions

Nuclear Yield: INA

Conventional Warhead Weight: kg~700

Conventional Warheads Available: Cluster munitions, HE, chemical, or sub-munitions

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single Stage

Propellant: Liquid

Speed: km/s2.4

Flight Ceiling: km400

Fire Control

Guidance System: INS/gyroscope guidance

Notes:

The Shahab-3B differs from the basic production variant. It has improvements to its guidance system and warhead with a greater range, a few small changes on the missile body, and a new re-entry vehicle whose terminal guidance system and rocket-nozzle steering method are completely different from the Shahab-3's spin-stabilized re-entry vehicle. The new re-entry vehicle uses a triconic aeroshell geometry (or "baby bottle" design) which improves the overall lift to drag ratio for the re-entry vehicle. This allows greater range maneuverability which can result in better precision. The triconic design also reduces the overall size of the warhead from an estimated 1 metric ton to 700 kg.

DF-21D (CSS-5 Mod-4) Chinese Anti-Ship Ballistic Missile





Tiers:

1 **2** 3 4

Variants:

- **DF-21:** The Dong-Feng 21 (DF-21; NATO reporting name CSS-5 - Dong-Feng (simplified Chinese: □□; traditional Chinese: □□; lit.: 'East Wind')) is a two-stage, solid-fuel rocket, single-warhead medium-range ballistic missile (MRBM) in the Dong Feng series developed by China Changfeng Mechanics and Electronics Technology Academy. Development started in the late 1960s and was completed around 1985–86, but it was not deployed until 1991. It was developed from the submarine-launched JL-1 missile, and is China's first solid-fuel land-based missile. The U.S. Department of Defense in 2008 estimated that China had 60-80 missiles and 60 launchers; approximately 10-11 missiles can be built annually. Originally developed as a strategic weapon, the DF-21's later variants were designed for both nuclear and conventional missions. It is thought able to carry a high explosive and submunition warheads, as well as a nuclear warhead of 300 kt. The latest DF-21D was said to be the world's first anti-ship ballistic missile (ASBM). The DF-21 has also been developed into a space-capable anti-satellite weapon/anti-missile weapon carrier.
- **DF-21/A/C (CSS-5 Mod-1/2/3):** The basic variant DF-21 had a range of 1,770+ km, and a payload of 600 kg (1,300 lb) consisting of a single 500 kt nuclear warhead, with an estimated circular error probable (CEP) of 300~400 m; this version did not enter operational service. The DF-21A was operational by 1996 and has improved accuracy with an estimated CEP of 100~300 m. This version is reported to have a similar 1,770+ km range, with a potential extended range of 2,150 km (1,340 mi). Revealed in 2006, the DF-21C is a terminally guided version that has a maximum range believed to be about 1,700 km (1,100 mi) and accuracy estimated to be 50~10 m. The missile was the first dual-capable version, able to be armed with either a nuclear or conventional warhead. In 2010, the DF-21C was being deployed in central Western China.

System

Alternate Designation: DF-21D; CSS-5 Mod-4
Type: Anti-Ship Ballistic Missile
Launch Platform(s): Mobile Launcher
Maximum Range: 2,000 km
Warhead Type: Conventional or Nuclear
Warhead Weight: 600

Dimensions

Length: m10.7

Diameter: m1.4

Fin Span: INA

Missile Weight: kg47,700

Payload

Warhead Type: Conventional or Nuclear

Warhead Weight: 600kg

MIRV: No MIRV capability

Yield: 200-300kt

Propulsion Characteristics

Engine: Multistage

Propellant: Solid

Speed: Mach 10

Fire Control

Guidance System: Inertial/terminal radar/20m CEP

Accuracy: 20m CEP

Notes:

The Dong Feng 21D, or DF-21D, is a medium ranged, road mobile, ballistic missile developed by the People's Republic of China. A variant of the DF-21A, the DF-21D was deemed operational in 2012 and is the world's first anti-ship ballistic missile (ASBM) intended to attack ships at sea. Reaching speeds up to Mach 10 during the terminal phase, the DF-21D is the fastest MRBM to date and can surpass existing U.S. missile defense systems such as the sea-based AEGIS ballistic missile defense (BMD) system. In 2013, the DF-21D was tested against targets equivalent to U.S. surface ships which proved to be successful. By using both inertial and radar guidance systems, the ASBM increases speed upon reentering Earth's atmosphere to avoid missile defense structures and ensure a direct hit on moving sea-based targets. A variant of the DF-21D is currently in production with intentions of increasing its range and payload. Until the United States deploys adequate capabilities to defend against the DF-21D, U.S. aircraft carrier strike groups operating within the missile's range will remain vulnerable. With that in mind, the DF-21D is critical to China's anti-access/area denial (A2/AD) strategy in the Asia-Pacific region, which aims to limit U.S. freedom of movement by exploiting U.S. operational vulnerabilities. Using long-range precision-guided ballistic missiles such as the DF-21D, China puts all U.S. forces operating in the Asia-Pacific at risk, undercutting U.S. power projection in the region. In addition, the long-range standoff capability of the DF-21D grants China more operation flexibility in the field while minimizing the chance of a surprise attack. Consequently, this provides China with a significant operational advantage in the region.

DF-3 Chinese Surface to Surface Medium Range Ballistic Missile







Tiers:



Variants:

- **DF-3A:** The DF-3A is an upgraded variant of the DF-3 that became operational in August 1988. Like the DF-3, the DF-3A lacks significant road-mobile capabilities however it is deployed using a towed launcher. The improved missile possesses a range of up to 4,000km and a more accurate guidance system than the DF-3. Both missiles share the same propellants, diameter, and burn time, however the DF-3A has an improved version of the YF-2 engine.

System

Alternate Designation: CSS-2, Dong Feng-3, East Wind-3
Country of Origin: China
Basing: Ground
Launch Platform(s): Silo (DF-3A can be launched from a towed launcher)
Effective Range: km3,000
Circular Error Probability: m4,000
Time Required to go from Travel to Ready to Fire: mins120-150

Dimensions

Length: m24
Missile Weight: kg64,000
Diameter: m2.25
Fin Span: mINA

Payload

Warhead Type: Up to 3

Warhead Options: HE, Nuclear, or 3 separating reentry vehicles (RVs)

Nuclear Yield: A minimum of 50 kT per warhead, up to 3 (some estimates are up to 700kT)

Conventional Warhead Weight: kg2000

Conventional Warheads Available: HE

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: No

Chemical Capable: INA

Propulsion Characteristics

Engine: Single (YF-2A)

Propellant: Liquid (UDMH / AK-27S)

Speed: INA

Fire Control

Guidance System: Inertial

Notes:

Designed to be China's first modern missile, the DF-3 has a range of up to 3,000km and was deemed operational in 1971. The silo-based, single-stage, MRBM uses a liquid propellant and an inertial guidance system. The DF-3, and its improved variant the DF-3A, have largely been replaced by the DF-21 and only a minimal number of DF-3 missiles are suspected to exist today. Many outmoded DF-3 missiles have been outsourced to Saudi Arabia. The DF-3A is an upgraded variant of the DF-3 that became operational in August 1988. Like the DF-3, the DF-3A lacks significant road-mobile capabilities however it is deployed using a towed launcher. The improved missile possesses a range of up to 4,000km and a more accurate guidance system than the DF-3. Both missiles share the same propellants, diameter, and burn time, however the DF-3A has an improved version of the YF-2 engine. The DF-3 and the DF-3A proved that China possesses the technological capacity to produce MRBMs and granted China the chance to expand their A2/AD range. This also paved the way for many of China's advances in ballistic missiles such as the D-21 and its several variants.

Shahab-4 Iranian Medium Range Ballistic Missile



Tiers:



Variants:

- **Shahab-3C and D:** Little is known about Shahab-3C and Shahab-3D. From what can be gathered, the missiles have an improved precision, navigation system, and a longer range. The missiles were indigenoulys developed, and are being mass-produced. Iran has a production capacity of 70 units per year.

System

Alternate Designation: Meteor-3, Shooting Star-3
Basing: Ground
Launch Platform(s): TEL or silo
Proliferation: Not proliferated
Effective Range: km1,300
Circular Error Probability: m50

Dimensions

Length: m16.6
Missile Weight: kg~16,000
Diameter: m1.25 or 1.38
Fin Span: mINA

Payload

Warhead Type: Multiple or Single
Warhead Options: Multiple: Cluster munition warheads in new models, each warhead can target different destinations. Single: Nuclear, HE, chemical, or sub-munitions
Nuclear Yield: INA
Conventional Warhead Weight: kg~700
Conventional Warheads Available: Cluster munitions, HE, chemical, or sub-munitions
Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA
Chemical Capable: Yes

Propulsion Characteristics

Engine: Single Stage

Propellant: Liquid

Speed: km/s2.4

Flight Ceiling: km400

Fire Control

Guidance System: INS/gyroscope guidance

Notes:

The Shahab-4 (Persian: ۴-شهاب, meaning "Meteor-4") (a.k.a. IRIS) was an unbuilt Iranian space launch vehicle derived from the Shahab-3 medium-range ballistic missile. The IRIS/Shahab-4 project was initiated in 1988, but it never went beyond the drawing board. The design heritage of the IRIS was later incorporated into the Safir.

NoDong-1 North Korean Surface to Surface Medium Range Ballistic Missile





Tiers:



Variants:

- **Shahab-3 (Iran):** The Shahab-3 (Persian: Šahâb 3; meaning "meteor") is a medium-range ballistic missile (MRBM) developed by Iran and based on the North Korean Nodong-1. The Shahab-3 has a range of 1,000km, a MRBM variant can now reach 2,000km (can hit targets as far as Israel, Egypt, Romania, Bulgaria and Greece). It was tested from 1998 to 2003 and added to the military arsenal on July 7, 2003, with an official unveiling by Ayatollah Khamenei on July 20. With an accuracy of 140m CEP, the Shahab-3 missile is primarily effective against large, soft targets (like cities). Given the Shahab-3's payload capacity, it would likely be capable of delivering nuclear warheads. According to the IAEA, Iran, in the early 2000s may have explored various fusing, arming, and firing systems to make the Shahab-3 more capable of reliably delivering a nuclear warhead.
- **Ghauri (Pakistan):** The Ghauri–I (Urdu: I-غوری; official codename: Hatf–5 Ghauri–I) is a land-based surface-to-surface medium-range ballistic missile, in current service with the Pakistan Army's Strategic Forces Command— a subordinate command of Strategic Plans Division. Influenced from the design of Nodong-1 of North Korea, its extensive modification and engineering took place in Kahuta Research Laboratories (KRL) in 1990s with an objective of developing an electronic system that uses a single stage liquid fuel rocket motor to carry a payload of 700kg to a range of 1,500 km. This is enough to reach most, if not all of India. Two variants of the Ghauri were produced under the secretive missile research program started in 1987 and the development of a third variant was cancelled. The Ghauri-II uses increased motor assembly length and improved propellants for an increased range of 2,300km.

System

Alternate Designation: No Dong, Nodong, Hwasong, Nodong-A, Hwasong-7, Rodong

Basing: Ground

Launch Platform(s): TEL similar to the Russian-made MAZ-543 but with 10 wheels

Proliferation: Iran and Pakistan. Estimates are that Pakistan obtained 12-25 NoDong missiles. In regards to Iran, reports indicate that it received 150 NoDong 1/2 missiles. Iraq, Eqypt, Syria, and Libya are all believed to have negotiated to obtain the missile at some point, though there are no confirmed exports to these countries.

Effective Range: km900-1,300

Circular Error Probability: 2,000m (50m is GPS is integrated)

Time Required to go from Travel to Ready to Fire: mins60

Dimensions

Length: m16.2

Missile Weight: kg16,500

Diameter: m1.36

Fin Span: INA

Payload

Warhead Type: Single warhead

Warhead Options: Nuclear, chemical, HE or sub-munitions

Nuclear Yield: Medium yield

Conventional Warhead Weight: kg700-1,200

Conventional Warheads Available: HE, sub-munitions

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Chemical Capable: Yes (thickened VX)

Propulsion Characteristics

Engine: Single

Propellant: Liquid propellant

Speed: INA

Fire Control

Guidance System: Inertial

Notes:

The NoDong is a medium range ballistic missile indigenous to North Korea. The missile has a maximum range of 1250 km, making it capable of striking all of South Korea and Japan. The NoDong is liquid fueled and can carry a payload of 1,200kg. It is likely capable of carrying nuclear warheads. As a road-mobile system, the missile can be launched from any location and is concealable, making it more resilient to a preemptive strike. Believed to have been developed in the late 1980s as a part of a Soviet technological transfer, the NoDong is an enhanced version of the Soviet Scud-C missile. However, the development of the NoDong was not entirely an independent North Korean effort, but a collaboration of Chinese and Russian assistance. A derivative of the NoDong was used as the first stage of the long-range Taepodong-1 when it was launched in 1998. Although the rocket failed to reach orbit, the NoDong performed successfully as the first stage. The capabilities of the NoDong-1 missile are such that it can only effectively be used against large, soft targets like cities, airports, or harbors. Its range is sufficient to put parts of Japan within striking distance. However, the accuracy is extremely low for modern missiles and likely ineffective against hardened military targets unless it was equipped with a nuclear warhead. In 2006, it was estimated that North Korea’s inventory of NoDong-1 missiles was approximately 200. By 2009, reports indicated that this stockpile may have reached 300 missiles.

Shahab-3A Iranian Medium Range Ballistic Missile





Tiers:



Variants:

- **Emad:** Originated from: Iran Possessed by: Iran Class: Intermediate-Range Ballistic Missile (IRBM) Basing: Road-mobile Length: 16-16.5m Diameter: 1.25 to 1.38 m Launch weight: 19,000 kg Payload: 750 kg Warhead: Nuclear, chemical, HE, sub-munitions Propulsion: Liquid first-stage, liquid propelled Range: 1,700 km Status: Operational In service: 2015
- **Ghadr:** Originated from: Iran Possessed by: Iran Class: Intermediate-Range Ballistic Missile (IRBM) Basing: Road-mobile Length: 15.86m Diameter: 1.25 to 1.38 m Launch weight: 19,000 kg Payload: 800 kg Warhead: Nuclear, chemical, HE, submunitions Propulsion: Liquid first-stage, solid second-stage propellant Range: 1,950 km Status: Operational In service: 2007

System

Alternate Designation: Meteor-3, Shooting Star-3, Shahab-3A

Basing: Ground

Launch Platform(s): TEL or silo

Proliferation: Not proliferated

Effective Range: km1,300

Circular Error Probability: m140

Dimensions

Length: m16.6

Missile Weight: kg~16,000

Diameter: m1.25 or 1.38

Fin Span: mINA

Payload

Warhead Type: Multiple or Single

Warhead Options: Multiple: Five cluster munition warheads in new models, each warhead can target different destinations. Single: Nuclear, HE, chemical, or sub-munitions

Nuclear Yield: INA

Conventional Warhead Weight: kg~1,400 (280 kg each of 5 warheads)

Conventional Warheads Available: Cluster munitions, HE, chemical, or sub-munitions

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Chemical Capable: Yes

Propulsion Characteristics

Engine: Single Stage

Propellant: Liquid

Speed: km/s2.4

Flight Ceiling: km400

Fire Control

Guidance System: Inertial navigation system

Notes:

The Shahab-3 (Persian: Šahâb 3; meaning "meteor") is a medium-range ballistic missile (MRBM) developed by Iran and based on the North Korean Nodong-1. The Shahab-3 has a range of 1,000 kilometres (620 mi); a MRBM variant can now reach 2,000 kilometres (1,200 mi) (can hit targets as far as Israel, Egypt, Romania, Bulgaria and Greece). It was tested from 1998 to 2003 and added to the military arsenal on 7 July 2003, with an official unveiling by Ayatollah Khamenei on July 20. With an accuracy of 140 m CEP, the Shahab-3 missile is primarily effective against large, soft targets (like cities). Given the Shahab-3's payload capacity, it would likely be capable of delivering nuclear warheads. According to the IAEA, Iran in the early 2000s may have explored various fuzing, arming and firing systems to make the Shahab-3 more capable of reliably delivering a nuclear warhead. The forerunners to this missile include the Shahab-1 and Shahab-2. The then-Iranian Defence Minister Admiral Shamkhani has denied that Iran plans to develop a Shahab-4. Some successors to the Shahab have longer range and are also more maneuverable. Operating under the Sanam Industrial Group (Department 140), which is part of the Defense Industries Organization of Iran, the Shahid Hemmat Industrial Group (SHIG), led the development of the Shahab missile. US Air Force National Air and Space Intelligence Center estimates that as of June 2017 fewer than 50 launchers were operationally deployed.

→→Air-Launched Ballistic Missiles (ALBM) (1,001 km - 3,000 km)

→→Vessel-Launched Ballistic Missiles (VLBM) (1,001 km - 3,000 km)

→→Submarine-Launched Ballistic Missiles (SLBM) (1,001 km - 3,000 km)

→→Multiple-Launch Platform Ballistic Missiles (MLPBM) (1,001 km - 3,000 km)

→Intermediate-Range Ballistic Missiles (IRBM) (3,001 km - 5,500 km)

→→Ground-Launched Ballistic Missiles (GLBM) (3,001 km - 5,500 km)

DF-17 (Dong Feng-17) Chinese Ballistic Missile with the DF-ZF Hypersonic Glide Vehicle (HGV)







Tiers:

1 2 3 4

System

Alternate Designation: DF-17; Dong Feng-17; WU-14
Country of Origin: China
Class: Medium-range Ballistic Missile (MRBM) / Hypersonic Glide Vehicle (HGV)
Chassis: The DF-17 ballistic missile is based on a special wheeled chassis with 10x10 configuration.
Basing: Road-mobile
Missile Engine: INA
Missile Speed: Mach 5-10 (1.72-3.43 km/s) in its glide phase
Warhead Type: The missile is expected to be capable of delivering both nuclear and conventional payloads and may be capable of being configured to deliver a maneuverable reentry vehicle instead of an HGV.
Effective Range: 1,800-2,500 km
Circular Error Probability: 30m

Hypersonic Glide Vehicle (HGV)

Name: DF-ZF

Type: Hypersonic Glide Vehicle (HGV)

Manufacturer: 10th Research Institute, China Aerospace Science Industry Corporation (CASIC)

Description: The Chinese DF-ZF Hypersonic Glide Vehicle (HGV), dubbed WU-14, is a nuclear-capable hypersonic missile delivery vehicle designed to penetrate the United States ballistic missile defenses. The HGV payload is launched as the final stage of an intercontinental ballistic missile (ICBM).

Propellant: Single or Two-Stage; Solid

Speed: The HGV hypersonic vehicle is capable of speeds between Mach 5 (+6,000 kilometers per hour) and Mach 10 (+12,000 kilometers per hour) at altitudes of up to 62 miles (100 kilometers).

Note #1: An hypersonic cruise missile can perform precision strikes with relative low altitude and flat trajectory which makes it difficult to detect and neutralize by conventional air and missile defenses.

Note #2: The DF-ZF will bring a hypersonic capability to the PLARF. Missiles carrying the DF-ZF will have shorter flight times and be capable of performing evasive maneuvers at hypersonic speeds, which will complicate the ability of current missile defenses to intercept it. The current missiles believed to be capable of carrying the HGV are short- and medium-ranged but could strike targets in South Korea and Japan, including U.S. carriers and bases in the region. It is also capable of carrying nuclear payloads as well as conventional.

Dimensions

Chassis Length: INA

Missile Length: m11

Missile Diameter: INA

Missile Weight: kg15,000

Fin Span: INA

Automotive (Chassis: The DF-17 ballistic missile is based on a special wheeled chassis with 10x10 configuration)

Engine Name: INA

Engine Type: Diesel

Engine Power: 600 hp

Maximum Road Speed: 70 km/h

Maximum Range: 650 km

Gradient: %40

Side Slope: %20

Vertical Step: 0.4 m

Trench: 2.5 m

Fording: 1.2 m

Protection

Hull Armor: INA

Applique Armor: INA

Active Protection System: No

Smoke Equipment: No

Notes:

The DF-17 (Dong Feng-17) is a Chinese medium-range missile system equipped with a hypersonic glide vehicle. U.S. officials first confirmed the existence of DF-17 prototypes (DF-ZF/Wu-14) in 2014. Thge DF-17 mounts to the DF-ZF Hypersonic Glide Vehicle. China has invested significant resources in the DF-17 and its other hypersonic weapon programs. The People's Liberation Army (PLA) has reportedly done so to counter adversary missile defenses, as well as to develop a fast, long-range, high-precision strike capability that "leaves enemies with little time to react." While slower than a conventional ballistic reentry vehicle, HGVs' higher maneuverability and lower-altitude flight make them harder to track and predict their flight path, challenging legacy ballistic missile defense systems. In 2018, one U.S. official noted that China had conducted around 20 times the number of hypersonic weapons tests as the United States had in the preceding decade. China's 10th Research Institute is responsible for developing the DF-17 and other Chinese HGVs. Also known as the "Near Space Flight Vehicle Research Institute," the organization operates under the China Aerospace Science Industry Corporation (CASIC) 1st Academy. U.S. officials confirmed the DF-17's existence in 2014, identifying it as the Wu-14. News media later identified the missile as the DF-ZF – likely an early Chinese designation. Between January 2014 and November 2017, China conducted at least nine flight tests of the DF-17. Tests took place at the Taiyuan Satellite Launch Centre in Shanxi Province. The DF-17 is solid-fueled, measures around 11 m in length, and weighs around 15,000 kg. Its accompanying DF-ZF HGV reportedly reaches speeds of Mach 5-10 (1.72-3.43 km/s) in its glide phase. U.S. intelligence assessments suggest that the DF-17 possesses a range between 1,800 and 2,500 km. Although Chinese commentators have emphasized the DF-17's conventional mission, the missile may alternatively equip nuclear warheads. The DF-17 has demonstrated a high degree of accuracy in testing, with one U.S. government official saying a test warhead "within meters" of its intended, stationary target. U.S. defense officials have also said the DF-ZF HGV performed "extreme maneuvers" and "evasive actions" in previous test flights. Some reports suggest China could develop the DF-17 into a second-generation anti ship ballistic missile (ASBM), further enabling China's strategy to deter U.S. regional intervention. In January 2019, PLA officials claimed to have an anti ship DF-17 variant under development.

Hwasong-10 (Musudan) North Korean Intermediate-Range Ballistic Missile





Tiers:



System

Alternate Designation: Hwasong-10; BM-25; Musudan

Type: Intermediate-Range Ballistic Missile

Launch Platform(s): Transporter Erector Launcher (TEL): MAZ-547)

Basing: Road-Mobile

Crew: 3

Missile Engine Name: Soviet 4D10 engine and uses liquid propellant.

Type of Engine: Single-stage

Warhead Type: Nuclear, single warhead with a blast yield of up to 1 MT

Range of Fire: 2,500-4,000 km

CEP: INA

Note #1: The Hwasong 10 is based on a Soviet R-27 submarine-launched ballistic missile, but is slightly longer. Its development was assisted by Russians. In 1992, after the collapse of the Soviet Union, North Korea signed a contract with a Russian Makeyev Design Bureau to develop a space launch vehicle, based on the R-27 missile. Russian ballistic missile designers and engineers went to North Korea to develop this missile.

Note #2: The TEL vehicle can launch its missile from prepared sites or from unprepared positions during field deployment. Once the missile is launched, the TEL vehicle can be reloaded with another missile. Reloading is performed by a crane.

Dimensions

Missile Length: m12

Missile Diameter: m1.5

Missile Launch Weight: 20 tons

Throw Weight: 650 kg

Warhead Weight: The missile carries a singe warhead, which weights around 650 kg. Though other sources suggest that the warhead could weight 1 000-1 250 kg.

Automotive (Transporter Erector Launcher: MAZ-547)

Engine Name: INA

Engine Type: V12 Diesel

Engine Power: 525

Maximum Speed: 60 km/h

Maximum Range: INA

Fuel Capacity: INA

Protection

Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Self-Entrenching Blade: No

NBC Equipment: INA

Smoke Equipment: INA

Notes:

The Hwasong-10 (Chosŏn'gŭl: □□ 10□; hancha: □□ 10□), also known by the names BM-25 and Musudan (Korean: □□□; Hanja: □□ □), is a mobile intermediate-range ballistic missile developed by North Korea. Hwasong-10 was first revealed to the international community in a military parade on 10 October 2010 celebrating the Korean Worker's Party's 65th anniversary, although experts believe these were mock-ups of the missile.Hwasong-10 resembles the shape of the Soviet Union's R-27 Zyb submarine-launched missile, but is slightly longer. It is based on the R-27, which uses a 4D10 engine propelled by unsymmetrical dimethylhydrazine (UDMH) and nitrogen tetroxide (NTO). These propellants are much more advanced than the kerosene compounds used in North Korea's Scuds and Nodong missiles. Since April 2016 the Hwasong-10 has been tested a number of times, with two apparent partial successes and a number of failures. The Hwasong-10 was not shown in the April 2017 and February 2018 military parades, suggesting that the design had not been deployed. Assuming a range of 3200 km, the Musudan could hit any target in East Asia (including US military bases in Guam and Okinawa). Inventory is less than 50 launchers. In the mid-1990s, after the collapse of the Soviet Union, North Korea invited the Makeyev Design Bureau's ballistic missile designers and engineers to develop this missile, based on the R-27 Zyb. In 1992, a large contract between Korea Yon'gwang Trading Company and Makeyev Rocket Design Bureau of Miass, Russia was signed. The agreement stated that Russian engineers would go to the DPRK and assist in the development of the Zyb Space Launch Vehicle (SLV). It was decided that, as the Korean People's Army's MAZ-547A/MAZ-7916 Transporter erector launcher could carry 20 tonnes, and the R-27 Zyb was only 14.2 tonnes, the R-27 Zyb's fuel/oxidizer tank could be extended by approximately 2 metres. Additionally, the warhead was reduced from a three-warhead MIRV to a single warhead. The actual rocket design is a liquid fuel rocket, generally believed to use a hypergolic combination of unsymmetrical dimethylhydrazine (UDMH) as fuel, and nitrogen tetroxide (NTO) as oxidizer.[4] Once the fuel/oxidizer combination are fed into the missile, it could maintain a 'ready to launch' condition for several days, or even weeks, like the R-27 SLBM, in moderate ambient temperatures. A fueled Hwasong-10 would not have the structural strength to be safely land transported, so would have to be fueled at the launch site. It was originally believed that the rocket motors of Hwasong-10 is made up the second stage of the Taepodong-2, which North Korea unsuccessfully test fired in 2006. However analysis of the Unha-3 launch, believed to be based on the Taepodong-2, showed that the second stage did not use the same fuel as the R-27, and is probably based on Nodong rocket technology. Initially it was believed that there is a possibility that Hwasong-10 likewise is using the Nodong's kerosene and corrosion inhibited red fuming nitric acid (IRFNA) propellants, reducing the missile's range by about half. However it is unlikely that North Korea uses IRFNA propellants which will reduce its range by about half, after the experts acknowledged that the June 22 twin test range could be at 3,150 km if the missile was not launched in the lofted trajectory.

→→Air-Launched Ballistic Missiles (ALBM) (3,001 km - 5,500 km)

→→Vessel-Launched Ballistic Missiles (VLBM) (3,001 km - 5,500 km)

→→Submarine-Launched Ballistic Missiles (SLBM) (3,001 km - 5,500 km)

→→Multiple-Launch Platform Ballistic Missiles (MLPBM) (3,001 km - 5,500 km)

→Intercontinental-Range Ballistic Missiles (ICBM) (More than 5,500 km)

→→Ground-Launched Ballistic Missiles (GLBM) (More than 5,500 km)

Hwasong-14 (KN-14) North Korean Intercontinental Ballistic Missile







Tiers:



Variants:

- **KN-08:** The KN-08 (North Korean: Hwasong-13; it has also been called the No Dong-C) is a three-stage, road-mobile intercontinental ballistic missile (ICBM) being developed by North Korea. The missile is believed to be powered by 4D10 engines adapted from those on the Soviet R-27 (NATO: SS-N-6) missiles. Pyongyang reportedly obtained some of these missiles in the early 1990s after the collapse of the Soviet Union.

System

Alternate Designation: Hwasong-14 KN-14
Type: Intercontinental Ballistic Missile
Launch Platform(s): MAZ-based vehicle. Six missiles were carried on 16-wheel transporter erector launchers (TEL),similar in size to those used by the Russian RT-2PM2 Topol-M missiles. The TELs are thought to be based on WS-51200 frames made by Wanshan Special Vehicle in China, possibly using technology from Minsk Automobile Plant.

Missile Engine: 3-stage liquid-propelled rocket

Missile Maximum Range: 9,000 km to 10,000 km

Missile Accuracy: 1.9 km) at 2,400 km

Dimensions

Missile Length: 16.9 m to 17.40 m

Missile Weight: INA

Warhead Weight: 400 kg

Automotive

Launcher: MAZ-based vehicle. Six missiles were carried on 16-wheel transporter erector launchers (TEL),similar in size to those used by the Russian RT-2PM2 Topol-M missiles.

Fire Control

Guidance System: INA

Protection

Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Self-Entrenching Blade: No

NBC Equipment: INA

Smoke Equipment: INA

Notes:

Compared to KN-08, the KN-14, is a slightly shorter, with a blunt and rounded nose cone. Due to the lack of evidence to analyze, it is unclear if the KN-14 is a three- or two-staged missile, but some analysts suggest the latter to be more likely. According to analysis by 38 North, the KN-14's robust design has the potential of a 50-60% reliability, whereas it is estimated that the KN-08 would operate only 30-40% of the time. Similar to the KN-08, the design of KN-14 appears comes from the Soviet-era R-27/SS-N-6 missiles. This seemed to be confirmed during the liquid-fueled engine test on April 9, 2016. While there is no video footage, images released of the test appear to show a pair of clustered 4D10 engines, which are used on the R-27.3 The images display the engines, embedded within a fuel tank fitted for an ICBM, spitting out bright orange exhaust, which is indicative of a highly efficient fuel called unsymmetrical dimethyl hydrazine (UDMH). The use of such fuel could increase KN-14's range.

Hwasong-13 (KN-08) North Korean Intercontinental Ballistic Missile



Tiers:

1 **2** 3 4

Variants:

- **KN-14 (KN-08 Mod 2):** This is an upgraded variant. It has two stages and a blunt, cone-shaped nose. First revealed on Oct. 10, 2015, it is believed to have a smaller warhead capability and shorter range. The KN-14 is thought to be road-mobile, similar to the KN-08. Later analysis has suggested this is a new missile, which has been designated the KN-20 (Hwasong-14).

System

Alternate Designation: Hwasong-13; Rodong-C; KN-08

Type: Intercontinental Ballistic Missile

Launch Platform(s): MAZ-based vehicle. Six missiles were carried on 16-wheel transporter erector launchers (TEL),similar in size to those used by the Russian RT-2PM2 Topol-M missiles. The TELs are thought to be based on WS-51200 frames made by Wanshan Special Vehicle in China, possibly using technology from Minsk Automobile Plant.

Missile Engine: 3-stage liquid-propelled rocket

Missile Maximum Range: 5,500 km to 11,500 km

Missile Accuracy: 1.9 km) at 2,400 km

Dimensions

Missile Length: 17.5 m to 19.75 m

Missile Diameter 1st to 2nd Stage: 1.8 m to 2.00 m

Missile Diameter 3rd Stage: 1.25 m

Missile Weight: INA

Warhead Weight: 300 kg to 700 kg

Automotive

Launcher: MAZ-based vehicle. Six missiles were carried on 16-wheel transporter erector launchers (TEL),similar in size to those used by the Russian RT-2PM2 Topol-M missiles.

Fire Control

Guidance System: INA

Protection

Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Self-Entrenching Blade: No

NBC Equipment: INA

Smoke Equipment: INA

Notes:

The Hwasong-13 (Korean: □□ 13□; Hanja: □□ 13□; lit. Mars-13), also known as Rodong-C (Korean: □□-□; Hanja: □□-C) or KN-08 under the U.S. naming convention,[3] is a road-mobile intercontinental ballistic missile believed to be under development by North Korea. The changes shown in the mock-up displayed in October 2015 indicated a change from a three to two-stage design. Mock-ups of the missile were first displayed during a military parade in April 2012 to mark the 100th anniversary of Kim Il Sung. Six missiles were carried on 16-wheel transporter erector launchers (TEL), similar in size to those used by the Russian RT-2PM2 Topol-M missiles. The TELs are thought to be based on WS-51200 frames made by Wanshan Special Vehicle in China, possibly using technology from Minsk Automobile Plant. UN investigators have concluded that the TELs were Chinese WS51200 trucks exported to North Korea for lumber transport. The North Koreans converted them into TELs by installing hydraulic gear and controls to erect a missile. Despite being converted to fire a missile, the truck would not be likely to survive damage from the rocket exhaust like a purpose-built TEL, making it a single-use launcher. Mock-ups were again paraded in 2013, with fewer discrepancies between them than in the previous year. The KN-08 was paraded again to celebrate the 70th anniversary of the founding of Korean Workers Party on 11 October 2015. In this parade, the missile featured a modified smaller-in-length but larger-in-diameter third stage plus re-entry vehicle section design, which has led to suggestions that North Korea might have perfected nuclear warhead miniaturization. The KN-08 mock-up dimensions are estimated to be: length of about 17.1 metres, and first and second stage diameter of about 1.9 metres, reducing to about 1.25 metres for the third stage. Liquid-fueled ICBMs generally only have two stages for best performance, with a few exceptions (usually when an existing design is upgraded). The three stage design of the KN-08 is puzzling.[20] While a three-stage design is common for solid propellant ICBMs, western analysts say that North Korea lacks the experience and ability to develop a solid-fueled ICBM. In early 2015, the U.S. Department of Defense announced that although they had not seen the KN-08 tested, they believed North Korea had the ability to put a nuclear weapon on a KN-08, and it was prudent to plan for that threat. The KN-08 theoretically poses a threat to the U.S. mainland, able to deliver a 500–700 kg (1,100–1,500 lb) payload 7,500–9,000 km (4,700–5,600 mi) to the American West Coast. Practically speaking however, its accuracy is likely "barely adequate" to target large cities, mobility would be limited to paved roads, and the system will require 1–2 hours of pre-launch fueling. In 2017, speculations were published, that the KN-08 may achieve an emergency operational status by 2020 It is reported on December 2, 2017, that the missile was canceled and that development team was sent to assist development of Hwasong-12 IRBM, Hwasong-14 and Hwasong-15 ICBMs. German analyst Norbert Brugge in interview on November 27, 2017 for Difesa Online, a military focused website claimed that Hwasong-10 and Hwasong-13 were likely canceled due to inability to solve engine problems.

RS-28 Sarmat Russian Intercontinental Ballistic Missile (ICBM)





Tiers:

1 2 3 4

System

Additional Designation: SS-X-30, PC-28, Capmat, Satan II
Range: 18,000 kilometres
Launch Platform: Silo
Circular Error Probability: m10

Dimensions

Length: m36
Diameter: m3.5
Weight: tonnes208
Speed: km/h25,500
Maximum Warhead Capacity: kg10,000

Payload

Note:: 10 heavy MIRVs; 16 light MIRVs; 24 hypersonic glide vehicles

↳ *Warheads (Multiple Independently Targetable re-entry Vehicles)*

Quantity: Up to 16
Note:: Each MIRV, which can be aimed at different targets, has the explosive yield of up to 750 kilotons (Hiroshima was 15 kilotons)

Hypersonic Glide Vehicle (HGV)

Name: YU-74 Avangard

Quantity: Up to 24

Note:: HGVs are capable of carrying a nuclear payload and can travel at 20 times the speed of sound. Their high speed, low trajectory, and mid-flight maneuverability make it difficult to engage with systems like the US's THAAD.

Fire Control

Note:: Inertial guidance, GLONASS, Astro-inertial

Protection

Note:: Like all silo based missiles, the RS-28 is most vulnerable while being transported. Otherwise, OPSEC of the exact location of the silo and the hardening of the silo itself provide the missile its best protection. Once the missile is in flight, terrestrial and space based counter-missile systems are the ICBM's greatest threat. It is expected that the RS-28 will carry countermeasures to defeat these threats.

Notes:

The RS-28 Sarmat (Russian: РС-28 Сармат, named after the Sarmatians, NATO reporting name SS-X-30) is a Russian liquid-fueled, MIRV equipped, heavy thermonuclear intercontinental ballistic missile (ICBM), under development by the Makeyev Rocket Design Bureau since 2009. It is intended to replace the R-36M ICBM (SS-18 'Satan') in Russia's arsenal. The Sarmat is one of the six new Russian strategic weapons unveiled by Russian President Vladimir Putin on 1 March 2018. One source suggests that the program is being accelerated and will make up 100% of Russia's fixed land-based nuclear arsenal by 2021. Some sources state that with the range of the RS-28, the missile could be launched to take a south pole trajectory thus avoiding the US's missile defense umbrella. The RS-28 will be 100 times more powerful than the bomb dropped on Hiroshima and one missile’s payload could destroy France. A regiment of the 62nd Missile Division, deployed in Uzhur, part of the 33rd Guards Missile Army, headquartered in Omsk in southwestern Siberia, will reportedly receive two silo-based RS-28 ICBMs in 2021 with four more ICBMs delivered the following year. In total, seven regiments with six missiles in a regiment plus one ten-missile regiment for a total count of 46 RS-28s will be deployed and split up between two missile divisions based in Dombarovskiy and Uzhur.

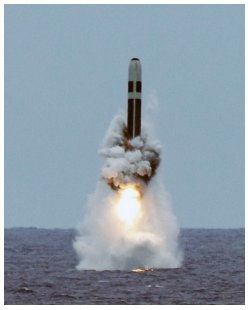
↳

→→Air-Launched Ballistic Missiles (ALBM) (More than 5,500 km)

→→Vessel-Launched Ballistic Missiles (VLBM) (More than 5,500 km)

→→Submarine-Launched Ballistic Missiles (SLBM) (More than 5,500 km)

RSM-56 Bulava (SS-NX-30) Russian Submarine-Launched Ballistic Missile



Tiers:



System

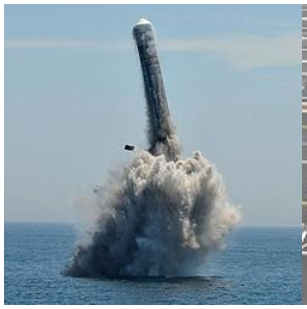
Alternate Designation: RSM-56 Bulava
Type: Submarine-Launched Ballistic Missile
Date of Introduction: 2018
Country of Origin: Russia
Length: 11.5 m (38 ft) (without warhead) 12.1 m (40 ft) (launch container)
Diameter: 2 m (6 ft 7 in) (missile) 2.1 m (6 ft 11 in) (launch container)
Weight: 36.8 t (36.2 long tons; 40.6 short tons)
Warhead: 6-10 × 100-150 kt MIRVs
Engine: Three stage solid and liquid head stage
Propellant: Solid propellant and liquid fuel
Operational Range: 8,000-8,300 km
Guidance System: Inertial guidance, possibly with Astro-inertial guidance and/or GLONASS update
Accuracy: 120-350 meters
Launch Platform: Borei-class submarines Typhoon-class submarine Dmitri Donskoi (as a testbed)

Notes:

The RSM-56 Bulava (Russian: Булава, lit. "mace", NATO reporting name SS-NX-30 or SS-N-32, GRAU index 3M30, 3K30) is a submarine-launched ballistic missile (SLBM) developed for the Russian Navy and deployed in 2013 on the new Borei class of ballistic missile nuclear submarines. It is intended as the future cornerstone of Russia's nuclear triad, and is the most expensive weapons project in the country. The weapon takes its name from bulava, a Russian word for mace. Designed by Moscow Institute of Thermal Technology, development of the missile was launched in the late 1990s as a replacement for the R-39 Rif solid-fuel SLBM. The Project 955/955A Borei-class submarines carry 16 missiles per vessel. Development and deployment of the Bulava missile within the Russian Navy is not affected by the enforcement of the new START treaty. A source in the Russian

defense industry told TASS on June 29, 2018 that the D-30 missile system with the R-30 Bulava intercontinental ballistic missile had been accepted for service in the Russian Navy after its successful four-missile salvo launch tests in 2018. The Bulava missile was developed by Moscow Institute of Thermal Technology under the leadership of chief designer Yury Solomonov. Although it utilizes some engineering solutions used for the recent RT-2PM2 Topol-M ICBM, the new missile has been developed virtually from scratch. Bulava is both lighter and more sophisticated than the Topol-M.[citation needed] The two missiles are expected to have comparable ranges, and similar CEP and warhead configurations.[citation needed] Bulava has a declared START throw weight of 1150 kg to 9,500 kilometers. The missile has three stages; the first and second stages use solid fuel propellant, while the third stage uses a liquid fuel to allow high maneuverability during warhead separation. The missile can be launched from an inclined position, allowing a submarine to fire them while moving.[citation needed] It has a low flight trajectory, and due to this could be classified as a quasi-ballistic missile. It possesses advance missile defense evasion capabilities making it resistant to any missile-defense systems. Borei-class submarines carrying Bulava missiles are expected to be an integral part of the Russian nuclear triad until 2040. Bulava can be loaded on TEL road mobile launchers, on railway BZhRK trains and other various launchers

JL-2 (CSS-N-14) Chinese Intercontinental-Range Submarine-Launched Ballistic Missile (SLBM)






Tiers:

1 2 3 4

System

:
:
:

↳ ***Missile***

Name: JL-2 (CSS-N-14)
Type: Intercontinental-Range Submarine-Launched Ballistic Missile (SLBM)
Basic Load: 12
Length: 13 m
Diameter: INA
Weight: 42,000 km
Warhead: 1 nuclear warhead
Blast Yield: 1 megaton of TNT
Propellant: Solid-fuel rocke
Operational Range: 7,200 km
Guidance System: Astro-inertial with Beidou
Launch Platform: Type 094 submarine

Notes:

The JL-2 (Chinese: □□-2; pinyin: Jù Làng Èr; literally: 'Giant Wave 2', NATO reporting name CSS-N-14) is a Chinese second-generation intercontinental-range submarine-launched ballistic missile (SLBM) deployed on the People's Liberation Army Navy's (PLAN) Type 094 submarines. It succeeds the JL-1 SLBM deployed on the Type 092 submarine. The JL-2 is the first Chinese SLBM that allows PLAN ballistic missile submarines to strike portions of the United States from the Chinese coast, and provide China with a viable sea-based nuclear deterrent. The JL-2 is a naval variant of the land-based DF-31. Their common 2-metre diameter solid fuel rocket motor was successfully tested in late 1983, and research and development efforts were reorganized starting in 1985 to produce both missiles. The first JL-2 at-sea launch occurred in 2001 from a Type 031 submarine. The program was delayed after a failed test in 2004. Successful launches occurred in 2005 and 2008. The missile was successfully fired from a Type 094 submarine, the intended operational platform, for the first time in 2009. A series of test launches

occurred in 2012. Another test launch occurred in January 2015. During the development of the missile, it was reported that China was considering modifying the missile to accommodate an anti-satellite warhead to give it a sea-based anti-satellite capability. Type 094 deterrence patrols with JL-2 missiles began in December 2015. As of 2017, 48 JL-2 launchers are deployed on submarines. The JL-2 is a three-stage, solid-fuelled missile, with a maximum range of 7,200 km (4,500 mi). Its payload is a single 1 Megaton warhead.

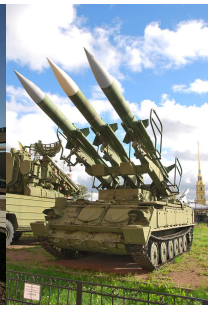
→→Multiple-Launch Platform Ballistic Missiles (MLPBM) (More than 5,500 km)

Air Defense

→Radar Guided Missile Systems

→→Short-Range Missile Systems (Less than 25 km)

SAM-6 (Gainful) Iranian Surface-to-Air Missile System

Tiers:



Variants:

- **Gainful Mod 1 (SA-6b):** Initial operating capability (IOC) was reached in 1979. This system is mounted on a variant of the MT-LB general-purpose tractor that also carries missile guidance radar.

System

Alternative Designations: 2K12 Kub; SA-6 Gainful
Type: Tracked medium-range surface-to-air missile system
Target: Low to medium altitude FW and heli for SA-6a. FW, heli, CM for SA-6b FW, heli, TBM, CM, UAV, and ground targets for SA-6b/Kvadrat-M4.
Manufactuer: Ulyanovsk Mechanical Plant (SURNs) ZiK (TELs) Still in Service in over 25 countries through Russia, Africa, and Asia.
In Service: 1960-Present
Chassis: Modified PT-76
Launch Vehicle: 2P25 SPU Launch Vehicle
Crew: 3

Dimensions

Length, Hull: m6.79
Length, with Missiles: m7.39
Height, Hull Top: m1.80

Height, with Missiles: m3.45

Width: m3.18

Tracks Length on the Ground: m3.80

Track Width: m0.36

Ground Clearance: m0.40

Combat Weight: kg14,000

Ground Pressure: 0.48 kg/cm sq

Automotive

Engine Name: Model V-6R

Engine Type: water-cooled, in-line 6-cylinder diesel

Engine Power: 240 hp at 1,800 rpm

Power-to-weight ratio: 17.14 hp/metric ton

Fuel Capacity: 250 Liters

Suspension: torsion bar, 6 road wheels, rear drive, front idler, two hydraulic shock absorbers, no return rollers

Transmission: manual, 5 forward and 1 reverse gears

Electrical system: 24 v

Batteries: 2 x 12 v, 100 Ah (for vehicle)

Maximum Speed: km/h44

Maximum Range, Road: km/h260

Vertical Obstacle: m1.00

Trench: m2.50

Gradient: %60

Side Slope: %30

Fording: m1.10

Communications

Tactical Radio: Depends on which country the SA-6 is operating in.

Armament

Launcher: 2P25 SPU Launch Vehicle

Name: Kub-M3/3M9M3

Reaction Time (sec): sec22-24

Time Between Launches (sec): INA

Reload Time (min): min10

Fire on Move: No

Simultaneous targets launcher: ea1

Simultaneous targets battery: ea1

Simultaneous missiles battery: ea1-4

Emplacement Time (min): min5 or less

Displacement Time (min): min15 for a battery

↳*Missile (Option 1)*

Name: Kub-M1

Missiles per TEL: 3

Engagement Range: 4–23 km

Engagement Altitude: 80–8,000 m

Missile Speed: Mach 1.75

Maximum Target Speed: Mach 1.75

Response Time: sec22–24

Missile Weight: 630 kg

Deployment Time: Min5

Guidance System: semi-active radar homing

↳*Missile (Option 2)*

Name: Kub-M3

Missiles per TEL: 3

Engagement Range: 4–25 km

Engagement Altitude: 20–8,000 m

Missile Speed: Mach 2

Maximum Target Speed: Mach 1.75

Response Time: sec22–24

Missile Weight: 630 kg

Deployment Time: min5

Guidance System: semi-active radar homing

↳*Missile (Option 3)*

Name: Kub-M4 (Buk-M1)

Missiles per TEL: 3

Engagement Range: 4–24 km

Engagement Altitude: 30–14,000 m

Missile Speed: Mach 2

Maximum Target Speed: Mach 1.75

Response Time: sec24

Deployment Time: min5

Guidance System: semi-active radar homing

Fire Control

FCS Name: INA

Computerized FCS: Yes

EO sighting system: TV

Commander and driver: IR

IFF: Pulse-doppler

Radar Vehicle

Name: SURN 1S91 "Straight Flush" Radar

Type: fire control and guidance radar associated with surface-to-air „Kub“ (kyrillisch: Куб; english: cube, NATO-Bezeichnung: SA-5 Gammon) missile system.

Band: It is operating in C-Band surveillance and aquisition radar, combined with an operating in I-Band tracking and illuminating radar.

Peak Power: 600 kW

Maximum Range: km75

Beamwidth: deg1

Antenna Rotation: 15 or 20 min-1

↳*Additional Radar Systems Available*

Note: The 2K12 can also be used at a regimental level, if used as such it can be accompanied by a number of additional radar systems for extended air search at longer range and lower altitude, to supplement the 1S91 "Straight Flush". These systems include the: P-12 "Spoon Rest", a VHF early warning radar (also used by the SA-2), with a 200 kilometres (120 mi) range. P-40 "Long Track", an E band early warning radar (also used by the SA-4 and SA-8), with a 370 kilometres (230 mi) range. P-15 "Flat Face A", a UHF early warning radar (also used by the SA-3, with a 150 kilometres (93 mi) range. "Thin Skin" or "Side Net" E band height finding radar (also used by the SA-2, SA-4 and SA-5, range 240 km/148 miles) "Score Board" IFF radar The "Spoon Rest" and "Thin Skin" are mounted on a truck, "Long Track" on a tracked vehicle (a modified AT-T) and "Flat Face" on a van. It is unknown what kind of mounting the "Score Board" has. Without the P-40 "Long Track" mobile radar vehicle, the 2K12 is unable to track aircraft at high altitudes.

Protection

Hull Armor Type: 9.40 mm

Turret Armor: 9.40 mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, collective overpressure and filtration

Smoke Protection: INA

Notes:

The SAM-6 (Gainful) is a export of the Russian 2K12 (NATO: SA-6 Gainful). The 2K12 "Kub" (NATO reporting name: SA-6 "Gainful") mobile surface-to-air missile system is a Soviet low to medium-level air defence system designed to protect ground forces from air attack. "2K12" is the GRAU designation of the system. Each 2K12 battery consists of a number of similar tracked vehicles, one of which carries the 1S91 (SURN vehicle, NATO designation "Straight Flush") 25 kW G/H band radar (with a range of 75 km (47 mi)) equipped with a continuous wave illuminator, in addition to an optical sight. The battery usually also includes four triple-missile transporter erector launchers (TELs), and four trucks, each carrying three spare missiles and a crane. The TEL is based on a GM-578 chassis, while the 1S91 radar vehicle is based on a GM-568 chassis, all developed and produced by MMZ. he 2K12 system shares many components with the 2K11 Krug (SA-4) system. In many ways they are designed to complement each other; 2K11 is effective at long ranges and high altitudes, 2K12 at medium ranges and intermediate altitudes. The system is able to acquire and begin tracking targets using the 1S91 "Самоходная установка разведки и наведения" (SPRGU - "Self-propelled Reconnaissance and Guidance Unit" / NATO: "Straight Flush" radar) at 75 km (47 mi) and begin illumination and guidance at 28 km (17 mi). IFF is also performed using this radar. It can only guide one or two missiles to a single target at any time. The missile is initially command guided with terminal semi-active radar homing (SARH), with target illumination provided by the "Straight Flush" radar. Detonation is via either the impact or proximity fuze. On the latest models, this vehicle is also fitted with an optical tracking system which allows engagement without the use of the radar (for active RF emissions stealth reasons, or due to heavy ECM jamming) in which case the effective altitude is limited to 14 km/46000 ft. The optical tracking method also allows engagements to altitudes below that where the radar is able to track targets. Maximum target speed is around Mach 2 for head-on engagements and Mach 1 for tail-chase engagements. Top speed of the missile is approximately Mach 2.8. In contrast to the elaborate Patriot missile or even the simpler Hawk system fielded by US forces, most of the system rides on two tracked self-propelled vehicles, rather than towed or mounted on trucks, and either the launcher or control vehicle can be set to launch in only 15 minutes after changing location.

HQ-7 (FM-80) Chinese Short-Range Air Defense Missile System



Tiers:

1 2 **3** 4

Variants:

- **FM-80 (Feimeng 80),:** export version of the HQ-7. It was revealed in 1989.
- **HHQ-7:** a naval version of the HQ-7. It was introduced in the 1990s. It has a bank of 8 missiles. For over a decade it was the standard Chinese ship-based air defense system. Currently a more capable HQ-9 with a longer range is being fitted on newly-built Chinese warships.
- **Shahab Tagheb:** an Iranian short-range air defense missile system. It was revealed in 1999. It was developed with Chinese assistance and by transferring technology of the HQ-7.
- **HQ-7A:** improved variant introduced in 1998. It has a maximum range of fire of 15 km. Detection range is 25 km and tracking range is 20 km. Also this missile has a maximum speed of 900 m/s in stead of 750 m/s.
- **HQ-7B:** latest variant, based on indigenous 6x6 armored chassis. It was first revealed somewhere in 2009. This air defense system is wisely used by the Chinese armed forces. It is more mobile due to its 6x6 configuration. This vehicle is more suited to follow motorized infantry, or mechanizes armored units.

System

Alternative Designation: HQ-7, FM-80, HongQi 7, Fei Meng, Flying Midge" or Flying Mongoose,
Type: Short-Range Air Defense Missile System
Family: HQ-7
Manufacturer: China, Company: INA
In Service: 1988-Present
Crew: ea3
Chassis: Thomson-Hotchkiss P4R chassis
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: INA
Note #1: It is a reverse engineered copy of the French Crotale.

Note #2: A battery of HQ-7 consists of one vehicle with acquisition radar and two or three TELAR vehicles. Also each battery is supported by a maintenance group with around 10 support vehicles.

Dimensions (Thomson-Hotchkiss P4R Chassis)

Length: mINA

Width: mINA

Height: mINA

Weight, Combat: kgINA

Ground Pressure: kg/mINA

Automotive (Thomson-Hotchkiss P4R Chassis)

Engine Name: INA

Engine Type: petrol / diesel

Engine Power: hpINA

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.5

Communications

Missile System

↳*Missile Launcher*

Name: INA

Type: TELAR vehicle

Firing Interval: 3 seconds

Operational Response Time: 6-10 seconds

Single-Shot Kill Rate: %85-90

↳*Missile*

Name: 4-cel or 8-cel missile launcher

Type: Short-Range Air Defense Missile

Length: m3

Diameter: m0.55

Wingspan: m0.55

Weight: kg84.5

Warhead Type: HE-FRAG

Warhead Weight: kg15

Maximum Range of Fire: kmup to 12

Minimum Range of Fire: m500-700

Maximum Altitude of Fire: km5.5

Minimum Altitude of Fire: m15

Basic Load: ea4

Speed: Mach 2.3 or 750 m/s

Missile Maneuverability: 20 G

Maximum Kill Distance at 400 m/s: km8.5

Maximum Kill Distance at 300 m/s: km10

Maximum Kill Distance at Helicopter: km12

Minimum Kill Distance: m500

Homing Range: km17

Target Seeking Range: km18.4

Guidance System: Radar

Note: The HQ-7 can engage helicopters, aircraft, cruise missiles, air-to-ground missiles and anti-radiation missiles.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Optical Aiming System: Yes

Target Processing Unit: Yes, the system can process 30 targets & track 12 targets simultaneously

Generators: 4 x 40 kW generators

Target Processing Unit: Yes

Network: Wired Network

Radar #1

Name: INA
Type: Doppler Search Radar
Band: E/F Band
Range: km18.4
TV Tracking System: Yes
IR Localiser: Yes

Protection

Hull Armor: Protection against small arms fire and artillery shell splinters.
Turret Armor: Protection against small arms fire and artillery shell splinters.
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: INA
NBC Protection: Yes
Smoke Equipment: No
Countermeasures: Resists active and passive jamming and rejects ground and atmospheric clutter
IFF: Yes

Notes:

The HQ-7 SAM is used by PLA and PLAAF for short-range air-defense. At some PLAAF bases, the HQ-7 is deployed in hardened shelters. The PLA has mounted the HQ-7 on towed trailers. The HongQi 7 (HQ-7) short-range air defense missile system has been developed in China in the 1980s. It is a reverse engineered copy of the French Crotale. Sometimes it is referred as Sino Crotale. In 1978-1979 China imported some of the Thomson-CSF Crotale systems for evaluation. These where both land-based and ship-based versions. Some French R-440 Sea Crotale systems were purchased and installed on the Chinese warships. Eventually China reverse engineered this system. First Chinese clone of the ground-based version was produced for testing in 1983. In 1986-1988 it was approved for production. The HQ-7 was also deployed by the Chinese air force and protected the air bases from air attacks. Since 1989 the HQ-7 was proposed for export customers as the FM-80.

↳

R440 Crotale French 4x4 Short-Range Air Defense Missile System





Tiers:



Variants:

- **R440 Crotale:** The original Crotale SAM system, with both land and sea (Sea Crotale) systems. Over 330 systems and several thousand missiles were produced and exported to more than 15 countries.
- **HQ-7:** China developed the HQ-7 system partly from reverse-engineering Crotale. An improved version, the HQ-7A/FM-90, is known to exist.
- **Shahab Thaqeb:** In 2002 Iran revealed details concerning a domestically produced surface-to-air missile system, named Shahab Thaqeb. The system, mounted on a 4-wheel trailer, closely resemembled the Chinese HQ-7/FM-80/90 series which Iran had already received. It was unclear whether these systems were actually manufactured in Iran, or whether some portion of the assembly had been conducted domestically.
- **R460 SICA (Shahine):** Thomson-CSF (now Thales) developed a specific version of the Crotale known as "Shahine" for Saudi Arabia. The system became operational in 1980. The main visible differences are mainly the carrier (an AMX 30 armoured carrier instead of the non protected classic carrier), and that it carries a six missile firing unit (instead of four). The purpose of the changes was to allow the Shahine firing and acquisition units to follow and protect the armoured units of the Saudi Armed Forces on the battlefield. The Shahine units were among the first vehicles to liberate Kuwait City in February 1991 – a picture taken of the scene was widely publicised by Newsweek magazine.
- **Liberty Forward Area Air Defense System:** Developed in conjunction with LTV for the US Army's Line of Sight-Forward Heavy competition, the Liberty air defense system consisted of either 6 R460 SICA or 6 VT-1 missiles mounted on an M1A1 Abrams chassis along with a pair of 25mm cannons
- **Crotale NG (VT-1):** An updated version, New Generation. Finland was the first operator of the system. The cost of the system is roughly 8 million euros (excluding the vehicle). Greece is another user, and paid 1 Billion French Francs in 1998 for 11 systems: 9 for the Hellenic Air Force and 2 for the Hellenic Navy. In 2002 euros, that would have amounted up to 12 million euros per unit.
- **Crotale Mk.3 (system):** In January 2008, France test-fired the new Crotale Mk.3 system at the CELM missile launch test center in Biscarrosse. The Crotale Mk.3 system's VT1 missile successfully intercepted a Banshee target drone at 970 metre altitude and 8 km range in 11 seconds on 15 January 2008. Later, on 31 January 2008, the system successfully intercepted another target drone at a 500-metre altitude and 15 km range in 35 seconds.

System

Alternative Designation: R440 Crotale
Type: French Short-Range Air Defense Missile System
Family: Crotale
Function: The Crotale is a point defense system, designed to protect high value targets, such as airfields, military bases, ammunition depots, and so on. The original design aim of the Crotale was to engage supersonic low-flying aircraft.
Crew: ea3
Chassis: Thomson-Hotchkiss P4R 4x4 armored chassis
Displacement Time: minutes5

Emplacement Time: minutes5

Fire on the Move: No, it takes 5 minutes to launch the missiles from travelling.

Note #1: The Crotale is one of the most successful SAM design ever built. This air defense system still evolves and remains in production for more than 40 years. A wide range of its variants have been built. It is in service with 15 countries.

Note #2: A typical battery of the Crotale consists of two or three TELAR vehicle and one vehicle with acquisition radar. TELARs and acquisition and coordination unit are connected with cables. These are supported by a host of maintenance and support vehicles. It takes 2 minutes to reload all four missiles.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Ground Pressure: INA

Note: There is no available information on the dimensions of the Thomson-Hotchkiss P4R 4x4 armored chassis.

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.8

Note: mobility of this vehicle is rather limited. It was developed as a point defense system, rather than operate alongside land force maneuver elements. It takes about 5 minutes to launch missiles from travelling. There is also a towed variant, that is less mobile.

Communications

Tactical Radio: INA

Missile System

Name: VT-1

TELAR: Thomson-Hotchkiss P4R 4x4 armored chassis

Length: m3

Diameter: m0.55

Engine: solid-propellant fuel

Missile Weight: kg84.5

Basic Load: ea4

Warhead Type: HE-FRAG

Warhead Weight: kg15

Max Elevation: degINA

Min Elevation: degINA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Range Of Fire: up to 12 km

Minimum Range of Fire: m500-700

Guidance System: semi-active radar homing electro-optical sensors Infra-red search and track.

Maximum Altitude of Fire: km5.5

Detonation Mechansim: infrared fuse, radio fuse

Speed: m/s1,200

Hit Probability, 1 Missile: %80

Hit Probability, 2 Missile: %96

Additional Missiles: VT-1 or the Mk3 Missiles can be fired from the R440 Crotale

Fire Control

↳*Fire Control System*

Name: Crotale Acquisition and Coordination Unit (ACU)

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Optical Aiming System: Yes

↳*Radar*

Name:

Type: Engagement Radar

Frequency/Band:

Maximum Detection Range: km18.4

Maximum Tracking Range: km17

Number of Targets System can Detect: 30

Number of Targets System can Track: 12

Note: This vehicle detects targets, tracks them, identifies targets, identifies weather it is friend or foe.

Protection

Hull Armor: Armor of this vehicle provides protection against small arms fire and artillery shell splinters.

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Crotale EDIR is an all-weather short-range anti-air missile, which can be used to intercept low-flight anti-ship missiles and aircraft. It has been developed by Thomson CSF Matra and exists in two versions, a mobile land-based version and a ship-launched one. Originally the Crotale R440 system was developed by Rockwell International and Thomson-Houston (and Mistral) in France for South Africa, where it was named Cactus. However, the achievements of the system impressed the French Armed Forces, who purchased the system both for the air force and for the navy. The firing system includes the main sensors of the ship, the firing system of the turret, and a central coordination system. The turret holds eight missiles ready for launch in watertight containers. The magazine behind the turret holds 18 missiles. The French army first utilised a 4x4 wheeled vehicle, armed with four launchers. In order to ensure higher mobility, it was decided to mount the system on the chassis of the French AMX-30 main battle tank. At the same time, the number of launchers were increased to six. In Finnish Army service, the Crotale NG system has been mounted on Sisu Pasi vehicles. Here the number of launchers is eight. The Crotale system has also been installed on various military ships. For instance the French Navy La Fayette class frigates have a Crotale 8-tubed launcher near the helicopter flight deck.

Tor M2DT Russian Amphibious Short-Range Air Defense Missile System



Tiers:



Variants:

- **9K330 Tor:** he project was given strict design specifications to meet; Tor had to provide extended detection and tracking of fast, low radar cross section targets and be capable of quickly and efficiently dealing with massed air raids, whilst providing a high degree of automation and integration with other air defence assets. In order to meet these demanding specifications, the designers used a variety of new technologies, including advanced Passive electronically scanned array radar for improved detection and tracking performance, enhanced digital information processing, and vertically launched missiles to improve reaction time and increase the number of readily available munitions. After a period of testing and evaluation between December 1983 and December 1984, the land based system was accepted into service on 19 March 1986.
- **9K331 Tor-M1:** "Tor-M1", introduced in 1991 with the 9M331 missile, with greatly improved missile accuracy[4] and the ability to engage two targets simultaneously, minimum range 1.5 km (0.93 mi), minimum height 10 m. Even while the Tor was being introduced into service, work started on improving the system, resulting in an enhanced version, the Tor-M1. Many improvements over the original system were made; these included the addition of a second fire control channel, allowing two targets to be engaged at once; as well as upgrades to the optical tracking system and computer equipment. ECM protection and warhead design were also modified, as was the ammunition handling system. State tests, conducted between March and December 1989, showed that the result was a system which could engage more targets in a shorter time frame with reaction times reduced by over a second and an increased probability of target destruction.[2] Further modifications occurred partly as a response of insight gained from the 1995 NATO bombing in Bosnia and Herzegovina resulting in the Tor-M1-1, or Tor-M1V, which offered improved network connectivity and ECM functions as well as protection against countermeasures.
- **9K332 Tor-M2E:** Upgrades have continued over the lifetime of the system, with developer Almaz Antey unveiling the newest incarnation of the Tor missile system, the Tor-M2E, at the MAKS Airshow in 2007.
- **Tor-M1-2U:** Tor-M1-2U" entered service at the end of 2012. This system is designed to destroy aircraft, helicopters, UAVs, missiles, and other precision guided weapons, flying at medium, low and very low altitudes in all weather. The system is able to engage four targets simultaneously at a height of up to 10 kilometers. Its crew consists of three people. Deliveries are underway. It can hit targets on the move, at a speed of up to 25 km/h (includes all the necessary functions for independent fight).
- **3K95 Kinzhal (Naval Variant):** The 3K95 "Kinzhal" (Russian: Кинжал – dagger) is the naval version of the Tor missile system developed by Altair and has the NATO reporting name SA-N-9 Gauntlet. Using the same 9M330 missile as the land based version, the system can be mounted on vessels displacing over 800 tonnes and is known to be installed on Admiral Kuznetsov class aircraft carriers, Kirov class multimission cruisers, Udaloy class anti-submarine destroyers and Neustrashimy class frigates. The naval version of the later Tor-M1 is known as the "Yozh" (Russian: Ёж – hedgehog), while the export version of the Kinzhal is known as "Klinok"
- **Tor-M2KM:** The Tor-M2KM is a self-contained fighting module version of the system that can be mounted in various locations. In October 2016, it was loaded onto the helipad of the Admiral Grigorovich frigate by means of an ordinary wharf crane and fixed in position with steel chains to fire at simulated cruise missiles while the ship was underway. This could give advanced SAM capabilities to vessels without the capacity to install the larger and heavier Kinzhal system; it can also be mounted on a truck, building roof, or any horizontal surface at least 2.5 m wide and 7.1 m long. The module weighs 15 tons and contains all equipment needed to operate without any external support. It can go from standby to full alert in 3 minutes and acquire 144 air targets while simultaneously tracking the 20 most dangerous ones marked for priority by the two-man crew. The Tor-M2 km missiles have a range of 15 km.
- **Tor-M2DT:** The system is especially designed to be used for Arctic region at temperatures up to -50 degrees C based on the chassis of the DT-30PM tracked all-terrain vehicle and is capable of detecting over 40 air targets, especially high-precision weapons, and to track and engage up to four of them simultaneously at a range of up to 12 km and altitudes

up to 10 km with its 16 missiles even on the move. Its creation was completed in 2018 and the first delivery of 12 systems was held in November of the same year.

- **Tor-2E:** JSC Rosoboronexport, part of the Rostec State Corporation, has started promoting the newest Tor-E2 SAM system developed and produced by the Almaz-Antey Air and Space Defence Concern in 2018. Tor-E2 combat vehicle is an independent, mobile, all-terrain fighting unit that provides detection and identification of air targets on the march and at the halt, target lock-on and engagement at the halt, from a short stop and on the move. A battery of the four-channel Tor-E2 SAM systems, consisting of four combat vehicles, can simultaneously engage up to 16 targets flying from any direction at a range of at least 15 km and an altitude of up to 12 km. Each vehicle carries 16 missiles, twice as many as the previous version of the Tor system. In addition, the two Tor-E2 combat vehicles can operate in the "link" mode, which enables them to exchange information about the air situation at different altitude ranges and coordinate joint engagement operations. In this mode, one of the combat vehicles, acting from an ambush, receives information from the other one and does not reveal itself until the launch of the missile. A command post can be attached to a battery of four Tor-E2 combat vehicles to control and coordinate the Tor combat vehicles and interact with the customer's air defense control system.
- **HQ-17 (China Variant):** The HQ-17 (Hongqi-17) is China's reported variant of the Tor-M1 system. In 1996, China ordered 14 Tor-M1 missile systems from Russia which were delivered under contract in 1997. In 1999, another contract for 13 Tor-M1 systems was signed between Russia and China. Delivery of the systems took place in 2000.
- **FM-2000:** FM-2000 is a mobile short-range air-defence (SHORAD) system unveiled by China Aerospace Science and Industry Corporation at the 2018 Zhuhai Airshow and in service as of 2019. Its range is 15 km and engagement altitude is 10 km. It is carried on a 3 axle TEL. It is a version of the HQ-17.

System

Alternative Designation: Tor M2DT

Type: Short-Range Air Defense Missile System

Family: Tor Missile System

Manufacturer: Russia

In Service: 2018-Preseent

Crew: ea3

Chassis: DT-30PM tracked carrier

Displacement Time: INA

Emplacement Time: INA

Fire on the Move: Yes

Note: The DT-30PM tracked carrier was specially designed to operate over difficult terrain where there are no roads. It has articulated configuration the with two sections. The front section of the Tor M2DT has a fully enclosed forward control cab for the driver and operators. It also accommodates the engine. The rear unit carries missile launchers and radars.

Dimensions

Length: m16.3

Width: m3.1

Height, in Traveling Order: m4.5

Weight, Combat: 40-45 tons

Ground Pressure: INA

Automotive

Engine Name: YaMZ-847-10 Diesel

Engine Type: Diesel

Engine Power: hp800

Maximum Range: km700

Speed, Maximum Road: km/h45

Speed, Average Cross: INA

Speed Maximum Swim: km/h5

Gradient: %60

Side Slope: %30

Vertical Step: 1.5

Trench: up to 4.5 m

Fording Depth: Amphibious

Missile System

Name: 9M338 missiles

Type: Short-Range Air Defense Missile

Launcher: The 9M338K is a designation of the missile in its launch container.

Missile Length, with Container: 2.94

Missile Diameter, with Container: 0.24

Fin Span: INA

Basic Load: 16

Missile Weight: kg163

Warhead Type: HE-FRAG

Warhead Weight: INA

Range of Fire: km16

Altitude of Fire: km10

Reload Time: Reloading vehicle of the Tor M2DT is fitted with a crane and carries reload missiles. It is also based on the same DT-30PM articulated all-terrain tracked carrier chassis. It takes around 30 to 45 minutes to reload a full set of 16 missiles.

Note: This system can engage all kinds of modern air targets. It can be used against aircraft, helicopters, UAVs, various missiles and precision guided munitions. It destroys targets that long- and medium-range air defense systems fail to hit.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Targets: The Tor M2DT can engage multiple targets simultaneously. It is claimed that this air defense system can deflect massive enemy air raids, when enemy extensively uses electronic countermeasures.

Note: The Tor M2DT can engage multiple targets simultaneously. It is claimed that this air defense system can deflect massive enemy air raids, when enemy extensively uses electronic countermeasures.

↳*Radar*

Name: INA

Type: INA

Function: INA

Frequency/Band: INA

Range: INA

Number of Targets System can Track: The Tor M2DT can engage multiple targets simultaneously

Protection

Hull Armor: The Tor M2DT is unarmored and carries no defensive weapons other than its air defense missiles.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The system is especially designed to be used for Arctic region at temperatures up to -50 degrees C based on the chassis of the DT-30PM tracked all-terrain vehicle and is capable of detecting over 40 air targets, especially high-precision weapons, and to track and engage up to four of them simultaneously at a range of up to 12 km and altitudes up to 10 km with its 16 missiles even on the move. Its creation was completed in 2018 and the first delivery of 12 systems was held in November of the same year. The Tor-M2DT is an Arctic version of the Tor-M2 (NATO reporting name: SA-15 Gauntlet) system. It is designed to provide air and ballistic missile defense at the battalion level. The Tor-M2DT covers strategic administrative facilities, the first echelons of land formations from strikes by anti-radar and cruise missiles, glide bombs, planes, helicopters and unmanned aerial vehicles. It can operate in manual and automatic modes. The Tor system monitors the airspace and downs independently all the aerial targets unrecognized by the identification friend-or-foe device. The Tor-M2DT has been developed on the basis of a two-section prime mover to operate in the harsh conditions of the Arctic and the Extreme North and at a temperature of -50°C. It is based on the DT-30 tracked chassis to be able to float and move in cross-country terrain. The Tor-M2DT comprises 16 vertically-launched air defense missiles with a target engagement range of up to 12 kilometers (7 miles) and an altitude range of up to 10,000 meters. The upgraded target acquisition station is capable of detecting stealth aerial targets.

BTR-ZD Russian Airborne 23mm Self-Propelled Anti-Aircraft Gun







Tiers:



Variants:

- **BTR-DG (Ob'yekt 925G):** Cargo variant without bow machine guns, firing ports and periscopes. The troop compartment was modified to serve as a cargo compartment.
- **BTR-DG:** converted into an airborne SPAAG fitted with a specially built three-legged ZU-23-2 twin anti-aircraft autocannon mount over the roof of the cargo compartment.
- **BTR-D San:** BTR-D converted into an airborne armoured ambulance.
- **BREM-D:** (BREM-D stands for bronirovannaya remonto-evakuatsionnaya mashina desanta – armoured maintenance-recovery vehicle of the airborne) (Ob'yekt 932) – BTR-D converted into an airborne ARV. It carries specialized equipment for the repair and recovery of BMD-1 type vehicles. This equipment includes a light collapsible crane stored on the roof of the personnel compartment, which can be traversed through 180°, a recovery winch, a combination spade and dozer blade, a generator, towing equipment, electric welding system, tools and ready use spares. One of the 7.62 mm bow PKT tank machine guns was eliminated. This entered service in 1989 in very small numbers
- **BTR-RD "Robot":** BTR-D converted into an airborne ATGM team carrier with two 9P135M-1 ATGM launchers capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. They can be used by the dismounted ATGM squad or fitted on a pintle mount on the right side of the hull. This is basically a BTR-D with a pintle mount added and with missile racks inside the troop compartment
- **BTR-ZD "Skrezhet":** (ZD stands for zenitnaya ustanovka) – BTR-D converted into an airborne air defense vehicle for carrying two MANPAD teams. The vehicle is fitted with racks for spare MANPAD missiles. It also is fitted with external stowage rails for a MANPAD on the right hand side of the roof of the troop compartment. It can also carry a complete ZU-23-2 twin anti-aircraft autocannon mount on the roof of the troop compartment.
- **NPDU "Sterkh":** (NPDU stands for nazemnyj punkt distantsionnogo upravleniya) – BTR-D converted into an airborne unmanned aerial vehicle carrier and launch vehicle of the "Stroy-P" set. It is used to launch Yak-061 "Pchela-1T" UAV for reconnaissance or jamming at ranges up to 60 km. The single-rail launcher is mounted on left hand side of the roof of the hull. It has large three-piece tube on forward right hand side of the roof of the hull. It entered service in 1990
- **BMD-1KSh "Soroka" (Ob'yekt 926):** (KSh stands for komandno-shtabnaya – command and staff) – airborne command post equipped with the R-123M, R-111 and R-130M or R-134 radio sets, as well as an AB1 portable 1 kW generator, the TNA-3 navigation system, folding CLOTHES HORSE type antennae around the superstructure and two slim antenna masts. Bow mounted machine guns and firing ports were removed. The commander's hatch is offset to the left and does not project forward. It's sometimes called BMD-KSh or KShM-D
- **BMD-1R "Sinitsa":** (R stands for radiostantsiya – signals vehicle) – Division-level command and signals vehicle equipped with R-161A2M radio set, one heavy telescopic antenna mast stowed along the left hand side of the roof of the hull and one slim elevatable antenna mast on the rear right hand side of the roof of the personnel compartment. Only a small number was delivered.

- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **1V119 "Reostat":** BTR-D converted into an airborne artillery battalion fire direction vehicle. The vehicle is fitted with a turret equipped with NNP-21 and V-7 observation devices, three R-173 and R-159 radiosets, PAB-2AM aiming circle, three antennae mounts, DSP-30 and DAK-2 rangefinders. The turret was also equipped with PSNR-5K (1RL-133-1) "Tall Mike" ground surveillance radar mounted on the roof of the turret. Located over the turret front sights were the visors hinged in the center
- **2S9 Nona-S (Ob'yekt 925S) –:** Airborne self-propelled mortar, armed with a 120 mm 2A60 mortar. Entered service 1981.

System

Alternative Designation: BTR-ZD

Type: Airborne APC/23 mm self-propelled anti-aircraft gun

Family: BTR

Manufacturer: Volgograd Tractor Factory

In Service: 1980-Present

Crew: ea12

Dimensions

Length: m5.88

Width: m2.63

Height: m2

Weight, Combat: tons8

Ground Pressure: INA

Automotive

Engine Name: 5D20 V6 Diesel

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h62

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: mAmphibious

Note: The BTR-D is amphibious and is propelled on water by two waterjets

Communications

Primary: INA

Main Weapon System

Note #1: This air defense gun has only simple sights

Note #2: Vehicle has racks for shoulder-launched anti-aircraft missiles. Usually three missiles are carried

↳*System*

Name: ZU-23-2 (ZU-23)

Type: 23 mm anti-aircraft twin-barreled autocannon

Manufacturer: KBP Instrument Design Bureau

In Service: 1960-Present

Proliferation: Widely Proliferated

Number of Barrels: ea2

Length: m4.57

Barrel Length: m2.008

Width: m2.88

Height: m1.22

Weight: 0.95 tonnes

Crew: 2 -- gunner and commander

Action: Gas operated

Maximum Elevation: deg+90

Minimum Elevation: deg-10

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire: 2000 rpm cyclic, 400 rpm practical

Effective Firing Range: km2.5

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23x152B

Muzzle Velocity: INA

Baslic Load: INA

Secondary Weapon System

Note: The BTR-ZD carries two 7.62 mm machine guns, mounted in front of the hull and are operated by the troops.

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +1 Million

Length: mm1,203

Barrel Length: mm605

Weight, Gun Only: kg9

Weight, Tripod Only: kg7.7

Max Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: No, This air defense gun has only simple sights

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Protection

Hull Armor: aluminum armor hull, which protects against small arms fire and artillery shell splinters

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Firing Ports: all-round firing ports

Notes:

The BTR-ZD is an airborne armored personnel carrier which carries two teams with man-portable air defense missiles. BTR-ZD "Skrezhet" (ZD stands for zenitnaya ustanovka) – BTR-D converted into an airborne air defense vehicle for carrying two MANPAD teams. The vehicle is fitted with racks for spare MANPAD missiles. It also is fitted with external stowage rails for a MANPAD on the right hand side of the roof of the troop compartment. It can also carry a complete ZU-23-2 twin anti-aircraft autocannon mount on the roof of the troop compartment

MIM-23A Hawk American Surface-to-Air Missile (SAM) System




Tiers:



Variants:

- **I-Hawk (Improved Hawk /Hawk B/MIM-23B):** This variant reached initial operating capability (IOC) in 1972. Upgrades from the original Hawk included solid-state electronics, factory certified and sealed missile round, all-altitude capability, digital automatic data processor for the information coordination central (ICC), improved solid-pro pellant rocket motor and a larger warhead.
- **Hawk Mobility Enhancement (HME):** This was jointly developed by Raytheon and the Dutch air force. It reduced number of vehicles in a Hawk firing unit from 14 trucks and trailers to seven, updated the Hawk launcher and simplified reloading.
- **Patriot /Hawk Interoperability:** This is a software upgrade to permitting Hawk missile platoons to receive targeting data from Patriot information coordination center (ICC). An April 1988 test simulated an interception of a short-range tactical missile by shooting down a missile traveling at Mach 2 and at an altitude of more than 25,000 ft (7,620 m).
- **Sparrow /Hawk Demonstration Program:** In 1985, Raytheon combined elements of two of its missile products into one system. The Sparrow /Hawk system replaced the three I-Hawks on the M192 launcher with eight AIM-7 Sparrow missiles (the original launcher had nine missiles).
- **NOAH (Norwegian Adapted Hawk):**
- **Iran MIM-23 Hawk variant:** Iran reportedly made several upgrades to MIM-23 missiles for the carriages of its F-14 Tomcats. Some were displayed in Tehran in September 1998.
- **Danish Enhanced Hawk (DEHAWK):** Introduced in December 2002, the Danish Enhanced Hawk (DEHAWK) was developed by Terma and Thales. After several years of delays, the program was handed over to the Danish Air Materiel Command.

System

Alternative Designation: MIM-23 Hawk, MIM-23A
Type: medium-range surface-to-air missile.
Family: MIM-23 Hawk Family
Manufacturer: Raytheon Company
In Service: 1960-Present
Crew: eaINA
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: No
Note: The original Hawk has been phased out of NATO and U.S. service, although several countries have missiles in storage. All active Hawk missiles are the I-Hawk variant.

Dimensions

Length: m5.08

Diameter: m0.37

Wingspan: m1.21

Weight, Combat: kg590

Warhead Weight: kg45

Automotive

Engine Name: 1 x Aerojet dual-thrust solid-fuel rocket (M22E8 motor)

Engine Type: Solid-fuel rocket engine

Speed: Mach 2.5

Transporter: The Hawk missile is transported and launched from the M192 towed triple-missile launcher.

M22E8 Motor Burn Rate: seconds25-32

Communications

Missile System

Name: (M3) MIM-23A

Type: Semi-active Radar Homing Missile

Guidance: Semi-active Radar Homing

Length/Caliber: INA

Maximum Effective Range: km25

Minimum Effective Range: km2

Maximum Altitude: km14

Minimum Altitude: m30

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Max Rate of Fire: INA

Launcher: M192 towed triple-missile launcher

Reflector: parabolic reflector

Warhead Type: Conventional high-explosive blast fragmentation

Warhead Weight: kg45

Warhead Fragments Speed: 2,000 meters per second

Warhead Fragments: 4,000 8-gram (0.28 oz) fragments

Warhead Fragments Arc: deg18

Fuze Type: w/proximity and contact fuzes

Speed: Mach 2.5

Guidance System: Semi-active radar homing

Kill Probability: 0.56

Fire Control

Note: The original Hawk system used 4 or in some models 6 radars: to detect (PAR and CWAR), to track (CWAR and HPIR) and to engage (HPIR and ROR) targets.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

↳*Radar #1*

Name: AN/MPQ-35 (Basic Hawk)

Type: PAR Pulse Acquisition Radar

Radar Pulse Power: kW450

Pusle Length: 3 µs

Pulse Repetition Frequency: 800 and 667 Hz alternately

Radar Ghz Range: 1.25 to 1.35 GHz range

Antenna Dimensions: 6.7 m × 1.4 m

Rotation Rate: rpm20

Note: The BCC – Battery Control Central and the CWAR are synchronized by the PAR revolutions and the PAR system trigger.

↳*Radar #2*

Name: AN/MPQ-34 (Basic Hawk)

Type: CWAR Continuous Wave Acquisition Radar

Power Rating: Watts200

Frequency: 10 GHz (X-Band)

↳*Radar #3*

Name: AN/MPQ-33/39 (Basic Hawk)

Type: HPIR High Power Illuminating Radar

Power Output: Watts125

Operating Ghz Band: 10–10.25 GHz band

Note: The unit comes mounted on its own mobile trailer. Unit automatically acquires and tracks designated targets in azimuth elevation and range rate.

↳*Radar #4*

Name: AN/MPQ-37 (Basic Hawk)

Type: ROR Range Only Radar

Radar Type: Pulse Radar

Ku Band Frequency: 15.5-17.5 GHz

Power Output: kW120

Pusle Length: 0.6 µs

Pulse Repetition Frequency: 1600 Hz

Antenna: 1.2m dish

Range: 83 km (52 mi) versus 3 m2 (32 sq ft) target.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Raytheon MIM-23 Hawk (or HAWK: Homing All the Way Killer) is an American medium-range surface-to-air missile. It was designed to be a much more mobile counterpart to the MIM-14 Nike Hercules, trading off range and altitude capability for a much smaller size and weight. Its low-level performance was greatly improved over Nike through the adoption of new radars and a continuous wave semi-active radar homing guidance system. Hawk was originally intended to attack aircraft, especially those flying at medium and low altitudes. It entered service with the Army in this role in 1959. In 1971 it underwent a major improvement program as the Improved Hawk, or I-Hawk, which made several improvements to the missile and replaced all of the radar systems with new models. Improvements continued throughout the next twenty years, adding improved ECCM, a potential home-on-jam feature, and in 1995, a new warhead that made it capable against short-range tactical missiles. Jane's reported that the original system's single shot kill probability was 0.56; I-Hawk improved this to 0.85. A typical Basic Hawk battery consists of: 1 × PAR: Pulse Acquisition Radar—a search radar with a 20 rpm rotation, for high/medium altitude target detection. 1 × CWAR: Continuous Wave Acquisition Radar—a search doppler radar with a 20 rpm rotation, for low altitude target detection. 2 × HPIR: High Power Illuminator doppler Radar—target tracking, illumination and missile guidance. 1 × ROR: Range Only Radar—K-band pulse radar which provides range information when the other systems are jammed or unavailable. 1 × ICC: Information Coordination Central 1 × BCC: Battery Control Central 1 × AFCC: Assault Fire Command Console—miniature battery control central for remote control of one firing section of the battery. The AFCC controls one CWAR, one HPI, and three launchers with a total of nine missiles. 1 × PCP: Platoon Command Post 2 × LCS: Launcher Section Controls 6 × M-192: Launchers with 18 missiles. 6 × SEA: Generators 56 kVA (400 Hz) each. 12 × M-390: Missile transport pallets with 36 missiles 3

× M-501: Missile loading tractors. 1 × [bucket loader] 1 × Missile test shop AN/MSM-43.

HQ-7B (FM-90) Chinese 6x6 Short-Range Air Defense Missile System





Tiers:



Variants:

- **FM-80 / HQ-7:** Improved version with E/F band TA radar, EO range of 15km, IR localizer and HQ-7 missile range of 7km

System

Alternative Designation: HQ-7B (FM-90)
Chassis / TELAR: P4R 4x4
Crew: ea3
Target: Helicopters, fixed wing aircraft, and cruise missiles, ARM missiles, ASM missiles
In Service: 2009-Present
Note: This air defense system is widely used by the Chinese armed forces. It is also being proposed for export customers as the FM-90. This air defense system has been exported to Pakistan

↳*Dimensions*

Height: m3.41
Length: m6.22
Width: m2.72
Weight: mt15

↳*Radar #1*

Name: Mirador IV pulse doppler
Detection Range: km18.5
Function: Target acquisition, surveillance
Antenna Rotation Rate: rpm60
Altitude Coverage: m0-4,500
Target Detection: 30 targets per rotation
Multiple Target Tracking: 12 targets
Frequency Band: E

Note: a battery of HQ-7B consists of one vehicle with acquisition radar and three TELAR vehicles. Also each battery is supported by a maintenance group with 10 support vehicles

↳*Radar #2*

Name: INA, located on launcher vehicle

Function: Fire control

Targets Tracked: 1

Missile Guidance, Simultaneous: 2

Detection Range: km17

Altitude Coverage: m0-5,000

Frequency: GHz12-18

Frequency Band: J-monopulse

Associated Radar: I-band (8-10 GHz) cmd

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Range, Cruising: km600

Max Road Speed: km/h90

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.6

Fording: m0.8

Main Weapon System

↳*Launcher*

Name: INA

Type: TELAR Vehicle

Fire on the Move: YEs

Reaction Time: sec6.5

Reload Time: min2

↳*Missile*

Name: Crotale EDIR

Type: all-weather short-range anti-air missile

Purpose: can be used to intercept low-flight anti-ship missiles and aircraft

Manufacturer: Thales Group Samsung Group

Length: m2.35

Diameter: m0.166=5

Missile Weight: kg76

Warhead Type: HE-FRAG

Warhead Weight: kg13

Detonation Mechanism: infrared fuse radio fuse

Engine: solid-propellant fuel

Operational Range: km11

Flight Ceiling: m6,000

Speed: m/s1,200

Guidance System: semi-active radar homing electro-optical sensors Infra-red search and track

Hit Probability: single shot is more than 85%

Fire Control System

IFF: Yes, dipole on ACU

Countermeasures: Digital C2 and ECM

Missile Tracker: IR, for remote control

↳*Day Camera*

Specification: TV tracker, low elevation, range: 14km

↳*Optical Sight*

Specification: Back-up binocular tracker

↳*Day / Night Camera*

Specification: Thermal sight

Field of View: degrees8.1 / 2.7

Elevation: degrees5.4 / 1.8

Range: km19

Protection

Armor Protection: Protection against small arms fire and artillery shell splinters

NBC Protection: Yes

Notes:

The original HongQi 7 (HQ-7) short-range air defense missile system has been developed in China in the 1980s. It was a copy of the French Crotale. In 1978-1979 China imported some of the Thomson-CSF Crotale systems for evaluation and reverse

engineered them. First Chinese clone was produced for testing in 1983. Its production commenced in the late 1980s. Sometimes it is referred as Sino-Crotale. Its improved variant, the HQ-7A, was introduced in 1998. The HQ-7B is the latest version, based on an indigenous 6x6 armored chassis. It was first revealed somewhere in 2009. This air defense system is widely used by the Chinese armed forces. It is also being proposed for export customers as the FM-90. This air defense system has been exported to Pakistan. A TELAR vehicle carries four missiles and is fitted with engagement radar. It appears that engagement radar is similar to that of the previous HQ-7A.

Crotale-NG (Export) Iranian Short-Range Air Defense System




Tiers:



Variants:

- **Generic:** SYSTEM IS IN A MODULAR POD, DESIGNED TO FIT ON SHIPS, VEHICLES, AND ON STATIONARY PLATFORMS. THE MODULAR ALL-WEATHER SYSTEM INCLUDES ACQUISITION, TRACKING, LAUNCH, AND SUPPORTING COMPUTER UNITS INTEGRATED ON ONE VEHICLE, FOR MANAGEMENT BY A SINGLE SYSTEM OPERATOR. VEHICLE PLATFORMS INCLUDE APCS, E.G., M113, KOREAN IFV, PIRANHA 10X10, AND THE XA-180 AS NOTED. THE SYSTEM CAN BE RETROFITTED ONTO EXISTING CROTALE LAUNCHER VEHICLES.
- **PEGASUS:** SOUTH KOREAN SYSTEM WITH A DIFFERENT MISSILE
- **Crotale Mk.3:** A Long range Version of the NG

System

Alternative Designations: Crotale-NG, R440 Crotale, HQ-7 (Chinese) R460 Crotale (Saudi Arabia), XA-181 (Finnish Launcher vehicle) This is not a modification to Crotale. It is a completely new modular system.
Date of Introduction: 1991-1992
Proliferation: At least 5 countries, all variants. Crotale NG entered production in 1990 and is in service with the Finnish Army (20 systems), and the French Air Force (12 shelter-mounted systems) and Navy.
Target: FW, heli, CM, ASM, UAV
Mission: The missions of the system are in front-line armoured brigade defence, permanent or semi-permanent site defence and area defence against air threats, such as fixed-wing aircraft, attack helicopters, cruise missiles, tactical missiles and saturation attacks with stand-off weapons released from aircraft and helicopters.
TELAR: XA-181 is XA-180 (PASI) 6x6 APC with Crotale NG launcher system
Crew: ea4
All Weather Operation: Yes, tracking and engagement and all weather operation.

↳*Automotive*

Engine Name:
Engine Type: Diesel
Engine Power: 240-hp
Cruising Range: km800
Max Road Speed: km/h80

Dimensions

Length: m7.35

Width: m2.3

Height: m2.9

Weight: tons23

Main Weapon System

↳*Launcher*

Name: INA

Type: Launcher

↳*Missile*

Name: VT1 missile

Type: The VT1 missile is a land and sea based missile designed especially for short-range surface to air defence systems.

Function: The VT1 missile has been created to counter all threats including tactical missiles, pop-up helicopters, UAVs and aircrafts deploying high-maneuvering, low-level stand-off weapons. When combined with the Crotale Mk3, the hyper velocity and high maneuverability of the VT1 offer a class-leading performance and allows a system with a 15km no escape zone against high maneuvering targets.

Speed: Mach 3.5

Load Factor: grams35

Maximum Range: km15

Ceiling: m6,000

Warhead Weight: kg13

Fire Control

FCS Name: INA

Computerized FCS: Yes

Thermal Camera: Yes

Thermal; Camera Range: km19

Daylight CCD camera: Yes

Daylight CCD camera Range: km15

IR Localiser: Yes

↳*Radar*

Name: N/A

Type: S-band Pulse Doppler radar

Function: Fire Control, tracking

Antenna: Planar array Detection Range (km): Aircraft: 20

Hovering Rotary Wing Aircraft: 11

Altitude Coverage: m0-5000

Multiple Target Tracking: Automatic track-while-scan for up to 8 targets.

Frequency Band: Ku

ECCM: Wideband frequency agile

Detection Range: km30

Frequency: GHz35 doppler TWT (travelling wave tube)

Automatic Aqquisition: Yes

Multi-Target Detection: Yes

IFF: Yes

↳*Sights with Magnification*

Day Camera: Mascot, CCD TV Field of view (□): 2.4 Elevation (□): 1.8 Range (km): 15

Night Camera: Night Camera: Castor, thermal Field of view (□): 8.1/2.7 Elevation (□): 5.4/1.8 Range (km): 19

Missile Tracker: IR missile localizer on CCD camera for passive TV tracking

IFF: Yes

↳*Other Assets*

Description: The SAM system links to the IADS to get digital AD data and warnings. Associated radar for EW and TA data is radar at Brigade and Division Tier 1 and 2. System can also pass data to the net.

Protection

Armor Protection: mm6-12

Notes:

A modernized version, the Crotale NG (New Generation), entered production in 1990. This version used the new VT-1 missile with Mach 3.5 speed, load factor to 35G, 11 km range, 13 kg warhead (8 m kill-zone) and 6,000 m ceiling. The system includes a S-band Pulse Doppler radar (20 km), Ku-band TWT tracking radar (30 km), Thermal camera (19 km), Daylight CCD camera (15 km), and an IR localiser.[1] An early '90s proposal to fit the system (in its eight-round form) to a Leclerc tank chassis in order to provide a battlefield air defence vehicle for protecting armored formations on the move was not realised due to post-Cold War cutbacks. The missions of the system are in front-line armoured brigade defence, permanent or semi-permanent site defence and area defence against air threats, such as fixed-wing aircraft, attack helicopters, cruise missiles, tactical missiles and saturation attacks with stand-off weapons released from aircraft and helicopters.

SAM-22 (SA-22 Greyhound) Iranian Short-Range Air Defense Gun/Missile System



Tiers:

1 **2** 3 4

Variants:

- **PANTSIR-S1:** The gun/missile system module can be mounted on various chassis. The early version is mounted on a Ural-5323 truck, used for site defense of stationary targets. It had three radars and 2A72 gun. A production version has newer radars, guns, and 12 missile launchers.
- **PANTSIR-S1-0:** "Unified Armament Turret" with 8 launchers (12 SAMS) and 2 guns mounts on various chassis (e.g., trucks, BTR-80, BMP-3, BMD-3, trailers, and stands). Russians now offer this variant on the 2S6 (GM-352) chassis. A low cost version has missiles and only EO guidance.

System

Alternative Designation: SA-22E Other spellings: Pantsyr, Pantzyr, Pantzir.
Target: FW, heli, CM, ASM, UAV, guided bomb
Primary Components per Battery: ea6
Combat Vehicle Description: N/A
Crew: ea3
Combat Weight: mt20
Chassis: Kamaz-6560
Radio: R-173, R-173P

↳*Dimensions*

Height, Overall: mINA
Length, Overall: m10
Width, Overall: m2.5
Wheelbase: m3.6

Automotive

Automotive Performance: Performance data based on Kamaz-6560
Engine Type: YaMZ-5367 diesel, 450hp
Speed: km/h90

Cruising Range: km1000

Fording Depths: m1.8

Ground Clearance: mm400

Side slope: %40

Vertical Step: mm600

Angel of Approach: deg31

Armament

↳*Gun*

Name: 2A38

Type: Autocannon

Rate of Fire (2 twin guns): rd/min4,800

Reload Time: min15-16 min, gun ammunition and missiles

Elevation: deg-5 to + 87

Fire on Move: Yes

↳*Missile*

Name: 57E6-E/9M335/SA-22E

Max. Range: m<12,000 1,500 m 18,000 above 1,500m Min. Range: 1,500

Max. Altitude: m10,000 Min. Altitude: 5, 0 with degraded Ph

Length in Cannister: m3.2 Diameter (mm): 170/90 second stage

Weight: kg65

Weight in Container: kg85

Missile Speed: m/s1,300

Guidance: Radar SACLOS, ACLOS, Homeon- Jam

Seeker Field of View: degINA

Warhead Type: Fragmenting rod and HE

Warhead Weight: kg16

Fuze Type: Proximity, PD, and KE impact

Probability of Hit (Undegraded): %80

Simultaneous Missiles: 3

Self-Destruct: secINA

System Reaction time: sec5-6

Fire on Move: Yes, short halt or slow move

Simultaneous Targets: 2 per vehicle

Main Armament Ammunition

Description: An optimized mix uses 2 rounds, with each having similar ballistics. The below rounds offer flat trajectory, long range, armor penetration, high P-hit, and frangible round (KE/'CE) effects.
Type: APFSDS-T, M929
Range: m200-2,500+
Altitude: m0-3,000
Penetration: mm CE45 (RHA) 2,000 m
Other Ammuntion Types: Earlier 30 x 165 rounds: Frag-HE and HEI-T, API, API-T, APDS

Weapons & Ammunition Types Typical Combat Load

57E6-E Missiles: Pantsir -S1 12 -S1-0 12 On Launchers 8 Spares inside 4
2 x 30-mm twin-barrel autocannons Mix of FAPDS-T and APFSDS-T: 1,400

Fire Control

↳*Gunner's Sight*

Gunner: 1TPP1
Field of View: deg1.8 x 2.6
Acq Range Air Targets: km18 Auto-tracker: Dual Infrared/video tracker
IFF: Yes
Stabilized day/night: Yes
Dual Channel Infrared Thermal Sight: Yes
Video Tracker: Yes
Passive acquisition modes: Yes

↳*Target Acquisition Radar*

Range: INA
Altitude: INA
Output Power: kW10
RF Band: E

↳*Tracking Radar*

Range: INA
Altitude: m3500
Output Power: kW150
RF Band: J

Notes:

Iran imports many of their military weapons and equipment from China and Russia. The SAM-22 is a exported Pantsir-S1 (SA-22 Greyhound). The Pantsir missile system is a family of self-propelled, medium-range surface-to-air missile systems. Pantsir-S1

(Russian: Панцирь-С1, NATO reporting name SA-22 Greyhound) is the first version and is a combined short to medium range surface-to-air missile and anti-aircraft artillery weapon system produced by KBP of Tula, Russia. The system is a further development of 2K22 Tunguska (NATO reporting name: SA-19/SA-N-11) and represents the latest air defence technology by using phased array radars for both target acquisition and tracking. Although more are planned to made later into 2019, only 112 of the 200 made continue to operate due to newer, more efficient models being made. The Pantsir-S1 was designed to provide point air defence of military/industrial/administrative installations against aircraft, helicopters, precision munitions, cruise missiles and UAVs and to provide additional protection to air defence units from enemy air attacks employing precision munitions especially at the low to extremely low ranges. The first finished version was completed in 1995 with the 1L36 radar, later another was designed. It is a short to medium range ground-based air defence system, wheeled, tracked or stationary with two to three operators. Its air defense consists of automatic anti-aircraft guns and surface-to-air missiles with radar or optical target-tracking and radio-command guidance. Its purpose is the protection of civil and military point and area targets, for motorised or mechanised troops up to regimental size or as defensive asset of higher ranking air defence systems like S-300/S-400. The system has capability for anti-munitions missions. It can hit targets on the waterline/above-water. It can operate in a fully automatic mode. It has the ability to work in a completely passive mode. The probability of hitting a target for 1 rocket is not less than 0.7 with a reaction time of 4–6 seconds.It can fire missiles and gun armament while in motion. For its main radar station, early detection in height may be between 0-60° or 26-82° depending on the mode. The system has claimed significant advantages over other systems, such as Crotale NG (France), Roland-3 (France + USA), Rapier 2000 (UK), SeaRAM (Germany + USA). This is not confirmed by comparative testing, but clearly follows from declared limit of possibilities of systems (2010). In 2013, there was a variant with two radar stations for early detection * standing back to back *. The system has a modular structure which enables a fast and easy replacement of any part. After receiving target coordinates (from any source) it may defeat the target (using all the radar except the early detection radar) within a range from -5 to +85 degrees (vertical). The interval between missile launches is 1-1.5 seconds (a world record for analogue systems). S-400 Triumf and Pantsir missile system can be integrated into a two-layer defense system

96K6 Pantsir-S1 (SA-22 Greyhound) Russian Short-Range Air Defense Gun/Missile System









Tiers:



Variants:

- **PANTSIR-S1:** The gun/missile system module can be mounted on various chassis. The early version is mounted on a Ural-5323 truck, used for site defense of stationary targets. It had three radars and 2A72 gun. A production version has newer radars, guns, and 12 missile launchers.
- **PANTSIR-S1-0:** "Unified Armament Turret" with 8 launchers (12 SAMS) and 2 guns mounts on various chassis (e.g., trucks, BTR-80, BMP-3, BMD-3, trailers, and stands). Russians now offer this variant on the 2S6 (GM-352) chassis. A low cost version has missiles and only EO guidance.

System

Alternative Designation: SA-22E Other spellings: Pantsyr, Pantzyr, Pantzir.
Target: FW, heli, CM, ASM, UAV, guided bomb
Primary Components per Battery: ea6
Combat Vehicle Description: N/A
Crew: ea3
Combat Weight: mt20
Chassis: Kamaz-6560
Radio: R-173, R-173P

↳*Dimensions*

Height, Overall: mINA
Length, Overall: m10
Width, Overall: m2.5
Wheelbase: m3.6

Automotive

Automotive Performance: Performance data based on Kamaz-6560
Engine Type: YaMZ-5367 diesel, 450hp
Speed: km/h90
Cruising Range: km1000
Fording Depths: m1.8
Ground Clearance: mm400
Side slope: %40
Vertical Step: mm600
Angel of Approach: deg31

Armament

↳*Gun*

Name: 2A38
Type: Autocannon
Rate of Fire (2 twin guns): rd/min4,800
Reload Time: min15-16 min, gun ammunition and missiles
Elevation: deg-5 to + 87
Fire on Move: Yes

↳*Missile*

Name: 57E6-E/9M335/SA-22E
Max. Range: m<12,000 1,500 m 18,000 above 1,500m Min. Range: 1,500
Max. Altitude: m10,000 Min. Altitude: 5, 0 with degraded Ph
Length in Cannister: m3.2 Diameter (mm): 170/90 second stage
Weight: kg65
Weight in Container: kg85
Missile Speed: m/s1,300
Guidance: Radar SACLOS, ACLOS, Homeon- Jam
Seeker Field of View: degINA

Warhead Type: Fragmenting rod and HE

Warhead Weight: kg16

Fuze Type: Proximity, PD, and KE impact

Probability of Hit (Undegraded): %80

Simultaneous Missiles: 3

Self-Destruct: secINA

System Reaction time: sec5-6

Fire on Move: Yes, short halt or slow move

Simultaneous Targets: 2 per vehicle

Main Armament Ammunition

Description: An optimized mix uses 2 rounds, with each having similar ballistics. The below rounds offer flat trajectory, long range, armor penetration, high P-hit, and frangible round (KE/'CE) effects.

Type: APFSDS-T, M929

Range: m200-2,500+

Altitude: m0-3,000

Penetration: mm CE45 (RHA) 2,000 m

Other Ammuntion Types: Earlier 30 x 165 rounds: Frag-HE and HEI-T, API, API-T, APDS

Weapons & Ammunition Types Typical Combat Load

57E6-E Missiles: Pantsir -S1 12 -S1-0 12 On Launchers 8 Spares inside 4

2 x 30-mm twin-barrel autocannons Mix of FAPDS-T and APFSDS-T: 1,400

Fire Control

↳*Gunner's Sight*

Gunner: 1TPP1

Field of View: deg1.8 x 2.6

Acq Range Air Targets: km18 Auto-tracker: Dual Infrared/video tracker

IFF: Yes

Stabilized day/night: Yes

Dual Channel Infrared Thermal Sight: Yes

Video Tracker: Yes

Passive acquisition modes: Yes

↳*Target Acquisition Radar*

Range: INA

Altitude: INA

Output Power: kW10

RF Band: E

↳*Tracking Radar*

Range: INA

Altitude: m3500

Output Power: kW150

RF Band: J

Notes:

The Pantsir missile system is a family of self-propelled, medium-range surface-to-air missile systems. Pantsir-S1 (Russian: Панцирь-С1, NATO reporting name SA-22 Greyhound) is the first version and is a combined short to medium range surface-to-air missile and anti-aircraft artillery weapon system produced by KBP of Tula, Russia. The system is a further development of 2K22 Tunguska (NATO reporting name: SA-19/SA-N-11) and represents the latest air defence technology by using phased array radars for both target acquisition and tracking. Although more are planned to made later into 2019, only 112 of the 200 made continue to operate due to newer, more efficient models being made. The Pantsir-S1 was designed to provide point air defence of military/industrial/administrative installations against aircraft, helicopters, precision munitions, cruise missiles and UAVs and to provide additional protection to air defence units from enemy air attacks employing precision munitions especially at the low to extremely low ranges. The first finished version was completed in 1995 with the 1L36 radar, later another was designed. It is a short to medium range ground-based air defence system, wheeled, tracked or stationary with two to three operators. Its air defense consists of automatic anti-aircraft guns and surface-to-air missiles with radar or optical target-tracking and radio-command guidance. Its purpose is the protection of civil and military point and area targets, for motorised or mechanised troops up to regimental size or as defensive asset of higher ranking air defence systems like S-300/S-400. The system has capability for anti-munitions missions. It can hit targets on the waterline/above-water. It can operate in a fully automatic mode. It has the ability to work in a completely passive mode. The probability of hitting a target for 1 rocket is not less than 0.7 with a reaction time of 4–6 seconds.It can fire missiles and gun armament while in motion. For its main radar station, early detection in height may be between 0-60° or 26-82° depending on the mode. The system has claimed significant advantages over other systems, such as Crotale NG (France), Roland-3 (France + USA), Rapier 2000 (UK), SeaRAM (Germany + USA). This is not confirmed by comparative testing, but clearly follows from declared limit of possibilities of systems (2010). In 2013, there was a variant with two radar stations for early detection * standing back to back *. The system has a modular structure which enables a fast and easy replacement of any part. After receiving target coordinates (from any source) it may defeat the target (using all the radar except the early detection radar) within a range from -5 to +85 degrees (vertical). The interval between missile launches is 1-1.5 seconds (a world record for analogue systems). S-400 Triumf and Pantsir missile system can be integrated into a two-layer defense system.

9K33 Osa (SA-8 Gecko) Russian 6x6 Amphibious Short-Range Tactical Surface-to-Air Missile System






Tiers:

1 2 3 4

Variants:

- **9K33 "Osa":** (US DoD designation SA-8A "Gecko") began development in 1960 and was introduced in 1971–1972 with four exposed 9M33 missiles per TELAR 9A33B and a maximum range of 12 km (7.5 mi).
- **4K33 "OSA-M":** (NATO reporting name SA-N-4 "Gecko") was introduced in 1972 and is the naval version of the system with two 9M33M missiles on a Zif-122 retractable rotating launcher and improved performance. It has been installed on Gepard class frigate, Kara class guided missile cruisers, Kiev class VTOL cruisers and also the Kirov, Slava and Krivak classes.
- **9K33M2 "Osa-AK":** (US DoD designation SA-8B "Gecko Mod-0") with TELAR 9A33BM2 was introduced in 1975 with the new six-missile box launcher, each 9M33M2 missile being a sealed round.
- **9K33M3 "Osa-AKM":** (US DoD designation SA-8B "Gecko Mod-1") with TELAR 9A33BM3 and missiles 9M33M3 was introduced in 1980 with the maximum range extended to 15 km (9.3 mi) and maximum altitude to 12 km (40,000 ft) as explained above. Most OSA-AKM systems also feature an IFF antenna.
- **Saman and Saman-M:** (Russian Саман – adobe) is a development of the Osa\Osa-M system into target drones, used for testing and training with air defense systems, including SAMs.

System

Alternative Designation: 9K33 Osa (SA-8 Gecko)
Type: Russian Short-Range Tactical Surface-to-Air Missile System
Family: INA
Manufacturer: Znamya Truda Plant
In Service: 1971-Present
Crew: ea5
Chassis: BAZ-5937
Displacement Time: minutes
Emplacement Time: minutes

Fire on the Move: No, The Osa can not launch missiles on the move. It launches them from stationary position or from short stops.

Airborne: Yes

Amphibious: Yes

Note: A battery of Osa consists of 4 combat vehicles and 2 reloading vehicles.

Dimensions

Length: m9.1

Width: m2.78

Height: 4.20 m (radar mast stowed)

Weight, Combat: kg18

Ground Pressure: INA

Ground Clearance: mm400

Automotive

Engine Name: 2D20B Diesel

Engine Type: Diesel

Engine Power: hp300

Maximum Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: km/h8

Gradient: INA

Side Slope: INA

Vertical Step: 0.5

Trench: 1.2

Fording Depth: Amphibious

Communications

Tactical Radio: Azart-P (4km), Azart-N (12km), and Azart-BM (40km)

Missile System

↳*Launcher*

Name: 9A33 Transporter Erector Launcher and Radar (TELAR) Vehicle

Type: TELAR

Basic Load: 6 x SA-8 SAM

Note: There is also a reloading vehicle, which is based on a similar BAZ-5939 chassis. It carries 18 reload missiles in containers and is fitted with a crane. All six missiles are reloaded within 5 minutes.

↳*Missile (Option 1)*

Name: 9M33

Type: Surface-to-air missile

Manufacturer: Znamya Truda Plant

Variants: 9M33, 9M33M1, 9M33M2, 9M33M3, 9A33BM3

Length: mm3,158

Diameter: mm209.6

Missile Weight: kg170

Warhead Type: FRAG-HE

Detonation Mechanism: Contact and proximity

Guidance System: RF CLOS

Propellant: Solid propellant rocket motor

Operational Range: km15

Flight Altitude: m12,000

Boost Time: 2 s boost, then 15 s sustain

Speed: m/s1,020

Steering System: Dual-thrust rocket motor.

Accuracy: m5

Note: The 9K33 Osa (SA-8 Gecko) can also fire the following missiles: 9M33, 9M33M1, 9M33M2, 9M33M3, 9A33BM3

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Optics: Infrared night-vision systems for commander and driver.

IFF Capable: Yes

↳*Target Acquisition and Fire COntrol Radar*

Name: Land Roll

Type: Target acquisition and command guidance radar for the SA-8 Gecko

Band, Surveillance: G-H (6-8 GHz)

Maximum Range, H-Band Surveillance Radar: 20-30 km

Band, Tracking Radar: J (14.2-14.8 GHz)

Maximum Range, H-Band Guidance Radar Radar: 20-25 km

Band, Guidance Radar: I (8-10 GHz)

Maximum Range, J-Band Detection Radar: 20 km

Traverse Left: deg180

Traverse Range: deg360

Traverse Right: deg180

Note #1: The normal SA-8 battery deployment consists of four SA-8 /Land Roll vehicles and one command vehicle. The SA-8 regiment headquarters consists of a Long Track radar or Thick Skin-B radar vehicle, as well as one command vehicle.

Note #2: The radar folds back 90 degrees to reduce the overall height of the vehicle for air transport or high-speed road travel.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: collective overpressure protection with air filtration

Smoke Equipment: INA

Notes:

The 9K33 Osa (English: wasp; NATO reporting name SA-8 Gecko) is a highly mobile, low-altitude, short-range tactical surface-to-air missile system designed in the Soviet Union. Its export version name is Romb. The SA-8 was the first mobile air defense missile system incorporating its own engagement radars on a single vehicle. All versions of the 9K33 feature all-in-one 9A33 transporter erector launcher and radar (TELAR) vehicles which can detect, track and engage aircraft independently or with the aid of regimental surveillance radars. The six-wheeled transport vehicles BAZ-5937 are fully amphibious and air transportable. The road range is about 500 km. The 1S51M3-2 radar system on the SA-8 TELAR received the NATO codename Land Roll. It was derived from the naval `Pop Group' radar system but is smaller since it does not require the elaborate stabilisation system. An improved system designated the SA-8B `Gecko' Mod 1, was first seen in Germany in 1980. It had improvements added to the launcher configuration, carrying six missiles in ribbed containers. The system is reported to be of the frequency-agile monopulse type. It consists of an elliptical rotating surveillance antenna mounted on top of the array, operates in H band (6 to 8 GHz) and has a 30 km acquisition range against most targets. The large pulsed J band (14.5 GHz) engagement antenna is mounted below it in the centre of the array and has a maximum tracking range of about 20 km. Mounted on either side of the tracking radar antenna is a small J band parabolic dish antenna to track the missile. Below that is a small circular antenna which emits an I band uplink capture beam to gather the missile shortly after launch. The final antennas in the array are two small white rectangular ones, one on either side of the array mounted alongside the I band. These are used for command uplink to the missile. This twin antenna system permits the 'Land Roll' radar to control up to two missiles simultaneously against a single target. Furthermore, the two missiles can be guided on different frequencies to further complicate ECM. There is also a tubular device fitted to and above the tracking radar; this is a 9Sh33 electro-optical tracker. It can be used to track the target when the main tracking radar is jammed by ECM. A 9K33 battery comprises four 9A33B TELAR vehicles and two 9T217 transloader vehicles on BAZ-5939 chassis with reload missiles and a crane. A reload time of five minutes has been reported per TELAR. In addition to the TELARs, each regiment is also assigned a single radar collimation vehicle 9V914 (initially on the BAZ-5938 chassis but more often found on the ZiL-131 truck). This vehicle assists in the alignment of the TELAR's radar systems, ensuring accurate target tracking and engagement. Since its introduction this air defense system was exported to a number of countries. Currently the Osa and its variants are used by 19 countries, including Russia (400), Belarus, Greece (39), India (48), Poland (64) and Ukraine.

Crotale-NG French Short-Range Air Defense System






Tiers:



Variants:

- **Generic:** SYSTEM IS IN A MODULAR POD, DESIGNED TO FIT ON SHIPS, VEHICLES, AND ON STATIONARY PLATFORMS. THE MODULAR ALL-WEATHER SYSTEM INCLUDES ACQUISITION, TRACKING, LAUNCH, AND SUPPORTING COMPUTER UNITS INTEGRATED ON ONE VEHICLE, FOR MANAGEMENT BY A SINGLE SYSTEM OPERATOR. VEHICLE PLATFORMS INCLUDE APCS, E.G., M113, KOREAN IFV, PIRANHA 10X10, AND THE XA-180 AS NOTED. THE SYSTEM CAN BE RETROFITTED ONTO EXISTING CROTALE LAUNCHER VEHICLES.
- **PEGASUS:** SOUTH KOREAN SYSTEM WITH A DIFFERENT MISSILE
- **Crotale Mk.3:** A Long range Version of the NG

System

Alternative Designations: Crotale-NG, R440 Crotale, HQ-7 (Chinese) R460 Crotale (Saudi Arabia), XA-181 (Finnish Launcher vehicle) This is not a modification to Crotale. It is a completely new modular system.

Target: FW, heli, CM, ASM, UAV

Mission: The missions of the system are in front-line armoured brigade defence, permanent or semi-permanent site defence and area defence against air threats, such as fixed-wing aircraft, attack helicopters, cruise missiles, tactical missiles and saturation attacks with stand-off weapons released from aircraft and helicopters.

TELAR: XA-181 is XA-180 (PASI) 6x6 APC with Crotale NG launcher system

Crew: ea4

All Weather Operation: Yes, tracking and engagement and all weather operation.

↳*Automotive*

Engine Name:

Engine Type: Diesel

Engine Power: 240-hp

Cruising Range: km800

Max Road Speed: km/h80

Dimensions

Length: m7.35

Width: m2.3

Height: m2.9

Weight: tons23

Main Weapon System

↳*Launcher*

Name: INA

Type: Launcher

↳*Missile*

Name: VT1 missile

Type: The VT1 missile is a land and sea based missile designed especially for short-range surface to air defence systems.

Function: The VT1 missile has been created to counter all threats including tactical missiles, pop-up helicopters, UAVs and aircrafts deploying high-maneuvering, low-level stand-off weapons. When combined with the Crotale Mk3, the hyper velocity and high maneuverability of the VT1 offer a class-leading performance and allows a system with a 15km no escape zone against high maneuvering targets.

Speed: Mach 3.5

Load Factor: grams35

Maximum Range: km15

Ceiling: m6,000

Warhead Weight: kg13

Fire Control

FCS Name: INA

Computerized FCS: Yes

Thermal Camera: Yes

Thermal; Camera Range: km19

Daylight CCD camera: Yes

Daylight CCD camera Range: km15

IR Localiser: Yes

↳*Radar*

Name: N/A

Type: S-band Pulse Doppler radar

Function: Fire Control, tracking

Antenna: Planar array Detection Range (km): Aircraft: 20

Hovering Rotary Wing Aircraft: 11

Altitude Coverage: m0-5000

Multiple Target Tracking: Automatic track-while-scan for up to 8 targets.

Frequency Band: Ku

ECCM: Wideband frequency agile

Detection Range: km30

Frequency: GHz35 doppler TWT (travelling wave tube)

Automatic Aqquisition: Yes

Multi-Target Detection: Yes

IFF: Yes

↳*Sights with Magnification*

Day Camera: Mascot, CCD TV Field of view (□): 2.4 Elevation (□): 1.8 Range (km): 15

Night Camera: Night Camera: Castor, thermal Field of view (□): 8.1/2.7 Elevation (□): 5.4/1.8 Range (km): 19

Missile Tracker: IR missile localizer on CCD camera for passive TV tracking

IFF: Yes

↳*Other Assets*

Description: The SAM system links to the IADS to get digital AD data and warnings. Associated radar for EW and TA data is radar at Brigade and Division Tier 1 and 2. System can also pass data to the net.

Protection

Armor Protection: mm6-12

Notes:

A modernized version, the Crotale NG (New Generation), entered production in 1990. This version used the new VT-1 missile with Mach 3.5 speed, load factor to 35G, 11 km range, 13 kg warhead (8 m kill-zone) and 6,000 m ceiling. The system includes a S-band Pulse Doppler radar (20 km), Ku-band TWT tracking radar (30 km), Thermal camera (19 km), Daylight CCD camera (15 km), and an IR localiser.[1] An early '90s proposal to fit the system (in its eight-round form) to a Leclerc tank chassis in order to provide a battlefield air defence vehicle for protecting armored formations on the move was not realised due to post-Cold War cutbacks. The missions of the system are in front-line armoured brigade defence, permanent or semi-permanent site defence and area defence against air threats, such as fixed-wing aircraft, attack helicopters, cruise missiles, tactical missiles and saturation attacks with stand-off weapons released from aircraft and helicopters.

Shahab Saghib (Shooting Star) Iranian Short-Range Air Defense Missile System





Tiers:



Variants:

- **FM-80 (Feimeng 80),:** export version of the HQ-7. It was revealed in 1989.
- **HHQ-7:** a naval version of the HQ-7. It was introduced in the 1990s. It has a bank of 8 missiles. For over a decade it was the standard Chinese ship-based air defense system. Currently a more capable HQ-9 with a longer range is being fitted on newly-built Chinese warships.
- **Shahab Tagheb:** an Iranian short-range air defense missile system. It was revealed in 1999. It was developed with Chinese assistance and by transferring technology of the HQ-7.
- **HQ-7A:** improved variant introduced in 1998. It has a maximum range of fire of 15 km. Detection range is 25 km and tracking range is 20 km. Also this missile has a maximum speed of 900 m/s in stead of 750 m/s.
- **HQ-7B:** latest variant, based on indigenous 6x6 armored chassis. It was first revealed somewhere in 2009. This air defense system is wisely used by the Chinese armed forces. It is more mobile due to its 6x6 configuration. This vehicle is more suited to follow motorized infantry, or mechanizes armored units.

System

Alternative Designation: HQ-7, FM-80, HongQi 7, Fei Meng, Flying Midge" or Flying Mongoose,
Type: Short-Range Air Defense Missile System
Family: HQ-7
Manufacturer: China, Company: INA
In Service: 1988-Present
Crew: ea3
Chassis: Thomson-Hotchkiss P4R chassis
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: INA
Note #1: It is a reverse engineered copy of the French Crotale.
Note #2: A battery of HQ-7 consists of one vehicle with acquisition radar and two or three TELAR vehicles. Also each battery is supported by a maintenance group with around 10 support vehicles.

Dimensions (Thomson-Hotchkiss P4R Chassis)

Length: mINA
Width: mINA

Height: mINA

Weight, Combat: kgINA

Ground Pressure: kg/mINA

Automotive (Thomson-Hotchkiss P4R Chassis)

Engine Name: INA

Engine Type: petrol / diesel

Engine Power: hpINA

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.5

Missile System

↳*Missile Launcher*

Name: INA

Type: TELAR vehicle

Firing Interval: 3 seconds

Operational Response Time: 6-10 seconds

Single-Shot Kill Rate: %85-90

↳*Missile*

Name: 4-cel or 8-cel missile launcher

Type: Short-Range Air Defense Missile

Length: m3

Diameter: m0.55

Wingspan: m0.55

Weight: kg84.5

Warhead Type: HE-FRAG

Warhead Weight: kg15

Maximum Range of Fire: kmup to 12

Minimum Range of Fire: m500-700

Maximum Altitude of Fire: km5.5

Minimum Altitude of Fire: m15

Basic Load: ea4

Speed: Mach 2.3 or 750 m/s

Missile Maneuverability: 20 G

Maximum Kill Distance at 400 m/s: km8.5

Maximum Kill Distance at 300 m/s: km10

Maximum Kill Distance at Helicopter: km12

Minimum Kill Distance: m500

Homing Range: km17

Target Seeking Range: km18.4

Guidance System: Radar

Note: The HQ-7 can engage helicopters, aircraft, cruise missiles, air-to-ground missiles and anti-radiation missiles.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Optical Aiming System: Yes

Target Processing Unit: Yes, the system can process 30 targets & track 12 targets simultaneously

Generators: 4 x 40 kW generators

Target Processing Unit: Yes

Network: Wired Network

↳*Radar #1*

Name: INA

Type: Doppler Search Radar

Band: E/F Band

Range: km18.4

TV Tracking System: Yes

IR Localiser: Yes

Protection

Hull Armor: Protection against small arms fire and artillery shell splinters.

Turret Armor: Protection against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Countermeasures: Resists active and passive jamming and rejects ground and atmospheric clutter

IFF: Yes

Notes:

Shahab Saghib (Shooting Star) is based on the Chinese FM-80. The HQ-7 is a Chinese clone of the French Thales/Thomson CSF Crotale SAM. During the 1970s the French supplied samples of the Crotale which was promptly reverse engineered. The cloned Crotale has been built in two configurations, a high mobility variant for PLA Army units on a 4 x 4 cloned French Thomson-Hotchkiss P4R armoured vehicle, and a less mobile PLA-AF air field defence system, using either a trailer or a truck platform. Since then, derivative variants have emerged in the FM-90 series, in addition to the shipboard variants. The Thomson-Hotchkiss P4R vehicle uses either a diesel or gasoline engine driving an alternator which powers electrical motors driving the wheels. Chinese sources sometimes label the P4R as a B-20. A naval variant of the Crotale as also been developed. A four round elevating tube launcher turret is used, mounting the Ku-band Automatic Command to Line Of Sight monopulse radar dish antenna. Export variants are the FM-80 and improved FM-90 with a FLIR tracker and longer ranging missiles. HQ-7/FM-80/90 batteries are typically supported by an acquisition radar system, the FM-90 usually on a new design indigenous 6 x 6 light armoured personnel carrier. The HQ-7 SAM is used by PLA and PLAAF for short-range air-defense. At some PLAAF bases, the HQ-7 is deployed in hardened shelters. The PLA has mounted the HQ-7 on towed trailers. The HongQi 7 (HQ-7) short-range air defense missile system has been developed in China in the 1980s. It is a reverse engineered copy of the French Crotale. Sometimes it is referred as Sino Crotale. In 1978-1979 China imported some of the Thomson-CSF Crotale systems for evaluation. These where both land-based and ship-based versions. Some French R-440 Sea Crotale systems were purchased and installed on the Chinese warships. Eventually China reverse engineered this system. First Chinese clone of the ground-based version was produced for testing in 1983. In 1986-1988 it was approved for production. The HQ-7 was also deployed by the Chinese air force and protected the air bases from air attacks. Since 1989 the HQ-7 was proposed for export customers as the FM-80.

Yitian Chinese 6x6 Self-Propelled Short-Range Air-Defense System





Tiers:



System

Alternate Designation: Yitian is a short-range air-defense (SHORAD)

Type: Short-Range Air-Defense (SHORAD)

Crew: 4 (Commander, two Operators and a Driver)

Chassis: The Yitian can be mounted to a variety of vehicles

Displacement Time: minINA

Emplacement Time: minINA

Maximum Effective Range: m6,000

Minimum Effective Range: m300

Effective Kill Altitude: m15-4,000

Basic Combat Load: INA

Fire on the Move: INA

Fuse Type: Laser Proximity Fuze

Single-Shot Probability of Kill: %80

Launchers: ea8

Notes: Norinco suggests that a Yitian battery should consist of a command vehicle, six launchers, two missile resupply vehicles, a missile testing and maintenance vehicle and a mechanical/electronic maintenance vehicle.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: tons16

Automotive

Notes: The Yitian is modular and can be carried on a variety of wheeled or tracked chassis, such as the WMZ-551 6 x 6 wheeled or EQ-2050 high-mobility vehicle. In Chinese service, it is integrated with the WMZ-551 vehicle.

↳*WZ551 Chinese Armored Personnel Carrier (APC)*

Engine Name: INA
Engine Type: 8-cylinder, turbo-charged, air-cooled diesel
Engine Power: hp320
Crusing Range: km800
Speed, Maximum Road: km/h100
Speed, Average Cross: km/h85
Fording Depth: amphibious
WZ551 Length: m6.63
WZ551 Width: m2.8
WZ551 Height: m2.8
WZ551 Weight: kg11,339.81
Propellers: ea2

Communication

↳*TBR-142 VHF Radio*

VHF FM Transceiver: Yes, TBR-142(I)
VHF Range: km1 to 50
Megahertz: 40.000 to 59.975
Output Power: Watts1 to 0.3
Power: 12V Ni-Ca Rechargeable Battery or external 12V DC power source
Dimensions: mm217x135x58
Weight: kg2.7
Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna
Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance/C2 Units
Control Device: TBR-142(II)
Multi-function Field Phone: TBR-142(IIID)
Anti-Aircraft Control Unit: TBR-142(IIIG)
ZXY88-200 C2 Capable: Yes
Messaging: Limited Capability
Amplifier: Available
Physical Conditions Limitations: Terrain and Weather favorable

Protection

Note: This WEG sheet is specific to the Yitian TY90 Chinese Short-Range Air-Defense (SHORAD) and not the vehicle transporting it.

Hull Armor: mm

Turret Armor: mm

Applique Armor: mm

Explosive Reactive Armor:

Active Protection System:

Mien Clearing:

Slef-Entrenching Blade:

NBC Protection: Yes, on WMZ-551

Smoke Equipment: Yes, on WMZ-551

C4I Suite: Yes, on WMZ-551

Armament (Titian SHORAD)

Type: Anti-Aircraft Missile System

Guidance System: All-Aspect Infared Guidance System

Seeker Field of View: Launched even if humidity or smoke obscures the target from the seeker

Self-Destruct Time:

Traverse Range: deg

Travere Left: deg

Traverse Right: deg

Rate of Fire, Burst: ea

Rate of Fire, Sustain: ea

Transport/Launch Canisters: Two banks of four on either side of the turret.

Missile Container Weight: kg23

Ammunition (Titian SHORAD)

Name: CATIC TY-90 Fire-and-Forget SAMs

Munition Type: HE, Frangible Rod

Location: Roof of the Vehicle in two banks of four on either side of the Turret

Length: 1.9

Diameter: mm90

Warhead: kg3

Fuze Type: Laser Proximity Fuze

Detonation Mechanism: Impact / Proximity

Engine Propellant: Solide-Fuel Rocket Motor

Missile Speed: mach2.2

Max Range: m6,000

Min Range: m300

Effective Slant Kill Range: m500-6,000

Kill Radius: m4

Effective Elevation: m15-3,962.4

Flight Ceiling: km6

Effective Kill Altitude: m15-4,000

Guidance System: ImIR IR

IR Seekers: Yes

Missle Velocity: m/s2.2

60-Deg Off-Boresight Capability: Yes

Indium Antimonide (InSb) Detector: Yes

Mid-Course Guidance: Yes

Fire Control / Radar

Note: In Chinese service, a Yitian battery consists of a command vehicle, six Yitian vehicles, two missile resupply vehicles, one missile testing and maintenance vehicle and a mechanical/electronics maintenance vehicle.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Thermal Day Sensors: Yes

Thermal Night Sensors: Yes

Laser Rangefinder: Yes

Automatic Target Tracker: Yes

Tarket Tracking Range: km10

E/O Detection Range: km12

Operational Modes: Two Modes, Mode 1: Company Command, Mode 2: Individual Vehicle Mode.

System Reaction Time: sec6-8

↳*Radar*

Type: Rotating Antenna Acquisition Radar

Frequency/Band: 3D X-Band

Radar Acquisition (Fighter Target): km18

Radar Acquisition (Cruise Missile Target): km8

Radar Tracking Range: km10

Advanced Electro-Optical Range: km12

Number of Targets: INA

Notes:

The Yitian is a short-range air-defense (SHORAD) system built by China for the domestic and export market. Its primary mission is to provide low-altitude protection for armored units against fixed-wing aircraft, helicopters, unmanned aerial vehicles and other airborne threats. The manufacturer also claims the system has an anti-cruise missile capability. The system consists of eight canister-launched TY-90 infrared homing missiles and two sensor systems mounted on a turret. The radar systems include a rotating antenna acquisition radar on top with an advanced electro-optical package beneath it. The three-dimensional X-band tracking radar can be folded down for transport. The E/O package includes day and thermal sights, laser rangefinder and an automatic target tracker. The E/O system has a detection range of 7 mi (12 km) and tracking range of 6 mi (10 km), according to the manufacturer.

2K12 Kub (SA-6 Gainful) Russian Surface-to-Air Missile System






Tiers:



Variants:

- **Gainful Mod 1 (SA-6b):** Initial operating capability (IOC) was reached in 1979. This system is mounted on a variant of the MT-LB general-purpose tractor that also carries missile guidance radar.

System

Alternative Designations: 2K12 Kub; SA-6 Gainful
Type: Tracked medium-range surface-to-air missile system
Target: Low to medium altitude FW and heli for SA-6a. FW, heli, CM for SA-6b FW, heli, TBM, CM, UAV, and ground targets for SA-6b/Kvadrat-M4.
Manufactuer: Ulyanovsk Mechanical Plant (SURNs) ZiK (TELs) Still in Service in over 25 countries through Russia, Africa, and Asia.
In Service: 1960-Present
Chassis: Modified PT-76
Launch Vehicle: 2P25 SPU Launch Vehicle
Crew: 3

Dimensions

Length, Hull: m6.79
Length, with Missiles: m7.39
Height, Hull Top: m1.80
Height, with Missiles: m3.45
Width: m3.18

Tracks Length on the Ground: m3.80

Track Width: m0.36

Ground Clearance: m0.40

Combat Weight: kg14,000

Ground Pressure: 0.48 kg/cm sq

Automotive

Engine Name: Model V-6R

Engine Type: water-cooled, in-line 6-cylinder diesel

Engine Power: 240 hp at 1,800 rpm

Power-to-weight ratio: 17.14 hp/metric ton

Fuel Capacity: 250 Liters

Suspension: torsion bar, 6 road wheels, rear drive, front idler, two hydraulic shock absorbers, no return rollers

Transmission: manual, 5 forward and 1 reverse gears

Electrical system: 24 v

Batteries: 2 x 12 v, 100 Ah (for vehicle)

Maximum Speed: km/h44

Maximum Range, Road: km/h260

Vertical Obstacle: m1.00

Trench: m2.50

Gradient: %60

Side Slope: %30

Fording: m1.10

Communications

Tactical Radio: Depends on which country the SA-6 is operating in.

Armament

Launcher: 2P25 SPU Launch Vehicle

Name: Kub-M3/3M9M3

Reaction Time (sec): sec22-24

Time Between Launches (sec): INA

Reload Time (min): min10

Fire on Move: No

Simultaneous targets launcher: ea1

Simultaneous targets battery: ea1

Simultaneous missiles battery: ea1-4

Emplacement Time (min): min5 or less

Displacement Time (min): min15 for a battery

↳*Missile (Option 1)*

Name: Kub-M1

Missiles per TEL: 3

Engagement Range: 4–23 km

Engagement Altitude: 80–8,000 m

Missile Speed: Mach 1.75

Maximum Target Speed: Mach 1.75

Response Time: sec22–24

Missile Weight: 630 kg

Deployment Time: Min5

Guidance System: semi-active radar homing

↳*Missile (Option 2)*

Name: Kub-M3

Missiles per TEL: 3

Engagement Range: 4–25 km

Engagement Altitude: 20–8,000 m

Missile Speed: Mach 2

Maximum Target Speed: Mach 1.75

Response Time: sec22–24

Missile Weight: 630 kg

Deployment Time: min5

Guidance System: semi-active radar homing

↳*Missile (Option 3)*

Name: Kub-M4 (Buk-M1)

Missiles per TEL: 3

Engagement Range: 4–24 km

Engagement Altitude: 30–14,000 m

Missile Speed: Mach 2

Maximum Target Speed: Mach 1.75

Response Time: sec24

Deployment Time: min5

Guidance System: semi-active radar homing

Fire Control

FCS Name: INA

Computerized FCS: Yes

EO sighting system: TV

Commander and driver: IR

IFF: Pulse-doppler

Radar Vehicle

Name: SURN 1S91 "Straight Flush" Radar

Type: fire control and guidance radar associated with surface-to-air „Kub“ (kyrillisch: Куб; english: cube, NATO-Bezeichnung: SA-5 Gammon) missile system.

Band: It is operating in C-Band surveillance and aquisition radar, combined with an operating in I-Band tracking and illuminating radar.

Peak Power: 600 kW

Maximum Range: km75

Beamwidth: deg1

Antenna Rotation: 15 or 20 min-1

↳*Additional Radar Systems Available*

Note: The 2K12 can also be used at a regimental level, if used as such it can be accompanied by a number of additional radar systems for extended air search at longer range and lower altitude, to supplement the 1S91 "Straight Flush". These systems include the: P-12 "Spoon Rest", a VHF early warning radar (also used by the SA-2), with a 200 kilometres (120 mi) range. P-40 "Long Track", an E band early warning radar (also used by the SA-4 and SA-8), with a 370 kilometres (230 mi) range. P-15 "Flat Face A", a UHF early warning radar (also used by the SA-3, with a 150 kilometres (93 mi) range. "Thin Skin" or "Side Net" E band height finding radar (also used by the SA-2, SA-4 and SA-5, range 240 km/148 miles) "Score Board" IFF radar The "Spoon Rest" and "Thin Skin" are mounted on a truck, "Long Track" on a tracked vehicle (a modified AT-T) and "Flat Face" on a van. It is unknown what kind of mounting the "Score Board" has. Without the P-40 "Long Track" mobile radar vehicle, the 2K12 is unable to track aircraft at high altitudes.

Protection

Hull Armor Type: 9.40 mm

Turret Armor: 9.40 mm

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, collective overpressure and filtration

Smoke Protection: INA

Notes:

The 2K12 "Kub" (NATO reporting name: SA-6 "Gainful") mobile surface-to-air missile system is a Soviet low to medium-level air

defence system designed to protect ground forces from air attack. "2K12" is the GRAU designation of the system. Each 2K12 battery consists of a number of similar tracked vehicles, one of which carries the 1S91 (SURN vehicle, NATO designation "Straight Flush") 25 kW G/H band radar (with a range of 75 km (47 mi)) equipped with a continuous wave illuminator, in addition to an optical sight. The battery usually also includes four triple-missile transporter erector launchers (TELs), and four trucks, each carrying three spare missiles and a crane. The TEL is based on a GM-578 chassis, while the 1S91 radar vehicle is based on a GM-568 chassis, all developed and produced by MMZ. he 2K12 system shares many components with the 2K11 Krug (SA-4) system. In many ways they are designed to complement each other; 2K11 is effective at long ranges and high altitudes, 2K12 at medium ranges and intermediate altitudes. The system is able to acquire and begin tracking targets using the 1S91 "Самоходная установка разведки и наведения" (SPRGU - "Self-propelled Reconnaissance and Guidance Unit" / NATO: "Straight Flush" radar) at 75 km (47 mi) and begin illumination and guidance at 28 km (17 mi). IFF is also performed using this radar. It can only guide one or two missiles to a single target at any time. The missile is initially command guided with terminal semi-active radar homing (SARH), with target illumination provided by the "Straight Flush" radar. Detonation is via either the impact or proximity fuze. On the latest models, this vehicle is also fitted with an optical tracking system which allows engagement without the use of the radar (for active RF emissions stealth reasons, or due to heavy ECM jamming) in which case the effective altitude is limited to 14 km/46000 ft. The optical tracking method also allows engagements to altitudes below that where the radar is able to track targets. Maximum target speed is around Mach 2 for head-on engagements and Mach 1 for tail-chase engagements. Top speed of the missile is approximately Mach 2.8. In contrast to the elaborate Patriot missile or even the simpler Hawk system fielded by US forces, most of the system rides on two tracked self-propelled vehicles, rather than towed or mounted on trucks, and either the launcher or control vehicle can be set to launch in only 15 minutes after changing location.

HQ-61A Chinese Surface to Air Missile





Tiers:



Variants:

- **RF-61 Naval Variant (HQ-61B):** The naval version, the RF-61, weighs 648 lbs (320 kg), has a maximum slant range of 6.21 mi (10 km) and a maximum vertical range of 5 mi (8 km). It is said to be capable of operating in "severe sea conditions." The naval variant was fitted to the JIANGWEI-class frigates beginning in 1992. It was located on a long deckhouse forward of the bridge and on the after deckhouse abaft the mainmast. The missile magazine was probably below the launcher. Fog Lamp** missile fire-control radars were fitted mid-way up each mast. Reports indicated the RF-61s were being replaced on the JIANGWEI-class frigates by the HQ-11 (LY-60). A July 30, 2015, report in The Diplomat (Tokyo) indicates that the RF-61s were removed in order to convert the vessels into coast guard cutters. The JIANGWEI-class vessels were the only ones that w ere fitted with the RF-61, according to A New Direction for China's Defense Industry(2005). With their removal the system may no longer be in service.

System

Alternate Designations: Red Leader 61, SD-1, RF-61, CSA-N-2, H-61, HQ-41
Engine: 1 x single-stage solid-propellant rocket
Speed: Mach 3
Maximum Range: 10 km
Minimum Range: 3 km
Maximum Altitude: 10,000 m
Minimum Altitude: 50 m
Warhead: High-explosive (HE) chain-type
Guidance: Guidance is provided by the Type 571 radar system. SAR seeker w/ECCM capability.
Fuze: Dual proximity and IR

Dimensions

Length: 3.99 m
Wingspan: 1.17 m
Diameter: 286 mm
Weight: 310 kg

Notes:

The cumbersome HQ-61 series has been largely superceded by the HQ-7 and HQ-64 point defense SAMs. The Chinese HQ-61 HongQi/Hungchi (Red Leader) is a surface-to-air missile (SAM) system for land-mobile and shipboard use. The shipboard RF-61, the first in Chinese service, reportedly entered service before the vehicle-mounted HQ-61. The HQ-61 appears similar visually to the U.S. Sparrow, but is slightly longer and heavier and has a semi-active radar (SAR) homing seeker and midcourse command link guidance. The missile is a thin, pointed cylinder with cruciform steerable foreplanes at mid-body and cruciform delta tailplanes aft that are indexed 45 degrees to the foreplanes. The missile’s SAR homing seeker tracks continuous wave (CW) illumination from a target-illuminating radar and is reported to have good electronic counter countermeasures (ECCM) capabilities. The system can handle only one missile at a time. Detonation is by a dual-fuze system (proximity and infrared). The HQ-61 is powered by a solid-propellant rocket. The rectangular, traversable mount is topped by an elevating, twin-rail launcher that is pivoted at the rear. There is little visible difference between land-mobile and shipboard mounts. The land-mobile version is deployed in groups of four launch vehicles (tracked or on 6 x 6-wheeled chassis). Other vehicles transport target acquisition radars (C-band Type 571), target-tracking and illumination radars, a battery command post and mobile generators. Source: Military Periscope, June 2017

→→Medium-Range Missile Systems

50R6 Vityaz (S-350E) Russian Medium-Range Air Defense Missile System







Tiers:



Variants:

- **S-350E:** S-350E is a downgraded export version.

System

Alternative Designation: S-350 Knight
Type: Medium-Range Air Defense Missile System
Family: S-350
Manufacturer: Northwest Regional Center of Almaz-Antey (GOZ, ZRTO)
In Service: 2019-Present
Crew: The TEL vehicle has a crew of three.
Chassis: BAZ-6909
Displacement Time: minutes5
Emplacement Time: minutes5
Fire on the Move: No
Note: The S-350 Vityaz (knight) is a short-to-mid range air defense missile system. It was developed by Almaz-Antey company as a replacement for the ageing S-300PS, which was developed back in the early 1980s, and Buk M1-2 system, which is now over 20 years old.

Dimensions (BAZ-6909 Launcher Vehicle)

Length: m11.3

Width: m2.75

Height: m2.85

Weight, Empty: tons22

Weight, Combat: INA

Ground Pressure: INA

Payload Capacity: tons18-20

Automotive (BAZ-6909 Launcher Vehicle)

Engine Name: YaMZ-8424.10

Engine Type: Diesel

Engine Power: hp470

Maximum Range: km1,000

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Sidel Slope: %40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.2

Missile System

↳*Launcher*

Name: 50P6 Launcher Vehicle

Chassis: BAZ-6909 special wheeled chassis with 8x8 configuration.

Maximum Elevation: +90

Minimum Elevation: INA

Traverse Range: INA

Traverse Left: INA

Travese Right: INA

↳*Missile (Option 1)*

Name: 9M96E

Type: Vertically-launched Direct Impact missile

Basic Load: 12

Length: m4.75

Diameter: mm240

Weight: kg333

Warhead Weight: kg24

Speed: INA

Kill Probability vs. Aircraft: %90

Kill Probability vs Harpoon Missiles: %70

Maximum Range: km60

Minimum Range: km1

Maximum Altitude: km20

Minimum Altitude: m5

Note: he 9M96E is a variant of the 9M96 active radar-homing interceptor missile.

↳*Missile (Option 2)*

Name: 9M96E2

Type: Vertically-launched Direct Impact missile

Basic Load: 12

Length: m5.65

Diameter: mm240

Weight: kg420

Warhead Weight: kg24

Speed: m/s1,800

Kill Probability vs. Aircraft: %90

Kill Probability vs Harpoon Missiles: %70

Maximum Range: km120

Minimum Range: km1

Maximum Altitude: km30

Minimum Altitude: m5

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Number of Targets: This air defense system can engage 12 to 16 targets simultaneously, including aircraft and ballistic missiles.

Radar Vehicle

Name: 50N6A

Number of Radar Vehicles: 1 - 2

Type: The 50N6A is the MFMTR Multi-Function Mobile Tracking Radar which is used with the Vityaz 50R6 ground-to-air defense missile system.

Chassis: BAZ-69092 with 6x6 configuration.

Function: Designed for the rapid acquisition and initial tracking of inbound ballistic missiles within a 90 degree sector.

Frequency/Band: X Band

Range: INA

Number of Targets System can Detect: The roof-mounted MFMTR X-band phased array radar of the fire-control system can detect and track up to 40 targets simultaneously.

Number of Targets System can Engage: The Radar can engage eight tragets typically using two missiles per target to ensure a high-kill probability.

Search Sector: deg90

Maximum Elevation: deg+45

Minimum Elevation: INA

Tracking Error Range: m250

Simultaneous Target Detection: Yes

Multiple Target Tracking: Yes

Missile Up-Link: Yes

Note: The radar contains a Rotating phased-array antenna (60 rpm) with Full electronic scanning, with large deflection (+/- 45° in elevation and bearing).

↳*Command Post Vehicle*

Name: 50K6A

Number of Command Vehicles: 1

Type: Command Post Vehicle

Coverage: Fully autonomous combat work with interaction with other remote systems.

Note: Command post can target up to 32 missiles on various targets at once.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

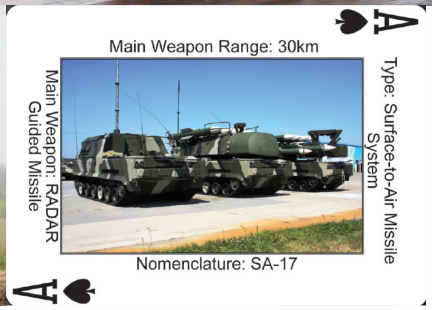
Notes:

The S-350 Vityaz is an advanced mobile medium-range air defense system being developed by Almaz-Antey Concern as the replacement for the S-125 Pechora (SA-3 Goa) and Buk-M1/2 (SA-11 Gadfly and SA-17 Grizzly) missile systems by 2015/2016 as well as aging S-300PS air defense systems. The missile weapon system consists of command post, an X-band multi-functional fire control, tracking and surveillance radar, and up to three missile launchers with 12, originally 10, 9M96E missiles or two 9M100 short-range missiles replacing one 9M96E missile. The rotating phased array X-band radar has been designed for operations in high clutter and heavy jamming environments. All the Vityaz components are mounted on 8x8 all-terrain trucks or similar vehicles. The weapon system is designed to engage a wide spectrum of threats at ranges of up to 40 kilometers such as fixed- an rotary-wing aircraft, Unmanned Aerial Vehicles (UAVs), cruise missiles and tactical ballistic missiles. The Vityaz is able to detect and track up to 40 targets simultaneously while engaging eight of them with two missiles per target. Its development started in 2007. A Russian press article, released in August 2011, stated that the Vityaz leveraged some technology from the S-300 air defense system family but with each launch vehicle carrying 16 missiles instead of only four. The new air defense system combat capabilities also surpass largely those of the S-300 family. The Russian Armed Forces expect to deploy the Vityaz medium-range air defense system along with the Morfei, S-400 and S-500 air defense systems to produce a highly effective multi-layered air defense network capable to shoot down targets flying from altitudes of five kilometers to near space. The 50R6A Vityaz missile system consists of: * 1-2 50N6A multifunctional passively electronically scanned array radar stations. 360° coverage for early detection, target illumination and missile guidance.[5] * 1 50K6A command post, fully autonomous combat work with interaction with other remote systems. * 1-8 50P6 launcher (12-96 missiles). * 9M96/9M96E(E2) guided missiles; passive guidance and other missiles with active homing guidance.[6] 12– 120 km (7.5–74.6 mi) range, aerodynamic control surfaces and jet engines of control surfaces. * 9M100 guided missiles; 10–15 km (6.2–9.3 mi) range; infrared passive homing; aerodynamic control surfaces and jet engines of control; maximum maneuver 60 G-20 surfaces.

Buk-M2 (SA-17 Grizzly) Russian Medium-Range Air Defense Missile System





Tiers:

1 2 3 4

Variants:

- **9K37-1 'Buk-1:** First Buk missile system variant accepted into service, incorporating a 9A38 TELAR within a 2K12M3 Kub-M3 battery.
- **9K37 'Buk':** he completed Buk missile system with all new system components, back-compatible with 2K12 Kub.
- **9K37M1 'Buk-M1:** An improved variant of the original 9K37 which entered into service with the then Soviet armed forces.
- **9K37M1-2 'Buk-M1-2' ('Gang' for export markets):** An improved variant of the 9K37M1 'Buk-M1' which entered into service with the Russian armed forces.
- **9K317 'Ural':** initial design of Buk-M2 which entered into service with the Russian armed forces
- **9K317E 'Buk-M2E:** revised design for export markets
- **9K37M1-2A 'Buk-M1-2A:** redesign of Buk-M1-2 for the use of 9M317A missile
- **Buk-M2EK:** A wheeled variant of Buk-M2 on MZKT-6922 chassis exported to Venezuela and Syria.
- **9K317M 'Buk-M3:** A SAM battalion has 36 target channels in total

System

Alternative Designation: 9K317 Buk-M2; SA-17; 9K37M1, Grizzly, Beech M2E

Family: Muk

In Service: 2008-Present

Type: Medium-Range Air Defense Missile System

Manufacturer: Almaz-Antey:

Crew: ea4

Chassis: GM-569 chassis

Note: In terms of organisation, one Buk-M1-2 brigade consisted of four "divisions" (approximately a battalion set), with a single 9S52 Polyana-D4 Brigade C2 vehicle in control of all four "divisions". One "divizion" was composed of three batteries, with one 9S470 command vehicle and one 9S18 search radar vehicle responsible for three batteries. Each battery was composed of two 9A310M1-2 TELARs and one 9A39M1-2 TEL/transloader vehicle. It should be noted that "divizion" means 'division', but this measurement takes on a different meaning when dealing with Russian anti-air unit sets as opposed to

personnel or armour formations, and so the term has been transliterated rather than translated to reflect this difference of meaning and avoid confusion. It is perhaps most accurately translated into English as a battalion set. The table below displays the principle vehicles known to be included within a "divizion"

Dimensions (GM-5955 chassis)

Length: m9.3
Width: m3.25
Height: m3.8
Weight, Combat: tons34
Ground Pressure: 0,8 kg/cm2

Automotive (GM-569 chassis)

Engine Name: INA
Engine Type: Multifuel liquid-cooled diesel
Engine Power: hp840
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: km/h45
Speed Maximum Swim: km/hNot Amphibious
Chassis Weight: kg24,000
Max Load: kg11,500
Wheelbase: mm4,50
Fuel Distance: km500

Transporter Erector Launcher and Radar (TELAR) Vehicle

Name: 9A310M1-2 TELAR vehicle
Chassis: GM-569 chassis
Basic Load (9M317M missiles): ea6
Array Radar: two array radars. the first radar if for target tracking and fire control by illumination of the target and the the secondary radar is a smaller backup array radar
Fire Control Radar Band: C Band
Antena Type: phased array antenna
Continuous Wave (CW) Illumination Capable: Yes
Target Detecting Capability: detecting targets with an RCS of at least 2 m2 out to a maximum range of 120 km
IR Tracking: Yes, electro-optical IR tracking system
Steering: electronic beam steering
Fire Control Radar: 9S35M1-2 (NATO: Fire Dome) fire control radar
Launch Rails: ea4
CRT TV Displays: Yes

Radar Band: X-Band

Antennas: 2 ea, with 2 transmitters

Target Tracking Range (Altitude of at least 3km): km65-70

Target Tracking Range (Altitude lower than 3km): km40

Beam Width for the Pulsed Transmitter: 1.3 deg in azimuth and 2.5 deg in elvecation

Beam Width for the CW Transmitter: 1.4 deg azimuth and 2.65 in elevation

Tracking System: 9Sh38-3 electro-optical tracking system

NOTE: The missiles of the Buk-M2 can be launched from either the 9A310M1-2 TELAR vehicle, or the 9A39M1-2 TEL/transloader vehicle

↳*Ammunition (Option 1)*

Name: 9M317 Missile

Type: surface-to-air missile

Maximum Effective Range: km45

Maximum Altitude: km25

Speed: m/s1,230

Capable of Engaging Targets Traveling at Speeds of: m/s1,200

Fuze Type: Proximity fuze

Generator: solid propellant-based gas generator.

Length: m5.55

Foward Body Diameter: mm330

Main Body Diameter: mm400

Weight: kg715

Storage Container: 9Ya266 transport container

Storage Life: years10

Training Missiles: 9M317UD and the 9M317UR Missiles

Guidance Principle: semi-active radar homing guidance principle

Autopilot Capable: Yes

Radar Reciever: 9E420 semi-active radar homing receiver

Warhead Type: HE-FRAG

Warhead Weight: kg70

Launcher Type: 9A310 TELAR vehicle, or the 9A39 TEL/transloader vehicle

↳*Ammunition (Option 2)*

Name: 9M317MA

Type: solid-propellant surface-to-air missile

Maximum Effective Range: km35

Maximum Altitude: km22

Speed: m/s850

Capable of Engaging Targets Traveling at Speeds of: m/s800

Fuze Type: proximity fuze

Generator: solid propellant-based gas generator

Length: m5.55

Forward Body Diameter: mm330

Main Body Diameter: mm400

Weight: kg690

Storage Container: 9Ya266 transport container

Storage life: years10

Training Missiles: 9M38UD and the 9M38UR Missiles

Guidance Principle: semi-active radar homing guidance principle

Autopilot: Yes

Inertial Navigation System Enabled: Yes

Radar Receiver: 9E50M1 semi-active radar homing receiver

Warhead Type: HE-FRAG

Warhead Weight: kg70

Launcher Type: 9A310 TELAR vehicle, or the 9A39 TEL/transloader vehicle

Targeting and Guidance Systems Vehicles

↳*Search Radar Vehicle*

Name: 9S18M1-2 Kupol-M1 (NATO: Snow Drift)

Chassis: GM-567M chassis

Maximum Speed: km/h56

Maximum Range: km/h250

Fuel Timeline: A maximum of 2 hours of fuel.

Crew: 3 (driver-mechanic, an operator, and a senior operator)

Array Radar: flat-faced 3D pulsed phased array radar

Radar Band: S Band

Maximum Target Range: km160

Minimum Target Range: km10

Number of Targets Capable of Tracking (Range of 10km): ea75

Maximum Altitude: km25

Search Modes: one for aerial threats, the second for ballistic threats

Range Resolution: m200

Angular Coordinate Resolution: 3° in azimuth and 4.5° in elevation

Rotational Speeds: 5 individual settings.3.6 s, 4.5 s, 6 s, 12 s, 60 s to complete a single rotation.

Road March State to Ready State Timeline: min5

↳*Fire Control Radar Vehicle*

Name: 9A36M

Chassis: GM-5955 chassis

Antenna: 21 m telescoping mast

Radar Capability: detecting targets with an RCS of at least 2 meters squared out to a maximum range of 120 km

Number of Targets: 10 simultaneous targets

Steering: electronic beam steering

Operating Mode: two: the first being a track while scan mode and the second being the pure target tracking mode

C2 Systems Vehicles

Name: 9S470M1-2

Chassis: GM-579 chassis with six roadwheels

Combat Weight: tons29.87

Maximum Speed: km/h65

Crew: ea6

TV Displays: four CRT TV displays and control equipment

Antenna Type: omnidirectional antenna

Range Accuracy: m400-700

Note: The 9S470M1-2 is capable of processing and co-ordinating information on 75 simultaneous targets within 100 km and at a maximum altitude of 20 km

Notes:

Buk-M2E (SA-17 Grizzly) Buk-M2E (NATO name: SA-17 Grizzly) is a medium-range advanced defence missile complex (ADMC) designed and manufactured by Almaz-Antey. The Buk-M2E surface-to-air missile (SAM) system is an export variant of the Buk-M2, which entered into service with the Russian Army in 2008. The possibility of sudden intense attacks launched from unmanned aircraft land and subtle precision and high-speed weapons, simultaneously from several directions, with flying at altitudes up to extremely low confronts medium-range SAMs with requirements for versatility, multi-channel, omnidirectional, high performance and low fire reaction time. The main condition for organizing counter saturation air attack is defense echelon construction of ground facilities. With this organization, defense of ground objects extends the range of tasks assigned to the medium-range SAM. First, before the medium-range SAM the problem arises from maximum range goals manned flying a combat mission without entering the zone of the defense: aircraft-jamming directors and management, carrier aircraft unmanned aerial vehicles. Secondly, there is the problem of massive defeat at the boundaries of self-defense attack at extremely low altitudes CR and ORS, which radar detection occurs at a range of limited radio horizon. Multi-channel, multi-functional highly mobile medium-range SAM "Buk-M2E" designed to engage aircraft strategic and tactical aircraft, helicopters, including hovering, cruise missiles and other aerodynamic flying objects in the whole range of their possible application, tactical ballistic missiles and air-driven bombs under intense electronic and fire enemy countermeasures, as well as surface and ground bombardment radiocontrast purposes. SAM can be used for air defense troops (military facilities) in different forms of fighting, administrative and industrial facilities and areas of the country. The SAM "Buk-M2E" is able to conduct operations independently (stand-alone) and in the grouping of air defense forces under the control of the automated control system of antiaircraft missile brigade (mixed group of air defense forces) "Glade-D4M1" or other automated solution to having export supply and matched with a complex communication protocol. The Command post (CP) provides simultaneous processing of complex information about the traffic situation on 50 targets according to their own station detection and targeting (SOC) and a

higher command post exercises and distribution of targets between the firing of self-propelled unit (SDA), and radar illumination and guidance (RPN). The complex provides a complete set of simultaneous firing up to 24 air targets flying from any direction at altitudes ranging from 0,015 km to 23-25 km. The SAM uses inertial guidance with updating method with homing in the terminal phase of flight. The complex and its combat vehicles take measures to protect against high-precision weapons defeat (regulation of radiation screens, laser irradiation sensors, aerosol veil). The time to bring combat weapons complex embattled deployment from the march and the clotting time of no more than 5 minutes (for RPN - 12 min.) Exchange of technical information and command between the complex is provided by means of radio or two-wire communication lines. Transport base combat assets may be tracked or wheeled chassis with high cross. Weatherproof complex and works in different climatic zones in the temperature range from -50 o C to +50 o C, with humidity up to 98%. The crew compartment has an air conditioning and heater. The complex power system is driven by a gas turbine engine, which can also work on external power supplies.

2K11 Krug (SA-4 Ganef) Russian Medium-Range Surface-to-Air Missile (SAM) System





Tiers:



Variants:

- **Krug-A:** first operational deployment version, entered service in 1967
- **Krug-M::** a modified version of Krug-A, entered service in 1971
- **Krug-M1:** a modified version of Krug-M, entered service in 1974

System

Alternative Designation: SA-4 Ganef; 2K11 Krug; 2K11 ZRD-SD
Type: Medium-Range Surface-to-Air Missile (SAM) System
Family: INA
Manufacturer: MZiK
Crew: ea3-5
Chassis: GM-123 chassis
In Service: 1965-present 1965- 1990s (USSR) Other Countries: See proliferation
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length, Hull: m7.5
Width: m3.2
Height, with Missiles: m4.472
Weight, Combat: kg28,200 kg
Ground Pressure: INA
Track, Length on Ground: m5
Track, Width: m0.54
Ground Clearance: m0.44

Automotive

Engine Name: V59

Engine Type: V-12 water-cooled diesel

Engine Power: hp420

Maximum Range: km780

Speed, Maximum Road: km/h35

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Fuel Capacity: 850 liters

Suspension: torsion bar, 7 road wheels, front drive, rear idler, 2 hydraulic shock absorbers, 4 return rollers

Communications

Note: Depends on what country the 2K11 Krug is being used in.

Main Weapon System

↳*Launcher*

Name: 2P24 SPU launch vehicle

Crew: ea3-5

Maximum Elevation: deg+70

Minimum Elevation: INA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

↳*Missile*

Name: 9M33

Type: Suface-to-Air Missile

Length: m8,784

Diameter: cm86

Weight: 2,453 kg

Engine: solid fuel rocket motors inside boosters attached to the outside of the missile

Propellant: Kerosene fuelled ramjet

Speed: Mach 4

Basic Load: ea2

Operational Range: km55

Flight Altitude: 24,500 metres

Booster Time: Four solid fuel booster rocket motors

Guidance System: Radio command

Warhead Type: Frag-HE

Warhead Weight: 150 kg

Detonation Mechanism: Contact and proximity fuzes

Note: Additional Missiles the 2K11 Krug can be equipped with: 2 x 3M8; or 2 x 3M8M; or 2 x 3M8M1 (SA-4a); or 2 x3M8M2 (SA-4b); or 2 x 3M8M3 missiles; Note: Missile types can be mixed

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes, An electro-optical fire-control system is fitted for heavy electronic countermeasures environments

Direct Fire: Yes

Indirect Fire: Yes

Night Vision: infrared night-vision system

Optics: electro-optical fire-control system on launcher

Guidance System: radio command with semi-active radar terminal homing

↳*On-Board Radar*

Note: The Ganef launch vehicle carries no onboard radar. See Mobile Missile Guidance Station

Transporter/Loader Vehicle

Name: Ural-375 TZM (transportno-zaryazhayushchaya mashina) transporter-loader vehicle

Mobile Missile Guidance Vehcile

Name: 1S32 Pat Hand SSNR (samokhodnaya stantsiya navendeniya raket) mobile missile guidance station

Type: H-band continuous wave fire control and guidance radar

Band: H-Band

Maximum Range: km128

Antenna: The vehicle carries a large circular antenna for target tracking and a smaller antenna for missile guidance.

SSNR: Russian acronym for radar vehicle

Note: It is used to track targets and guide one or two Ganefs to intercept.

Protection

Hull Armor: mm15

Turret Armor: mm15

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes, Collective overpressure

Smoke Equipment: INA

Notes:

The 2K11 Krug (NATO code SA-4 Ganef) is a Soviet-made medium-range air defense missile. The development of the system started in 1958. The first version, Krug-A, entered service in 1967, with extensively modified versions, the Krug-M in 1971 and the Krug-M1 in 1974, which were developed to rectify problems discovered during army service. It was first unveiled during a military parade in Moscow in May 1965. Modified versions, the Krug-M in 1971 and the Krug-M1 in 1974 were developed to rectify problems discovered during army service. The 2K11 was briefly operated by the Soviet army during the war in Afghanistan in 1979 and 1980, but was withdrawn several months after the initial invasion. In 1997, it was reported that, between 1993 and 1996, some 27 fire units of Krug and 349 missiles had been sold to Armenia. The SA-4 system has three major components: a 2P24 SPU (samokhodnaya puskovaya ustanovka) mobile launcher unit; a Ural-375 TZM (transportno-zaryazhayushchaya mashina) transporter-loader vehicle; and a 1S32 Pat Hand SSNR (samokhodnaya stantsiya navendeniya raket) mobile missile guidance station mounted on an AT-T chassis. A typical Ganef battery has one Pat Hand SSNR, three 2P24 SPUs and four TZMs. The Ganef launch vehicle carries no onboard radar. The guidance of the missiles depends on the Pat Hand radar. During wartime, a fourth SPU could be added to the unit. The battery also often has two 23-mm ZU-23 towed anti-aircraft guns and a technical support section. A missile launch battalion has three launch batteries and a Long Track early warning radar. A brigade has three battalions, an additional Long Track radar and a Thin Skin B height-finding radar. The Krug had several features that improved the survivability of the radar against anti-radiation missiles. In PI mode (ПИ) the system only briefly illuminated the target and the computer calculated it's prolonged path based on data received from early warning radars. After a longer passive period the main radar illuminated the calculated flight direction of the target for a few seconds and recalculate path of the target if necessary (if the distance between the calculated track and the actual position is greater than 7 km). As a result, the system emitted detectable signals only for a few seconds in every few minutes, making it difficult to jam or launch an anti-radar missile against Krug. The system was also able to tracking the target in full-passive automated PNS (ПНС) mode based on the data provided by "Long Track" mobile EWR via radio datalink. In this mode it was almost impossible to detect the Krug system until the moment of missile launch, because Krug did not emit radiation at all. In 3M mode (3m aka three-point) the krug track on jamming signal emitting container (e.g., AN/ALQ-99). So the jamming signal that supposed to protect the aircraft made it to a target.

MIM-23B Shahin Iranian Surface-to-Air Missile (SAM) System




Tiers:



Parent:

MIM-23 Hawk American Surface-to-Air Missile (SAM) System

Variants:

- **I-Hawk (Improved Hawk /Hawk B/MIM-23B):** This variant reached initial operating capability (IOC) in 1972. Upgrades from the original Hawk included solid-state electronics, factory certified and sealed missile round, all-altitude capability, digital automatic data processor for the information coordination central (ICC), improved solid-pro pellant rocket motor and a larger warhead.
- **Hawk Mobility Enhancement (HME):** This was jointly developed by Raytheon and the Dutch air force. It reduced number of vehicles in a Hawk firing unit from 14 trucks and trailers to seven, updated the Hawk launcher and simplified reloading.
- **Patriot /Hawk Interoperability:** This is a software upgrade to permitting Hawk missile platoons to receive targeting data from Patriot information coordination center (ICC). An April 1988 test simulated an interception of a short-range tactical missile by shooting down a missile traveling at Mach 2 and at an altitude of more than 25,000 ft (7,620 m).
- **Sparrow /Hawk Demonstration Program:** In 1985, Raytheon combined elements of two of its missile products into one system. The Sparrow /Hawk system replaced the three I-Hawks on the M192 launcher with eight AIM-7 Sparrow missiles (the original launcher had nine missiles).
- **NOAH (Norwegian Adapted Hawk):** INA
- **Iran MIM-23 Hawk variant:** Iran reportedly made several upgrades to MIM-23 missiles for the carriages of its F-14 Tomcats. Some were displayed in Tehran in September 1998.
- **Danish Enhanced Hawk (DEHAWK):** Introduced in December 2002, the Danish Enhanced Hawk (DEHAWK) was developed by Terma and Thales. After several years of delays, the program was handed over to the Danish Air Materiel Command.

System

Alternative Designation: MIM-23B Shahin, Shahin
Type: Medium-range surface-to-air missile.
Family: MIM-23 Hawk Family
Manufacturer: Raytheon Company
In Service: 1971-Present
Crew: eaINA
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: No

Note #1: The original Hawk has been phased out of NATO and U.S. service, although several countries have missiles in storage. All active Hawk missiles are the I-Hawk variant.

Note #2: Product Improvement Plan In 1973 the US Army started an extensive multi-phase Hawk PIP (Product Improvement Plan), mainly intended to improve and upgrade the numerous items of ground equipment. Phase I Phase I involved replacement of the CWAR with the AN/MPQ-55 Improved CWAR (ICWAR), and the upgrade of the AN/MPQ-50 PAR to Improved PAR (IPAR) configuration by the addition of a digital MTI (Moving Target Indicator). The first PIP Phase I systems were fielded between 1979 and 1981. Phase II Developed from 1978 and fielded between 1983 and 1986. upgraded the AN/MPQ-46 HPI to AN/MPQ-57 standard by replacing some of the vacuum tube based electronics with modern solid-state circuits, and added an optical TAS (Tracking Adjunct System). The TAS, designated OD-179/TVY, is an electro-optical (TV) tracking system that increases Hawk operability and survivability in a high-ECM environment. Phase III The PIP Phase III development was started in 1983, and was first fielded by U. S. forces in 1989. Phase III was a major upgrade which significantly enhanced the computer hardware and software for most components of the system, a new CWAR the AN/MPQ-62, added single-scan target detection capability, and upgraded the HPI to AN/MPQ-61 standard by addition of a Low-Altitude Simultaneous Hawk Engagement (LASHE) system. LASHE allows the Hawk system to counter saturation attacks by simultaneously intercepting multiple low-level targets. The ROR was phased out in Phase III Hawk units.

Dimensions

Length: m5.03

Diameter: m0.37

Wingspan: m1.21

Weight, Combat: kg640

Warhead Weight: kg54

Automotive

Engine Name: 1 x Aerojet dual-thrust solid-fuel rocket (M112 motor)

Engine Type: Solid-fuel rocket engine

Speed: Mach 2.7

Transporter: The Hawk missile is transported and launched from the M192 towed triple-missile launcher.

M112 Motor Burn Rate: a 5-second boost phase and a sustain phase of around 21 seconds.

M112 Motor Weight: 395 kg including 295 kg of propellant.

Communications

Note: See Fire Control

Missile System

Name: MIM-23B

Type: Semi-active Radar Homing Missile

Guidance: Semi-active Radar Homing

Length/Caliber: INA

Maximum Effective Range: km35

Minimum Effective Range: km1.5

Maximum Altitude: km18

Minimum Altitude: m30

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Max Rate of Fire: INA

Launcher: M192 towed triple-missile launcher

Reflector: low side lobe, high-gain plane antenna to reduce sensitivity to ground clutter

Warhead Type: Conventional high-explosive blast fragmentation

Warhead Weight: kg54

Warhead Fragments Speed: 2,000 meters per second

Warhead Fragments: 14,000 2-gram (0.071 oz) fragments

Warhead Fragments Arc: deg70

Fuze Type: radio frequency proximity and impact fuses

Speed: Mach 2.5

Guidance System: X-band CW monopulse semi-active radar seeker.

Kill Probability: 0.85 (Improvement from the MIM-23A)

Mean Time Between Failures (MTBF): 300-400 hours

Peak Velocity: 500 m/s

Maximum Maneuver Speed: 15 Gs

Fire Control

Note: The original Hawk system used 4 or in some models 6 radars: to detect (PAR and CWAR), to track (CWAR and HPIR) and to engage (HPIR and ROR) targets.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Digital Data Processing Central Information Coordinator: Yes, for Target Processing, Threat Ordering, and Intercept Evaluation.

↳*Radar #1*

Name: AN/MPQ-50 (Improved Hawk to Phase III)

Type: PAR Pulse Acquisition Radar

Digital MTI (Moving Target Indicator): Yes

Frequency: 500 to 1,000 MHz

Band: C-Band

Peak Operating Power: 1,000 watts

High PRF Range: 104 km

Low PRF Range: 96 km

↳*Radar #2*

Name: AN/MPQ-48 (Improved Hawk)

Type: CWAR Continuous Wave Acquisition Radar

Power Rating: Watts400

Frequency: 10 GHz (X-Band)

Range: 69 km (43 mi) (CW) to 63 km (39 mi) (FM) versus 3 m2 (32 sq ft) target.

↳*Radar #3*

Name: AN/MPQ-46 (Improved Hawk – Phase I)

Type: HPIR High Power Illuminating Radar

Power Output: Watts125

Operating GHz Band: 10-20 GHz J band

Range: 99 km (62 mi) (high PRF) to 93 km (58 mi) (low PRF) versus 3 m2 (32 sq ft) target.

↳*Radar #4*

Name: AN/MPQ-51 (Improved Hawk – Phase II)

Type: ROR Range Only Radar

Frequency: 15.5-17.5 GHz)

Pusle Radar: Yes

Power Output: 120 kW

Pusle Length: 0.6 µs

Pulse Repetition Frequency: 1600 Hz

Range: 83 km (52 mi) versus 3 m2 (32 sq ft) target.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Raytheon MIM-23 Hawk (or HAWK: Homing All the Way Killer) is an American medium-range surface-to-air missile. Iran reportedly made several upgrades to MIM-23 missiles for the carriages of its F-14 Tomcats. Some were displayed in Tehran in September 1998. The Iranian Air Force has its own version of the MIM-23 Hawk, the Shahin, which it claims to be under production. A typical Phase-III MIM-23B Hawk battery consists of: 1 × PAR: Pulse Acquisition Radar—a search radar with a 20 (+/−2) rpm rotation, for high/medium altitude target detection. 1 × CWAR: Continuous Wave Acquisition Radar—a search doppler radar with a 20 (+/−2) rpm rotation, for low altitude target detection. 2 × HIPIR: HIgh Power Illuminator doppler Radar—target tracking, illumination and missile guidance. 1 × FDC: Fire Direction Center 1 × IFF: Identification Friend or Foe Transceiver 6 × DLN: Digital Launchers with 18 missiles. 6 × MEP-816: Generators 60KW (400 Hz) each. 12 × M-390: Missile transport pallets with 36 missiles 3 × M-501: Missile loading tractors. 1 × [bucket loader]

Iron Dome Israeli Missile Defense System





Tiers:



Variants:

- **C-Dome:** This is a proposed naval variant of the Iron Dome system.

System

Alternative Designation: Iron Dome
Type: The Iron Dome is a mobile short-range defense system designed to shoot down rockets, artillery and, potentially, mortar rounds in all weather conditions. It is intended to serve as part of a two-tiered missile defense system along with the Stunner (David's Sling) interceptor system. The Iron Dome is aimed at defeating Kassam and Katyusha rockets fired by militants from the Gaza Strip and Lebanon.
Crew: INA
Chassis: Components including the launcher and battle management shelter are based on flatracks. These are transported by heavy military trucks, fitted with palletized loading systems. Radar is also carried on a flatbed truck and can be dismounted prior to operation. So all components can be picked-up, transported and unloaded in a different site by heavy military trucks. It seems that all components of the Iron Dome system can be used while still on the trucks.
Displacement Time: INA
Emplacement Time: INA
Note #1: A battery of the Iron Dome consists of 3 to 4 launchers, radar, and battle management and missiles control unit.
Note #2: The system can operate day and night and in adverse weather conditions.

Dimensions

Length: INA
Width: INA
Height: INA

Weight, Combat: INA

Automotive

Note: Components including the launcher and battle management shelter are based on flatracks. These are transported by heavy military trucks, fitted with palletized loading systems. Radar is also carried on a flatbed truck and can be dismounted prior to operation. So all components can be picked-up, transported and unloaded in a different site by heavy military trucks. It seems that all components of the Iron Dome system can be used while still on the trucks

Missile System

Name: Tamir interceptor missiles

Type: Surface-to-Air Missile

Basic Load: 20 x Tamir interceptor missiles

Length: 3 m

Diameter: 0.16 m

Weight: 90 kg

Steering Fins: Yes

Wahread Type: Fragmentation

Warhead Weight: INA

Estimate Effectiveness: 75 to 95%

Missile Reload Vehicle: Reload missiles are carried by another military truck, fitted with a crane.

Note: The launcher unit is deployed and operated remotely via a secure wireless connection.

Fire Control and Radar Systems

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: INA

Battle Management System: A battery of the Iron Dome consists of 3 to 4 launchers, radar, and battle management and missiles control unit. Components including the launcher and battle management shelter are based on flatracks.

↳*Radar*

Name: INA

Note: Radar of the Iron Dome detects targets and monitors their trajectory. It is deployed and operated remotely via a secure wireless connection. This missile defense system also acquires preliminary information from other Israeli radars.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: No

Smoke Equipment: INA

Notes:

Iron Dome (Hebrew: כִּפַּת בַּרְזֶל, kippat barzel) is a mobile all-weather air defense system developed by Rafael Advanced Defense Systems and Israel Aerospace Industries. The system is designed to intercept and destroy short-range rockets and artillery shells fired from distances of 4 kilometres (2.5 mi) to 70 kilometres (43 mi) away and whose trajectory would take them to an Israeli populated area. Israel hopes to increase the range of Iron Dome's interceptions, from the current maximum of 70 kilometres (43 mi) to 250 kilometres (160 mi) and make it more versatile so that it could intercept rockets coming from two directions simultaneously. Iron Dome was declared operational and initially deployed on 27 March 2011 near Beersheba. On 7 April 2011, the system successfully intercepted a BM-21 Grad launched from Gaza for the first time. On 10 March 2012, The Jerusalem Post reported that the system shot down 90% of rockets launched from Gaza that would have landed in populated areas. By November 2012, official statements indicated that it had intercepted over 400 rockets. By late October 2014, the Iron Dome systems had intercepted over 1,200 rockets. In addition to their land-based deployment, Iron Dome batteries will in the future be deployed at sea, where they will protect off-shore gas platforms in conjunction with Israel's Barak 8 missile system. Iron Dome is part of a future multi-tiered missile defense system that Israel is developing, which includes Arrow 2, Arrow 3, Iron Beam, Barak 8 and David's Sling. The system is designed to counter short-range rockets and 155 mm artillery shells with a range of up to 70 kilometers. According to its manufacturer, Iron Dome will operate day and night, under adverse weather conditions, and can respond to multiple threats simultaneously. Iron Dome has three central components: *Detection & Tracking Radar: the radar system is built by Elta, an Israeli defense company and subsidiary of Israel Aerospace Industries, and by the IDF. *Battle Management & Weapon Control (BMC): the control center is built for Rafael by mPrest Systems, an Israeli software company. *Missile Firing Unit: the unit launches the Tamir interceptor missile, equipped with electro-optic sensors and several steering fins for high maneuverability. The missile is built by Rafael. The system's radar is referred to as EL/M-2084. It detects the rocket's launch and tracks its trajectory. The BMC calculates the impact point according to the reported data, and uses this information to determine whether the target constitutes a threat to a designated area. Only when that threat is determined, is an interceptor missile fired to destroy the incoming rocket before it reaches the predicted impact area.

Khordad-3 Iranian Medium-Range Surface-to-Air Missile (SAM) System



Tiers:



Parent:

Ra'ad (Thunder) Iranian Surface-to-Air Missile (SAM) System

Variants:

- **3rd Khordad:** The 3rd Khordad is the most advanced version of the Ra'ad air defense system. It has the greatest reported range of any of the variants.
- **Tabas:** The Tabas is a transporter-erector-launcher radar variant of the Ra'ad fitted with a radar similar to the "Fire Dome" radar fitted to the Buk-M1. It can reportedly only engage a single target at a time, while providing guidance to two missiles.
- **Alam al Hoda:** The Alam al Hoda is a transporter-erector-launcher in the Ra'ad family. The TEL can carry three missiles.

System

Alternative Designation: Khordad-3, 3-Khordad, Ra'ad 3
Type: Surface-to-Air Missile (SAM) System
Family: Ra'ad
Manufacturer: IRGC aerospace force
In Service: 2012-Present
Crew: eaINA.
Chassis: MZKT-6922
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: No
Note: A 3rd Khordad battalion consists of four batteries, each consisting of one 3rd Khordad TELARs linked to two Alam al Hoda TELs for a total of four TELARS and eight TELs. Overall air surveillance is achieved with a Bashir 3D phased array surveillance radar operating in the S-band with a range of 190 mi (350 km).

Dimensions (Chassis: MZKT-6922)

Length: m7.5
Width: m3.3

Height: m5.1

Weight, Combat: kgINA

Ground Pressure: kg/mINA

Automotive (Chassis: MZKT-6922)

Engine Name: YaMZ-7513.10-02

Engine Type: turbocharged 8-cylinder diesel

Engine Power: hp420

Cruising Range: km1,000

Speed, Maximum Road: km/h80

Speed, Off-Road: km/h30

Speed Maximum Swim: Not Amphibious

Fording Depth: mINA

Fuel Endurance: km1,000

Communications

Primary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: INA

↳*Missile Set #1*

Name: Taer-2

Type: Surface-to-Air Missile

Basic Load: ea3

Engine: Solid Fuel Rocket

Maximum Effective Range: km50

Minimum Effective Range: m1,000

Ceiling: km25

Speed: Mach 3.5

Guidance System: Radar

↳*Missile Set #2*

Name: Sayyad-2C

Type: Surface-to-Air Missile

Basic Load: ea3

Engine: Solid Fuel Rocket

Maximum Effective Range: km75

Minimum Effective Range: mINA

Ceiling: km30

Speed: Mach 4.5

Guidance System: Radar

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Camera Optics Range: km80

Note: The system can engage two targets at a time.

↳*Radar #1*

Name: Alam-Al-Hoodi Air Defense System

Type: Long-range radar

Band: VHF

Range: INA

Number of Targets System can Track: INA

Note: Very little is written about the radar systems of the Ra'ad.

↳*Radar #2*

Name: Bashir 3D array surveillance radar

Type: Air surveillance

Band: S-Band

Maximum Effective Range: km350

Protection

Hull Armor: No

Turret Armor: No

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: Thunderbolt Air Defense Systems

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The 3rd Khordad is the most advanced version of the Ra'ad air defense system. It has the greatest reported range of any of the variants. Khordad-3 equipped with Opt-Electronic System and Taer-2 Missile and Sayyad-2C Missile which also known as Khordad-3 Missile System. The technical data of the individual Raad versions are based on official Iranian publications. The extent to which the information can be accurate is difficult to verify.

S-125 Neva/Pechora (SA-3 Goa) Russian 6x6 Surface-to-Air Missile System





Tiers:



Variants:

- **SA-3A: :** Two-rail launcher. Missiles without interstage fins.
- **SA-3B (GOA MOD 1):** SA-3B (GOA Mod 1): two-rail launcher. Missiles have inter-stage fins. SA-3C: four-rail launcher.
- **NEWA SC:** Polish modernized system
- **PECHORA-M :** Upgrade fielded in 1994 and used in at least 3 countries. It has digitized FCS, and laser/EO/thermal auto-tracker for use without a radar. It added the Kasta-2E2 TA EW radar.
- **PECHORA-2/UNV MODEL 1999 :** Further upgrade with truck-mounted low blow FC radar), tracks 2 targets. It is resistant to aircraft ECM.
- **PECHORA-2M:** Russian mobile variant of -2, with launcher mounted on a truck chassis modified into a transporter-erector-launcher (TEL). Other changes: the 2-rail launcher has a storage compartment underneath for support and test equipment. Navigation and automated fire control terminal are mounted onboard. The cab has room for two or three crew members. The latest missile is 5V27DE. The trailer-mounted unv model 1999 FC radar (up to 300 m away) can emplace and displace in 5 minutes or less. This system has been

System

Alternative Designation: NICKNAMES SA-3 Goa (NATO reporting name for S-125) SA-N-1 Goa (NATO reporting name for Volna) M-1 Volna (naval version of S-125) Neva (Soviet service nickname) Pechora (export model nickname) ItO 79 (Finnish service)
Type: Russian Surface-to-Air Missile System
Manufacturer: JSC Defense Systems (Pechora-M)
In Service: 1961-Present
Crew:
Chassis: The S-125 is normally transported from battalion storage areas on modified ZIL-131 (6 x 6) or ZIL-157 (6 x 6) trucks and loaded onto the launchers.
Emplacement Time: Approximately one minute is required to load the missiles onto the launch rails, but nearly an hour is required between missile launches due to missile preparation, truck transit and other reloading procedures.
Displacement Time: See Emplacement
Target Types: FW, heli, CM; Also ASMs, UAVs Pechora-M

Dimensions (Chassis: ZIL-131)

Length: m7.04
Width: m2.49
Height, Cab: m2.49

Height, Transport Body: m2.97

Wheelbase: m3.30

Curb Weight: kg6,700

Automotive (Chassis: ZIL-131)

Engine Name: INA

Engine Type: V8 gasoline (carburetor)

Engine Power: INA

Maximum Road Distance: INA

Maximum Speed: km/h80

Seating Capacity: ea3

Payload: 5000 kg plus trailer 5000 kg (on road), or 3,500 kg plus trailer 4000 kg off road.

Main Weapon System

Note: The S-125 is fired from trainable launchers which are normally fixed, but can be relocated. The crew loads the missiles with the aid of a conveyor onto the ground-mounted, trainable launcher for firing, with both twin and quadruple launchers in use. A pair of missiles are carried in tandem on a modified truck or tracked vehicle. The S-125 is normally transported from battalion storage areas on modified ZIL-131 (6 x 6) or ZIL-157 (6 x 6) trucks and loaded onto the launchers. Approximately one minute is required to load the missiles onto the launch rails, but nearly an hour is required between missile launches due to missile preparation, truck transit and other reloading procedures.

↳*Missile Launcher*

Description: Towed twin or quad-rail launcher

Displacement Time : min100; 30 Pechora-M

Reaction Time : sec8; 2-3 Pechora-M

Reload Time : min50 (quad launcher)

↳*Missile (Option 1)*

Name: V-600 (5V24)

Type: SAM

Length : mm6.1

Diameter : mm550.0

Propulsion : Solid fuel booster

Altitude, Maximum : m18,300.0

Altitude, Minimum : m20, 7.5 blast radius

Combat Load : rds2 or 4

Fuze Type: Proximity RF, 20 m detection

Guidance: Command RF

Kill Radius : m12.5

Probability of Hit: PCT70 FW, 70 heli; 80 Pechora-M, -2M

Range, Maximum : m 25,000; 28,000 Pechora-2A

Range, Minimum : m 2400.0

Simultaneous Missiles: 2 per target

Speed : km/h650-1,150

Warhead Type: Fragmenting Rod-HE

Velocity : km/h4321.0

Weight: kg946.0

↳*Missile (Option 2)*

Name: V-601 (or 5V27)

Type: SAM

Length: 6.09 m

Diameter: m0.375

Wing Span: 2.2 m

Weight: kg953

Warhead Weight: 70 kg warhead containing 33 kg of HE and 4,500 fragments

Propellant: Solid propellant rocket motor

Minimum Range: km3.5

Maximum Range: km35

Intercept Altitudes: 00 m and 18 km

Fire Control System

↳*Radar #1*

Name: FLAT FACE (P-15) Radar

Function: Target Acquisition

Range: 200-250 km

Frequency: C band (UHF)

Associated Weapon System: SA_3 GOA possibly SA-8 GECKO SAM, LOW BLOW missile control radar

Number of Missiles: Can guide three missiles simultaneosly

Power: 380kw

PRF: 200-700pps

Vehicle Mount: Long-range surveillance and target acquisition is handled by the van-mounted P-15 FLAT FACE) radar.

Parabolic Reflectors: Two eliptical parabolic reflectors measuring 11x5.5 m. Reflectors arranged one above the other on van roof.

Note #1: The P-15 radar has been replaced in many S-125 units by the P-15M SQUAT EYE radar.

Note #2: Target data generated by these tracking radars is passed to the battalion's LOW BLOW trailer-mounted fire control radar.

↳*Radar #2*

Name: LOW BLOW

Function: A Fire Control, Trk/FC, and Missile Guidance Radar

Frequency, Fire Control: I band

Range, Fire Control: km40

Scan, Fire Control: Scan (trough) 16HZ

Frequency, Trk/FC: I band

Range, Trk/FC: km40-85

Scan, Trk/FC: Scan (Para) 25HZ

Frequency, Missile Guidance: D band

Range, Missile Guidance: km29

Mount: Four-wheeled trailer-mounted

Parabolic Dishes: Two scanning parabolic dishes one above the other

Associated Weapon System: SA-3 GOA SAM, FLAT FACE, SQUAT EYE acquisition radar.

↳*Radar #3*

Name: SIDE NET (PRV-11)

Function: Height Radar

Frequency: E band, 2.7 GHz

Pulse Repetition Time (PRT): 3 and 1,3 ms

Pulsewidth: 3 and 1.5 µs

Pulse Repetition Frequency (PRF): 330 and 730 Hz

Peak Power: 1.2 MW

Average Power: 1.3 kW

Maximum Range: km28

Maximum Altitude: km32

Associated Weeapon System: SA-2/3/5

↳*Radar Upgrade (SQUAT EYE would replace the FLAT FACE (P-15 Radar)*

Name: SQUAT EYE (P-15M(2))

Function: Target Acquisition

Maximum Range: km128

Frequency: C-band

Power: 380kw

Associated Weapon System: SA-3/5

Protection

Hull Armor: INA

Turret Armor: INA

Notes:

The S-125 Neva/Pechora, NATO reporting name SA-3 Goa) Soviet surface-to-air missile system was designed by Aleksei Isaev to complement the S-25 and S-75. It has a shorter effective range and lower engagement altitude than either of its predecessors and also flies slower, but due to its two-stage design it is more effective against more maneuverable targets. It is also able to engage lower flying targets than the previous systems, and being more modern it is much more resistant to ECM than the S-75. The 5V24 (V-600) missiles reach around Mach 3 to 3.5 in flight, both stages powered by solid fuel rocket motors. The S-125, like the S-75, uses radio command guidance. The launchers are accompanied by a command building or truck and three primary radar systems: * P-15 "Flat Face" or P-15M(2) "Squat Eye" 380 kW C-band target acquisition radar (also used by the SA-6 and SA-8, range 250 km/155 miles) * SNR-125 "Low Blow" 250 kW I/D-band tracking, fire control and guidance radar (range 40 km/25 miles, second mode 80 km/50 miles) * PRV-11 "Side Net" E-band height finder (also used by SA-2, SA-4 and SA-5, range 28 km/17 miles, max height 32 km/105,000 ft) The S-125 system uses 2 different missile versions. The V-600 (or 5V24) had the smallest warhead with only 60 kg of high explosive. It had a range of about 15 km. The later version is named V-601 (or 5V27). It has a length of 6.09 m, a wing span of 2.2 m and a body diameter of 0.375 m. This missile weighs 953 kg at launch, and has a 70 kg warhead containing 33 kg of HE and 4,500 fragments. The minimum range is 3.5 km, and the maximum is 35 km (with the Pechora 2A). The intercept altitudes are between 100 m and 18 km. The S-125M (1970) system uses 5V27. The intercept altitudes are between 20 m and 14 km. The minimum range is 2.5 km, and the maximum is 22 km. The S-125M1 (1978) system uses 5V27D. In the early 1980s established for each system 1-2 radar simulator (against anti radar missiles assigned). The S-125 is somewhat mobile, an improvement over the S-75 system. The missiles are typically deployed on fixed turrets containing two or four but can be carried ready-to-fire on ZIL trucks in pairs. Reloading the fixed launchers takes a few minutes.

Type 03 (Chu-SAM) Japanese 300mm Medium-Range Surface-to-Air Missile System





Tiers:



Variants:

- **Chu-SAM Kai:** This is an upgraded variant with improved sensors and networking features. It has greater range and can defeat more complex threats, such as cruise and air-to-ground missiles.

System

Alternative Designation: Type 03; Chu-SAM; SAM-4
Type: Medium-Range Surface-to-Air Missile System
Configuration: 8x8
Manufacturer: Mitsubishi Heavy Industries
In Service: 2003-Present
Crew: INA
Chassis: The SAM's vehicle chassis is based on the Kato Works Ltd/Mitsubishi Heavy Industries NK series heavy crane truck.
Displacement Time: INA
Emplacement Time: INA
Fire on the Move: No
Note: The system as a whole is based on 8x8 cross country trucks, including command center, radar unit, launcher and transloader.

Dimensions

Chassis Length: INA
Chassis Width: INA
Chassis Height: INA
Chassis Weight, Combat: INA
Ground Pressure: INA

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth: INA

Missile System

Name: Type 03 Missile

Type: Medium-Range Surface-to-Air Missile

Length: 4.90 m

Diameter: 0.33 m

Weight: 570 kg

Engine: 1 x single-stage solid rocket

Speed: Mach 2.5

Range: 50 km

Altitude: 10,000 m

Warhead: high-explosive fragmentation w/proximity fuze

Guidance System: inertial w/command updates and active radar terminal seeker

Fire Control and Radar Systems

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

↳*Radar*

Name: INA

Type: Phased Array Antenna

Maximum Number of Targets to Track: tracks up to 100 targets

Maximum Number of Targets to Target: 12

Note: A data link guides the missile towards a predicted area of intercept where the missile's own seeker takes over. The active radar homing seeker on the missile is derived from the Type 99 air to air missile.

Protection

Hull Armor: The trucks are not armored and the system is not protected in any way.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Type 03 Medium-Range Surface-to-Air Missile (03□□□□□□□□□□, maru-san-shiki-chu-kyori-chi-tai-kuu-yuudou-dan) or SAM-4 or Chu-SAM (□SAM, Chū-Samu) is a Japanese developed surface-to-air missile system currently in service with the Japan Army as JGSDF. The SAM's vehicle chassis is based on the Kato Works Ltd/Mitsubishi Heavy Industries NK series heavy crane truck. It uses a state-of-the-art active electronically scanned array radar. The Chu-SAM air defense system is based on 8×8 cross country unarmored trucks, including a command center, radar unit, launcher, and transloader, with each unit equipped with six missiles that travel at Mach 2.5. The system can track up to 100 targets simultaneously and target 12 at the same time, engaging fighter jets, helicopters, and cruise missiles.

Tabas Iranian Medium-Range Air Defense Missile System





Tiers:



Variants:

- **Sevom Khordad:** Sevom Khordad (also known as 3rd Khordad) is a further improved version of the Tabas. It uses an active phased array radar. It is capable of reaching targets within range of up to 105 km and at an altitude of up to 30 km altitude. This system was officially displayed in 2016. By 2019 it was the most advanced and powerful Iranian medium-range air defense missile system.

System

Alternative Designation: Tabas

Type: Medium-Range Air Defense Missile System

Crew: ea3

Chassis: It was officially displayed in 2016. It uses a 6x6 wheeled chassis, based on IVECO commercial truck, though with many design changes.

Displacement Time: INA

Emplacement Time: INA

Note #1: A battery contains 1 Transporter Erector Launcher and Radar (TELAR) and 2 Transporter Erector Launcher (TEL) vehicles. These are based on a heavily modified IVECO 6x6 commercial truck chassis. Each vehicle carrier 3 missiles. So a single battery has 9 ready-to-fire missiles. A battalion has 4 batteries with 4 TELARs and 8 TELs and can engage multiple targets simultaneously

Note #2: Each battalion additionally includes a Bashir S-band 3D phased array surveillance radar which has a detection range of 350 km. The battalion also has a command and control (C2) unit, based on IVECO truck chassis. The C2 unit provides communication between Tabas batteries. Furthermore, the C2 unit can connect other air defense systems of the Raad family, including the older Raad and further improved Sevom Khordad, into a single air defense network. This allows to cover large area and targets can be engaged with a wide range of missiles from the cheapest Taer-1 missiles to the most capable Taer-2s. This adds the capability of facing different types of threats with different types of interceptors. In case of heavy jamming when even the X-band engagement radar can’t handle its duty, the C2 unit can provide an additional data link, connecting the system to electro-optical engagement systems of Raad batteries, in order to guide missiles toward targets.

Dimensions

Length: 7.5 m

Width: 3.3 m

Height: 5.1 m

Weight, Combat: INA

Automotive

Engine Name: IVECO

Engine Type: Diesel

Engine Power: INA

Cruising Range: km500

Speed, Maximum Road: 65 km/h

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Missile System

Missile Name: This system uses Taer-1 and Taer-2 missiles

Type: Surface-to-Air Missile

Missile Diameter: INA

Missile Length: INA

Missile Maximum Range: 75 km

Missile Maximum Altitude: 25 km

Note #1: This air defense system can engage aircraft and helicopters. Most likely that Tabas can also engage ballistic missiles, cruise missiles, anti-radiation missiles, smart bombs and unmanned aerial vehicles.

Note #2: There is very little unclassified information online about the Tabas.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Note: It can reportedly only engage a single target at a time, while providing guidance to two missiles.

↳*Radar*

Name: Bashir S-band 3D phased array surveillance radar

Type: Phased Array Radar

Frequency/Band: S-Band

Range: 350 km

Note: Bashir Radar Bashir radar systemThis radar was seen at the 2017 IRGC Aerospace Force Exhibition, and then images of its close-up were displayed in the national media. The Bashir radar has a flat antenna based on a base that has a 360 degree rotation and looks like a phased array type. In fact, the Bashir radar scans the environment on the horizon with the mechanical rotation of the antenna, which is a common structure in many radars. In addition, in advanced radars, the ambient scanning is carried out in altitude with a change in the angle of the waves, which is also commonly used in the Bashir radar. The antenna shape also shows that the radar uses smaller wavelengths such as L and S bands that have a higher accuracy in determining the position of targets compared to the HF / VHF / UHF bands,

but still to search for and track radar targets in and out. Medium and long rackets are used. In the Bashir radar, similar to the overall design of the radar, its antenna and its base, and the location and shape of the antenna of the friend recognition system from the enemy, there are significant differences in these parts and the lateral components as compared to similar radars. The integrated antenna level, the difference in the number of antenna elements in the IFF system and the 3 components mounted on the back and on the sides of the antenna are among these differences, which indicate the native design of the Bashir radar, while modeling the successful and successful foreign radars.

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Tabas missile radar system Tabas radar systemThe Tabas missile defense system has been designed and traced for destruction targets in the medium range and medium to high. The radar of this system is flat-panel, and it seems that it has the ability to change the mechanical angle in 2 horizontal and vertical directions. Although Tabas is designed to achieve less costly systems than the 3rd Khordad missile system, it has fewer targets for fighting, but due to the firing of missiles from the TAERER-2 family by the Tabas radar, it is naturally high and at least about 100 km is estimated.

Ra'ad (Thunder- 1) Iranian Medium-Range Surface-to-Air Missile (SAM) System





Tiers:



Variants:

- **3rd Khordad:** The 3rd Khordad is the most advanced version of the Ra'ad air defense system. It has the greatest reported range of any of the variants.
- **Tabas:** The Tabas is a transporter-erector-launcher radar variant of the Ra'ad fitted with a radar similar to the "Fire Dome" radar fitted to the Buk-M1. It can reportedly only engage a single target at a time, while providing guidance to two missiles.
- **Alam al Hoda:** The Alam al Hoda is a transporter-erector-launcher in the Ra'ad family. The TEL can carry three missiles.

System

Alternative Designation: Ra'ad, Thunder, Ra'd, Raad
Type: Surface-to-Air Missile (SAM) System
Family: Ra'ad
Manufacturer: IRGC aerospace force
In Service: 2012-Present
Crew: eaINA
Chassis: MZKT-6922
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: No
Note #1: A battery contains 1 Transporter Erector Launcher and Radar (TELAR) and 2 Transporter Erector Launcher (TEL) vehicles. These are based on a heavily modified IVECO 6x6 commercial truck chassis. Though there was also a version based on a standard commercial truck chassis, sometimes referred as the Raad-2. Each vehicle carrier 3 missiles. So a single battery has 9 ready-to-fire missiles. A battalion has 4 batteries with 4 TELARs and 8 TELs and can engage multiple targets simultaneously.
Note #2: Each battalion additionally includes a Bashir S-band 3D phased array surveillance radar which has a detection range of 350 km. The battalion also has a command and control (C2) unit, based on IVECO truck chassis. The C2 unit provides communication between Raad batteries. Furthermore, the C2 unit can connect other air defense systems of the Raad family, including the improved Tabas and further improved Sevom Khordad, into a single air defense network. This allows to cover large area and targets can be engaged with a wide range of missiles from the cheapest Taer-1 missiles to the most capable Taer-2s. This adds the capability of facing different types of threats with different types of interceptors. In case of heavy jamming when even the X-band engagement radar can’t handle its duty, the C2 unit can provide an additional data link, connecting the system to electro-optical engagement systems of Raad batteries, in order to guide missiles toward

targets.

Dimensions (Chassis: MZKT-6922)

Length: m7.5

Width: m3.3

Height: m5.1

Weight, Combat: kgINA

Ground Pressure: kg/mINA

Automotive (Chassis: MZKT-6922)

Engine Name: YaMZ-7513.10-02

Engine Type: turbocharged 8-cylinder diesel

Engine Power: hp420

Cruising Range: km1,000

Speed, Maximum Road: km/h80

Speed, Off-Road: km/h30

Speed Maximum Swim: Not Amphibious

Fording Depth: mINA

Fuel Endurance: km1,000

Communications

Primary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: INA

↳*Missile*

Name: Taer-2

Type: Surface-to-Air Missile

Basic Load: ea3

Engine: Solid Fuel Rocket

Maximum Effective Range: km50

Minimum Effective Range: m1,000

Ceiling: km25

Speed: Mach 3.5

Guidance System:

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Camera Optics Range: km80

Note: Fire control radars for accurately determining the position of the target in the sky require high resolution and high resolution. Hence, due to the inherent error of several hundred to several hundred meters, the VHF / HF band radar detects positions in air defense sets of these radars only for The initial identification was used and the fire control task was delivered to radar in bands such as x. On the other hand, the range of these radars falls sharply against aircraft with low radar cross-sections.

↳*Radar*

Name: Alam-Al-Hoodi Air Defense System

Type: Long-range radar

Band: VHF

Range: INA

Number of Targets System can Track: INA

Note #1: The Alam-Al-Hoodi Air Defense System utilizes a long-range radar in the VHF band (the ability of this frequency spectrum to detect radar cross-sectional targets is very low), as well as parts of the Thunderbolt air defense systems. Fire control radars for accurately determining the position of the target in the sky require high resolution and high resolution. Hence, due to the inherent error of several hundred to several hundred meters, the VHF / HF band radar detects positions in air defense sets of these radars only for The initial identification was used and the fire control task was delivered to radar in bands such as x. On the other hand, the range of these radars falls sharply against aircraft with low radar cross-sections. Previously, activities have been seen to use VHF radars for initial detection and transfer of data with lower frequency radars or other types of sensors to control fire and provide practical solutions to counteract the world's most secret targets. But according to information published at the IRGC Aerospace Force, the radar of Alam-al-Hoda (the main radar of the Al-Hoda Air Defense System) is engaged in the discovery, tracing, and directing of fire against targets, which, in view of the inherent problems of the frequency band, Determining the exact location of the goals is unprecedented. Therefore, Irans experts must find a way to overcome this problem. The radar consists of two main horizontal and vertical sections, which, with its large length of transport, can be folded onto a two-axle trailer, and its displacement capabilities are faster and faster. It should be noted that in general, fuzzy arrays have the ability to quickly scan the environment, have high stability against electronic warfare, and are able to detect and track a large number of targets. Obviously, as the next target of the Thunderbolt air defense systems is reaching the level of capabilities of systems such as the S-300, other components of this defense suite should also be developed within Iran. Therefore, it can be concluded that the Radar of Al-Hadi as an Iranian example is one of the important species of the Nebo radar, a radar explored as similar to the radars of Bashir and Ghadir and Aliam, each one with the ingenuity and ingenuity of young engineers. Specialists of the Iranian lines have found differences with similar or similar foreign samples forming a modern and integrated set of national air defense. While the provision of airborne radars and air defense complexes that are in full compliance with indigenous needs is today much more difficult than before, the internal construction of these radars and missiles required not only to meet the basic needs of defense. But on the way to cover more and more of all the necessary areas and, in the long run, will replace the existing systems with modern and native products.

Note #2: Each battalion additionally includes a Bashir S-band 3D phased array surveillance radar which has a detection range of 350 km. The battalion also has a command and control (C2) unit, based on IVECO truck chassis. The C2 unit provides communication between Raad batteries. Furthermore, the C2 unit can connect other air defense systems of the Raad family, including the improved Tabas and further improved Sevom Khordad, into a single air defense network. This

allows to cover large area and targets can be engaged with a wide range of missiles from the cheapest Taer-1 missiles to the most capable Taer-2s. This adds the capability of facing different types of threats with different types of interceptors. In case of heavy jamming when even the X-band engagement radar can’t handle its duty, the C2 unit can provide an additional data link, connecting the system to electro-optical engagement systems of Raad batteries, in order to guide missiles toward targets.

Protection

Hull Armor: No

Turret Armor: No

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: Thunderbolt Air Defense Systems

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Raad or Ra'd (Persian: رعد, meaning "thunder") is an Iranian aerial defence system deployed in September 2012. The system is designed to enhance Iran's capabilities in terms of defense, and as a partner to Bavar 373 air defense system. According to Fars news agency the Raad is designed to confront fighter jets, cruise missiles, smart bombs, helicopters and drones. The system is also designed specially for US fighters. The system is equipped with "Taer" (Bird) missiles, which can trace and hit targets in ranges up to 50 km and in altitudes from 25 to 27 km (75,000 feet), Ra'd is ranked as a mid-range radar system and air defense system. The Raad 1 mounts a turret appearing to be identical to the Russian 2S1 122mm self propelled howitzer, but on the chassis of the Iranian Boragh APC, a variant of the Chinese WZ-501/503 series, themselves copies of the Russian BMP-1. The artillery piece used was either the standard Russian type 122mm howitzer, manufactured under the designation HM51L by the Armaments Industries Group of the Iranian Defense Industries Organization, or the improved HM51 howitzer. As of 2008 Iran was the sole operator of the system, maintaining a mixed force of upgraded 2S1 and Raad 1 self-propelled howitzers. Iran first announced the "Thunder"-1 type 122mm self-propelled howitzer developed by the Hadid Artillery Factory in early 2002. The chassis was under the responsibility of the Shahid Kladuz Industrial Complex (SKDIC) of the DIO. The combat system is partly handled by the Hadid Artillery Factory. The shape of the "Thunder"-1 self-propelled howitzer is very similar to that of the Soviet 2S1 "Dianzhu" 122mm self-propelled howitzer. Therefore, Iranian military personnel would refer to the 2S1 self-propelled howitzer when developing the gun. The "Thunder"-1 self-propelled howitzer adopts the layout commonly used by similar self-propelled artillery, that is, the cockpit and power cabin are arranged at the front of the vehicle body, the rear is a combat cabin, and the turret is mounted above the combat cabin. The gun features an all-welded steel structure with a maximum armor thickness of 17 mm to withstand light weapons and shell fragments. The chassis of the "Thunder"-1 self-propelled howitzer was improved from the chassis of the Iranian "Bolager" infantry fighting vehicle. The main change was that the body at the rear of the cockpit was raised. The "Thunder"-1 self-propelled howitzer is 6.65 meters long and 3.25 meters wide. It has 4 crew members and 17.5 tons of combat weight. The power unit is the air-cooled BF-8L513 four-stroke eight-cylinder turbocharged diesel engine from Germany Deutz. The maximum power is 231.5 kW. Manual transmission, 2 forward gears and 1 reverse gear, the suspension device is torsion bar type, there are 6 hanging rubber load wheels on each side of the vehicle, the driving wheel is in front, the induction wheel is behind, and there is a supporting pulley in the middle. The maximum speed is 65 km / h, the maximum off-road speed is 4 5 km / h, and the maximum stroke is 400 km. The chassis of the "Thunder"-1 self-propelled howitzer was improved from the chassis of the Iranian "BORAQ" infantry fighting vehicle. The Soviet 2S1 "Dianzhu" 122mm self-propelled howitzer and the Iranian "Thunder"-1 self-propelled howitzer are very similar in appearance, the biggest difference is the use of different chassis. The "Thunder"-1 self-propelled howitzer is equipped with a fully enclosed 3-person turret. The top of the turret is equipped with optical equipment for direct shooting and inter-shot shooting. The turret is equipped with a HM-51 type with a diameter of 122 mm and a diameter of 122 mm. Artillery (imitation of the Soviet 2A31 122mm howitzer), when the marching artillery is placed in the front of the truck body and locked by the fastener. The high-low range of the HM-51 gun is -3° to +72°, the muzzle velocity is 721 m/s, and the range is 15.2 km when the ZBK-13 propellant is used to launch the 122 mm high-explosive grenade. The life of the gun can reach 3000 rounds. The gun is equipped with an automatic loading machine with a maximum firing rate of 4-5 rounds. The gun can also be loaded when shooting at a large elevation angle. The shell carries 35 rounds. The types of shells include grenades, flares, and smoke bombs. The auxiliary weapon of the Thunder "-1 type self-propelled howitzer is a 12.7 mm high-altitude machine gun.

9K37 Buk (SA-11 Gadfly) Russian Medium-Range Surface-to-Air Missile System



Tiers:



Variants:

- **SA-6B/ KUB-M4/KVADRAT-M4:** Hybrid Unit with SA-6, and or BUK-M1/SA-11 Type TELARS.
- **BUK-M:** System with SA-11 missile. It had the inadequate tube arm, replaced by snow drift. Few BNs were fielded. Most SA-11 units use BUK-M1.
- **BUK-M1-2 AND SA-17/GRIZZLY:** Upgrade systems.

System

Alternative Designation : Buk-M1, Gang; For Hybrid Threat Buk-M1 is a Tier 2 system.
Date of Introduction: 1979
Description: Brigade assets include bde/btry CPs and radars, TELARs, launcher-loaders, TM-9T229 missile transporter, maintenance and test units. The 6 batteries have 1 TELAR and 1 LL each.
Proliferation: Azerbaijan, Belarus, Finland, India, Iran, Russian, Syria, Ukraine
Target: FW, heli, CM, UAV, guided bomb, artillery rocket, ground targets, ships

Dimensions

Length: m9.3
Width: m3.25

Height: m3.8

Weight: tons34

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp710

Maximum Range, Road: km500

Maximum Speed: km/h65

Gradient: %60

Side Slope: %30

Vertical Step: m1

Trench: m1.5

Fording: m1

Main Weapon System

↳*Launcher*

Name: 9A39M1

Combat Load, per Launcher: 4.0

Displacement Time : min5.0

Emplace Time, Reposition : sec20 for a 100-200 m survivability move.

Emplacement Time : min5.0

Fire on Move: No

Reaction Time : min0.25-0.5; 0.1 for low-flyers

Reload Time : min12.0

Simultaneous Missiles: 1 (targets per launcher); 2 (missiles per launcher)

Time Between Launches : sec3.0

↳*Missile*

Name: 9M38M1

Length : m5.55

Diameter : mm400

Weight: kg690

Altitude, Maximum : m22,000

Altitude, Minimum : m15, 0 with degraded Ph

Combat Load : rds4 (TELAR), 8 (launcher-loaders)

Warhead Type: Frag HE

Fuze Type: Proximity RF

Guidance: RF command, inertial correction, semi-active radar homing

Lethal Radius : m17

Probability of Hit Fixed Wing and Helicopter: PCT80

Propulsion: Solid fuel

Range, Maximum : m 36,000

Range, Minimum : m 3,000

Simultaneous Missiles: 2 per target

Speed, Maximum Missile: m/s1,200

Speed, Maximum Target : m/s830

Fire Control Systems

Navigation System: Yes

Notes: Use of LLs is transforming SA-11 units. They appear to be updated and modified SA-6 TELs (2P25s), economically converted to expand the unit missile load, yet requiring SA- 11 batteries to have only one expensive TELAR. Thus the force can expand with existing stocks of SA-6.

↳*C2 Vehicle*

Name: 9S470M1

Function: Battery Command Post

Data Link : Wire and radio AD net, to IADS net, and to SA- 10/Osnova

Targets Tracked: 15 (with 6 at TELs)

↳*Radar #1*

Name: 9S35 Fire Dome Radar

Function: Dual (acquisition and fire control)

Detection Range : km80 (2 m2), 100 (3m2)

Frequency : GHz6-10 GHz (H/I band)

Guidance Range : km42 km

Other Assets: SA-11 digitally links to the IADS (e.g., aircraft, intel , and other SAM units. SA- 10/20/11 FO radars share data with other units in the IADS net. Other assets are FOs and ELINT, e.g., Orion.

Targets Tracked: 1 per SPL vehicle

Note: The 9S35 Fire Dome provides a limited search and acquisition capability, a tracking capability and CW illumination for terminal guidance of the semi-active homing SAM seekers. It incorporates an IFF interrogator, optical tracker, datalink, and is powered by the TELAR's gas turbine generator. A shared antenna is employed for two X-band transmit/receive channels. These respectively provide a pulsed mode for search and track functions, with linear chirp for compression, and a CW mode for illumination. Monopulse angle tracking is employed for jam resistance. For target tracking the antenna and feed system provide a mainlobe with 2.5° width in azimuth and 1.3° in elevation. For CW illumination the antenna and feed system provide a mainlobe with 1.4° width in azimuth and 2.65° in elevation. Operating autonomously, the 9S35 will take 4 seconds to sweep a 120° sector, with an elevation of 6° to 7°. When cued to acquire and track, with will take 2 seconds to sweep a 10° x 7° az/elev solid angle. Average power output in pulsed tracking modes varies between 0.5 and 1 kiloWatt, with CW illumination at 2 kiloWatts. The search and monopulse angle tracking receivers are both rated at a Noise Figure of NF=10 dB. The range error is cited at 175 metres, the angular

error at less than 1°. The radar can switch from standby mode to combat operation in twenty seconds.

↳*Radar #2*

Name: 9S18M1 SNOW DRIFT

Description: Armored tracked chassis w/ phased array radar and dipole antenna

Azimuth Coverage : deg:360 with rotation

Type: Spoon Rest

Detection Altitude: km25

Detection Range : km100-150

Displacement Time: min5

Emplacement Time : min5

Frequency: Centimetric 3-D phased array

Function: Battery target acquisition radar

Other Radars: Regiment/Bde will have

Range Precision: 400

Targets Tracked: 75

↳*Sights*

Acquisition Range : km20

Type: TV optial auto-tracker

Protection

Armor Protection: Small arms (est)

NBC Protection: INA

Notes:

The 9K37 Buk / SA-11 Gadfly was developed to fill two compatible basic requirements, the first being to provide a replacement for the 1960s developed 2K12 Kub / 2K12 / SA-6 Gainful Surface to Air Missile system, the second being the provision of a common missile round for the M-22 Uragan / SA-N-7 Gadfly Surface to Air Missile system for medium sized naval surface combatants. Key design imperatives were to provide a design with a better capability to engage multiple targets compared to the 2K12 / SA-6 Gainful, with an easier to maintain weapon system and missile round, with improved kinematic performance, improved countermeasures resistance, and a capability against 10 to 12G manoeuvring targets, and TBMs such as the Lance. Development was initiated early in 1972, with Tikhomirov NIIP responsible for system design, and Novator, at that stage engaged in the development of the 9M82/9M83 / SA-12 missile round, tasked with developing the new missile. Agat were tasked with developing a new semi-active homing radar seeker. The development process was split into two phases to accelerate the deployment of the new missile and engagement radar, with the hybrid 2K12M4 system using the 1S91 Straight Flush, and a new 9A38 TELAR replacing the 2P25M3. The new design departed fundamentally from the 2K12 / SA-6 Gainful in system configuration, as each TELAR was equipped with a 9S35 Fire Dome engagement radar, which provided tracking and CW illumination for the missile seekers. The newer Metrovagonmash GM-569 series chassis was adopted. This design strategy removed the fundamental bottleneck in the firing rate of the 2K12 / SA-6 Gainful, where every TEL depended on the fine tracking and illumination provided by the 1S91 Straight Flush. The 2K12M4 hybrid, armed with either 3M9M4 or 9K37-1 missile rounds, would not suffer target saturation in the manner of earlier variants. This strategy of using a tracking nd illuminating radar on each TELAR remains unique to Soviet/Russian Army Air Defence SAMs, also used with the S-300V / SA-12 Giant/Gladiator system and its 9A82/9A83 TELARs. the 9S35 Fire Dome illuminator was thus compatible with the 1SB4M missile seeker, and compatible data link terminals were required. This variant attained IOC in 1978. The cross compatibility between the 9K37 and 2K12 systems continues to be reflected in various contemporary block upgrades which involve the retrofit of 9K37 components into 2K12 systems, including the newer missile rounds. The second phase of the development resulted in the

new 9S470 self propelled command post, the 9S18 Kupol / Tube Arm acquisition radar, the 9A39 TELAR, and the 9A310 TEL/transloader designs, forming the new 9K37-1 Buk / SA-11 Gadfly system. The battery structure was also a departure from the 2K12 model, with the 9S18 Kupol / Tube Arm acquisition radar and 9S470 command post structure much closer in concept to that used in the S-300V / SA-12 with its 9S15 Bill Board acquisition radar and 9S457 command post. All system components were designed, like the S-300V / SA-12, to shoot and scoot in five minutes. IOC was achieved in 1980. While the new system design provided many performance improvements over the 2K12 / SA-6 Gainful, and permitted a greater rate of fire, the system did not perform well against TBMs, anti-radiation missiles, cruise missiles and anti-tank helicopters in hover. Development of the improved 9M37M1 Buk M1 variant commenced in 1979 and IOC was achieved in 1983. The 9M37M1 Buk M1 variant has been exported. The new variant introduced a range of incremental improvements to system components, resulting in the 9S470M1 command post, the 9A310M1 TELAR with improved 9S35M1 Fire Dome and 9Sh38-3 electro-optical tracker, the 9A39M1 TEL/transloader, and the entirely new 9S18M1 Kupol M1 / Snow Drift engagement radar. The Snow Drift was a radical departure from the Tube Arm, and used similar planar array antenna technology to the 9S15 Bill Board series. The end of the Cold War saw the 9K37M1 in production, and development of the follow-on 9K37M1-2 Buk M1-2 was initiated during the later 1990s. This variant was intented to expand the target set further, to encompass strategic and tactical aircraft, helicopters in hover, cruise missiles, tactical ballistic missiles, air to surface missiles, precision-guided munitions, maritime surface targets, and high value ground targets. The latter was to include parked aircraft on airfields, missile launchers and command posts. This variant introduced a substantially new missile round design, the 9M317 designed by DNPP. It uses a redesigned semi-active homing seeker using P-nav, a midcourse guidance datalink channel, inertial navigation system, more capable proximity and contact fusing, and a more lethal combined effects warhead. A dual pulse motor is employed. The new missile is described as multirole, due to the range of target types it is intended to kill. It is claimed to be capable to intercepting a 12G target. The most recent variant of this family of weapons is the 9K317 Buk M2 / SA-17 Grizzly, exported as the 9K317E Ural. This variant incorporates some of the most prominent design changes to date. A new 8 round 9A316 TEL/Transloader has been introduced. The new fully autonomous 9A317 TELAR is equipped with a 9S36 passive phased array antenna equipped radar, replacing the mechanically steered antenna in earlier 9S35 Fire Dome equipped TELARs. This is intended to provide the capability to concurrently engage four targets with a single TELAR, and improve countermeasures resistance. A more basic TELAR, the 9A318, is also provided. The baseline 9S18M series acquisition radar is replaced by the 9S117 Kupol M2E. The most interesting component of this design is the standalone mast mounted 9S36 phased array, designed to provide extended low altitude and surface coverage, in air defence but also maritime coastal defence applications. This design uses a 21 metre telescoping and elevating mast which mounts a radar head with the 9S36. Each mast mounted 9S36 engagement radar controls a pair of 9A316 TEL/Transloaders. The 9K317 Buk M2/M2E / SA-17 Grizzly is offered on the baseline tracked chassis, but also on the new wheeled 6 x 6 MZKT-6922 TELAR vehicle, in testing through 2010. The Belarus integrator Agat, best known for designing command posts, is also offering the 9K39MB Buk MB, a digital block upgrade to the baseline 1980s analogue 9K39 Buk.

MEADS German Medium-Range Air Defense System





Tiers:

1 **2** 3 4

System

Alternative Designation: MEADS
Type: Medium-Range Air Defense System
Manufacturer: The Medium Extended Air Defense System or MEADS was jointly developed by Germany, Italy and the United States.
Mission: The main role of the MEADS is to defend maneuver forces and key installations against aircraft, helicopters, UAVs, as well as tactical and short-range ballistic missiles (with a maximum range of up to 1 000 km), and cruise missiles.
Crew: INA
Chassis: Components of the German MEADS systems are based on MAN SX45 military trucks.
Displacement Time: INA
Emplacement Time: INA
Note: The complete battery includes six launcher vehicles, one surveillance radar, two multifunctional fire control radar, two battle management systems, and reloading vehicles, that carry spare missiles for the launchers.

Dimensions

Length: 10.5 m
Width: 2.55 m
Height: 3.92 m
Weight, Empty: 13 tons
Weight, Combat: INA

Automotive

Engine Name: MAN D2066 LFG

Engine Type: Diesel

Engine Power: hp440

Cruising Range: km750

Speed, Maximum Road: km/h88

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: 0.6 m

Trench: 1.9 m

Fording Depth: up to 1.5 m

Missile System

Name: MIM-104F Missile

Type: Surface-to-Air Missile

Length: 5.21 m

Diameter: INA

Fin Span: INA

Missile Weight: 312 kg

Warhead Type: HE-FRAG

Warhead Weight: INA

Maximum Range: 40 km

Maximum Altitude: 20 km

Elevation: MEADS launcher fires nearly vertically at a 70° launch position

Traverse: 360 deg

Basic Load: Each launcher vehicle of the MEADS is equipped with 12 missiles.

Reload: The MEADS launchers use a palletized load handling system. So the whole set of 12 missiles can be rapidly reloaded.

Note: This missile is highly maneuverable and destroys targets by ramming them. Yet still it has a small HE-FRAG warhead to enhance the kill probability.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Battle Management Systems: 2 x Battle Management Systems. The battle management system is basically a command and control element of the MEADS. It provides battle management for the launcher units. It calculates optimal engagements and sends firing commands to the launcher vehicles. At least two launchers can fire simultaneously in order to defended against multiple threats or massed missile attacks.

↳*Radar #1*

Name: INA

Type: Surveillance Radar

Frequency/Band: INA

Range: INA

Coverage: 360 deg

Note: The surveillance radar provides long-range detection of low radar cross-section objects. This radar operates below detection frequency of current anti-radiation missiles.

↳*Radar #2*

Name: INA

Type: Fire COntrol Radar

Frequency/Band: X-band solid-state phased array radar with an Active Electronically Scanned Array (AESA).

IFF: Yes

Note: It provides precision tracking and discrimination and classification capabilities. The radar uses its main beam for missile guidance, eliminating the need for a separate guidance array.

Protection

Hull Armor: The MAN SX45 is also available with an integrated armored cab, which provides protection against 7.62x51 mm armor-piercing rounds, artillery shell splinters and withstands 8 kg anti-tank mine blast. An integrated cab can be equipped with remotely controlled weapon stations, fitted with a 12.7 mm heavy machine gun or 40 mm automatic grenade launcher.

Applique Armor: The MAX SX family has a modular cab, which can be fitted with add-on armor protection kit. This kit was jointly developed by MAN and Krauss-Maffei Wegmann. It provides protection against 7.62x39 mm rounds, artillery shell splinters, grenades, small anti-personnel mines. Armored modules are attached to the outside of the cab. Armored kit can be installed within 10 hours in field conditions.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Germany is considered the architect and driving force behind greater European collaboration across defense. The country has played a pivotal role in developing largescale European programs, including the development of the Medium Extended Air Defense System (MEADS). Development of the Medium Extended Air Defense System began in 2004 as a U.S.-Italian-German partnership that shared costs for a new air and missile defense (AMD) system. As member to the tri-lateral partnership, Germany shared costs for a new Integrated Air and Missile Defense (IAMD) system. The system enables coalition

interoperability and regional operation and is developed to incorporate other radars and launchers – both existing and future – as part of a regional air and missile defense system. After a comprehensive review, the German Federal Ministry of Defense announced in 2015 it would make MEADS the foundation of Taktisches Luftverteidigungssystem (TLVS), its next-generation AMD system, designed to replace Patriot. The MEADS program submitted a proposal to the German Ministry of Defense in July 2016 to continue Lockheed Martin's development partnership with MBDA and use MEADS technology as the basis for Germany's next-generation TLVS.

MR-SAM Indian Medium-Range Air Defense Missile System





Tiers:

1 2 3 4

System

Alternative Designation: MR-SAM
Type: Medium-Range Air Defense Missile System
Mission: The MR-SAM system was designed to intercept enemy aircraft, missiles, helicopters and drones at a range of up more than 70 km.
Crew: INA
Chassis: INA
Displacement Time: INA
Emplacement Time: INA
Note: Three launcher units will comprise a battery. These will be supported by a control and management unit, radar unit, associated reloading vehicles and maintenance vehicles.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Automotive

Engine Name: INA
Engine Type: INA

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: INA

Fording Depth: INA

Missile System

Name: Barak 8 Missile

Type: Surface-to-Air Missile

Basic Load: 8 x Barak 8 Missiles

Length: 4.5 m

Diameter: 0.54 m

Fin Span: 0.94 m

Missile Weight: 274 kg

Warhead Type: Fragmentation with proximity fuse

Warhead Weight: 60 kg

Speed: Mach 2

Maximum Range of Fire: more than 70 km

Maximum Altitude: 16 km

Note #1: The missiles are fired vertically from the canister-launchers and provide 360 degree coverage. The vertical launch systems holds 2 stacks of 4 ready-to-fire missiles.

Note #2: All missiles can be fired within 20 seconds

Fire Control and Radar Systems

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

↳*Radar*

Name: EL/M-2084

Type: Target and Tracking Radar

Frequency/Band: INA

Range: 470 km

Note: The ELM-2084 is an Israeli ground-based mobile 3D AESA multi-mission radar (MMR) family produced by ELTA, a subsidiary of Israel Aerospace Industries. The radar is capable of detecting and tracking both aircraft and ballistic targets

and providing fire control guidance for missile interception or artillery air defense. As a tactical radar, the ELM 2084 is a mobile system consisted of the radar unit, a control module, a cooling unit and a power generator. It can be mounted on a variety of transport platforms. The radar was designed to accommodate medium range operational needs in the battlefield: detection, classification and tracking of targets. The Radar's main missions are: *Hostile weapon location – detection and tracking of hostile ballistic projectiles, calculating enemy launchers or artillery position. *Early warning – impact point calculation for warning of civil population and military rear units. *Friendly fire ranging – tracking of friendly artillery and providing corrections to the firing unit. *Aerial surveillance – detecting and tracking aircraft, maintaining continuous aerial picture. *Firing control radar – for various air defense systems, including Iron Dome, David's Sling, Skyhunter, and SPYDER-MR (Medium Range). Notable features of the radar: *Advance technology AESA radar *Extensive operational experience, due to participation in large number of interceptions *Interoperability with modern battle management systems and several different interceptor missiles. *The radar is advertised as capable of processing all types of threats – aerial and ballistic including low radar cross-section (RCS) targets.

Protection

Hull Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Medium-Range Surface-to-Air Missile (MRSAM) is being developed by India’s Defence Research and Development Organisation (DRDO) in collaboration with Israel Aerospace Industries (IAI). It is expected to enter service with the Indian Air Force (IAF) in 2017. The missile is designed to provide the armed forces with air defence capability against a variety of aerial threats at medium ranges. Each MRSAM weapon system comprises of one command and control system, one tracking radar, missiles, and mobile launcher systems. The mobile launcher is used to transport, emplace and launch up to eight canisterised missiles in two stacks. It can fire the missiles in single or ripple firing modes from the vertical firing position. The combat management system simplifies the process of engaging a variety of threats. It identifies and tracks the threat using tracking radar. The system calculates the distance between the target and the launcher, and then determines if the identified target is a friend or a foe. The target information is, then, transmitted to the mobile launcher. The weapon is 4.5m-long, weighs approximately 276kg, and is equipped with canards and fins for control and manoeuvrability.

S-125 Neva/Pechora (SA-3 Goa) (Export) North Korean 6x6 Surface-to-Air Missile System







Tiers:

1 2 3 4

Variants:

- **SA-3A: :** Two-rail launcher. Missiles without interstage fins.
- **SA-3B (GOA MOD 1):** SA-3B (GOA Mod 1): two-rail launcher. Missiles have inter-stage fins. SA-3C: four-rail launcher.
- **NEWA SC:** Polish modernized system
- **PECHORA-M :** Upgrade fielded in 1994 and used in at least 3 countries. It has digitized FCS, and laser/EO/thermal auto-tracker for use without a radar. It added the Kasta-2E2 TA EW radar.
- **PECHORA-2/UNV MODEL 1999 :** Further upgrade with truck-mounted low blow FC radar), tracks 2 targets. It is resistant to aircraft ECM.
- **PECHORA-2M:** Russian mobile variant of -2, with launcher mounted on a truck chassis modified into a transporter-erector-launcher (TEL). Other changes: the 2-rail launcher has a storage compartment underneath for support and test equipment. Navigation and automated fire control terminal are mounted onboard. The cab has room for two or three crew members. The latest missile is 5V27DE. The trailer-mounted unv model 1999 FC radar (up to 300 m away) can emplace and displace in 5 minutes or less. This system has been

System

Alternative Designation: NICKNAMES SA-3 Goa (NATO reporting name for S-125) SA-N-1 Goa (NATO reporting name for Volna) M-1 Volna (naval version of S-125) Neva (Soviet service nickname) Pechora (export model nickname) ItO 79 (Finnish service)

Type: Russian Surface-to-Air Missile System

Manufacturer: JSC Defense Systems (Pechora-M)

In Service: 1961-Present

Crew: INA

Chassis: The S-125 is normally transported from battalion storage areas on modified ZIL-131 (6 x 6) or ZIL-157 (6 x 6) trucks and loaded onto the launchers.

Emplacement Time: Approximately one minute is required to load the missiles onto the launch rails, but nearly an hour is required between missile launches due to missile preparation, truck transit and other reloading procedures.

Displacement Time: See Emplacement

Target Types: FW, heli, CM; Also ASMs, UAVs Pechora-M

Dimensions (Chassis: ZIL-131)

Length: m7.04

Width: m2.49

Height, Cab: m2.49

Height, Transport Body: m2.97

Wheelbase: m3.30

Curb Weight: kg6,700

Automotive (Chassis: ZIL-131)

Engine Name: INA

Engine Type: V8 gasoline (carburetor)

Engine Power: INA

Maximum Road Distance: INA

Maximum Speed: km/h80

Seating Capacity: ea3

Payload: 5000 kg plus trailer 5000 kg (on road), or 3,500 kg plus trailer 4000 kg off road.

Main Weapon System

Note: The S-125 is fired from trainable launchers which are normally fixed, but can be relocated. The crew loads the missiles with the aid of a conveyor onto the ground-mounted, trainable launcher for firing, with both twin and quadruple launchers in use. A pair of missiles are carried in tandem on a modified truck or tracked vehicle. The S-125 is normally transported from battalion storage areas on modified ZIL-131 (6 x 6) or ZIL-157 (6 x 6) trucks and loaded onto the launchers. Approximately one minute is required to load the missiles onto the launch rails, but nearly an hour is required between missile launches due to missile preparation, truck transit and other reloading procedures.

↳*Missile Launcher*

Description: Towed twin or quad-rail launcher

Displacement Time : min100; 30 Pechora-M

Reaction Time : sec8; 2-3 Pechora-M

Reload Time : min50 (quad launcher)

↳*Missile (Option 1)*

Name: V-600 (5V24)

Type: SAM

Length : mm6.1

Diameter : mm550.0

Propulsion : Solid fuel booster

Altitude, Maximum : m18,300.0

Altitude, Minimum : m20, 7.5 blast radius

Combat Load : rds2 or 4

Fuze Type: Proximity RF, 20 m detection

Guidance: Command RF

Kill Radius : m12.5

Probability of Hit: PCT70 FW, 70 heli; 80 Pechora-M, -2M

Range, Maximum : m 25,000; 28,000 Pechora-2A

Range, Minimum : m 2400.0

Simultaneous Missiles: 2 per target

Speed : km/h650-1,150

Warhead Type: Fragmenting Rod-HE

Velocity : km/h4321.0

Weight: kg946.0

↳*Missile (Option 2)*

Name: V-601 (or 5V27)

Type: SAM

Length: 6.09 m

Diameter: m0.375

Wing Span: 2.2 m

Weight: kg953

Warhead Weight: 70 kg warhead containing 33 kg of HE and 4,500 fragments

Propellant: Solid propellant rocket motor

Minimum Range: km3.5

Maximum Range: km35

Intercept Altitudes: 00 m and 18 km

Fire Control System

↳*Radar #1*

Name: FLAT FACE (P-15) Radar

Function: Target Acquisition

Range: 200-250 km

Frequency: C band (UHF)

Associated Weapon System: SA_3 GOA possibly SA-8 GECKO SAM, LOW BLOW missile control radar

Number of Missiles: Can guide three missiles simultaneosly

Power: 380kw

PRF: 200-700pps

Vehicle Mount: Long-range surveillance and target acquisition is handled by the van-mounted P-15 FLAT FACE) radar.

Parabolic Reflectors: Two eliptical parabolic reflectors measuring 11x5.5 m. Reflectors arranged one above the other on van roof.

Note #1: The P-15 radar has been replaced in many S-125 units by the P-15M SQUAT EYE radar.

Note #2: Target data generated by these tracking radars is passed to the battalion's LOW BLOW trailer-mounted fire control radar.

↳*Radar #2*

Name: LOW BLOW

Function: A Fire Control, Trk/FC, and Missile Guidance Radar

Frequency, Fire Control: I band

Range, Fire Control: km40

Scan, Fire Control: Scan (trough) 16HZ

Frequency, Trk/FC: I band

Range, Trk/FC: km40-85

Scan, Trk/FC: Scan (Para) 25HZ

Frequency, Missile Guidance: D band

Range, Missile Guidance: km29

Mount: Four-wheeled trailer-mounted

Parabolic Dishes: Two scanning parabolic dishes one above the other

Associated Weapon System: SA-3 GOA SAM, FLAT FACE, SQUAT EYE acquisition radar.

↳*Radar #3*

Name: SIDE NET (PRV-11)

Function: Height Radar

Frequency: E band, 2.7 GHz

Pulse Repetition Time (PRT): 3 and 1,3 ms

Pulsewidth: 3 and 1.5 µs

Pulse Repetition Frequency (PRF): 330 and 730 Hz

Peak Power: 1.2 MW

Average Power: 1.3 kW

Maximum Range: km28

Maximum Altitude: km32

Associated Weeapon System: SA-2/3/5

↳*Radar Upgrade (SQUAT EYE would replace the FLAT FACE (P-15 Radar)*

Name: SQUAT EYE (P-15M(2))

Function: Target Acquisition

Maximum Range: km128

Frequency: C-band

Power: 380kw

Associated Weapon System: SA-3/5

Protection

Hull Armor: INA

Turret Armor: INA

Notes:

The S-125 Neva/Pechora, NATO reporting name SA-3 Goa) Soviet surface-to-air missile system was designed by Aleksei Isaev to complement the S-25 and S-75. It has a shorter effective range and lower engagement altitude than either of its predecessors and also flies slower, but due to its two-stage design it is more effective against more maneuverable targets. It is also able to engage lower flying targets than the previous systems, and being more modern it is much more resistant to ECM than the S-75. The 5V24 (V-600) missiles reach around Mach 3 to 3.5 in flight, both stages powered by solid fuel rocket motors. The S-125, like the S-75, uses radio command guidance. The launchers are accompanied by a command building or truck and three primary radar systems: * P-15 "Flat Face" or P-15M(2) "Squat Eye" 380 kW C-band target acquisition radar (also used by the SA-6 and SA-8, range 250 km/155 miles) * SNR-125 "Low Blow" 250 kW I/D-band tracking, fire control and guidance radar (range 40 km/25 miles, second mode 80 km/50 miles) * PRV-11 "Side Net" E-band height finder (also used by SA-2, SA-4 and SA-5, range 28 km/17 miles, max height 32 km/105,000 ft) The S-125 system uses 2 different missile versions. The V-600 (or 5V24) had the smallest warhead with only 60 kg of high explosive. It had a range of about 15 km. The later version is named V-601 (or 5V27). It has a length of 6.09 m, a wing span of 2.2 m and a body diameter of 0.375 m. This missile weighs 953 kg at launch, and has a 70 kg warhead containing 33 kg of HE and 4,500 fragments. The minimum range is 3.5 km, and the maximum is 35 km (with the Pechora 2A). The intercept altitudes are between 100 m and 18 km. The S-125M (1970) system uses 5V27. The intercept altitudes are between 20 m and 14 km. The minimum range is 2.5 km, and the maximum is 22 km. The S-125M1 (1978) system uses 5V27D. In the early 1980s established for each system 1-2 radar simulator (against anti radar missiles assigned). The S-125 is somewhat mobile, an improvement over the S-75 system. The missiles are typically deployed on fixed turrets containing two or four but can be carried ready-to-fire on ZIL trucks in pairs. Reloading the fixed launchers takes a few minutes.

HQ-16 Chinese 6x6 Medium-Range Surface-to-Air Missile System







Tiers:



Variants:

- **HQ-16A:** An improved version that uses an improved missile with slightly better performance.
- **HQ-16B:** A 70-km range version of the HQ-16 has been developed by the China Academy of Defense Technology (CASIC), according to IHS Jane's Defence Weekly(Sept. 7, 2016). Development of this variant reportedly began in 2005. The HQ-16B title is a Western designation.
- **LY-80:** An export version of the HQ-16A.
- **HHQ-16 (Red Sea 16):** This is the naval variant installed on China’s Type 054A JIANGKAI II-class frigates. The missile can reportedly intercept sea-skimming missiles flying less than 30 ft (10 m) above the surface of the ocean. Aboard the JIANGKAI II-class frigates, a single, 32-cell vertical launch system carries the missiles. Guidance is provided by four MR090 Front Dome C/X-band fire-control radars.
- **HQ-17:** According to some reports, this is an improved version of the HQ-16 with range of 56 mi (90 km). This variant may include digital electronics, new display screens, and improved training and simulation facilities. (Military Periscope, June 2017)

System

Alternative Designation: HQ-16A, LY-80 (Export Version), Hong Qi 16 (Red Flag 16), CSA-16
Function: In Chinese armed forces the HQ-16 fits the gap between the short-range HQ-7 and medium- to long rande HQ-9. This air defense system is mainly used to protect stationary assets such as airfields, command posts, concentration of troops, bridges, and other important targets.
Chassis: 6 x 6 high mobility wheeled truck based upon the Taian TA5350
Target: Aircraft, cruise missiles, UAVs, and short and medium range ballistic missiles
Crew: INA

Dimensions (Chassis: TA5350)

Length: INA
Width: INA

Height: INA

Weight, Empty: tons15

Payload Capacity: tons15

Automotive (Chassis: TA5350)

Engine Name: Deutz BF6M1015

Engine Type: Turbocharged Diesel

Engine Power: hp250

Fording Depth: m1

Range, Cruising: km1,000

Maximum Road Speed: km/h85

Gradient: %60

Side slope: %30

Vertical step: m.5

Trench: m.6

Other Capabilities: Central tire inflation system

Crew Capacity: 1 driver, 5 passengers

Main Weapon System

↳*Launcher*

Name: INA

Type: Transporter-Erector-Launcher on a 6 x 6 chassis with cold-launch vertical launch tubes.

Missile Storage: Missiles are store in containers and are launched vertically.

Firing Position: In the firing position, the wheels are raised off the ground and the vehicle is supported at four points by hydraulic jacks: two at the rear and one on each side.

Note: The HQ-16 launcher is based on Taian TA5350 6x6 special wheeled chassis. The TEL carries 6 containers with missiles. Missiles are launcher vertically. Two missiles can be launched within a short period of time.

↳*Missile*

Name: INA. It is reported that the missile is very similar to the 9M38 Missile.

Type: Surface-to-air missile

Length: m5

Diameter: m0.34

Weight: kg330

Warhead Type: HE-Frag

Warhead Weight: kg70

Maximum Altitude: km10

Minimum Altitude: m100

Fire on Move: No

Elevation: Vertical Launch

Probability of Kill: 85% vs aircraft and 60% vs cruise missiles

Guidance System: inertial navigation, radio mid-course updates, semi-active terminal homing

Missile Speed: Mach 4

Range of Proximity Fuse: m35

Maximum Range vs. Aircraft: km40

Cruise Missile Range: km3.5 to 18

Fire Control System

IFF: Yes, within the radar

Guidance System: Inertial navigation, radio mid-course updates, semi-active terminal homing

↳*Search Radar Guidance Vehicle*

Name: INA

Type: Search Radar Guidance Vehicle

Maximum Range: km150

Maximum Altitude: km20

Band: solid-state S-band three-dimensional mast-mounted passive phased-array radar.

IFF: Yes

Note: When a target is identified, the vehicle automatically performs identification-friend-or-foe (IFF), threat analysis and flight-path processing tasks. It then provides target eng agement data to the tracking-and-guidance radar.

↳*Tracking-and-Guidance Radar Vehicle*

Name: INA

Type: Tracking-and-Guidance Radar Vehicle

Function: The tracking-and-guidance radar provides target acquisition, tracking and identification of target types. It controls the missile launch and illuminates the target after the missile is fired.

Maximum Range: km85

Band: L-Band

Fire Control and Guidance: Fire control and guidance can be provided for up to eight missiles.

Targets: It can detect up to six targets and track four simultaneously.

Protection

Armor Hull: Protection from small arms fire and projectile splinters

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The HQ-16 is a Chinese-made, medium range, surface-to-air missile system which was introduced in the Chinese armed forces in September 2011. The HQ-16 is produced by China Aerospace Science and Technology Corp (CASC). Using advanced technologies of intermittent illumination, semi-active radar homing guidance, phased array radar, vertical cold launch, and radio communication network, the HQ-16 can be operated in a strong elector-magnetic interference environment and in all weather conditions. The HQ-16 is a land based version of the HHQ-16 system used in ships and fired from VLS (Vertical Launch System) containers. The HQ-16 is based on a joint development of the Russian Buk-M1 (SA-11 'Gadfly') and Buk-2M (SA-17 'Grizzly') Surface-to-Air Missile (SAM) systems for use from mobile ground vehicles and later from ships. The HQ-16 is able to engage aerial targets at high altitude. The mid-range HQ-16 is also able to intercept very low-flying targets at a distance of up to about 40 kilometers, filling the gap between the HQ-7 short-range SAM and the HQ-9 long-range SAM systems. The HQ-16 missile can hit targets at an altitude from 400 to 10,000 meters. According to the SIPRI (Stockholm International Peace Research Institute) arms transfers' database, three units of the LY-80 (HQ-16 alternated designation) were ordered by Pakistan in 2014 and delivered in 2015/2016. The Pakistan Army formally inducted the LY-80 (HQ-16) medium-range surface-to-air missile (SAM) system on March 12, 2017. In January 2018, the Pakistani army performed the first live firing with the LY-80 during the Al Bayza-2019 military exercise. The HQ-16 is mainly used to protect stationary assets such as airfields, bridges, command posts, concentrations of troops, and other high value assets. The battalion of the HQ-16 consists of twelve launcher vehicles (four in each battery), a command and control vehicle, three tracking and guidance radar vehicles (one in each battery), a target searching radar vehicle, and several missile transport and reloading vehicles, and power supply vehicles, most using the same 6 x 6 chassis.

MIM-23B I-Hawk American Surface-to-Air Missile (SAM) System





Tiers:

1 2 3 **4**

Parent:

MIM-23 Hawk American Surface-to-Air Missile (SAM) System

Variants:

- **I-Hawk (Improved Hawk /Hawk B/MIM-23B):** This variant reached initial operating capability (IOC) in 1972. Upgrades from the original Hawk included solid-state electronics, factory certified and sealed missile round, all-altitude capability, digital automatic data processor for the information coordination central (ICC), improved solid-pro pellant rocket motor and a larger warhead.
- **Hawk Mobility Enhancement (HME):** This was jointly developed by Raytheon and the Dutch air force. It reduced number of vehicles in a Hawk firing unit from 14 trucks and trailers to seven, updated the Hawk launcher and simplified reloading.
- **Patriot /Hawk Interoperability:** This is a software upgrade to permitting Hawk missile platoons to receive targeting data from Patriot information coordination center (ICC). An April 1988 test simulated an interception of a short-range tactical missile by shooting down a missile traveling at Mach 2 and at an altitude of more than 25,000 ft (7,620 m).
- **Sparrow /Hawk Demonstration Program:** In 1985, Raytheon combined elements of two of its missile products into one system. The Sparrow /Hawk system replaced the three I-Hawks on the M192 launcher with eight AIM-7 Sparrow missiles (the original launcher had nine missiles).
- **NOAH (Norwegian Adapted Hawk):** INA
- **Iran MIM-23 Hawk variant:** Iran reportedly made several upgrades to MIM-23 missiles for the carriages of its F-14 Tomcats. Some were displayed in Tehran in September 1998.
- **Danish Enhanced Hawk (DEHAWK):** Introduced in December 2002, the Danish Enhanced Hawk (DEHAWK) was developed by Terma and Thales. After several years of delays, the program was handed over to the Danish Air Materiel Command.

System

Alternative Designation: MIM-23B Hawk, MIM-23 I-Hawk
Type: medium-range surface-to-air missile.
Family: MIM-23 Hawk Family
Manufacturer: Raytheon Company
In Service: 1971-Present
Crew: eaINA
Displacement Time: minutesINA
Emplacement Time: minutesINA
Fire on the Move: No

Note #1: The original Hawk has been phased out of NATO and U.S. service, although several countries have missiles in storage. All active Hawk missiles are the I-Hawk variant.

Note #2: Product Improvement Plan In 1973 the US Army started an extensive multi-phase Hawk PIP (Product Improvement Plan), mainly intended to improve and upgrade the numerous items of ground equipment. Phase I Phase I involved replacement of the CWAR with the AN/MPQ-55 Improved CWAR (ICWAR), and the upgrade of the AN/MPQ-50 PAR to Improved PAR (IPAR) configuration by the addition of a digital MTI (Moving Target Indicator). The first PIP Phase I systems were fielded between 1979 and 1981. Phase II Developed from 1978 and fielded between 1983 and 1986. upgraded the AN/MPQ-46 HPI to AN/MPQ-57 standard by replacing some of the vacuum tube based electronics with modern solid-state circuits, and added an optical TAS (Tracking Adjunct System). The TAS, designated OD-179/TVY, is an electro-optical (TV) tracking system that increases Hawk operability and survivability in a high-ECM environment. Phase III The PIP Phase III development was started in 1983, and was first fielded by U. S. forces in 1989. Phase III was a major upgrade which significantly enhanced the computer hardware and software for most components of the system, a new CWAR the AN/MPQ-62, added single-scan target detection capability, and upgraded the HPI to AN/MPQ-61 standard by addition of a Low-Altitude Simultaneous Hawk Engagement (LASHE) system. LASHE allows the Hawk system to counter saturation attacks by simultaneously intercepting multiple low-level targets. The ROR was phased out in Phase III Hawk units.

Dimensions

Length: m5.03

Diameter: m0.37

Wingspan: m1.21

Weight, Combat: kg640

Warhead Weight: kg54

Automotive

Engine Name: 1 x Aerojet dual-thrust solid-fuel rocket (M112 motor)

Engine Type: Solid-fuel rocket engine

Speed: Mach 2.7

Transporter: The Hawk missile is transported and launched from the M192 towed triple-missile launcher.

M112 Motor Burn Rate: a 5-second boost phase and a sustain phase of around 21 seconds.

M112 Motor Weight: 395 kg including 295 kg of propellant.

Communications

Note: See Fire Control

Missile System

Name: MIM-23B

Type: Semi-active Radar Homing Missile

Guidance: Semi-active Radar Homing

Length/Caliber: INA

Maximum Effective Range: km35

Minimum Effective Range: km1.5

Maximum Altitude: km18

Minimum Altitude: m30

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Max Rate of Fire: INA

Launcher: M192 towed triple-missile launcher

Reflector: low side lobe, high-gain plane antenna to reduce sensitivity to ground clutter

Warhead Type: Conventional high-explosive blast fragmentation

Warhead Weight: kg54

Warhead Fragments Speed: 2,000 meters per second

Warhead Fragments: 14,000 2-gram (0.071 oz) fragments

Warhead Fragments Arc: deg70

Fuze Type: radio frequency proximity and impact fuses

Speed: Mach 2.5

Guidance System: X-band CW monopulse semi-active radar seeker.

Kill Probability: 0.85 (Improvement from the MIM-23A)

Mean Time Between Failures (MTBF): 300-400 hours

Peak Velocity: 500 m/s

Maximum Maneuver Speed: 15 Gs

Fire Control

Note: The original Hawk system used 4 or in some models 6 radars: to detect (PAR and CWAR), to track (CWAR and HPIR) and to engage (HPIR and ROR) targets.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Digital Data Processing Central Information Coordinator: Yes, for Target Processing, Threat Ordering, and Intercept Evaluation.

↳*Radar #1*

Name: AN/MPQ-50 (Improved Hawk to Phase III)

Type: PAR Pulse Acquisition Radar

Digital MTI (Moving Target Indicator): Yes

Frequency: 500 to 1,000 MHz

Band: C-Band

Peak Operating Power: 1,000 watts

High PRF Range: 104 km

Low PRF Range: 96 km

↳*Radar #2*

Name: AN/MPQ-48 (Improved Hawk)

Type: CWAR Continuous Wave Acquisition Radar

Power Rating: Watts400

Frequency: 10 GHz (X-Band)

Range: 69 km (43 mi) (CW) to 63 km (39 mi) (FM) versus 3 m2 (32 sq ft) target.

↳*Radar #3*

Name: AN/MPQ-46 (Improved Hawk – Phase I)

Type: HPIR High Power Illuminating Radar

Power Output: Watts125

Operating GHz Band: 10-20 GHz J band

Range: 99 km (62 mi) (high PRF) to 93 km (58 mi) (low PRF) versus 3 m2 (32 sq ft) target.

↳*Radar #4*

Name: AN/MPQ-51 (Improved Hawk – Phase II)

Type: ROR Range Only Radar

Frequency: 15.5-17.5 GHz)

Pusle Radar: Yes

Power Output: 120 kW

Pusle Length: 0.6 µs

Pulse Repetition Frequency: 1600 Hz

Range: 83 km (52 mi) versus 3 m2 (32 sq ft) target

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Raytheon MIM-23 Hawk (or HAWK: Homing All the Way Killer) is an American medium-range surface-to-air missile. The MIM-23 I-Hawk or MIM-23B has a larger 74 kg (163 lb) blast-fragmentation warhead, a smaller and improved guidance package, and a new M112 rocket motor. The new warhead produces approximately 14,000 2-gram (0.071 oz) fragments that cover a much larger 70 degree arc. The missiles M112 rocket motor has a boost phase of 5 seconds and a sustain phase of 21 seconds. The motors total weight is 395 kg (871 lb) including 295 kg (650 lb) of propellant. This new motor improves the engagement envelope to 1.5 to 40 km (0.93 to 24.85 mi) in range at high altitude, and 2.5 to 20 km (1.6 to 12.4 mi) at low altitude, the minimum engagement altitude is 60 meters (200 ft). The missile was operational in 1971. All US units had converted to this standard by 1978. A typical Phase-III MIM-23B Hawk battery consists of: 1 × PAR: Pulse Acquisition Radar—a search radar with a 20 (+/−2) rpm rotation, for high/medium altitude target detection. 1 × CWAR: Continuous Wave Acquisition Radar—a search doppler radar with a 20 (+/−2) rpm rotation, for low altitude target detection. 2 × HIPIR: HIgh Power Illuminator doppler Radar—target tracking, illumination and missile guidance. 1 × FDC: Fire Direction Center 1 × IFF: Identification Friend or Foe Transceiver 6 × DLN: Digital Launchers with 18 missiles. 6 × MEP-816: Generators 60KW (400 Hz) each. 12 × M-390: Missile transport pallets with 36 missiles 3 × M-501: Missile loading tractors. 1 × [bucket loader]

9K317M Buk-M3 (9K37M3) Russian Medium-Range Air Defense Missile System







Tiers:

1 2 3 4

System

Alternative Designation: 9K317M Buk-M3 (SA-X-27); SA-17

Family: Muk

Type: Medium-Range Air Defense Missile System

Manufacturer: Almaz-Antey:

In Service: 2016-Present

Crew: ea4

Chassis: GM-5955 chassis

Dimensions (GM-5955 chassis)

Length: m7.5

Width: m3.3

Height: m5.1

Weight, Combat: tons34

Ground Clearance: mm450

Ground Pressure: kg/mINA

Automotive (GM-5955 chassis)

Engine Name: V-46

Engine Type: Multifuel Diesel

Engine Power: hp710

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Transporter Erector Launcher and Radar (TELAR)

Name: 9A317M

Chassis: GM-5955 chassis

Basic Load (9M317M missiles): ea6

Array Radar: two array radars. the first radar if for target tracking and fire control by illumination of the target and the the secondary radar is a smaller backup array radar

Fire Control Radar Band: C Band

Antena Type: phased array antenna

Continuous Wave (CW) Illumination Capable: Yes

Target Detecting Capability: detecting targets with an RCS of at least 2 m2 out to a maximum range of 120 km

IR Tracking: Yes, electro-optical IR tracking system

Steering: electronic beam steering

↳***Missile (Option 1)***

Name: 9M317M Missile

Type: surface-to-air missile

Engine: dual-mode solid-propellant rocket engine

Maximum Altitude: km35

Maximum Speed: m/s1,550

Maximum G Force: g24

Maximum Effective Range: km70

Minimum Effective Range: km2.5

Fuze Type: 9E346 radio proximity fuze

Turbogenerator: solid propellant-based gas generator

Missile Length: m5.18

Missile Diameter: mm360

Missile Weight: kg581

Rear Control Fins Length: mm820

Missile Storage Life: years10

Guidance System: semi-active radar homing guidance system

Autopilot: Yes

Inertail Navigation: Yes

Radar Homing Receiver: 9E432 semi-active radar homing receiver for terminal phase guidance

Warhead Weight: kg62

Warhead Type: HE-FRAG

Active Seeker: 9E432 semi-active seeker

Basic Load: ea6

Note #1: Unlike its predesesors, the Buk-M3 carries its missiles in launch containers rahter than the naked missle being mounted on launch rails atop the launch vehicle

Note: #2: The 9M317M is capable of engaging targets travelling as fast as 3,000 meters per second.

↳*Missile (Option 2)*

Name: 9M317MA

Type: surface-to-air missile

Active Seeker: ARGSN 9B-1103M active seeker

Engine: dual-mode solid-propellant rocket engine with an extended burn time

Maximum Effective Range: km70

Minimum Effective Range: km2

Maximum Altitude: km35

TELAR Types: The 9M317MA can be launched from either the 9A317M TELAR vehicle, or the 9A316M TEL.

Maximum Speed: m/s1,550

Maximum G Force: g24

Fuze Type: 9E346 radio proximity fuze

Turbogenerator: solid propellant-based gas generator

Missile Length: m5.18

Missile Diameter: mm360

Missile Weight: kg581

Rear Control Fins Length: mm820

Guidance System: active radar homing guidance system

Radar Seeker: ARGSN 9B-1103M active radar seeker

Warhead Weight: kg62

Warhead Type: HE-FRAG

Note: The 9M317MA is capable of engaging targets travelling as fast as 3,000 meters per second.

Targeting and Guidance Systems Vehicles

↳*Search Radar Vehicle*

Name: 9S18M1-3 Kupol-M1-3 (NATO: Snow Drift)

Chassis: GM-5955 chassis

Maximum Speed: km/h56

Maximum Range: km/h250

Fuel Timeline: A maximum of 2 hours of fuel

Crew: 3 (driver-mechanic, an operator, and a senior operator)

Array Radar: flat-faced 3D pulsed phased array radar

Radar Band: S Band

Maximum Target Range: km150

Minimum Target Range: km10

Number of Targets Capable of Tracking: ea120

Maximum Altitude: km25

Search Modes: one for aerial threats, the second for ballistic threats

Range Resolution: m200

Angular Coordinate Resolution: 3° in azimuth and 4.5° in elevation

Rotational Speeds: 5 individual settings. 4 s, 5 s, 6 s, 9 s, 60 s to complete a single rotation.

Road March State to Ready State Timeline: min5

↳***Fire Control Radar Vehicle***

Name: 9A36M

Chassis: GM-5955 chassis

Antenna: 21 m telescoping mast

Radar Capability: detecting targets with an RCS of at least 2 meters squared out to a maximum range of 120 km

Number of Targets: 10 simultaneous targets

Steering: electronic beam steering

Operating Mode: two: the first being a track while scan mode and the second being the pure target tracking mode

Notes:

The Buk M3 (Beech M3) is a brand new Russian air defense system. It uses new missile and has advanced electronic components. It has much improved capabilities comparing with the older Buk systems. It outperforms even the old S-300P long-range air defense system. A single Buk-M3 complex (including several launch vehicles) is capable of engaging up to 36 different targets simultaneously from any angle, while a single fire-control radar is capable of supporting the engagement of up to 6 different targets simultaneously within a sector 120° in azimuth and 85° in elevation. In terms of organisation, one Buk-M3 brigade would be expected to consist of four "divisions" (approximately a battalion set), with a single 9S52 Polyana-D4 Brigade C2 or similar vehicle in control of all four "divisions". One "divizion" is typically composed of three batteries, with one command vehicle and one search radar vehicle responsible for three batteries. Each battery would be composed battery would consist of 2 launch vehicles. These launch vehicles can be either one 9A317M TELAR and a 9A316M TEL, or two 9A316M TELs and a single 9S36M illumination and guidance radar vehicle. It should be noted that "divizion" means 'division', but this measurement takes on a different meaning when dealing with Russian anti-air unit sets as opposed to personnel or armour formations, and so the term has been transliterated rather than translated to reflect this difference of meaning and avoid confusion. It is perhaps most accurately translated into English as a battalion set. The table below displays the principle vehicles known to be included within a "divizion" (battalion set):

→→Long-Range Missile Systems (More than 80 km)

KN-06 Pon'gae-5 North Korean Surface-to-Air Missile (SAM) System







Tiers:

1 **2** 3 4

System

Alternative Designation: KN-06 Pon'gae-5
Type: Surface-to-Air Missile System
Family: INA
Manufacturer: North Korea industries
In Service: 2010-Present
Crew: eaINA
Chassis: 6X6 KamAZ 55111 (Taebaeksan 96)

Dimensions (Chassis: 6X6 KamAZ 55111)

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Automotive (Chassis: 6X6 KamAZ 55111)

Engine Name: INA
Engine Type: INA
Engine Power: INA
Cruising Range: INA
Speed, Maximum Road: INA
Speed, Average Cross: INA
Speed Maximum Swim: INA
Fording Depth: INA

Missile System

Name: INA

Length: 6.8-7.25 m

Diameter: m0.45-0.50

Warhead Type: Explosive HE

Warhead Weight: kg120-200

Engine: Solid propellant rocket engine

Propellant: Solid , composite

Maximum Elevation: INA

Maximum Elevation: INA

Traverse Range: INA

Traverse Right: INA

Traverse Left: INA

Maximum Operational Range: km150

Guidance System: Radar, Data Link

Launch Platform: TEL, 6x6 KamAZ-55111 truck (Taebaeksan 96)

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: INA

Direct Fire: Yes

Indirect Fire: Yes

↳*Radar*

Name: Flap Lid

Type: Phased Array Radar

Function: Target Radar

Frequency/Band: I/J-Band

Maximum Range: km300

Number of Targets System can Track: Flap Lid provides for the simultaneous tracking of six targets with each of these being engaged by two missiles.

Counter Measure: It is stated that the radar is highly resistant to electronic countermeasures and has a high-resolution capability.

Sector of Interest: The whole radar cabin is mounted on a turntable and used to slew the phased array to cover a 60 or 100 degree sector of interest.

Target Elecation Coverage: Flap Lid has a target elevation coverage reported to be from 0 to 50º, but is believed to have been modified to provide cover up to 75º for ballistic missile defence.

Protection

Hull Armor: INA
Applique Armor: No
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: INA
Smoke Equipment: INA

Notes:

The KN-06 (Korean: □□ 5□; MR: Pon'gae-5) is a North Korean surface-to-air missile system. The system was first shown publicly at the 65th anniversary of the Workers' Party of Korea on October 10, 2010. The KN-06 is a long-range SAM that bears resemblance to the Russian S-300 and Chinese FT-2000. Imagery of missile launch tubes shows they are larger in diameter, but shorter than the S-300's missiles. The missiles are mounted on locally produced, stretched 6X6 KamAZ 55111 (Taebaeksan 96) launcher trucks, with each holding two or three missile tubes. The KN-06 is reportedly capable of hitting targets minimum up to 250 kilometres (160 mi) away. The system is equipped with a Flap Lid type phased array radar. A test launch occurred in June 2011. Another test launch, attended by Kim Jong-Un was reported on 2 April 2016. As of May 2017, it was reportedly still undergoing testing. The system underwent final testing on May 28, 2017 with KCNA reporting that 'glitches' previously identified during testing had been resolved. It said the new system would be mass-produced and deployed across the country. As many as 156 KN-06 launchers could be operational according to the Center for Strategic and International Studies.

S-200 Dubna (SA-5 Gammon) (Export) North Korean Surface-to-Air Missile (SAM) System





Tiers:



Variants:

- **SA-5a (S-200A Angara):** This missile attained initial operating capability in 1962 on the "Tallinn line" with conventional warheads. System includes a V-860/5V21 or V-860P/5V21A missile; range, 88 mi (160 km); and ceiling, 66,000 ft (20 km).
- **SA-5b (S-200V Vega):** This version reached initial operating capability in 1970 with nuclear warhead. Other versions include the S-200 Vega with a V-870 missile and range 186 mi (300 km). Also: S-200M Vega-M with a V-880E/5V28E missile, export version, high-explosive warhead only, with a range of 155 mi (250 km) and, ceiling of 95,000 ft (29 km).
- **SA-5c (S-200D Dubna):** The SA-5c's initial operating capability was attained in 1975 with a dual-capable (nuclear or conventional) warhead and upgraded terminal homing capability. Characteristics include a 5V25V, V-880M/5V28M or V-880MN/5V28MN2 missile, with a range of 248 mi (400 km) and a ceiling of 125,000 ft (40 km).
- **SA-5d:** This designation was briefly used for the SA-X-12 Gladiator missile.
- **SA-5e:** This variant attained initial operating capability in 1983 with a passive anti-radiation seeker. It was probably designed to be used against AWACS aircraft

System

Alternative Designation: SA-5 Gammon; S-200 Angara (Russian system designation) S-200 Volga (Russian system designation) S-200 Vega (Russian system designation) V-860 (Russian missile designator) 5V28 (Russian missile designator)

Type: A very long range, medium-to-high altitude surface-to-air missile (SAM) system.

Family: SA-5 Series

In Service: 1967-Present

Wars: First Libyan Civil War Syrian Civil War

Crew: eaINA

Displacement Time: minINA

Emplacement Time: minINA

Fire on the Move: No

Guidance System: Semi-active radar homing

Dimensions

Missile Length: m10.72

Wingspan: m2.85

Mainbody Diamter: m0.85

Solid Propellant Booster Length: m4.9

Solid Propellant Booster Width: m0.48

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

Automotive

Engine: 4 x solid-fuel boosters; solid-fuel second stage

Speed: Mach 4

Maximum Range: km7

Minimum Range: km300

Maximum Altitude: INA

Minimum Altitude: km35

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail

Maximum Effective Range: km250

Minimum Effective Range: kmThe missile's minimum range of 60 km is due to the booster burn time and jettison requirements, limiting the system to engagements against relatively large unmaneuverable targets at ranges up to 250 km.

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

↳*Missile (Option 1)*

Name: 5V21

Type: HE-Frag

Variant: Angara (A)

Length: m10.5

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km150-180

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳*Missile (Option 2)*

Name: 5V28

Type: HE-Frag

Variant: Vega (V)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km200

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳*Missile (Option 3)*

Name: 5V28

Type: HE-Frag, Nuclear

Variant: Vega M (VM)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km250

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No, due to booster burn time and jettison requirements

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Guidance System: Semi-active radar homing

↳*Radar #1*

Name: P-15M(2)

Type: Squat Eye

Function: INA

Frequency: C-band

Range: km128

Associated Weapon System: SA-3/5

Recognition: Power 380kw

↳*Radar #2*

Name: P-14

Type: TALL KING

Function: Electronic Warfare

Range: km605

Frequency: A Band

Associated Weapon System: SA-5

Recongintion: Scan 2-6rpm

↳*Radar #3*

Name: PRV-11

Type: SIDE NET

Function: Height

Range: 28 km 32km Max altitude

Frequency: E-band

Associated Weapon System: SA-2/3/5

Recognition: INA

↳*Radar #4*

Name: INA

Type: BACK NET

Function: EW/GCI

Range: 300 km

Frequency: E-Band

Associated Weapon System: SA-5

Recognition: 3-6 rpm Scan

↳*Radar #5*

Name: P-35/37

Type: BAR LOCK

Function: EW

Range: 200 km

Frequency: E/F-bands

Associated Weapon System: SA-5

Recognition: INA

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The S-200 Volga (SA-5 Gammon**) is a Russian long-range, high-altitude strategic surface-to-air missile (SAM). It is a fixed-site, point defense SAM that relies on long range early warning and ground control intercept radars (Big Back, Bar Lock , Tin Shield and Side Net) for target tracking information and 5N62 series Square Pair** radar for fire control. The S-200 surface-to-air missile system was designed for the defense of the most important administrative, industrial and military installations from all types of air attack. S-200 provides defeat of modern and advanced aircraft, including air command and control centers, AWACS aircraft, aircraft jamming creation and other manned and unmanned aerial vehicles. The S-200 is an all-weather system that can be operated in various climatic conditions. By 1966, the S-200 was officially accepted into service in order to replace the failed anti-ballistic missile RZ-25/5V11 "Dal". The Dal was assigned the NATO reporting name SA-5 "Griffon" before it was cancelled. The first S-200 operational regiments were deployed in 1966 with 18 sites and 342 launchers in service by the end of the year. By 1968 there were 40 sites, and by 1969 there were 60 sites. The growth in numbers then gradually increased throughout the 1970s (1,100 launchers) and early 1980s until the peak of 130 sites and 2,030 launchers was reached in 1980–1990. Each missile is launched by 4 solid-fueled strap-on rocket boosters.[7] After they burn out and drop away (between 3 and 5.1 seconds from launch) it fires a 5D67 liquid fueled sustainer rocket engine (for 51–150 seconds) which burns a fuel called TG-02 Samin (50% xylidine and 50% triethylamine), oxidized by an agent called AK-27P Melange (red fuming nitric acid enriched with nitrogen oxides, phosphoric acid and hydrofluoric acid). Maximum range is between 150 km (81 nmi) and 300 km (160 nmi), depending on the model. The missile uses radio illumination mid-course correction to fly towards the target with a terminal semi-active radar homing phase. Maximum target speed is around Mach 6 for new model and Mach 4 for earlier model. Effective altitude is 300 m (980 ft) to 20,000 m (66,000 ft) for early models and up to 35,000 m (115,000 ft) for later models. The warhead is either 217 kg (478 lb) high-explosive fragmentation (16,000 × 2 g fragmentation pellets and 21,000 × 3.5 g pellets) triggered by radar proximity fuse or command signal, or a 25 kt nuclear warhead triggered by command signal only. Each missile weighs around 7,108 kg (15,670 lb) at takeoff. The system utilises radio semi active guidance throughout the missile's flight, which is far more accurate at long range than the command guidance method used by the earlier S-75 Dvina and other missiles. The existence of an optional terminal passive radar homing mode for use against airborne early warning (AEW) aircraft remains unconfirmed. Peak missile speed is around Mach 8 and the single-shot kill probability is quoted as 0.85, presumably against a high altitude bomber-type target. The fire control radar of the S-200 system is the 5N62 (NATO: Square Pair) H band continuous wave radar, whose range is 270 km (170 mi). It is used for both the tracking of targets and their illumination. Additional radar systems * P-14/5N84A "Tall King" A-band early warning radar (range 600 km (370 mi), 2–6 RPM, maximum search altitude 46 km (29 mi)) * "Big Back" E-band early warning radar 600 km (370 mi) Kabina 66/5N87 "Back Net" or "Back Trap" E-band early warning radar (with special low-altitude search mod, range 370 km (230 mi), 3–6 RPM) * P-35/37 "Bar Lock\Bar Lock B" 1,000 kW E\F-band target detection and tracking radar (with integrated IFF, range 392 km (244 mi), 7 RPM) * "Side Net" or "Odd Pair" E-band height finding radar (also used by the SA-2, SA-4 and SA-6, range 240 km (150 mi), 3–6 RPM) P-15M(2) "Squat Eye" 380 kW C-band target detection radar (range 128 km (80 mi)

SA-20C (S-300PMU-2) Iranian-Long Range Air Defense Missile System



Tiers:



Parent:

SA-20 Gargoyle (S-300PMU-1) Russian Surface-to-Air Missile (SAM) System

Variants:

- **S-300PMU2 Favorit/SA-20B:** This is an upgraded variant with larger 9M96E and 9M96E2 missiles developed for the S-400 . It can also fire the previous 5V55K , 5V55R , 48N6E and 48N6E2 missiles. It is equipped with an improved guidance system. Unveiled in 1997, the system has an increased range of 124 mi (200 km). The 48N6E2 missile features a warhead designed to destroy ballistic missiles.

System

Alternative Designation: SA-20C, Iranian S-300PMU-2)
Manufacturer: MZiK
Type: long range surface-to-air missile systems. multi-channel mobile air defense system
Family: S-300 Family
In Service: 1997-Present
Crew: eaINA
Chassis: MAZ-543 Special Wheeled Chassis
Displacement Time: INA
Emplacement Time: 5 Minutes
Maximum Range of Fire: km165
Maximum Altitude: km27
Number of Targets Engaged Simultaneously: ea6
Reload Vehicile: 5T58 reload vehicle
Note #1: Capable of hitting ballistic and aerodynamic targets. Became the first multi-channel anti-aircraft missile system, is able to accompany each system (ADMS) to 6 goals and build them up to 12 missiles
Note #2: A typical SA-20 battery consists of 48 missiles on 12 mobile launchers. Each battery can launch a 48N6 missile every three seconds.

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7

Width: m3.07

Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Configuration: 8x8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Communications

Note: See Fire Control

Missile System

Note #1: The S-300 family missiles have four clipped folding triangular moving control fins at the rear and four thrust vector control vanes in the motor efflux.

Note #2: Missiles are vertically launched by a hot gas cartridge in the canister base. The motor ignites once the missile reaches an altitude of 25 m.

↳*Missile Launcher*

Name: 5P85S or 5P85D launchers

Type: Tube Launcher

Anti-Ballistic Missile (ABM) Capability: Yes

Note: The missiles can be fired in a salvo with an interval between 3 and 5 seconds

↳*Missile (Option 1)*

Name: 48N6E2

Engine Type: Single-stage, solid-fuel-propelled

Type: INA

Length: m7.5

Width: m0.5

Weight: kg1,780

Warhead Weight: 70-100 kg

Maximum Range: km200

Guidance System: Track-via-missile

TVM Guidance Capable: Yes

ABM Capable: Yes

Maximum Velocity: m/s2,000

Speed: Mach 6

Kill Probability: 0.70 to 0.93 single shot

Ballistic Targets Range: km5-40

Basic Load: 4 per TEL

Maximum Altitude: km28

Minimum Altitude: m10

Note: The 48N6E2 can engage targets with a maximum speed of Mach 8.

↳*Missile (Option 2)*

Name: 5V55R/5V55KD

Type: INA

Length: m7

Diameter: mm450

Weight: kg1,450

Warhead Weight: kg100

Maximum Range: km90

Guidance System: SARH

Maximum Velocity: m/s1,900

Maximum Target Speed: m/s1,150

Basic Load: 4 per TEL

↳*Missile (Option 3)*

Name: 9M96E1

Type: INA

Length: INA

Width: INA

Weight: kg330

Warhead Weight: kg24

Maximum Range: km40

Guidance System: Active radar homing

Maximum Velocity: m/s900

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

↳*Missile (Option 4)*

Name: 9M96E2

Type: INA

Width: INA

Weight: kg420

Warhead Weight: kg24

Maximum Range: km120

Guidance System: Active radar homing

Maximum Velocity: m/s1,000

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

Fire Control

Command Post Vehicle: 54K6E2 Command Post Vehicle

↳*Fire Control System*

Name: 83M6E2 Command and Control System

Computerized FCS: Yes

Direct Fire: Yes, no less than 1km

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Number of Targets Engaged Simultaneously: ea6

GPS/GLONASS Enabled: Yes

Loran-C Capable: Yes

Fiber-optic Gyros: Yes

Note #1: The vehicle lowers four hydraulic jacks for launch

Note #2: The S-300PMU2 air defense missile system can simultaneously engage up to 36 air targets by 72 missiles.

↳*Radar #1*

Name: 64N6 BIG BIRD

Type: Surveillance and Target Acquisition Radar

NATO Reporting Name: BIG BIRD

Frequency/Band: 3D S-band radar

Target Detection Range: km600

Simultaneously Detected Targets: +300

Note #1: It has 3 400 elements on each side (a total of 7 800), which is a great number for a radar in this band

Note #2: Regiment Radar

↳*Radar #2*

Name: 30N6E2 Tomb Stone

Type: Illumination and Guidance Radar

Mission: primarily designed to be used as an engagement radar and to track targets and guide missiles to impact using a command link channel

NATO Reporting Name: FLAP LID B

NATO Frequency Band: I-J

Target Detection Range: km300

Azimuth Detection: deg360

Number of Tragets Detection: ea100

Simultaneously Engaged Targets: ea6

Maximum Target Speed: 30 - 2,800 m/s

Antenna: Antenna RPN 30N6E2 may rise to a special mobile tower 40V6M.

Chassis: The 30N6E2 Tomb stone radar is mounted on the high mobility truck chassis 8x8 MAZ-7910 vehicle derived from the MAZ-543

Missile Control: km72

Time Ready to Work: min5

Maximum Elevation: deg+60

Minimum Elevation: deg-3

↳*Radar #3*

Name: 96L6E - CHEESE BOARD Radar

Type: 3D early-warning and acquisition radar

NATO Reporting Name: CHEESE BOARD

Introduction Date: 1997

NATO Frequency Band: INA

Target Detection Range: km300

Simultaneously Tracked Targets: ea100

Works in Conjunction with: the 83M6E2 control post and S-300MPU2 launchers

Chassis: MAZ-7930 (8x8) truck chassis and is intended for use with the S-300PMU and S-300PMU1 air defence systems as an upgrade to replace several existing radar's with a single more capable system

Band: C-Band

Crew: Three operators are needed to run the set. Up to five operator consoles are provided

Antenna: The phased-array antenna with 96 radiating rows employs mechanical beamsteering in azimuth and electronic beamsteering in elevation

Antenna Rotation: 5-10 rpm

Mean Time Betweeen Critical Failure: 10,000 hours

High Jam Resistance: Yes

Frequency Hoppying: Yes

High Clutter Rejection: Yes

Operation Modes: There are two operation modes implemented: Low altitude targets can be acquired by constraining the mainlobe elevation angle between -3° and +1.5° using an antenna rotation of 5 rpm

Note: The 96L6E “Cheese Board” is designed to replace the 36D6 “Tin Shield B” and 76N6 “Clam Shell”.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Note: Protection. Additional elements of protection are the placement of components of C-300 in the trenches (practiced as placing on the hills for a better view and more rapid care of the horizon, and in the trenches for stealth and protection against fragments of explosions).

Notes:

The SA-20C is a exported version of the S-300PMU-2 The S-300PMU-2 or SA-20B Favorit air defense missile system was developed specially for export. It evolved from the S-300PM-2, which was developed for the Russian Armed Forces. The S-300PMU-2 has the highest capabilities in the S-300P family. It was introduced in 1997. As of 2016 this system is 19 years old. The S-300PMU-2 is referred in the West as SA-20B Gargoyle. It uses a 30N6E1 (Tomb Stone) radar. This radar has a range of 300 km, can detect 100 targets, track and engage 36 of them and guide 72 missiles. It is worth noting that earlier radars of the S-300 family could simultaneously engage only 6 targets and guide 12 missiles. The S-300PMU-2 Favourite (DoD designation SA-20B), introduced in 1997 (presented ready 1996), is an upgrade to the S-300PMU-1 with range extended once again to 195 km (121 mi) with the introduction of the 48N6E2 missile. This system is apparently capable against not just short range ballistic missiles, but now also medium range ballistic missiles. It uses the 83M6E2 command and control system, consisting of the

54K6E2 command post vehicle and the 64N6E2 surveillance/detection radar. It employs the 30N6E2 fire control/illumination and guidance radar. Like the S-300PMU-1, 12 TELs can be controlled, with any mix of 5P85SE2 self-propelled and 5P85TE2 trailer launchers. Optionally it can make use of the 96L6E all altitude detection radar and 76N6 low altitude detection radar. A version titled HQ-15 is currently in Chinese service.

S-200 Dubna (SA-5 Gammon) Russian Surface-to-Air Missile (SAM) System





Tiers:



Variants:

- **SA-5a (S-200A Angara):** This missile attained initial operating capability in 1962 on the "Tallinn line" with conventional warheads. System includes a V-860/5V21 or V-860P/5V21A missile; range, 88 mi (160 km); and ceiling, 66,000 ft (20 km).
- **SA-5b (S-200V Vega):** This version reached initial operating capability in 1970 with nuclear warhead. Other versions include the S-200 Vega with a V-870 missile and range 186 mi (300 km). Also: S-200M Vega-M with a V-880E/5V28E missile, export version, high-explosive warhead only, with a range of 155 mi (250 km) and, ceiling of 95,000 ft (29 km).
- **SA-5c (S-200D Dubna):** The SA-5c's initial operating capability was attained in 1975 with a dual-capable (nuclear or conventional) warhead and upgraded terminal homing capability. Characteristics include a 5V25V, V-880M/5V28M or V-880MN/5V28MN2 missile, with a range of 248 mi (400 km) and a ceiling of 125,000 ft (40 km).
- **SA-5d:** This designation was briefly used for the SA-X-12 Gladiator missile.
- **SA-5e:** This variant attained initial operating capability in 1983 with a passive anti-radiation seeker. It was probably designed to be used against AWACS aircraft

System

Alternative Designation: SA-5 Gammon; S-200 Angara (Russian system designation) S-200 Volga (Russian system designation) S-200 Vega (Russian system designation) V-860 (Russian missile designator) 5V28 (Russian missile designator)
Type: A very long range, medium-to-high altitude surface-to-air missile (SAM) system.
Family: SA-5 Series
In Service: 1967-Present
Wars: First Libyan Civil War Syrian Civil War
Crew: eaINA
Displacement Time: minINA
Emplacement Time: minINA
Fire on the Move: No

Guidance System: Semi-active radar homing

Dimensions

Missile Length: m10.72

Wingspan: m2.85

Mainbody Diamter: m0.85

Solid Propellant Booster Length: m4.9

Solid Propellant Booster Width: m0.48

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

Automotive

Engine: 4 x solid-fuel boosters; solid-fuel second stage

Speed: Mach 4

Maximum Range: km7

Minimum Range: km300

Maximum Altitude: INA

Minimum Altitude: km35

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail

Maximum Effective Range: km250

Minimum Effective Range: kmThe missile's minimum range of 60 km is due to the booster burn time and jettison requirements, limiting the system to engagements against relatively large unmaneuverable targets at ranges up to 250 km.

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

↳*Missile (Option 1)*

Name: 5V21

Type: HE-Frag

Variant: Angara (A)

Length: m10.5

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km150-180

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳***Missile (Option 2)***

Name: 5V28

Type: HE-Frag

Variant: Vega (V)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km200

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳***Missile (Option 3)***

Name: 5V28

Type: HE-Frag, Nuclear

Variant: Vega M (VM)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km250

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

Fire Control

↳***Fire Control System***

Name: INA

Computerized FCS: Yes

Direct Fire: No, due to booster burn time and jettison requirements

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Guidance System: Semi-active radar homing

↳*Radar #1*

Name: P-15M(2)

Type: Squat Eye

Function: INA

Frequency: C-band

Range: km128

Associated Weapon System: SA-3/5

Recognition: Power 380kw

↳*Radar #2*

Name: P-14

Type: TALL KING

Function: Electronic Warfare

Range: km605

Frequency: A Band

Associated Weapon System: SA-5

Recongintion: Scan 2-6rpm

↳*Radar #3*

Name: PRV-11

Type: SIDE NET

Function: Height

Range: 28 km 32km Max altitude

Frequency: E-band

Associated Weapon System: SA-2/3/5

Recognition: INA

↳*Radar #4*

Name: INA

Type: BACK NET

Function: EW/GCI

Range: 300 km

Frequency: E-Band

Associated Weapon System: SA-5

Recognition: 3-6 rpm Scan

↳*Radar #5*

Name: P-35/37

Type: BAR LOCK

Function: EW

Range: 200 km

Frequency: E/F-bands

Associated Weapon System: SA-5

Recognition: INA

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The S-200 Volga (SA-5 Gammon**) is a Russian long-range, high-altitude strategic surface-to-air missile (SAM). It is a fixed-site, point defense SAM that relies on long range early warning and ground control intercept radars (Big Back, Bar Lock , Tin Shield and Side Net) for target tracking information and 5N62 series Square Pair** radar for fire control. The S-200 surface-to-air missile system was designed for the defense of the most important administrative, industrial, and military installations from all types of air attack. S-200 provides defeat of modern and advanced aircraft, including air command and control centers, AWACS aircraft, aircraft jamming creation and other manned and unmanned aerial vehicles. The S-200 is an all-weather system that can be operated in various climatic conditions. By 1966, the S-200 was officially accepted into service in order to replace the failed anti-ballistic missile RZ-25/5V11 "Dal". The Dal was assigned the NATO reporting name SA-5 "Griffon" before it was cancelled. The first S-200 operational regiments were deployed in 1966 with 18 sites and 342 launchers in service by the end of the year. By 1968 there were 40 sites, and by 1969 there were 60 sites. The growth in numbers then gradually increased throughout the 1970s (1,100 launchers) and early 1980s until the peak of 130 sites and 2,030 launchers was reached in 1980–1990. Each missile is launched by 4 solid-fueled strap-on rocket boosters.[7] After they burn out and drop away (between 3 and 5.1 seconds from launch) it fires a 5D67 liquid fueled sustainer rocket engine (for 51–150 seconds) which burns a fuel called TG-02 Samin (50% xylidine and 50% triethylamine), oxidized by an agent called AK-27P Melange (red fuming nitric acid enriched with nitrogen oxides, phosphoric acid and hydrofluoric acid). Maximum range is between 150 km (81 nmi) and 300 km (160 nmi), depending on the model. The missile uses radio illumination mid-course correction to fly towards the target with a terminal semi-active radar homing phase. Maximum target speed is around Mach 6 for new model and Mach 4 for earlier model. Effective altitude is 300 m (980 ft) to 20,000 m (66,000 ft) for early models and up to 35,000 m (115,000 ft) for later models. The warhead is either 217 kg (478 lb) high-explosive fragmentation (16,000 × 2 g fragmentation pellets and 21,000 × 3.5 g pellets) triggered by radar proximity fuse or command signal, or a 25 kt nuclear warhead triggered by command signal only. Each missile weighs around 7,108 kg (15,670 lb) at takeoff. The system utilises radio semi active guidance throughout the missile's flight, which is far more accurate at long range than the command guidance method used by the earlier S-75 Dvina and other missiles. The existence of an optional terminal passive radar homing mode for use against airborne early warning (AEW) aircraft remains unconfirmed. Peak missile speed is around Mach 8 and the single-shot kill probability is quoted as 0.85, presumably against a high altitude bomber-type target. The fire control radar of the S-200 system is the 5N62 (NATO: Square Pair) H band continuous wave radar, whose range is 270 km (170 mi). It is used for both the tracking of targets and their illumination. Additional radar systems * P-14/5N84A "Tall King" A-band early warning radar (range 600 km (370 mi), 2–6 RPM, maximum search altitude 46 km (29 mi)) * "Big Back" E-band early warning radar 600 km (370 mi) Kabina 66/5N87 "Back Net" or "Back Trap" E-band early warning radar (with special low-altitude search mod, range 370 km (230 mi), 3–6 RPM) * P-35/37

"Bar Lock\Bar Lock B" 1,000 kW E\F-band target detection and tracking radar (with integrated IFF, range 392 km (244 mi), 7 RPM) * "Side Net" or "Odd Pair" E-band height finding radar (also used by the SA-2, SA-4 and SA-6, range 240 km (150 mi), 3–6 RPM) P-15M(2) "Squat Eye" 380 kW C-band target detection radar (range 128 km (80 mi)

S-300PMU-2 Favourite (SA-20B) Russian Long-Range Air Defense Missile System





Tiers:



Variants:

- **Note:** The S-300 Family has over 25 different varients.

System

Alternative Designation: S-300PPMU-2 Favorit; SA-20B
Manufacturer: MZiK
Type: long range surface-to-air missile systems. multi-channel mobile air defense system
Family: S-300 Family
In Service: 1997-Present
Crew: eaINA
Chassis: MAZ-543 Special Wheeled Chassis
Displacement Time: INA
Emplacement Time: 5 Minutes
Number of Targets Engaged Simultaneously: ea6
Reload Vehicile: 5T58 reload vehicle
Note #1: Capable of hitting ballistic and aerodynamic targets. Became the first multi-channel anti-aircraft missile system, is able to accompany each system (ADMS) to 6 goals and build them up to 12 missiles
Note #2: The S-300PMU2 Favorit can engage targets flying from 10 m to 27 km above the surface at a speed of up to 10,000 km/h. It is claimed that it has a kill ratio ranging from 0.8 to 0.93 against aircraft and from 0.8 to 0.98 against Tomahawk-class cruise missiles.

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7

Width: m3.07

Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Configuration: 8x8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Communications

Note: See Fire Control

Missile System

Note #1: This system is apparently capable against not just short range ballistic missiles, but now also medium range ballistic missiles.

Note #2: Against ballistic targets, such as theater ballistic missiles the S-300PMU-2 system uses the 48N6E2 missiles. Role of the 9M96E2 is to defeat more capable targets, like high speed re-entry vehicles in 35 km altitude, and ballistic missiles with a range of more than 2 000 km. The 9M96E is also capable of engaging cruise missiles, anti-radiation missiles, guided bombs and other precision guided munitions. The 48N6 missiles has single shot kill probability of 80% to 93% for an aerial target, 40% to 85% for cruise missiles and 50% to 77% for theater ballistic missiles. The 9M96 missiles has a single shot kill probability of 70% against Harpoon class missile and 90% against a manned aircraft.

↳*Missile Launcher*

Name: Like the S-300PMU-1, 12 TELs can be controlled, with any mix of 5P85SE2 self-propelled and 5P85TE2 trailer launchers.s

Type: The missiles use "cold" vertical launch - before starting sue-tainer they launched from a container to height over 30 metres.

Anti-Ballistic Missile (ABM) Capability: Yes

Note #1: The missiles can be fired in a salvo with an interval between 3 and 5 seconds

↳*Missile (Option 1)*

Name: 48N6E2 missile

Engine Type: Single-stage, solid-fuel-propelled

Type: SAM

Length: m7.5

Diameter: 0.5

Weight: kg1,800

Warhead Weight: kg150

Maximum Range: km200

Speed: Mach 6

Maximum Altitude: m10

Minimum Altitude: km28

Maximum Target Speed: Mach 8

Ballistic Missile Engagement: Yes, his missile is optimized to engage ballistic missiles.

Guidance System: Track-via-missile

Basic Load: 4 per TEL

↳*Missile (Option 2)*

Name: 9M96E1

Type: SAM

Length: m4.75

Diameter: m0.24

Weight: kg330

Warhead Weight: kg24

Maximum Range: km40

Maximum Altitude: km20

Guidance System: Active radar homing

Maximum Velocity: m/s900

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

↳*Missile (Option 3)*

Name: 9M96E2

Type: SAM

Length: m5.56

Diameter: m0.24

Weight: kg420

Warhead Weight: kg24

Maximum Range: km120

Maximum Altitude: km35

Guidance System: Active radar homing

Maximum Velocity: m/s1,000

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

Guidance System: Active radar homing

Fire Control

Command Post Vehicle: The 54K8 command-post vehicle has six operator positions. The command post can monitor data within a 300-km radius and can track 100 targets while controlling up to six interceptions. Two missiles can be launched against each target if required.

↳*Fire Control Radar System Vehicle*

Name: 30N6E2 (Tomb Stone) fire control/illumination and guidance radar

Computerized FCS: Yes

Direct Fire: Yes, no less than 1km

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Maximum Detection Range: km300

Missile Control: up to 72

Time to work: min5

Number of Targets Detection: 100

Number of Targets to Track and Engage: 36

Maximum Elevation: deg+60

Minimum Elevation: deg-3

Azimuth Detection: deg360

Maximum Target Speed: 30 - 2,800 m/s

↳*Air Surveillance Radar Vehicle*

Name: 64N6E2

Type: Long-range air surveillance radar

Maximum Detection Range: km600

Band: S-Band

Jamming Resistance: Yes, The system has high resistance against jamming.

Note: It is the most capable radar of the S-300 missile system and has a key role of defeating ballistic missiles and electronic warfare aircraft.

↳*Command Post Vehicle*

Name: 83M6E2 Command Post (CP)

Note: The 83M6E2 command post (CP) is intended for operational control of multichannel SAM system S-300 PMU, S-300 PMU1. S-300 PMU2, S-200DE and S-200VE and cooperation among SAM system groupings and with higher command. The 83M6E2 is a highly mobile automated control aid providing the above SAM systems with designation of targets including modem and future aircraft, cruise missiles, ballistic targets and other air attack means over the entire range of there practical employment, cooperation between SAM systems (also under intensive jamming conditions). To control the SAM systems, the 83M6E2 uses its own radar data and data received from the controlled SAM systems, as well as information derived from higher control aids, electronic reconnaissance troops and neighbouring SAM systems groupings.

↳*All-Altitude Detector and Acquisition Radar Vehicle*

Name: 96L6

Type: All-Altitude Detector and Acquisition Radar

Band: L-Band

Maximum Range: km300

Detect and Track Targets: 100

Target Class Identification: It identifies 4 target classes, including aircraft, helicopters, remotely piloted aerial vehicles, and missiles. It is claimed that this radar can also detect stealthy targets.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Note: Protection. Additional elements of protection are the placement of components of C-300 in the trenches (practiced as placing on the hills for a better view and more rapid care of the horizon, and in the trenches for stealth and protection against fragments of explosions).

Notes:

The S-300PMU-2 or Favorit air defense missile system was developed specially for export. It evolved from the S-300PM-2, which

was developed for the Russian Armed Forces. The S-300PMU-2 has the highest capabilities in the S-300P family. It was introduced in 1997. As of 2016 this system is 19 years old. The S-300PMU-2 is referred in the West as SA-20B Gargoyle. It uses a 30N6E1 (Tomb Stone) radar. This radar has a range of 300 km, can detect 100 targets, track and engage 36 of them and guide 72 missiles. It is worth noting that earlier radars of the S-300 family could simultaneously engage only 6 targets and guide 12 missiles. Unlike the previous S-300PMU-1, the S-300PMU-2 don't use the 36D6 (Tin Shield) and 76N6 (Clam Shell) radars. Instead the system uses 96L6 all-altitude detector and acquisition radar. The 96L6 works in L-band. It has a 300 km range and very high resolution. The system can detect and track 100 targets. It identifies 4 target classes, including aircraft, helicopters, remotely piloted aerial vehicles, and missiles. It is claimed that this radar can also detect stealthy targets. The S-300PMU2 Favorit system is comprised of: * 83M6E2 command post (CP) * up to six 90Zh6E2 air defence missile complexes * 48N6E2 air defence missiles * technical support facilities. A battery of the S-300PMU-2 also includes the 30N6E2 X-band engagement radar, the 96L6E L-band acquisition radar, eight (maximum of twelve are supported) 5P58TE/SE or 5T58-2 TELs with missiles a 54K6E2 or 55K6E command post and a 22T6E2 missile loader. Also battalions uses one or two 64N6E2 S-band radars.

S-300P (SA-10 Grumble) Russian 8x8 Long-Range Surface-to-Air Missile System







Tiers:



Variants:

- **S-300PS/S-300PM:** introduced in 1985 and is the only version thought to have been fitted with a nuclear warhead. This model saw the introduction of the modern TEL and mobile radar and command-post vehicles that were all based on the MAZ-7910 8 × 8 truck
- **S-300PMU:** introduced in 1992 for the export market and featured the upgraded 5V55U missile which still utilised the intermediate SARH terminal guidance method and smaller warhead of the 5V55R but increased the engagement envelope to give this missile roughly the same range and altitude capabilities as the newer 48N6 missile (max. range 150 km/93 mi). The radars were also upgraded, with the surveillance radar for the S-300PMU being designated 64N6 (BIG BIRD) and the illumination and guidance radar being designated 30N6-1 in the GRAU index
- **S-300PMU-1/2 (SA-20):** The S-300PMU-1 (Russian: С-300ПМУ-1, US DoD designation SA-20A, NATO reporting name SA-20 Gargoyle) was also introduced in 1993 with the new and larger 48N6 missiles for the first time in a land-based system and introduced all the same performance improvements from the S300FM version including the increased speed, range, TVM guidance and ABM capability.[14][15] The warhead is slightly smaller than the naval version at 143 kg (315 lb). This version also saw the introduction of the new and more capable 30N6E TOMB STONE radar.
- **S-300PMU-2:** ntroduced in 1997 (presented ready 1996), is an upgrade to the S-300PMU-1 with range extended once again to 195 km (121 mi) with the introduction of the 48N6E2 missile. This system is apparently capable against not just short range ballistic missiles, but now also medium range ballistic missiles.

System

Alternative Designations: S-300PM
Target: FW, heli, TBM, CM, ASM, UAV
Primary Components per Battery: 1 5P85S cmd TEL. 1 5P85D slaveTEL. 1 5P85 trailer launcher. 1 30N6 radar/fire control vehicle A 5P85SU launcher has a command shelter behind the cab. A 5P58DU TEL does not.
Manufacturer: MZiK
In Service: 1987-Present
Crew: ea6
Chassis: MAZ-7910 8 x 8 Truck

Dimensions (Chassis: MAZ-7910 8 x 8 Truck)

Length: m9.40
Width: m3.10
Height: m3.70
Weight: kg20,000

Automotive (Chassis: MAZ-7910 8 x 8 Truck)

Engine Name: D12A-525
Engine Type: V-12 water-cooled diesel
Engine Power: 525 hp at 2,100 rpm
Power-to-Weight Ratio: 26.25 hp/metric ton
Maximum Speed, Road: km/h60
Maximum Speed, Off-Road: km/h30
Maximum Range: km800
:

Communications

VHF Radio: R-168 Akveduk
HF Radio: R-161 Poisk

Weapon System

↳*Launcher System*

Name: 5P85-1 Launch Vehicles
Type: INA
Launcher Maximum Elevation: deg+90
Launcher Minimum Elevation: INA
Max Targets Engaged: 6 simultaneously
Max Missiles Guided: 12 simultaneously
Set-ip Time: 9 to 11 seconds
Close-down Time: min5
Rate of Fire: 1/3-5 sec
Armament: 4 x 5V55R SAMs per launcher

↳*Missile*

Name: 5V55R
Type: Radar Guided Missile
Length: m7

Diameter: 450mm

Weight: 1,450 kg

Warhead Weight: 100 kg

Maximum Target Speed: m/s1,150

Maximum Velocity: 1,900 m/s

Operational Range: 47 km - 75 km

Note #1: The S-300P can fire the following list of missiles: 5V55K; 5V55R; 5V55V; 5V55KD; 5V55U

Note #2: missile has active radar w/terminal homing system that can engage up to 6 targets at once

Fire Control

Note: The original S-300P utilises a combination of the 5N66M continuous-wave radar Doppler radar for target acquisition and the 30N6 FLAP LID A I/J-band phased array digitally steered tracking and engagement radar. Both are mounted on trailers.

↳*Radar #1*

Name: 30N6 Flap Lid FLAP Lid

Type: Engagement Radar

Antenna: 2.75 sq m

Band: I-J (8-20 GHz)

Interception Range: km90

Minimum Interception Altitude: m25

Maximum Target Velocity: 4,200 kmh

Target Elevation Coverage: 0-50 degrees

Screening angle: 100 degrees

Mount: The 30N6 FLAP LID A is mounted on a small trailer

Note: The 36D6 TIN SHIELD radar can also be used to augment the S-300 system to provide earlier target detection than the FLAP LID radar allows. It can detect a missile-sized target flying at an altitude of 60 metres (200 ft) at least 20 km (12 mi) away, at an altitude of 100 m (330 ft) at least 30 km (19 mi) away, and at high altitude up to 175 km (109 mi) away. In addition a 64N6 BIG BIRD E/F band target acquisition radar can be used which has a maximum detection range of 300 km (190 mi).

↳*Radar #2*

Name: 76N6 Clam Shell

Type: Acquisition Radar

Band: I (8-10 GHz)

Power: 1.4 kW continuous wave

Turn-on Time: 3 min

Setup Time (40V6M mast): 1 hour

Detection Range, Target Flying at 500 meters: km90

Detection Range, Target Flying at 1,000 meters: km120

Target Tracking: up to 180

Target Resolution Azimuth: deg1

Target Resolution Range: 1.9 km

Target Resolution Velocity: 8.7 kmh

Minimum detectable Radar Cross-Section (RCS): 0.02 sq m

Maximum Target Speed: Mach 2.1

Average Power: 1.4 kW

Peak Power: 55.0 kW

Mean Time Between Failures: 100 hours

Mount: he 76N6 CLAM SHELL (5N66M etc.) is mounted on a large trailer with a mast which is between 24 and 39 m (79 and 128 ft) tall. Usually is used with a mast.

↳***Radar #3***

Name: 64N6 (Big Bird) Surveillance Radar

Type: Designation Radar

Crew: ea6

Weight: 60,000 kg

Band: 2 GHz

Coverage Azimuth: 360 deg or 180 deg

Elevation Detection Mode: deg13.4

Elevation Tracking Mode: deg28

Ballistic Target Detection Sector Azimuth: deg60

Ballistic Target Detection Sector Elevation: 0-55 deg; or 20-75 deg

64N6E2: 0-75 deg

Detection Range (Mig-21 Type Target): km260

Detection Range, Ballistic Target: km127

Accuracy Range: m150

Accuracy Azimuth: deg0.5

Accuracy Elevation: deg0.5

Scan Rate: sec12

Tracking: 200 targets simultaneously

Emplacement Time: 5 min

Displacement Time: INA

Mount: The 64N6 BIG BIRD is mounted on a large trailer along with a generator and typically towed with the now familiar 8-wheeled truck

Protection

Note: INA. There is very little information about the protection capabilities of the SA-10.

Notes:

The S-300P (transliterated from Russian С-300П, NATO reporting name SA-10 Grumble) is the original version of the S-300 system which became operational in 1978. In 1987, over 80 of these sites were active, mainly in the area around Moscow. The P suffix stand for PVO-Strany (country air defence system). An S-300PT unit consists of a 36D6 (NATO reporting name TIN SHIELD) surveillance radar, a 30N6 (FLAP LID) fire control system and 5P85-1 launch vehicles. The 5P85-1 vehicle is a semi-trailer truck. Usually a 76N6 (CLAM SHELL) low altitude detection radar is also a part of the unit. This system broke substantial new ground, including the use of a passive electronically scanned array radar and multiple engagements on the same Fire-control system (FCS). Nevertheless, it had some limitations. It took over one hour to set up this semi-mobile system for firing and the hot vertical launch method employed scorched the TEL. 9S32 engagement radar It was originally intended to fit the Track Via Missile (TVM) guidance system onto this model. However, the TVM system had problems tracking targets below 500 m. Rather than accept the limitation, the Soviets decided that the tracking of low altitude targets was a must and decided to use a pure command-guidance system until the TVM head was ready. This allowed the minimum engagement altitude to be set at 25 m.

HQ-22 Chinese Long-Range Air Defense Missile System



Tiers:

1 2 3 4

System

Alternative Designation: HQ-22

Type: Long-Range Air Defense Missile System

Crew: INA

Chassis: The launcher is based on a Hanyang special chassis with 8x8 configuration.

Mission: The HQ-22 air defense system can engage aircraft, helicopters, UAVs, ballistic and cruise missiles.

Displacement Time: INA

Emplacement Time: INA

Note: A typical battery of HQ-22 includes 3 launcher vehicles. A battery can engage 6 air targets simultaneously.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Cruising Range: INA

Maximum Road Speed: INA

Speed Maximum Swim: Not Amphibious

Missile System

Name: INA

Missile Length: 7 m

Missile Diameter: 0.7 m

Missile Weight: 1 300 kg

Warhead Type: HE-FRAG

Warhead Weight: 180 kg

Guidance System: Semi-Active GPS

Maximum Ceiling: 27 km

Maximum Range: 100 km

Note: the complex (three PU) is able to fire 12 missiles on six targets simultaneously.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

↳*Radar*

Name: INA

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The HQ-22, also known as FK-3, is a long-range air defense system developed by China to engage a wide range of aerial targets at ranges of up to 170 kilometers. The missile system has been designed to engage fourth generation aircraft, helicopters, cruise missiles and drones as well as a variety of aerodynamic threats. Besides, the new weapon system has been designed to withstand to electronic countermeasures and operate in heavy jamming environments. This new air defense system relies on 8x8 vehicles that transport four vertically launched missiles each. The HQ-22 long-range surface-to-air missile system was unveiled at the China Airshow 2016.

S-200 Dubna (SA-5 Gammon) (Export) Iranian Surface-to-Air Missile (SAM) System







Tiers:



Variants:

- **SA-5a (S-200A Angara):** This missile attained initial operating capability in 1962 on the "Tallinn line" with conventional warheads. System includes a V-860/5V21 or V-860P/5V21A missile; range, 88 mi (160 km); and ceiling, 66,000 ft (20 km).
- **SA-5b (S-200V Vega):** This version reached initial operating capability in 1970 with nuclear warhead. Other versions include the S-200 Vega with a V-870 missile and range 186 mi (300 km). Also: S-200M Vega-M with a V-880E/5V28E missile, export version, high-explosive warhead only, with a range of 155 mi (250 km) and, ceiling of 95,000 ft (29 km).
- **SA-5c (S-200D Dubna):** The SA-5c's initial operating capability was attained in 1975 with a dual-capable (nuclear or conventional) warhead and upgraded terminal homing capability. Characteristics include a 5V25V, V-880M/5V28M or V-880MN/5V28MN2 missile, with a range of 248 mi (400 km) and a ceiling of 125,000 ft (40 km).
- **SA-5d:** This designation was briefly used for the SA-X-12 Gladiator missile.
- **SA-5e:** This variant attained initial operating capability in 1983 with a passive anti-radiation seeker. It was probably designed to be used against AWACS aircraft

System

Alternative Designation: SA-5 Gammon; S-200 Vega
Type: A very long range, medium-to-high altitude surface-to-air missile (SAM) system.
Family: SA-5 Series
In Service: 1967-Present
Wars: First Libyan Civil War Syrian Civil War
Crew: eaINA
Displacement Time: minINA
Emplacement Time: minINA
Fire on the Move: No
Guidance System: Semi-active radar homing

Dimensions

Missile Length: m10.72

Wingspan: m2.85

Mainbody Diamter: m0.85

Solid Propellant Booster Length: m4.90

Solid Propellant Booster Width: m0.48

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

Automotive

Engine: 4 x solid-fuel boosters; solid-fuel second stage

Speed: Mach 4

Maximum Range: km7

Minimum Range: km300

Maximum Altitude: INA

Minimum Altitude: km35

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail

Maximum Effective Range: km250

Minimum Effective Range: kmThe missile's minimum range of 60 km is due to the booster burn time and jettison requirements, limiting the system to engagements against relatively large unmaneuverable targets at ranges up to 250 km.

Note: Each Missile has four jettisonable, wraparound solid propellant boosters

↳*Missile (Option 1)*

Name: 5V21

Type: HE-Frag

Variant: Angara (A)

Length: m10.5

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km150-180

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳***Missile (Option 2)***

Name: 5V28

Type: HE-Frag

Variant: Vega (V)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km200

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

↳***Missile (Option 3)***

Name: 5V28

Type: HE-Frag, Nuclear

Variant: Vega M (VM)

Length: m10.7

Diameter: mm86

Booster Length: m4.9

Booster Diameter: m0.48

Effective Range: km250

Maximum Speed: Mach 4

Guidance System: Semi-active radar homing

Fire Control

↳***Fire Control System***

Name: INA

Computerized FCS: Yes

Direct Fire: No, due to booster burn time and jettison requirements

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

↳*Radar #1*

Name: P-15M(2)

Type: Squat Eye

Function: INA

Frequency: C-band

Range: km128

Associated Weapon System: SA-3/5

Recognition: Power 380kw

↳*Radar #2*

Name: P-14

Type: TALL KING

Function: Electronic Warfare

Range: km605

Frequency: A Band

Associated Weapon System: SA-5

Recongintion: Scan 2-6rpm

↳*Radar #3*

Name: PRV-11

Type: SIDE NET

Function: Height

Range: 28 km 32km Max altitude

Frequency: E-band

Associated Weapon System: SA-2/3/5

Recognition: INA

↳*Radar #4*

Name: INA

Type: BACK NET

Function: EW/GCI

Range: 300 km

Frequency: E-Band

Associated Weapon System: SA-5

Recognition: 3-6 rpm Scan

↳*Radar #5*

Name: P-35/37

Type: BAR LOCK

Function: EW

Range: 200 km

Frequency: E/F-bands

Associated Weapon System: SA-5

Recognition: INA

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The S-200 Volga (SA-5 Gammon**) is a Russian long-range, high-altitude strategic surface-to-air missile (SAM). It is a fixed-site, point defense SAM that relies on long range early warning and ground control intercept radars (Big Back, Bar Lock , Tin Shield and Side Net) for target tracking information and 5N62 series Square Pair** radar for fire control. The S-200 surface-to-air missile system was designed for the defense of the most important administrative, industrial, and military installations from all types of air attack. S-200 provides defeat of modern and advanced aircraft, including air command and control centers, AWACS aircraft, aircraft jamming creation and other manned and unmanned aerial vehicles. The S-200 is an all-weather system that can be operated in various climatic conditions. By 1966, the S-200 was officially accepted into service in order to replace the failed anti-ballistic missile RZ-25/5V11 "Dal". The Dal was assigned the NATO reporting name SA-5 "Griffon" before it was cancelled. The first S-200 operational regiments were deployed in 1966 with 18 sites and 342 launchers in service by the end of the year. By 1968 there were 40 sites, and by 1969 there were 60 sites. The growth in numbers then gradually increased throughout the 1970s (1,100 launchers) and early 1980s until the peak of 130 sites and 2,030 launchers was reached in 1980–1990. Each missile is launched by 4 solid-fueled strap-on rocket boosters.[7] After they burn out and drop away (between 3 and 5.1 seconds from launch) it fires a 5D67 liquid fueled sustainer rocket engine (for 51–150 seconds) which burns a fuel called TG-02 Samin (50% xylidine and 50% triethylamine), oxidized by an agent called AK-27P Melange (red fuming nitric acid enriched with nitrogen oxides, phosphoric acid and hydrofluoric acid). Maximum range is between 150 km (81 nmi) and 300 km (160 nmi), depending on the model. The missile uses radio illumination mid-course correction to fly towards the target with a terminal semi-active radar homing phase. Maximum target speed is around Mach 6 for new model and Mach 4 for earlier model. Effective altitude is 300 m (980 ft) to 20,000 m (66,000 ft) for early models and up to 35,000 m (115,000 ft) for later models. The warhead is either 217 kg (478 lb) high-explosive fragmentation (16,000 × 2 g fragmentation pellets and 21,000 × 3.5 g pellets) triggered by radar proximity fuse or command signal, or a 25 kt nuclear warhead triggered by command signal only. Each missile weighs around 7,108 kg (15,670 lb) at takeoff. The system utilises radio semi active guidance throughout the missile's flight, which is far more accurate at long range than the command guidance method used by the earlier S-75 Dvina and other missiles. The existence of an optional terminal passive radar homing mode for use against airborne early warning (AEW) aircraft remains unconfirmed. Peak missile speed is around Mach 8 and the single-shot kill probability is quoted as 0.85, presumably against a high altitude bomber-type target. The fire control radar of the S-200 system is the 5N62 (NATO: Square Pair) H band continuous wave radar, whose range is 270 km (170 mi). It is used for both the tracking of targets and their illumination. Additional radar systems * P-14/5N84A "Tall King" A-band early warning radar (range 600 km (370 mi), 2–6 RPM, maximum search altitude 46 km (29 mi)) * "Big Back" E-band early warning radar 600 km (370 mi) Kabina 66/5N87 "Back Net" or "Back Trap" E-band early warning radar (with special low-altitude search mod, range 370 km (230 mi), 3–6 RPM) * P-35/37 "Bar Lock\Bar Lock B" 1,000 kW E\F-band target detection and tracking radar (with integrated IFF, range 392 km (244 mi), 7 RPM) * "Side Net" or "Odd Pair" E-band height finding radar (also used by the SA-2, SA-4 and SA-6, range 240 km (150 mi), 3–6 RPM) P-15M(2) "Squat Eye" 380 kW C-band target detection radar (range 128 km (80 mi)

YJ-12B Chinese Coastal Defense Missile System







Tiers:

1 2 3 4

System

Alternative Designation: YJ-12B
Type: Coastal Defense Missile System
Manufacturer: INA
In Service: 2019-Present
Crew: INA
Configuration: 10x8
Cab Seating: INA

Dimensions

Length: 16.35 m
Width: 3.05 m
Height: 2.82 m
Weight, Curb: 22.5 t
Payload Capacity: 42.5 t

Automotive

Engine Name: Deutz
Engine Type: Diesel
Engine Power: hp544

Cruising Range: km650

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg40

Side Slope: deg20

Vertical Step: m0.4

Trench: m2.5

Fording Depth: m1.2

Main Weapon System

↳*Launcher*

Name: YJ-12B

Note: The YJ-12B can be seen as a ground-launched version of the naval YJ-12 anti-ship missile, that is carried by warships.

↳*Missile*

Name: YJ-12 Missile

Type: Supersonic Anti-Ship Cruise Missile

Length: 6.3 m

Diameter: 0.756 m

Weight: 2,500 kg

Warhead Type: HE-FRAG

Engine: integrated ramjet/booster propulsion system

Operational Range: 500 km

Maximum Speed: Mach 3

Guidance System: Inertial with active radar homing

Protection

Armor: Protection from small arms and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The YJ-12B is a new China's coastal defense missile system. Its images first emerged in 2018. This system was first publicly

revealed in 2019. It is in service with the China's military. It is a general purpose heavy duty missile transporter developed from the original WS2500 and is built by Wanshan Special Vehicle. Its other contemporary is the larger HTF5680A1. The WS2600 is a heavy duty TEL co-developed by a joint Chinese and Belarusian venture. The WS2600 is slightly bigger than the WS2500 and a larger version of the original WS2400 with an additional axle to support the increased payload. Due to its larger size, the WS2600 is able to carry much heftier missiles, of which its most common payload is the DF-21C medium-range ballistic missile and the DF-21D anti-ship ballistic missile. Both the WS2500 and WS2600 form one of the main TEL carriers of China's MRBM and ASBM stockpiles. Like the WS2500, the TEL has a 4-door cab, which allows the WS2600 to easily accommodates the driver and 7 additional passengers.

HQ-10 (SA-20 Gargoyle) Chinese Long-Range Air Defense Missile System






Tiers:



Variants:

- **S-300PMU2 Favorit/SA-20B:** This is an upgraded variant with larger 9M96E and 9M96E2 missiles developed for the S-400 . It can also fire the previous 5V55K , 5V55R , 48N6E and 48N6E2 missiles. It is equipped with an improved guidance system. Unveiled in 1997, the system has an increased range of 124 mi (200 km). The 48N6E2 missile features a warhead designed to destroy ballistic missiles.

System

Alternative Designation: SA-20 Gargoyle, SA-20A Gargoyle, S-300PMU-1, С-300ПМУ-1
Manufacturer: MZiK
Type: long range surface-to-air missile systems. multi-channel mobile air defense system
Family: S-300 Family
In Service: 1993-Present
Crew: ealNA
Chassis: MAZ-543 Special Wheeled Chassis
Displacement Time: INA
Emplacement Time: 5 Minutes
Maximum Range of Fire: km150
Maximum Altitude: km27
Number of Targets Engaged Simultaneously: ea6
Reload Vehicile: 5T58 reload vehicle
Note #1: Capable of hitting ballistic and aerodynamic targets. Became the first multi-channel anti-aircraft missile system, is able to accompany each system (ADMS) to 6 goals and build them up to 12 missiles

Note #2: A typical SA-20 battery consists of 48 missiles on 12 mobile launchers. Each battery can launch a 48N6 missile every three seconds.

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7

Width: m3.07

Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Configuration: 8x8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Communications

Note: See Fire Control

Missile System

Note #1: The S-300 family missiles have four clipped folding triangular moving control fins at the rear and four thrust vector control vanes in the motor efflux.

Note #2: Missiles are vertically launched by a hot gas cartridge in the canister base. The motor ignites once the missile reaches an altitude of 25 m.

↳*Missile Launcher*

Name: 5P85S or 5P85D launchers

Type: Tube Launcher

Anti-Ballistic Missile (ABM) Capability: Yes

Note: The missiles can be fired in a salvo with an interval between 3 and 5 seconds

↳*Missile (Option 1)*

Name: 48N6/48N6E

Engine Type: Single-stage, solid-fuel-propelled

Type: INA

Length: m7.5

Width: m0.5

Weight: kg1,780

Warhead Weight: 70-100 kg

Maximum Range: km150

Guidance System: Track-via-missile

TVM Guidance Capable: Yes

ABM Capable: Yes

Maximum Velocity: m/s2,000

Kill Probability: 0.70 to 0.93 single shot

Ballistic Targets Range: km5-40

Basic Load: 4 per TEL

↳*Missile (Option 2)*

Name: 5V55R/5V55KD

Type: INA

Length: m7

Diameter: mm450

Weight: kg1,450

Warhead Weight: kg100

Maximum Range: km90

Guidance System: SARH

Maximum Velocity: m/s1,900

Maximum Target Speed: m/s1,150

Basic Load: 4 per TEL

↳*Missile (Option 3)*

Name: 9M96E1

Type: INA

Length: INA

Width: INA

Weight: kg330

Warhead Weight: kg24

Maximum Range: km40

Guidance System: Active radar homing

Maximum Velocity: m/s900

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

↳*Missile (Option 4)*

Name: 9M96E2

Type: INA

Width: INA

Weight: kg420

Warhead Weight: kg24

Maximum Range: km120

Guidance System: Active radar homing

Maximum Velocity: m/s1,000

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

Fire Control

Command Post Vehicle: The 54K8 command-post vehicle has six operator positions. The command post can monitor data within a 300-km radius and can track 100 targets while controlling up to six interceptions. Two missiles can be launched against each target if required.

↳*Fire Control System*

Name: 83M6E command and control system, although it is also compatible with the older Baikal-1E and Senezh-M1E CCS command and control systems.

Computerized FCS: Yes

Direct Fire: Yes, no less than 1km

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Number of Targets Engaged Simultaneously: ea6

Note #1: The vehicle lowers four hydraulic jacks for launch

Note #2: The S-300PMU1 air defense missile system can simultaneously engage up to 36 air targets by 72 missiles.

↳*Radar #1*

Name: 64N6E

Type: Regiment Radar

NATO Reporting Name: BIG BIRD

Frequency/Band: C-Band

Target Detection Range: km300

Simultaneously Detected Targets: 300

↳*Radar #2*

Name: 30N6E(1)

Type: Fire control/illumination and guidance radar

NATO Reporting Name: FLAP LID B

NATO Frequency Band: H-J

Target Detection Range: km200

Simultaneously Tracked Targets: ea6

Simultaneously Engaged Targets: ea6

↳*Radar #3*

Name: 36D6

Type: INA

NATO Reporting Name: TIN SHIELD

NATO Frequency Band: E/F

Target Detection Range: km180-360

Simultaneously Tracked Targets: ea120

↳*Radar #4*

Name: 96L6E

Type: All altitude detection

NATO Reporting Name: CHEESE BOARD

NATO Frequency Band: INA

Target Detection Range: km300

Simultaneously Tracked Targets: ea100

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Note: Protection. Additional elements of protection are the placement of components of C-300 in the trenches (practiced as placing on the hills for a better view and more rapid care of the horizon, and in the trenches for stealth and protection against fragments of explosions).

Notes:

The Chinese HQ-D is a export of the Russian S-300PMU-1 (NATO: SA-20 Gargoyle). The SA-20 Gargoyle (S-300PMU-1) Russian Surface-to-Air Missile (SAM) System was first introduced in 1993 with the new and larger 48N6 missiles for the first time in a land-based system and introduced all the same performance improvements from the S300FM version including the increased speed, range, TVM guidance and ABM capability. The warhead is slightly smaller than the naval version at 143 kg (315 lb). This version also saw the introduction of the new and more capable 30N6E TOMB STONE radar. The S-300PMU1 air defense missile system can simultaneously engage up to 36 air targets by 72 missiles. The S-300PMU-1 was introduced in 1993 and for the first time introduces several different kinds of missiles in a single system. In addition to the 5V55R and 48N6E missiles the S-300PMU-1 can utilise two new missiles, the 9M96E1 and 9M96E2. Both are significantly smaller than the previous missiles at 330 and 420 kg (730 and 930 lb) respectively, and carry smaller 24 kg (53 lb) warhead. The 9M96E1 has an engagement range of 1–40 km (0.62–25 mi) and the 9M96E2 of 1–120 km (0.62–75 mi). They are still carried 4 per TEL. Rather than just relying on aerodynamic fins for manoeuvring, they use a gas-dynamic system which allows them to have an excellent probability of kill (Pk) despite the much smaller warhead. The Pk is estimated at 0.7 against a tactical ballistic missile for either missile. The S-300PMU-1 typically uses the 83M6E command and control system, although it is also compatible with the older Baikal-1E and Senezh-M1E CCS command and control systems. The 83M6E system incorporates the 64N6E (BIG BIRD) surveillance/detection radar. The fire control/illumination and guidance radar used is the 30N6E, optionally matched with a 76N6 low altitude detection radar and a 96L6E all altitude detection radar. The 83M6E command and control system can control up to 12 TELs, both the self-propelled 5P85SE vehicle and the 5P85TE towed launchers. Generally support vehicles are also included, such as the 40V6M tow vehicle, intended for lifting of the antenna post

S-500 Russian Long-Range Air Defense and Anti-Ballistic Missile System






Tiers:

1 2 3 4

System

Alternative Designation: Prometheus, Prometey, 55R6M, Triumfator-M, Samoderzhets
Crew: ea3
Chassis: S-500 launcher, based on the BAZ-69069 chassis
Displacement Time: See Emplacement
Emplacement Time: It has been reported that the S-500 can launch missiles within 10 minutes from travelling. Also it can be considered as a survivable system, as after launching its missiles it can briefly redeploy.
Maximum Effective Range: km600
Target Altitude Maximum: km200
Target Altitude Minimum: mINA
Fire on the Move: No
Probability of Kill: INA
Note #1: It can be seen as an advanced version of the S-400.
Note #2: The S-500 missiles will be used only against the most important targets, such as intercontinental ballistic missiles, AWACS and jamming aircraft.

Dimensions

Length: m14.5
Width: m3
Height: INA
Weight: tons54

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: 550

Maximum Road Speed: km/h70

Maximum Road Range: km1,000

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m2

Fording: m1.7

Communications

Tactical Radio: VHF: Azart-P (4km), Azart-N (12km), and Azart-BM (40km).

Main Weapon System

Note: Some sources claim that this system is capable of tracking 5-20 ballistic targets and intercepting up to 5-10 ballistic targets simultaneously. It can defeat ballistic missiles travelling at a speed of 5-7 kilometers per second. It has been reported that this air defense system can also target low orbital satellites.

↳*Launcher*

Name: 77P6 launch vehicle, based on the BAZ-69096 10x10 truck

Type: Launch Vehicle

↳*Missile (Option 1)*

Name: 77N6 missile

Type: A new Surface-to-Air Missile that source say, "In May 2018, Russia conducted the longest range surface-to-air missile test to date with the S-500. According to reports citing unnamed sources familiar with U.S. intelligence on the program, the S-500 was able to hit a target just shy of 300 miles (482 km) away, which is some 50 miles further than the previous record."

Length: INA

Diameter: INA

Weight: INA

Maximum Range: km500-600

Maximum Altitude: km40

Note #1: The S-500 will likely use a variety of missiles in addition to the 77N6 missile series, currently under development for the S-400, as a hit-to-kill interceptor for ballistic missile targets.

↳*Missile (Option 2)*

Name: 40N6E

Type: Surface-to-Air Missile

Maximum Range: 400 km

Maximum Altitude: 185 km

Maximum Velocity: 3840 m/s

Maximum Target Velocity: 4,800 m/s

Weight: 1,893 kg

Guidance System: Semi-active radar homing or active radar homing

Note: With an active radar homing head, climbs to designated altitude then guidance switches to search & destroy mode. Effective against low-altitude targets at extremely long range (below the radio horizon).

↳*Missile (Option 3)*

Name: 48N6DM/ 48N6E3

Type: Surface-to-Air Missile

Maximum Range: 250 km

Maximum Altitude: 60 km

Maximum Velocity: 2,000 m/s

Maximum Target Velocity: 4,800 m/s

Weight: 1,835 kg

Guidance System: Semi-active radar homing

S-500 Components

↳*55K6MA and 85Zh6-2 Command Posts Vehicles*

Chassis: based on BAZ-69092-12 6x6

↳*91N6A(M) Acquisition and Battle Management Radar*

Chassis: towed by the BAZ-6403.01 8x8 tractor

Note: A modification of the 91N6 (Big Bird)

↳*96L6-TsP Acquisition Radar*

Chassis: BAZ-69096 10x10

Note: an upgraded version of the 96L6 (Cheese Board)

↳*76T6 Multimode Engagement Radar*

Chassis: BAZ-6909-022 8x8

↳*77T6 ABM Engagement Radar*

Chassis: BAZ-69096 10x10

Protection

Armor: All systems are light skinned

NBC Protection: Likely

Notes:

The S-500 is a new-generation surface-to-air missile system. It is designed for intercepting and destroying intercontinental ballistic missiles, hypersonic cruise missiles, and aircraft. It is also designed to defend against Airborne Early Warning and Control System (AWACS) aircraft and other jamming aircraft. With a planning range of 600 km (370 mi) for ballistic missiles (BM) and 500 km (310 mi) for aircraft, the S-500 is able to detect and simultaneously engage up to 10 ballistic hypersonic targets flying at a speed of 5 kilometers per second (3.1 mi/s; 18,000 km/h; 11,000 mph) to a limit of 7 km/s (4.3 mi/s; 25,000 km/h; 16,000 mph). It can destroy hypersonic cruise missiles and other aerial targets to include spacecraft at speeds of higher than Mach 5. The altitude of a target can be as high as 200 km (120 mi). It is effective against ballistic missiles with a launch range of 3,500 km (2,200 mi), the radar reaches a radius of 3,000 km (1,300 km for the EPR 0,1 square meter). Other targets that the S-500 has been successful at engaging include unmanned aerial vehicles, low Earth orbit satellites, space weapons launched from hypersonic aircraft, drones, and hypersonic orbital platforms. The system is highly mobile and is capable of rapid deployability. Experts believe that the system's capabilities can affect enemy intercontinental ballistic missiles at the middle and end portions of flight, but reports by Almaz-Antey say that the external target-designation system (RLS Voronezh-DM and missile defense system A-135 radar Don-2N) will be capable of mid-early flight portion interception of enemy ballistic missiles, which is one of the final stages of the S-500 project. The S-500 and its crew have a response time of less than 4 seconds (Compared to the S-400's less than 10). The S-500 will work with the S-400 and replace the S-300. It is anticipated that initially, the S-500 will be deployed to protect Moscow and critical infrastructure however, a naval version is being developed to be deployed in the new Lider-class destroyer which is to enter service in 2020. The S-500 will consist of: * 77P6 launch vehicle, based on the BAZ-69096 10x10 truck * 55K6MA and 85Zh6-2 command posts, based on BAZ-69092-12 6x6 * 91N6A(M) acquisition and battle management radar, a modification of the 91N6 (Big Bird) towed by the BAZ- * 6403.01 8x8 tractor * 96L6-TsP acquisition radar, an upgraded version of the 96L6 (Cheese Board) on BAZ-69096 10x10 * 76T6 multimode engagement radar on BAZ-6909-022 8x8 * 77T6 ABM engagement radar on BAZ-69096 10x10

S-300V (SA-12b Giant) Russian Long-Range Air Defense Missile System





Tiers:



Variants:

- **SA-12a Gladiator:** The S-300V with a 9M83 SA-12a GLADIATOR missile 9A93 SA-12a GLADIATOR TELAR
- **S-300VM:** S-300VM is an upgraded version of the S-300V. It seems that it is also called S-300V3. Western reporting name for this system is SA-23 Gladiator/Giant. It has new command post vehicle and new radars. It fires improved 9M83M and 9M82M missiles with a longer range. Missiles have a range of 200 km and can reach targets at altitude of 30 km. The S-300VM is in service with Russia.
- **Antey 2500:** Antey 2500 an export version of the S-300VM. It can engage up to 24 aircraft or up to 16 ballistic missiles simultaneously. This system can engage ballistic missiles at a range of 250 km and aircraft at a range of 200 km. Two battalions of these air defense systems were exported to Venezuela. These were delivered in 2013. Estimated export price of this system is 1 billion dollars.
- **S-300V4:** S-300V4 improved version. It seems that this system is also called S-300VMD. It has a range of 300 km. Russian armed forces issued production order for this air defense system. Deliveries commenced in 2014.

System

Alternative Designation: S-300V; SA-12b Giant
Type: The S-300V air defense missile system was developed to engage short- and intermediate-range ballistic missiles, cruise missiles, strategic and tactical aircraft, as well as early warning and electronic warfare aircraft.
Family: S-300 Family
Crew: ea3
In Service: 1988-Present
Emplacement Time: min5
Displacement Time: min5
Note #1: A battery of the S-300V typically includes up two six launchers in two variants, command post vehicle, surveillance radar, sector surveillance radar, and up to 6 reloading vehicles/launchers in two variants.
Note #2: S-300V system may be controlled by an upper level command post system 9S52 Polyana-D4 integrating it with Buk missile system into a brigade

Dimensions

Hull Length: m9.50
Hull Width: m2.90
Hull Height: m3.30
Weight, Total: tons50
Chassis Weight: 20,000 kg
Ground Pressure: INA

Automotive

Engine Name: V-84
Engine Type: Diesel
Engine Power: hp840
Cruising Range: km250
Speed, Maximum Road: km/h53
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %40
Side Slope: %20
Vertical Step: 0.7
Trench: 2.5
Fording Depth: m1.2

Communications

Radio: R-168 Akveduk, Russia’s fifth generation tactical radio system

Missile System

↳*Launcher*

Name: 9A82 SA-12b GIANT TELAR
Type: TELAR
Maximum Elevation: +90
Minimum Elevation: INA
Note: The TELARs are not capable of autonomous engagements, requiring the support of the GRILL PAN radar.

↳*Missile*

Name: 9M82 SA-12b GIANT missile
Type: Semi-Active Radar Homing Missile
Basic Load: carries only two 9M82 SA-12b GIANT missiles

Length: m8.5

Diameter: mm800

Weight: 4,730 kg

Warhead Type: HE fragmentation

Warhead Weight: 150 kg

Guidance System: Semi-Active Radar Homing Missile

Maximum Velocity: m/s2,400

Maximum Range, Aircraft: km13

Maximum Range, SRBM: km25

Maximum Range, Ballistic Targets: km40

Minimum Range, Ballistic Targets: km20

Maximum Altitude: 30,000 m

Minimum Altitude: 1,000 m

Maximum Speed: 2,400 m/s, Mach 8.00

Chance to Defeat Ballistic Missiles: 40-65% chance of defeating ballistic missile.

Note: The larger 9M82 is used to engage intermediate-range ballistic missiles, AWACS and jamming aircraft at ranges of up to 100 km. Warheads of 9M82 and 9M83 missiles are packed with 150 kg of explosives

Launcher/Loader Vehcile (LLV)

Name: 9A85 GLADIATOR Launcher/Loader Vehicle (LLV)

Crew: ea3

Crane: Yes

Basic Load: carries only two 9M82 SA-12b GIANT missiles

Reloading Time: 50-60 minutes

Note #1: There are two variants of reloading vehicles

Note #2: These vehicles are combination of the TEL and reloading vehicle. A unique capability of these vehicles is that they can launch missiles themselves. Firing data is acquired from the launcher vehicle

Command Station

Name: 9S457 Command Station (Command Post Vehicle)

Crew: ea7

Mission: It controls radars and up to 4 launcher vehicles

Target Tracking: It can track up to 70 air targets simultaneously. It prioritizes which targets should be attacked first and transmits firing data to launcher vehicles

Note: he CPV and its associated radars can detect up to 200 targets, track as many as 70 targets and designate 24 of the targets to the brigade's four GRILL PAN radar systems for engagement by the SA-12a and SA-12b TELARs

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: INA

Indirect Fire: Yes

↳*Radar #1*

Name: 9S15 BILL BOARD Surveillance Radar system

Type: Phased-Array Surveillance Radar system

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Crew: ea4

Detection Range: km330

Aircraft Detection: At a range of 240 km aircraft are detected with a chance of 50%

Ballistic Missile Detection: It detects ballistic missiles at a range of about 150 km

Antenna Rotating Speed: sec6-12

Target Detection: up to 200 targets

Target Coverage Elevation: 0-55º in Elevation

Target Coverage Range: 10-250 km

Target Coverage Accuracy: 30-35 min of arc in azimuth and 250 m in range

↳*Radar #2*

Name: 9S19 HIGH SCREEN Sector Radar system

Type: Sector Radar system

Purpose: The HIGH SCREEN sector radar supporst the ATBM role, providing surveillance of anticipated azimuths of threat missiles

Crew: ea4

Mission: t is used to detect high speed targets, such as ballistic missile warheads

Detection Range: km175

Maximum Targets, Simultaneous: maximum being 16 simultaneous targets

Note: The radar is switches to a tracking mode when high speed targets are detected, automatically transmiting the trajectory parameters to the Command Post Vehicle

↳*Radar #3*

Name: 9S32 GRILL PAN Guidance Radar system

Type: Parabolic dish target-illumination radar on telescoping mast on missile launch vehicle

Purpose: The GRILL PAN radar system controls the battery's launcher vehicles (TELARs and LLVs)

Sector Scan: 90-deg sector scan through 50 deg elevation on separate vehicle

Guidance System: inertial guidance with semi-active terminal homing

Band: X-Band

Multichannel: Yes

Peak Power: kW150

Maximum Range: km250

Beamwidth: deg0.5

Antenna: ransmission type of space fed phased-array antenna

Maximum Targets, Simultaneous: It can simultaneously track up to 12 targets and control up to six missiles against these targets

Radar Cross-Section: radar cross-section of 2m2 at a range of 150 km in manual mode and 140 km in automatic mode

Note: The GRILL PAN tracks targets assigned to it by the CP while simultaneously maintaining a horizon search for new targets

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Note: The S-300V is considered as a survivable system. Once all the missiles are launched the launcher vehicles can briefly redeploy. It uses shoot, scoot and hide tactics in order to avoid being destroyed.

Notes:

The S-300V air defense missile system was developed to engage short- and intermediate-range ballistic missiles, cruise missiles, strategic and tactical aircraft, as well as early warning and electronic warfare aircraft. It was designed to counter the threat posed by Lance and Pershing ballistic missiles. The main role of the S-300V is to protect task forces and vital industrial and military installations against massed air attacks. Its reporting name in the West is SA-12 or Gladiator/Giant. The S-300V consists of: 9M82 SA-12b GIANT missile 9M83 SA-12a GLADIATOR missile 9A82 SA-12b GIANT TELAR 9A93 SA-12a GLADIATOR TELAR 9A84 GIANT Launcher/Loader Vehicle (LLV) 9A85 GLADIATOR Launcher/Loader Vehicle (LLV) 9S15 BILL BOARD Surveillance Radar system 9S19 HIGH SCREEN Sector Radar system 9S32 GRILL PAN Guidance Radar system 9S457 Command Station Note: The S-300V comes in two versions: 1. SA-12a Gladiator 2. SA-12b Giant Once equipped with 9M83 missiles is referred in the West as SA-12A or Gladiator. When equipped with 9M82 missiles it is referred as SA-12B or Giant. The 9M83 SA-12a GLADIATOR is a dual-role anti-missile and anti-aircraft missile with a maximum range between 75 and 90 km. The 9M82 SA-12b GIANT missile, configured primarily for the ATBM role, is a longer range system [maximum range between 100 and 200 km] with a longer fuselage with larger solid-fuel motor. The 9A82 SA-12b GIANT and 9A93 SA-12a GLADIATOR TELAR vehicles are similar, though the 9A83-1 carries four 9M83 SA-12a GLADIATOR missiles, whereas the 9A82 carries only two 9M82 SA-12b GIANT missiles. The configuration of the vehicles command radar is also different. On the 9A83-1 the radar is mounted on a folding mast providing 360º coverage in azimuth and full hemispheric coverage in elevation. The radar on the 9M82 TELAR is mounted in a semi-fixed position over the cab, providing 90º coverage on either side in azimuth and 110º in elevation. The TELARs are not capable of autonomous engagements, requiring the support of the GRILL PAN radar. The 9S457-1 Command Post Vehicle is the command and control vehicle for the SA-12 system, which is supported by the BILL BOARD A surveillance radar and the HIGH SCREEN sector radar. The CPV and its associated radars can detect up to 200 targets, track as many as 70

targets and designate 24 of the targets to the brigade's four GRILL PAN radar systems for engagement by the SA-12a and SA-12b TELARs. The BILL BOARD A radar provides general surveillance, with the antenna rotating every 6-12 seconds. The radar, which can detect up to 200 targets, provides target coverage of 0-55º in elevation and 10-250 km in range with an accuracy is 30-35 min of arc in azimuth and 250 m in range. and. The HIGH SCREEN sector radar supports the ATBM role, providing surveillance of anticipated azimuths of threat missiles. The radar is switches to a tracking mode when high speed targets are detected, automatically transmitting the trajectory parameters to the Command Post Vehicle. The CPV prioritizes the threat and instructs the HIGH SCREEN radar to track specific missiles, with the maximum being 16 simultaneous targets. The GRILL PAN radar system controls the battery's launcher vehicles (TELARs and LLVs). It can simultaneously track up to 12 targets and control up to six missiles against these targets The radar can acquire targets with a radar cross-section of 2m2 at a range of 150 km in manual mode and 140 km in automatic mode. The GRILL PAN tracks targets assigned to it by the CP while simultaneously maintaining a horizon search for new targets. The LLVs (9A85 GLADIATOR and 9A83 GLADIATOR) resemble normal TELARs, but with a loading crane rather than command radars. While the primary role of the LLV is to replenish the TELARs, they can also erecting and launch missiles if needed, though they are dependent on the use of command radars from neighboring TELARs.

S-300PMU-1 (SA-20 Gargoyle) Russian Long-Range Air Defense Missile System





Tiers:



Variants:

- **S-300PMU2 Favorit/SA-20B:** This is an upgraded variant with larger 9M96E and 9M96E2 missiles developed for the S-400 . It can also fire the previous 5V55K , 5V55R , 48N6E and 48N6E2 missiles. It is equipped with an improved guidance system. Unveiled in 1997, the system has an increased range of 124 mi (200 km). The 48N6E2 missile features a warhead designed to destroy ballistic missiles.

System

Alternative Designation: SA-20 Gargoyle, SA-20A Gargoyle, S-300PMU-1, С-300ПМУ-1
Manufacturer: MZiK
Type: long range surface-to-air missile systems. multi-channel mobile air defense system
Family: S-300 Family
In Service: 1993-Present
Crew: eaINA
Chassis: MAZ-543 Special Wheeled Chassis
Displacement Time: INA
Emplacement Time: 5 Minutes
Maximum Range of Fire: km150
Maximum Altitude: km27
Number of Targets Engaged Simultaneously: ea6
Reload Vehicile: 5T58 reload vehicle
Note #1: Capable of hitting ballistic and aerodynamic targets. Became the first multi-channel anti-aircraft missile system, is able to accompany each system (ADMS) to 6 goals and build them up to 12 missiles

Note #2: A typical SA-20 battery consists of 48 missiles on 12 mobile launchers. Each battery can launch a 48N6 missile every three seconds.

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7

Width: m3.07

Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Configuration: 8x8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Communications

Note: See Fire Control

Missile System

Note #1: The S-300 family missiles have four clipped folding triangular moving control fins at the rear and four thrust vector control vanes in the motor efflux.

Note #2: Missiles are vertically launched by a hot gas cartridge in the canister base. The motor ignites once the missile reaches an altitude of 25 m.

↳*Missile Launcher*

Name: 5P85S or 5P85D launchers

Type: Tube Launcher

Anti-Ballistic Missile (ABM) Capability: Yes

Note: The missiles can be fired in a salvo with an interval between 3 and 5 seconds

↳*Missile (Option 1)*

Name: 48N6/48N6E

Engine Type: Single-stage, solid-fuel-propelled

Type: INA

Length: m7.5

Width: m0.5

Weight: kg1,780

Warhead Weight: 70-100 kg

Maximum Range: km150

Guidance System: Track-via-missile

TVM Guidance Capable: Yes

ABM Capable: Yes

Maximum Velocity: m/s2,000

Kill Probability: 0.70 to 0.93 single shot

Ballistic Targets Range: km5-40

Basic Load: 4 per TEL

↳*Missile (Option 2)*

Name: 5V55R/5V55KD

Type: INA

Length: m7

Diameter: mm450

Weight: kg1,450

Warhead Weight: kg100

Maximum Range: km90

Guidance System: SARH

Maximum Velocity: m/s1,900

Maximum Target Speed: m/s1,150

Basic Load: 4 per TEL

↳*Missile (Option 3)*

Name: 9M96E1

Type: INA

Length: INA

Width: INA

Weight: kg330

Warhead Weight: kg24

Maximum Range: km40

Guidance System: Active radar homing

Maximum Velocity: m/s900

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

↳*Missile (Option 4)*

Name: 9M96E2

Type: INA

Width: INA

Weight: kg420

Warhead Weight: kg24

Maximum Range: km120

Guidance System: Active radar homing

Maximum Velocity: m/s1,000

Maximum Target Speed: 4,800–5,000 m/s

Basic Load: 4 per TEL

Probability of Kill: 0.7 against a tactical ballistic missile

Fire Control

Command Post Vehicle: The 54K8 command-post vehicle has six operator positions. The command post can monitor data within a 300-km radius and can track 100 targets while controlling up to six interceptions. Two missiles can be launched against each target if required.

↳*Fire Control System*

Name: 83M6E command and control system, although it is also compatible with the older Baikal-1E and Senezh-M1E CCS command and control systems.

Computerized FCS: Yes

Direct Fire: Yes, no less than 1km

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Number of Targets Engaged Simultaneously: ea6

Note #1: The vehicle lowers four hydraulic jacks for launch

Note #2: The S-300PMU1 air defense missile system can simultaneously engage up to 36 air targets by 72 missiles.

↳*Radar #1*

Name: 64N6E

Type: Regiment Radar

NATO Reporting Name: BIG BIRD

Frequency/Band: C-Band

Target Detection Range: km300

Simultaneously Detected Targets: 300

↳*Radar #2*

Name: 30N6E(1)

Type: Fire control/illumination and guidance radar

NATO Reporting Name: FLAP LID B

NATO Frequency Band: H-J

Target Detection Range: km200

Simultaneously Tracked Targets: ea6

Simultaneously Engaged Targets: ea6

↳*Radar #3*

Name: 36D6

Type: INA

NATO Reporting Name: TIN SHIELD

NATO Frequency Band: E/F

Target Detection Range: km180-360

Simultaneously Tracked Targets: ea120

↳*Radar #4*

Name: 96L6E

Type: All altitude detection

NATO Reporting Name: CHEESE BOARD

NATO Frequency Band: INA

Target Detection Range: km300

Simultaneously Tracked Targets: ea100

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Note: Protection. Additional elements of protection are the placement of components of C-300 in the trenches (practiced as placing on the hills for a better view and more rapid care of the horizon, and in the trenches for stealth and protection against fragments of explosions).

Notes:

The SA-20 Gargoyle (S-300PMU-1) Russian Surface-to-Air Missile (SAM) System was first introduced in 1993 with the new and larger 48N6 missiles for the first time in a land-based system and introduced all the same performance improvements from the S300FM version including the increased speed, range, TVM guidance and ABM capability. The warhead is slightly smaller than the naval version at 143 kg (315 lb). This version also saw the introduction of the new and more capable 30N6E TOMB STONE radar. The S-300PMU1 air defense missile system can simultaneously engage up to 36 air targets by 72 missiles. The S-300PMU-1 was introduced in 1993 and for the first time introduces several different kinds of missiles in a single system. In addition to the 5V55R and 48N6E missiles the S-300PMU-1 can utilise two new missiles, the 9M96E1 and 9M96E2. Both are significantly smaller than the previous missiles at 330 and 420 kg (730 and 930 lb) respectively, and carry smaller 24 kg (53 lb) warhead. The 9M96E1 has an engagement range of 1–40 km (0.62–25 mi) and the 9M96E2 of 1–120 km (0.62–75 mi). They are still carried 4 per TEL. Rather than just relying on aerodynamic fins for manoeuvring, they use a gas-dynamic system which allows them to have an excellent probability of kill (Pk) despite the much smaller warhead. The Pk is estimated at 0.7 against a tactical ballistic missile for either missile. The S-300PMU-1 typically uses the 83M6E command and control system, although it is also compatible with the older Baikal-1E and Senezh-M1E CCS command and control systems. The 83M6E system incorporates the 64N6E (BIG BIRD) surveillance/detection radar. The fire control/illumination and guidance radar used is the 30N6E, optionally matched with a 76N6 low altitude detection radar and a 96L6E all altitude detection radar. The 83M6E command and control system can control up to 12 TELs, both the self-propelled 5P85SE vehicle and the 5P85TE towed launchers. Generally support vehicles are also included, such as the 40V6M tow vehicle, intended for lifting of the antenna post

HQ-9 (Hong Qi 9) Chinese 8x8 Long-Range Air Defense Missile System




Tiers:



Variants:

- **HQ-9A:** Upgraded electronics and software. Production began by 2013. Range: 200 km. Altitude: 30,000 m. Dual seeker. Improved electronic equipment and software provide the HQ-9A with higher accuracy and probability of kill. Can have semi-active radar homing (SARH).
- **HQ-9B / HHQ-9B:** Range: 200 km. Altitude: 30,000 m. Dual seeker. Found on the LUYANG III class destroyers in 2014. Longer 300 km range; an additional seeker provides semi-active radar homing (SARH) and infrared homing modes.
- **HQ-9C:** Expected to have an active radar homing mode. Currently in development; incorporates fully active radar homing,
- **HHQ-9:** Naval variant identical to HQ-9; launched from VLS tubes in Lanzhou class destroyers.
- **HHQ-9A:** Naval variant identical to HQ-9A.
- **FT-2000:** Anti-radiation system; range of up to 100 km.
- **FD-2000:** Identical to original HQ-9, but designed for export with minor electronic improvements

System

Alternative Designation: HQ-9, FT-2000, Hóng Qí
Manufacturer: CPMIEC
Type: Track-Via-Missile (TVM), Self-propelled surface-to-air missile (SAM) system
Family: INA
Crew: ea1+5
Chassis: Tai'an TAS5501 10 x 10 high mobility cross country truck
Displacement Time: minINA
Emplacement Time: minINA
Target: Low-flying aircraft, cruise missiles, air-to-ground missiles, and tactical ballistic missiles. Effective against any airborne radar system.
Maximum Effective Range: km200
Minimum Effective Range: km12
Target Altitude Maximum: m3,000
Target Altitude Minimum: m20,000
Fire on the Move: No
System Reaction Time: seconds10

Fuse Type: Active Fuze, which activates at 5 km from the target.

Probability of Kill: INA

Note: The HQ-9 can intercept various aircraft, helicopters, UAVs, cruise missiles, air-to-ground missiles, guided bombs and theater ballistic missiles at medium- to long ranges.

Dimensions

Length (Vehicle): m11

Width (Vehicle): m3

Height (Vehicle): m3

Weight, Combat (Vehicle): tons18

Payload Capacity: tons20

Ground Pressure: kg/mINA

Weight, Warhead: kg180

Automotive

Prime Mover: Tai'an TAS5501 10 x 10 high mobility cross country truck

Engine Name: Deutz Turbocharged Diesel

Engine Type: Turbocharged Diesel

Engine Power: hp517

Vehicle Diameter: mm466

Cruising Range: km800

Speed, Maximum Road: km/h80

Speed, Average Cross: km/h70

Speed Maximum Swim: Not Amphibious

Vehicle Configuration: 8x8

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.5

Trench: m1.8

Fording Depth: m1.1

All Wheel Drive: Yes

Central Tire Inflation System: Yes

Communications

↳*TBR-142*

VHF FM Transceiver: Yes, TBR-142(I)

VHF Range: km1 to 50

Megahertz: MHz40.000 to 59.975

Output Power: Watts1 to 0.3

Power Source: 12V Ni-Ca Rechargeable Battery or external 12V DC power source

Dimensions: mm217x135x58

Weight: kg2.7

Antennas: 3 Total: a 1.3m whip antenna, a 0.3m short antenna, and a 10m wire antenna

Proliferated: Widely with Artillery/Gun/Missile/Reconnaissance Units

Control Device: TBR-142(II)

Multi-function Field Phone: TBR-142(IIID)

Anti-Aircraft Control Unit: TBR-142(IIIG)

ZXY88-200 C2 Capable: Yes

Messaging: Capability – Limited

Amplifier: Available

Physical Conditions: Terrain and Weather favorable

Missile System

Name: Taian TAS5380

Guidance: inertial guidance in the initial stages with radio command mid-course correction and TVM for end game.

launcher Type: TAS5380 8 × 8

Fuse Type: Active Fuze, which activates at 5 km from the target.

Missile Type: two-stage missiles with thrust vector control.

Rocket Engine: Two-stage solid propellant rocket

Missile Length: m6.8

Missile Weight: kg1,300

Warhead Weight: kg180

Warhead Type: HE-FRAG

Missile Speed: Mach4.2

Maximum Effective Range: km200

Minimum Effective Range: kg12

Maximum Altitude: m3,000

Minimum Altitude: m20,000

Launch Type: Verticaly Cold Launched

Min Elevation: degINA

Max Elevation: deg+90

Traverse Range: deg360

Max Rate of Fire: rds/minINA

Missile Engagement Time: seconds12-15

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type: system Inertial guidance with mid-course update and terminal active radar homing

Self-Destruct Time: INA

Thrust Vector Control: Yes

Note: Equivalent to the Russian S-300

Fire Control

Note: To reduce the cost, the HQ-9 is designed to be flexible enough to employ a wide range of radars, both the search/surveillance/acquisition radar and the tracking/engagement/fire control radar (FCR).

↳*Fire Control System*

Name: HT-233 Radar

Computerized FCS: Yes, KS-1 SAM, SJ-212, itself an enlarged and improved version of the SJ-202 fire control radar (FCR) used in HQ-2J.[H-200 & SJ-231 FCRs of latter models of KS-1 SAM are also compatible with HQ-9.

Direct Fire: INA

Indirect Fire: Yes

Fire Control Sensors: Yes

Guidance: Track via Missile (TVM) semi-active radar homing

↳*Radar #1*

Name: HT-233 Radar

Type: Primary Target Radar

Function: Primary radar for the HQ-9. Fire Control Radar (Some reports state that this radar can also search and target like the radar found the the U.S. Patriot system)

Frequency/Band: G (4-6 GHz) 300 MHz

Range: km300

Number of Targets System can Track: ea100

Azimuth of Search: deg120

Elevation of Search: deg0-90

Number of Missile Radar can Guide at once: 6 missiles to 6 targets or 6 missiles to 3 targets (2 missiles to each target)

Peak Power Output: MW1 (Average 60 kW)

Note: most advanced FCRs HQ-9 could employ

Lens Arrangement: AN/MPQ-53

:

Guiding System: The HT-233 Radar can guide up to 6 missiles to 6 seperate targets, or to 3 targets witha pair of missile for each target

Radar #2

Name: Type 305B Radar

Type: Standar Search Radar

Alternate Designation: LLQ-305B

Function: Standard search radar for HQ-9. This 3-D radar has an antenna height of 3.5 meters, and employs sixty 350 mm waveguide feeds. It operates in the S-band at a wavelength of 11.67 cm. Mechanically steered planar array with electronic beam-steering for height-finding. It is similar to many radars used in the West but is build for greater mobility in the field, making is more survivable.

Variant: YLC-2V acquisition radar

↳*Radar #3*

Name: Type 120 Radar

Type: Low altitude search radar

Alternate Designation: LLQ-120

Fuction: Low altitude search radar. A telescoping radar with an antenna height of 2.3 meters folded, and 7 meters unfolded. Uses a feed network of sixteen 230mm wave guides. It rotates at a maximum of ten revolutions per minute, and operates in the L-band at a wavelength of 23.75 cm. Uses a hydraulically elevated mast to increase low altitude coverage. Operating in L-band improves detection range against stealth aircraft and cruise missiles.

Variant: JY-11B

↳*Radar #4*

Name: Type 305A radar

Type: Search Radar

Function: Type 305A (also known as LLQ-305A) radar is another search radar for HQ-9 system. This AESA radar is designed maximize the anti-ballistic capability of HQ-9, and it resembles Thales Ground Master 400 AESA radar. Very little info is released about this radar other than it can also act as Fire-control radar.

↳*Radar #5*

Name: YLC-20 passive sensor

Type: Search Radar

Function: Although Type 305 radars are effective against stealthy targets such as F-35, full stealth target such as B-2 is difficult to detect. YLC-20 passive radar was conceptually based on KRTP-91 Tamara passive sensor, incorporating experience obtained from documentation acquired during the abortive attempt to procure six Czech VERA passive sensors. YLC-20 passive radar was first revealed in 2006.

↳*Radar #6*

Name: DWL002 passive sensor

Type: Passive Radar

Function: DWL002 passive radar is the development of earlier YLC-20, incorporating Kolchuga passive sensor, four of which were sold to China. Like its predecessor YLC-20, DWL002 is also developed by China Electronics Technology Corp. (CETC).

Protection

↳

Hull Armor: INA

Turret Armor: INA

Applique Armor: No, Not supposed to be stationed near the front line of the battle field

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: No

Notes:

The HQ-9 (Hong Qi-9) is a Surface to Air missile (SAM) engineered to attack airborne radars, essentially a surface to air anti-radiation missile (ARM) that can attack single or multiple electromagnetic radiating systems in the 1-18 Ghz band. It is also effective against fixed wing aircraft, rotary wing aircraft, and UAVs. The HQ-9 has limited success against cruise missiles and ballistic missiles. Sources conflict in identifying the organization for combat of the HQ-9 battery and battalion. We assess that the following is true: A HQ-9 battery will usually have 8 TELs, 1 HT-233 Radar, and a TWS-312 CP. In addition, associated support vehicles (generator, missile resupply) may be seen in the area. The battery can operate independently of the battalion as listed above with some degradation in search capability. This degradation will be eliminated when the organization is deployed as a battalion as this will bring additional radars to include the Type 120 Low Angle Search Radar and the Type 305B Radar. The battalion formation will include 3 batteries (24 TELs) though some sources state that the battalion can control 48 TELs. The battalion also deploys with a site survey team which does not deploy with the battery, missile resupply, and its own TWS 312 Command Post. It is safe to assume that other mission and soldier support items will be found in the area of the HQ-9 formation. The HQ-9 has been designed to be able to use several of the Chinese radars. The assessment above is the most likely deployment course of action. Refs:
http://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/china-anti-access-area-denial-coming-soon/hq-9/
https://www.armyrecognition.com/china_chinese_army_missile_systems_vehicles/hq-9_ground-to-air_medium_range_air_defense_missile_technical_data_sheet_specifications_pictures.html
https://medium.com/@skunkworksLH/hq-9-long-range-air-defense-missile-system-ee58232185a

S-300V (SA-12a Gladiator) Russian Long-Range Air Defense Missile System





Tiers:



Variants:

- **SA-12b Giant:** The S-300V with a 9M82 SA-12b GIANT missile and 9A82 SA-12b GIANT TELAR
- **S-300VM:** S-300VM is an upgraded version of the S-300V. It seems that it is also called S-300V3. Western reporting name for this system is SA-23 Gladiator/Giant. It has new command post vehicle and new radars. It fires improved 9M83M and 9M82M missiles with a longer range. Missiles have a range of 200 km and can reach targets at altitude of 30 km. The S-300VM is in service with Russia.
- **Antey 2500:** Antey 2500 an export version of the S-300VM. It can engage up to 24 aircraft or up to 16 ballistic missiles simultaneously. This system can engage ballistic missiles at a range of 250 km and aircraft at a range of 200 km. Two battalions of these air defense systems were exported to Venezuela. These were delivered in 2013. Estimated export price of this system is 1 billion dollars.
- **S-300V4:** S-300V4 improved version. It seems that this system is also called S-300VMD. It has a range of 300 km. Russian armed forces issued production order for this air defense system. Deliveries commenced in 2014.

System

Alternative Designation: S-300V; SA-12s Gladiator; 9K81 Antey-300
Type: The S-300V air defense missile system was developed to engage short- and intermediate-range ballistic missiles, cruise missiles, strategic and tactical aircraft, as well as early warning and electronic warfare aircraft.
Family: S-300 Family
Crew: ea3
In Service: 1988-Present
Displacement Time: min5
Emplacement Time: min5
Note #1: A battery of the S-300V typically includes up two six launchers in two variants, command post vehicle, surveillance radar, sector surveillance radar, and up to 6 reloading vehicles/launchers in two variants.
Note #2: S-300V system may be controlled by an upper level command post system 9S52 Polyana-D4 integrating it with Buk missile system into a brigade

Dimensions

Hull Length: m9.30

Hull Width: m4.50

Hull Height: m3.40

Weight: tons50

Ground Pressure: INA

Automotive

Engine Name: V-84

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km250

Speed, Maximum Road: km/h53

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %40

Side Slope: %20

Vertical Step: 0.7

Trench: 2.5

Fording Depth: m1.2

Communications

Missile System

↳*Launcher*

Name: 9A93 SA-12a GLADIATOR TELAR

Type: TELAR

Maximum Elevation: +90

Minimum Elevation: INA

Note: The TELARs are not capable of autonomous engagements, requiring the support of the GRILL PAN radar.

↳*Missile*

Name: 9M83 SA-12a GLADIATOR Missile

Type: Semi-Active Radar Homing Missile

Basic Load: Carries four 9M83 SA-12a GLADIATOR missiles

Length: m7.0

Diameter: mm800

Weight: 2,345 kg

Warhead Type: HE fragmentation

Warhead Weight: 150 kg

Guidance System: Semi-Active Radar Homing Missile

Maximum Velocity: m/s1,700

Operational Range: 6–75 km

Maximum Altitude: km25

Minimum Altitude: m250

Maximum Speed: 1,700 m/s, Mach 5.75

Chance to Defeat Ballistic Missiles: 40-65% chance of defeating ballistic missile

Chance to Defeat Cruise Missiles: 50-70% defeating cruise missile

Chance to Defeat Enemy Aircraft: 70-90% chance of defeating enemy aircraft

Launcher/Loader Vehcile (LLV)

Name: 9A85 GLADIATOR Launcher/Loader Vehicle (LLV)

Crew: ea3

Crane: Yes

Basic Load: Four 9M82 missiles

Reloading Time: 50-60 minutes

Note #1: There are two variants of reloading vehicles

Note #2: These vehicles are combination of the TEL and reloading vehicle. A unique capability of these vehicles is that they can launch missiles themselves. Firing data is acquired from the launcher vehicle

Command Station

Name: 9S457 Command Station (Command Post Vehicle)

Crew: ea7

Mission: It controls radars and up to 4 launcher vehicles

Target Tracking: It can track up to 70 air targets simultaneously. It prioritizes which targets should be attacked first and transmits firing data to launcher vehicles

Note: he CPV and its associated radars can detect up to 200 targets, track as many as 70 targets and designate 24 of the targets to the brigade's four GRILL PAN radar systems for engagement by the SA-12a and SA-12b TELARs

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: INA

Indirect Fire: Yes

↳*Radar #1*

Name: 9S15 BILL BOARD Surveillance Radar system

Type: Phased-Array Surveillance Radar system

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Crew: ea4

Detection Range: km330

Aircraft Detection: At a range of 240 km aircraft are detected with a chance of 50%

Ballistic Missile Detection: It detects ballistic missiles at a range of about 150 km

Antenna Rotating Speed: sec6-12

Target Detection: up to 200 targets

Target Coverage Elevation: 0-55º in Elevation

Target Coverage Range: 10-250 km

Target Coverage Accuracy: 30-35 min of arc in azimuth and 250 m in range

↳*Radar #2*

Name: 9S19 HIGH SCREEN Sector Radar system

Type: Sector Radar system

Purpose: The HIGH SCREEN sector radar supporst the ATBM role, providing surveillance of anticipated azimuths of threat missiles

Crew: ea4

Mission: t is used to detect high speed targets, such as ballistic missile warheads

Detection Range: km175

Maximum Targets, Simultaneous: maximum being 16 simultaneous targets

Note: The radar is switches to a tracking mode when high speed targets are detected, automatically transmiting the trajectory parameters to the Command Post Vehicle

↳*Radar #3*

Name: 9S32 GRILL PAN Guidance Radar system

Type: Parabolic dish target-illumination radar on telescoping mast on missile launch vehicle

Purpose: The GRILL PAN radar system controls the battery's launcher vehicles (TELARs and LLVs)

Sector Scan: 90-deg sector scan through 50 deg elevation on separate vehicle

Guidance System: inertial guidance with semi-active terminal homing

Band: X-Band

Multichannel: Yes

Peak Power: kW150

Maximum Range: km250

Beamwidth: deg0.5

Antenna: ransmission type of space fed phased-array antenna

Maximum Targets, Simultaneous: It can simultaneously track up to 12 targets and control up to six missiles against these targets

Radar Cross-Section: radar cross-section of 2m2 at a range of 150 km in manual mode and 140 km in automatic mode

Note: The GRILL PAN tracks targets assigned to it by the CP while simultaneously maintaining a horizon search for new targets

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Note: The S-300V is considered as a survivable system. Once all the missiles are launched the launcher vehicles can briefly redeploy. It uses shoot, scoot and hide tactics in order to avoid being destroyed.

Notes:

The S-300V air defense missile system was developed to engage short- and intermediate-range ballistic missiles, cruise missiles, strategic and tactical aircraft, as well as early warning and electronic warfare aircraft. It was designed to counter the threat posed by Lance and Pershing ballistic missiles. The main role of the S-300V is to protect task forces and vital industrial and military installations against massed air attacks. Its reporting name in the West is SA-12 or Gladiator/Giant. The S-300V consists of: 9M82 SA-12b GIANT missile 9M83 SA-12a GLADIATOR missile 9A82 SA-12b GIANT TELAR 9A93 SA-12a GLADIATOR TELAR 9A84 GIANT Launcher/Loader Vehicle (LLV) 9A85 GLADIATOR Launcher/Loader Vehicle (LLV) 9S15 BILL BOARD Surveillance Radar system 9S19 HIGH SCREEN Sector Radar system 9S32 GRILL PAN Guidance Radar system 9S457 Command Station Note: The S-300V comes in two versions: 1. SA-12a Gladiator 2. SA-12b Giant Once equipped with 9M83 missiles is referred in the West as SA-12A or Gladiator. When equipped with 9M82 missiles it is referred as SA-12B or Giant. The 9M83 SA-12a GLADIATOR is a dual-role anti-missile and anti-aircraft missile with a maximum range between 75 and 90 km. The 9M82 SA-12b GIANT missile, configured primarily for the ATBM role, is a longer range system [maximum range between 100 and 200 km] with a longer fuselage with larger solid-fuel motor. The 9A82 SA-12b GIANT and 9A93 SA-12a GLADIATOR TELAR vehicles are similar, though the 9A83-1 carries four 9M83 SA-12a GLADIATOR missiles, whereas the 9A82 carries only two 9M82 SA-12b GIANT missiles. The configuration of the vehicles command radar is also different. On the 9A83-1 the radar is mounted on a folding mast providing 360º coverage in azimuth and full hemispheric coverage in elevation. The radar on the 9M82 TELAR is mounted in a semi-fixed position over the cab, providing 90º coverage on either side in azimuth and 110º in elevation. The TELARs are not capable of autonomous engagements, requiring the support of the GRILL PAN radar. The 9S457-1 Command Post Vehicle is the command and control vehicle for the SA-12 system, which is supported by the BILL BOARD A surveillance radar and the HIGH SCREEN sector radar. The CPV and its associated radars can detect up to 200 targets, track as many as 70 targets and designate 24 of the targets to the brigade's four GRILL PAN radar systems for engagement by the SA-12a and SA-12b TELARs. The BILL BOARD A radar provides general surveillance, with the antenna rotating every 6-12 seconds. The radar, which can detect up to 200 targets, provides target coverage of 0-55º in elevation and 10-250 km in range with an accuracy is 30-35 min of arc in azimuth and 250 m in range. and. The HIGH SCREEN sector radar supports the ATBM role, providing surveillance of anticipated azimuths of threat missiles. The radar is switches to a tracking mode when high speed targets are detected, automatically transmitting the trajectory parameters to the Command Post Vehicle. The CPV prioritizes the threat and instructs the HIGH SCREEN radar to track specific missiles, with the maximum being 16 simultaneous targets. The GRILL PAN radar system controls the battery's launcher vehicles (TELARs and LLVs). It can simultaneously track up to 12 targets and control up to six missiles against these targets The radar can acquire targets with a radar cross-section of 2m2 at a range of 150 km in manual mode and 140 km in automatic mode. The GRILL PAN tracks targets assigned to it by the CP while simultaneously maintaining a horizon search for new targets. The LLVs (9A85 GLADIATOR and 9A83 GLADIATOR) resemble

normal TELARs, but with a loading crane rather than command radars. While the primary role of the LLV is to replenish the TELARs, they can also erecting and launch missiles if needed, though they are dependent on the use of command radars from neighboring TELARs.

Sevom Khordad (3rd Khordad) Iranian Long-Range Air Defense Missile System





Tiers:

1 2 3 4

Variants:

- **Note:** The Raad (Thunder) family contains 3 different systems which came into service one after another. The original Raad air defense missile system was officially displayed in 2012. It was a medium-range system of new design. It uses two electro-optical systems to provide both detection and engagement coverage. Each launcher vehicle carrier 3 missiles, plus and additional passive radar. The second member of the family was Tabas. Its name refers to the desert of Tabas incident in 1980. This improved air defense missile system was officially displayed in 2014. Tabas is equipped with a mechanical radar and also carries 3 missiles. It can reach targets at a maximum range of up to 75 km. The third, so far the most advanced member of Raad family is the Sevom Khordad. (Sevom - Third, Khordad - third month of Iranian calendar). The name "Sevom Khordad" refers to the 3rd day of 3rd month of the Iranian calendar, which coincides with the liberation of the city of Khorramshahr during Iran–Iraq War.

System

Alternative Designation: Sevom Khordad; 3rd Khordad

Type: Medium-Range Air Defense Missile System

Crew: INA

Chassis: The Sevom Khordad uses the same 6x6 wheeled chassis as Raad and Tabas systems.

Displacement Time: INA

Emplacement Time: INA

Note #1: The 3rd Khordad is the most advanced version of the Ra'ad air defense system. It has the greatest reported range of any of the variants.

Note #2: A battery contains 1 TELAR and 2 TEL vehicles. So a single battery has 9 ready-to-fire missiles. A battalion has 4 batteries with 4 TELARs and 8 TELs and can engage 16 targets simultaneously. Each battalion additionally includes a Bashir S-band 3D phased array surveillance radar which has a detection range of 350 km. The battalion also has a command and control (C2) unit, based on IVECO truck chassis. The C2 unit provides communication between Sevom Khordad batteries. Furthermore, the C2 unit can connect other air defense systems of the Raad family, including Raad and Tabas, into a single air defense network. This allows to cover large area and targets can be engaged with a wide range of missiles from the cheapest Taer-1 missiles to the most capable Taer-2s. This adds the capability of facing different types of threats with different types of interceptors. In case of heavy jamming when even the X-band engagement radar can’t handle its duty, the C2 unit can provide an additional data link, connecting the system to electro-optical engagement systems of Raad batteries, in order to guide missiles toward targets.

Dimensions

Length: 7.5 m

Width: 3.3 m

Height: 5.1 m

Weight, Combat: INA

Automotive

Engine Name: IVECO, Model: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: 500 km

Speed, Maximum Road: 65 km/h

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Missile System

Name: 3rd Khordad TELAR

Note: The system can engage two targets at a time.

↳*Missile (Option 1)*

Name: Taer-2B Missile

Type: Surface-to-Air Missile

Diameter: INA

Length: INA

Maximum Effective Range: 105 km

Maximum Intercept Altitude: 25,000 m

Speed: INA

Guidance System: Radar, mid-course update

↳*Missile (Option 2)*

Name: Sayyad-2C Missile

Type: Surface-to-Air Missile

Diameter: INA

Length: INA

Maximum Effective Range: up to 75 km

Maximum Intercept Altitude: up to 30 km

Speed: Mach 4.5+

Guidance System: Radar, mid-course update

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

↳*Internal Radar*

Name: INA

Type: Phased Array Engagement Radar

Frequency/Band: X-Band

Target Identification: Each Sevom Khorad TELAR can detect 100 targets at once.

Target Engagement: It can engage 4 targets simultaneously and guide 2 missiles on each target.

Note: It employs a phased-array radar on its transporter-erector-launcher radar (TELAR) that is visually similar to the Chair Back radar on the Buk-M2. The phased-array radar can reportedly provide guidance for up to two additional Alam al Hoda transporter-erector-launchers.

↳*External Radar Vehicle*

Name: Bashir

Type: 3D phased Array Surveillance Radar

Frequency/Band: S-band

Maximum Detection Range: 350 km

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Sevom Khordad, also known as the 3rd Khordad is the most advanced version of the Ra'ad air defense system. It has the greatest reported range of any of the variants. It employs a phased-array radar on its transporter-erector-launcher radar (TELAR) that is visually similar to the Chair Back radar on the Buk-M2. The phased-array radar can reportedly provide guidance for up to two additional Alam al Hoda transporter-erector-launchers. The system can employ Taer-2B missiles as well as the Sayyad-2C missile that is based off of the American SM-1R. The Sayyad-2C has a reported range of 46 miles and a maximum intercept altitude of 100,000 ft. The missile has a maximum speed of Mach 4.5. When fitted on the 3rd Khordad, the Sayyad missiles are not carried in canisters. The system can engage two targets at a time. The name comes from the Persian date (May 24) that Iran recaptured Khorramshahr in 1982 during the Iran-Iraq war. A 3rd Khordad battalion consists of four batteries, each consisting of one 3rd Khordad TELARs linked to two Alam al Hoda TELs for a total of four TELARS and eight TELs. Overall air surveillance is achieved with a Bashir 3D phased array surveillance radar operating in the S-band with a range of 190 mi (350 km). The 3rd Khordad is a specialised variant of the Iranian Raad medium range air defence system which entered service

in the mid 2010s, and deploys Taer-2B missiles from mobile transporter erector launchers. The missile systems have been mass produced and are heavily relied on today by the country’s air defence forces - complementing longer ranged platforms acquired from Russia including the S-200 and the S-300PMU-2. The 3rd Khordad is the longest ranged variant of the Raad system, and reportedly retains an engagement range of up to 200km. The platform can engage up to four targets with up to eight missiles simultaneously, and makes use of a powerful phased array radar. The successful testing of the missile system against a high end American drone is likely to have significant consequences for the balance of power in the Middle East - with Iran’s adversaries likely to be more wary about the risks of engaging the country’s indigenous defence systems. Iran itself may well speed up development of new long range missile platforms domestically - and the incident may also affect the military's decision making regarding the need to import more sophisticated foreign weapons systems such as the Russian S-400 which is reportedly currently under consideration.

S-400 Triumph (SA-21 Growler) Russian Long-Range Surface-to-air Missile System









Tiers:



System

Alternative Designations: Triumf, Triumph as a translation
Target: FW, IRBMs to 3,500 km, heli, CM, ASM, UAV, and artillery rocket
Crew: INA

↳Primary Components

Description: Group/brigade 2-8 bns and 91N6 E2. Each bn has 6-12 trailer launchers (TLs, aka mobile erectorlaunchers or MELs) , 55K6E 8x8 van, 5T58-2 SAM transporter, 22T6-2 loading crane, and radars. Battery (firing unit) has 3 TLs.

ARMAMENT

↳Trailer Launcher (TL) or MEL

Name: 5P85TE2
Tractor: BAZ-64022 6x6 tractor
Missiles per Launcher: 3 x 40N6, 4 x 9M96E2 (current likely mix)
Automotive Performance: For 5P85TE2 TL
Cruising Range (km): 800 (est)
Road/ Dirt Road Speed (km/h): 60/30 (est)

↳Missile

Name: 40N6 “big missile”

Type: Solid-fuel

Launch Mode: Vertical launch

Launch Range (km): 5-400

Max Range TBMs: 40

Targets: 28-48

Guidance: Track-Via-Missile, missile active radar homing, home on jam

Warhead Type: Frag-HE

Warhead Weight (kg): 180+

Fuze Type: Radio command

Probability of Hit (Ph%): 90 FW. 80 heli

Simultaneous missiles: up to 2 per target (doubles probability of hit)

Weight (kg): 2,000, 2,800 in canister

↳*9M96E2/9M96M "small missile"*

Description: A canister of 4 can fit on the SA-21 launcher in place of a big missile. It is possible that most launchers in most batteries (by the Near Term) will have 2 canisters of small missiles (8 total).

↳*Other Missiles*

Description: The system can also launch older missiles for SA-10 and SA-20 systems. There are reports of a 48N6DM missile, which offers longer range than the 48N6. This may have been an interim missile for use until 40N6 was fielded.

Missiles

Description: Typical Combat Load

TEL and trailer launcher: 7

40N6 (with 1x 9M96E2 canister): 3, Near Term 2

9M96M/E2 ("small missile"): 4, Near Term 8

SA-18S MANPADS: 2

ARMAMENT

Name: 92N2E

Description: This VHF target acquisition radar is at Brigade level. The first search priority is stealth aerial systems. Because of limited sector coverage, it is likely that up to 4 will be used.

Detection Range (km): At least 400

Azimuth Coverage (°): 120, 360 with rotation

Function: Dual (TA/FC) radar vehicle and CP

Unit Associated With: Trailer with KrAZ-260 tractor

Mobility: MAZ-7930 8x8 van

Operation: Digital links to battery, battalion, and brigade/IADS processing center

Emplacement/Displacement time (min): 15

Range (km): 400

Targets Tracked Simultaneously: up to 150

Frequency Band: I/J, 3-D phased array

NATO Designation: GRAVESTONE

Unit: Battery (SAM system), for 3 launchers

Detection and Guidance (km): 400 auto-track

Targets Engaged Simultaneously: up to 6 (est)

Missiles Guided Simultaneously: up to 12 (est)

OTHER ASSETS

Description: A RECENT COUNTER-STEALTH RADAR SYSTEM IS THE NEBO-M MOBILE MULTI-BAND SYSTEM, WITH THREE VEHICLES. RLM-D HAS L-BAND RADAR. RLM-S HAS X-BAND. RLM-M HAS A VHF RADAR, SIMILAR TO NEBO-SVU. THE SYSTEM IS SPECIFICALLY DESIGNED AGAINST STEALTH AIRCRAFT AND F-35. A RECENT RUSSIAN CONTRACT CALLS FOR 100 SYSTEMS TO REPLACE NEBO-SVU IN SA-20B/S-400 UNITS, AND WILL BE INCLUDED IN SA-23/S-300V4 UNITS.

VARIANTS

Description: THE S-400 SERIES USES A NEW ARRAY OF TRUCKS, TRACTORS, AND TRAILERS. DUE TO S-400 PRODUCTION DELAYS, THE SA-20 SERIES WAS CONFUSED WITH IT. MANY S-400 UPGRADES CAN BE APPLIED TO SA-10, SA-12, AND SA-23. CHINA IS ORDERING SA-20B AND UPGRADING OTHER LAUNCHERS TO SA-20B CAPABILITY.

↳*S-400/SA-21A*

Description: THE SYSTEM WAS FIELDED IN 2007 WITH RUSSIAN VEHICLES. EARLY UNITS ARE STRATEGIC AND USE ONLY 40N6 400-KM BIG MISSILES. MOST LAUNCHERS CAN ALSO MOUNT CANISTERS OF 9M96 SERIES SMALL MISSILES.

↳*SA-21B/S-400M/SAMODERZHETS*

Description: UNLIKE THE OTHER. SAMS, SA-21A’S 40N6 WILL RANGE 400 KM.

NOTES

Description: THERE ARE ALSO REPORTS OF A SYSTEM IN DEVELOPMENT CALLED S-500, WITH LONGER RANGE AND A DESIGN VELOCITY OF 10,000 M/S. NO DETAILS ARE AVAILABLE. THE PHASED-ARRAY RADARS FEATURE LOW DETECTION, AND HIGH JAM RESISTANCE.

Notes:

The S-400 Triumph (NATO reporting name: SA-21 Growler), previously known as the S-300PMU-3, is an anti-aircraft weapon system developed in the 1990s by Russia's Almaz Central Design Bureau as an upgrade of the S-300 family. It has been in service with the Russian Armed Forces since 2007. In 2017 the S-400 was described by The Economist as "one of the best air-defence systems currently made". According to Siemon Wezeman Senior Researcher of SIPRI the S-400 "is among the most advanced air defence systems available"

→Infrared/Command Guidance Missile Systems

→→Short-Range Missile Systems (Less than 30 km)

Rapier (Export) Iranian Surface-to-Air Missile System



Tiers:



Variants:

- **Laserfire Rapier:** With the range of upgrades and new components, the original low-cost Rapier system was gone. In order to address international market requirements for a lower-cost system, BAC started development of the "Rapier Laserfire" in 1982. Laserfire replaced the original optical tracker unit with a new lidar (laser radar) illuminating system that is considerably smaller, allowing the entire system to be mounted on a single pallet that could itself be mounted on a truck or other flatbed vehicle. Laserfire used a millimetric Doppler radar. Due to its very high frequency of operation and ability to transform its beamshape from narrow azimuth and high elevation to wide azimuth and narrow elevation, Laserfire was able to detect helicopters hovering or travelling at low altitude and in areas of high clutter by detecting the movement of the helicopter's rotor blades. Initial engagement is similar to the original Rapier, but the target was illuminated and automatically tracked by a high power YAG:Nd laser. After the missile was launched the laser alternately illuminated the target and missile to determine their locations, and guidance was sent to the missile as normal (see laser guidance). Laserfire thus represented a fairly major upgrade to the original optical system, allowing semi-automatic engagements, and greatly reducing operator skill and training requirements. On the downside, Laserfire no longer has the optical system of the original, which served an important second duty by allowing the aircraft to be visually identified at long range. Additionally, while the Laserfire tracking system was capable of being operated at night, target acquisition was optical, like the original Rapier.
- **Field Standard B1:** Shortly after introducing FSA, "Field Standard B" (FSB) added a number of basic upgrades. Additionally, the search radar was upgraded to be easily shut down in case of an anti-radiation missile attack. FSB included lessons from the Falklands campaign, notable the 'pointing stick' that enabled the detachment commander of a fire unit to point the aiming unit at a target.
- **Darkfire Rapier/Field Standard B2:** In 1985 development started on a new tracker that replaced the original optical system with a new IR thermal imager system to improve its abilities, especially at night. This version was known as "Rapier Darkfire" for this reason. Trials of the new system started in 1987, and were deployed operationally in 1990 as "Field Standard B2" (FSB2), the earlier upgrades retroactively becoming FSB1. This system was also known as "Rapier 90". Cooling for the imager was provided by bottles of compressed gas. FSB2 also introduced a number of improvements that greatly improved Rapier capabilities. First and foremost was the Tactical Control Console that allowed four Rapier launchers to be controlled from a central location. The launchers themselves were upgraded to carry six missiles instead of four, improving battery capacity. Finally, the search radar was updated to use a new planar array radar, although its capabilities remained generally the same as the earlier model.
- **Rapier 2000/Field Standard C:** In 1992, shortly after the introduction of Rapier 90, another major upgrade series started at MBDA (previously Matra BAe Dynamics). Emerging as "Rapier 2000", or "Field Standard C" (FSC) in British service, the system reached its ultimate form. Development of the FSC system began at the end of the 1980s and the systems first entered service in 1996. By this time the Cold War was over and British air defence capabilities were significantly reduced, with fewer and smaller batteries, albeit every fire unit with Blindfire. There is also an export version of this version, known as Jernas. Malaysia is the first export customer for Jernas. FSC was effectively a new system, although Blindfire was little changed and it could fire both Mk 1 and Mk 2 missiles. The Surveillance radar was removed from the launcher and became a separate element and each launcher now carried eight missiles. With the missiles increasingly relying on radar guidance since the introduction of Blindfire, it made sense to upgrade the original

search radar to something much more modern. This was supplied by the Alenia Marconi "Dagger", a 3D pulse doppler radar with an integrated Cossor IFF Mark 10 system. Dagger is mounted on its own trailer, so the radome on top of the launcher unit was no longer needed. In its place, a much more modern optical tracking system was added. The new tracker used a Stirling-cycle cooler instead of compressed gas bottles. The use of much smaller electronics greatly reduced stack height of the whole launcher, allowing an additional two missiles to be added, for a total of eight. In operation, the Rapier 2000 is similar to earlier Blindfire-equipped systems. Targets are acquired visually or through the Dagger radar, and then the Blindfire and optical tracker are slewed onto the target. The optical system can be used solely to track the missile, or it can be used for all guidance, like the original Rapier. In either case the engagement is entirely automatic, with no operator guidance needed. The optical system can also be used as a search system, seeking out IR sources, allowing radar-quiet operation. In 2006 a Ministry of Defence study in Ground Based Air Defence recommended further reductions, based on a reduced air threat and the improved air defence capabilities afforded by the Typhoon fighter. These included removing the role from the RAF Regiment as a measure to preserve Royal Artillery units in the face of significant cuts to the Army. Nevertheless, the Royal Artillery units were placed under command of the HQ 1 Group RAF (within HQ Air Command) and the Joint Ground-Based Air Defence HQ was formed.

- **Tracked Rapier:** With sales to Iran came the additional requirement for a fully mobile version of Rapier to protect the Chieftain tanks being supplied on a UK MOD contract. BAC responded by adapting the Rapier system to fit on the M548, a cargo-carrier version of the ubiquitous M113. Development started in 1974 as "Tracked Rapier", with the first public showing at the 1977 Paris Air Show as a static display unit. The system had not yet been fully developed when the Shah fell from power in 1978. The vehicles were later purchased by the British Army as part of a Fixed-price Develop and Supply contract. The first production Tracked Rapier was accepted on time and to cost at Wellington Barracks in early 1981, and entered service with 11 (Sphinx) Air Defence Battery, of 22 Air Defence Regiment, Royal Artillery in 1983 in Napier Barracks near Dortmund. The initial proposal for the system was to simply mount the towed launcher, (less its running gear) and its petrol generator set on the flat bed of the M548 carrier. When this was shown to Mr G.R. Jefferson, the GW Managing Director, he was not very impressed. Aware of the amount of money available, he required a much more extensive change. Greville Beale and Adrian Pollicutt led development of a very significant new arrangement was produced in quite a short period.

System

Alternative Designation: Rapier

Type: Surface-to-Air Missile System

Family: Rapier Series

In Service: 1971-Present

Crew: ea6

Chassis: The launcher is carried on a two-wheeled A-frame trailer. In the firing position, the wheels are removed and it is stabilized on four adjustable legs.

Displacement Time: INA

Emplacement Time: INA

Fire on the Move: No

Rapier Fire Unit: A Rapier fire unit includes the trailer-mounted launcher with four missiles and surveillance radar, tripod-mounted optical tracker and generator. Two light trucks are used for towing the launcher and a trailer carrying nine reload missiles.

Rapier Battery: A battery typically includes a headquarters and a repair section equipped with a Land Rover with diagnostic and performance test gear and a trailer with ready use spare parts. There is also a battery repair team with two vehicles: one for optical and hydraulic repairs and one for major electronic repairs. An ordnance spares vehicle is also provided.

Airborne Capable: Yes, Individual Rapier components can be transported slung under helicopters such as the SA 330 Puma or CH-47 Chinook . A C-130 cargo aircraft can carry a complete system with radar tracker or two optical systems.

Targets: Supersonic, Low-Level, High-Maneuverability Aircraft, Unmanned Aerial Vehicles, Supersonic Missiles, Cruise Missiles, and Fixed/Rotary-Wing Aircraft

Automotive

Note: The launcher is carried on a two-wheeled A-frame trailer. In the firing position, the wheels are removed and it is

stabilized on four adjustable legs.

Communications

Radio: INA

Missile System

↳*Mk 1 Missile Launcher*

Type: Towed Trailer

Length: 3.8 m

Width: 2.2 m

Height: 2.6 m

Weight: 1,227 kg

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire: 7 rds/min

Note: The launcher consists of a large cylindrical unit carrying two missiles on each side; the surveillance radar dish and IFF system under a radome on top; the guidance computer and radar transmitter and receiver electronics at the bottom; and a prominent parabolic antenna for sending guidance commands to the missiles at the front.

↳*Mk 1 Missile*

Type: Anti-Ship Missile

Length: 2.24 m

Diameter: 133 mm

Wingspan: 381 mm

Weight: 43 kg

Fragmentation Warhead Weight: 1.40 kg

Armor Piercing Warhead Weight: 0.55 kg

Propulsion: 1 x IMI Troy dual-thrust solid-propellant rocket

Warhead Types: semi-armor-piercing, contact fuze

Speed: >Mach 2

Maximum Range: km8

Minimum Range: 500 m

Maximum Altitude: 3,000 m

Minimum Altitude: very low level

Maneuver Limit: 22 g

Guidance System: Semi-Automatic Command to Line-of-Sight (SACLOS)

↳*Mk 2 Missile Launcher*

Type: Towed Trailer

Length: 4.1 m

Width: 2.2 m

Height: 2.6 m

Weight: 2,400 kg

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire: 7 rds/min

Note: The launcher consists of a large cylindrical unit carrying two missiles on each side; the surveillance radar dish and IFF system under a radome on top; the guidance computer and radar transmitter and receiver electronics at the bottom; and a prominent parabolic antenna for sending guidance commands to the missiles at the front.

↳*Mk 2 Missile*

Type: Anti-Ship Missile

Length: 2.24 m

Diameter: 133 mm

Wingspan: 381 mm

Weight: 43 kg

Fragmentation Warhead Weight: 1.40 kg

Armor Piercing Warhead Weight: 0.55 kg

Propulsion: 1 x Roxel Thermopylae two-stage, solid-propellent rocket

Warhead Types: high-explosive shaped charge, fragmentation; infrared, laser, impact, proximity fuze (active multimode)

Speed: Mach 2.5

Maximum Range: 25 km

Minimum Range: km8

Maximum Altitude: 500 m

Minimum Altitude: very low level

Maneuver Limit: 35 g

Guidance System: Semi-Automatic Command to Line-of-Sight (SACLOS)

Fire Control

↳*Fire Control System*

Name: INA
Computerized FCS: Yes
Direct Fire: Yes
Indirect Fire: Yes
Time to Engage Target from Detection: 6-8 seconds
Time to Engage Re-Engage Target: 3-6 seconds
Reload Time: 2.5 minutes for 4 missiles
Successor Identification Friend or Foe (SIFF): Yes, with a Range of 15 km
Passive Infra-Red Electro-Optic Sensor: Yes
Optical Tracker: 1 x optical tracker or Marconi I/J-band frequency-agile

↳*Radar*

Name: Dagger
Type: Target Acquisition and Surveillance Radar
Frequency/Band: K Band
Range: km15
Number of Targets System can Track: INA

Protection

Armor: INA
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: INA
Smoke Equipment: No

Notes:

Rapier is a surface-to-air missile developed for the British Army to replace their towed Bofors 40/L70 anti-aircraft guns. The system is unusual as it uses a manual optical guidance system, sending guidance commands to the missile in flight over a radio link. This results in a high level of accuracy, therefore a large warhead is not required. Entering service in 1972, it eventually replaced all other anti-aircraft weapons in Army service; both the Bofors guns used against low-altitude targets and the Thunderbird missile[4] used against longer-range and higher-altitude targets. As the expected air threat moved from medium-altitude strategic missions to low-altitude strikes, the fast reaction time and high maneuverability of the Rapier made it more effective than either of these weapons, replacing most of them by 1977. Rapier was later selected by the RAF Regiment to replace their Bofors guns and Tigercat missiles. It also saw international sales. It remains one of the UK's primary air-defence weapons, and its deployment is expected to continue until 2020. The original Rapier took the form of a wheeled launcher with four missiles, an optical tracker unit, a generator, and trailer of stores. The launcher consists of a vertical cylindrical unit carrying two missiles on each side, the surveillance radar dish and "Identification Friend or Foe" (IFF) system under a radome on top, the guidance computer and radar electronics at the bottom, and a prominent parabolic antenna for sending guidance

commands to the missiles on the front. The search radar was of the pulsed Doppler type with a range of about 15 km. The aerial, located at the top of the launcher, rotated about once a second, looking for moving targets through their doppler shift. When one was located, a lamp would light up on the Selector Engagement Zone (SEZ), a box containing 32 orange lamps arranged in a circle about the size of an automobile steering wheel. The radar operator could also blank out returns from other directions, providing jamming resistance. The optical tracker unit was made up of a stationary lower section and a rotating upper section. The lower section housed the operator controls, while the upper section housed the tracking optics. The operator's optical system was a modified telescope containing a Dove prism to prevent the image 'toppling' as the optics rotate in azimuth. This system meant that, unlike a periscope, the operator did not have to move in order to track the target. The upper section also contained a separate missile tracking system that was slaved to the operator's optics, based on a television camera optimized for the IR band. Upon detection of a target, the optical tracking system would be slewed to target azimuth and the operator would then search for the target in elevation. The operator's field of view would depend on the target range: "wide" at about 20 degrees or "track" at about 4.8 degrees. When the target was found the operator switches to "track" and uses a joystick to keep the target centred in the telescope. Once a steady track was established the missile was fired. The TV camera on the tracker was tuned to track the four flares on the missile's tail. Like the operator's telescope, the TV system had two views, one about 11 degrees wide for the initial "capture", and another at 0.55 degrees for midcourse tracking. The difference between the line-of-sight of the operator's telescope and the missile's flare was calculated by the computer in the base of the launcher. Guidance updates were sent to the missile through the transmitter on the launcher platform, and received on small antennas on the rear of the mid-body fins. The operator simply kept the telescope's crosshairs on the target using the joystick, and the missile would automatically fly into the line-of-sight, a system of operation known as SACLOS. The basic concept is very similar to the one used by most anti-tank missiles, with the exception that those systems normally use small wires to send guidance information to the missile, rather than a radio link. The missile contained a small 1.4 kg warhead with a contact fuse and a single-stage solid-rocket motor that accelerated the missile to about 650 m/s (about Mach 2). Engagement time to the maximum effective range was about 13 seconds. Response time from the start of the target detection to missile launch is about 6 seconds, which has been repeatedly confirmed in live firing. The whole system, along with its crew, was delivered by two Land Rovers designated as the Fire Unit Truck (FUT) and the Detachment Support Vehicle (DSV). Royal Artillery batteries comprised three troops each of four fire units while RAF Regiment squadrons had eight fire units. By 1980 each Royal Artillery fire unit consisted of a (24 volt) 101 FC 1 tonne Land Rover towing the Rapier Launcher and carrying 4 missiles on board, a 109-inch 3/4 ton 24v FFR (Fitted For Radio) Land Rover towing a 1-ton Missile Supply Trailer (MST), containing up to a further 10 missiles. Blindfire radar (see below) was only provided for 1⁄3 of fire units in British Army service, and for all fire units in the RAF Regiment.

CSA-41 (FM-80) Iranian Short-Range Air Defense Missile System







Tiers:



Variants:

- **FM-80 (Feimeng 80),:** export version of the HQ-7. It was revealed in 1989.
- **HHQ-7:** a naval version of the HQ-7. It was introduced in the 1990s. It has a bank of 8 missiles. For over a decade it was the standard Chinese ship-based air defense system. Currently a more capable HQ-9 with a longer range is being fitted on newly-built Chinese warships.
- **Shahab Tagheb:** an Iranian short-range air defense missile system. It was revealed in 1999. It was developed with Chinese assistance and by transferring technology of the HQ-7.
- **HQ-7A:** improved variant introduced in 1998. It has a maximum range of fire of 15 km. Detection range is 25 km and tracking range is 20 km. Also this missile has a maximum speed of 900 m/s in stead of 750 m/s.
- **HQ-7B:** latest variant, based on indigenous 6x6 armored chassis. It was first revealed somewhere in 2009. This air defense system is wisely used by the Chinese armed forces. It is more mobile due to its 6x6 configuration. This vehicle is more suited to follow motorized infantry, or mechanizes armored units.

System

Alternative Designation: CSA-4A, HQ-7, FM-80, HongQi 7, Fei Meng, Flying Midge" or Flying Mongoose,

Type: Short-Range Air Defense Missile System

Family: HQ-7

Manufacturer: China, Company: INA

In Service: 1988-Present

Crew: ea3

Chassis: Thomson-Hotchkiss P4R chassis

Displacement Time: minutesINA

Emplacement Time: minutesINA

Fire on the Move: INA

Note #1: It is a reverse engineered copy of the French Crotale.

Note #2: A battery of CSA-4A's consists of one vehicle with acquisition radar and two or three TELAR vehicles. Also each battery is supported by a maintenance group with around 10 support vehicles.

Dimensions (Thomson-Hotchkiss P4R Chassis)

Length: mINA

Width: mINA

Height: mINA

Weight, Combat: kgINA

Ground Pressure: kg/mINA

Automotive (Thomson-Hotchkiss P4R Chassis)

Engine Name: INA

Engine Type: petrol / diesel

Engine Power: hpINA

Cruising Range: km600

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m0.5

Fording Depth: m0.5

Communications

Missile System

↳*Missile Launcher*

Name: INA

Type: TELAR vehicle

Firing Interval: 3 seconds

Operational Response Time: 6-10 seconds

Single-Shot Kill Rate: %85-90

↳*Missile*

Name: 4-cel or 8-cel missile launcher

Type: Short-Range Air Defense Missile

Length: m3

Diameter: m0.55

Wingspan: m0.55

Weight: kg84.5

Warhead Type: HE-FRAG

Warhead Weight: kg15

Maximum Range of Fire: kmup to 12

Minimum Range of Fire: m500-700

Maximum Altitude of Fire: km5.5

Minimum Altitude of Fire: m15

Basic Load: ea4

Speed: Mach 2.3 or 750 m/s

Missile Maneuverability: 20 G

Maximum Kill Distance at 400 m/s: km8.5

Maximum Kill Distance at 300 m/s: km10

Maximum Kill Distance at Helicopter: km12

Minimum Kill Distance: m500

Homing Range: km17

Target Seeking Range: km18.4

Note: The CSA-4A can engage helicopters, aircraft, cruise missiles, air-to-ground missiles and anti-radiation missiles.

Guidance System: Command + electro-optical tracking

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Sensors: Yes

IADS Integration: INA

Optical Aiming System: Yes

Target Processing Unit: Yes, the system can process 30 targets & track 12 targets simultaneously

Generators: 4 x 40 kW generators

Target Processing Unit: Yes

Network: Wired Network

↳*Radar #1*

Name: INA

Type: Doppler Search Radar

Band: E/F Band

Radar Range: km18.4

Radar Homing Range: km17

Radar Antenna: Ku-band Automatic Command to Line Of Sight monopulse radar dish antenna

TV Tracking System: Yes

IFF: Yes

IR Localiser: Yes

Protection

Hull Armor: Protection against small arms fire and artillery shell splinters.

Turret Armor: Protection against small arms fire and artillery shell splinters.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: No

Countermeasures: Resists active and passive jamming and rejects ground and atmospheric clutter

IFF: Yes

Notes:

Iran imports many of their military weapons and equipment from Russia and China. The CSA-4A is a export model of the HQ-7 (FM-80) Chinese Short-Range Air Defense Missile System. The HQ-7 SAM is used by PLA and PLAAF for short-range air-defense. At some PLAAF bases, the HQ-7 is deployed in hardened shelters. The PLA has mounted the HQ-7 on towed trailers. The HongQi 7 (HQ-7) short-range air defense missile system has been developed in China in the 1980s. It is a reverse engineered copy of the French Crotale. Sometimes it is referred as Sino Crotale. In 1978-1979 China imported some of the Thomson-CSF Crotale systems for evaluation. These where both land-based and ship-based versions. Some French R-440 Sea Crotale systems were purchased and installed on the Chinese warships. Eventually China reverse engineered this system. First Chinese clone of the ground-based version was produced for testing in 1983. In 1986-1988 it was approved for production. The HQ-7 was also deployed by the Chinese air force and protected the air bases from air attacks. Since 1989 the HQ-7 was proposed for export customers as the FM-80.

SAM-15 (SA-15 Gauntlet) Iranian Short-Range Surface-to-Air Missile (SAM) System




Tiers:



Variants:

- **9K331 Tor M1:** "Tor-M1", introduced in 1991 with the 9M331 missile, with greatly improved missile accuracy and the ability to engage two targets simultaneously, minimum range 1.5 km (0.93 mi), minimum height 0,01 km.
- **9K332 Tor-M2E:** Upgrades have continued over the lifetime of the system, with developer Almaz Antey unveiling the newest incarnation of the Tor missile system, the Tor-M2E,[26] at the MAKS Airshow in 2007.
- **Tor-M1-2U:** "Tor-M1-2U" entered service at the end of 2012. This system is designed to destroy aircraft, helicopters, UAVs, missiles, and other precision guided weapons, flying at medium, low and very low altitudes in all weather.
- **3K95 Kinzhal (Naval Variant):** The 3K95 "Kinzhal" (Russian: Кинжал – dagger) is the naval version of the Tor missile system developed by Altair and has the NATO reporting name SA-N-9 Gauntlet. Using the same 9M330 missile as the land based version, the system can be mounted on vessels displacing over 800 tonnes and is known to be installed on Admiral Kuznetsov class aircraft carriers, Kirov class multimission cruisers, Udaloy class anti-submarine destroyers and Neustrashimy class frigates.
- **Tor-M2KM:** The Tor-M2 km is a self-contained fighting module version of the system that can be mounted in various locations. In October 2016, it was loaded onto the helipad of the Admiral Grigorovich frigate by means of an ordinary wharf crane and fixed in position with steel chains to fire at simulated cruise missiles while the ship was underway. This could give advanced SAM capabilities to vessels without the capacity to install the larger and heavier Kinzhal system; it can also be mounted on a truck, building roof, or any horizontal surface at least 2.5 m wide and 7.1 m long.
- **Tor-M2DT:** The system is especially designed to be used for Arctic region at temperatures up to -50 degrees C based on the chassis of the DT-30PM tracked all-terrain vehicle and is capable of detecting over 40 air targets, especially high-precision weapons, and to track and engage up to four of them simultaneously at a range of up to 12 km and altitudes up to 10 km with its 16 missiles even on the move. Its creation was completed in 2018 and the first delivery of 12 systems was held in November of the same year
- **Tor-2E:** JSC Rosoboronexport, part of the Rostec State Corporation, has started promoting the newest Tor-E2 SAM system developed and produced by the Almaz-Antey Air and Space Defense Concern in 2018. Tor-E2 combat vehicle is an independent, mobile, all-terrain fighting unit that provides detection and identification of air targets on the march and at the halt, target lock-on and engagement at the halt, from a short stop and on the move. A battery of the four-channel Tor-E2 SAM systems, consisting of four combat vehicles, can simultaneously engage up to 16 targets flying from any direction at a range of at least 15 km and an altitude of up to 12 km.
- **HQ-17 (China Variant):** The HQ-17 (Hongqi-17) is China's reported variant of the Tor-M1 system.
- **FM-2000:** FM-2000 is a mobile short-range air-defence (SHORAD) system unveiled by China Aerospace Science and Industry Corporation at the 2018 Zhuhai Airshow. Its range is 15 km and engagement altitude is 10 km. It is carried on a 3 axle TEL. It is a version of the HQ-17

System

Alternative Designation: Tor, SA-15
Type: Low to medium altitude, short-range surface-to-air missile
Family: 9K330 Series
Manufacturer: IEMZ Kupol Metrowagonmash (GM chassis designer), MZKT (wheeled chassis designer)
In Service: 1986-Present

Crew: ea3

Chassis: GM-355 special tracked chassis

Displacement Time: Less than 5 min

Emplacement Time: 3 min

Fire on the Move: No

Reloading Vehicle: Reloading vehicle is based on Ural-4320 6x6 heavy truck

Fully Reload Time: 18 Minutes

Note: This system can engage all kinds of modern air targets. It is used against aircraft, helicopters, UAVs, various missiles and precision guided munitions. It destroys targets that long- and medium-range air defense systems fail to hit.

Dimensions

Length: m8

Width: m3.2

Height, Combat Configuration: m4

Weight, Combat: tons32

Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-2S1

Engine Type: Diesel

Engine Power: hp780

Cruising Range: km580

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2

Fording Depth: m1

Hydropneumatic Suspension: Yes

Adjustable Ground Clearance: Yes

Communications

Primary: INA

Missile System

Missile Launcher

Name: 9A331 Combat Vehicle
Type: Vertical Launch
Note: The SA-15 can only engage one target at a time.

↳***Missile***

Name: 9M330
Type: Surface-to-Air Missile (SAM)
Length: m2.89
Diameter: m0.23
Wingspan: mm650
Weight: kg165
Engine: thruster jets with 2-stage solid-fuel rockets
Warhead Type: HE-FRAG
Warhead Weight: kg14.8
Range of Fire: km5-12
Maximum Altitude: km6
Minimum Altitude: m10
Basic Load: ea8
Guidance System: Radio Command Guidance System
Kill Probability against Helicopters: 50-88%
Kill Probability against Aircraft: 26-75%
Kill Probability against UAVs: 85-95%
Maximum Speed: Mach 3
Maximum Target Speed: kph3,060
Minimum Target Speed: kph0
Maximum Range: km12
Minimum Range: m100
Load Limit: 30 Gs
Fuze Type: RF proximity
Detonation Mechanism: RF Proximity
Propellant: Solid-fuel rocket
Boost time: Cold launch ejection for 20 m
Steering system: Gas dynamic control system, with four control surfaces
Note: The higher the target the higher the probability to hit the target.

↳

Fire Control

Note: The Tor combat vehicle has radar and missiles based on a single vehicle.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Radar: J/K-band

Fire Control Sensors: Yes

IADS Integration: INA

Reaction Time (Target Detection to Launch): 8-12 seconds

↳*Radar #1*

Name: INA

Type: 3D pulse Doppler

Maximum Range against Aircraft: 25-27 km

Maximum Range against Helicopters: 12 km

Maximum Range against UAVs: 9-15 km

Search for Targets on the Move: Yes

Detect and Intercept Anti-Radiation Missiles: Yes

Coverage: up to 48 targets

Surveillance Band: G/H-band

Detection Range: km25

Guidance: Command; active terminal homing

Protection

Hull Armor: All-welded steel

Turret Armor: All-welded steel

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Air-Transportable: Yes

IFF: Yes

Notes:

The Tor missile system (Russian: "Top"; English: torus) is an all-weather low to medium altitude, short-range surface-to-air missile system designed for engaging airplanes, helicopters, cruise missiles, precision guided munitions, unmanned aerial vehicles and short-range ballistic threats (Anti-Munitions). Originally developed by the Soviet Union under the GRAU designation 9K330 Tor, the system is commonly known by its NATO reporting name, SA-15 "Gauntlet". A navalized variant was developed under the name 3K95 "Kinzhal", also known as the SA-N-9 "Gauntlet". Tor was also the first air defence system in the world designed from the start to shoot down precision guided weapons like the AGM-86 ALCM day and night, in bad weather and jamming situations. Tor can detect targets while on the move. The vehicle must stop intermittently when firing, although trials are being conducted to eliminate this restriction. The closest foreign equivalent to the Tor, in function and operation, are systems like the British Rapier missile and French Crotale missile systems, which some consider to have somewhat less performance[8][9][10] than Tor (the other two systems being based on somewhat older equipment). All three systems are mobile and self-propelled, Tor using the 9A330 combat vehicle, which carries a crew of four (one driver, three operators), and acts as an autonomous Transporter, Launcher, And Radar unit, or TLAR (similar to but not a TELAR, as it does not erect the missile to a launch position). The 9A330 is based on the GM-355 chassis manufactured by MMZ, the Tor-M1 using the improved GM-5955. It is equipped with NBC (nuclear, biological and chemical) protection. Like Rapier and Crotale, in addition to the tracked vehicle, there are also static and towed versions of the Tor, as well as a wheeled one. Mobility time is 3 minutes and it can be transported by any transport means (including aerial). The reaction time of the original Tor is 7–8 (standard) / 7–10 (if it is in motion) seconds. Arranged in a similar fashion to the previous 9K33 Osa and 9K22 Tunguska (Russian: Тунгуска) air defense systems, Tor's TLAR features a turret with a top mounted target acquisition radar, and frontal tracking radar, with 8 ready to fire missiles stored vertically between the two radars. The target acquisition radar is a F band pulse doppler 3D radar, equipped with a truncated parabolic antenna, and a mechanically, later electronically, scanned in azimuth with a 32 degree sector view, and has an average power output of 1.5 kW, which provides a maximum detection range of 25 km/16 mi. For reference, a McDonnell Douglas F-15 at an altitude of 6 km has a detection probability of 0.8 at this range. The electronic ‘heart’ of the system is a digital fire control system, which allows detection of up to 48 targets and the tracking of ten at any one time, and integrates IFF functionality; the IFF antenna being mounted above the search radar. The target engagement radar is a G band/H band (later K band) pulse doppler radar with an (in azimuth) passive electronically scanned array antenna. The radar is classed as a thinned array (design using fewer elements) incorporating only 570 phase shifters and uses linear polarization. The radar has an average power output of 0.6 kW providing a maximum detection range of 20 km/12 mi. An F-15 type aircraft had a detection probability of 0.8 at this range. Originally Tor could only engage one target at a time, and with only two of its missiles. Later variants of the Tor system (Tor-M1 and M2E) incorporate additional fire control channels, as well as improved fire control computers, allowing the system to engage two (M1) and then four (M2E) targets, whilst simultaneously guiding up to four (M1) and then eight (M2E) missiles. There is also a small antenna on the top of the target engagement radar to communicate with missiles after launch. Together these radars carry the NATO reporting name "Scrum Half". To reduce the dimensions of the vehicle, the target acquisition radar can be folded down horizontally when travelling, and the tracking radar can partially rotate away from vertical. To allow engagements in the ECM heavy environment that is the modern battlefield, the 9K332 is equipped with an optical tracking system, complementing the main radar. As a fully mobile system, the Tor is capable of acquiring and tracking targets while the TLAR is moving. Due, however, to the interference with launch operations while on the move, missiles can be fired only when the system is in a stationary position. Once set up, the reaction time (from target detection to engagement) is described as 5–8 seconds, depending on the variant; however, reaction time is somewhat longer (around 10 seconds) whilst in motion and firing in short halts. To facilitate this mode of operation, an auxiliary power unit (APU) is fitted so that the main engine can be shut down while the radar and missile system continue to operate when stationary, enabling long periods of readiness. The digital computers allowed for a higher degree of automation than any previous Soviet system of its type. Target threat classification is automatic and the system can be operated with little operator input, if desired. The high performance computing system combined with a passive electronically scanned array radar are the main reasons for the system's high degree of accuracy, ability to intercept small, fast and highly maneuverable targets, and the very fast reaction times of the system. Typically, a battery of four Tor vehicles is accompanied by the mobile Ranzhir-M (Russian: "Ранжир-М") command center, which provides automatic interaction with the SA-15,8,13,16. It allows for efficient allocation of tasks between the individual Tor-M1 crews and allows each TLAR to be linked into a wider air defense system, thereby increasing target detection range and reducing reaction time. Tor vehicles are accompanied by the mobile Polyana-D4, which provides automatic interaction with the SA-15,17,19,23 (S-300V, Buk, Tor, Tunguska), (integrates all functions of several different systems into a single whole + various air force aircraft + direct transfer of target designation). Tor-M1 receiving commands from Ranzhir-M / Polyana-D4 can shoot down targets in the range of 0–84 degrees. Tor-M1 system (the time of creating the version, 1991) can operate in a * pair *, then the angle of observation was 0–64 degrees (vertical). Combat vehicle of antiaircraft Tor missile system provides simultaneous detection of up to 48 targets.

9K31 Strela-1 (SA-9 Gaskin) Russian 4x4 Infrared Guided Surface-to-Air Missile System





Tiers:



System

Alternative Designations: 9K31 Strela-1; SA-9 Gaskin

Type: Infrared Guided Surface-to-Air Missile System

Name: 9A31M

Chassis: BRDM-2

Crew: 3 (commander, gunner and driver)

Dimensions

Length: m5.8

Width: m2.4

Height, while Traveling: m2.3

Weight: kg7,000

Ground Clearance: m0.43

Automotive

Engine Name: GAZ 41

Engine Type: V-8 water-cooled petrol

Engine Power: hp140

Cruising Range: km750

Speed, Maximum Road: km/h100

Speed, Maximum Water: km/h10

Fuel Capacity: 290 litres

Armament

Launcher: INA

Name: 9M31

Reaction Time: sec6

Time Between Launches: sec5

Reload Time: min5

Fire on the Move: No, stop or short halts

Emplacement Time: < 2.0 min

Displacement Time: < 2.0 min

Range: Max. Range: 4,200 m (6,100 tail aspect) Min. Range: 800 m

Altitude: Max. Altitude: 3,500 m Min. Altitude: 30 m

Dimensions: Length: 1.80 Diameter: 120

Weight: kg32

Missile Speed: m/s580

Propulsion: Single-stage solid propellant

Guidance: Photo contrast IR-homing, 1-3□m

Warhead Type: Frag-HE

Warhead Weight: kg2.6

Fuze Type: Proximity and Contact

Probability of Hit: (Ph%60 FW, 70 heli

Simultaneous missiles: ea2 per Target

Self-Destruct: Yes

Auxiliary Weapon: None

Operational Range: km6.5

Weapons and Ammunition Types

9M31M missiles: Typical Combat Load 6

Ready: Typical Combat Load 4

With Add-on racks: Typical Combat Load +2

Fire Control

Sights with Magnification: INA

Elecro-optical/ Infrared System: Day Range (m): 6,500 Night Range (m): 2,000 tail chase only

Navigation: Inertial

IFF: INA

RF Direction-Finder: The FLAT BOX-A passive system uses several Pelengator sensors mounted on the vehicle to detect aircraft navigation signals for early warning and DF of approach azimuth. Detection range is up to 30 km. Many forces with this older air defense system are not proficient in using the RF DF system.

Guidance Systemm: Infrared homing

Associated Vehicles Radars

Name: PPRU-1/Ovod AD ACV

Chassis: MTLB-U

Radar: DOG EAR (use in OPFOR units)

Function: Target Acquisition

Frequency: F/G band

Range: 80 detection, 35 tracking

Other Radars: The SA-9 can also link to the IADS to get analog AD data and warnings.

Radar: Gundish: In the earlier unit configuration, an SA-9 platoon is employed in an AD battery/ battalion with ZSU-23-4 SPAA guns. The radar on those systems supports the SA-9 platoon by providing detection and warning. Some of the users employ truck-mounted J-band GUN DISH acquisition radar in the platoons, instead of the Pelengator system.

Protection

Hull Armor Type: mm5-14

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Protection: INA

Notes:

The 9K31 Strela-1 is a highly mobile, short-range, low altitude infra-red guided surface-to-air missile system. Originally developed by the Soviet Union under the GRAU designation 9K31, it is commonly known by its NATO reporting name, SA-9 "Gaskin". The system consists of a BRDM-2 amphibious vehicle, mounting two pairs of ready-to-fire 9M31 missiles. The 9K31 is based on the BRDM-2 4x4 chassis. The driver and commander are seated in the front and the gunner in the turret. Up to four launch container can be attached to the turret. During travel the missiles are lowered. The 9K31 is a stand alone system, but usually it operates in pairs or groups of four. Target information is relayed by radio by other air defense systems. he turret is fitted with four 9M31 Strela-1 surface to air missiles with infrared guidance. The maximum effective range is 4.2 km and maximum altitude is 3 km. Due to the limitations of the seeker the maximum range can only be achieved under favorable circumstances. Effectiveness during head-on engagements and at night is much reduced.

Sayyad-1 (SA-2 Guideline) Iranian Strategic Surface-to-Air (SAM) System



Tiers:



Variants:

- **SA-2A (Guideline Mod 0):** This was the initial variant of the SA-2, which was deployed around Moscow, Leningrad and in the Baku region. It was guided by the Fan Song A radar system. It was probably a pre-production version.
- **SA-2B (Guideline Mod 1):** This improved version replaced the Mod 0. It is slightly longer than the Guideline Mod 0 and is guided by the Fan Song B radar system.
- **SA-2C (Guideline Mod 2):** Developed at the same time as the Guideline-B, this variant is equipped with a modified Fan Song C/D G-band engagement radar. The missile itself has a longer engagement range and can attack targets that are at lower altitudes than earlier versions of the SA-2.
- **SA-2D (Guideline Mod 3):** This short-lived variant fired V-750AK missiles and operated with the Fan Song E radar. It was more capable of defeating targets in hostile electronic warfare environments. It was eventually superseded in Soviet service by the Guideline Mod 4.
- **SA-2E (Guideline Mod 4):** This variant, also known as the S-75M Volga, used the V-755 missile, which was characterized by a swelled warhead section that could be fitted with a 25 kT nuclear warhead. It was guided by the Fan Song F radar.
- **SA-2F (Guideline Mod 5):** This variant, also designated the S-75M3 Volkhov, was developed with some technology derived from the SA-3 Goa ** (see separate record). It utilizes the improved Fan Song E radar, which is much more capable of hitting targets in a heavy ECM environment. This is accomplished by deploying a two-man t eam in a "dog house" on top of the radar. These two crewmembers track targets when the normal automatic tracking system has been jammed.
- **S-75 Volga 2A:** This version was developed in 1995. Twelve digital assemblies replaced 78 analog assemblies. It fired an upgraded V-755 missile and used a modernized Fan Song F radar. It was primarily intended for export.
- **S-75 Volga 2T:** Belarusian firm Tetraedr in 2004 began offering the S-75 Volga 2T upgrade kit. This included digital electronics and enhanced radars, launch control and missiles.
- **SA-N-2:** This is the naval version of the SA-2. The mount included a twin-arm launcher fed by a large drum magazine. A navalized version of the Fan Song E radar was equipped, along with a High Lune** height finding radar.
- **Iraqi modified SA-2 Guideline:** Iraq announced in 1989 that it had modified a number of SA-2s with an infrared terminal guidance system that improved the missile's capability against targets in high ECM environments. If the missile lost lock at this stage, the weapon could switch back to radio guidance. Iraq also attempted other modifications
- **CSS-8:** his is a short-range ballistic missile based on the SA-2.
- **Sayyad-1:** This is an Iranian reverse-engineered version of the SA-2. It is believed to have entered service in 1998. The design is also influenced by the Chinese HQ-2 and may feature some North Korean technology.
- **Sayyad-2:** This is an Iranian upgrade of the Sayyad-1, based on both the SA-2 and the Chinese HQ-2.
- **RM-75MVU-1/VU-1 target missiles:** his is a low-altitude (RM-75MVU-1) and high-altitude (RM-75VU-1) target missile based on the SA-2 was announced by Russia in mid-2004. The target missiles were to be used to test new surface-to-air missile systems being designed by the Almaz research and production association.
- **Qaher-1/-M2:** These variants based on the S-75/SA-2 have been used by Houthi rebels in Yemen. The Qaher-1 was revealed in 2015 with a range of 186.4 mi (300 km) and warhead weighing 440.9 lb (200 kg).

System

Alternative Designation: Volga-75SM, S-75 Dvina, V-75 Volkhov

In Service: 1998-Present

Manufacturer: Raspletin KB-1 (head developer), Grushin MKB Fakel (missile developer), Lavochkin OKB

Crew: eaINA

Wars: Vietnam War, Six-Day War, Indo-Pakistani War of 1965, Indo-Pakistani War of 1971, Yom Kippur War, Cold War, Iran–Iraq War, Gulf War, War in Abkhazia (1992–93), First Libyan Civil War, Syrian Civil War, Yemeni Civil War (2015–present), Saudi Arabian-led intervention in Yemen, Saudi–Yemeni border conflict (2015–present)

Guidance System: Radio command guidance from Fan Song A/B; or E/F-band missile control radar; or Fan Song D/E G-band missile control radar Many installations have Spoon Rest early warning radar.

Note: Each battalion will typically have six, semi-fixed, single-rail launchers for their V-750 missiles positioned approximately 60 to 100 m (200 to 330 ft) apart from each other in a hexagonal "flower" pattern, with radars and guidance systems placed in the center. It was this unique "flower" shape that led to the sites being easily recognizable in reconnaissance photos. Typically another six missiles are stored on tractor-trailers near the center of the site.

Dimensions

Booster Diameter: m0.70

Second Stage Diameter: m0.50

Length: m10.47

Wingspan: m2.50

Total Weight: INA

Automotive

Primary Propulsion Type: solid-fuel booster

Primary Propulsion Duration: 4-5 sec

Secondary Propulsion Type: liquid-fuel (nitric acid/hydrocarbon) sustainer

Secondardy Propulsion Duration: 22 sec

Note: The missiles themselves are carried by a special transloader semi-trailer, which is towed by a Zil truck.

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail Guided

Launcher Weight: kg2,165

Launch Rail/Tubes: Single rail, ground mounted (not mobile)

Reload Time: min12

Note: S-75 Dvina and equipped with either V-750 or V-750V missiles.

↳*Missile*

Name: Either the V-750 or V-750V missiles.

Type: Standard

Missile Length: m10.60

Missile Diameter: m0.70

Weight at Launch: kg2,300

Warhead Weight: kg190

Warhead Type: HE 200kg (295kg SA-2E) 188kg (HQ-2B/F/J/P), possible nuclear

Guidance System: Command

Maximum Velocity (Mach): Mach 4

Bursting Radius Low Altitude: m125-135

Bursting Radius High Altitude: m250

Kill Radius: m65

CEP: m76

Maximum Effective Range: km30

Minimum Effective Range: km7

Maximum Altitude: m22,000

Minimum Altitude: m3,000

Fire Control System

↳*Radar #1*

Name: Spoon Rest

Type: Spoon Rest is a Russian ground-based, early warning radar that later evolved into the Knife Rest** series.

Band: A

Frequency: 147-161 MHz

Pulse Width: 4-6 microseconds

Maximum Range: km275

Vertical Beamwidth: deg2.5

Horizontal Beamwidth: deg7-9

Peak Power: 180-350 kW

Pulse Repetition Frequency (PRF): 310-400 Hz

↳*Radar #2*

Name: P-15 Flat Face

Type: 2D UHF radar developed and operated by the former Soviet Union

Band: L-Band

Frequency: 810-950 MHz

Peak Power: kW400

Maximum Range: km250

↳*Radar #3*

Name: PRV-11 Side Net

Type: Side Net is a ground-based height-finding radar used in a ground control intercept (GCI) mode with early-warning radars Bar Lock , Back Net and Tall King

Band: E Band

Frequency: 2,560-2,710 MHz

Antenna Height: m8.50

Antenna Width: m3.50

Average Range: km180

Maximum Range: km400

NOD CYCLES/SEC: 5-30

Pulse Width: 3/1.5 micro sec

Average Power: 1.3 kW

Peak Power: 1.2 MW

↳*Radar #4*

Name: Fan Song A/B/F

Type: Fire control & Tracking Radar

Band: E/F, G Band

Frequency: 3 GHz (S-band)

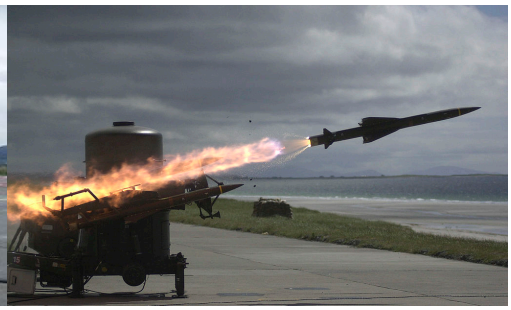
Peak Power: 600 kW

Maximum Range: km60

Notes:

The Sayyad-1 (SA-2/Guideline) is a two-stage medium-to-high altitude, radar-tracking SAM. Because its range is generally 35 to 50-kms, it is more of an MRAD system than LRAD. The weapon is a national-level asset usually found in the rear area with the mission of site defense of static assets such as supply and command installations. It is fired from a single-rail ground-mounted launcher that can be moved by a truck. The missiles are carried on a special transloader-semi-trailer towed by a ZIL truck. AN SA-2 regiment consists of three battalions, each having a single firing battery. Each battery has six launchers arranged in a star formation, centrally positioned fan song fire control radar, and a loading vehicle. The two forward batteries usually locate 40 to 50 km behind front lines; the third battery locates approx.. 80 km behind. Limitations include limited effectiveness against updated ECM, restricted mobility, and limited effectiveness against low-altitude targets.

Rapier British Towed Surface-to-Air Missile System

Tiers:



Variants:

- **Laserfire Rapier:** With the range of upgrades and new components, the original low-cost Rapier system was gone. In order to address international market requirements for a lower-cost system, BAC started development of the "Rapier Laserfire" in 1982. Laserfire replaced the original optical tracker unit with a new lidar (laser radar) illuminating system that is considerably smaller, allowing the entire system to be mounted on a single pallet that could itself be mounted on a truck or other flatbed vehicle. Laserfire used a millimetric Doppler radar. Due to its very high frequency of operation and ability to transform its beamshape from narrow azimuth and high elevation to wide azimuth and narrow elevation, Laserfire was able to detect helicopters hovering or travelling at low altitude and in areas of high clutter by detecting the movement of the helicopter's rotor blades. Initial engagement is similar to the original Rapier, but the target was illuminated and automatically tracked by a high power YAG:Nd laser. After the missile was launched the laser alternately illuminated the target and missile to determine their locations, and guidance was sent to the missile as normal (see laser guidance). Laserfire thus represented a fairly major upgrade to the original optical system, allowing semi-automatic engagements, and greatly reducing operator skill and training requirements. On the downside, Laserfire no longer has the optical system of the original, which served an important second duty by allowing the aircraft to be visually identified at long range. Additionally, while the Laserfire tracking system was capable of being operated at night, target acquisition was optical, like the original Rapier.
- **Field Standard B1:** Shortly after introducing FSA, "Field Standard B" (FSB) added a number of basic upgrades. Additionally, the search radar was upgraded to be easily shut down in case of an anti-radiation missile attack. FSB included lessons from the Falklands campaign, notable the 'pointing stick' that enabled the detachment commander of a fire unit to point the aiming unit at a target.
- **Darkfire Rapier/Field Standard B2:** In 1985 development started on a new tracker that replaced the original optical system with a new IR thermal imager system to improve its abilities, especially at night. This version was known as "Rapier Darkfire" for this reason. Trials of the new system started in 1987, and were deployed operationally in 1990 as "Field Standard B2" (FSB2), the earlier upgrades retroactively becoming FSB1. This system was also known as "Rapier 90". Cooling for the imager was provided by bottles of compressed gas. FSB2 also introduced a number of improvements that greatly improved Rapier capabilities. First and foremost was the Tactical Control Console that allowed four Rapier launchers to be controlled from a central location. The launchers themselves were upgraded to carry six missiles instead of four, improving battery capacity. Finally, the search radar was updated to use a new planar array radar, although its capabilities remained generally the same as the earlier model.
- **Rapier 2000/Field Standard C:** In 1992, shortly after the introduction of Rapier 90, another major upgrade series started at MBDA (previously Matra BAe Dynamics). Emerging as "Rapier 2000", or "Field Standard C" (FSC) in British service, the system reached its ultimate form. Development of the FSC system began at the end of the 1980s and the systems first entered service in 1996. By this time the Cold War was over and British air defence capabilities were significantly reduced, with fewer and smaller batteries, albeit every fire unit with Blindfire. There is also an export version of this version, known as Jernas. Malaysia is the first export customer for Jernas. FSC was effectively a new system, although Blindfire was little changed and it could fire both Mk 1 and Mk 2 missiles. The Surveillance radar was removed from the launcher and became a separate element and each launcher now carried eight missiles. With the missiles increasingly relying on radar guidance since the introduction of Blindfire, it made sense to upgrade the original search radar to something much more modern. This was supplied by the Alenia Marconi "Dagger", a 3D pulse doppler radar with an integrated Cossor IFF Mark 10 system. Dagger is mounted on its own trailer, so the radome on top of the launcher unit was no longer needed. In its place, a much more modern optical tracking system was added. The new tracker used a Stirling-cycle cooler instead of compressed gas bottles. The use of much smaller electronics greatly reduced stack height of the whole launcher, allowing an additional two missiles to be added, for a total of eight. In operation, the Rapier 2000 is similar to earlier Blindfire-equipped systems. Targets are acquired visually or through the

Dagger radar, and then the Blindfire and optical tracker are slewed onto the target. The optical system can be used solely to track the missile, or it can be used for all guidance, like the original Rapier. In either case the engagement is entirely automatic, with no operator guidance needed. The optical system can also be used as a search system, seeking out IR sources, allowing radar-quiet operation. In 2006 a Ministry of Defence study in Ground Based Air Defence recommended further reductions, based on a reduced air threat and the improved air defence capabilities afforded by the Typhoon fighter. These included removing the role from the RAF Regiment as a measure to preserve Royal Artillery units in the face of significant cuts to the Army. Nevertheless, the Royal Artillery units were placed under command of the HQ 1 Group RAF (within HQ Air Command) and the Joint Ground-Based Air Defence HQ was formed.

- **Tracked Rapier:** With sales to Iran came the additional requirement for a fully mobile version of Rapier to protect the Chieftain tanks being supplied on a UK MOD contract. BAC responded by adapting the Rapier system to fit on the M548, a cargo-carrier version of the ubiquitous M113. Development started in 1974 as "Tracked Rapier", with the first public showing at the 1977 Paris Air Show as a static display unit. The system had not yet been fully developed when the Shah fell from power in 1978. The vehicles were later purchased by the British Army as part of a Fixed-price Develop and Supply contract. The first production Tracked Rapier was accepted on time and to cost at Wellington Barracks in early 1981, and entered service with 11 (Sphinx) Air Defence Battery, of 22 Air Defence Regiment, Royal Artillery in 1983 in Napier Barracks near Dortmund. The initial proposal for the system was to simply mount the towed launcher, (less its running gear) and its petrol generator set on the flat bed of the M548 carrier. When this was shown to Mr G.R. Jefferson, the GW Managing Director, he was not very impressed. Aware of the amount of money available, he required a much more extensive change. Greville Beale and Adrian Pollicutt led development of a very significant new arrangement was produced in quite a short period.

System

Alternative Designation: Rapier

Type: Surface-to-Air Missile System

Family: Rapier Series

In Service: 1971-Present

Crew: ea6

Chassis: The launcher is carried on a two-wheeled A-frame trailer. In the firing position, the wheels are removed and it is stabilized on four adjustable legs.

Displacement Time: INA

Emplacement Time: INA

Fire on the Move: No

Rapier Fire Unit: A Rapier fire unit includes the trailer-mounted launcher with four missiles and surveillance radar, tripod-mounted optical tracker and generator. Two light trucks are used for towing the launcher and a trailer carrying nine reload missiles.

Rapier Battery: A battery typically includes a headquarters and a repair section equipped with a Land Rover with diagnostic and performance test gear and a trailer with ready use spare parts. There is also a battery repair team with two vehicles: one for optical and hydraulic repairs and one for major electronic repairs. An ordnance spares vehicle is also provided.

Airborne Capable: Yes, Individual Rapier components can be transported slung under helicopters such as the SA 330 Puma or CH-47 Chinook . A C-130 cargo aircraft can carry a complete system with radar tracker or two optical systems.

Targets: Supersonic, Low-Level, High-Maneuverability Aircraft, Unmanned Aerial Vehicles, Supersonic Missiles, Cruise Missiles, and Fixed/Rotary-Wing Aircraft

Automotive

Note: The launcher is carried on a two-wheeled A-frame trailer. In the firing position, the wheels are removed and it is stabilized on four adjustable legs.

Communications

Radio: INA

Missile System

↳*Mk 1 Missile Launcher*

Type: Towed Trailer
Length: 3.8 m
Width: 2.2 m
Height: 2.6 m
Weight: 1,227 kg
Maximum Elevation: deg+60
Minimum Elevation: deg-5
Traverse Range: deg360
Traverse Left: deg180
Traverse Right: deg180
Rate of Fire: 7 rds/min
Note: The launcher consists of a large cylindrical unit carrying two missiles on each side; the surveillance radar dish and IFF system under a radome on top; the guidance computer and radar transmitter and receiver electronics at the bottom; and a prominent parabolic antenna for sending guidance commands to the missiles at the front.

↳*Mk 1 Missile*

Type: Anti-Ship Missile
Length: 2.24 m
Diameter: 133 mm
Wingspan: 381 mm
Weight: 43 kg
Fragmentation Warhead Weight: 1.40 kg
Armor Piercing Warhead Weight: 0.55 kg
Propulsion: 1 x IMI Troy dual-thrust solid-propellant rocket
Warhead Types: semi-armor-piercing, contact fuze
Speed: >Mach 2
Maximum Range: km8
Minimum Range: 500 m
Maximum Altitude: 3,000 m
Minimum Altitude: very low level
Maneuver Limit: 22 g
Guidance System: Semi-Automatic Command to Line-of-Sight (SACLOS)

↳*Mk 2 Missile Launcher*

Type: Towed Trailer

Length: 4.1 m

Width: 2.2 m

Height: 2.6 m

Weight: 2,400 kg

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Rate of Fire: 7 rds/min

Note: The launcher consists of a large cylindrical unit carrying two missiles on each side; the surveillance radar dish and IFF system under a radome on top; the guidance computer and radar transmitter and receiver electronics at the bottom; and a prominent parabolic antenna for sending guidance commands to the missiles at the front.

↳*Mk 2 Missile*

Type: Anti-Ship Missile

Length: 2.24 m

Diameter: 133 mm

Wingspan: 381 mm

Weight: 43 kg

Fragmentation Warhead Weight: 1.40 kg

Armor Piercing Warhead Weight: 0.55 kg

Propulsion: 1 x Roxel Thermopylae two-stage, solid-propellent rocket

Warhead Types: high-explosive shaped charge, fragmentation; infrared, laser, impact, proximity fuze (active multimode)

Speed: Mach 2.5

Maximum Range: 25 km

Minimum Range: km8

Maximum Altitude: 500 m

Minimum Altitude: very low level

Maneuver Limit: 35 g

Guidance System: Semi-Automatic Command to Line-of-Sight (SACLOS)

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Time to Engage Target from Detection: 6-8 seconds

Time to Engage Re-Engage Target: 3-6 seconds

Reload Time: 2.5 minutes for 4 missiles

Successor Identification Friend or Foe (SIFF): Yes, with a Range of 15 km

Passive Infra-Red Electro-Optic Sensor: Yes

Optical Tracker: 1 x optical tracker or Marconi I/J-band frequency-agile

↳*Radar*

Name: Dagger

Type: Target Acquisition and Surveillance Radar

Frequency/Band: K Band

Range: km15

Number of Targets System can Track: INA

Protection

Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Rapier is a surface-to-air missile developed for the British Army to replace their towed Bofors 40/L70 anti-aircraft guns. The system is unusual as it uses a manual optical guidance system, sending guidance commands to the missile in flight over a radio link. This results in a high level of accuracy, therefore a large warhead is not required. Entering service in 1972, it eventually replaced all other anti-aircraft weapons in Army service; both the Bofors guns used against low-altitude targets and the Thunderbird missile[4] used against longer-range and higher-altitude targets. As the expected air threat moved from medium-altitude strategic missions to low-altitude strikes, the fast reaction time and high maneuverability of the Rapier made it more effective than either of these weapons, replacing most of them by 1977. Rapier was later selected by the RAF Regiment to replace their Bofors guns and Tigercat missiles. It also saw international sales. It remains one of the UK's primary air-defence weapons, and its deployment is expected to continue until 2020. The original Rapier took the form of a wheeled launcher with four missiles, an optical tracker unit, a generator, and trailer of stores. The launcher consists of a vertical cylindrical unit carrying two missiles on each side, the surveillance radar dish and "Identification Friend or Foe" (IFF) system under a radome on top, the guidance computer and radar electronics at the bottom, and a prominent parabolic antenna for sending guidance commands to the missiles on the front. The search radar was of the pulsed Doppler type with a range of about 15 km. The aerial, located at the top of the launcher, rotated about once a second, looking for moving targets through their doppler shift. When one was located, a lamp would light up on the Selector Engagement Zone (SEZ), a box containing 32 orange lamps arranged in a circle about the size of an automobile steering wheel. The radar operator could also blank out returns from other directions, providing jamming resistance. The optical tracker unit was made up of a stationary lower section and a rotating upper section. The lower section housed the operator controls, while the upper section housed the tracking optics. The

operator's optical system was a modified telescope containing a Dove prism to prevent the image 'toppling' as the optics rotate in azimuth. This system meant that, unlike a periscope, the operator did not have to move in order to track the target. The upper section also contained a separate missile tracking system that was slaved to the operator's optics, based on a television camera optimized for the IR band. Upon detection of a target, the optical tracking system would be slewed to target azimuth and the operator would then search for the target in elevation. The operator's field of view would depend on the target range: "wide" at about 20 degrees or "track" at about 4.8 degrees. When the target was found the operator switches to "track" and uses a joystick to keep the target centred in the telescope. Once a steady track was established the missile was fired. The TV camera on the tracker was tuned to track the four flares on the missile's tail. Like the operator's telescope, the TV system had two views, one about 11 degrees wide for the initial "capture", and another at 0.55 degrees for midcourse tracking. The difference between the line-of-sight of the operator's telescope and the missile's flare was calculated by the computer in the base of the launcher. Guidance updates were sent to the missile through the transmitter on the launcher platform, and received on small antennas on the rear of the mid-body fins. The operator simply kept the telescope's crosshairs on the target using the joystick, and the missile would automatically fly into the line-of-sight, a system of operation known as SACLOS. The basic concept is very similar to the one used by most anti-tank missiles, with the exception that those systems normally use small wires to send guidance information to the missile, rather than a radio link. The missile contained a small 1.4 kg warhead with a contact fuse and a single-stage solid-rocket motor that accelerated the missile to about 650 m/s (about Mach 2). Engagement time to the maximum effective range was about 13 seconds. Response time from the start of the target detection to missile launch is about 6 seconds, which has been repeatedly confirmed in live firing. The whole system, along with its crew, was delivered by two Land Rovers designated as the Fire Unit Truck (FUT) and the Detachment Support Vehicle (DSV). Royal Artillery batteries comprised three troops each of four fire units while RAF Regiment squadrons had eight fire units. By 1980 each Royal Artillery fire unit consisted of a (24 volt) 101 FC 1 tonne Land Rover towing the Rapier Launcher and carrying 4 missiles on board, a 109-inch 3/4 ton 24v FFR (Fitted For Radio) Land Rover towing a 1-ton Missile Supply Trailer (MST), containing up to a further 10 missiles. Blindfire radar (see below) was only provided for 1⁄3 of fire units in British Army service, and for all fire units in the RAF Regiment.

FB-6A Chinese 4x4 Mobile Short-Range Air Defense System



Tiers:



System

Alternative Designation: FB-6A Missile Launching Vehicle

Type: Short Range Air Defense System

Crew: ea2

Chassis: Shenyang SFQ2040

Maximum Effective Range: m6,000

Minimum Range: m500

Target Altitude (Max): m4,500

Target Altitude (Min): m15

Fire on the Move: INA; its parent, the US Avenger can fire on the move so, it is prudent to assume that the FB-6A can also

Reaction Time: seconds2-3

Dimensions (Chassis: Shenyang SFQ2040)

Length: mm4,600

Width: mm2,100

Height: mm3,000

Weight, Combat: mt4.6

Automotive (Chassis: Shenyang SFQ2040)

Engine Name: Cummins 4BTAA-92

Engine Type: Turbo-diesel engine

Engine Power: hp~150

Cruising Range: kmINA

Speed, Maximum Road: km/h100

Speed, Average Cruising: km/hINA

Fording Depth: m~1.5

Side Slope: %~40

Slope Climbing: %~60

Communication

Radio: Yes; Type INA

Main Weapon System

↳*System*

Name: INA

Type: Pedestal mounted on Shenyang SFQ2040 4x4 tactical vehicle

Basic Load: missiles8

Traverse Range: %360

↳*FN-6 (A single source stated that the DY-90 may be found on the FB-6A)*

Type: Surface to Air Missile

Guidance: Passive IR

Caliber / Length: mm1,862

Missile Weight: kg20

Missile Diameter: mm90

Missile Speed: mach2.2

Seeker Field of View: INA

Self-Destruct Time: INA

Maximum Elevation: INA

Minimum Elevation: INA

Proximity Fuze: Yes

Rate of Fire, Sustained: ~1 round every 5 seconds. Gunner must acquire the target before they can go into the launch sequence. This process is expedited when the launch vehicle is teamed with the search/acquisition radar vehicle.

Missile Stages: A launch motor ejects the missile out of the launch tube; once clear of the vehicle, the flight motor ignites and carries the missile to its target

Probability of Kill: %70

Maximum Target Speed: km/h300

Maximum Effective Range: m6,000

Fire Control / Radar

↳*Fire Control System*

Name: INA

Computerized FCS: INA

Direct Fire: INA

Acquisition Range: km12

↳*Radar*

Name: Subsystem to the FB-6A

Type: Planar array or electronically scanned passive phased array

Function: Scan and track

Frequency / Band: INA

Range: km>12

Number of Targets System Can Track: INA

Protection

Vehicle Armor: No

Pedistal Armor: No

Applique Armor: No

NBC Protection: Over-pressure in pedestal only

Notes:

The FB-6A is a copy of the US Army's AN/TWQ-1 Avenger Short Range Air Defense (SHORAD) system. The HMMWV copy that carries the pedestal launcher is the Shenyang SFQ2040. The main difference between FN-6A and its successor FB-6A is that the SAM system is broken down into two portions in the FB-6A: FB-6A SAM system consists of two vehicles, one carrying the engagement radar, while the other carrying the missile launcher and missiles. Although the 12.7 mm heavy machine gun is no longer the standard equipment of FB-6A system, it can be added as an option, and is interchangeable with other machine guns. The total numbers of missiles carried by the launching vehicle of FB-6A remain the same as FN-6A, still totaling eight. A command vehicle and 8 launching vehicles form an air defense battery when fighting as a coherent unit, and this in turn can be integrated into larger air defense networks. Alternatively, the launching vehicle can be directly integrated into larger air defense networks without the need of the command vehicle. The launch vehicle can be task organized to fight alone without the radar however, aircraft acquisition become more difficult and engagement times become longer.

HQ-17A (FM-2000) Chinese Short-Range Air Defense Missile System







Tiers:

1 2 3 4

Variants:

- **FM-2000:** FM-2000 is an export version of the HQ-17A. It was first publicly revealed in 2018. It uses a Dongfeng high mobility chassis with 6x6 configuration.

System

Alternative Designation: HQ-17A

Type: Short-Range Air Defense Missile System

Family: HQ

Status: Operational; Exported to Cyprus, Egypt, Greece, Iran, Ukraine, and Venezuela

Crew: ea3

Chassis: The HQ-17A uses a new wheeled chassis instead of tracked. In terms of capabilities it is broadly similar to the Russian Tor M2 system. Overall it resembles versions of the Tor, based on a Belarusian MZKT-6922 high mobility wheeled chassis.

Displacement Time: minutes5

Emplacement Time: minutes5

Fire on the Move: INA

Note: The HQ-17A launcher vehicle carries both radars and missiles.

Dimensions

Length: m9.7

Width: m3.1

Height: m3.7

Weight, Combat: tons30

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp400

Range: km800

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.4

Trench: m0.5

Fording Depth: m1.2

Communications

Missile System

↳*Launcher*

Name: INA

Note: Missiles are launched vertically.

↳*Missile*

Name: 9M330 Missile

Type: Surface-to-Air Missile

Length: 2,900 mm

Diameter: 235 mm

Wingspan: 650 mm

Weight: 167 kg

Warhead: Frag-HE (fragmentation high explosives)

Warhead Weight: 15 kg

Detonation Mechanism: RF Proximity

Propellant: Solid-fuel rocket

Operational Range: 12 km

Flight Ceiling: 6,000 m

Boost Time: Cold launch ejection for 20 m

Guidance System: Radio command

Speed: 850 m/s

Steering System: Gas dynamic control system, with four control surfaces

Basic Load: ea16

Hit Probability: Hit probability of a single missile against aircraft is up to around 45-80%.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Targets: Cruise missiles, low-flying aircraft, short-range ballistic missiles

↳*Detection Radar*

Name: INA

Type: Detection Radar

Frequency/Band: E/F-Band

Maximum Detection Range: Range of 25 km while moving

Number of Targets System can Track: INA

Note: Some components of the HQ-17A, such as the radar, might be actually more advanced than those of the Russian Tor.

↳*Tracking Radar*

Name: INA

Type: Tracking Radar

Frequency/Band: G/H-Band

Maximum Tracking Range: Range of 15 km while stopped

Number of Targets System can Track: INA

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The HQ-17A is a new China's short-range air defense system. It evolved from the HQ-17 (China's copy of the Russian Tor). China imported a total of 35 Tor M1 systems from Russia and offered to co-produce this air defense system in China. However Russia reportedly refused. Eventually China copied the Tor M1 and developed its indigenous version - the HQ-17, which featured some improvements, including a modern radar. The HQ-17A is a further development. This could be a good indication

of how self-sufficient and advanced is China's weapon industry. Pre-production version of the HQ-17A, was first publicly revealed in 2018 in the form of FM-2000 air defense missile system. Operational HQ-17A systems were first publicly revealed in 2019 during a military parade. The HQ-17A uses a new wheeled chassis instead of tracked. In terms of capabilities it is broadly similar to the Russian Tor M2 system. Overall it resembles versions of the Tor, based on a Belarusian MZKT-6922 high mobility wheeled chassis. Some components of the HQ-17A, such as the radar, might be actually more advanced than those of the Russian Tor. The HQ-17A can engage all kinds of modern air targets, including aircraft, helicopter, UAVs, cruise missiles and precision guided munitions. Basically it is intended to destroy targets that long- and medium- range air defense systems failed to hit. The HQ-17A was designed to protect mechanized formations. Though it can be also used to protect important stationary assets, such as military bases, airfields, ports, supply depots, command centers and so on. For this role an expensive tracked chassis was not required. The HQ-17A launcher vehicle carries both radars and missiles. A total of 16 missiles. Missiles are launched vertically. Maximum range of fire is around 15 km. Missiles can reach their targets at an altitude of up to 10 km. Hit probability of a single missile against aircraft is up to around 45-80%. The HQ-17A uses wheeled chassis with all-wheel drive configuration. It seems that this chassis is produced by Dongfeng motor corporation. Vehicle has good cross-country mobility and can travel over difficult terrain. A central tyre pressure system is fitted as standard. The cab is lightly armored and provides some degree of protection against small arms fire and shell splinters.

9M337 Sosna-R Russian Short-Range Air Defense Missile System





Tiers:



Variants:

- **Palma close-in weapon system:** This is a naval anti-aircraft gun system that can be equipped with eight Sosna-R missiles. It also has two AO-18KD 30-mm cannons. It has reportedly been purchased by at least one (unspecified) country. See separate record for more information.
- **Mobile/Tracked Sosna-R SAM:** This is a tracked air defense system featuring an upgraded MT-LB armored fighting vehicle chassis with a turret supporting 12 Sosna-R missiles in the ready-to-launch position. Two advanced electro-optical packages for acquisition, tracking and laser guidance are situated between the two banks of six missiles. The sights are said to be operational under almost all weather conditions. Once all 12 missiles have been launched, the system can be reloaded manually in about 12 minutes from a support vehicle carrying additional missiles. The system may be integrated with tracked or wheeled vehicles.
- **Sosna SHORAD system:** The Sosna system consisted of Sosna-R missiles and a twin-barrel 30-mm 2A38M cannon. Mounted on a wheeled, towed chassis it had four containerized ready-to-launch Sosna-R missiles. The cannon had a range of 13,100 ft (4,000 m). The Sosna featured a 360-degree target-acquisition radar and a gyro-stabilized multisensory turret with room for four sensors. An electro-optical fire-control system was equipped with laser-beam control for the missiles. It was offered for sale in 2003. However, development was ultimately shelved in favor of a self-propelled version.

System

Alternative Designation: 9M337 Sosna-R
Type: Short-Range Air Defense Missile System
Family: Sosna
Mission: The system is intended to protect against all types of air threats including high-precision weapons e.g. cruise missiles and guided aircraft missiles in the area of the system responsibility: in range – up to 10 km, in altitude – up to 5 km
Manufacturer: High Precision Systems
In Service: 2017-Present
Crew: ea3
Chassis: MT-LB Armored Personnel Carrier
Displacement Time: INA
Emplacement Time: INA
Fire on the Move: Yes
Launch Platforms: Sosna vehicle Palma CIWS Palash CIWS
Note: The (M337 Sosna-R (SA-24) Turret can be mounted on any vehcile that has a payload of more than 3,500 kg

Chassis Dimensions (MT-LB Armored Personnel Carrier)

Hull Length: m6.45
Width: m2.85
Height: m1.87
Length of Track on Ground: m3.80
Track Width Standard: mm350
Track Width Wide: mm570
Ground Clearance: mm400

Automotive (MT-LB Armored Personnel Carrier)

Engine Name: 1 x YaMZ 238V liquid-cooled, V-8 Diesel Engine
Engine Type: Diesel Engine
Engine Power: hp240 hp at 2,100 rpm
Power-to-Weight Ratio: 20.16 hp/metric ton
Transmission: manual w/1 reverse gear and 6 forward gears
Fuel Capacity: liters450
Cruising Range: km500
Speed, Maximum Road: km/h62
Speed, Average Cross: km/h
Speed Maximum Swim: km/h5-6
Suspension: torsion bar, 6 road wheels, front drive, rear idler, 2 shock absorbers, no return rollers
Gradient: %60
Side Slope: %30
Vertical Obstacle: m0.70
Trench: m2.70
Fording Depth: Amphibious

Communications

Primary: INA

Missile System

Name: 9M337 Sosna-R (SA-24)
Launcher Type: Tracked SAM Launcher
Length, Transport-Launch Canister: m2.20
Diameter, Transport-Launch Canister: m0.15
Launcher Weight: kg30.0
Missile Length: m2.20

Missile Booster Diameter: m0.13

Missile Forward Section Diameter: m0.07

Missile and Container Weight: kg42.0

Warhead Type: 1× Fragmented-rod warhead 1× AP-Frag warhead tandem warhead with high-explosive rod-fragmentation warhead for proximity detonation and an armor-piercing fragmentation warhead that goes off on impact

Warhead Weight: kg7.2

Missile Speed: m/s900

Detonation Mechanism: Fuze

Maximum Range: km10

Minimum Range: m1,300

Maximum Altitude: km10

Minimum Altitude: INA

Guidance System: The system features a two-stage solid-propellant missile. During the first phase of flight the missile is guided by radio command. The booster falls away, and the second stage is guided to the target by a laser beam

Max Elevation: INA

Min Elevation: INA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Load Factor: g52

Reaction Time: 5-8 seconds

Reloading: 10 minutes

Fuze Type: The missile is equipped with an impact/proximity fuze with a continuous circular pattern and an adaptive burst time for maximum target effect

Basic Load: 12 missiles in twin launchers, each with six tubes

Note: The light weight of the missile eliminates the need for a dedicated transport/reloading vehicle

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes, a Missile FLight-Control Unit that is linked to the ECM-Protected Electro-Optical Control System

Fire on the Move: Yes

Thermal Camera: Yes

TV Camera: Yes

Laser Rangfinder: Yes

Passive Mode Capable: Yes, passive optical detection capability provides 360-degree coverage from -5 degrees to 60 degrees in azimuth

Jamming Resistant: Yes

Optronic Combat Control System: Yes, a multi-channel, automatic, day/night electro-optical sensor system that operates in nearly all weather conditions

Gyrostabilized Sensor: Yes

Sector Scan: Yes, 60-degree horizontal and 20-degree azimuth sectors

Automatic Target Designation Mode: Yes

Thermal Imaging Channel: Yes

Thermal and Laser Channels for MIssile Guidance: Yes

Direct Fire: Yes, the system is capable of firing at ground targets

Indirect Fire: Yes

Note #1: The Sosna-R is able to operate effectively under the control of various types of old, modern and prospective battery command posts, the most preferable of which is the FPU "Assembly-M1-2" (9S80M1-2) and is resistant to jamming

Note #2: It can track 50 targets simultaneously and engage one while moving

Protection

Hull Armor: 7-14 mm Maximum

Turret Armor: 7-14 mm Maximum

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The SOSNA-R 9M337 hyper-velocity beam rider missile is a two-stage missile designed for interception of fired wing aircraft and helicopters, as well as guided weapons and cruise missiles. The system is intended to protect against all types of air threats including high-precision weapons e.g. cruise missiles and guided aircraft missiles in the area of the system responsibility: in range – up to 10 km, in altitude – up to 5 km. Structure principles * mount of missile armament with a launcher in one combat vehicle, air search and target tracking equipments, missile flight control units that are combined by integrated optronic combat control system * missile armament consists of 12 high-speed high-precision maintenance-free missiles SOSNA-R deployed in a launcher. Light weight of the missiles allows to dispose of a transport/loading vehicle from the system * optimal configuration of surface-to-air guided missile (SAM) payload allows to improve impact effect due to increased weight of spread warheads and application of impact/non-impact laser fuse with continuous circular beam pattern and adaptive burst time * special multichannel automatic high-precision practically all-weather and day/night optronic control system * combined missile control system: radio command system in start zone; remote orientation in laser beam after engine division and missile targeting to the line-of-sight * optronic combat control system with sector scan and in the automate target designation mode provide autonomous target detection capability. State trials of Russia’s new short-range air defense missile system would begin in summer 2015, Tochmash design bureau told RIA Novosti on 19 May 2015. The system, dubbed Sosna ["Pine"], was expected to replace Strela-10M air defense systems in service with the Russian armed forces. “Last year, we successfully completed the preliminary tests of this system. In summer, the state trials of the system at testing grounds of the Land forces will begin,” Tochmash Managing Director Vladimir Slobodchikov said. “The outcome of the trials will determine whether this system will be put in service with the Russian Army,” Slobodchikov said. According to Tochmash, the Sosna system “is intended to protect against all types of air threats including high-precision weapons like cruise missiles and guided aircraft missiles in the area of

the system responsibility: in range – up to 10 km, in altitude – up to 5 km.” Slobodchikov noted that a number of foreign countries, including those of the South-East Asia region and the Middle East, have shown interest in acquiring the Russian Sosna system. Sosna participated in military exhibitions in South Africa and United Arab Emirates and would be exhibited in Peru and Brunei. Several Sosna vehicles will typically operate together with a command vehicle carrying a surveillance system. Each Sosna vehicle had 12 ready-to-fire missiles and could be reloaded in 12 minutes. It uses the same Sosna-R two-stage missile that is used with the company's Palma naval air defence system, which is in service with the Russian and Vietnamese navies. One variant of the system features high fire power due to the combination of the missiles and 30mm 2F38 twin-barreled air defense automatic gun.

9K35M Strela-10M (SA-13 Gopher) Russian Short-Range Surface-to-Air Missile (SAM) System



Tiers:



Variants:

- **Strela-10M:** improved air defense missile system. It entered service with the Soviet Army in 1979. Its missile has improved guidance. It distinguishes targets from infrared decoys. Therefore it is more effective.
- **Strela-10M2:** it is a further development of the Strela-10M. It can receive target data from air defense command posts or nearby radars. There is a 30-60% possibility to engage fighter aircraft with a single missile. Vehicle is fitted with floatation buoys on either side of the hull. It is fully amphibious and can ford rivers and lakes. On water it is propelled by its tracks. Amphibious speed on water is 5-6 km/h. It entered service with the Soviet Army in 1981.
- **Strela-10M3:** is a further development of the system. It can additionally engage UAVs and cruise missiles. Missile has improved resistance to enemy countermeasures. Warhead contains 5 kg of explosive material instead of 3 kg. It is more efficient against small-size air targets, such as UAVs. These missiles weight 42 kg. These can be used by all other versions of the Strela-10. The Strela-10M3 entered service with the Soviet Army in 1989.
- **Strela-10M3-K:** a proposed Russian upgrade, based on refurbished BTR-60 APC 8x8 wheeled chassis.
- **Strela-10M4:** a proposed Russian upgrade of the -10M, -10M2 and -10M3 systems.
- **Strela-10T:** a proposed Belarusian upgrade.
- **Luchnik-E:** a proposed Russian upgrade. It has 8 ready to use Igla short-range surface-to-air missiles.

System

Alternative Designation: 9K35 Strela-10, SA-13 "Gopher, 9K35
Type: Short-Range Surface-to-Air Missile (SAM) System
Manufacturer: Saratovskiy Zenit Machine Plant (Muromteplovoz Joint Stock Company for the 9K35M3-K)
In Service: 1976-Present
Family: Strela
Crew: ea3
Chassis: MT-LB multi-purpose armored vehicle.
Displacement Time: INA
Emplacement Time: INA
Note: Reload missiles are carried by escorting Ural-4320 6x6 truck, fitted with a crane.

Dimensions

Length: m6.45
Width: m2.85
Height: m2.22

Height in Combat Configuration: m3.96

Weight, Combat: tons12.1

Automotive

Engine Name: YaMZ-238V

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: INA

Gradient: deg60

Side Step: deg30

Vertical Step: m0.6

Trench: m2.4

Fording Depth: m1.2 m / Amphibious

Communications

Primary: R-173

Missile System

↳*Missile Launcher*

Name: INA

Type: INA

Basic Load: ea8

Note #1: Missiles are visually aimed.

Note #2: Four missiles are mounted on the turret in boxes, ready to launch, and eight more are carried inside the vehicle as reloads. Reloading takes around 3 minutes.

↳*Missile*

Name: 9M37

Type: Short-Range Surface-to-Air Missile (SAM) System

Length: m2.19

Wingspan: mm360

Diameter: m0.12

Weight: kg40

Warhead Type: HE-FRAG

Warhead Weight: kg3

Maximum Range of Fire: m5,000

Minimum Range of Fire: m800

Maximum Altitude: m3,500

Minimum Altitude: m25

Detonation Mechanism: contact and laser proximity fuzes

Propellant: Single-stage solid propellant rocket motor

Speed: m/s550

Guidance System: dual-mode passive 'photocontrast'/IR seeker

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: +1 Million

Max Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Length, Overall: mm1,203

Length, Barrel: mm605

Weight (Gun Only): 9 kg

Weight (Tripod Only): 7.7 kg

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: 7.62 mm

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: 90 mm

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Electro-Optical Guidance: Yes

Guidance: Dual-guidance mode -- optical "photo-contrast" and dual-band passive infrared (IR)

↳*Radar #1 (Separate Vehicle)*

Name: "DOG EAR" Radar

Type: Acquisition Radar

Proliferation: Angola Air Force [10] (9K35 Strela-10) Azerbaijan Army [N/A] (9K35 Strela-10) Belarus Air Force [N/A] (9K35 Strela-10) Bosnia-Herzegovina Air Force [1] (9K35M3 Strela-10M3) Croatia Army [9] (9K35 Strela-10) Cuba Army [200] (9K35 Strela-10) Czech Republic Air Force [N/A] (9K35 Strela-10) Georgia Army [N/A] (9K35 Strela-10) India Army [250] (9K35 Strela-10) Jordan Army [92] (9K35 Strela-10) Kazakhstan Air Force [N/A] (9K35 Strela-10) Macedonia Air Force [8] (9K35 Strela-10) North Korea Army [N/A] (9K35 Strela-10) Russia Airborne Forces [30] (Strela-10MN) Army [400] (9K35M3 Strela-10M3) Marines [N/A] (9K35 Strela-10) Serbia Army [5] (9K35M Strela-10M) Slovak Republic Army [48] (9K35 Strela-10) Syria Army [N/A] (9K35 Strela-10) Turkmenistan Army [13] (9K35 Strela-10 mod) Ukraine Army [N/A] (9K35 Strela-10)

Function: The radar supplies target alerting information to the SA-13 Gopher (Russian 9K35 Strela-10) surface-to-air missile (SAM) system.

Vehicle Mount: The Dog Ear (with the Russian designation of 9S80) is a Russian ground-based, target-acquisition radar mounted on an MT-LB multi-purpose tracked vehicle or MT-LBu armored command and reconnaissance vehicle (ACRV).

Band: F-G (3-6 GHz)

Antenna Type: open-mesh, rounded-rectangle parabolic antenna.

Maximum Range, Acquisition: km80

Maximum Range, Tracking: km35

Note #1: Target acquisition requires a separate vehicle mounting a Dog Ear** forward alerting radar.

Note #2: Deployment usually involves one system for each air defense battery/battalion.

↳*Radar #2 (On Missile Vehicle)*

Name: 9S86 "SNAP SHOT"

Type: Rangefinding

Maximum Range: m10,000

Minimum Range: m450

Note: located between the two pairs of missile canisters on the transporter erector launcher and radar (TELAR)

↳*Radar #3 (On Missile Vehicle)*

Name: 9S16 (NATO "Flat Box-B")

Type: Radar warning

Traverse Range: deg360

Maximum Elevation: deg40

Minimum Elevation: INA

Protection

Hull Armor: Protection from small arms fire and projectile fragments.

Turret Armor: Protection from small arms fire and projectile fragments.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Strela-10M (9M31M) This variant has an uncooled lead sulphide (PbS) seeker. The 9K35 is the successor of the 9K31 Strela-1 (SA-9 "Gaskin") and can also use the Strela-1's missiles in place of the 9M37. Development of the 9K37 Strela-10SV system was initiated July 24, 1969. The decision to begin the development of a new non-all-weather system was taken despite the simultaneous development of an all-weather hybrid gun/missile system 9K22 "Tunguska" mainly as an economical measure. It was also seen as advantageous to have a system capable of fast reaction times and immunity to heavy radio-frequency jamming. Rather than being mounted on an amphibious but lightly armoured BRDM chassis like the 9K31, the 9K35 is mounted on a more mobile tracked, modified MT-LB, with more room for equipment and missile reloads. Provision for amphibious capability is provided in some variants in the form of polyurethane-filled floats. The Strela-10SV system and its 9M37 missile were tested in Donguzkom range from 1973 to 1974, but the results were disappointing: the system was found deficient in terms of missile probability of kill, vehicle reliability, among other things. Acceptance to service was thus delayed until May 16, 1976, by which time improvements had been introduced to the system. Development of the system continued throughout the years through Strela-10M, -10M2 and -10M3 variants introducing among other things improved radio communications and provision for better integration to the Soviet integrated air defence system air picture data. Also improved missiles (9M37M and 9M333) have been developed and by September 2007 the 9K35M3-K Kolchan variant, mounted on a BTR-60 wheeled chassis, was displayed for the first time at the Moscow Air Show MAKS 2007. The Russian Armed Forces will receive 72 advanced mobile “night” short-range anti-aircraft missile complexes “Strela-10M4″ by 2016. In 2014, the Russian Airborne Troops received the first batch of 18 “Strela-10M4″ vehicles. Modernization of equipment extends the “life” of an air defense system for 3–5 years. The SA-13 Gopher Strela-10M is expected to be replaced by the Sosna anti-aircraft missile system. The system is based on the MT-LB chassis consisting of 2x6 Sosna-R 9M337 (SA-24) beam rider missiles with a range of 10 km and altitude of 5 km. The 9K35 is a SAM system with electro-optical guidance. It has the capability to use radars for target acquisition and range. Some vehicles have a pintle-mounted PKT 7.62 mm machine gun in front of the forward hatch for local protection. Other vehicles have been seen with additional support railings for the system on the rear deck. The following is a list of associated equipment: * 9A34M2, 9A34M3-K: launcher vehicle with 9S86 "SNAP SHOT" range only radar located between the two pairs of missile canisters on the transporter erector launcher and radar (TELAR) (maximum radar range is 450 to 10,000 m). * 9A35M2, 9A35M3-K: launcher vehicle with 9S16 (NATO "Flat Box-B") passive radar detection system that gives a 360° azimuth and minimum 40° elevation coverage * 9F624 and 9F624M training simulator * 9S482M7 Control Post. * 9U111: a 1,950 kg trailer-mounted 12 kW generator unit, designed to feed power to up to four 9A35M2, * * 9A35M3-K or 9A34M2, 9A34M3-K launcher vehicles at a distance of up to 30 m by cable while conducting maintenance or training operations. * 9V839M: system checkout vehicle * 9V915M, 9V915M-1: technical maintenance vehicle MT-LBU "DOG EAR" F/G-band target acquisition radar (maximum range 80 km/50 miles) * Ranzhir-M 9S737M (GRAU designation 9S737); is a mobile command center for a mixed grouping of air defense forces, such as Tor, Tunguska, Strela-10, and Igla.

AN/TWQ-1 Avenger American 4x4 Mobile Air Defense Missile System





Tiers:



Variants:

- **Boeing/Shorts Starstreak Avenger:** Boeing teamed with Shorts Brothers PLC (now part of Thales) to offer an Avenger system in which one Stinger pod was replaced with a pod of four Starstreak Hyper-velocity laser-guided missiles, in the hopes of attracting a U.S. Army contract under the Forward Area Air Defense System Line-of-Sight Rear (FAADS-LOS-R) program. Test installation was carried out in mid-1990 and firing trials followed from mid-1991 in the U.K. Starstreak would have complemented the Stinger by improving the overall systems ability to deal with low hovering helicopters which frequently do not provide enough contrast for lock-on by infrared guided missiles. Starstreak also has the ability to be used against un-armored and lightly armored ground vehicles.
- **Boeing/Matra Guardian:** In the 1990s Boeing teamed with Matra of France to offer the Avenger modified by the substitution of standard triple launcher boxes for Matra Mistral missiles in place of the quadruple Stinger pods of the standard Avenger. One demonstrator vehicle was built in 1992 and test firings took place in France. The project was dropped around 1997.
- **Avengers during the Iraq War:** Due to the lack of serious airborne threats during much of the Iraq War, along with the pressing need for ground assets for combat roles such as convoy protection, the Avenger was pressed into this role. The FLIR/laser rangefinder combined with the .50 cal machine gun has proved to be very effective, but was limited by no-fire zones, particularly to the front of the vehicle. A program was instituted to remove one of the missile pods and move the machine gun to that position to enable a 360° field of fire. The upgrade also increased the ammunition capacity to 650 rounds.
- **Avenger DEW:** Another potential variant proposed by Boeing is an Avenger with a Directed Energy Weapon (DEW). Boeing completed an initial test of a 1 kilowatt laser mounted where the right missile pod would be. The M3P .50 cal has been replaced by the M242 Bushmaster as its close defense weapon.
- **Avenger Multi-Role Weapon System:** Test firing demonstrations took place in 2004 of this variant modified by re-locating the M3P machine gun over the turret cab to allow a 360-degree field of fire, increasing ready-use machine gun ammunition stowage to 600 rounds, and providing the option to substitute launchers for 2 FGM-148 Javelin missiles in place of 1 Stinger pod.
- **Accelerated Improved Interceptor Initiative (AI3):** In February 2012, Raytheon was awarded a contract to develop the AI3, a modified AIM-9 Sidewinder missile mounted on the Avenger launcher, to perform counter rocket, artillery, mortar (C-RAM), counter unmanned aerial vehicle (C-UAV), and counter cruise missile duties. In 2013, the US Army decided to not buy the system. In August 2014, the system successfully intercepted a UAV and cruise missile target featuring a semi-active radar homing seeker in a test.
- **Other variants:** Boeing have proposed that the Avenger PMS turret could be mounted on other vehicles such as Unimog truck, BV-206 all-terrain vehicles, M113 APC, and M548 tracked cargo carrier as well as being used as a stationary ground mount on a pallet for defense of static targets. The Avenger PMS has been demonstrated with a mock-up of two 70 mm helicopter-type rocket pods carrying a total of 36 rockets to give the system greater multi-mission utility. Other missiles such as the Bofors RBS 70/Bolide have been proposed for use on the Avenger PMS. In March 2017, Boeing revealed a modernized Avenger system fitted with AIM-9X Sidewinder and Longbow Hellfire missiles on the sides and a directed energy weapon affixed to the top. It is also planned to be integrated onto other platforms including the JLTV, Stryker, and Bradley Fighting Vehicle. While Boeing had configured a Stryker with the Avenger turret to fulfill the Army's Interim Maneuver-Short-Range Air Defense (IM-SHORAD) requirement, the Army ultimately decided against the idea, feeling it would require major modifications to the vehicle and because of the company's desire for the service to supply the turrets, of which there were a limited amount existing readily in the inventory.

System

:
:
:
Role: Short-range surface-to-air shoot-on-the-move air defense weapon; protection for the maneuver force
Components: HMMWV, C2i, radars, platforms and stinger missiles, and a .50 caliber machine gun

↳*AN/TWQ-1 Avenger (Launcher)*

Name: AN/TWQ-1 Avenger
Type: Surface-to-Air Missile System
In Service: 1989-Present
Manufacturer: Boeing
Crew: 2 (Basic), 3 (STC)
Missile: FIM-92 Stinger missiles
Targets: Cruise missiles, UAVs, low-flying, high-speed fixed-winged aircraft, and helicopters

↳*Missile*

Name: FIM-92 Stinger missiles
Type: Infrared homing surface-to-air missile (SAM).
Length: m1.52
Diameter: mm70.1
Weight: kg15.19
Warhead: High explosive annular blast fragmentation
Warhead Weight: kg3
Engine: Solid-fuel rocket motor
Guidance System: Infrared homing
Speed: m/s750
Operational Range: It has an outward targeting range of up to 4,800 m and can engage low altitude enemy threats at up to 3,800 m.

Dimensions

Length: m4.95 m
Width: m2.18 m
Height: m2.64
Weight: 3,900 kg

Automotive

Engine Name: INA

Engine Type: Detroit Diesel cooled V-8

Engine Power: hp135

Maximum Range: 443 km

Maximum Speed: 89 km/h

Mobility: Highly mobile, Mounted atop a 4×4 Heavy High Mobility Multipurpose Wheeled Vehicle (HMMWV)

Protection

Armor: INA

Smoke: INA

Notes:

The Avenger Air Defense System, designated AN/TWQ-1 under the Joint Electronics Type Designation System, is an American self-propelled surface-to-air missile system which provides mobile, short-range air defense protection for ground units against cruise missiles, unmanned aerial vehicles, low-flying fixed-wing aircraft, and helicopters. The Avenger was originally developed for the United States Armed Forces and is currently used by the U.S. Army. The Avenger system was also used by the U.S. Marine Corps. The Avenger comes mainly in three configurations, the Basic, Slew-to-Cue, and the Up-Gun. The Basic configuration consists of a gyro-stabilized air defense turret mounted on a modified heavy Humvee. The turret has two Stinger missile launcher pods, each capable of firing up to 4 fire-and-forget infrared/ultraviolet guided missiles in rapid succession. The Avenger can be linked to the Forward Area Air Defense Command, Control, Communications and Intelligence (FAAD C3I) system, which permits external radar tracks and messages to be passed to the fire unit to alert and cue the gunner. The Slew-to-Cue (STC) subsystem allows the commander or gunner to select a FAAD C3I reported target for engagement from a display on a Targeting Console developed from VT Miltope's Pony PCU. Once the target has been selected, the turret can be automatically slewed directly to the target with limited interaction by the gunner. The Up-Gun Avenger was developed specifically for the 3rd Armored Cavalry Regiment for the Regiment's 2005 deployment to Iraq. The modification was designed to allow the Avenger to perform unit and asset defense in addition to its air defense mission. The right missile pod was removed and the M3P .50 cal machine gun was moved to the pod's former position. This allowed for the removal of the turret's cab safety limits which enabled the gun to be fired directly in front of the HMMWV. Eight of the unit's Avengers were modified to this configuration. With the 3rd ACR's redeployment from Iraq, the Up-Gun Avenger completed its role in Operation Iraqi Freedom and the Avengers have been scheduled to be converted back to STC systems.

SA-15 Gauntlet (9K330 Tor) Russian Short-Range Surface-to-Air Missile System








Tiers:



Variants:

- **Tor-M1:** 9K331 "Tor-M1", introduced in 1991 with the 9M331 missile, with greatly improved missile accuracy and the ability to engage two targets simultaneously, minimum range 1.5 km (0.93 mi), minimum height 0,01 km.
- **Tor-M2E:** 9K332 upgrades have continued over the lifetime of the system, with developer Almaz Antey unveiling the newest incarnation of the Tor missile system, the Tor-M2E,[26] at the MAKS Airshow in 2007.
- **Tor-M1-2U:** "Tor-M1-2U" entered service at the end of 2012. This system is designed to destroy aircraft, helicopters, UAVs, missiles, and other precision guided weapons, flying at medium, low and very low altitudes in all weather.
- **3K95 Kinzhal (Naval Variant):** The 3K95 "Kinzhal" (Russian: Кинжал – dagger) is the naval version of the Tor missile system developed by Altair and has the NATO reporting name SA-N-9 Gauntlet. Using the same 9M330 missile as the land based version, the system can be mounted on vessels displacing over 800 tonnes and is known to be installed on Admiral Kuznetsov class aircraft carriers, Kirov class multimission cruisers, Udaloy class anti-submarine destroyers and Neustrashimy class frigates.
- **Tor-M2KM:** The Tor-M2 km is a self-contained fighting module version of the system that can be mounted in various locations. In October 2016, it was loaded onto the helipad of the Admiral Grigorovich frigate by means of an ordinary wharf crane and fixed in position with steel chains to fire at simulated cruise missiles while the ship was underway. This could give advanced SAM capabilities to vessels without the capacity to install the larger and heavier Kinzhal system; it can also be mounted on a truck, building roof, or any horizontal surface at least 2.5 m wide and 7.1 m long.
- **Tor-M2DT:** The system is especially designed to be used for Arctic region at temperatures up to -50 degrees C based on the chassis of the DT-30PM tracked all-terrain vehicle and is capable of detecting over 40 air targets, especially high-precision weapons, and to track and engage up to four of them simultaneously at a range of up to 12 km and altitudes up to 10 km with its 16 missiles even on the move. Its creation was completed in 2018 and the first delivery of 12 systems was held in November of the same year
- **Tor-2E:** JSC Rosoboronexport, part of the Rostec State Corporation, has started promoting the newest Tor-E2 SAM system developed and produced by the Almaz-Antey Air and Space Defense Concern in 2018. Tor-E2 combat vehicle is an independent, mobile, all-terrain fighting unit that provides detection and identification of air targets on the march and at the halt, target lock-on and engagement at the halt, from a short stop and on the move. A battery of the four-channel Tor-E2 SAM systems, consisting of four combat vehicles, can simultaneously engage up to 16 targets flying from any direction at a range of at least 15 km and an altitude of up to 12 km.
- **HQ-17 (Chinese Variant):** The HQ-17 (Hongqi-17) is China's reported variant of the Tor-M1 system.
- **FM-2000:** FM-2000 is a mobile short-range air-defence (SHORAD) system unveiled by China Aerospace Science and Industry Corporation at the 2018 Zhuhai Airshow. Its range is 15 km and engagement altitude is 10 km. It is carried on a 3 axle TEL. It is a version of the HQ-17

System

Alternative Designation: Tor, SA-15

Type: Low to medium altitude, short-range surface-to-air missile

Family: 9K330 Series

Manufacturer: IEMZ Kupol Metrowagonmash (GM chassis designer), MZKT (wheeled chassis designer)

In Service: 1986-Present

Crew: ea3

Chassis: GM-355 special tracked chassis

Displacement Time: Less than 5 min

Emplacement Time: 3 min

Fire on the Move: No

Reloading Vehicle: Reloading vehicle is based on Ural-4320 6x6 heavy truck

Fully Reload Time: 18 Minutes

Note: This system can engage all kinds of modern air targets as well as engage between 2-4 targets simultaneous depending on model (M1 vs. M2). It is used against aircraft, helicopters, UAVs, various missiles and precision guided munitions. It destroys targets that long- and medium-range air defense systems fail to hit.

Dimensions

Length: m8

Width: m3.2

Height, Combat Configuration: m4

Weight, Combat: tons32

Ground Pressure: kg/mINA

Automotive

Engine Name: V-46-2S1

Engine Type: Diesel

Engine Power: hp780

Cruising Range: km580

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1

Trench: m2

Fording Depth: m1

Hydropneumatic Suspension: Yes

Adjustable Ground Clearance: Yes

Communications

HF Radio: R-176 Antey

VHF Radio: Azart-P (4km), Azart-N (12km), and Azart-BM (40km)

Missile System

↳*Missile Launcher*

Name: 9A331 Combat Vehicle

Type: Vertical Launch

Note: The SA-15 can only engage one target at a time.

↳*Missile*

Name: 9M330

Type: Surface-to-Air Missile (SAM)

Length: m2.89

Diameter: m0.23

Wingspan: mm650

Weight: kg165

Engine: thruster jets with 2-stage solid-fuel rockets

Warhead Type: HE-FRAG

Warhead Weight: kg14.8

Range of Fire: km5-12

Maximum Altitude: km10

Minimum Altitude: km06

Basic Load: ea8

Guidance System: Radio Command Guidance System

Kill Probability against Helicopters: 50-88%

Kill Probability against Aircraft: 26-75%

Kill Probability against UAVs: 85-95%

Maximum Speed: Mach 3

Maximum Target Speed: kph3,060

Minimum Target Speed: kph0

Maximum Range: km12

Minimum Range: m100

Load Limit: 30 Gs

Fuze Type: RF proximity

Detonation Mechanism: RF Proximity

Propellant: Solid-fuel rocket

Boost time: Cold launch ejection for 20 m

Steering system: Gas dynamic control system, with four control surfaces

Note: The higher the target the higher the probability to hit the target.

Fire Control

Note: The Tor combat vehicle has radar and missiles based on a single vehicle.

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

Fire Control Radar: J/K-band

Fire Control Sensors: Yes

IADS Integration: INA

Reaction Time (Target Detection to Launch): 8-12 seconds

↳*Radar #1*

Name: INA

Type: 3D pulse Doppler

Maximum Range against Aircraft: 25-27 km

Maximum Range against Helicopters: 12 km

Maximum Range against UAVs: 9-15 km

Search for Targets on the Move: Yes

Detect and Intercept Anti-Radiation Missiles: Yes

Coverage: up to 48 targets

Surveillance Band: G/H-band

Detection Range: km25

Guidance: Command; active terminal homing

Protection

Hull Armor: All-welded steel

Turret Armor: All-welded steel

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Air-Transportable: Yes

IFF: Yes

Notes:

The Tor missile system (Russian: "Top"; English: torus) is an all-weather low to medium altitude, short-range surface-to-air missile system designed for engaging airplanes, helicopters, cruise missiles, precision guided munitions, unmanned aerial vehicles and short-range ballistic threats (Anti-Munitions). Originally developed by the Soviet Union under the GRAU designation 9K330 Tor, the system is commonly known by its NATO reporting name, SA-15 "Gauntlet". A navalized variant was developed under the name 3K95 "Kinzhal", also known as the SA-N-9 "Gauntlet". Tor was also the first air defence system in the world designed from the start to shoot down precision guided weapons like the AGM-86 ALCM day and night, in bad weather and jamming situations. Tor can detect targets while on the move. The vehicle must stop intermittently when firing, although trials are being conducted to eliminate this restriction.

9K35 Strela-10 (SA-13 Gopher) Russian Short-Range Surface-to-Air Missile System









Tiers:



Variants:

- **Strela-10M:** improved air defense missile system. It entered service with the Soviet Army in 1979. Its missile has improved guidance. It distinguishes targets from infrared decoys. Therefore it is more effective.
- **Strela-10M2:** it is a further development of the Strela-10M. It can receive target data from air defense command posts or nearby radars. There is a 30-60% possibility to engage fighter aircraft with a single missile. Vehicle is fitted with floatation buoys on either side of the hull. It is fully amphibious and can ford rivers and lakes. On water it is propelled by its tracks. Amphibious speed on water is 5-6 km/h. It entered service with the Soviet Army in 1981.
- **Strela-10M3:** is a further development of the system. It can additionally engage UAVs and cruise missiles. Missile has improved resistance to enemy countermeasures. Warhead contains 5 kg of explosive material instead of 3 kg. It is more efficient against small-size air targets, such as UAVs. These missiles weight 42 kg. These can be used by all other versions of the Strela-10. The Strela-10M3 entered service with the Soviet Army in 1989.
- **Strela-10M3-K:** a proposed Russian upgrade, based on refurbished BTR-60 APC 8x8 wheeled chassis.
- **Strela-10M4:** a proposed Russian upgrade of the -10M, -10M2 and -10M3 systems.
- **Strela-10T:** a proposed Belarusian upgrade.
- **Luchnik-E:** a proposed Russian upgrade. It has 8 ready to use Igla short-range surface-to-air missiles.

System

Alternative Designation: 9K35 Strela-10, SA-13 "Gopher, 9K35
Type: Short-Range Surface-to-Air Missile (SAM) System
Manufacturer: Saratovskiy Zenit Machine Plant (Muromteplovoz Joint Stock Company for the 9K35M3-K)

In Service: 1976-Present

Family: Strela

Crew: ea3

Chassis: MT-LB multi-purpose armored vehicle.

Displacement Time: INA

Emplacement Time: INA

Note: Reload missiles are carried by escorting Ural-4320 6x6 truck, fitted with a crane.

Dimensions

Length: m6.45

Width: m2.85

Height: m2.22

Height in Combat Configuration: m3.96

Weight, Combat: tons12.1

Automotive

Engine Name: YaMZ-238V

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: INA

Speed Maximum Swim: INA

Gradient: deg60

Side Step: deg30

Vertical Step: m0.6

Trench: m2.4

Fording Depth: m1.2 m / Amphibious

Missile System

↳*Missile Launcher*

Name: INA

Type: INA

Basic Load: ea8

Note #1: Missiles are visually aimed.

Note #2: Four missiles are mounted on the turret in boxes, ready to launch, and eight more are carried inside the vehicle as reloads. Reloading takes around 3 minutes.

↳***Missile***

Name: 9M37
Type: Short-Range Surface-to-Air Missile (SAM) System
Length: m2.19
Wingspan: mm360
Diameter: m0.12
Weight: kg40
Warhead Type: HE-FRAG
Warhead Weight: kg3
Maximum Range of Fire: m5,000
Minimum Range of Fire: m800
Maximum Altitude: m3,500
Minimum Altitude: m25
Detonation Mechanism: contact and laser proximity fuzes
Propellant: Single-stage solid propellant rocket motor
Speed: m/s550
Guidance System: dual-mode passive 'photocontrast'/IR seeker
Note:

Coaxial Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: 7.62mm
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: +1 Million
Max Rate of Fire: 650 rds/min
Effective Rate of Fire: 250-300 rds/min
Length, Overall: mm1,203
Length, Barrel: mm605
Weight (Gun Only): 9 kg
Weight (Tripod Only): 7.7 kg
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: 7.62 mm

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: 90 mm

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Electro-Optical Guidance: Yes

Guidance: Dual-guidance mode -- optical "photo-contrast" and dual-band passive infrared (IR)

↳*Radar #1 (Separate Vehicle)*

Name: MT-LBU "DOG EAR"

Type: Acquisition Radar

Band: F/G-band

Maximum Range: km80

Note: Target acquisition requires a separate vehicle mounting a Dog Ear** forward alerting radar.

↳*Radar #2 (On Missile Vehicle)*

Name: 9S86 "SNAP SHOT"

Type: Rangefinding

Maximum Range: m10,000

Minimum Range: m450

Note: located between the two pairs of missile canisters on the transporter erector launcher and radar (TELAR)

↳*Radar #3 (On Missile Vehicle)*

Name: 9S16 (NATO "Flat Box-B")

Type: Radar warning

Traverse Range: deg360

Maximum Elevation: deg40

Minimum Elevation: INA

Protection

Hull Armor: Protection from small arms fire and projectile fragments.

Turret Armor: Protection from small arms fire and projectile fragments.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The 9K35 Strela 10 / SA-13 Gopher was developed as a replacement for the 9K31 Strela 1 / SA-9 Gaskin, and was intended to provide a system with better mobility and a longer ranging and more lethal missile design. Development was initiated in 1969, in parallel with the 2K22 Tunguska / SA-19 Grison, the intent being to provide a complementary system with a btter capability in heavily jammed environments, where the radar directed SPAAG might be at a disadvantage. Design requirements included the ability to engage closing targets with speeds of up to 415 m/s and receding targets at 310 m/s, at altitudes between 25 m and 3,500 m, at ranges between 800 and 5,000 m. A single shot Pk between 0.5 and 0.6 for targets with load factors between 3 and 5G was envisaged. The system was to be relatively autonomous capable of providing point defence for maneuver formations. The system was to be air transportable by An-12 Cub and Mi-6 helicopter, and able to cross bodies of water. The Nudelman bureau was tasked with missile design and Geofizika tasked with developing the seeker. IOC was achived in 1976 with Red Army air defence units. The baseline 9M37 Strela-10SV variant fitted with a 9E47 Virazh two colour infrared/visible band seeker deployed on the 9K35 TELAR from 1976. Development of the improved 9K37M Strela-10M with a 9E47M seeker, deployed on the 9A35M TELAR, started in 1977, with IOC in 1979. The third missile variant, the further improved 9K37M2 Strela-10M2 deployed on the 9K35M2 TELAR from 1981. The last Cold War variant was the Strela-10M3 deployed on the 9K35M3 TELAR from 1989, this variant using the 9M333 missile which was supplied with a 9E425 three channel seeker, the first infrared, the second using a visible band television contrast lock design, and the third a passive homing channel intended to home on the emissions from jamming equipment. The 9M333 included a new autopilot and IR background rejection processing, as well as a laser proximity fuse with eight rather than four lobes for engaging small targets,and a larger and more lethal warhead. The 9K35M3 included an improved 9Sh127 optical sighting system for the gunner with WFOV and NFOV modes. The 9K35 / SA-13 Gopher system employs a coherent pulse Doppler millimetric band 9S86 Snap Shot range and radial velocity finding radar. Two TELARs were developed on the MT-LB tracked chassis, these being the 9A35 TELAR equipped with the 9S16 Flat Box-B radio-frequency passive detection system, and the 9A34 without it. The Flat Box antenna suite comprised multiple antennas on the top of the MT-LB hull and an additional antenna package on the electrically powered TELAR turret. Typically one 9A35 was deployed with three 9A34 TELARs. All TELARs carry four ready rounds and four stowed reloads. The Gryuza variant employs the 9A34A TELAR which is equipped with an Azovsky L-136 MAK-F infrared search and track (IRST) system, intended to cue to gunner to targets. the system is claimed to be capable of passively acquiring an F-15 class target at 10 to 15 km range day or night. This system is detailed under 9K35A Gyurza / SA-13 Gopher SAM System Upgrade. A typical battery deploys with three 9A34 series TELARS, one 9A35 series TELAR, and a single PPRU-1/1M command post, although early variants often used the PU-12M series command post. Typically the PPRU-1 or -1M is equipped with the X-band 9S80/9S80M/M1 Ovod / Dog Ear battery acquisition radar. A digital variant of the this command post, the PPRU-1M-2, has been recently displayed, equipped with an entirely new planar array solid state digital 9S80M1-2 radar.

T38 Stilet Belarusian Short-Range Air Defense System







Tiers:

1 2 3 4

Variants:

- **Note:** There was a variant of the T38 Stilet air defense system co-developed with Ukrainian Luch design bureau. This missile would use a new Belarusian missile, developed by the Tetraedr. However in 2014 this development was suspended due to ongoing military conflict in Ukraine.

System

Alternative Designation: T38 Stilet

Type: Short-Range Air Defense System

Crew: ea4

Chassis: The T38 uses new MZKT-6922 chassis

Displacement Time: minutes5

Emplacement Time: minutes5

Fire on the Move: INA

Note: Battery of the T38 Stilet comprises of TELAR vehicles, and is supported by 6 KamAZ trucks, that are used as a basis for mobile command center, reloading vehicle, maintenance vehicle and other support vehicles.

Dimensions

Length: m9

Width: m3.3

Height: m5.1

Weight, Combat: 30 tons

Automotive

Engine Name: YaMZ-7513.10-04

Engine Type: Diesel

Engine Power: hp420

Operational Range: km840

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: m0.58

Trench: m0.6

Fording Depth: INA

Missile System

Name: T381 launcher vehicle

Launcher: The Stileto TELAR vehicle carries 8 missiles arranged in 2 launcher pods with 4 missiles each.

Missile Types: It can fire 9M33M2 and 9M33M3 missiles used by the Osa.

Max Elevation: INA

Min Elevation: INA

Traverse Range: INA

Traverse Left: INA

Traverse Right: INA

Max Rate of Fire: INA

Note: The T38 STILET air defence missile system uses the T383 Transportation and Loading Vehicle (TLV) for loading and unloading missiles to/from containers. It also provides transportation for missiles and temporary storage.

↳*Missile*

Name: 9M33M3 Missile

Type: Surface-to-Air Missile

Length: 3158 mm

Diameter: 209.6 mm

Weight: 170 kg

Warhead: Frag-HE

Warhead Weight: 16 Kg

Detonation Mechanism: Contact and proximity

Propellant: Solid propellant rocket motor

Operational Range: km12.5 - 20

Flight Altitude: 12,000 metres

Boost Time: 2 s boost, then 15 s sustain

Speed: 1020 m/s

Guidance System: Command to Line-Of-Sight (CLOS)

Steering System: dual-thrust rocket motor.

Accuracy: 5 m

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: Yes

Indirect Fire: Yes

Fire Control Sensors: INA

Probability of Kill: 90%

Note: he system is also capable of detecting targets with minimal radar cross section of 0.03m² and has an emplacement / displacement time of five minutes.

↳*Radar*

Note: The combat vehicle is further fitted with target acquisition radar, target tracking radar, two-channel missile sighting radar and two-channel command-transmit radar.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The T38 STILET is a short-range air defence missile system (ADMS) designed and built by Tetraedr to provide enhanced combat and performance capabilities to air defence units. The system, which is a modernised version of OSA-1T ADMS, can be deployed to strike all types of aerial platforms moving at low and medium altitudes. It is integrated with radars to acquire and identify targets while on the move and at halt. Up to two missiles are used by the ADMS to engage a target from short halt or from stationary position. It can be lifted by an IL-76-class cargo aircraft and transported by rail. The development of T38 STILET missile system began in 2008. It was later exhibited at the IDEX 2011 (International Defence Exhibition and Conference) in Abu

Dhabi as well as at the MILEX 2014 (Exhibition of Armaments and Military Equipment) in Republic of Belarus. The T38 STILET air defence missile system first performed five live firings at the 174 training test range of the Air Force and Air Defense of the Republic of Belarus in October 2010. It did this using the 9M33M3 missiles. During the tests, the weapons successfully destroyed high-velocity, small-sized IVTs-M1 aerial target simulators. A year later, in October 2011, the ADMS successfully engaged two small-sized high-velocity IVTs-M1 aerial target simulators and three angle reflectors. Tetraedr demonstrated combat mission readiness of the T38 STILET missile system with the 9M33M2(3) surface-to-air missiles during integration tactical military exercise conducted by the Ministry of Defence of the Republic of Belarus in February 2014. SHARE TYPE Short-range air defence missile system MANUFACTURER Tetraedr CREW Four NUMBER OF MISSILES CARRIED EightExpand T38 Stilet ADMS The T38 STILET is a short-range air defence missile system (ADMS) designed and built by Tetraedr to provide enhanced combat and performance capabilities to air defence units. The system, which is a modernised version of OSA-1T ADMS, can be deployed to strike all types of aerial platforms moving at low and medium altitudes. It is integrated with radars to acquire and identify targets while on the move and at halt. Up to two missiles are used by the ADMS to engage a target from short halt or from stationary position. It can be lifted by an IL-76-class cargo aircraft and transported by rail. The development of T38 STILET missile system began in 2008. It was later exhibited at the IDEX 2011 (International Defence Exhibition and Conference) in Abu Dhabi as well as at the MILEX 2014 (Exhibition of Armaments and Military Equipment) in Republic of Belarus. Test firings of T38 STILET ADMS S-125-2TM / Pechora-2TM Medium Range Air Defence Missile System S-125-2TM is an upgraded version of S-125 / Pechora air defence missile system (ADMS). The T38 STILET air defence missile system first performed five live firings at the 174 training test range of the Air Force and Air Defense of the Republic of Belarus in October 2010. It did this using the 9M33M3 missiles. During the tests, the weapons successfully destroyed high-velocity, small-sized IVTs-M1 aerial target simulators. A year later, in October 2011, the ADMS successfully engaged two small-sized high-velocity IVTs-M1 aerial target simulators and three angle reflectors. Tetraedr demonstrated combat mission readiness of the T38 STILET missile system with the 9M33M2(3) surface-to-air missiles during integration tactical military exercise conducted by the Ministry of Defence of the Republic of Belarus in February 2014. T38 missile system mounted on T381 CV The T38 STILET missile system is mounted on the T381 Combat Vehicle (CV), which is operated by a crew of four. The highly-mobile vehicle features MZKT-69222T self-propelled wheeled chassis driven by a powerful diesel engine. An electro-optical system is fitted on the vehicle, as is navigation and communication systems, map-positioning, air conditioning and a heating system. It also comes with an automatic launch system and launch device, electric power supply system and functional check and combat crew training equipment. A digital master computer and crew commander’s automated workstation can also be found on-board the CV. The combat vehicle is further fitted with target acquisition radar, target tracking radar, two-channel missile sighting radar and two-channel command-transmit radar. The T38 STILET air defence missile system can carry up to eight T382 surface-to-air guided missiles in the Transportation-and-Launch Container (TLC). The two-stage, bi-calibre and solid-propellant missile features a power unit consisting of a booster and a sustainer. A radio fuse installed in the missile ensures effective destruction of the target by actuating a non-contact explosion of the warhead. Targets flying at a maximum speed of 900m/s, at altitudes varying between 25m and 10km, can be destroyed by the missile system. It can also detect targets within a range of 40km, whilst the maximum slant range of target destruction is 20km. A maximum cross range of 10km can be achieved by the ADMS. The probability of killing the target with one missile is 90%. The system is also capable of detecting targets with minimal radar cross section of 0.03m² and has an emplacement / displacement time of five minutes. The T38 STILET air defence missile system uses the T383 Transportation and Loading Vehicle (TLV) for loading and unloading missiles to/from containers. It also provides transportation for missiles and temporary storage. The T385 maintenance vehicle is utililised to carry out maintenance of the combat vehicle. Other technical support assets of the missile system include T384 alignment vehicle, T386 automated mobile check-up and testing station along with the T387 Ground Equipment Kit (GEK).

→→Medium-Range Missile Systems (More than 31 km)

S-75 Dvina (SA-2 Guideline) (Export) North Korean Strategic Surface-to-Air Missile System




Tiers:



Variants:

- **SA-2A (Guideline Mod 0):** This was the initial variant of the SA-2, which was deployed around Moscow, Leningrad and in the Baku region. It was guided by the Fan Song A radar system. It was probably a pre-production version.
- **SA-2B (Guideline Mod 1):** This improved version replaced the Mod 0. It is slightly longer than the Guideline Mod 0 and is guided by the Fan Song B radar system.
- **SA-2C (Guideline Mod 2):** Developed at the same time as the Guideline-B, this variant is equipped with a modified Fan Song C/D G-band engagement radar. The missile itself has a longer engagement range and can attack targets that are at lower altitudes than earlier versions of the SA-2.
- **SA-2D (Guideline Mod 3):** This short-lived variant fired V-750AK missiles and operated with the Fan Song E radar. It was more capable of defeating targets in hostile electronic warfare environments. It was eventually superseded in Soviet service by the Guideline Mod 4.
- **SA-2E (Guideline Mod 4):** This variant, also known as the S-75M Volga, used the V-755 missile, which was characterized by a swelled warhead section that could be fitted with a 25 kT nuclear warhead. It was guided by the Fan Song F radar.
- **SA-2F (Guideline Mod 5):** This variant, also designated the S-75M3 Volkhov, was developed with some technology derived from the SA-3 Goa ** (see separate record). It utilizes the improved Fan Song E radar, which is much more capable of hitting targets in a heavy ECM environment. This is accomplished by deploying a two-man t eam in a "dog house" on top of the radar. These two crewmembers track targets when the normal automatic tracking system has been jammed.
- **S-75 Volga 2A:** This version was developed in 1995. Twelve digital assemblies replaced 78 analog assemblies. It fired an upgraded V-755 missile and used a modernized Fan Song F radar. It was primarily intended for export.
- **S-75 Volga 2T:** Belarusian firm Tetraedr in 2004 began offering the S-75 Volga 2T upgrade kit. This included digital electronics and enhanced radars, launch control and missiles.
- **SA-N-2:** This is the naval version of the SA-2. The mount included a twin-arm launcher fed by a large drum magazine. A navalized version of the Fan Song E radar was equipped, along with a High Lune** height finding radar.
- **Iraqi modified SA-2 Guideline:** Iraq announced in 1989 that it had modified a number of SA-2s with an infrared terminal guidance system that improved the missile's capability against targets in high ECM environments. If the missile lost lock at this stage, the weapon could switch back to radio guidance. Iraq also attempted other modifications
- **CSS-8:** his is a short-range ballistic missile based on the SA-2.
- **Sayyad-1:** This is an Iranian reverse-engineered version of the SA-2. It is believed to have entered service in 1998. The design is also influenced by the Chinese HQ-2 and may feature some North Korean technology.
- **Sayyad-2:** This is an Iranian upgrade of the Sayyad-1, based on both the SA-2 and the Chinese HQ-2.
- **RM-75MVU-1/VU-1 target missiles:** his is a low-altitude (RM-75MVU-1) and high-altitude (RM-75VU-1) target missile based on the SA-2 was announced by Russia in mid-2004. The target missiles were to be used to test new surface-to-air missile systems being designed by the Almaz research and production association.
- **Qaher-1/-M2:** These variants based on the S-75/SA-2 have been used by Houthi rebels in Yemen. The Qaher-1 was revealed in 2015 with a range of 186.4 mi (300 km) and warhead weighing 440.9 lb (200 kg).

System

Alternative Designation: Volga-75SM, S-75 Dvina, V-75 Volkhov

Function: The SA-2 Guideline is a long-range, high-altitude, surface-to-air missile (SAM) in widespread use in Russia and other countries.

In Service: 1957-Present

Manufacturer: Raspletin KB-1 (head developer), Grushin MKB Fakel (missile developer), Lavochkin OKB

Crew: INA

Wars: Vietnam War, Six-Day War, Indo-Pakistani War of 1965, Indo-Pakistani War of 1971, Yom Kippur War, Cold War, Iran–Iraq War, Gulf War, War in Abkhazia (1992–93), First Libyan Civil War, Syrian Civil War, Yemeni Civil War (2015–present), Saudi Arabian-led intervention in Yemen, Saudi–Yemeni border conflict (2015–present)

Guidance System: Radio command guidance from Fan Song A/B; or E/F-band missile control radar; or Fan Song D/E G-band missile control radar Many installations have Spoon Rest early warning radar.

Note: Each battalion will typically have six, semi-fixed, single-rail launchers for their V-750 missiles positioned approximately 60 to 100 m (200 to 330 ft) apart from each other in a hexagonal "flower" pattern, with radars and guidance systems placed in the center. It was this unique "flower" shape that led to the sites being easily recognizable in reconnaissance photos. Typically another six missiles are stored on tractor-trailers near the center of the site.

Dimensions

Booster Diameter: m0.70

Second Stage Diameter: m0.50

Length: m10.47

Wingspan: m2.50

Total Weight: INA

Automotive

Primary Propulsion Type: solid-fuel booster

Primary Propulsion Duration: 4-5 sec

Secondary Propulsion Type: liquid-fuel (nitric acid/hydrocarbon) sustainer

Secondardy Propulsion Duration: 22 sec

Note: The missiles themselves are carried by a special transloader semi-trailer, which is towed by a Zil truck.

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail Guided

Launcher Weight: kg2,165

Launch Rail/Tubes: Single rail, ground mounted (not mobile)

Reload Time: min12

Note: S-75 Dvina and equipped with either V-750 or V-750V missiles.

↳***Missile***

Name: Either the V-750 or V-750V missiles.

Type: Standard

Missile Length: m10.60

Missile Diameter: m0.70

Weight at Launch: kg2,300

Warhead Weight: kg190

Warhead Type: HE 200kg (295kg SA-2E) 188kg (HQ-2B/F/J/P), possible nuclear

Guidance System: Command

Maximum Velocity (Mach): Mach 4

Bursting Radius Low Altitude: m125-135

Bursting Radius High Altitude: m250

Kill Radius: m65

CEP: m76

Maximum Effective Range: km30

Minimum Effective Range: km7

Maximum Altitude: m22,000

Minimum Altitude: m3,000

Fire Control System

↳***Radar #1***

Name: Spoon Rest

Type: Spoon Rest is a Russian ground-based, early warning radar that later evolved into the Knife Rest** series.

Band: A

Frequency: 147-161 MHz

Pulse Width: 4-6 microseconds

Maximum Range: km275

Vertical Beamwidth: deg2.5

Horizontal Beamwidth: deg7-9

Peak Power: 180-350 kW

Pulse Repetition Frequency (PRF): 310-400 Hz

↳***Radar #2***

Name: P-15 Flat Face

Type: 2D UHF radar developed and operated by the former Soviet Union

Band: L-Band

Frequency: 810-950 MHz

Peak Power: kW400

Maximum Range: km250

↳*Radar #3*

Name: PRV-11 Side Net

Type: Side Net is a ground-based height-finding radar used in a ground control intercept (GCI) mode with early-warning radars Bar Lock , Back Net and Tall King

Band: E Band

Frequency: 2,560-2,710 MHz

Antenna Height: m8.50

Antenna Width: m3.50

Average Range: km180

Maximum Range: km400

NOD CYCLES/SEC: 5-30

Pulse Width: 3/1.5 micro sec

Average Power: 1.3 kW

Peak Power: 1.2 MW

↳*Radar #4*

Name: Fan Song A/B/F

Type: Fire control & Tracking Radar

Band: E/F, G Band

Frequency: 3 GHz (S-band)

Peak Power: 600 kW

Maximum Range: km60

Notes:

The S-75 (Russian: C-75; NATO reporting name SA-2 Guideline) is a Soviet-designed, high-altitude air defence system, built around a surface-to-air missile with command guidance. Following its first deployment in 1957 it became one of the most widely deployed air defence systems in history. It scored the first destruction of an enemy aircraft by a surface-to-air missile, with the shooting down of a Taiwanese Martin RB-57D Canberra over China on 7 October 1959 that was hit by a salvo of three V-750 (1D) missiles at an altitude of 20 km (65,600 ft). This success was credited to Chinese fighter aircraft at the time in order to keep the S-75 program secret. This system first gained international fame when an S-75 battery, using the newer, longer-range and higher-altitude V-750VN (13D) missile was deployed in the 1960 U-2 incident, when it shot down the U-2 of Francis Gary Powers overflying the Soviet Union on May 1, 1960. The system was also deployed in Cuba during the Cuban Missile Crisis, when it shot down another U-2 (piloted by Rudolf Anderson) overflying Cuba on October 27, 1962, almost precipitating a nuclear war. North Vietnamese forces used the S-75 extensively during the Vietnam War to successfully defend Hanoi and Haiphong against US bombing. It has also been locally produced in the People's Republic of China under the names HQ-1 and HQ-2. Each battalion will typically have six, semi-fixed, single-rail launchers for their V-750 missiles positioned approximately 60 to 100 m (200 to 330 ft) apart from each other in a hexagonal "flower" pattern, with radars and guidance systems placed in

the center. It was this unique "flower" shape that led to the sites being easily recognizable in reconnaissance photos. Typically another six missiles are stored on tractor-trailers near the center of the site. The V-750 is a two-stage missile consisting of a solid-fuel booster and a storable liquid-fuel upper stage, which burns red fuming nitric acid as the oxidizer and kerosene as the fuel. The booster fires for about 4–5 seconds and the main engine for about 22 seconds, by which time the missile is traveling at about Mach 3. The booster mounts four large, cropped-delta wing fins that have small control surfaces in their trailing edges to control roll. The upper stage has smaller cropped-deltas near the middle of the airframe, with a smaller set of control surfaces at the extreme rear and (in most models) much smaller fins on the nose. The missiles are guided using radio control signals (sent on one of three channels) from the guidance computers at the site. The earlier S-75 models received their commands via two sets of four small antennas in front of the forward fins while the D model and later models used four much larger strip antennas running between the forward and middle fins. The guidance system at an S-75 site can handle only one target at a time, but it can direct three missiles against it. Additional missiles could be fired against the same target after one or more missiles of the first salvo had completed their run, freeing the radio channel. The missile typically mounts a 195 kg (430 lb) fragmentation warhead, with proximity, contact, and command fusing. The warhead has a lethal radius of about 65 m (213 ft) at lower altitudes, but at higher altitudes the thinner atmosphere allows for a wider radius of up to 250 m (820 ft). The missile itself is accurate to about 75 m (246 ft), which explains why two were typically fired in a salvo. One version, the SA-2E, mounted a 295 kg (650 lb) nuclear warhead of an estimated 15 kiloton yield or a conventional warhead of similar weight. Typical range for the missile is about 45 km (28 mi), with a maximum altitude around 20,000 m (66,000 ft). The radar and guidance system imposed a fairly long short-range cutoff of about 500 to 1,000 m (1,600 to 3,300 ft), making them fairly safe for engagements at low level.

S-75 Dvina (SA-2 Guideline) Russian Strategic Surface-to-Air Missile System







Tiers:



Variants:

- **SA-2A (Guideline Mod 0):** This was the initial variant of the SA-2, which was deployed around Moscow, Leningrad and in the Baku region. It was guided by the Fan Song A radar system. It was probably a pre-production version.
- **SA-2B (Guideline Mod 1):** This improved version replaced the Mod 0. It is slightly longer than the Guideline Mod 0 and is guided by the Fan Song B radar system.
- **SA-2C (Guideline Mod 2):** Developed at the same time as the Guideline-B, this variant is equipped with a modified Fan Song C/D G-band engagement radar. The missile itself has a longer engagement range and can attack targets that are at lower altitudes than earlier versions of the SA-2.
- **SA-2D (Guideline Mod 3):** This short-lived variant fired V-750AK missiles and operated with the Fan Song E radar. It was more capable of defeating targets in hostile electronic warfare environments. It was eventually superseded in Soviet service by the Guideline Mod 4.
- **SA-2E (Guideline Mod 4):** This variant, also known as the S-75M Volga, used the V-755 missile, which was characterized by a swelled warhead section that could be fitted with a 25 kT nuclear warhead. It was guided by the Fan Song F radar.
- **SA-2F (Guideline Mod 5):** This variant, also designated the S-75M3 Volkhov, was developed with some technology derived from the SA-3 Goa ** (see separate record). It utilizes the improved Fan Song E radar, which is much more capable of hitting targets in a heavy ECM environment. This is accomplished by deploying a two-man t eam in a "dog house" on top of the radar. These two crewmembers track targets when the normal automatic tracking system has been jammed.
- **S-75 Volga 2A:** This version was developed in 1995. Twelve digital assemblies replaced 78 analog assemblies. It fired an upgraded V-755 missile and used a modernized Fan Song F radar. It was primarily intended for export.
- **S-75 Volga 2T:** Belarusian firm Tetraedr in 2004 began offering the S-75 Volga 2T upgrade kit. This included digital electronics and enhanced radars, launch control and missiles.
- **SA-N-2:** This is the naval version of the SA-2. The mount included a twin-arm launcher fed by a large drum magazine. A navalized version of the Fan Song E radar was equipped, along with a High Lune** height finding radar.
- **Iraqi modified SA-2 Guideline:** Iraq announced in 1989 that it had modified a number of SA-2s with an infrared terminal guidance system that improved the missile's capability against targets in high ECM environments. If the missile lost lock at this stage, the weapon could switch back to radio guidance. Iraq also attempted other modifications
- **CSS-8:** his is a short-range ballistic missile based on the SA-2.
- **Sayyad-1:** This is an Iranian reverse-engineered version of the SA-2. It is believed to have entered service in 1998. The design is also influenced by the Chinese HQ-2 and may feature some North Korean technology.
- **Sayyad-2:** This is an Iranian upgrade of the Sayyad-1, based on both the SA-2 and the Chinese HQ-2.
- **RM-75MVU-1/VU-1 target missiles:** his is a low-altitude (RM-75MVU-1) and high-altitude (RM-75VU-1) target missile based on the SA-2 was announced by Russia in mid-2004. The target missiles were to be used to test new surface-to-air

missile systems being designed by the Almaz research and production association.
- **Qaher-1/-M2:** These variants based on the S-75/SA-2 have been used by Houthi rebels in Yemen. The Qaher-1 was revealed in 2015 with a range of 186.4 mi (300 km) and warhead weighing 440.9 lb (200 kg).

System

Alternative Designation: Volga-75SM, S-75 Dvina, V-75 Volkhov

Function: The SA-2 Guideline is a long-range, high-altitude, surface-to-air missile (SAM) in widespread use in Russia and other countries.

In Service: 1957-Present

Manufacturer: Raspletin KB-1 (head developer), Grushin MKB Fakel (missile developer), Lavochkin OKB

Crew: INA

Wars: Vietnam War, Six-Day War, Indo-Pakistani War of 1965, Indo-Pakistani War of 1971, Yom Kippur War, Cold War, Iran–Iraq War, Gulf War, War in Abkhazia (1992–93), First Libyan Civil War, Syrian Civil War, Yemeni Civil War (2015–present), Saudi Arabian-led intervention in Yemen, Saudi–Yemeni border conflict (2015–present)

Guidance System: Radio command guidance from Fan Song A/B; or E/F-band missile control radar; or Fan Song D/E G-band missile control radar Many installations have Spoon Rest early warning radar.

Note: Each battalion will typically have six, semi-fixed, single-rail launchers for their V-750 missiles positioned approximately 60 to 100 m (200 to 330 ft) apart from each other in a hexagonal "flower" pattern, with radars and guidance systems placed in the center. It was this unique "flower" shape that led to the sites being easily recognizable in reconnaissance photos. Typically another six missiles are stored on tractor-trailers near the center of the site.

Dimensions

Booster Diameter: m0.70

Second Stage Diameter: m0.50

Length: m10.47

Wingspan: m2.50

Total Weight: INA

Automotive

Primary Propulsion Type: solid-fuel booster

Primary Propulsion Duration: 4-5 sec

Secondary Propulsion Type: liquid-fuel (nitric acid/hydrocarbon) sustainer

Secondardy Propulsion Duration: 22 sec

Note: The missiles themselves are carried by a special transloader semi-trailer, which is towed by a Zil truck.

Communications

Primary: INA

Secondary: INA

Missile System

↳*Missile Launcher*

Name: INA

Type: Rail Guided

Launcher Weight: kg2,165

Launch Rail/Tubes: Single rail, ground mounted (not mobile)

Reload Time: min12

Note: S-75 Dvina and equipped with either V-750 or V-750V missiles.

↳***Missile***

Name: Either the V-750 or V-750V missiles.

Type: Standard

Missile Length: m10.60

Missile Diameter: m0.70

Weight at Launch: kg2,300

Warhead Weight: kg190

Warhead Type: HE 200kg (295kg SA-2E) 188kg (HQ-2B/F/J/P), possible nuclear

Guidance System: Command

Maximum Velocity (Mach): Mach 4

Bursting Radius Low Altitude: m125-135

Bursting Radius High Altitude: m250

Kill Radius: m65

CEP: m76

Maximum Effective Range: km30

Minimum Effective Range: km7

Maximum Altitude: m22,000

Minimum Altitude: m3,000

Fire Control System

↳***Radar #1***

Name: Spoon Rest

Type: Spoon Rest is a Russian ground-based, early warning radar that later evolved into the Knife Rest** series.

Band: A

Frequency: 147-161 MHz

Pulse Width: 4-6 microseconds

Maximum Range: km275

Vertical Beamwidth: deg2.5

Horizontal Beamwidth: deg7-9

Peak Power: 180-350 kW

Pulse Repetition Frequency (PRF): 310-400 Hz

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Name: P-15 Flat Face

Type: 2D UHF radar developed and operated by the former Soviet Union

Band: L-Band

Frequency: 810-950 MHz

Peak Power: kW400

Maximum Range: km250

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Type: Side Net is a ground-based height-finding radar used in a ground control intercept (GCI) mode with early-warning radars Bar Lock , Back Net and Tall King

Band: E Band

Frequency: 2,560-2,710 MHz

Antenna Height: m8.50

Antenna Width: m3.50

Average Range: km180

Maximum Range: km400

NOD CYCLES/SEC: 5-30

Pulse Width: 3/1.5 micro sec

Average Power: 1.3 kW

Peak Power: 1.2 MW

↳*Radar #4*

Name: Fan Song A/B/F

Type: Fire control & Tracking Radar

Band: E/F, G Band

Frequency: 3 GHz (S-band)

Peak Power: 600 kW

Maximum Range: km60

Notes:

The S-75 (Russian: C-75; NATO reporting name SA-2 Guideline) is a Soviet-designed, high-altitude air defence system, built around a surface-to-air missile with command guidance. Following its first deployment in 1957 it became one of the most widely deployed air defence systems in history. It scored the first destruction of an enemy aircraft by a surface-to-air missile, with the shooting down of a Taiwanese Martin RB-57D Canberra over China on 7 October 1959 that was hit by a salvo of three V-750 (1D) missiles at an altitude of 20 km (65,600 ft). This success was credited to Chinese fighter aircraft at the time in order to keep the S-75 program secret. This system first gained international fame when an S-75 battery, using the newer, longer-range and higher-altitude V-750VN (13D) missile was deployed in the 1960 U-2 incident, when it shot down the U-2 of Francis

Gary Powers overflying the Soviet Union on May 1, 1960. The system was also deployed in Cuba during the Cuban Missile Crisis, when it shot down another U-2 (piloted by Rudolf Anderson) overflying Cuba on October 27, 1962, almost precipitating a nuclear war. North Vietnamese forces used the S-75 extensively during the Vietnam War to successfully defend Hanoi and Haiphong against US bombing. It has also been locally produced in the People's Republic of China under the names HQ-1 and HQ-2. Each battalion will typically have six, semi-fixed, single-rail launchers for their V-750 missiles positioned approximately 60 to 100 m (200 to 330 ft) apart from each other in a hexagonal "flower" pattern, with radars and guidance systems placed in the center. It was this unique "flower" shape that led to the sites being easily recognizable in reconnaissance photos. Typically another six missiles are stored on tractor-trailers near the center of the site. The V-750 is a two-stage missile consisting of a solid-fuel booster and a storable liquid-fuel upper stage, which burns red fuming nitric acid as the oxidizer and kerosene as the fuel. The booster fires for about 4–5 seconds and the main engine for about 22 seconds, by which time the missile is traveling at about Mach 3. The booster mounts four large, cropped-delta wing fins that have small control surfaces in their trailing edges to control roll. The upper stage has smaller cropped-deltas near the middle of the airframe, with a smaller set of control surfaces at the extreme rear and (in most models) much smaller fins on the nose. The missiles are guided using radio control signals (sent on one of three channels) from the guidance computers at the site. The earlier S-75 models received their commands via two sets of four small antennas in front of the forward fins while the D model and later models used four much larger strip antennas running between the forward and middle fins. The guidance system at an S-75 site can handle only one target at a time, but it can direct three missiles against it. Additional missiles could be fired against the same target after one or more missiles of the first salvo had completed their run, freeing the radio channel. The missile typically mounts a 195 kg (430 lb) fragmentation warhead, with proximity, contact, and command fusing. The warhead has a lethal radius of about 65 m (213 ft) at lower altitudes, but at higher altitudes the thinner atmosphere allows for a wider radius of up to 250 m (820 ft). The missile itself is accurate to about 75 m (246 ft), which explains why two were typically fired in a salvo. One version, the SA-2E, mounted a 295 kg (650 lb) nuclear warhead of an estimated 15 kiloton yield or a conventional warhead of similar weight. Typical range for the missile is about 45 km (28 mi), with a maximum altitude around 20,000 m (66,000 ft). The radar and guidance system imposed a fairly long short-range cutoff of about 500 to 1,000 m (1,600 to 3,300 ft), making them fairly safe for engagements at low level.

→Hybrid Missile Systems

K30 Biho (Flying Tiger) South Korean 30mm Self-Propelled Anti-Aircraft Gun



Tiers:



System

Alternative Designation: K30 Biho; Flying Tiger
Type: 30mm Self-Propelled Anti-Aircraft Gun
Crew: 4 (commander, gunner, loader, driver)
Chassis: INA
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: 6.95 m
Width: 3.20 m
Height, Hull: 1.89 m
Height, Radar Up: 4.50 m
Ground Clearance: 410 mm
Weight, Combat: 25,000 kg

Automotive

Engine Name: 1 x Doosan Infracore D2848T
Engine Type: Diesel
Engine Power: hp350
Transmision: General Dynamics Land Systems HMPT-500-3EK
Suspension: torsion bar
Range: km500
Speed, Maximum Road: km/h60
Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Fording Depth: 1.2 m

Main Weapon System

↳*System*

Name: 2 x 30-mm Oerlikon Contraves KCB-B

Type: Anti-Aircraft Guns

Caliber: 30mm

Barrel Length: INA

Weight: INA

Elevation: 85 degrees to -10 degrees

Traverse: 360 degrees

Muzzle Velocity: 1,080 mps

Rate of Fire: 600 rds/min per cannon

Maximum Range: 3,000 m

Maximum Altitude: 3,500 m

Turret Drive: 90 deg per second

Reaction Time: 6 to 13 seconds

↳*Ammunition*

Type: Rifle

Caliber: mm30

Cartridge: INA

Basic Load: 600

Ready Rounds: 250 per gun

Missile Weapon System

↳*System*

Name: Chiron Missile

Type: Surface-to-Air Missile

Basic Load: 4 x Chiron Missiles

Length: 1.68m

Diameter: 80 mm

Weight: 24.3 kg

Engine: Solid fuel rocket

Guidance System: Infrared homing

Warhead Type: INA

Warhead Weight: 2.5 kg

Maximum Firing Range: 7 km

Effective Firing Range: 7 km

Fire Control

Name: INA

Computerized FCS: Yes

Optics: Sagem periscopic sight Raytheon EOTS

Main Gun Stabilization: Yes

IFF: Yes, 1, 2, 3/A, 4

Radar System

Name: LG TPS-830K

Type: Search Radar

Frequency: X Band

Effective Range: 30 km

Detection Range: 17 km

Protection

Hull Armor: Armor of the K30 Biho provides protection against small arms fire and artillery shell splinters.

Turret Armor: Armor of the K30 Biho provides protection against small arms fire and artillery shell splinters.

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 10 x smoke grenade launchers

Notes:

The South Korean K30 Biho (Flying Tiger) twin 30 mm self-propelled anti-aircraft weapon was developed to meet the operational requirements of the Republic of Korea Armed Forces for a highly mobile short range air defense system suited to the operational and terrain conditions of the Korean peninsula. It combines an electro-optically guided 30 mm gun system with a surveillance radar system on a K200 chassis. It supplements the K263A1 Chungung, a self-propelled 20 mm Vulcan system. The K30 is primarily built by Hanwha Defense. A K30 Biho system consists of twin 30 mm guns, a TPS-830K surveillance and fire-control radar, an electro-optical targeting system (EOTS), panoramic periscope, forward looking infrared system (FLIR), laser rangefinder (LRF), thermal sight, a TV camera, and a digital fire-control system. The combined targeting system of EOTS, FLIR, and LRF has a targeting range of over 10 km (6.2 mi). The TPS-830K radar can detect and track a 2 m2 (22 sq ft)-RCS

target from a range of 17 km (11 mi). The cannons have a cyclic rate of fire of 600 rpm and an effective anti-aircraft range of 3,000 m (1.9 mi), and each is loaded with 300 rounds of ammunition. In December 2013, DAPA announced that the Biho had been integrated with the Shingung surface-to-air missile to increase its coverage to 7 km. Two pods each containing two missiles are mounted, one of each side of the turret. Design integration with the missiles was completed in 2014, and by October 2015 the system was in full-rate production. The upgraded vehicle was in service by late 2018. The TPS-830K radar of K30 is an X-band (8 to 12.5 GHz) surveillance and fire-control pulse-Doppler radar, specialized for use against low-flying aircraft. Its features include real-time early warning, multiple target detection, an integral L-band (1 to 2 GHz) Identification Friend or Foe (IFF) subsystem, pulse compression, frequency agility, and adaptive moving target indication as an anti-chaff measure. It supplies ballistic computation data to the digital fire-control system to direct the aim of the electro-optical targeting system, which then aligns the 30 mm guns with the target for accurate fire. The radar can be installed on a separate vehicle (usually a 5-ton six-wheeled truck with a self-towed generator unit) to serve as an independent surveillance platform for other short range air defense systems. The secondary FLIR system and laser rangefinder supplements the TPS-830K radar to provide additional targeting means in case the radar is rendered inoperative, or is turned off to retain the element of surprise against aircraft that are equipped with radar warning receivers. The K30 adapts the chassis of the K200 infantry fighting vehicle, but has some differences. It has an extra roadwheel in its suspension and uses a D2840L engine instead of the D2848T engine of the K200, with an increase in engine power from 350 horsepower to 520 horsepower, necessary since the K30 weighs almost twice as much as the K200. Allison Transmission's X200-5K transmission is likewise replaced by S&T Dynamics' HMPT500-3EK/4EK to accommodate the more powerful engine. The modified chassis largely retains the protection and amphibious capability of the original chassis.

2S6 Tunguska Russian 30mm Self-Propelled Anti-Aircraft System






Tiers:

1 2 **3** 4

Variants:

- **2S6:** first version of the vehicle with four missiles, two either side of the turret.
- **2S6M:** the production version with eight missiles
- **2S6M1:** digital interface Ranzhir automated command-and-control system, new fire control system, new missile 9M311M with a maximum range of 10 km. Existing 2S6M Tunguska will be gradually upgraded to the new standard.

System

Alternative Designation: 2S6 Tunguska

Type: tracked self-propelled anti-aircraft weapon armed with a surface-to-air gun and missile system.

In Service: 1982-Present

Crew: ea4

Chassis: GM-352M tracked vehicle

Displacement Time: INA

Emplacement Time: INA

Note: Battery of Tunguskas includes six 2S6 combat vehicles, six reloading vehicles, and five various technical assistance vehicles, including repair and maintenance vehicles, mobile workshop and missile test vehicles. A battery of Tunguskas can automatically receive fire control information from Ranzhir mobile command center.

Dimensions

Length: m7.93

Width: m3.24

Height, TAR Up: m4.02

Height, TAR Down: m3.36

Weight, Combat: t34.8

Automotive

Engine Name: V-46

Engine Type: Diesel

Engine Power: hp780

Cruising Range: km580

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: 1 m

Trench: 1 m

Fording Depth: 1 m

Communications

Tactical Radio: R-173

Main Weapon System

↳*System*

Name: Shipunov 2A38M

Type: Soviet/Russian 30 mm autocannon

Caliber: mm30

Quantity: 4 x Shipunov 2A38M 30mm Autocannon

Length: m3.027

Barrel Length: mm2,416

Barrels: ea1

Weight: kg115

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min

Maximum Effective Firing Range: m4,000

Effective Firing Range: 2,000

Feed System: Twin Feed

Reload Time: gun ammunition and missiles in about 16 min

Maximum Elevation: deg+87

Minimum Elevation: deg-10

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Maximum Range: m4,000

Minimum Range: m200

Maximum Altitude: m3,000

Basic Load: INA

Ammo Types: AP-T, Frag-T, HE-I

Missile System

↳*System*

Name: 9M311 Missile

Type: Surface-to-Air Missile

Length: 2,560 mm

Weight: 57 kg

Warhead: Continuous-rod and steel cubes

Warhead Weight: 9 kg

Basic Load: 8 x 9M311 Missiles

Detonation Mechanism: Laser fuze (Radio fuze for 9M311-M1)

Propellant: Solid-fuel rocket

Operational Range: 8 km

Flight Ceiling: 3,500 m

Boost Time: 2 stages: boost to 900 m/s, then sustained 600 m/s stage to range

Maximum Speed: 900 m/s

Guidance Speed: Radio Command guidance

Steering System: rocket motor with four steerable control surfaces

Accuracy: 5 m

Fire Control

FCS Name: INA

Computerized FCS: Yes

IFF: Yes, IFF system (1RL138), operating in C-and D-band

Direct-view Optics (DVO): Yes

Radar System

Note: Radar detection range of the original 2S6 Tunguska is 17-18 km and tracking range is 11-16 km. Since its introduction no less than four different variants of search radars were used. Guidance is performed by a gunner who uses optical sight. Reaction time of the system is 10 seconds.

Protection

Hull Armor: The armor protects the Tunguska from small arms fire and shell splinters. This allows the Tunguska to be used near the front line. However the Tunguska remains vulnerable to most kinds of direct fire. The standoff range of its missiles increases the survivability against combat helicopters with long range anti-tank missiles and ground attack aircraft. NBC protection and fire suppression systems are present.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Introduction The 2S6 Tunguska is a self-propelled anti-aircraft gun and SAM system of Soviet origin. It was developed in the 1970's as a more capable successor to the widely used ZSU-23-4 Shilka. The main role of the Tunguska is to protect armor and infantry units against helicopters and ground attack aircraft. The Tunguska was to be more than twice as effective in combat than its predecessor. Therefore it uses larger caliber projectiles and missiles were integrated later during the design. Layout The Tunguska has a somewhat similar layout as the German Gepard, which entered service with West Germany while the Tunguska was in development. The Tunguska is based on a tracked chassis. The turret is located in the front and the engine and drivetrain are located at the rear. A double barrel 2A38M autocannon is located on each side of the turret. Eight ready to launch surface to air missiles are fitted alongside the guns. Firepower The Tunguska is armed with both guns and missiles. The two twin barrel 2A38M autocannon fire 30mm projectiles. The combined cyclic rate of fire is about 5.000 rpm. The Tunguska can fire its guns on the move against aerial targets. The missiles can only be launched while halted. Sensor systems The Tunguska features a tracking radar at the front of the turret. At the rear of the turret the surveillance radar is located. When in use the radar rotates continuously. When on the move the surveillance radar is stowed behind the turret. The tracking radar can track targets up to an altitude of 3.5 km. The surveillance radar has a range of 18 km. Mobility The tracked chassis provides good mobility in the field. This allows it to keep up with the tracked combat vehicles it is meant to protect. The water-cooled V12 diesel engine provides up to 780 hp. The maximum speed is 65 km/h on roads.

2S6M Tunguska-M Russian 30mm Self-Propelled Anti-Aircraft System







Tiers:



Variants:

- **2S6:** first version of the vehicle with four missiles, two either side of the turret.
- **2S6M:** the production version with eight missiles
- **2S6M1:** digital interface Ranzhir automated command-and-control system, new fire control system, new missile 9M311M with a maximum range of 10 km. Existing 2S6M Tunguska will be gradually upgraded to the new standard.

System

Alternative Designation: 2K22M, Tunguska-M
Type: tracked self-propelled anti-aircraft weapon armed with a surface-to-air gun and missile system.
Family: 2K22 Tunguska
In Service: 1990-Present
Crew: ea4
Chassis: GM-352M tracked vehicle
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m7.93
Width: m3.24
Height, TAR Up: m4.02
Height, TAR Down: m3.36
Weight, Combat: mt34

Automotive

Engine Name: INA
Engine Type: V-12 turbo diesel
Engine Power: hpINA
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Fording Depth: INA

Communications

Tactical Radio: R-173

Main Weapon System

↳*System*

Name: Shipunov 2A38M
Type: Soviet/Russian 30 mm autocannon
Caliber: mm30
Length: m3.027
Barrel Length: mm2,416
Barrels: ea1
Weight: kg115
Action: Gas-operated
Rate of Fire, Low: 200 to 300 rds/min
Rate of Fire, High: 550-800 rds/min
Maximum Effective Firing Range: m4,000
Effective Firing Range: 2,000
Feed System: Twin Feed
Reload Time: gun ammunition and missiles in about 16 min
Maximum Elevation: deg+87
Minimum Elevation: deg-10
Fire on the Move: Yes

↳*Ammunition*

Type: Rifle, Autocannon
Caliber: mm30
Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Maximum Range: m4,000

Minimum Range: m200

Maximum Altitude: m3,000

Basic Load: INA

Ammo Types: AP-T, Frag-T, HE-I

Missile System

↳*System*

Name: SA-19/GRISON

Length: m2.83

Weight in Container: kg57

Guidance System: SACLOS

Maximum Effective Range: m8,000-10,000

Minimum Effective Range: m2,500

Speed: m/s600-900

Tracking Rate: INA

Warhead Type: Frag-HE

Warhead Weight: kg9

Fuze Type: Proximity

Self Destruct: INA

System Reaction Time: sec6-12

Fire on the Move: No (must be at a halt to fire the missile)

Fire Control

FCS Name: INA

Computerized FCS: Yes

IFF: Yes, IFF system (1RL138), operating in C-and D-band

Direct-view Optics (DVO): Yes

Radar System

Note: the HOT SHOT radar system, which consists of a surveillance radar with a maximum range of 18 km, and a tracking radar with a maximum range of 13 km

↳*Radar #1*

Name: 1RL144 Radar

Type: Target Acquisition Radar (TAR)

Function: This radar provides primary search capability in addition to measurement of range and bearing

Frequency/Band: E-band

Maximum Range: km20

Antenna Location: antenna is mounted at the rear of the turret and is folded down when not in use

Antenna Rotation: The antenna rotates at approximately 1 r/s, which gives a rapid update of the airspace around the 2S6M

Fan Beam: The TAR emits a fan beam covering 4.50 in azimuth and 150 in elevation. The beam is pointed at a constant elevation of 7.50 to permit detection of low-altitude targets.

↳*Radar #2*

Name: 1RL144M

Type: Target Tracking Radar (TTR)

Function: The tracking radar constantly relays target range, elevation and bearing to the fire-control computer, and on the basis if these data the computer generated the laying commands for the weapon system.

Frequency/Band: J-band

Maximum Range: km18

Antenna Location: antenna is mounted at the front section of the turret and has two fundamental functions that depend on whether the guns or missiles are selected.

Optical Sight: A stabilized optical sight is used as a back up tracking channel, allowing target data to be relayed to the fire-control computer. This sight is also used to calculate the deviation of a missile's flight path from the line-of-sight, these data being automatically relayed to the fire control computer and used to generate correction signals.

Gun Engagement: During a gun engagement, the TTR functions as an automatic target tracker, feeding target position data to the fire-control computer.

Missile Engagement: During missile engagement, the tracking radar locks onto the target and then lays the optical sight on the target. Subsequently the gunner assumes the target-tracking function with the electro-optic sight, and the radar is used for relaying guidance commands to the SA-19 missile.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The 2S6 Tunguska 2K22 (NATO code SA-19 Grison) is a Russian-made self-propelled air defence system which combines gun and missile armament. The development of the 2S6 Tunguska began in 1970 after a request by the Russian army for a new self-propelled anti-aircraft weapon system to replace the old ZSU-23-4 self-propelled anti-aircraft gun. The first version entered service in 1986 were only four missiles, two either side, in the ready to launch position. The second version to enter service

with the Russian army, and the current production model vehicle, is designated the 2S6M or 2K22M, he has eight missiles, four to each side of the turret. The Tunguska vehicle uses a tracked chassis GM-352M which is also used for the ground-to-air missile system Buk-M1 SA-11 Gadfly. A typical 2K22/2K22M battery would consist of six 2S6/2S6M self-propelled air defence vehicles, six reload vehicles and associated support and maintenance vehicles. The 2S6 Tunguska is intended to protect tank and motorized units from low-flying aircraft and helicopters, some types of cruise-missile, as well as to engage light armour ground targets and manpower of the enemy.

2S6M1 Tunguska-M1 Russian 30mm Self-Propelled Anti-Aircraft System





Tiers:

1 2 3 4

Variants:

- **2S6:** first version of the vehicle with four missiles, two either side of the turret.
- **2S6M:** the production version with eight missiles
- **2S6M1:** digital interface Ranzhir automated command-and-control system, new fire control system, new missile 9M311M with a maximum range of 10 km. Existing 2S6M Tunguska will be gradually upgraded to the new standard.

System

Alternative Designation: 2S6M1 Tunguska-M1
Date of Introduction: 2003
Type: tracked self-propelled anti-aircraft weapon armed with a surface-to-air gun and missile system.
Family: 2K22 Tunguska
Proliferation: Belarus: a number of 2S6 India: according to various data, from 20 to 92 2S6 units, as of 2012 Morocco: 12 complexes 2K22M1 as of 2012, according to Military Balance 2012, page 340 Myanmar Russia: more than 250 complexes 2K22 as of 2012, according to Military Balance 2012, page 193. 21 Tunguska-M1s were delivered in 2012-2017. Syria: 6 2S6M1 units delivered in 2008 Yemen: a number of 2S6M1, as of 2005. According to Stockholm International Peace Research Institute neither supply nor licensed production of 2S6M1 in Yemen is made.
In Service: 2003-Present
Crew: ea4

Chassis: GM-5975 chassis

Displacement Time: INA

Emplacement Time: INA

Note: The Tunguska-M1 is much more effective than the previous Tunguska-M. All previous Tunguskas can be upgraded to this standard.

Dimensions

Length: m7.93

Width: m3.24

Height, TAR Up: m4.02

Height, TAR Down: m3.36

Weight, Combat: mt34

Automotive

Engine Name: INA

Engine Type: V-12 turbo diesel

Engine Power: hpINA

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Communications

Tactical Radio: R-173

Main Weapon System

↳*System*

Name: Shipunov 2A38M

Type: Soviet/Russian 30 mm autocannon

Caliber: mm30

Length: m3.027

Barrel Length: mm2,416

Barrels: ea1

Weight: kg115

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min

Maximum Effective Firing Range: m4,000

Effective Firing Range: 2,000

Feed System: Twin Feed

Reload Time: gun ammunition and missiles in about 16 min

Maximum Elevation: deg+87

Minimum Elevation: deg-10

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Maximum Range: m4,000

Minimum Range: m200

Maximum Altitude: m3,000

Basic Load: INA

Ammo Types: AP-T, Frag-T, HE-I

Missile System

↳*System*

Name: 9M311-M1

Type: Surface-to-air missiles

Length: m2.5

Diameter: m1.7

Wingspan: m2.2

Basic Load: ea8

Speed: m/s900

Engage Speed: The missile’s maximum speed is 900m/s and can engage targets travelling at speeds up to 500m/s.

Maximum Range: 15 to 6,000m for ground targets and 15 to 10,000m for air targets.

Fuse Type: Radio proximity fuse

Note: These missiles have improved optical tracking and accuracy

Fire Control

FCS Name: INA

Computerized FCS: Yes, a improved FCS over the 2S6M

IFF: Yes, IFF system (1RL138), operating in C-and D-band

Direct-view Optics (DVO): Yes

Command-and-Control System: Ranzhir automated command-and-control system

Radar System

Note: the HOT SHOT radar system, which consists of a surveillance radar with a maximum range of 18 km, and a tracking radar with a maximum range of 13 km

↳*Radar #1*

Name: 1RL144 Radar

Type: Target Acquisition Radar (TAR)

Function: This radar provides primary search capability in addition to measurement of range and bearing

Frequency/Band: E-band

Maximum Range: km20

Antenna Location: antenna is mounted at the rear of the turret and is folded down when not in use

Antenna Rotation: The antenna rotates at approximately 1 r/s, which gives a rapid update of the airspace around the 2S6M

Fan Beam: The TAR emits a fan beam covering 4.50 in azimuth and 150 in elevation. The beam is pointed at a constant elevation of 7.50 to permit detection of low-altitude targets.

↳*Radar #2*

Name: 1RL144M

Type: Target Tracking Radar (TTR)

Function: The tracking radar constantly relays target range, elevation and bearing to the fire-control computer, and on the basis if these data the computer generated the laying commands for the weapon system.

Frequency/Band: J-band

Maximum Range: km18

Antenna Location: antenna is mounted at the front section of the turret and has two fundamental functions that depend on whether the guns or missiles are selected.

Optical Sight: A stabilized optical sight is used as a back up tracking channel, allowing target data to be relayed to the fire-control computer. This sight is also used to calculate the deviation of a missile's flight path from the line-of-sight, these data being automatically relayed to the fire control computer and used to generate correction signals.

Gun Engagement: During a gun engagement, the TTR functions as an automatic target tracker, feeding target position data to the fire-control computer.

Missile Engagement: During missile engagement, the tracking radar locks onto the target and then lays the optical sight on the target. Subsequently the gunner assumes the target-tracking function with the electro-optic sight, and the radar is used for relaying guidance commands to the SA-19 missile.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

2S6M1 Tunguska-M1 if a further improved variant with improved fire control system. It is based on a GM-5975 special tracked chassis and uses new 9M311-M1 missiles. These have a range of 10 km. These missiles have improved optical tracking and accuracy. Laser proximity fuse was replaced by a radio proximity fuse. The new missiles can engage small targets, such as cruise missiles. The Tunguska-M1 is much more effective than the previous Tunguska-M. All previous Tunguskas can be upgraded to this standard. The 2S6M1 entered service with the Russian Army in 2003. A total of 21 Tunguska-M1 systems were delivered in 2012-2017. The is a modernized variant of the basic 2K22 Tunguska system that was introduced in 2003. It features a digital interface for the Ranzhir automatic command-and-control system, which enables remote, automated target designation for any Tunguska launch vehicle from higher echelons; modernization of the fire-control radar; improved fire-control software, which increases engagement capability against fast-moving targets in the electro-optical mode; new 9M311M or 9M311-1M missiles; and upgraded target angular speed-measuring devices, which increases accuracy for both the missiles and guns. Other improvements included automatic external target designation, reception and transmission and processing equipment by radio with the battery command post. This allows the command post to automatically distribute targets among the battery; gunner's assistance system, which performs automatic high-speed, two-coordinate optical tracking; upgraded missile coordination calculation equipment that improves jamming resistance; and modified heading and roll/pitch control system that reduces disturbances to gyros while the system is moving, reducing line of sight stabilization errors and enhancing the stability of the 30-mm cannons.

Type 95 SPAAA (PGZ95) Chinese Self-Propelled Anti-Aircraft Artillery






Tiers:



System

Alternative Designation: Type 95 SPAAA; PGZ95. Earlier in development the system was designated Type 90-II and Type 90-III

Type: Self-Propelled Anti-Aircraft Artillery

Crew: 3 (commander, gunner, driver)

Chassis: The vehicle uses a tracked armoured chassis with six road wheels, a drive sprocket, an idler and three return rollers on each side.

Displacement Time: INA

Emplacement Time: INA

Note: The system consists of a full-tracked armored chassis and a power-operated turret boasting four 25-mm cannons (firing 800 rounds a minute) and four fire-and-forget SAMs.

Dimensions

Length: 6.71 m

Width: 3.20 m

Height, with Radar Up: 4.82 m

Height, with Radar Down: 3.40 m

Weight: 22,500 kg

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: 450 km

Speed, Maximum Road: 53 km/h

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Gun System

↳*System*

Name: INA

Type: Autocannon

Caliber: 25mm

Quantity: 4 x 25mm Autocannon

Elevation: INA

Traverse: 360 deg

Maximum Range: INA

Rate of Fire: 800 Rounds per Minute

↳*Ammunition*

Type: Autocannon

Caliber: mm25

Shell: INA

Basic Load: INA

Ammunition Resupply Vehicle: The Type 95 battery also consists of three ammunition re-supply vehicles, one battery testing vehicle, and one power supply vehicle, all mounted on similar 6x6 cross-country trucks..

Auxiliary Missile System

↳*System*

Name: QW-2 Vanguard 2

Type: Infrared Homing Guided Surface-to-Air Missile

Manufactured: Shenyang-based CASIC 119 Factory

Length: 1.59 m

Diameter: INA

Weight: 11.32 kg

Detonation Mechanism: Impact & Proximity

Engine: Rocket

Propellant: Solid Rocket

Operational Range: 6 km maximum

Flight Ceiling: 4 km

Flight Altitude: 10 meter minimum

Maximum Speed: > 600 m/s

Guidance System: Infrared Homing

Radar and Fire Control System

Name: INA

Computerized FCS: Yes

Main Gun Stabilization: Yes

Radar: CLC-1 pulse-Doppler search

Radar Range: 11 km

TV Tracking Camera: Yes

Infrared Camera: Yes

Laser Range Finder: Yes

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 95 (PLA military designation: PGZ95 – Chinese: 95□□□□□□; pinyin: 95 shi zixing gaoshepao, "Type 95 self-propelled anti-aircraft artillery") is a Chinese self-propelled anti-aircraft vehicle. It is armed with four 25 mm caliber cannons and optionally four fire-and-forget QW-2 infrared homing missiles. It was first displayed publicly at the Beijing Military Parade in 1999. Earlier in development the system was designated Type 90-II and Type 90-III. The vehicle uses a tracked armored chassis with six road wheels, a drive sprocket, an idler and three return rollers on each side. The vehicle has a crew of three: driver, commander, and gunner. The engine is located at the front of the vehicle, with the driver sitting on the left side. The driver is provided with a hatch and three vision blocks for visibility when buttoned up. Behind the driver sits the commander, who is provided with a raised hatch, also fitted with three vision blocks. Towards the rear of the hull is the large powered one-man turret. Mounted on the front of the turret in an armored box is the electro-optical tracking equipment which consists of a TV tracking camera, and infra-red tracking camera and a laser rangefinder. The tracking cameras have a day range of approximately 6,000 meters and a night range of 5,000 meters. The laser rangefinder has a range of between 500 and 5,500 meters with an accuracy of 5 meters. Mounted on either side of the turret are two 25 millimeter Type 87 25x183mmB gas-operated cannons. It shares the same ammunition with the ZPT-90 auto-cannon mounted on the infantry fighting vehicle variant of the WZ-551, and the cartridge itself is a bored-out and longer-cased derivative of the 2A14's 23x152mmB cartridge. The cannons have a rate of fire of 600–800 rpm each, eject spent shell casings to either side of the vehicle. About 1,000 rounds are carried. The cannons are used to engage targets out to a range of 2,500 meters and at altitudes of up to 2,000 meters. Additionally two QW-2 infra-red homing missiles can be mounted above the cannons on each side. The QW-2 missiles are based on a shoulder-launched missile and can engage targets flying between 10 and 3,500 meters in altitude at a slant range of between 500 and 6,000 meters, but has to be manually reloaded which is known to take about 2.45 minutes. To the rear of the turret is the CLC-1 S-band pulse-doppler search radar which has a reported range of 11 kilometers, and is optimized to detect low-flying targets. Finally, an array of four electrically fired smoke grenades are mounted on either side of the turret, aimed to fire forward and to either side of the vehicle. A large door which opens to the left is provided in the rear of the hull. The system can automatically optically track targets and provide the gunner with an alert when the target is within range. The gunner can also manually aim the guns, using either the optical system or an external backup ring sight provided on the outside of the turret. The system has a reaction time of around 10 seconds when in radar search mode, and six seconds in optical mode. The

vehicle also provides a simulator function for training. A battery control vehicle using the same chassis is also built. It has a crew of five people. It uses a S-band CLC-2 surveillance radar with a maximum range of 45 kilometers and a maximum altitude of 4,500 meters. The communication system in the vehicle allows it to communicate digitally to a range of up to 5 kilometers and via a normal radio link up to 15 kilometers. Additionally it can use signal wire to communicate up to 500 meters. An Auxiliary Power Unit (APU) provides power for the electronics. A single 12.7 mm heavy machine gun is provided for self-defense. A typical Type 95 battery consists of six SPAAA vehicles, and a single command vehicle. Additionally, three ammunition re-supply trucks, a test/repair truck and a power supply truck support each battery.

→Anti-Aircraft Guns

→→Towed Anti-Aircraft Guns

Type 56 Chinese 14.5-mm Towed Anti-Aircraft Gun



Tiers:



Variants:

- **ZPU-1:** INA
- **ZPU-2:** INA

System

Alternative Designations: Type 56
Description: 14.5mm Towed Anti-Aircraft Gun
Carriage: 4 wheeled/2 axle towed chassis
Crew: 5
Prime Mover: INA
Max. Towed Speed: km/h35
Emplacement Time: min2
Displacement Time: min2
In Service: 1949-Present

Dimensions

Length: m4.53
Width: m7.72
Height: m2.13
Length of Barrel: mm1,348
Weight: tons2

Armament

Gun: INA

Caliber: 14.5 mm

Number of Barrels: 4

Service Life of Barrels: INA

Max Rate of Fire: rd/min2,200-2,400 (600/barrel)

Practical Rate of Fire: rd/min600 (150/barrel)

Loader Type: Belt of 150 rds

Reload Time: sec15

Traverse: deg360

Traverse Rate: sec48

Elevation: deg-8 to +90

Elevation Rate: o/sec29

Reaction time: 8

Notes: The ZPU-4 can be fired from a brief stop (<10 sec) with wheels in travel position.

Main Armament Ammunition

Type: API, API-T, HEI, AP-T, HEI-T

Max Range: m8,000

Max. Effective (slant) Range: m2,200

Max Altitude: m5,000

Max Effective Altitude: m0-1,400

Name: BZT-44M API-T

Effective Altitude: m0-2,200

Weapons and Ammunition Types

4 barreled KPV 14.5-mm heavy machinegun: Typical Combat Load 4,800 rds (1,200 rds/barrel)

Fire Control

On-Carriages: Optical mechanical computing sight Telescope, ground targets

Off-Carriage: Generally, there is no organic radar except with variants NK Type 56 and M1983. Many radars are available Optional Radar: SON-9/SON-9A, aka FIRE CAN (NATO)

Function: Fire Control

Detection Range: km80

Tracking Range: km35

Frequency: 2.7-2.9 GHz

Frequency Band: E Band

Peak Power: kw300

Notes:

The Type 56 Chinese 14.5mm Towed Anti-Aircraft Gun is a Chinese built version of the Russian ZPU-4. The ZPU-4 is a quadruple

anti-aircraft version of the basic Soviet 14.5mm machine gun. Introduced in 1949, it was used in Korea and was later considered the most dangerous opposition to U.S. helicopters in Vietnam. It was used by Iraqi forces during Operation Desert Storm. The Type 56 is the Chinese version. The quad ZPU-4 uses a four-wheel carriage similar to that once used by the obsolete 25mm automatic antiaircraft gun M1940. In firing position the weapon is towered onto firing jacks. In many units it has been replaced by the newer and more powerful twin 23mm automatic antiaircraft gun ZU-23. All weapons in this series fire the API (BS 41) projectiles weighing 64.4 grams having a muzzle velocity of 1000 meters per second which will penetrate 32 mm of armour. The ZPU-4 uses four 14.5 mm Vladimirova KPV (Krubnokalibernyj Pulemet Vladimirova) heavy machine gun, which has a quick-change barrel, mounted on a wheeled chassis. In the firing position, the wheels are raised off the ground and the carriage is supported at four points, screw jacks at each end of the carriage and on outriggers on each side of the carriage that are also provided with screw jacks. The weapon can be brought into action in 15 to 20 seconds but can, if required, be fired with the wheels in the travelling position. The ZPU-4 14.5 mm twin guns can fired the following fixed ammunition: - API (BS 41) projectile weighing 64.4 g, with a muzzle velocity of 1,000 m/s, which will penetrate 32 mm of conventional steel armour at an incidence of 0º at a range of 500 m - API-T (BZT) projectile weighing 59.56 g - I-T (ZP) projectile weighing 59.68 g. The ZPU-4 14.5 mm twin guns has an effective slant range of 1,402 m, effective limit at +45º elevation is 975 m while effective altitude limit at +65º is 1,280 m. The quadruple guns ZPU-4 uses a four-wheel carriage similar to that once used by the obsolete 25 mm automatic anti-aircraft gun M1940. In firing position, the weapon is lowered onto firing jacks. Rhe ZPU-4 can be brought in and out of action in about 15 to 20 seconds, and can be fired with the wheels in the traveling position if needed. Two ammunition boxes are mounted at the front of the wheeled chassis, one under each gun. Each ammunition boxes can carried 2,400 rounds of 14.5 mm. The ZPU-4 is equipped with a single optical sight. Improved optical gun sights was added later in its production.

ZPU-4 Russian 14.5-mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **ZPU-1:**
- **ZPU-2:**

System

Alternative Designations: ZPU-4
Description: 14.5mm Towed Anti-Aircraft Gun
Carriage: 4 wheeled/2 axle towed chassis
Crew: 5
Prime Mover: INA
Max. Towed Speed: km/h35
Emplacement Time: min2
Displacement Time: min2
In Service: 1949-Present

Dimensions

Length: m4.53
Width: m7.72
Height: m2.13
Length of Barrel: mm1,348
Weight: tons2

Armament

Gun: INA
Caliber: 14.5 mm
Number of Barrels: 4
Service Life of Barrels: INA

Max Rate of Fire: rd/min2,200-2,400 (600/barrel)

Practical Rate of Fire: rd/min600 (150/barrel)

Loader Type: Belt of 150 rds

Reload Time: sec15

Traverse: deg360

Traverse Rate: sec48

Elevation: deg-8 to +90

Elevation Rate: o/sec29

Reaction time: 8

Notes: The ZPU-4 can be fired from a brief stop (<10 sec) with wheels in travel position.

Main Armament Ammunition

Type: API, API-T, HEI, AP-T, HEI-T

Max Range: m8,000

Max. Effective (slant) Range: m2,200

Max Altitude: m5,000

Max Effective Altitude: m0-1,400

Name: BZT-44M API-T

Effective Altitude: m0-2,200

Weapons and Ammunition Types

4 barreled KPV 14.5-mm heavy machinegun: Typical Combat Load 4,800 rds (1,200 rds/barrel)

Fire Control

On-Carriages: Optical mechanical computing sight Telescope, ground targets

Off-Carriage: Generally, there is no organic radar except with variants NK Type 56 and M1983. Many radars are available Optional Radar: SON-9/SON-9A, aka FIRE CAN (NATO)

Function: Fire Control

Detection Range: km80

Tracking Range: km35

Frequency: 2.7-2.9 GHz

Frequency Band: E

Peak Power: kw300

Notes:

The ZPU-4 is a quadruple anti-aircraft version of the basic Soviet 14.5mm machine gun. Introduced in 1949, it was used in Korea and was later considered the most dangerous opposition to U.S. helicopters in Vietnam. It was used by Iraqi forces during Operation Desert Storm. The Type 56 is the Chinese version. The quad ZPU-4 uses a four-wheel carriage similar to that once used by the obsolete 25mm automatic antiaircraft gun M1940. In firing position the weapon is towered onto firing jacks. In many units it has been replaced by the newer and more powerful twin 23mm automatic antiaircraft gun ZU-23. All weapons in this series fire the API (BS 41) projectiles weighing 64.4 grams having a muzzle velocity of 1000 meters per second which will

penetrate 32 mm of armour. The ZPU-4 uses four 14.5 mm Vladimirova KPV (Krubnokalibernyj Pulemet Vladimirova) heavy machine gun, which has a quick-change barrel, mounted on a wheeled chassis. In the firing position, the wheels are raised off the ground and the carriage is supported at four points, screw jacks at each end of the carriage and on outriggers on each side of the carriage that are also provided with screw jacks. The weapon can be brought into action in 15 to 20 seconds but can, if required, be fired with the wheels in the travelling position. The ZPU-4 14.5 mm twin guns can fired the following fixed ammunition: - API (BS 41) projectile weighing 64.4 g, with a muzzle velocity of 1,000 m/s, which will penetrate 32 mm of conventional steel armour at an incidence of 0º at a range of 500 m - API-T (BZT) projectile weighing 59.56 g - I-T (ZP) projectile weighing 59.68 g. The ZPU-4 14.5 mm twin guns has an effective slant range of 1,402 m, effective limit at +45º elevation is 975 m while effective altitude limit at +65º is 1,280 m. The quadruple guns ZPU-4 uses a four-wheel carriage similar to that once used by the obsolete 25 mm automatic anti-aircraft gun M1940. In firing position, the weapon is lowered onto firing jacks. Rhe ZPU-4 can be brought in and out of action in about 15 to 20 seconds, and can be fired with the wheels in the traveling position if needed. Two ammunition boxes are mounted at the front of the wheeled chassis, one under each gun. Each ammunition boxes can carried 2,400 rounds of 14.5 mm. The ZPU-4 is equipped with a single optical sight. Improved optical gunsights was added later in its production.

Oerlikon GDF-006 Swiss 35mm Towed Anti-Aircraft Gun



Tiers:

1 2 3 4

Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: GDF-006
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes
Note: Initial operating capability was achieved in 1985. It is fitted with the Contraves Gun King digital optronic sighting system. There is three-dimensional target tracking with laser rangefinder, periscope sight and digital computer. It has an integrated power supply on the mount; the battery power is sufficient for five combat cycles before IPS must be restarted. It also includes an autonomous gun sighting system.

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m

Width, Traveling: 2.26 m

Width, Firing: 4.49 m

Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

AHEAD Ammunition: Advanced Hit Efficiency and Destruction (AHEAD) ammunition was developed in late 1980s for service in mid-1990s. The GDF muzzle is fitted with three-coil muzzle-velocity sensor; Sky Guard fire-control software is modified. When the AHEAD round is fired, its passage through the rear two coils is timed and its exact muzzle velocity determined and used to set the time fuze in the projectile through the forward coil. When the timer triggers the fuze, the shell is fractured into a cone of heavy-metal fragments that spray the target. A 25-round burst is capable of generating a spray of 3,800 fragments. The system is designed to provide quick kills against small targets at long-ranges.

↳*System*

Name: KDC-002 Gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Laser Rangefinder: Yes

Digital Computer: Yes

Autonomous Gun Sighting System: Yes, Contraves Gun King digital optronic sighting system.

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves

Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-006 The GDF-006 is a further development of the basic GDF system. Features include: *High rate of fire; *Ahead capability (programmable air burst munition); *High hit probability; *High impact efficiency; *Rapid response to FCU target data in remote mode; *Two 35-mm positively locked, gas operated automatic cannons with automatic weapon lubrication; *Automatic muzzle velocity measurement and projectile fuze programming; *High mobility with four-wheel trailer mount; *Rapid deployment at the firing position by tilting the wheels hydraulically; and *Accurate positioning which is statically determined through automatic leveling of a three-point hydraulic support. Additionally, the GDF-006 is fitted with the Advanced Hit Efficiency and Destruction (AHEAD) ammunition was developed in late 1980s for service in mid-1990s. The GDF muzzle is fitted with three-coil muzzle-velocity sensor; Sky Guard fire-control software is modified. When the AHEAD round is fired, its passage through the rear two coils is timed and its exact muzzle velocity determined and used to set the time fuze in the projectile through the forward coil. When the timer triggers the fuze, the shell is fractured into a cone of heavy-metal fragments that spray the target. A 25-round burst is capable of generating a spray of 3,800 fragments. The system is designed to provide quick kills against small targets at long-ranges. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

AZP S-60 (Export) North Korean 57mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **AK-725:** Naval version of the S-60 gun. Introduced in 1958. Mounted in single, double and quadruple mounts (designated ZIF-31) on many early Soviet destroyers.
- **ZIF-72:** Naval version which is enclosed in a metal housing and fully automatic. Also exported to India. Introduced in the mid-1970s.
- **ZSU-57-2::** Self-propelled version with two 57 mm S-60 guns (designated S-68)
- **Type-80::** Chinese version of the ZSU-57-2.
- **BM-57:** Updated version.
- **AU-220M Baikal::** Remote weapon station with fire control system using BM-57

System

Alternative Designations: AZP S-60
In Service: 1950-Present
Crew: 7
Carriage: Four Wheel
Prime Movers: Ural-375D
Max Towed Speed: km/h60
Emplacement Time: min1
Displacement Time: min3

Dimensions

Length Overall: m8.5
Length of Barrel: m4.4
Width Overall: m2.054

Height: m2.37

Weight: kg4,500

Main Armament

Type: 57-mm Automatic Cannon

Caliber: mm57

Number of Barrels: 1 each

Service Life of Barrel: INA

Cyclic Rate of Fire: rds/min105-120

Reload Type: sec4-8

Practical Rate of Fire: rds/min70

Loader Type: 4 Round Clip, Manual

Reaction time: sec4.5

Maximum Elevation: deg+85

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Muzzle Velocity: m/s1,000

Maximum Firing Range, Radar Guided: m6,000

Maximum Firing Range, Optical Guided: m4,000

Main Armament Ammunition

↳*Ammunition (Option 1)*

Name: UBR-281/281U

Type: APCBC-HE-T

Projectile Weight: grams2,820

Bursting Charge: grams13

Muzzle Velocity: m/s1,000

Note: Anti-tank round with sharp penetrator, blunt cap and an aerodynamic cover, with tracer and a delayed-action base fuze.Penetration 96 mm RHA at 1,000 m range or 106 mm at 500 m.UBR-281 and -281U are loaded with the same projectile and differ only by details in case mouth and swage grooves.

↳*Ammunition (Option 2)*

Name: 3UO6

Type: HE

Projectile Weight: INA

Bursting Charge: grams154

Muzzle Velocity: m/s1,000

Notes: Similar to UOR-281U but with proximity fuze AR-51 installed. Fuze operating with RPK-1 system together. Not to be confused with later smart shells which Russia developed.

↳*Ammunition (Option 3)*

Name: UOR-281U

Type: HE-T

Projectile Weight: grams2,850

Bursting Charge: grams168

Muzzle Velocity: m/s1,000

Note: Similar to UOR-281; some sources state the shell is the same as in UOR-281 and the round differs from it only in details of the case mouth and swage grooves (as with the UBR round),[8] while others claim a slightly larger HE filling

Fire Control

Rangefinder: D-49

Radar Name: Son-9/Son-9A (NATO FIRE CAN)

Radar Function: Fire Control

Radar Detection Range: km80

Radar Tracking Range: km35

Radar Frequency: 2.7-2.9 GHz

Radar Frequency Band: E

Radar Peak Power: kw300

Alternative Radar RPK- 1/FLAP WHEEL Range (km): km34

Notes:

The S-60 is a towed, road-transportable, short- to medium-range, single-barrel 57-mm antiaircraft gun system. The S-60 recoil-operated weapon replaced the earlier 37mm models in most Warsaw Pact units. It is a powerful weapon, well suited to attack armored vehicles as well as low-flying aircraft. In addition to on-carriage optical fire control, the S-60 also employs off-carriage fire control with the PUAZO-6/60 director and the SON-9 or SON-9A radars. Originally the PUAZO-5 director and SON-4 radar were used. Further improved director/radar combinations became available in subsequent years. Recognition features of the S-60 are the long, thin tube with multi-perforated muzzle brake, distinctive gun shield which folds down and the horizontal feed tray which holds the four-round clips. The normal Soviet prime mover is the Ural-375 truck. The four-wheel carriage can be leveled and stabilized on jacks to form a point firing base. Loading is accomplished by 4-round horizontally fed clips. The S-60 also has an ammunition ready rack that can hold 4 four-round clips near ammunition feed mechanism on left side of the breech. A twin version, the S-68, is mounted on the self-propelled ZSU-57-2, and twin and quad versions are used by the Soviet Navy. It should be noted that the ammunition for the 57mm antiaircraft guns is not_ interchangeable with that used by the 57mm antitank and assault guns. This is due to the different configuration and dimensions of the cartridge cases. Besides on-carriage optical fire control, the S-60 also employs an off-carriage FLAP WHEEL fire control radar, mounted on a separate van. The towed S-60 system lacks the mobility of the newer SAM systems with which it is being replaced. A self-propelled version, the ZSU-57-2, with twin 57-mm guns mounted on a modified T-54 tank chassis, was introduced in 1957. The ZSU-57-2 has the same characteristics as the S-60 except that it is not radar-controlled. It is now considered obsolete.

M-1939 (61-K) Russian 37mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **Type 55:** copy of the single barreled 37 mm M1939
- **Type 63:** twin 37 mm guns with vertical stabilization mounted on a T-34 chassis.
- **Type 65:** copy of the twin barreled 37 mm
- **Type 74:** upgraded version of the Type 65 with a greater rate of fire
- **Type 74SD:** Type 74 with servo system removed for operation with Type 800 laser course director system
- **Type 79-III:** upgraded version of the Type 74 with electro-optical director, and powered traverse and elevation.
- **Type 76:** Naval version of the twin 37 mm.
- **P793:** Advanced twin-barrel version, with electro-optical predicting sight and higher rate of fire and lengthened barrels giving a higher muzzle velocity (1,000 m/s). Operated by a crew of 5 or 6.

System

Alternative Designations: None
Description: 37mm Towed Anti-Aircraft Gun
Crew: 8, 4 (est) while traveling
Carriage: Four Wheels
Emplacement Time (sec): 8.5 while traveling. Gun can be fired from a halt without dropping trails. 30 full emplace, to drop trails.
Displacement Time (sec): 8 sec while traveling. 30 from full emplacement
In Service: 1939-Present

Dimensions

Length Overall: m6.04
Length of Barrel: m2.73
Height Overall: m2.11
Width Overall: m1.95
Combat Weight: kg2,050

Automotive

Prime Mover: Utility Vehicles, Small, and Medium Trucks

Max Towed Speed: km/h60

Cross Country: km/h25

Fording Depth: m0.7

Main Armament

Caliber, Type: 37-mm Rifled

Number of Barrels: 1

Breech Mechanism: Rising Block

Cyclic Rate of Fire: rd/min180

Practical Rate of Fire: rd/min80

Clip Capacity: rds5, gun magazine holds 2 clips for 10 rounds

Loader Type: Manual Gravity Feed

Reaction Time: sec4.5, 4 to stop and fire during a move (without radar)

Reload Time: sec2 per clip

Traverse: deg360

Traverse Rate: deg/sec61

Elevation: deg-5 to +85

Elevation Rate:: deg/sec22

Ammunition

Type: HE, HE-FRAG-T, AP, AP-T, HVAP, HVAP-T, HEI-T

Max Range: m8,500

Max Effective Range (slant): m3,500

Max Effective (ground targets): m3,500

Max Altitude: m6,000

Max Effective Altitude: m3,000

Armor Penetration: 55mm @ 500m

HE Projectile Weight: kg0.74

AP Projectile Weight: kg,77

HE-FRAG-T Projectile Weight: kg0.73

HVAP Projectile Weight: kg0.62

HEI-T Projectile Weight: INA

HE Muzzle Velocity: m/s880

AP Muzzle Velocity: m/s880

HE-FRAG-T Muzzle Velocity: m/s880

HVAP Muzzle Velocity: m/s960

Self-Destruct: sec8 to 12

Self-Destruct Range: m3,700 to 4,700

Weapons and Ammunition Types

1 x 37-mm AA gun HE HE-FRAG-T AP AP-T HVAP HVAP-T HEI-T: Typical Combat Load 500

Notes:

The 37 mm automatic air defense gun M1939 (61-K) (Russian: 37-мм автоматическая зенитная пушка образца 1939 года (61-K)) is a Soviet 37 mm calibre anti-aircraft gun developed during the late 1930s and used during World War II. The land-based version was replaced in Soviet service by the ZSU-57-2 during the 1950s. Guns of this type were successfully used throughout the Eastern Front against dive bombers and other low- and medium-altitude targets. It also had some usefulness against lightly armoured ground targets. Crews of the 37 mm AD guns shot down 14,657 Axis planes. The mean quantity of 37 mm ammunition to shoot down one enemy plane was 905 rounds. The Soviet Navy purchased a number of Bofors 25 mm Model 1933 guns in 1935, trials of the weapon were successful and it was decided to develop a 45 mm version of the weapon designated the 49-K. The development under the guidance of leading Soviet designers M. N. Loginov, I. A. Lyamin and L. V. Lyuliev was successful, but the army thought that the 45 mm calibre was a little too large for an automatic field weapon. In January 1938 the Artillery Factory Number 8 in Sverdlovsk was ordered to develop a 37 mm weapon based on the same design. The task was fulfilled by the chief designer of the factory, Mikhail Loginov, and his assistant Lev Loktev. Firing trials of the new 61-K were conducted in October 1938. Competitive firing trials were conducted in 1940 between the 61-K and the Bofors 40 mm/56. There were no substantial differences found between them. The weapon was initially installed as a single-barrel weapon on a four-wheeled ZU-7 carriage, and was soon ready for service. An initial order for 900 units was placed. The gun was operated by a crew of eight men. A total of 200 rounds of ammunition were carried which were fed into the gun in five-round clips. Total Soviet production was around 20,000 units, ending in 1945. However, it has also been produced in Poland, China and North Korea. Armour penetration of the armour-piercing (AP) rounds is reported as 37 millimetres of rolled homogeneous armour (RHA) at 60°at 500 metres range and 28 millimetres of RHA at 90° at 1,500 metres range.

ZU-23-2 Russian 23mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **ZU-23M:** Upgraded variant, designed by the Nudelman Precision Engineering Design Bureau (KB Tochmash). Has new targeting system (which includes laser rangefinder, television channel, optical mechanic device, can be reinforced with thermo location channel and a television system for usage at night) and electromechanic turn system. Optionally, the mount can be fitted with two short-range air-defence missiles, such as the 9M32M "Strela-2M" or the 9M39 "Igla
- **ZU-23M1:** This is the current model, developed by Open Joint Stock Company Podolsky Electromechanical Plant of Special Engineering "PEMZ Spetsmash" and Closed Joint Stock Company "NTC Elins" and offered by Rosoboronexport. Like the ZU-23M, it has an upgraded fire control system and can optionally be fitted with two launchers for the "Igla" series missile, usually the 9M342 "Igla-S"
- **ZU-23/ZOM1:** It consists of the "missile-gun firing module" (strel'bovoj modul) ZU-23/ZOM1-SM; the "missile-launching module" (puskovoj modul) ZU-23/ZOM1-PM armed with four 9M333 "Strela-10" missiles; a remote control module (modul distantsionnogo upravleniya) ZU-23/ZOM1-MU and a portable generator AB-1. Depending on the wishes of the client, the system can be delivered without the -SM module (ZU-23/ZOM1-1), without the -PM module (ZU-23/ZOM1-2), without the remote control (ZU-23/ZOM1-3), or without -PM and -MU modules (ZU-23/ZOM1-4). The latter can be carried by the Samum 4x4 wheeled chassis vehicle and the first export contract has been signed as of early 2019
- **Type 80:** Chinese variant
- **Type 85:** Chinese variant produced by China for export only

System

Alternative Designations: ZU-23-2; ZU-23
In Service: 1962-Present
Crew: 5
Carriage: Two-Wheeled
Emplacement Time: 15-20 min Can fire from travel position in emergencies.
Displacement Time: 35-40 min

Dimensions

Travel Position Length Overall: m4.57

Firing Position Length Overall: m4.60

Length of Barrel: m2.1

Travel Position Height Overall: m1.87

Firing Position Height Overall: m1.28

Travel Position Width Overall: m1.83

Firing Position Width Overall: m2.41

Weight: tons0.95

Automotive

Primary Mover: MTLB-T, GAZ-69 4 x 4 truck, BMD-2, BMD-3, BTR-3

Max. Towed Speed: km/h70

Main Armament

Caliber, Type: 23-mm, gas-operated gun, 2A14 or 2A14M

Number of Barrels: ea2

Breech Mechanism: Vertical Sliding Wedge

Cyclic Rate of Fire: rd/min1,600-2,000

Practical Rate of Fire: rd/min400 in 10-30 rd bursts

Feed: 50-rd ammunition canisters fitted on either side of the upper mount assembly

Loader Type: Magazine

Reload Time: sec15

Traverse: deg360

Traverse Rate: INA

Elevation: deg-10 to +90

Elevation Rate: deg/sec54

Reaction time: sec8

Main Armament Ammunition

Description: Can fire the same ammunition as ZSU-23-4. Best mix for modern versions (ZU-23M and ZU-23M1) is 1,200 APDS-T and 1,200 FAPDS. Rounds are ballistically matched and no HEI is required.

Type: 23x152 HE-I, HEI-T, API-T, TP

Max Effective Range: m2,500+

Max Effective Altitude: m1,500

Projectile Weight: INA

Muzzle Velocity: m/s970

FUZE TYPE: API-T: BASE IGNITING

Self-Destruct: sec11

Penetration: 19 @ 1000 m API-T INA for APDS-T 16+ @ 1500 m, FAPDS-T (helicopter simulant laminate array)

Max Effective Range: 2,500, 2,000 m against light armored ground targets such as LAVs

HE-I Projectile Weight: kg0.18

HEI-T Projectile Weight: kg0.19

HE-I Fuze Type: Point detonating

HEI-T Fuze Type: Point detonating

Weapons and Ammunition Types

2 x 23-mm AA guns: Typical Combat Load 2,400

Fire Control

Sights with Magnification: Optical mechanical sight for AA fire. Straight tube telescope for ground targets.

Range: m2,000

Azimuth warning receiver: 1L15-1

Notes:

The ZU-23-2 (2A13) mounts two 23 mm autocannons on a small trailer which can be converted into a stationary mount for firing the guns. While in this position the wheels are moved aside. The autocannon can be prepared for firing from the march position in 30 seconds and in emergency can be fired from the traveling position. The weapon is aimed and fired manually, with the help of the ZAP-23 optical-mechanical sight which uses manually entered target data to provide limited automatic aiming. It also has a straight-tube telescope T-3 for use against ground targets such as infantry as well as unarmored or lightly armoured vehicles. The ammo is fed by a conveyor belt from two ammunition boxes. Each of the ammunition boxes is located on the side of the twin autocannon and each carries 50 rounds. The fumes created by firing the weapon are partially removed through the side openings in the barrels. Normally, once each barrel has fired 100 rounds it becomes too hot and is therefore replaced with a spare barrel. Each weapon is normally provided with two replacement barrels as part of its standard equipment.
Tulamashzavod Joint Stock Company is offering to upgrade the 2A14 guns to the 2A14M standard with a barrel life of 10,000 rounds instead of 8,000 rounds. The cannon carriage is based on the earlier ZPU-2 anti-aircraft twin heavy machine gun, which mounted two KPV 14.5 mm heavy machine guns. ZU-23-2 can be identified by different placement of the ammunition boxes (at right angles to the gun carriage) and by muzzle flash suppressors. In another similarity to the ZPU series, single-barrel and four-barrel versions of the ZU-23 were also developed. However, these versions never entered service. The ZU-23-2 can be towed by a number of different vehicles. In USSR and later Russia the most frequently used towing vehicles for it were GAZ-66 4x4 trucks and GAZ-69 4x4 light trucks.

L70 Swedish 40mm Towed Anti-Aircraft Autocannon





Tiers:



Variants:

- **L/70 BOFI (Bofors Optronic Fire control Instrument) gun system:** Electro optic fire control system (with a computer and laser range finder) and proximity fused ammunition. A "fair weather system"
- **L/70 BOFI-R (All weather):** Multisensor fire control system with a J band radar. Provides automatic acquisition and tracking with an effective range of 4 km without external radar input.
- **L/70 REMO (Renovation and Modernisation):** Package aimed at extending life span and increasing effectiveness. Higher rate of fire, new fire control system/air burst programming, and ammunition.
- **L/70 40mm Netherlands upgrade:** New servo system, amplifiers, increased rate of fire (to 300 rds/min), ammo racks, and diesel power unit.
- **L/70 40mm Spanish upgrade:** Felis electro optic automatic tracking system (HD TV set, automatic tracking, telemetry laser, portable target designator, and radar interface)
- **AOS 40mm L70 FADM (Field Air Defense Mount):** Singapore Technologies electric drive aiming system
- **TRIDON 40mm L/70:** Bofers installed Volvo 725 6x6 truck with fully enclosed, armor protected cab for a crew of five, with only two crew required. Did not enter service.
- **LVS 40mm L/70:** Equipped with LVS modular fire-control system by Saab. Entered service with the Swedish Army and Royal Thai Army in 1994 and 1997.

System

Alternative Designation: L/70
Type: 40mm Towed Anti-Aircraft Autocannon
In Service: 1948-Present
Crew: 4-6
Carriage: INA
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length, Traveling: 7.29 m
Barrel Length: 2.80 m
Width, Traveling: 2.23 m
Width, Firing: 4.44 m
Height, Traveling: 2.35 m

Height, Firing: 1.94 m

Ground Clearance: 390 mm

Weight, Traveling: 4,800 kg

Cannon

Note: The two loaders, who stand to feed four-round clips into the feed guides, have guard rails to help them keep their feet while the mount rapidly slews to a new bearing. An ammunition stay can be rigged that will feed 26 rounds into the gun without loader intervention. Ammunition racks for 48 rounds (12 clips) are fitted to the rear of the platform.

↳*System*

Name: L/70

Type: 40mm Anti-Aircraft Autocannon

Caliber: 40mm

Bore: 40 mm/70 cal, rifled; fitted w/flash hiders

Breech Type: automatic vertical sliding block

Recoil System: concentric hydro-spring

Elevation: -4 deg to 90 deg

Elevation Rate: 45 deg/sec

Traverse: 360 deg

Traverse Rate: 85 deg/sec

Cyclic Rate of Fire: 260 rds/min

Maximum Range: 3,000-4,000 m

↳*Ammunition (Option 1)*

Name: INA

Type: HCHE

Caliber: mm40

Length: 534 mm

Weight: 0.87 kg

Muzzle Velocity: 1,030 mps

↳*Ammunition (Option 2)*

Name: INA

Type: PFHE

Caliber: 40mm

Length: 534 mm

Weight: 0.88 kg

Muzzle Velocity: 1,025 mps

↳*Ammunition (Option 3)*

Name: INA

Type: APC-T

Caliber: 40mm

Length: 534 mm

Weight: 0.92 kg

Muzzle Velocity: 1,010 mps

Fire Control

Name: INA

Computerized FCS: Local fire control for the basic system consists of two NIFE SRS 5 sights. The gun is aimed by the gunner, who uses a joystick. The L/70 is usually operated as part of a centralized air defense system that includes remote target designation and tracking by such systems as the Signaal L4/5 and Flycatcher systems and the Contraves Super Fledermaus and Skyguard. Upgrade programs as well as the BOFI Fair Weather and All Weather optronic fire-control systems are described in "Variants," below.

Direct Fire: Yes

Indirect Fire: No

Collimator: INA

Notes:

L70 Swedish 40mm Anti-Aircraft Autocannon By the end of World War II, jet aircraft had so increased the speed of attack that the Bofors simply could not get enough rounds into the air to counter the aircraft before it had already flown out of range. In order to effectively engage these threats, the gun would have to have longer range and a higher rate of fire, thereby increasing the number of rounds fired over the period of an engagement. Bofors considered either updating the 40 mm, or alternately making a much more powerful 57 mm design. In the end they did both. The new 40 mm design used a larger 40×365R round firing a slightly lighter 870 g shell at a much higher 1,030 m/s (3,379 fps) muzzle velocity. The rate of fire was increased to 240 rounds per minute[1] (4.0 rounds per second), similar to the German Flak 43. Additionally, the carriage was modified to be power-laid, the power being supplied by a generator placed on the front of the carriage. The first version was produced in 1947, accepted in 1948 as the "40 mm lvakan m/48", and entered Swedish service in 1951. Additional changes over the years have improved the firing rate first to 300 rpm (5.0 rounds per second), and later to 330 rpm (5.5 rps). Foreign sales started, as they had in the past, with the Netherlands and the United Kingdom. In November 1953 it was accepted as the NATO standard anti-aircraft gun, and was soon produced in the thousands. The L/70 was also used as the basis for a number of SPAAGs, including the U.S. Army's failed M247 Sergeant York. The UK's RAF Regiment adopted the L70 to replace its L60 guns in 1957, retiring its last examples in 1977 and replacing them with the Rapier system. In 1970s Zastava Arms acquired from Bofors license to produce L/70 version together with laser-computer group. Ammunition 40mm for L/70 is locally produced for domestic use and export in Sloboda Čačak. In 1979 the Royal Netherlands Air Force acquired 25 KL/MSS-6720 Flycatcher radar system and upgraded 75 of their 40L70s to create 25 firing units for static air base defence. The improved guns had an increased rate of fire (300 rounds/min) and the loading mechanism was provided with extended guides so that it could hold 22 cartridges. A 220 V diesel generator was mounted onto the undercarriage. This generator was powered by a Volkswagen diesel engine. In 1989 the Royal Netherlands Army acquired 30 Flycatcher systems. Each Flycatcher was fielded with two modified Bofors 40L70G guns. The 'G' stands for 'Gemodificeerd', which is the Dutch word meaning 'modified'. In the 40L70G version the loading mechanism was further improved and could be recognized by open rear guides. The 40L70G guns were also provided with muzzle velocity radars. Early in the 1990s the Royal Netherlands Air Force 40L70s were upgraded to the 'G' version. In some versions of the Swedish Army Combat Vehicle 90 there is a cartridge fed, automatic version of the L/70 autocannon installed. In order to fit inside the vehicle, the gun is mounted upside down. New armour piercing and programmable ammunition have also been developed. Germany has used L/70 guns on its Class 352, Class 333 and Class 332 mine hunting vessels, although these will be replaced by Rheinmetall MLG 27 remote-controlled gun systems until 2008. Until the early 80s L/70 guns guided by D7B radars were in widespread use in the anti-aircraft role in the German Navy and German Air Force until replaced by Roland SAMs. The L/70 is also used by the Indian Abhay IFV which carries 210 APFSDS and high explosive rounds.

Oerlikon GDF-005 Swiss 35mm Towed Anti-Aircraft Gun




Tiers:



Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: GDF-005
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes
Note: Initial operating capability was achieved in 1985. It is fitted with the Contraves Gun King digital optronic sighting system. There is three-dimensional target tracking with laser rangefinder, periscope sight and digital computer. It has an integrated power supply on the mount; the battery power is sufficient for five combat cycles before IPS must be restarted. It also includes an autonomous gun sighting system.

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m

Width, Traveling: 2.26 m

Width, Firing: 4.49 m

Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

↳*System*

Name: KDC-002 Gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI
Caliber: mm35
Projectile Length: 387 mm
Projectile Weight: 550 g
Explosive: 112 g
Propellant: 330 g
Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)
Caliber: mm35
Projectile Length: 387 mm
Projectile Weight: 550 g
Explosive: 70 g
Propellant: 330 g
Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA
Computerized FCS: INA
Sight: Ferranti sight
Laser Rangefinder: Yes
Digital Computer: Yes
Autonomous Gun Sighting System: Yes, Contraves Gun King digital optronic sighting system.
Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.
Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow

missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-005: Initial operating capability was achieved in 1985. It is fitted with the Contraves Gun King digital optronic sighting system. There is three-dimensional target tracking with laser rangefinder, periscope sight and digital computer. It has an integrated power supply on the mount; the battery power is sufficient for five combat cycles before IPS must be restarted. It also includes an autonomous gun sighting system. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

Type 55 Chinese 37mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **Type 63:** Twin 37 mm guns with vertical stabilization mounted on a T-34 chassis.
- **Type 65:** Copy of the twin barreled 37 mm
- **Type 74:** Upgraded version of the Type 65 with a greater rate of fire
- **Type 74SD:** Type 74 with servo system removed for operation with Type 800 laser course director system
- **Type 79-III:** Upgraded version of the Type 74 with electro-optical director, and powered traverse and elevation.
- **Type 76:** Naval version of the twin 37 mm.
- **P793:** Advanced twin-barrel version, with electro-optical predicting sight and higher rate of fire and lengthened barrels giving a higher muzzle velocity (1,000 m/s). Operated by a crew of 5 or 6.

System

Alternative Designations: Type 55
Description: 37mm Towed Anti-Aircraft Gun
Crew: 8, 4 (est) while traveling
Carriage: Four Wheels
Emplacement Time (sec): 8.5 while traveling. Gun can be fired from a halt without dropping trails. 30 full emplace, to drop trails.
Displacement Time (sec): 8 sec while traveling. 30 from full emplacement

Dimensions

Length Overall: m6.04
Length of Barrel: m2.73
Height Overall: m2.11
Width Overall: m1.95
Combat Weight: kg2,050

Automotive

Prime Mover: Utility Vehicles, Small, and Medium Trucks
Max Towed Speed: km/h60
Cross Country: km/h25

Fording Depth: m0.7

Main Armament

Caliber, Type: Rifled

Caliber: 37mm

Number of Barrels: 1

Breech Mechanism: Rising Block

Cyclic Rate of Fire: rd/min180

Practical Rate of Fire: rd/min80

Clip Capacity: 5 rounds, gun magazine holds 2 clips for 10 rounds

Loader Type: Manual Gravity Feed

Reaction Time: 4.5 sec, 4 to stop and fire during a move (without radar)

Reload Time: 2 seconds per clip

Traverse: deg360

Traverse Rate: deg/sec61

Elevation: deg-5 to +85

Elevation Rate:: deg/sec22

Ammunition

Type: HE, HE-FRAG-T, AP, AP-T, HVAP, HVAP-T, HEI-T

Max Range: m8,500

Max Effective Range (slant): m3,500

Max Effective (ground targets): m3,500

Max Altitude: m6,000

Max Effective Altitude: m3,000

Armor Penetration: 55mm @ 500m

HE Projectile Weight: kg0.74

AP Projectile Weight: kg,77

HE-FRAG-T Projectile Weight: kg0.73

HVAP Projectile Weight: kg0.62

HEI-T Projectile Weight: INA

HE Muzzle Velocity: m/s880

AP Muzzle Velocity: m/s880

HE-FRAG-T Muzzle Velocity: m/s880

HVAP Muzzle Velocity: m/s960

Self-Destruct: sec8 to 12

Self-Destruct Range: m3,700 to 4,700

Weapons and Ammunition Types

1 x 37-mm AA gun HE HE-FRAG-T AP AP-T HVAP HVAP-T HEI-T: Typical Combat Load 500

Notes:

The Type 55 37mm Towed Anti-Aircraft Gun is a Chinese version of the Russian M1939 (61-K) 37mm Anti-Aircraft Gun. The 37 mm automatic air defense gun M1939 (61-K) (Russian: 37-мм автоматическая зенитная пушка образца 1939 года (61-К)) is a Soviet 37 mm caliber anti-aircraft gun developed during the late 1930s and used during World War II. The land-based version was replaced in Soviet service by the ZSU-57-2 during the 1950s. Guns of this type were successfully used throughout the Eastern Front against dive bombers and other low- and medium-altitude targets. It also had some usefulness against lightly armored ground targets. Crews of the 37 mm AD guns shot down 14,657 Axis planes. The mean quantity of 37 mm ammunition to shoot down one enemy plane was 905 rounds. The Soviet Navy purchased a number of Bofors 25 mm Model 1933 guns in 1935, trials of the weapon were successful and it was decided to develop a 45 mm version of the weapon designated the 49-K. The development under the guidance of leading Soviet designers M. N. Loginov, I. A. Lyamin and L. V. Lyuliev was successful, but the army thought that the 45 mm caliber was a little too large for an automatic field weapon. In January 1938 the Artillery Factory Number 8 in Sverdlovsk was ordered to develop a 37 mm weapon based on the same design. The task was fulfilled by the chief designer of the factory, Mikhail Loginov, and his assistant Lev Loktev. Firing trials of the new 61-K were conducted in October 1938. Competitive firing trials were conducted in 1940 between the 61-K and the Bofors 40 mm/56. There were no substantial differences found between them. The weapon was initially installed as a single-barrel weapon on a four-wheeled ZU-7 carriage, and was soon ready for service. An initial order for 900 units was placed. The gun was operated by a crew of eight men. A total of 200 rounds of ammunition were carried which were fed into the gun in five-round clips. Total Soviet production was around 20,000 units, ending in 1945. However, it has also been produced in Poland, China and North Korea. Armor penetration of the armor-piercing (AP) rounds is reported as 37 millimetres of rolled homogeneous armor (RHA) at 60°at 500 metres range and 28 millimetres of RHA at 90° at 1,500 metres range.

Type 63 Chinese 37mm Towed Anti-Aircraft Gun



Tiers:



Variants:

- **Type 55:** copy of the single barreled 37 mm M1939
- **Type 63:** twin 37 mm guns with vertical stabilization mounted on a T-34 chassis.
- **Type 65:** copy of the twin barreled 37 mm
- **Type 74:** upgraded version of the Type 65 with a greater rate of fire
- **Type 74SD:** Type 74 with servo system removed for operation with Type 800 laser course director system
- **Type 79-III:** upgraded version of the Type 74 with electro-optical director, and powered traverse and elevation.
- **Type 76:** Naval version of the twin 37 mm.
- **P793:** Advanced twin-barrel version, with electro-optical predicting sight and higher rate of fire and lengthened barrels giving a higher muzzle velocity (1,000 m/s). Operated by a crew of 5 or 6.

System

Alternative Designations: Type 63
Description: 37mm Towed Anti-Aircraft Gun
In Service: 1942-Present
Crew: 8, 4 (est) while traveling
Carriage: Four Wheels
Emplacement Time (sec): 8.5 while traveling. Gun can be fired from a halt without dropping trails. 30 full emplace, to drop trails.
Displacement Time (sec): 8 sec while traveling. 30 from full emplacement

Dimensions

Length Overall: m6.04
Length of Barrel: m2.73
Height Overall: m2.11
Width Overall: m1.95
Combat Weight: kg2,050

Automotive

Prime Mover: Utility Vehicles, Small, and Medium Trucks

Max Towed Speed: km/h60

Cross Country: km/h25

Fording Depth: m0.7

Main Armament

Type: Rifled

Caliber: 37mm

Number of Barrels: 1

Breech Mechanism: Rising Block

Cyclic Rate of Fire: rd/min180

Practical Rate of Fire: rd/min80

Clip Capacity: rds5, gun magazine holds 2 clips for 10 rounds

Loader Type: Manual Gravity Feed

Reaction Time: sec4.5, 4 to stop and fire during a move (without radar)

Reload Time: sec2 per clip

Traverse: deg360

Traverse Rate: deg/sec61

Elevation: deg-5 to +85

Elevation Rate:: deg/sec22

Ammunition

Type: HE, HE-FRAG-T, AP, AP-T, HVAP, HVAP-T, HEI-T

Max Range: m8,500

Max Effective Range (slant): m3,500

Max Effective (ground targets): m3,500

Max Altitude: m6,000

Max Effective Altitude: m3,000

Armor Penetration: 55mm @ 500m

HE Projectile Weight: kg0.74

AP Projectile Weight: kg,77

HE-FRAG-T Projectile Weight: kg0.73

HVAP Projectile Weight: kg0.62

HEI-T Projectile Weight: INA

HE Muzzle Velocity: m/s880

AP Muzzle Velocity: m/s880

HE-FRAG-T Muzzle Velocity: m/s880

HVAP Muzzle Velocity: m/s960

Self-Destruct: sec8 to 12

Self-Destruct Range: m3,700 to 4,700

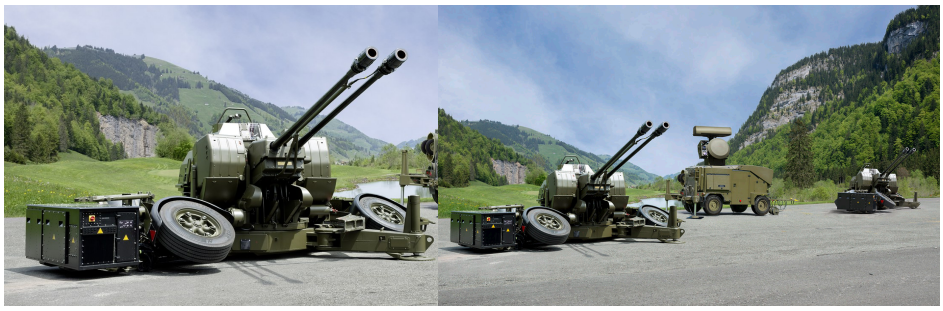
Weapons and Ammunition Types

1 x 37-mm AA gun HE HE-FRAG-T AP AP-T HVAP HVAP-T HEI-T: Typical Combat Load 500

Notes:

The Type 63 37mm Towed Anti-Aircraft Gun is a Chinese twin 37mm version of the Russian M1939 (61-K) 37mm Towed Anti-Aircraft Gun. The 37 mm automatic air defense gun M1939 (61-K) (Russian: 37-мм автоматическая зенитная пушка образца 1939 года (61-К)) is a Soviet 37 mm calibre anti-aircraft gun developed during the late 1930s and used during World War II. The land-based version was replaced in Soviet service by the ZSU-57-2 during the 1950s. Guns of this type were successfully used throughout the Eastern Front against dive bombers and other low- and medium-altitude targets. It also had some usefulness against lightly armoured ground targets. Crews of the 37 mm AD guns shot down 14,657 Axis planes. The mean quantity of 37 mm ammunition to shoot down one enemy plane was 905 rounds. The Soviet Navy purchased a number of Bofors 25 mm Model 1933 guns in 1935, trials of the weapon were successful and it was decided to develop a 45 mm version of the weapon designated the 49-K. The development under the guidance of leading Soviet designers M. N. Loginov, I. A. Lyamin and L. V. Lyuliev was successful, but the army thought that the 45 mm calibre was a little too large for an automatic field weapon. In January 1938 the Artillery Factory Number 8 in Sverdlovsk was ordered to develop a 37 mm weapon based on the same design. The task was fulfilled by the chief designer of the factory, Mikhail Loginov, and his assistant Lev Loktev. Firing trials of the new 61-K were conducted in October 1938. Competitive firing trials were conducted in 1940 between the 61-K and the Bofors 40 mm/56. There were no substantial differences found between them. The weapon was initially installed as a single-barrel weapon on a four-wheeled ZU-7 carriage, and was soon ready for service. An initial order for 900 units was placed. The gun was operated by a crew of eight men. A total of 200 rounds of ammunition were carried which were fed into the gun in five-round clips. Total Soviet production was around 20,000 units, ending in 1945. However, it has also been produced in Poland, China and North Korea. Armour penetration of the armour-piercing (AP) rounds is reported as 37 millimetres of rolled homogeneous armour (RHA) at 60°at 500 metres range and 28 millimetres of RHA at 90° at 1,500 metres range.

Oerlikon GDF-007 Swiss 35mm Towed Anti-Aircraft Gun



Tiers:



Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: GDF-007
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes
Note: Initial operating capability was achieved in 1985. It is fitted with the Contraves Gun King digital optronic sighting system. There is three-dimensional target tracking with laser rangefinder, periscope sight and digital computer. It has an integrated power supply on the mount; the battery power is sufficient for five combat cycles before IPS must be restarted. It also includes an autonomous gun sighting system.

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m

Width, Traveling: 2.26 m

Width, Firing: 4.49 m

Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

AHEAD Ammunition: Advanced Hit Efficiency and Destruction (AHEAD) ammunition was developed in late 1980s for service in mid-1990s. The GDF muzzle is fitted with three-coil muzzle-velocity sensor; Sky Guard fire-control software is modified. When the AHEAD round is fired, its passage through the rear two coils is timed and its exact muzzle velocity determined and used to set the time fuze in the projectile through the forward coil. When the timer triggers the fuze, the shell is fractured into a cone of heavy-metal fragments that spray the target. A 25-round burst is capable of generating a spray of 3,800 fragments. The system is designed to provide quick kills against small targets at long-ranges.

↳*System*

Name: KDC-002 Gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Laser Rangefinder: Yes

Digital Computer: Yes

Autonomous Gun Sighting System: Yes, Contraves Gun King digital optronic sighting system.

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves

Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-007 This is a further development of the basic GDF system. Features include: *High rate of fire; *Ahead capability (programmable air burst munition); *High hit probability; *High impact efficiency; *Rapid response to FCU target data in remote mode; *High performance sighting system and fire control for autonomous target engagement in local mode; *Self-defense capability; *Two 35-mm positively locked, gas operated automatic cannons with automatic weapon lubrication; *Automatic reloading; *Quick firing readiness after emplacement due to independent power supply unit; *Automatic muzzle velocity measurement and projectile fuze programming; *Built-in test and diagnostics; *High mobility with four-wheel trailer mount; *Rapid deployment at the firing position by tilting the wheels hydraulically; and *Accurate positioning, which is statically determined through automatic leveling of a three-point hydraulic support. Additionally, the GDF-006 is fitted with the Advanced Hit Efficiency and Destruction (AHEAD) ammunition was developed in late 1980s for service in mid-1990s. The GDF muzzle is fitted with three-coil muzzle-velocity sensor; Sky Guard fire-control software is modified. When the AHEAD round is fired, its passage through the rear two coils is timed and its exact muzzle velocity determined and used to set the time fuze in the projectile through the forward coil. When the timer triggers the fuze, the shell is fractured into a cone of heavy-metal fragments that spray the target. A 25-round burst is capable of generating a spray of 3,800 fragments. The system is designed to provide quick kills against small targets at long-ranges. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

M1939 (52-K) Russian 85mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **M1939, KS-12 (Soviet):** This is the original 85-mm anti-aircraft variant with built-up construction. Gun was later used in the SU-85 self-propelled gun and the T-34/85 medium tank. The M1939 designator has also been used to identify a 37-mm towed anti-aircraft gun. See separate database entry under that designator.
- **M1944:** This was a modified KS-12 with monobloc construction, longer barrel and reshaped muzzle brake that saw only limited use. Sources disagree on the Russian designations, some citing KS-12A, others KS-18.
- **Type 56:** This is the Chinese-built copy of KS-12.

System

Alternative Designation: M1939 (52-K)
Type: 85mm Towed Anti-Aircraft Gun
In Service: 1939-Present
Crew: ea7
Chassis: 2-axle and 4-wheeled with outriggers
Displacement Time: INA
Emplacement Time: INA

Air Defense Gun

↳*System*

Name: M1939 (52-K)
Type: Towed 85mm Anti-Aircraft Gun
Caliber: 85mm
Length: 7.05 m
Barrel Length: 4.7 m
Width: 2.15 m
Height: 2.25 m
Weight: combat: 4,500 kg (9,921 lbs) travel: 4,500 kg (9,921 lbs)
Breech: Vertical sliding-wedge

Recoil: Hydro-pneumatic
Carriage: 2-axle and 4-wheeled with outriggers
Elevation: -3° to 82°
Traverse: 360°
Rate of Fire: 10-12 rounds per minute
Muzzle Velocity: 792 m/s
Maximum Firing Range: 15.65 km
Effective Firing Range: 10,500m

↳*Ammunition*

Name: INA
Type: HE, AP-T
Caliber: 85mm
Shell: 85×629 mmR
Shell Weight: 9.2 kg

Fire Control

↳*Fire Control System*

Name: INA
Computerized FCS: PUAZO-6/12 director
Direct Fire: Yes
Indirect Fire: INA

Notes:

The 85 mm air defense gun M1939 (52-K) (Russian: 85-мм зенитная пушка обр. 1939 г. (52-К)) was an 85 mm (3.3 in) Soviet anti-aircraft gun, developed under guidance of leading Soviet designers M. N. Loginov and G. D. Dorokhin. This gun was successfully used throughout the German-Soviet War against level bombers and other high- and medium-altitude targets. In emergencies they were utilized as powerful anti-tank weapons. The barrel of the 52-K was the basis for the family of 85-mm Soviet tank guns. After the war some 52-Ks were refitted for peaceful purposes as anti-avalanche guns in mountainous terrain. Virtually every country behind the Iron Curtain received this gun after World War II for their air defense. In the Soviet Union itself, these guns were largely superseded by the 100 and 130 mm guns. Adopted in 1939, the 85-mm M1939, like its counterpart the 88-mm gun, was meant for air defense. Like many anti-aircraft (AA) guns of the era it was provided with antitank ammunition in the event a tank should appear. 85-mm M1939 guns were organized into heavy anti-aircraft regiments of 16 guns. The regiments were organized into divisions of the field anti-aircraft forces.

Type 90 (PG99) Chinese 35mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **Type 90B:** The Type 90B is the second generation of Type 90 series MLRS (Multiple Launch Rocket System) of 122mm caliber.
- **Type 90A:** able to fire unguided rockets, new computerised fire control, command post can lay and control Type 90A launchers units by remote control.

System

Alternative Designation: PG99, GDF-002
Description: Towed Twin 35mm Anti-Aircraft Gun
Crew: 5
Primary Targets: High-speed, low-flying aircraft, helicopters, unmanned aerial vehicles (UAV) and cruise missiles
Reaction time to an identified threat: secs6
Emplacement Time: secs90
Displacement Time: secs90
Rate of Fire: 1,100 rpm total, including both barrels
Range: m3,200
Power Source: External electric power. Manual power can be used in an emergency.
Weight: kg6,800
Traverse: degrees360
Elevation: -5 degrees / +92 degrees (electric); -8 degrees / +95 degrees (manual)
Maximum Aiming Speed (Traverse): degrees per second120
Maximum Aiming Speed (Elevation): degrees per second60
Power Station: kW40

Automotive

Notes:: The Type 90 is mounted on a cradle which is designed to carry the guns and the mobile platform. It contains the hydro-mechanical recoil mechanism, which absorbs the recoil forces. The lower part of the cradle comprises the two-axle chassis and the outriggers with the leveling spindles for four-point support in the firing positions. Raising and lowering the leveling spindles and raising the wheels are done electro-hydraulically or manually in the case of power failure. The Type 90

35mm twin-barrel can be towed by any military truck.

Maximum Towing Speed (Road): km/h80

Maximum Towing Speed (Cross Country): km/h30

Armament

Description: Twin Cannon

Power Source: Gas Powered

Round Description: 35mm / 90 caliber

Muzzle Velocity: mps1,175

Basic Load: rounds112

Ammunition in Ready Reserve: rounds126

Reload Time: secs7.5

Fire Control: Computer controlled electro-optical director for 3-dimensional target tracking in conjunction with the laser range finder.

Ammunition

HEI: High Explosive Incendiary

-T: Tracer

SAPHEI: Semi-Armor Piercing High Explosive Incendiary

FAPDS: Frangible Armor Piercing Discarding Sabot

AHEAD: Anti-missile rounds that fire 152 heavy tungsten metal sub projectiles

TP: Target Practice

↳*HE-T / HEI-T*

Projectile Weight: g535

Explosive: g98

Propellant: g330

Complete Round: g1,565

Muzzle Velocity: m/s1,175

↳*HE / HEI*

Projectile Weight: g550

Explosive: g112

Propellant: g330

Complete Round: g1,580

Muzzle Velocity: m/s1,175

↳*HEI (BF)*

Projectile Weight: g550

Explosive: g70

Propellant: g330

Complete Round: g1,580

Muzzle Velocity: m/s1,175

↳***SAPHEI / SAPHEI-T***

Projectile Weight: g550

Explosive: g22

Propellant: g330

Complete Round: g1,580

Muzzle Velocity: m/s1,175

↳***APDS / FAPDS***

Projectile Weight: g375

Explosive: gn/a

Propellant: g330

Complete Round: g1,440

Muzzle Velocity: m/s1,440

↳***TP-T / TP***

Projectile Weight: g550

Explosive: NA

Propellant: g330

Complete Round: g1,580

Muzzle Velocity: m/s1,175

↳***AHEAD***

Projectile Weight: g750

Explosive: NA

Propellant: g330

Complete Round: g1,780

Muzzle Velocity: m/s1,050

Notes:

The Type 90 is Chinese licensed copy of GDF-002 35mm anti-aircraft gun with twin barrels. The proven twin 35mm towed AA gun system represents the advanced development by NORINCO of a high performance, extremely accurate and reliable air defense gun. The gun is in service with the Chinese armed forces to provide field air defense for the ground forces at the division and group army level. The Type 90 was designed to engage high-speed, low-flying aircraft, helicopters, unmanned aerial vehicles (UAV) and cruise missiles. The Type 90 is suitable for point and coastal air defense. It is usually deployed near military bases, airfields, tunnels, islands, and along the coast to defend Sea Land of Communication (SLOC), ports, bridges and other important assets. The system’s reaction time to an airborne target is only 6 seconds, and the whole system can be set up

or taken down within 90 seconds.

Oerlikon GDF-003 Swiss 35mm Towed Anti-Aircraft Gun




Tiers:



Variants:

- **Skyguard:** SYSTEM/COMPLEX DESCRIBED FOR THE OPFOR HAS A RADAR, 2 ASPIDE MISSILE LAUNCHERS AND GENERATORS. AD COMPLEXES CAN VARY WIDELY. SINCE THEY ARE ORGANIZED AROUND THE SKYGUARD RADAR/CP UNIT, THEY MAY BE GUNS ONLY OR MISSILE LAUNCHERS ONLY. THE MOST EFFECTIVE AD ARRANGEMENT IS THE ONE NOTED ABOVE, AS A GUN/MISSILE SYSTEM.
- **GDF-001:** SYSTEM HAS A SIMPLE SIGHT.
- **GDF-002:** SYSTEM LINKS TO SKYGUARD.
- **GDF-003:** ADDS GUN SYSTEM UPGRADES.
- **GDF-005:** UPGRADE (FOR -003 WITH NDF-C KIT) HAS GUN KING 3-D AUTONOMOUS SIGHT SYSTEM, ONBOARD POWER SUPPLY AND AUTO-LOADER. CAN FIRE AHEAD ROUNDS.

System

Alternative Designations: GDF-003: Minor enhancements including protective covers and automatic weapon lubrication.
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m
Width, Traveling: 2.26 m
Width, Firing: 4.49 m
Height, Traveling: 2.60 m
Height, Firing: 1.72 m
Ground Clearance: 330 mm
Weight, Traveling: 6,700 kg
Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

↳*System*

Name: KDC-002 gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-003: Minor enhancements including protective covers and automatic weapon lubrication. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

Type 74 Chinese 37mm Towed Anti-Aircraft Gun




Tiers:



Variants:

- **Type 55:** Copy of the single barreled 37 mm M1939
- **Type 63:** Twin 37 mm guns with vertical stabilization mounted on a T-34 chassis.
- **Type 65:** Copy of the twin barreled 37 mm
- **Type 74SD:** Type 74 with servo system removed for operation with Type 800 laser course director system
- **Type 79-III:** Upgraded version of the Type 74 with electro-optical director, and powered traverse and elevation.
- **Type 76:** Naval version of the twin 37 mm.
- **P793:** Advanced twin-barrel version, with electro-optical predicting sight and higher rate of fire and lengthened barrels giving a higher muzzle velocity (1,000 m/s). Operated by a crew of 5 or 6.

System

Alternative Designations: Type 74

Description: 37mm Towed Anti-Aircraft Gun

Crew: 8, 4 (est) while traveling

Carriage: Four Wheels

Emplacement Time (sec): 8.5 while traveling. Gun can be fired from a halt without dropping trails. 30 full emplace, to drop trails.

Displacement Time (sec): 8 sec while traveling. 30 from full emplacement

Dimensions

Length Overall: m6.04

Length of Barrel: m2.73

Height Overall: m2.11

Width Overall: m1.95

Combat Weight: kg2,050

Automotive

Prime Mover: Utility Vehicles, Small, and Medium Trucks

Max Towed Speed: km/h60

Cross Country: km/h25

Fording Depth: m0.7

Main Armament

Type: Rifled

Caliber: 37mm

Number of Barrels: 1

Breech Mechanism: Rising Block

Cyclic Rate of Fire: rd/min180

Practical Rate of Fire: rd/min80

Clip Capacity: 5 rounds, gun magazine holds 2 clips for 10 rounds

Loader Type: Manual Gravity Feed

Reaction Time: 4.5 sec, 4 to stop and fire during a move (without radar)

Reload Time: 2 sec per clip

Traverse: deg360

Traverse Rate: deg/sec61

Elevation: -5 deg to +85 deg

Elevation Rate:: deg/sec22

Ammunition

Type: HE, HE-FRAG-T, AP, AP-T, HVAP, HVAP-T, HEI-T

Max Range: m8,500

Max Effective Range (slant): m3,500

Max Effective (ground targets): m3,500

Max Altitude: m6,000

Max Effective Altitude: m3,000

Armor Penetration: 55mm @ 500m

HE Projectile Weight: kg0.74

AP Projectile Weight: kg,77

HE-FRAG-T Projectile Weight: kg0.73

HVAP Projectile Weight: kg0.62

HEI-T Projectile Weight: INA

HE Muzzle Velocity: m/s880

AP Muzzle Velocity: m/s880

HE-FRAG-T Muzzle Velocity: m/s880

HVAP Muzzle Velocity: m/s960

Self-Destruct: sec8 to 12

Self-Destruct Range: m3,700 to 4,700

Weapons and Ammunition Types

1 x 37-mm AA gun HE HE-FRAG-T AP AP-T HVAP HVAP-T HEI-T: Typical Combat Load 500

Notes:

The Type 74 37mm Towed Anti-Aircraft Gun is a upgraded version of he Type 65 twin 37mm Towed Gun. The 37 mm automatic air defense gun M1939 (61-K) (Russian: 37-мм автоматическая зенитная пушка образца 1939 года (61-K)) is a Soviet 37 mm caliber anti-aircraft gun developed during the late 1930s and used during World War II. The land-based version was replaced in Soviet service by the ZSU-57-2 during the 1950s. Guns of this type were successfully used throughout the Eastern Front against dive bombers and other low- and medium-altitude targets. It also had some usefulness against lightly armored ground targets. Crews of the 37 mm AD guns shot down 14,657 Axis planes. The mean quantity of 37 mm ammunition to shoot down one enemy plane was 905 rounds. The Soviet Navy purchased a number of Bofors 25 mm Model 1933 guns in 1935, trials of the weapon were successful and it was decided to develop a 45 mm version of the weapon designated the 49-K. The development under the guidance of leading Soviet designers M. N. Loginov, I. A. Lyamin and L. V. Lyuliev was successful, but the army thought that the 45 mm caliber was a little too large for an automatic field weapon. In January 1938 the Artillery Factory Number 8 in Sverdlovsk was ordered to develop a 37 mm weapon based on the same design. The task was fulfilled by the chief designer of the factory, Mikhail Loginov, and his assistant Lev Loktev. Firing trials of the new 61-K were conducted in October 1938. Competitive firing trials were conducted in 1940 between the 61-K and the Bofors 40 mm/56. There were no substantial differences found between them. The weapon was initially installed as a single-barrel weapon on a four-wheeled ZU-7 carriage, and was soon ready for service. An initial order for 900 units was placed. The gun was operated by a crew of eight men. A total of 200 rounds of ammunition were carried which were fed into the gun in five-round clips. Total Soviet production was around 20,000 units, ending in 1945. However, it has also been produced in Poland, China and North Korea. Armour penetration of the armor-piercing (AP) rounds is reported as 37 millimetres of rolled homogeneous armor (RHA) at 60°at 500 metres range and 28 millimetres of RHA at 90° at 1,500 metres range.

ZU-23 (2A13) Russian 23mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **ZU-23-2:** The ZU-23-2, also known as ZU-23, is a russian made towed 23 mm anti-aircraft twin-barreled automatic cannon. At the end of World War II the standard anti-aircrfat gun was the ZPU series, armed with 14.5 mm machine gun. ZU-23-2 was developed in the late 1950s. It was designed to engage low-flying targets at a range of 2.5 km as well as armoured vehicles at a range of 2 km and for direct defense of troops and strategic locations against air assault usually conducted by helicopters and low-flying airplanes. During the Invasion of Grenada in October 1983, a ZU-23-2 shut down an American helicopter. ZU-23-2 entered service with the Soviet Army in 1960. ZU-23-2 is often mounted on trucks for use in both anti-aircraft and fire support roles. It can also be mounted on the roof of the MT-LB multi-purpose tracked APCs. Specially modified three-legged ZU-23-2 is used in BTR-DG based airborne SPAAG. Cheap, easy to operate and still effective, the ZU-23-2 is still used by the Russian Army and by more than 20 other armies in the word.

System

Alternative Designation: ZU-23; 2A13

Type: 23mm Towed Anti-Aircraft Gun

Caliber: 23mm

Crew: 6

Carriage: The ZU-23 consists from twin 2A14 Guns, light carriage mount based on two wheel chassis

Elevation: 90 deg

Traverse: 360 deg

Rate of Fire: 2,000 Rounds Per Minute

Maximum Firing Range: 2.5 km

Maximum Altitude: 2 km

Emplacement Time: For the ZU-23 preparation for firing from the march position there is a normative in 30 seconds.

Displacement Time: INA

Barrel Replacement: There is ability to replace quickly both barrels in the battlefield as they are overheating. Replacement operation takes 15 - 20 seconds and the spare barrels their self are completed with the gun.

Dimensions

Length: 4,570mm

Barrel Length: 87.3 Caliber

Width: 1,830mm

Height: INA

Weight, Combat: 950 kg

Ammunition

Name: INA

Type: Rifle

Caliber: 23mm

Muzzle Velocity: 970 m/s

Basic Load: INA

Belt: Feeding is provided from the 50 cartridge belts each, placed in the ammunition boxes.

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Sights: ZAP-23 automatic anti-aircraft sight, and additional sight used to fire at the ground targets.

Notes:

The ZU-23 Anti-Aircraft Artillery Gun was developed referring to the 1954 year Soviet Union requirements. The 2A14 Gun was developed for this gun in 1957. It's polygon tests took part till 1959 and finally in 1960 it entered service with the Soviet Army under the indexation as the ZU-23 23-mm Twin Anti-Aircraft Gun and also as the 2A13 as modifications with single or four barrels left only as test examples. At the moment the ZU-23 is used by the Russian Army and by more than 20 other countries of the world.

Type 59 Chinese 100mm Towed Anti-Aircraft Gun





Tiers:



System

Alternative Designations: Type 59
Crew: 15
Carriage: Towed 2-axle, 4-wheel carriage
Prime Movers: Towing vehicle AT-S or AT-T
Max Towed Speed: km/h35
Emplacement Time: sec7
Displacement Time: sec6

Dimensions

Length Overall: m9.3
Width Overall: m2.32
Combat Weight: kg11,000

Armament

Caliber, Type: 100-mm Gun
Number of Barrels: 1
Breech Mechanism: Rising Block
Service Life of Barrel: rds2,800
Rate of Fire: Maximum: INA Practical: 10-15 rd / min
Loader Type: Manual
Reaction Time: sec30
Reload Time: INA
Traverse: deg360
Traverse Rate: deg/sec61
Elevation: deg-3 to 89

Elevation Rate:: deg/sec12

Weapons and Ammunition Types

100-mm Gun Frag-HE AP-T APC-T: Typical Combat Load 100

Main Armament Ammunition

Type: Frag-HE, AP-T, APC-T

Range With On-Carriage Sight: m3,500

Range With Off-Carriage Radar: m12,600

Max Altitude: m14,500

Max Effective Altitude: m13,700

With On-Carriage Sight Altitude: m3,500

Frag-HE Projectile Weight: kg15.61

AP-T Projectile Weight: kg15.89

APC-T Projectile Weight: kg16

Muzzle Velocity: m/s900-1,000

Fuze Type: Proximity and Time

Self-Destruct: sec30

Fire Control

On-Carriages: INA

PO-IM Telescope Field of View: deg14

PO-IM Telescope Power: 5x

PO-IM Telescope Range: m3,500

PG Panoramic Telescope Field of View: deg10

PG Panoramic Telescope Power: 4x

Rangefinder: D-49 (off carriage)

Radar Name: SON-9/SON-9A (FIRE CAN)

Radar Function: Fire Control

Radar Detection Range: km80

Radar Tracking Range: km35

Radar Frequency: 2.7-2.9 GHz (E/F-band)

Radar Peak Power: kw300

PUAZO 6-19 or 6-19M: fire control director

Note: FIRE CAN, LONG TRACK, FLAT FACE, WHIFF

Notes:

The Type 59 is a Chinese version of the Russian KS-19 100mm Towed Anti-aircraft gun 100 mm air defense gun KS-19 was a Soviet anti-aircraft gun. Initially deployed aboard ships as the B-34 during the Second World War, a ground-mounted version

was introduced into service after the war as the KS-19. The KS-19 is a heavy towed anti aircraft gun that has largely disappeared from front line arsenals due to increased use of more effective surface-to-air missiles. Being a towed weapon an external form of mobility was required, usually an AT-S Medium or AT-T Heavy tracked artillery tractor. The 15 man crew were carried on the tractor along with ready use ammunition for the gun. Ammunition was loaded as a single round into the loading tray and a well trained crew could fire 15 rounds maximum per minute. Anti Aircraft ammunition includes high explosive, high explosive fragmentation and fragmentation types. The KS-19's onboard sights can be used to engage air targets; however increased accuracy was achieved if used in conjunction with a fire control radar such as the SON 9 (NATO Reporting name 'Fire Can') and PUAZO-6/19 director. As the KS-19 is a heavy caliber Anti-Aircraft gun it also has some utility in the ground role especially against armored targets. As a result of this two armor piecing rounds were produced: the AP-T (Armour Piercing-Tracer) and APC-T (Armour Piercing Capped-Tracer) with the AP-T round reportedly able to penetrate 185 mm of armor at 1000 m. The KS-19 was used in action by communist forces in both Korea and Vietnam.

ZPU-1 Russian 14.5mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **ZPU-4:** Type 56 – Chinese-built version. MR-4 – Romanian-built version with a two-wheel carriage designed locally.
- **ZPU-2:** Type 58 – Chinese-built version. PKM-2 – Polish-built version.
- **ZU-2:** INA
- **ZPU-1:** Type 75 and Type 75-1 - Chinese built-versions. BTR-40A SPAAG – A BTR-40 APC with a ZPU-2 gun mounted in the rear. Entered service in 1950. BTR-152A SPAAG – A BTR-152 with a ZPU-2 mounted in the rear. Entered service in 1952.

System

Alternative Designation: ZPU-1
Type: 14.5mm Towed Anti-Aircraft Gun
Caliber: 14.5mm
Crew: 4
Carriage: INA
Barrels: 1
Elevation: +88/−8 deg
Traverse: 360 deg
Maximum Firing Range: 8,000 m
Maximum Firing Altitude: 5,000 m
Effective Altitude: 1,400 m
Emplacement Time: INA
Displacement Time: INA

Dimensions

Length, Traveling: 3.44 m
Width, Traveling: 1.62 m
Height, Traveling: 1.34 m
Weight, Firing: 413 kg

Ammunition

Basic Load: 1,200 Rounds

↳*Ammunition (Option 1)*

Name: BS.41

Type: API

Projectile Weight: 64.4 g (2.27 oz)

Muzzle Velocity: 1,000 m/s

Armor Penetration: Armor-penetration at 500 m (550 yd) is 32 mm (1.3 in) of RHA at 90 degrees.

Note: Full metal jacket bullet round with a tungsten carbide core.

↳*Ammunition (Option 2)*

Name: BZT

Type: API-T

Projectile Weight: 59.56 g (2.101 oz)

Muzzle Velocity: 1,005 m/s

Armor Penetration: INA

Note: Full metal jacket round with a steel core. Tracer burns to at least 2,000 m (2,200 yd).

↳*Ammunition (Option 3)*

Name: ZP

Type: I-T

Projectile Weight: 60.0 g (2.12 oz).

Muzzle Velocity: INA

Armor Penetration: INA

Note: "Instantaneous Incendiary" bullet with internal fuze, incendiary in tip, tracer container in base.

Fire Control

Computerized FCS: No

Direct Fire: Yes

Indirect Fire: No

Notes:

The ZPU (Russian: ЗПУ; зенитная пулемётная установка/zenitnaya pulemotnaya ustanovka, meaning "anti-aircraft machine gun mount") is a family of towed anti-aircraft gun based on the Soviet 14.5×114mm KPV heavy machine gun. It entered service with the Soviet Union in 1949 and is used by over 50 countries worldwide. Development of the ZPU-2 and ZPU-4 began in 1945, with development of the ZPU-1 starting in 1947. All three were accepted into service in 1949. Improved optical predicting gunsights were developed for the system in the 1950s. All weapons in the ZPU series have air-cooled quick-change barrels and can fire a variety of ammunition including API (B32), API (BS41), API-T (BZT) and I-T (ZP) projectiles. Each barrel has a maximum rate of fire of around 600 rounds per minute, though this is practically limited to about 150 rounds per minute. The quad-barrel ZPU-4 uses a four-wheel carriage similar to that once used by the obsolete 25 mm automatic anti-aircraft gun M1940. In firing position, the weapon is lowered onto firing jacks. It can be brought in and out of action in about 15 to 20

seconds, and can be fired with the wheels in the traveling position if needed. The double-barrel ZPU-2 was built in two different versions; the early model has large mud guards and two wheels that are removed in the firing position, and the late model has wheels that fold and are raised from the ground in the firing position. ZPU-2 turned out to be too heavy for the Airborne Troops, so a new UZPU-2 (later redesignated as ZU-2) was developed from ZPU-1. The single-barrel ZPU-1 is carried on a two-wheeled carriage and can be broken down into several 80-kilogram pieces for transport over rough ground. Versions of the weapon are built in China, North Korea and Romania. The series was used during the Korean War by Chinese and North Korean forces, and was later considered to be the most dangerous opposition to U.S. helicopters in Vietnam. Later it was used by Morocco and the Polisario Front in the Western Sahara War. It was also used by Iraqi forces during Operation Desert Storm and again in Operation Iraqi Freedom. In 1974 the Cyprus National Guard artillery batteries used their ZPU-2's against the Turkish air force. In the Russian military, it was replaced by the newer and more powerful ZU-23 23 mm twin automatic anti-aircraft gun. During the Lebanese Civil War, the Lebanese militias mounted the ZPU-2 and ZPU-4 on various vehicles, such as M113 armored personnel carriers, to create self-propelled support vehicles. The ZPU has seen widespread use by both sides in the Libyan Civil War, Syrian Civil War, and Yemeni Civil War, being often mounted on technical pickup trucks. The weapon has also been heavily used in the being installed on pickup trucks and is credited for bringing down several Syrian Air Force helicopters

Samavat Iranian 35mm Towed Anti-Aircraft Gun




Tiers:



Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: Samavat
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m
Width, Traveling: 2.26 m
Width, Firing: 4.49 m
Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

NDF-C Package: The NDF-C version is the same as NDF-A, but substituting Gun King for the Ferranti sight and adding integrated power supply.

↳*System*

Name: KDC- gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳***Ammunition (Option 3)***

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

The Samavat is an Iranian copy of the 35-mm GDF that was first publicly displayed in 2008. Some reports claim the Samavat is similar to the GDF-001; it is said to utilize a Skyguard GCS. GDF-001 This is the first production variant. It is fitted with a Xaba optical sight. Many were updated with NDF-A, B or C kits. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

KS-12 Russian 85mm Towed Anti-Aircraft Gun





Tiers:



System

Alternative Designation: KS-12
Type: 85mm Towed Anti-Aircraft Gun
Caliber: 85mm
Crew: 7
Carriage: The 85mm cannon is mounted to four wheeled carriage with two axles, one at the front and one at the rear.
Mobility: 50 km/h maximum towed speed by truck
Rate of Fire: 15 - 20 rds/min
Maximum Firing Range: 10,000 m vertical and 15,650 m horizontal
Elevation: +82°/-3°
Traverse: 360°
Protection: An armour shield can be mounted at the front each side of the 85mm cannon.
Emplacement Time: Less than 5 Minutes
Displacement Time: Less than 5 Minutes

Dimensions

Length: 7.04 m
Width: 2.15 m
Height: 2.25 m
Weight, Combat: 4,300 kg

Ammunition

Name: INA

Type: AP (Armor-Piercing) and FRAG (FRAGmentation).

Caliber: 85mm

Basic Load: INA

Fire Control

Computerized FCS: The weapon system is fitted with fire control equipment which can be used in conjunction with the PUAZO-6/12 director and the SON-9/SON-9A (NATO designation `Fire Can') A/B-band fire-control radar.

Direct Fire: Yes

Indirect Fire: Yes

Collimator: INA

Notes:

The KS-12 85mm single shot AA gun is mounted on a 4 wheeled towed carriage. The Chinese variant is the Type-72. The 85-mm anti-aircraft gun of 1939 is also known as the KS-12. The new gun had good characteristics - 800 m / s initial projectile speed of 9.2 kg and a range of 10.5 km - allowed the new anti-aircraft gun to fight very effectively against armored and high-flying targets. The gun had inertial semi-automatic shutter. High results were supposed to show and shooting from an anti-aircraft gun at ground armored targets. Thus, even before the outbreak of hostilities, the KS-12 anti-aircraft gun went into mass production. Although long withdrawn from Russian service, it remains operational in several countries, including North Korea. The 85-mm anti-aircraft gun of 1939 appeared as a natural result of the development of Russian anti-aircraft artillery, which originated in 1914, when the designer of the Putilov factory F. Lander developed the first 76-mm anti-aerostatic gun of 1914. In 1915 and in 1928, this system was subjected to modernization, which increased the vertical firing range at a maximum elevation angle of up to 6,500 m; it was replaced by a 76-mm anti-aircraft gun of the 1931 model. In 1938, on the instructions of the GAU, several prototypes of the modernized 76-mm gun were manufactured. Installed on a four-wheeled carriage, it weighed 4200 kg - significantly less than the previous one. In this form, it is accepted into service as a 1938 anti-aircraft gun. However, the increase in speed and "ceiling" of the aircraft, increasing their survivability demanded an increase in the reach of anti-aircraft guns at height and an increase in the power of the projectile. At the end of the 1930s, it became obvious that the rapid development of aviation would lead to significant problems in the future in the event of opposition from aviation and air defense forces. Thus, the already available means of air defense could not adequately guarantee sufficient effectiveness. There was a need to give the army a long-range anti-aircraft gun, the weapon had to be powerful enough to hit high-flying armored targets. It was decided to base the 76.2-mm gun of the Rheinmetall company and to proceed from this when creating an anti-aircraft gun. The designers of the plant number 8 in 1937-1938 did this. The 76.2-mm gun had a large margin of safety embedded in the casing, breech and gun carriage. As a result, a new gun at that time was developed (not counting the single instances that appeared) of an 85-mm caliber.

Type 59 Chinese 57mm Towed Anti-Aircraft Gun




Tiers:

1 2 3 4

Variants:

- **AK-725:** Naval version of the S-60 gun. Introduced in 1958. Mounted in single, double and quadruple mounts (designated ZIF-31) on many early Soviet destroyers.
- **ZIF-72:** Naval version which is enclosed in a metal housing and fully automatic. Also exported to India. Introduced in the mid-1970s.
- **ZSU-57-2::** Self-propelled version with two 57 mm S-60 guns (designated S-68)
- **Type-80::** Chinese version of the ZSU-57-2.
- **BM-57:** Updated version.
- **AU-220M Baikal::** Remote weapon station with fire control system using BM-57

System

Alternative Designations: NA
Crew: 7
Carriage: Four Wheel
Prime Movers: Ural-375D
Max Towed Speed: km/h60
Emplacement Time: min1
Displacement Time: min3

Dimensions

Length Overall: m8.5
Length of Barrel: m4.4
Width Overall: m2.054
Height: m2.37
Weight: kg4,500

Main Armament

Type: 57-mm Automatic Cannon
Caliber: mm57
Number of Barrels: 1 each

Service Life of Barrel: INA

Cyclic Rate of Fire: rds/min105-120

Reload Type: sec4-8

Practical Rate of Fire: rds/min70

Loader Type: 4 Round Clip, Manual

Reaction time: sec4.5

Maximum Elevation: deg+85

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Muzzle Velocity: m/s1,000

Maximum Firing Range, Radar Guided: m6,000

Maximum Firing Range, Optical Guided: m4,000

Main Armament Ammunition

↳*Ammunition (Option 1)*

Name: UBR-281/281U

Type: APCBC-HE-T

Projectile Weight: grams2,820

Bursting Charge: grams13

Muzzle Velocity: m/s1,000

Note: Anti-tank round with sharp penetrator, blunt cap and an aerodynamic cover, with tracer and a delayed-action base fuze.Penetration 96 mm RHA at 1,000 m range or 106 mm at 500 m.UBR-281 and -281U are loaded with the same projectile and differ only by details in case mouth and swage grooves.

↳*Ammunition (Option 2)*

Name: 3UO6

Type: HE

Projectile Weight: INA

Bursting Charge: grams154

Muzzle Velocity: m/s1,000

Notes: Similar to UOR-281U but with proximity fuze AR-51 installed. Fuze operating with RPK-1 system together. Not to be confused with later smart shells which Russia developed.

↳*Ammunition (Option 3)*

Name: UOR-281U

Type: HE-T

Projectile Weight: grams2,850

Bursting Charge: grams168

Muzzle Velocity: m/s1,000

Note: Similar to UOR-281; some sources state the shell is the same as in UOR-281 and the round differs from it only in details of the case mouth and swage grooves (as with the UBR round),[8] while others claim a slightly larger HE filling

Fire Control

Rangefinder: D-49

Radar Name: Son-9/Son-9A (NATO FIRE CAN)

Radar Function: Fire Control

Radar Detection Range: km80

Radar Tracking Range: km35

Radar Frequency: 2.7-2.9 GHz

Radar Frequency Band: E

Radar Peak Power: kw300

Alternative Radar RPK- 1/FLAP WHEEL Range (km): km34

Notes:

The Type 59 57mm Towed Anti-Aircraft Gun is a Chinese version of the Russian S-60 57mm Towed Anti-Tank Gun. The S-60 is a towed, road-transportable, short- to medium-range, single-barrel 57-mm antiaircraft gun system. The S-60 recoil-operated weapon replaced the earlier 37mm models in most Warsaw Pact units. It is a powerful weapon, well suited to attack armored vehicles as well as low-flying aircraft. In addition to on-carriage optical fire control, the S-60 also employs off-carriage fire control with the PUAZO-6/60 director and the SON-9 or SON-9A radars. Originally the PUAZO-5 director and SON-4 radar were used. Further improved director/radar combinations became available in subsequent years. Recognition features of the S-60 are the long, thin tube with multi-perforated muzzle brake, distinctive gun shield which folds down and the horizontal feed tray which holds the four-round clips. The normal Soviet prime mover is the Ural-375 truck. The four-wheel carriage can be leveled and stabilized on jacks to form a point firing base. Loading is accomplished by 4-round horizontally fed clips. The S-60 also has an ammunition ready rack that can hold 4 four-round clips near ammunition feed mechanism on left side of the breech. A twin version, the S-68, is mounted on the self-propelled ZSU-57-2, and twin and quad versions are used by the Soviet Navy. It should be noted that the ammunition for the 57mm antiaircraft guns is not_ interchangeable with that used by the 57mm antitank and assault guns. This is due to the different configuration and dimensions of the cartridge cases. Besides on-carriage optical fire control, the S-60 also employs an off-carriage FLAP WHEEL fire control radar, mounted on a separate van. The towed S-60 system lacks the mobility of the newer SAM systems with which it is being replaced. A self-propelled version, the ZSU-57-2, with twin 57-mm guns mounted on a modified T-54 tank chassis, was introduced in 1957. The ZSU-57-2 has the same characteristics as the S-60 except that it is not radar-controlled. It is now considered obsolete.

Oerlikon GDF-002 Swiss 35mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: GDF-002
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes
Note: This has a digital data link from the Super Fledermaus or Skyguard radar fire-control system. Typical battery includes two gun mounts with separate generators, single Skyguard. There is a Ferranti Type GSA Mk 3 with optical alignment sight; target range is entered by gunner.

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m
Width, Traveling: 2.26 m

Width, Firing: 4.49 m

Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

NDF-C Package: The NDF-C version is the same as NDF-A, but substituting Gun King for the Ferranti sight and adding integrated power supply.

↳*System*

Name: KDC- gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-002: This has a digital data link from the Super Fledermaus or Skyguard radar fire-control system. Typical battery includes two gun mounts with separate generators, single Skyguard. There is a Ferranti Type GSA Mk 3 with optical alignment sight; target range is entered by gunner. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

KS-19 Russian 100mm Towed Anti-Aircraft Gun





Tiers:



System

Alternative Designations: KS-19
Crew: 15
Carriage: Towed 2-axle, 4-wheel carriage
Prime Movers: Towing vehicle AT-S or AT-T
Max Towed Speed: km/h35
Emplacement Time: sec7
Displacement Time: sec6

Dimensions

Length Overall: m9.3
Width Overall: m2.32
Combat Weight: kg11,000

Armament

Caliber, Type: 100-mm Gun
Number of Barrels: 1
Breech Mechanism: Rising Block
Service Life of Barrel: rds2,800
Rate of Fire: fd/minMaximum: INA Practical: 10-15
Loader Type: Manual
Reaction Time: sec30
Reload Time: secINA
Traverse: deg360
Traverse Rate: deg/sec61
Elevation: deg-3 to 89

Elevation Rate:: deg/sec12

Weapons and Ammunition Types

100-mm Gun Frag-HE AP-T APC-T: Typical Combat Load 100

Main Armament Ammunition

Type: Frag-HE, AP-T, APC-T

Range With On-Carriage Sight: m3,500

Range With Off-Carriage Radar: m12,600

Max Altitude: m14,500

Max Effective Altitude: m13,700

With On-Carriage Sight Altitude: m3,500

Min: 0

Frag-HE Projectile Weight: kg15.61

AP-T Projectile Weight: kg15.89

APC-T Projectile Weight: kg16

Muzzle Velocity: m/s900-1,000

Fuze Type: Proximity and Time

Self-Destruct: sec30

Fire Control

On-Carriages: INA

PO-IM Telescope Field of View: deg14

PO-IM Telescope Power: 5x

PO-IM Telescope Range: m3,500

PG Panoramic Telescope Field of View: deg10

PG Panoramic Telescope Power: 4x

Rangefinder: D-49 (off carriage)

Radar Name: SON-9/SON-9A (FIRE CAN)

Radar Function: Fire Control

Radar Detection Range: km80

Radar Tracking Range: km35

Radar Frequency: 2.7-2.9 GHz (E/F-band)

Radar Peak Power: kw300

PUAZO 6-19 or 6-19M: fire control director

Notes:

100 mm air defense gun KS-19 was a Soviet anti-aircraft gun. Initially deployed aboard ships as the B-34 during the Second World War, a ground-mounted version was introduced into service after the war as the KS-19. The KS-19 is a heavy towed anti

aircraft gun that has largely disappeared from front line arsenals due to increased use of more effective surface-to-air missiles. Being a towed weapon an external form of mobility was required, usually an AT-S Medium or AT-T Heavy tracked artillery tractor. The 15 man crew were carried on the tractor along with ready use ammunition for the gun. Ammunition was loaded as a single round into the loading tray and a well trained crew could fire 15 rounds maximum per minute. Anti Aircraft ammunition includes high explosive, high explosive fragmentation and fragmentation types. The KS-19's onboard sights can be used to engage air targets; however increased accuracy was achieved if used in conjunction with a fire control radar such as the SON 9 (NATO Reporting name 'Fire Can') and PUAZO-6/19 director. As the KS-19 is a heavy calibre Anti-Aircraft gun it also has some utility in the ground role especially against armored targets. As a result of this two armor piecing rounds were produced: the AP-T (Armour Piercing-Tracer) and APC-T (Armour Piercing Capped-Tracer) with the AP-T round reportedly able to penetrate 185 mm of armor at 1000 m. The KS-19 was used in action by communist forces in both Korea and Vietnam.

Oerlikon GDF-001 Swiss 35mm Towed Anti-Aircraft Gun





Tiers:



Variants:

- **GDF-001:** XABA sight
- **GDF-002:** Introduced in 1980. Improved Ferranti sight and digital data bus. The gun has 112 rounds ready and 126 in reserve (238 rounds total)
- **GDF-003:** Minor enhancements including protective covers and automatic weapon lubrication.
- **GDF-005:** Introduced in 1985. Fitted with Gunking 3D computer-controlled sight with a laser range finder and digital fire control system. Integrated power supply and diagnostics. 280 rounds on the gun and an automatic re-loading system.
- **GDF-007:** GDF-005 upgraded with AHEAD system.
- **GDF-009:** Unveiled at IDEF 2015, held in May 2015 in Istanbul. To date, its exterior significantly changed, although the installation has retained the design of the original serial versions of the systems.Unlike other variants, this one relies on an internal power source.The GDF-009 model is based on a four-wheeled carriage, and is raised off the ground by three stabilisers when deployed in the firing position. It also features an automatic levelling system that can compensate for a maximum tilt angle of up to 7°.Mounted on the forward part of the carriage is the integrated battery, which functions as the gun's power supply unit and can be recharged from an external source if required.
- **AHEAD:** An upgrade for the GDF series guns built around a special projectile which explodes at a pre-calculated point in front of the target, sending a cone of 152 tungsten sub-projectiles at the target. Used by Canada, Pakistan, Greece, Oman, Spain, Taiwan, and Chile (unconfirmed).

System

Alternative Designations: GDF-001
Crew: 3
Carriage: 4-wheeled/2-axle towed chassis
Emplacement: 1.5 minutes
Displacement: 1.5 minutes
Note: GDF-001: This is the first production variant. It is fitted with a Xaba optical sight. Many were updated with NDF-A, B or C kits

Dimensions

Length, Traveling: 7.80 m
Length, Firing: 8.83 m
Barrel Length: 3.15 m
Width, Traveling: 2.26 m

Width, Firing: 4.49 m

Height, Traveling: 2.60 m

Height, Firing: 1.72 m

Ground Clearance: 330 mm

Weight, Traveling: 6,700 kg

Weight, Without Ammunition: 6,300 kg

Main Weapon System

Ammunition Types: HE-T/HEI-T, HE/HEI, HEI(BF), SAPHEI/SAPHEI-T, APDS/FAPDS, TP-T/TP, AHEAD

NDF-A Package: The NDF-A is the simplest of three combat improvement kits for existing mounts. It offers a Ferranti sight, automatic breech block lubrication, a rate-of-fire limiter for better accuracy and a permanently attached camouflage kit.

NDF-B Package: The variants is the same as NDF-A, with the addition of an automatic reload system and gunner cab.

NDF-C Package: The NDF-C version is the same as NDF-A, but substituting Gun King for the Ferranti sight and adding integrated power supply.

↳*System*

Name: KDC- gun

Type: Towed Anti-Aircraft Gun

Caliber: mm35

Bore: 35-mm/90-cal, rifled

Elevation: -5 deg to 92 deg (-89 mils to 1,634 mils)

Elevation Rate: 56 deg (1,000 mils)/sec

Traverse: 360 deg (6,400 mils)

Traverse Rate: 112 deg (2,000 mils)

Breech Type: gas-operated positive lock

Recoil System: hydromechanical

Maximum Range: 4,000 m

Muzzle Velocity: 1,175 mps

Rate of Fire: 550 rounds/min per barrel

↳*Ammunition (Option 1)*

Type: HE-T/HEI-T

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 535 g

Explosive: 98 g

Propellant: 330 g

Weight of Complete Round: 1,565 g

↳*Ammunition (Option 2)*

Type: HE/HEI

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 112 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

↳*Ammunition (Option 3)*

Type: HEI(BF)

Caliber: mm35

Projectile Length: 387 mm

Projectile Weight: 550 g

Explosive: 70 g

Propellant: 330 g

Weight of Complete Round: 1,552 g

Fire Control System

FCS Name: INA

Computerized FCS: INA

Sight: Ferranti sight

Note: Most GDF mounts are integrated with an external fire-control system, usually the Super Fledermaus or Skyguard system.

Radar System

Radar Vehicle Name: Skyguard Radar Fire-Control System.

Skyguard Radar Details: The Skyguard system is contained within a towed trailer, mounted on the roof of which is a pulse doppler search radar, a pulse doppler tracking radar and a co-axial television camera. The trailer also houses the crew of two and a small petrol generator. Skyguard is an all-weather air defense system for the control of aircraft at low altitude and at low and medium altitude range up to 3,000 m. The maximum effective distance is given as 4,000 m. The system takes the air surveillance, target acquisition, calculation of the derivative-action values and the control of two Oerlikon 35 mm anti-aircraft guns. Skyguard is served by four people. It was created by Oerlikon-Buehrle. The weapon was introduced in the 1960s in the Swiss Army and got updates in 1975, 1995 and 2010. They are still in use. It had replaced the system Contraves Super Fledermaus in the Swiss Air Force. The Skyguard radar system was used in the German Air Force for surveillance of low-altitude flight zones. The radar unit is readied quickly through the use of hydraulic systems for antenna erection and leveling after deployment. A typical fire unit using the Skyguard consists of two twin 35 mm gun platforms with a single Skyguard fire control radar. Skyguard systems can also incorporate an optional SAM module based on the GDF's mount and radar system but with the guns replaced by four missile canisters. It can be armed with either Aspide or RIM-7 Sea Sparrow missiles. In Greek service the Skyguard system with RIM-7M is known as the VELOS.

Note: Typical battery includes two gun mounts with separate generators, single Skyguard.

Protection

Armor: INA

Notes:

GDF-001 This is the first production variant. It is fitted with a Xaba optical sight. Many were updated with NDF-A, B or C kits. The Oerlikon GDF or Oerlikon 35 mm twin cannon is a towed anti-aircraft gun made by Oerlikon Contraves (renamed as Rheinmetall Air Defence AG following the merger with Rheinmetall in 2009). The system was originally designated as 2 ZLA/353 ML but this was later changed to GDF-001. It was developed in the late 1950s and is used by around 30 countries. The system uses twin autocannons, firing 35×228mm NATO-standard ammunition. It was originally designated 353 MK and is now designated as the KD series. The same KD series 35mm cannons are used in the Leopard 1 based Gepard and Type 74 tank based Type 87 SPAAG and Marksman self-propelled anti-aircraft guns (SPAAG). The system could be paired with the off-gun (remote) Super Fledermaus fire control radar, which in the late 1970s was upgraded to the Skyguard system. The weapons was aimed either directly, by way of an advanced sighting system, or automatically, by locking onto the target with radar. Early models carried 112 rounds ready to fire, and an additional 126 stored on the chassis as reloads. Later versions with automated reloading carry 280 rounds total. A typical engagement burst is 28 rounds

AZP S-60 Russian 57mm Towed Anti-Aircraft Gun





Tiers:

1 2 3 4

Variants:

- **AK-725:** Naval version of the S-60 gun. Introduced in 1958. Mounted in single, double and quadruple mounts (designated ZIF-31) on many early Soviet destroyers.
- **ZIF-72:** Naval version which is enclosed in a metal housing and fully automatic. Also exported to India. Introduced in the mid-1970s.
- **ZSU-57-2::** Self-propelled version with two 57 mm S-60 guns (designated S-68)
- **Type-80::** Chinese version of the ZSU-57-2.
- **BM-57:** Updated version.
- **AU-220M Baikal::** Remote weapon station with fire control system using BM-57

System

Alternative Designations: AZP S-60
In Service: 1950-Present
Crew: 7
Carriage: Four Wheel
Prime Movers: Ural-375D
Max Towed Speed: km/h60
Emplacement Time: min1
Displacement Time: min3

Dimensions

Length Overall: m8.5
Length of Barrel: m4.4
Width Overall: m2.054

Height: m2.37

Weight: kg4,500

Main Armament

Type: 57-mm Automatic Cannon

Caliber: mm57

Number of Barrels: 1 each

Service Life of Barrel: INA

Cyclic Rate of Fire: rds/min105-120

Reload Type: sec4-8

Practical Rate of Fire: rds/min70

Loader Type: 4 Round Clip, Manual

Reaction time: sec4.5

Maximum Elevation: deg+85

Minimum Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Muzzle Velocity: m/s1,000

Maximum Firing Range, Radar Guided: m6,000

Maximum Firing Range, Optical Guided: m4,000

Main Armament Ammunition

↳*Ammunition (Option 1)*

Name: UBR-281/281U

Type: APCBC-HE-T

Projectile Weight: grams2,820

Bursting Charge: grams13

Muzzle Velocity: m/s1,000

Note: Anti-tank round with sharp penetrator, blunt cap and an aerodynamic cover, with tracer and a delayed-action base fuze.Penetration 96 mm RHA at 1,000 m range or 106 mm at 500 m.UBR-281 and -281U are loaded with the same projectile and differ only by details in case mouth and swage grooves.

↳*Ammunition (Option 2)*

Name: 3UO6

Type: HE

Projectile Weight: INA

Bursting Charge: grams154

Muzzle Velocity: m/s1,000

Notes: Similar to UOR-281U but with proximity fuze AR-51 installed. Fuze operating with RPK-1 system together. Not to be confused with later smart shells which Russia developed.

↳*Ammunition (Option 3)*

Name: UOR-281U

Type: HE-T

Projectile Weight: grams2,850

Bursting Charge: grams168

Muzzle Velocity: m/s1,000

Note: Similar to UOR-281; some sources state the shell is the same as in UOR-281 and the round differs from it only in details of the case mouth and swage grooves (as with the UBR round),[8] while others claim a slightly larger HE filling

Fire Control

Rangefinder: D-49

Radar Name: Son-9/Son-9A (NATO FIRE CAN)

Radar Function: Fire Control

Radar Detection Range: km80

Radar Tracking Range: km35

Radar Frequency: 2.7-2.9 GHz

Radar Frequency Band: E

Radar Peak Power: kw300

Alternative Radar RPK- 1/FLAP WHEEL Range (km): km34

Notes:

The S-60 is a towed, road-transportable, short- to medium-range, single-barrel 57-mm antiaircraft gun system. The S-60 recoil-operated weapon replaced the earlier 37mm models in most Warsaw Pact units. It is a powerful weapon, well suited to attack armored vehicles as well as low-flying aircraft. In addition to on-carriage optical fire control, the S-60 also employs off-carriage fire control with the PUAZO-6/60 director and the SON-9 or SON-9A radars. Originally the PUAZO-5 director and SON-4 radar were used. Further improved director/radar combinations became available in subsequent years. Recognition features of the S-60 are the long, thin tube with multi-perforated muzzle brake, distinctive gun shield which folds down and the horizontal feed tray which holds the four-round clips. The normal Soviet prime mover is the Ural-375 truck. The four-wheel carriage can be leveled and stabilized on jacks to form a point firing base. Loading is accomplished by 4-round horizontally fed clips. The S-60 also has an ammunition ready rack that can hold 4 four-round clips near ammunition feed mechanism on left side of the breech. A twin version, the S-68, is mounted on the self-propelled ZSU-57-2, and twin and quad versions are used by the Soviet Navy. It should be noted that the ammunition for the 57mm antiaircraft guns is not_ interchangeable with that used by the 57mm antitank and assault guns. This is due to the different configuration and dimensions of the cartridge cases. Besides on-carriage optical fire control, the S-60 also employs an off-carriage FLAP WHEEL fire control radar, mounted on a separate van. The towed S-60 system lacks the mobility of the newer SAM systems with which it is being replaced. A self-propelled version, the ZSU-57-2, with twin 57-mm guns mounted on a modified T-54 tank chassis, was introduced in 1957. The ZSU-57-2 has the same characteristics as the S-60 except that it is not radar-controlled. It is now considered obsolete.

Type 65 Chinese 37mm Twin-Barrel Anti-Aircraft Gun





Tiers:



Variants:

- **Type 74:** The Type 74 is an improved variant of the Type 65 introduced in 1974. The weapon share the same 37mm cannon and ammunitions as the Type 65, but can be operated either manually or remotely by the fire-control unit consisting of an electro-optical director and a target searching radar. This enables the weapon to operate under day/night, all-weather conditions.

System

Alternative Designations: INA
Description: The Type 65 is the twin-37mm towed anti-aircraft artillery (AAA)
Crew: 5 to 8
Carriage: 4 Wheeled/ 2 Axle Towed
Primer Mover: INA
Max Towed Speed: km/h60
Cross Country Tow Speed: km/h25
Emplacement Time: min1
Displacement Time: min3
Fording Depth: m0.7
Tuning Radius: m8

Dimensions

Length, Traveling: m6.21
Lenght, Barrel: m2.73
Width: m1.82
Height: m2.28
Trail: 4-wheel carriage;4 firing jacks
Weight, Firing: kg2,835

Armament

Gun: Type 65

Caliber, Type: 37-mm Automatic Gun

Number of Barrels: ea2

Operation: Recoil

Service Life of Barrel: rds2,500+

Barrel Change Time: min2-3

Cyclic Rate of Fire: Cyclic: 320-360 rds/min (160-180/barrel)

Practical Rate of Fire: rds/min80

Loader Type: Two 5-Round Clips

Reload Time: sec4-8

Traverse: deg360

Elevation: -5 to 85

Elevation Rate: INA

Reaction time: INA

Main Armament Ammunition

Type: AP-T, HE-T, HEI-T

Max Effective (Slant) Range): m3,500

Max Effective (grnd targets) Range: m3,500

Max Effective Altitude: m3,000

Min Altitude: m0

Self-destruct time: sec8-12

Self-destruct range: m3,700-4,700

Fire Control

Description: Sights w/magnification: optical mechanical computing sight Azimuth warning receiver: 1l15-1 Off-carriage radar: Optional. The Chinese Type 311 continuous wave I/J-band fire control radar was designed and produced to support 37mm and 57mm guns. The trailer-mount radar with computer automation can conduct surveillance and target acquisition. It has at least three variants, with ranges of 30km (311-A), 35km (311-B), and 40km (311-C). Target tracking range is 25km for the -A variant. Emplacement time is 15 minutes. Radar gives user weapons night-time and adverse weather capability. This radar has been exported.

Other Fire Control: The gun is linked to the battery net which receives analog voice radio alerts for approaching aircraft, including direction and altitude. Guns and battery/ battalion have air watches and forward observers.

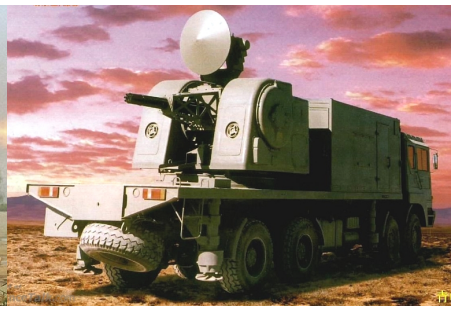
Notes:

The Type 65 is the twin-37mm towed anti-aircraft artillery (AAA) developed in the 1960s as a successor to the Soviet M1939 single-barrel 37mm AAA (produced in China as Type 55). The weapon was designed primarily to engage airborne targets within the distance of 8,500m (or slant range of 3,500m), but it can also be used against land or water surface targets. Based on the Type 65 design, the PLA developed a number of derivations including the Type 74/74SD towed AAA, Type 79-III towed AAA, Type 76 shipboard AAA, and Type 88 self-propelled AAA.

→→Self-Propelled Anti-Aircraft Guns

LD 2000 (LuDun-2000) Chinese 8x8 Mobile Air Defense Gun Missile System







Tiers:



Variants:

- **LD 2000 with Missiles:** Some LD 2000s have up to 6 SAMs attached to the side(s) of the gun mount (see pictures). Versions with missiles have an additional radar mounted on top of the shelter between the cab of the truck and the gun. Missile option include: TY-90, DK-9, and HQ-10 SAM
- **LD 2000 with 11 barreled "Gatling" gun:** Has higher rate of fire than the seven-barreled version.

System

Alternative Designation: HQ-6A, LD2000 Gai,
Chassis: 8 x 8, WS-2400
Manufactuer: NORINCO
Crew: ea9
Target: Low altitude, high speed cruise missiles; low altitude aircraft; and UAVs traveling less than Mach 2
Number of Tracks System Can Manage: targetsUp to 48
Reaction Time: sec9.8
Range: 2.5km for gun attacking air threats and 3km attacking ground threats; 6km for SAMs
In Service: 2005-Present
Note: LD2000 includes a combat unit that consists of an Intelligence & Command Vehicle (ICV) and up to eight Combat Vehicles (CV), supported by Ammunition Supply Vehicles (ASV). and other combat support vehicles. Besides the ready-to-service basic configuration and extended configuration, LD2000 also can be upgraded to multi-layer gun-missile integrated air defense system

Dimensions (Chassis: WS2400)

Length: m11.44

Width: m3.05

Height: m2.97

Weight, Empty: tons19

Automotive (Chassis: WS2400)

Engine Name: Deutz Diesel

Engine Type: Diesel

Engine Power: 517

Payload Capacity: tons22

Operational Range: km650

Speed: km/h75

Communications

Main Weapon System

Note #1: The 30-mm cannon is remotely controlled and mounted to the rear of the truck

Note #2: The cannon is operated by a gunner in the fully enclosed module to the behind the cab

↳***System***

Name: Type 730C (Land Based)

Type: "Gatling" Gun

Cailber/Length: mm30

Crew: Automated, with human oversight

Barrels: ea7

Length: INA

Diameter: INA

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: INA

Fire on Move: No

Minimum Elevation: INA

Reaction Time: sec9.8

Rate of Fire: rpm4,600 - 5,800 cyclic

Maximum Effective Range: 2.5km attacking air threats and 3km attacking ground threats

Basic Load: 1,000 rounds (500 rounds in each of two magazines located on either side of the cannons. Each magazine

is loaded with a type of 30mm ammunition, AP, APDS, or HEI)

Feed System: Two ammunition boxes, each holding 500 rounds (total 1000 rounds)

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunitionn*

Name: INA

Type: Sabot Armor-Piercing Rounds

Caliber: mm30

Muzzle Velocity: INA

Basic Load: 1,000 rounds (500 rounds in each of two magazines located on either side of the cannons. Each magazine is loaded with a type of 30mm ammunition, AP, APDS, or HEI)

Note: The LD2000 can fire tungsten APDS and HEI ammunitions for improved airborne weapon target destruction. One direct hit of APDS projectile will definitely detonate the warhead of incoming air-to-ground weapon target

Secondary Weapon Systemm

↳*Missile System*

Name: TY-90 (Sky Swallow-90)

Type: Suface-to-Air Missile

Manufacturer: China Aviation Industry Corporation I

Length: m1.9

Diameter: mm90

Weight: kg20

Warhead Weight: kg3

Detonation Mechanism: Impact / proximity

Engine: Solid-fuel rocket motor

Propellant: Solid fuel

Operational Range: 0.5 – 6 km

Flight Ceiling: km6

Flight Altitude: 0 – 6 km

Speed: > Mach 2

Guidance System: ImIR IR

Basic Load: ea6

Fire Control System

FCS Name: OFC-3

Computerized FCS: Yes

FCS Type: Photoelectric tracking system

Laser Rangefinder: Yes

IFF: INA

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

Main Gun Stabilization: INA

Night Vision Camera: Yes

↳***Radar***

Name: TR47C

Type: Fire Control Radar

Band: J

CCD Camera: Yes

Laser Rangefinder: Yes

Infrared Thermal Imager: Yes

Detection Range, Small Target: km10

Azimuth Scan: azimuth is scanned mechanically, while the elevation is scanned electronically, incorporating a total of 169 transceivers of phased array technology that enables the radar to pick up the splashes of 30 mm rounds

Number of targets: Up to 48

Note: The system can track a sea-skimming target with 0.1 square metre radar cross section at 8 km, extended to 15 km if the radar cross section is increased to 2 square metres, and further extended to 20 km if the radar cross section is increased to 10 square metres, though the targets could not be engaged until much closer (3 km) due to the limited range of the gun

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The LD2000 (LuDun-2000) is a ground-based anti-aircraft air defense weapon system designed, developed and manufactured by the Chinese Defense Company NORINCO (China North Industries Corporation). The system was unveiled during the defense exhibition IDEX in 2005. Modern critical ground assets are vulnerable to a growing number of precision-guided weapon and aerial threats, and particularly to cruise missiles. In response. China North Industries Corporation (NORINCO) has developed a unique and effective solution to these threats - LD2000 Ground-Based Close-In Weapon System based on the proven CIWS of naval application. LD2000 is the effective and efficient weapon system for close-in air defense in various scenarios. With highly accurate firepower and multiple target engagement capability. The LD2000 achieves satisfying hit probability to typical low-altitude, high-speed cruise missile targets. The system is also highly capable of intercepting low-altitude aircraft and UAV. The LD2000 can intercept flying targets at a velocity of Mach 2 or below. It has a reaction time of 9.8 sec and the capability to track

up to 48 targets.

M-1985 North Korean 57mm Self-Propelled Anti-Aircraft Gun



Tiers:

1 2 3 4

System

Alternative Designations: M-1985

Description: Self-propelled anti-aircraft gun (SPAAG), armed with two 57 mm autocannons

Crew: 6

Chassis: YW 531 APC

Emplacement Time (min): N/A

Displacement Time (min): N/A

Dimensions

Length, Hull: 5.476 m

Length, with Gun Forward: m8.46

Width: 2.978 m

Weight: tons12.6

Ground Clearance: mm425

Automotive

Engine Name: KHD BF8L 413F

Engine Type: 8-cylinder air-cooled, turbo-charged diesel

Engine Power: hp320

Suspension: individual torsion bar with hydraulic shock absorbers on the first and last road wheels

Fuel Capacity: INA

Operational Range, Road: km/h500

Speed, Road: km/h65

Speed, Off-Road: km/h46

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.7

Fording: m1.4

Main Weapon System

Gun, Caliber, Type: 57-mm recoil-operated air-cooled cannons,

Number of Barrels: ea2

Rate of Fire: rds/min150-180 rds/min per barrel

Loader Type: Two 5-round clips, manual, 10 rds

Reload Time: 4-8

Traverse: deg360

Traverse Rate: o/sec30

Elevation: 0 to 87 degrees

Elevation Rate: o/sec20

Basic Load: ea300

Azimuth: Unlimited

Main Weapon System Ammunition

Type: 57 x 348 SR APHE, Frag-T, APC-T, HVAP-T, HE-T. Uses same ammo as the towed single S-60

Max Effective Range: m4,000

Max Effective Altitude: m4,237 at 65o

Min Altitude: m0

Frag-T Projectile Weight: kg2.81

APC-T Projectile Weight: kg2.82

HE-T Projectile Weight: kg2.85

Muzzle Velocity: m/s1,000

Frag-T Fuze Type: Point Detonating

APC-T Fuze Type: Base Detonating Fuze

HE-T Fuze Type: (Yugoslavian, impact [super quick] action with pyrotechnical self-destruct)

Self-Destruct Time: sec13-17

Armor Penetration: mm CE130 at 1,000m, APHE 96 APC-T at 1,000 m

Fire Control System

Computerize FCS: Optical mechanical computing sight

Direct Fire: Yes

Indirect Fire: Yes

Protection

Armor Type: Welded-Stell

Armor: 14 mm maximum, welded steel

Notes:

This twin 57mm automatic AA gun, which is evidently without a formal designation in the open literature, [though possibly designated M-1985] is a DPRK-produced system mounted on a modified YW 531 APC. It is generally similar to, but distinct from, the Russian ZSU-57-2 system.

ZSU-57-2 (Ob'yekt 500) Russian 57mm Self-Propelled Anti-Aircraft Gun





Tiers:

1 2 3 4

System

Alternative Designations: ZSU-57-2
Description: self-propelled anti-aircraft gun (SPAAG), armed with two 57 mm autocannons
Crew: 6
Carriage: 4 road wheels/T-54 modified chassis
Chassis: T-54
Prime Mover: A shortened T-54 chassis with thinner armor and only four road wheels.
Emplacement Time (min): N/A
Displacement Time (min): N/A

Dimensions

Length, Hull: m6.22
Length, with Gun Forward: m8.46
Width: m3.27
Height, with Tarpaulin Top: m2.75
Weight: tons28.1
Ground Clearance: mm425

Automotive

Engine Name: V-54

Engine Type: 4-stroke, airless (mechanical)-injection, water-cooled 38.88 liter V12 diesel

Engine Power: hp520

Power-to-Weight Ratio: 18.5 hp/tonne

Suspension: individual torsion bar with hydraulic shock absorbers on the first and last road wheels

Fuel Capacity: 830 liters (including two externally mounted fuel tanks, 95 liters each)

Operational Range, Road: km/h420

Operation Range, Off-Road: km/h320

Speed, Road: km/h50

Speed, Off-Road: km/h30

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.7

Fording: m1.4

Main Weapon System

Gun, Caliber, Type: 57-mm recoil-operated air-cooled cannons, S-68

Number of Barrels: ea2

Rate of Fire: rds/minCyclic: 210-240 (105-120/gun) Practical: 140 (70/gun)

Loader Type: Two 5-round clips, manual, 10 rds

Reload Time: 4-8

Traverse: deg360

Traverse Rate: o/sec30

Elevation: deg-5 to +85

Elevation Rate: o/sec20

Basic Load: ea300

Main Weapon System Ammunition

Type: 57 x 348 SR APHE, Frag-T, APC-T, HVAP-T, HE-T. Uses same ammo as the towed single S-60

Max Effective Range: m4,000

Max Effective Altitude: m4,237 at 65o

Min Altitude: m0

Frag-T Projectile Weight: kg2.81

APC-T Projectile Weight: kg2.82

HE-T Projectile Weight: kg2.85

Muzzle Velocity: m/s1,000

Frag-T Fuze Type: Point Detonating

APC-T Fuze Type: Base Detonating Fuze

HE-T Fuze Type: (Yugoslavian, impact [super quick] action with pyrotechnical self-destruct)

Self-Destruct Time: sec13-17

Armor Penetration: mm CE130 at 1,000m, APHE 96 APC-T at 1,000 m

Armored Command Vehicle

Description: SYSTEM WILL LINK TO AN ACV WHICH MAY HAVE A RADAR FOR EW AND TARGET ACQUISITION. FOR EXAMPLE, SEE SBORKA ACV AND RADAR (PG 6-15).

Fire Control

Description: SIGHTS W/MAGNIFICATION: OPTICAL MECHANICAL COMPUTING REFLEX SIGHT (NOT RADAR CONTROLLED) LATER VARIANTS WERE FITTED WITH A MORE SOPHISTICATED SIGHTING SYSTEM, IDENTIFIED BY TWO SMALL PORTS IN FORWARD UPPER PORTION OF THE TURRET.

Other Fire Control: ABSENCE OF A TRACKING RADAR, A NIGHT VISION DEVICE, AND AN ENCLOSED TURRET MAKES THIS A DAYLIGHT, FAIR WEATHER WEAPON SYSTEM ONLY. OFF-CARRIAGE RADARS, SUCH AS THE SON-9/SON-9A (NATO FIRE CAN), RPK- 1/FLAP WHEEL, OR TYPE 311 CAN BE USED THE GUN IS LINKED TO THE BATTERY NET WHICH RECEIVES ANALOG VOICE RADIO ALERTS FOR APPROACHING AIRCRAFT, INCLUDING DIRECTION, ALTITUDE, AND DIRECTION. GUNS AND BATTERY/ BATTALION HAVE AIR WATCHES AND FORWARD OBSERVERS.

Protection

Armor Type: Welded-Stell

Armor: mm8-15

Notes:

The ZSU-57-2 Ob'yekt 500 is a Soviet self-propelled anti-aircraft gun (SPAAG), armed with two 57 mm autocannons. 'ZSU' stands for Zenitnaya Samokhodnaya Ustanovka, meaning "anti-aircraft self-propelled mount", '57' stands for the bore of the armament in millimetres and '2' stands for the number of gun barrels. It was the first Soviet mass-produced tracked SPAAG. In the USSR it had the unofficial nickname "Sparka", meaning "twin mount", referring to the twin autocannon with which the vehicle is armed. Based on past experiences with SPAAG designs, Soviet engineers designed a vehicle that used a modified T-54 chassis, with four twin road wheels per side instead of five, and much thinner armour. The vehicle was armed with twin 57 mm S-68 autocannon in a new, large, rotating, open-topped turret. The ZSU-57-2 consists of three compartments: driver's in the front, fighting in the middle and engine-transmission at the rear. The hull is more spacious in comparison with the T-54 because of the thinner armour and has different locations for some equipment. The general layout, with transverse mounting of the engine, is the same The driver's compartment is located on the left hand side of the front of the hull. The driver's seat is moved forward and to the left in comparison with its location in the T-54. The compartment is equipped with a single-piece hatch cover opening to the left and two periscopic vision devices. One of them can be replaced by the TVN-1 infrared vision device which is operated together with the infrared headlamp (active night vision), which is mounted on the right track board. A fire-fighting equipment signal panel and a spare parts case are also located in the driver's compartment. The open-topped box-type welded turret has a ball-bearing race ring 1850 mm in diameter. The turret rear can be removed, which makes replacement of the guns easier. The turret can be covered in the travelling position by a tarpaulin which has 16 plexiglass windows. To aim the guns, base data such as the target's speed, direction and range must be entered into the sighting system by the sight adjuster, who sits to the left of the guns at the rear of the turret. The target's speed and direction is determined by visual estimation, while range can also be estimated visually or with the rangefinder. The upper front of the turret has two small ports with armoured covers meant for collimators of the sight. To fire the guns, the breeches must first be opened. The left and right loaders, located in the forward part of the turret on both sides of the main armament, load clips into the magazines of their respective weapons. The loaders' travel seats should be stowed in clamps on the turret sides before opening fire. The gunner, seated on the left hand side in the middle of the turret, aims ("lays") the gun and opens fire using an electric trigger, which fires both barrels, or two foot pedals, which can fire either barrel independently. If manual mechanical backup gunlaying is used instead of electro-hydraulic drive, three crew members instead of two should work with the sight. The commander, who sits on the right hand side in the middle of the turret, lays the gun in azimuth, the gunner in elevation and the sight adjuster enters data into the sight. The loaders feed clips into the twin autocannon manually as needed, similar to the Bofors 40mm. The twin S-68s are recoil-operated and weigh 4,500 kg. Their construction was based on two 57 mm S-60 AA autocannons. The guns have a recoil of between 325 and 370 mm. The individual weapons cannot be swapped from one side to the other as they are mirror images. Each air-cooled gun barrel is 4365 mm long (76.6 calibers) and is fitted with a muzzle

brake. They can be elevated or depressed between −5° and +85° at a speed of between 0.3° and 20° per second, the turret can traverse 360° at a speed of between 0.2° and 36° per second. Drive is from a direct current electric motor and universal hydraulic speed gears (a manual mechanical drive is also provided in case of electrohydraulic failure; with the use of mechanical drive, elevation speed is 4.5° per second and the turret traverse speed is 4° per second). The guns firing together are capable of firing up to 210–240 fragmentation and armour-piercing tracer (AP-T) shells per minute, with a practical rate of fire of between 100 and 140 rounds per minute.[3] Muzzle velocity is 1,000 m/s. Each clip has 4 rounds, each of which weighs 6.6 kg; the charge in each round consists of 1.2 kg of 11/7 nitrocellulose powder, a projectile weighs 2.8 kg. Maximum horizontal range is 12 km (with an effective range against ground targets of up to 4 km / 2.5 miles. Maximum vertical range is 8.8 km with a maximum effective vertical range of 4.5 km / 14,750 ft). Fragmentation rounds have a safety-destructor which activates between 12 and 16 seconds after being fired to ensure the shells won't fall back to ground, so the maximum slant range of anti-aircraft fire is 6.5–7 km.[16] BR-281 armour-piercing rounds are able to penetrate 110 mm armour at 500 m or 70 mm armour at 2,000 m (at 90° impact angle). The S-68 autocannon was the most powerful AA gun installed on SPAAGs at that time. According to the statistical data of the Air Defence Research Institute No. 2, a direct hit of a single 57 mm shell could destroy a contemporary jet aircraft. In order to shoot down a jet bomber of the Canberra type, an average of 1.7 hits were deemed necessary. The vehicle carries 300 rounds, and the ammunition is stowed as follows: 176 rounds in clips inside the turret, 72 rounds in clips in the hull front, and 52 separate (unclipped) rounds in special compartments under the turret floor. Armour-piercing rounds in clips are placed in the rear part of the turret to the left and right of the guns. Empty shell cases and clips are removed via a conveyor belt through a special port in the turret rear into an external metal wire basket on the back of the turret.

Gepard German 35mm Self-Propelled Anti-Aircraft Gun






Tiers:



Variants:

- **German version:** Search radar: S band, 15 km range Tracking radar: Ku band, 15 km range Laser rangefinder
- **Netherland's version:** Search radar: X band, 15 km range Tracking radar: X/Ka band, 13 km range

System

Alternative Designations: 5PFZ-B2L Upgrade variant known as FlakPz 1A2
Crew: 3
Chassis: Leopard 1 tank chassis
Manufacturer: Krauss-Maffei Wegmann
Targets: Helicopters and Low-Flying Aircraft
In Service: See Proliferation
Note #1: The vehicle is based on the hull of the Leopard 1 tank with a large fully rotating turret carrying the armament—a pair of 35 mm Oerlikon KDA autocannons and the two radar dishes—a general search radar at the rear of the turret and the tracking radar, and a laser rangefinder, at the front between the guns.
Note #2: Since the eighties, Stinger teams have been accompanying the Gepard units to take advantage of their long-range scanning capacity. To combine this capacity in a single unit, a missile system upgrade that mounts the NATO ManPad Stinger surface-to-air missile (in twin packs) to the autocannons was developed. The system was tested by the German Bundeswehr but not bought due to budget restrictions and the fielding of the Ozelot Light Flak (leFla) System

Dimensions

Length, Hull: INA
Length, With Gun Forward: m7.68
Width: m3.71
Height, with Radar Lowered: m3.29
Height, With Radar Up: m4.23
Weight: tons47.3

Automotive

Engine Name: MTU MB 838 Ca M500 Diesel

Engine Type: Diesel

Engine Power: hp830

Maximum Range: km600

Maximum Speed: km/h65

Gradient: %60

Side Slope: %30

Vertical Step: m1.15

Trench: m3

Fording: m1.2

Fuel Capacity: 985 liters

Combined Operating Time: hrs48

Main Weapon System

Caliber, Type: 35x228 gun, KDA

Number of Barrels: 2

Rate of Fire: 1,100 rds/min (550/barrel)

Ammunition Loader: Twin Belt

Reload Time: INA

Elevation: deg-10 to +85

Fire on the Move: Yes (est)

Basic Load: ea680

Turret: The electrically driven turret is powered by a 40 kW generator driven by a 4-cylinder, 3.8 litre Mercedes-Benz OM 314 multi-fuel engine

Main Weapon System Ammunition

Type: Frangible APDS (FAPDS) for upgrades. On impact with the target surface, the penetrator breaks into several KE fragments. The round has Frag-HE effects with the higher velocity and flat trajectory of a sabot round.

Tactical AA range: 3,500 m (self-destruct)

Tracer Range: INA

Effective Altitude: m3,100

Min Altitude: m0

Self-Destruct: sec6-12

Range: m4,000

Tactical AA Range: m3,500

Effective: m3,500 (est)

Self-Destruct Time: sec6-12

Penetration: 115mm at 1,000 m

Type: APDS-T

Other Ammunition Type: HEI

Radar Systems

↳*Radar 1*

Name: INA

Type: Search Radar

Location: at the rear of the turret

Band: S band

Maximum Range: km15

↳*Radar 2*

Name: INA

Type: Tracking Radar

Location: at the front between the guns

Band: KU Band

Maximum Range: km15

Armored Command Vehicle

Description: SYSTEM WILL LINK TO AN ACV WHICH MAY HAVE A RADAR FOR EW AND TARGET ACQUISITION. FOR EXAMPLE, SEE SBORKA ACV AND RADAR (PG 6-15).

Fire Control

FC System: EADS digital computer-based FCS

Sights With Magnification: Stabilized video sights for -1A2 upgrade

Magnification: INA

Field of View: INA

Night Sights: Thermal for -1A2 upgrade

IFF: Yes, MSR-400

Navigation System: Computerized

Laser Rangefinder: ND Yag

Linked to Air Defense Net: Yes

Radars: INA

Name: INA

Function: Fire Control

Detection Range: km15

Tracking Range: km15

Frequency Band: Ku

Search on the Move: Yes

Other Fire Control: GUNS USE AIR WATCHES AND FORWARD OBSERVERS AND ARE LINKED TO AD NETS

Protection

Armor Type: Conventional steel

Hull Armor: 10–70 mm RHAe

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Flugabwehrkanonenpanzer Gepard ("anti-aircraft cannon tank Cheetah", better known as the Flakpanzer Gepard) is an all-weather-capable German self-propelled anti-aircraft gun (SPAAG)[1]. It was developed in the 1960s and fielded in the 1970s, and has been upgraded several times with the latest electronics. It constituted a cornerstone of the air defence of the German Army (Bundeswehr) and a number of other NATO countries. In Germany, the Gepard was phased out in late 2010 to be replaced by "Leichtes Flugabwehrsystem (LeFlaSys)", a mobile and stationary air defence system using the LFK NG missile and the new MANTIS gun system. The mobile platform of SysFla will likely be based on the GTK Boxer.

PGZ-07/PGZ-09 (Type 07) Chinese 35mm Self-Propelled Anti-Aircraft Gun






Tiers:

1 **2** 3 4

System

Alternative Designation: Type 07, PGZ-09, Type 09
Chassis: PLZ-05 self propelled artillery
Crew: ea3
Target: Low to medium altitude, fixed wing, rotary wing, UAS, and cruise missiles
Night Vision: Yes
Range: m50-5,000
Laser Range Finder: Yes
All Weather / IR Sighting: Yes
Basic Load: 2,380 rounds. 560 per gun loaded and 630 per gun at the ready.

↳*Dimensions*

Height: 4.82m with radar up; 3.4m with radar down
Length: m6.7
Width: m3.2
Weight: mt35

↳*Radar #1 (Tracking)*

Name: INA
Location: Front of Turret
Range of Traverse: 0 degrees, must traverse with turret
Range of Elevation: INA
Type: INA

↳*Radar #2 (Searching)*

Name: INA

Location: Above Turret

Range of Traverse: 360 degrees

Range of Elevation: INA

Type: Doppler

Range of Radar: Approximately 20 km

Automotive

Engine Name: INA

Engine Power: hp800

Engine Type: 8V150 diesel

Fording Depth: mINA

Range, Cruising: km450

Speed, Max on Road: kph55

Communications

VHF Radio: R-168-100U (Standard VHF)

↳*Data*

Note: System can connect via data-link to communicate with other systems in the battalion

Main Weapon System

↳*Weapon #1 (2 x 35mm Cannons)*

Name: GDF-002, PG99

Cailber/Length: 35mm

Type: Anti-Aircraft Gun similar if not the Oerlikon 35mm KDA autocannon used on the German Gepard.

Length: INA

Diameter: INA

Fire on Move: No

Maximum Range: m4,000

Rate of Fire: rds/min1,100

Action: Gas Operated

Reload Time: sec7.5

Note: The gun mount is electrically powered with an off carriage power supply unit and manual controls are provided for emergency use.

↳*Ammunition*

Name: INA

Caliber: mm35

Ammunition Types: The 35mm twin-gun can fire four types of lethal and versatile ammunitions, HEI (High Explosive Incendiary), HEI-T (High Explosive Incendiary Tracer), SAPHEI-T (Semi-armor-piercing high-explosive incendiary Tracer) and TP-T (Target Practice Tracer) cartridges

Muzzle Velocity: m/s1,175

Basic Load: 2,380 rounds. 560 per gun loaded and 630 per gun at the ready.

Fire Control System

FCS Name: INA

Computerized FCS: Yes

IFF: Yes

Laser Range Finder: Yes

Infrared Goniometer: Yes

Thermal Image Tracker: Yes

Doppler Radar: Yes

Optical / Day Sight: Yes

Protection

Armor, Hull: Protection from small arms fire and projectile splinters

NBC Protection: Yes, optional

Armor: Light armor protects against small arms and shrapnel. Steel front slope also protects against small arms fire.

Smoke Generation: Yes, 8 x Smoke Grenade Launchers

Notes:

The PGZ-07, now renamed as PGZ-09 is a Chinese-made 35mm self-propelled anti-aircraft gun. Some pictures take in Nanning Guagnxi show that the PGZ-07 is in service with Chinese armed forces (PLA People's Liberation Army). There is only one PLA division stationed in Nanning, the 123rd Mechanized Infantry Division. The PGZ-07 can fire five types of lethal and versatile ammunitions, HEI (High Explosive Incendiary), HEI-T (High Explosive Incendiary Tracer), SAPHEI-T (Semi-armor-piercing high-explosive incendiary), PMBDPF and TP-T (Target Practice Tracer) cartridges. The PGZ-07 anti-aircraft gun system can defeat almost any air threat, as well as various ground and surface targets, including light armored vehicles.

Type 88 (PGZ88) Chinese 37mm Self-Propelled Anti-Aircraft Gun







Tiers:

1 2 **3** 4

System

Alternative Designation: Type 88; PGZ88
Type: 37mm Self-Propelled Anti-Aircraft Gun
Crew: ea4
Chassis: The Type 88 SPAAG is mounted on a tracked chassis of the Type 79 main battle tank.
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg35,000
Ground Pressure: INA

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: hp570
Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m1

Trench: m2

Fording Depth: m1.2

Main Weapon System

↳*System*

Name: INA

Type: 2 x 37 mm Guns

Barrel Length: INA

Weight: INA

Rate of Fire: 380 rds/min

Maximum Range of Fire: 7,200 m

Automatic Loader: Yes

Elevation: - 5 to + 85 degrees

Traverse: 360 degrees

↳*Ammunition*

Type: Rifle

Caliber: mm37

Cartridge: INA

Basic Load: 1,000 rounds

Fire Control

Name: INA

Computerized FCS: Yes

Main Gun Stabilization: INA

Optical Sights: Yes

Electro-Optical Director: Yes

Ballistic Computer: Yes

Reaction Time: 6-11 seconds

Radar System

Name: INA

Type: Surveillance Radar

Maximum Detection Range: 15 km

Maximum Detection Altitude: 3 km

Protection

Hull Armor: Protection from small arms fire and shell splinters

Turret Armor: Chassis of the Type 88 is well protected for a SPAAG system, however turret has only thin armor, which protects against small arms fire.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 88, the PLA's first generation fully automatic self-propelled anti-aircraft artillery [SPAAA] system, features a Type 74 twin-37mm AAA mounted on a Type 69 MBT chassis. The turret is welded and fully enclosed with search radar and fire control equipment on top. The performance of the Type 88 was unsatisfactory, and the system never entered production. Development activity subsequently focused on work on the new Type 90II.

Type 80 Chinese 57mm Self-Propelled Anti-Aircraft Gun




Tiers:

1 2 3 4

System

Alternative Designations: Type 80
Description: Self-propelled anti-aircraft gun (SPAAG), armed with two 57 mm autocannons
Crew: 6
Chassis: Mounted on the chassis of a Chinese Type 69-II MBT
Emplacement Time (min): N/A
Displacement Time (min): N/A

Dimensions

Length, Hull: m6.24
Length, with Gun Forward: m8.46
Width: m3.3
Height: m2.80
Weight: tons30

Automotive

Engine Name: INA
Engine Type: diesel
Engine Power: hp580
Power-to-Weight Ratio: 18.5 hp/tonne
Suspension: Individual torsion bar with hydraulic shock absorbers on the first and last road wheels
Fuel Capacity: 830 liters (including two externally mounted fuel tanks, 95 liters each)
Operational Range, Road: km/h420
Operation Range, Off-Road: km/h320
Speed, Road: km/h50
Speed, Off-Road: km/h30

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.7

Fording: m1.4

Main Weapon System

Name: Type 59 twin anti-aircraft autocannon (a copy of the Soviet S-68)

Caliber: 57 mm

Number of Barrels: ea2

Rate of Fire: Cyclic: 210-240 rpm (105-120/gun) Practical: 140 rpm (70/gun)

Loader Type: Two 5-round clips, manual, 10 rds

Reload Time: 4-8

Traverse: deg360

Traverse Rate: o/sec30

Elevation: deg-5 to +85

Elevation Rate: o/sec20

Basic Load: ea300

Main Weapon System Ammunition

Type: 57 x 348 SR APHE, Frag-T, APC-T, HVAP-T, HE-T. Uses same ammo as the towed single S-60

Max Effective Range: m4,000

Max Effective Altitude: 4,237m at 65o

Min Altitude: m0

Frag-T Projectile Weight: kg2.81

APC-T Projectile Weight: kg2.82

HE-T Projectile Weight: kg2.85

Muzzle Velocity: m/s1,000

Frag-T Fuze Type: Point Detonating

APC-T Fuze Type: Base Detonating Fuze

HE-T Fuze Type: (Yugoslavian, impact [super quick] action with pyrotechnical self-destruct)

Self-Destruct Time: sec13-17

Armor Penetration: 130mm at 1,000m, APHE 96 APC-T at 1,000m

Armored Command Vehicle

Description: System will link to an ACV which may have a radar for EW and target acquisition. For example, see Sborka ACV and radar.

Fire Control

Description: Sights with magnification: optical mechanical computing reflex sight (not radar controlled) later variants were fitted with a more sophisticated sighting system, identified by two small ports in forward upper portion of the turret.

Other Fire Control: Absence of a tracking radar, a night vision device, and an enclosed turret makes this a daylight, fair weather weapon system only. Off-carriage radars, such as the Son-9/Son-9a (NATO fire can), RPK- 1/flap wheel, or Type 311 can be used the gun is linked to the battery net which receives analog voice radio alerts for approaching aircraft, including direction, altitude, and direction. Guns and battery/ battalion have air watches and forward observers.

Protection

Armor Type: Welded-Steel

Armor: mm8-15

Notes:

The Type 80 57mm Self-Propelled Anti-Aircraft Gun is a Chinese version of the Russian ZSU-57-2 57mm Self-Propelled Anti-Aircraft Gun. The ZSU-57-2 Ob'yekt 500 is a Soviet self-propelled anti-aircraft gun (SPAAG), armed with two 57 mm autocannons. 'ZSU' stands for Zenitnaya Samokhodnaya Ustanovka, meaning "anti-aircraft self-propelled mount", '57' stands for the bore of the armament in millimetres and '2' stands for the number of gun barrels. It was the first Soviet mass-produced tracked SPAAG. In the USSR it had the unofficial nickname "Sparka", meaning "twin mount", referring to the twin auto-cannon with which the vehicle is armed. Based on past experiences with SPAAG designs, Soviet engineers designed a vehicle that used a modified T-54 chassis, with four twin road wheels per side instead of five, and much thinner armor. The vehicle was armed with twin 57 mm S-68 auto-cannon in a new, large, rotating, open-topped turret. The ZSU-57-2 consists of three compartments: driver's in the front, fighting in the middle and engine-transmission at the rear. The hull is more spacious in comparison with the T-54 because of the thinner armor and has different locations for some equipment. The general layout, with transverse mounting of the engine, is the same The driver's compartment is located on the left hand side of the front of the hull. The driver's seat is moved forward and to the left in comparison with its location in the T-54. The compartment is equipped with a single-piece hatch cover opening to the left and two periscopic vision devices. One of them can be replaced by the TVN-1 infrared vision device which is operated together with the infrared headlamp (active night vision), which is mounted on the right track board. A fire-fighting equipment signal panel and a spare parts case are also located in the driver's compartment. The open-topped box-type welded turret has a ball-bearing race ring 1850 mm in diameter. The turret rear can be removed, which makes replacement of the guns easier. The turret can be covered in the travelling position by a tarpaulin which has 16 Plexiglas windows. To aim the guns, base data such as the target's speed, direction and range must be entered into the sighting system by the sight adjuster, who sits to the left of the guns at the rear of the turret. The target's speed and direction is determined by visual estimation, while range can also be estimated visually or with the rangefinder. The upper front of the turret has two small ports with armored covers meant for collimators of the sight. To fire the guns, the breeches must first be opened. The left and right loaders, located in the forward part of the turret on both sides of the main armament, load clips into the magazines of their respective weapons. The loaders' travel seats should be stowed in clamps on the turret sides before opening fire. The gunner, seated on the left hand side in the middle of the turret, aims ("lays") the gun and opens fire using an electric trigger, which fires both barrels, or two foot pedals, which can fire either barrel independently. If manual mechanical backup gun-laying is used instead of electro-hydraulic drive, three crew members instead of two should work with the sight. The commander, who sits on the right hand side in the middle of the turret, lays the gun in azimuth, the gunner in elevation and the sight adjuster enters data into the sight. The loaders feed clips into the twin auto-cannon manually as needed, similar to the Bofors 40mm. The twin S-68s are recoil-operated and weigh 4,500 kg. Their construction was based on two 57 mm S-60 AA auto-cannons. The guns have a recoil of between 325 and 370 mm. The individual weapons cannot be swapped from one side to the other as they are mirror images. Each air-cooled gun barrel is 4365 mm long (76.6 calibers) and is fitted with a muzzle brake. They can be elevated or depressed between −5° and +85° at a speed of between 0.3° and 20° per second, the turret can traverse 360° at a speed of between 0.2° and 36° per second. Drive is from a direct current electric motor and universal hydraulic speed gears (a manual mechanical drive is also provided in case of electro-hydraulic failure; with the use of mechanical drive, elevation speed is 4.5° per second and the turret traverse speed is 4° per second). The guns firing together are capable of firing up to 210–240 fragmentation and armor-piercing tracer (AP-T) shells per minute, with a practical rate of fire of between 100 and 140 rounds per minute.[3] Muzzle velocity is 1,000 m/s. Each clip has 4 rounds, each of which weighs 6.6 kg; the charge in each round consists of 1.2 kg of 11/7 nitrocellulose powder, a projectile weighs 2.8 kg. Maximum horizontal range is 12 km (with an effective range against ground targets of up to 4 km / 2.5 miles. Maximum vertical range is 8.8 km with a maximum effective vertical range of 4.5 km / 14,750 ft). Fragmentation rounds have a safety-destructor which activates between 12 and 16 seconds after being fired to ensure the shells won't fall back to ground, so the maximum slant range of anti-aircraft fire is 6.5–7 km.[16] BR-281 armor-piercing rounds are able to penetrate 110 mm armor at 500 m or 70 mm armor at 2,000 m (at 90° impact angle). The S-68 auto-cannon was the most powerful AA gun installed on SPAAGs at that time. According to the statistical data of the Air Defense Research Institute No. 2, a direct hit of a single 57 mm shell could destroy a contemporary jet aircraft. In order to shoot down a jet bomber of the Canberra type, an average of 1.7 hits were

deemed necessary. The vehicle carries 300 rounds, and the ammunition is stowed as follows: 176 rounds in clips inside the turret, 72 rounds in clips in the hull front, and 52 separate (unclipped) rounds in special compartments under the turret floor. Armour-piercing rounds in clips are placed in the rear part of the turret to the left and right of the guns. Empty shell cases and clips are removed via a conveyor belt through a special port in the turret rear into an external metal wire basket on the back of the turret.

BOV-3 Slovenian 20mm Self-Propelled Anti-Aircraft Weapon System



Tiers:



Variants:

- **BOV-M (Slovenia):** Some built with 12.7-mm MGs
- **BOV-VP:** Security version with swing out gates to direct crowds
- **BOV-1/Polo M-83:** Sans troop compartment with 2 ATGM launcher pods with 3 AT-3 launchers each with machine gun mounted before the two AT-3s
- **BOV-3:** 3 turret-mounted 20-mm cannons for air defense
- **BOV-30:** 2 turret-mounted 30-mm cannons for air defense
- **LOV (Croatia):** No raised compartment, increased hull protection, but with a 12.7-mm machine gun
- **BOV-SN:** Ambulance
- **Yugo import BOV variants:** Serbia has a variants that include SP AA vehicles with the Igla or Stinger missiles or the ZU-23; AT vehicles with the AT-5 Spandrel; or an armored reconnaissance vehicle with a 20-mm M55 cannon, 7.62-mm PKT machine gun with twin AT-3 Sagger AT launchers or a single Spandrel system

System

Alternative Designations: BOV-3
Description: 4 X 4 APC built originally by Yugoslavia with space for 8 soldiers to exit through side doors: 3 firing ports on each side & an additional one to the right of the commander’s vision block
Manufacturer: TAM Complex Battle System factory in Velika Plana, Serbia
In Service: 1984-Present
Crew: ea4
Passengers: INA

Dimensions

Length, Hull: m5.78
Length, Overall: m5.97
Width: m2.53
Height: m3.21
Ground Clearance: m0.33
Track: m1.90
Wheelbase: m2.75
Weight, Combat: 9,400 kg

Automotive

Engine Name: 1 x German Deutz F 6L 413 F 6-cyl Diesel

Engine Type: Diesel

Engine Power: hp148

Power-to-Weight Ratio: 25.74 hp/metric ton

Transmission: 1 reverse gear, 5 forward gears

Cruising Range: km500

Speed (Max Road): km/h93

Speed (Max Off-Road): km/hINA

Speed (Average cross-country): km/h45

Speed (Max Swim): INA

Fuel Capacity: 220 liters

Gradient: deg55

Side Slope: deg30

Vertical Obstacle: m0.54

Trench: m0.64

Fording Depths: m1.10

Turning Radius: m7.75

Brakes: air-hydraulic with a hand-operated parking brake

Suspension: leaf springs and hydraulic shock absorbers

Communications

Radio: INA

Intercom: INA

Main Weapon System

↳*System*

Name: Zastava M55

Type: 3 x 20mm triple-barreled automatic anti-aircraft gun

Manufacturer: Zastava Arms

In Service: 1971-Present

Proliferation: Total: INA Angola Angolan Armed Forces Bosnia and Herzegovina Armed Forces of Bosnia and Herzegovina Democratic Republic of the Congo Armed Forces of the Democratic Republic of the Congo Republic of Macedonia Army of the Republic of Macedonia Croatia Croatian Army Guatemala Guatemalan armed forces Mozambique Mozambique Defence Armed Forces El Salvador Salvadoran Army Serbia Serbian Army Slovenia Slovenian Armed Forces Tunisia Tunisian Army

Length (Driving Condition): m1.47

Barrel Length: mm1,956

Width (Driving Condition): m1.27

Height (Driving Condition): m4.30

Weight, Loaded: kg1,100

Weight, Unloaded: kg970

Barrels: ea3

Action: Gas Operated

Rate of Fire: 1,950 and 2,250 rpm cyclic, 700 rpm practical

Effective Firing Range, Vertical: m4,000

Effective Firing Range, Horizontal: m5,500

Feed System: 3 x 60 round top-fed drum magazines

Maximum Elevation: deg+83

Minimum Elevation: deg-4.5

Turret Elevation Speed: 50 deg per second

Turret Elevation Acceleration: 60 deg/sq sec

Turret Travese Range: deg360

Turret Traverse Right: deg180

Turret Traverse Left: deg180

Turret Traverse Speed: 80 deg/sec

Turret Traverse Acceleration: 120 deg/sq sec

↳*Ammunition*

Type: Rifle

Caliber: 20mm

Muzzle Velocity, HE/HEI: m/s850

Muzzle Velocity, AP/API: 840

Basic Load: 60 rounds each, 1,500 total

Types of Ammunition: 20 × 110 mm PZ (pancirno zrno) M60 armour-piercing grenade pointer/marker (with and without flow clearing device): Deep black paint with earth-red ring in the upper third of the grenade. The granulated shell consists of hardened steel and absorbs the phosphorus firing in the rear, which ignites when hitting a target. 20 × 110 mm TZO (trenutno zapaljivo obilježavajuće) M57 explosive torch cartridge with illuminator: Chrome-yellow paint with earth-red ring in the upper third of the grenades and a green ring above the guide ring. The grenade is made of steel and has a Trotile explosive filling inside the center, which ignites when a target is hit. The sensitive AZZ UT M57 headlamp screwed onto the grenade is an explosive impact fuse with a self-disengaging device which starts after 4.5 to 9.5 seconds. 20 × 110 mm TZ (trenutno zapaljivo) M57 explosive torch cartridge without illuminator. 20 × 110 mm M79 exercise carousel (with glow track): Dark green paint with light green ring above the guide ring. Steel case with impact lighter, which, when striking a target, ignites a lightning bolt to allow a better observation of the hit image. 20 × 110 mm M77 exercise cartridges: cream white. A plastic floor filled with iron powder and provided with breakpoints, which bursts after exiting the barrel.

Fire Control

Fire Control System: No

Periscope: ingle forward-facing day periscope in the roof

Passive Periscope: Yes

Searchlight: Yes

Firing Ports: three on each side

Night Vision: Yes

Optics: J-171 optical

Protection

Armor (turret front) (mm): 8mm (defeats 7.l62-mm AP at 300 m)

Applique Armor (mm): Available on sides for variants

Explosive Reactive Armor (mm): No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Available

Smoke Equipment: 2 x 3 smoke dischargers

Survivability Equipment: Grill armor over windows

Central Tire Inflation System: Yes

Notes:

The BOV-3 vehicle was armed with a triple-barreled anti-aircraft gun M55A4B1 20 mm. The BOV has a capacity of 10, including a driver, gunner, and eight infantrymen. The vehicle has a four-wheel drive and is powered by the Deutz type F 6L 413 F six-cylinder diesel engine developing 150 hp (110 kW) at 2650 rpm. The theoretical gun shooting speed is 1950 to 2250 bullets per minute. The allowed burst length is 180 rounds per tube, whereby the tube is heated to 250 ° C, so a break of 5-10 minutes is necessary for cooling.

ZSU-23-4 Shilka Russian 23mm Self-Propelled Anti-Aircraft Weapon System




Tiers:



Variants:

- **ZSU-23-4V "Shilka"(1964):** (1968): modernized variant with enhanced reliability of some details, ventilation system case located on the hull. Commander vision device was added.
- **ZSU-23-4V1 "Shilka"(1970)::** modernized variant with enhanced reliability of some details, ventilation system case located on the hull. Commander vision device was added.
- **ZSU-23-4V1 "Shilka" (1970)::** modernized variant with enhanced reliability of radar system and other details, ventilation system cases located on front bilges of the turret. Guidance-system computer was improved (as well as accuracy and efficiency of anti-aircraft fire on the move at 40 km/h). It is fitted with a slightly improved diesel engine V-6R-1.
- **ZSU-23-4M1 (1973)::** armed with modernized autocannons 2A7M. The pneumatic loading was replaced with pyrotechnic loading (unreliable compressor was removed), welded tubes of coolant outlet were replaced with flexible pipes which increased autocannon barrel life from 3500 rounds to 4500 rounds.
- **ZSU-23-4M3 "Biryusa" (1977)::** equipped with identification friend-or-foe system "Luk". All ZSU-23-4M were upgraded to ZSU-23-4M3 level during scheduled repairs. Army unofficially continued to use the name "Shilka" for all variants of ZSU-23-4.
- **ZSU-23-4M2 (1978)::** so-called "Afghan" variant. Re Equipment performed during the Soviet–Afghan War for mountain combat. The radar system was removed and a night-sight was added. Ammunition increased from 2,000 to 4,000 rounds.
- **ZSU-23-4M4 and ZSU-23-4M5 (1999)::** modernized variants, armed with two additional paired man-portable air-defense systems "Igla" on each side of the turret and equipped with 81mm smoke grenade launchers, laser emission sensors, electro-optical vision devices (including television system for driver) and improved weapon radar system. The mechanical transmission was replaced with hydrostatic transmission, hydraulic boosters were installed. Mobility increased to the level of main battle tanks. This upgrade was first shown during the exhibition MAKS-99 in Zhukovsky and was carried out by the Minotor Service Enterprise and Peleng Joint Stock Company from the Republic of Belarus, and the Ulyanovsk Mechanical Plant of Russia. The Ulyanovsk Mechanical Plant is also offering ZSU-23-4 upgrade packages independently
- **Donets (1999):** This is a Ukrainian modernization developed by Malyshev Tank Factory in Kharkov. It has the modified turret from the ZSU-23-4, armed with two additional paired man-portable air-defense systems "Strela-10" installed on the hull of the T-80UD main battle tank. Ammunition capacity for its 23 mm autocannons is doubled.
- **ZSU-23-4M-A (2017)::** A modernisation package developed by the Arsenal Factory in Kyiv, this system features a new Rokach-AS radar, laser rangefinder, and four automatic Igla missiles.
- **ZSU-23-4MP Biała (2000)::** Polish modernized upgrade with Grom anti-aircraft missiles and fully digital passive aiming devices instead of the radar

System

Alternative Designations: Shilka
Manufacturer: Mytishchi Machine-Building Plant
In Service: 1962-Present
Crew: ea4

Crew: ea4

Chassis: GM-575 Tracked, six road wheels, no track support rollers

Dimensions

Length: m6.54

Width: m3.3

Height: mRadar up: 3.75 Radar down: 2.60

Weight, Combat: tons20.5

Ground Pressure: INA

Automotive

Engine Name: V6R-1 Diesel

Engine Type: 6-cylinder 4-stroke airless-injection water-cooled 20-litre diesel

Engine Power: hp290

Cruising Range: km450

Speed, Maximum Road: km/h50

Speed, Average Cross: km/h35

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1.1

Trench: m2.8

Fording Depth: m1.0

Communications

Primary: R-123

Main Armament

Name: 4 × 23 mm 2A7 autocannons (AZP-23 "Amur" quad automatic anti-aircraft gun

Caliber: 23mm

Cyclic Rate of Fire (rd/min): 850-1,000

Practical Rate of Fire (rd/min): 400, in 10-30 rd bursts

Reload Time (min): 20

Elevation (o): -4° to +85°

Fire on the Move: Yes

Reaction Time (sec): 12-18

Maximum Slant Range: km2

Maximum Firing Range: km2.5

Rate of Fire: rds/min3,400

Maximum Elevation: deg+85

Minumum Elevation: deg-5

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Main Armament Ammunition

Description: Can fire the same ammunition as ZU-23. Best mix for modern versions (ZU-23M and ZU-23M1) is 1,200 APDS-T and 1,200 FAPDS. Rounds ballistically matched. No HEI required.

Type: 23x152 HE-I, HEI-T, API-T, TP

Max Effective Range (m): 2,500, 2,000 against light armored ground targets such as LAVs

Max Effective Altitude (m): 1,500

Projectile Weight (kg): INA

Muzzle Velocity (m/s): 970

Fuze Type: None

Self-Destruct (sec): 11

Penetration (mm KE): 19 @ 1000 m API-T

Min Altitude (m): 0

HE-I Projectile Weight (kg): 0.18

HEI-T Projectile Weight (kg): 0.19

API-T Projectile Weight (kg): 0.189

TP Projectile Weight (kg): 0.18

HE-I Fuze Type: Point detonating

HEI-T Fuze Type: Point detonating

API-T Fuze Type: Base igniting

Basic Load: ea2,000

Fire Control

Driver Periscope: BMO-190

Driver IR Periscope: INA

Commander Periscope: TPKU-2

Commander IR Periscope: TKH-ITC

IFF: INA

Radar: DOG EAR (use in OPFOR units)

Name: Sborka (9S80-1 or PPRU-M1)

Function: Target Acquisition

Detection Range (km): 20

Tracking Range (km): 13

Frequency: F/G band

Frequency Band: J

RPK-2: Optical-mechanical computing sight and part of FC subsystem

Armored Command Vehicle:

Chassis: MTLB-U

Range (km): 80 detection, 35 tracking ACV links to supported tactical unit nets.

Other Radars: Using the above ACV, if an Integrated Air Defense System (IADS) is available, ZSU-23-4 links indirectly for early warning and target acquisition data from radars.

Other Fire Control: Guns use air watches and forward observers, and are linked to AD nets

Protection

Hull Armor: Welded steel, up to 15 mm hull

Turret Armor: Welded steel, 9.2 mm (0.36 in) turret

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Shilka ZSU-23-4 [ZSU = Zenitnaya Samokhodnaya Ustanovka - Anti-aircraft Self-Propelled Gun] is a Self-Propelled Anti-Aircraft Gun (SPAAG) featuring a prominent radar dish that can be folded down mounted on a modified PT-76 chassis. ZSU 23-4 Shilka, is capable of acquiring, tracking and engaging low-flying aircraft (as well as mobile ground targets while either in place or on the move). Employed in pairs 200 meters apart, 400 meters behind battalion leading elements, it is commonly used to suppress ATGM launch sites, such as TOW vehicles. The armament consists of four 23mm cannon with a maximum slant range of 3,000 meters. Ammunition is normally loaded with a ratio of three HE rounds to one AP round. Resupply vehicles carry an estimated additional 3,000 rounds for each of the four ZSUs in a typical battery. Recent (October 1997) information details ZSU-23-4 updates/modernization being offered by the Ukrainians that include: a new radar system replacing the GUN DISH radar, plus a sensor pod believed to include day/night camera, and a laser rangefinder; and mounted above radar/sensor pod is a layer of six fire-and-forget SAMs, believed to be Russian SA-18/GROUSE. The radar-guided ZSU-23-4 "Shilka" SPAAG, with its four 23 mm (0.90") autocannons, was a revolutionary SPAAG, proving to be an extremely effective weapon against enemy attack aircraft and helicopters under every weather and light condition. The ZSU-23-4 has a very high density, rate and accuracy of fire, as well as the capability for each of the four autocannons to fire its own type of projectile from separate belts. While it is technically possible that each cannon shoots different type of ammunition, there were two types commonly used in late 1970s: OFZT incendiary fragmentation and BZT armour-piercing tracer, which were to be loaded in 3:1 ratio—three OFZT, then one BZT, every 10th BZT round equipped with so-called "copper remover" and marked. Operators were strongly discouraged from shooting from a single barrel. The appearance of the "Shilka" caused significant changes in NATO tactics in aircraft use at low altitude over the battlefield. Despite its present obsolescence as a modern short-range anti-aircraft weapon, the ZSU-23-4 is still deadly for enemy light armoured vehicles, infantry and firing points as an infantry-support vehicle. With its high rate of accurate fire, the ZSU-23-4 can even neutralize tanks by destroying their gun sights, radio antennas, or other vulnerable parts.[3] ZSU-23-4s, especially late models, have excellent performance and good systems reliability. Based on the GM-575 tracked vehicle chassis, which used components from the PT-76 light amphibious tank, the ZSU-23-4 mounts an armored turret holding four liquid-cooled 23 mm (0.9") 2A7 autocannons linked to an RPK-2 "Tobol" radar (NATO designator: "Gun Dish"). The vehicle weighs 19 tonnes (late modifications up to 21 tonnes), has a movement range of 450 km (280 mi) and

a top speed of 50 km/h (31 mph). Additional firepower of late modifications can be supplied by a roof-mounted pod of six short-range SA-18 SAMs, or side mounted SA-16s. The crew numbers four: driver, commander, gunner and radar operator. The driver's compartment is located in the nose part of the vehicle. The fighting compartment is in the center, and the engine compartment is in the rear part of the vehicle. The transmission consists of a multi-plate metal-contact main clutch, a manual gearbox with five forward gears, two planetary two-step steering gears with locking frictions and two final drive groups. The vehicle chassis has six single rubber tired road wheels, a rear drive sprocket with detachable sprocket rings (lantern-wheel gear) and one idler wheel per side. The first and fifth left, and sixth right road wheels have hydraulic shock absorbers. The track is 11.904 m long, 382 mm (15") wide and has 93 links. Because of a large number of different pipes and tubes to detach during maintenance, the repair procedure for some of the vehicle's mechanisms is hard (for example, replacement or repair of a starter). The electric drive of an air outlet hatch of a gas turbine engine (part of the vehicle's electric power supply system) has an inconvenient location (at the bottom of the hull) which causes overheating and sometimes, jamming of the electric drive. On the other hand, the construction of the electric power supply system is very reliable. Changing the main engine oil and coolant is easy, as is replacement of fuel and oil filters, and sections of the air filter. The ZSU-23-4 can cross vertical obstacles 0.7 m (2.3') high, trenches 2.5 m (8.2') wide, has a 1.0 m (3.3') fording depth and can climb 30° gradients. The ZSU-23-4 has good maneuverability and cross-country ability, but its diesel engine's power is insufficient for a vehicle of its weight. As a result, off-road acceleration capabilities are sub-par, and the vehicle lags behind MBTs and IFVs on up-hill terrain. The ZSU-23-4 is equipped with an NBC system with an air filtration unit, fire-fighting equipment, TNA-2 navigational system, infrared vision device, R-123 radio set, R-124 intercom and electric power supply system consisting of a DGChM-1 single-shaft gas turbine engine (70 hp at 6,000 rpm) and a direct-current generator (which provides 27 V and 54 V direct current or 220 V 400 Hz alternating current).

→Man-Portable Air-Defense Systems (MANPADS)

9K333 Verba (SA-25) Russian Man-Portable Infrared Homing Surface-to-Air Missile







Tiers:



System

Alternative Designation: 9K333 Verba (SA-25)
Type: Man-Portable Infrared Homing Surface-to-Air Missile
Family: 9K333
Manufacturer: KB Mashinostroyeniya - developer of the system
In Service: 2014-Present
Crew: ea1

Dimensions

Note: See Missile System

Missile System

↳*System*

Name: 9K333 Verba (SA-25)
Type: Man-Portable Air Defense System (MANPADS)
Missile Length: m1.64
Missile Diameter: m0.07
Fin Span: INA
Missile Weight: kg12

Launcher Type: 9P521 launcher

Launcher Weight: kg6

Missile Weight with Launcher: kg18

Engine: Solid fuel rocket motor

Warhead Type: High Explosive Blast Fragmentation

Warhead Weight: kg1.5

Range of Fire: km6

Flight Ceiling: km4.5

Guidance System: Three-channel optical seeker (ultraviolet, near-infrared, mid-infrared)

Fire Control

Name: INA

Computerized FCS: The new MANPADS also includes integrated automated control system. This enables data usage from both ground and early radar warning aircraft. Thus targets can be traced in advance and passed to MANPAD operators for engagement.

Direct Fire: Yes

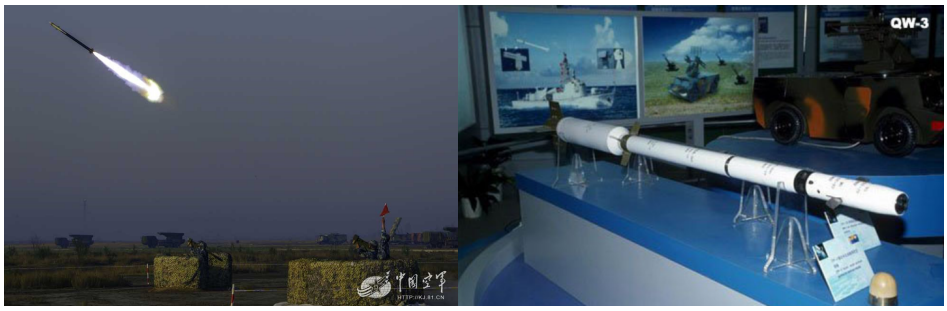
Imaging Sight: Maugli-2M infrared imaging sight

Identification Friend-or-Foe (IFF) Interrogator: Yes

Notes:

The 9K333 Verba Man-Portable Air Defense System (MANPADS) was developed by the Russian Konstruktorskoye Byuro Mashinostroyenia (KBM). It was unveiled in 2015. It was developed as a replacement for the 9K38 Igla system, which is currently used by Russian forces. Igla system is being used by many countries worldwide. The new Verba system uses a surface-to-air missile to engage air targets. It was approved for production in 2011 and adopted by the Russian Armed Forces in 2014. It is also being proposed for export customers. Verba's kill range is similar to the Igla-S (6 Km) and operating altitude is about 4.5 Km. But the engagement envelope has been extended by a factor of 2.5 besides improved protection from countermeasures. General performance factor has been increased by 1.5 to 2.

QW-3 Chinese Man-Portable Laser Guided Surface-to-Air Missile



Tiers:



Variants:

- **QW-1M:** QW-1M is a development of QW-1, and first revealed in Zhuhai Air Show. The missile is considered as a third generation MANPAD by Chinese, and many domestic Chinese media sources claim that it is the Chinese equivalent of Soviet SA-18 Grouse, which it strongly resembles. Like its predecessor QW-1, QW-1M also appeared to incorporate technologies of FIM-92 Stinger. Various western sources have postulated that China had likely obtained FIM-92 Stinger samples from either Afghan guerrilla or Pakistan, or even Iran, but such claims have yet to be confirmed. The missile is slightly heavier than QW-1, weighing at 18 kg for the entire system, and it is claimed to have better ECCM capability and better capability to engage low-flying aircraft in comparison to QW-1.[citation needed] Some have been supplied to Kata'ib Hezbollah.
- **QW-1A:** QW-1A is a derivative of QW-1M, with the adaptation of man-portable radar weighing 30 kg and a range of 15 km, and it is carried by the observer. The associating fire control system enables various QW-1A units to be linked up and thus increasing the effectiveness by forming an air defense network, which in turn, could be integrated into large air defense network. Although the entire QW-1A system including radar / fire control system could be carried by a crew of 2-men team, it is often mounted on vehicles.
- **QW-11 (QW-1G):** QW-11 is a development of QW family that is specifically designed to engage terrain hugging cruise missiles, while retaining the capability of engaging low-flying aircraft. QW-11 was first revealed at Zhuhai Air Show in 2002. A new combined impact and proximity fuze is developed to provide better capability against cruise missiles. Length: 1.477 m Missile weight: 10.69 kg System weight: 16.9 kg Warhead: 1.42 kg Range: 0.5 – 5000 m Altitude: 30 m - 4 km Reaction time: 10 sec
- **QW-18:** QW-18 is the development of the QW-11G with an improved seeker. QW-18 first appeared in Zhuai Air Show with QW-11 and QW-11G in 2002. An enhanced dual band infrared seeker is developed so that the target is not only tracked via the exhaust heat, but also the temperature difference of the skin of the target. These improvements provided better capabilities against terrain-hugging cruise missiles at supersonic speed. Externally, QW-18 is identical to QW-11G / QW-11.
- **QW-2:** QW-2 is a missile with all aspect attack capability and improved ECCM capability. There are two types of seeker for QW-2: the first is the dual band infrared passive seeker first revealed in 1998, and an imaging IR (ImIR) seeker has been designed sometimes later. The fuse is similar to that of QW-18. The minimum altitude is decreased to 10 m, thus further improving the capability against low-flying cruise missile and hovering helicopters that suddenly pop up from hiding.
- **QW-3:** This is the Chinese equivalent of French Mistral missile, with fuse developed from that of QW-2. The missile is unique among Chinese MANPAD in that this is the only surface-to-air missile that adopts the semi-active laser guidance similar to AGM-114 Hellfire. The gyro stabilized seeker provides very high degree of accuracy and is extremely effective against low altitude cruise missiles. The 15 degrees per second tracking rate of the seeker is relatively low in comparison for other MANPAD for supersonic targets in high g maneuver at very high altitudes, but this is by no means handicapping the performance because such targets are not intended to be for QW-3, which is specifically designed to engage terrain hugging helicopters and UAV's and other fast flying targets at extremely low altitudes, including supersonic sea skimming cruise missiles.
- **QW-4:** The newest member of QW series with the fuze similar to that of QW-2, and a new thermal imaging seeker. The new fully electric control surfaces provide smoother flight path curves, thus greatly improved accuracy.
- **Anza Mk 2:** INA
- **Anza Mk 3:** INA
- **TD-2000B:** To increase the capability of TD-2000, China National Precision Machinery Import and Export Corporation (CNPMIEC) also revealed a development of TD-2000, dubbed as TD-2000B at the same Zhuhai Airshow, where TD-2000B was displayed as part of the subsystem of TD-2000B. The primary improvement over the original system is the extra

C4ISR capability added so that in addition to control the QW-4 missiles of TD-2000, TD-2000B can also simultaneously control up to 6 anti-aircraft artillery pieces.

System

:
:
:

↳***QW-3 Man-Portable Laser Guided Surface-to-Air Missile***

Name: QW-3
Type: Laser Guided Surface-to-Air Missile
Manufactured: China Precision Machinery Import-Export Corp. (CPMIEC), Beijing, China China Aerospace Science and Industry Corporation (CASIC), Shenyang, China
Length: 2.10 m
Diameter: 72 mm
Launcher Weight: INA
Missile Weight: 23.0 kg
Propulsion: two-stage solid-propellant rocket
Maximum Speed: 750 m/sec, Mach 2.2
Maximum Engagement Altitude: 5,000 m
Minimum Engagement Altitude: 4 m
Maximum Range: 8,000 m
Minimum Range: 8 m
Guidance System: semi-active laser

Notes:

The QW-3, QianWei-3, is a person-transportable, shoulder-released surface-to-air missile (SAM) derived from the QW-1 missile. The QW-3 missile features a solid rocket booster taking into consideration an extended variety and extended warhead ability. The QW-3 steering device includes a nostril-established semi-active laser seeker. The missile is supplied with a blast-fragmentation warhead. The Q-three is capable of shooting down aerodynamic objectives flying at altitudes between 4 and 5,000 meters and at ranges between 800 and 8,000 meters. The QW-3 missile system become deployed with the aid of the people's Liberation army (PLA) inside the early 2000s.

Blowpipe British Man-Portable Air Defense Missile System (MANPAD)







Tiers:



System

Alternative Designation: Blowpipe
Type: Man-Portable Air Defense Missile System (MANPAD)
Manufacturer: Short Brothers
Number Built: 34,382
Crew: ea1
Effective Firing Range: 0.5 to 3.5 km
Warhead: Shape Charge
Warhead Weight: 2.2 kg
Engine: Solid rocket motor
Speed: Mach 1.5
Guidance System: MCLOS system

Dimensions

Length: m1.35
Width: mm76
Weight, Combat: 14.5 kg (missile in launch tube) 22 kg (complete system) 6.2 kg (launcher)

Notes:

The Shorts Blowpipe is a man-portable surface-to-air missile that was in use with the British Army and Royal Marines from 1975. It was superseded by an interim design, Javelin, and later the greatly improved Starstreak. The missile is supplied as a single round in a storage cylinder/firing tube. The aiming unit is clipped to the launch tube and fired from the operator's

shoulder. To reduce the overall size of the container, the rear fins of the missile are stored in the larger diameter cylinder at the front of the tube (this also contains the Yagi antenna for transmitting guidance signals); during firing, the fins slip onto the rear of the missile as it flies through and are held there by heat-activated adhesive tapes. This gives the launch container a unique shape, seemingly oversized at the front and extremely thin at the rear. The missile is powered by a short duration solid rocket for launch, then by a sustainer motor once it is well clear of the launch tube. The Blowpipe's guidance is initially semi-automatic with the missile gathered to the centre of the sight's crosshairs by the infrared optic atop the aiming unit. Two to three seconds after launch, missile guidance is switched to fully MCLOS mode, and the operator regains full control of the missile. The operator has to steer the missile all the way to its target manually via a small thumb joystick. The operator can opt not to use autogathering when engaging low flying targets such as helicopters, but then has to super-elevate the launcher to ensure that the missile does not hit the ground. Four flares in the tail of the missile make it visible in flight, first to the infrared optic, then to the operator. Detonation is either by proximity or contact fuse. In emergencies, the operator can end an engagement by shutting off the power to the transmitter with the system switch, after which the missile will immediately self-destruct. The aiming unit can then be removed from the empty missile container and fitted to a new round. Blowpipe was developed as a SAM for submarines, fitted as a cluster of four missiles into a mast that could be raised from the submarine's conning tower under the name Submarine Launched Airflight Missile (SLAM) trialled on HMS Aeneas (P427) in 1972. These were for a time installed on Israeli Gal class submarines.

SA-18 Grouse (9K38 Igla) Russian Man-Portable Air-Defense Missile System (MANPADS)







Tiers:

1 2 **3** 4

Variants:

- **Igla-1E:** Export version.
- **Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Igla-1D:** Igla-1D
- **Igla-1V:** Air-launched version, mainly for combat helicopters.
- **Igla-1N:** A version with heavier warhead at the cost of a slight reduction in range and speed.
- **Igla-1A:** Export version
- **Strelets Igla-S / Igla:** The Strelets is designed for remote automated firing of the Igla and Igla-S surface-to-air missile by single shot, ripple or in salvo. In service with Syria
- **3M-47 Gibka:** A turret for ships that is equipped with Igla missiles
- **Komar:** Another turret for ships that is equipped with Igla missiles

System

Alternative Designation: 9K38 Igla; SA18 Grouse

Type of Targets: Tactical aircraft, helicopter, UAV and cruise missile

Family: 9K38 Igla

Crew: ea1

Reaction Time: 5-10 Seconds

Note: The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1)

Dimensions

Length, Missile: m1.574

Diameter, Missile: mm72

Height: INA

Weight, Combat: See Missile Information

Missile System

↳*Missile Launcher*

Name: 9M 313–1 launching mechanism
Type: Portable Air-Defense Missile System (MANPADS)
Note: There is also a two-barrel 9K38 missile launcher called Djigit

↳*Missile*

Name: 9M39 Missile
Type: Portable Air-Defense Missile System (MANPADS)
Engine: Solid Fuel Rocket Motor
Length: m1.574
Diameter: mm72
Weight, Full System: kg17.9
Weight, Missile: kg10.8
Weight, Warhead: kg1.7
Warhead Type: Directed-energy blast fragmentation
Fuze Type: Delayed impact, magnetic and grazing
Target Engagement: m5,200
Speed: m/s600
Maximum Effective Range: m5,200
Maximum Target Speed, Receding: m/s360
Maximum Target Speed, Approaching: m/s320
Seeker Head Type: Nitrogen-cooled, Indium antimonide (InSb) and uncooled lead sulfide (PbS)
Seeker Scanning: FM-modulated
Maximum Altitude: m3500
Minimum Altitude: m10
Guidance System: Passive IR homing device and night vision (operating in the medium IR range)
NOTE: Missile is pitched by guidance unit over the lead point to avoid premature ground detonation when engaging targets at less than 10m. This slows engagement time.

Notes:

The SA-18 Grouse or Igla or 9K38 is a Russian made man-portable infrared homing surface-to-air missile defence system (SAM/MANPAD). This is a third-generation, man-portable, surface-to-air missile system and it is given the Russian industrial index number 9K38, for the complete system. The SA-18 Grouse with its 9M39 missile was accepted into service in the Soviet Army in 1983. The full-capability 9K38 Igla with its 9M39 missile was finally accepted into service in the Soviet Army in 1983. The main improvements over the Igla-1 included much improved resistance against flares and jamming, a more sensitive seeker, expanding forward-hemisphere engagement capability to include straight-approaching fighters (all-aspect capability) under favourable circumstances, a slightly longer range, a higher-impulse, shorter-burning rocket with higher peak velocity (but

approximately same time of flight to maximum range). The naval variant of 9K38 Igla has the NATO reporting name SA-N-10 Grouse. The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1). There is also a two-barrel 9K38 missile launcher called Djigit.

Misagh-2 Iranian Man-Portable Surface-to-Air Missile System (MANPADS)







Tiers:



Variants:

- **Misagh-1:** The Misagh 1 (also Mithaq-1, etc.) is an Iranian man-portable surface-to-air missile. It was developed by the Shahid Kazemi Industrial Complex in Tehran. It is a variant or reverse-engineered clone of the Chinese QW-1 Vanguard missile system and is comparable to the Soviet SA-16 Gimlet missile. It is used by Iran and has been exported to Hezbollah in Lebanon and to the Popular Mobilization Forces in Iraq and to Syria as well. The MANPADS was supplemented by the newer Misagh-2 missile system.

System

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↳ ***Weapon System***

Name: Misagh-2
Type: Man-Portable Surface-to-Air Missile System (MANPADS)
Manufacturer: Shahid Shah Abhady Industrial Complex
Crew: 1
Engine: Solid Rocket Motor
Guidance System: Passive IR homing device and night vision (operating in the medium IR range)
Speed: m/s850
Maximum Engagement Altitude: 4,000 m
Minimum Engagement Altitude: 10 m
Maximum Engagement Range: m6,000
Minimum Engagement Range: m500
Warhead Type:
Storage Life: 8 Years
Reaction Time: 5 to 10 sec.
Targets: Tactical aircraft, helicopter, UAV and cruise missile

Dimensions

Length: m1,590 m

Diameter: mINA

Weight: kg11.32

Warhead Weight: kg1.42

Notes:

The Misagh-2 is an Iranian man-portable infrared-guided surface-to-air missile. The Misagh-2 is the successor to the Misagh-1. Like its predecessor, the Misagh-2 is based on Chinese technology.[1] Iran’s defense minister launched the domestic mass production of the Misagh-2 on 5 February 2006. This missile destroys its target within 5 second and has an operation temperature of -40°C to +60°C. Near the target its speed reaches 2.7+ Mach. It is roughly comparable to the Soviet SA-18 Grouse missiles.

Misagh-1 Iranian Man-Portable Surface-to-Air Missile System (MANPADS)







Tiers:



Variants:

- **Misagh-2:** The Misagh-2 is an Iranian man-portable infrared-guided surface-to-air missile. The Misagh-2 is the successor to the Misagh-1. Like its predecessor, the Misagh-2 is based on Chinese technology.[1] Iran's defense minister launched the domestic mass production of the Misagh-2 on 5 February 2006. This missile destroys its target within 5 second and has an operation temperature of -40°C to +60°C. Near the target its speed reaches 2.7+ Mach.

System

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↳*Missile System*

Name: Misagh-1
Type: Man-Portable Surface-to-Air Missile System (MANPADS)
Manufacturer: Shahid Shah Abhady Industrial Complex
Crew: 1
Engine: Solid Rocket Motor
Guidance System: Passive infrared homing
Speed: m/s600
Maximum Engagement Altitude: 4,000 m
Minimum Engagement Altitude: 30 m
Maximum Engagement Range: 500 m
Minimum Engagement Range: 5,000 m
Warhead Type: HE-fragmentation
Fuze: Impact

Dimensions

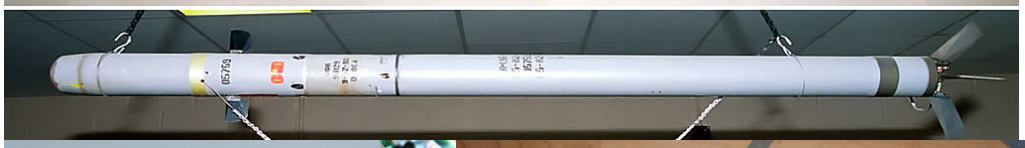
Length: m1.477
Diameter: m0.71 m
Height: INA
Weight: kg16.9
Warhead Weight: kg1.42

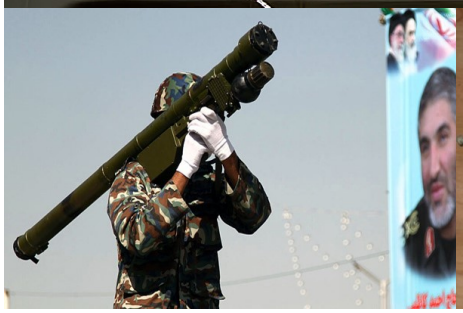
Notes:

The Misagh 1 (also Mithaq-1, etc.) is an Iranian man-portable surface-to-air missile. It was developed by the Shahid Kazemi Industrial Complex in Tehran. It is a variant or reverse-engineered clone of the Chinese QW-1 Vanguard missile system and is comparable to the Soviet SA-16 Gimlet missile. It is used by Iran and has been exported to Hezbollah in Lebanon and to the Popular Mobilization Forces in Iraq and to Syria as well. The MANPADS was supplemented by the newer Misagh-2 missile system. Visually, the Misagh-1 is virtually indistinguishable from the QW-1 it is cloned from, other QW-series missiles, the Misagh-2 upgrade, and Pakistan's Anza missiles.

9K34 Strela-3 (SA-14 Gremlin) Russian Man-Portable Air Defense Missile System (MANPADS)









Tiers:



System

Alternative Designations: 9K34 Strela-3 SA-14

Target: Air Defense

Description: The 9K34 Strela-3, NATO reporting name: SA-14 Gremlin) is a man-portable air defense missile system (MANPADS) developed in the Soviet Union as a response to the poor performance of the earlier 9K32 Strela 2 (SA-7 Grail) system.

Crew: 1, Normally 2 with a loader

Armament

Launcher Name: 9K34 Strela-3 (SA-14 Gremlin)

Missile Name: 9M36 or 9M36-1

Length: m1.4

Diameter: mm75

Weight: kg10.3

Reaction Time: sec25

Fire on the Move: Yes, in short halt

Max Range: m6,000

Min Range: m600

Max Altitude: m6,000

Min Altitude: m10; 0 with degraded Ph

Fin Span: INA

Missile Speed: m/s600

Propulsion: 2-stage solid-propellant rocket

Guidance: 1-color passive IR homing

Seeker Field of View: INA

Tracking Rate: INA

Warhead Type: Frag-HE

Warhead Weight: kg1.0

Fuze Type: Contact/grazing

Probability of Hit: Ph%50 FW/50 heli

Weapons and Ammunition Types

Ready missiles: Typical Combat Load One-man 1 Normal Dismount 2 From AD Vehicle 5

Fire Control

Sights with magnification: Launch tube has simple sights

Gunner: INA

Gunner Field of View: INA

Gunner Acquisition Range: INA

Gunner Night Sight: None standard, but available

Acquisition Range: 6,000

IFF: Yes

Notes:

The 9K34 Strela-3, NATO reporting name: SA-14 Gremlin is a man-portable air defense missile system (MANPADS) developed in the Soviet Union as a response to the poor performance of the earlier 9K32 Strela 2 (SA-7 Grail) system. The missile was largely based on the earlier Strela 2, and thus development proceeded rapidly. The new weapon was accepted into service in the Soviet Army in January 1974. The most significant change over the Strela 2 was the introduction of an all-new infra-red homing seeker head. The new seeker worked on FM modulation (con-scan) principle, which is less vulnerable to jamming and decoy flares than the earlier AM (spin-scan) seekers, which were easily fooled by flares and even the most primitive infrared jammers. The new seeker also introduced detector element cooling in the form of a pressurized nitrogen bottle attached to the launcher. The effect of cooling was to expand the seeker's lead sulphide detector element's sensitivity range to longer wavelengths (slightly over 4 µm as opposed to 2.8 µm of uncooled PbS elements). In practice this made possible the tracking of cooler targets over longer ranges, and enabled forward-hemisphere engagement of jets under favourable circumstances. The seeker also had better tracking rate, enabling the missile to track maneuvering of fast and approaching targets. A negative side effect from the aforementioned improvements was increased missile weight, which caused a slight decrease in the kinematic performance of the original Strela-2 (SA-7). Against relatively slow, low-altitude battlefield air threats the overall effectiveness was much improved. Strela-3 missiles have been exported to over 30 countries. The original Strela-3 missile was the 9M36. The follow-on to the Strela-3 was Igla. The naval version of this missile has the NATO reporting name of SA-N-8.

SAM-14A (SA-16 Gimlet) Iranian Man-Portable Air-Defense Systems (MANPADS)







Tiers:



Variants:

- **Igla-1E:** Export version.
- **Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Igla-1D:** A version for paratroopers and special forces.
- **Igla-1V:** Air-launched version, mainly for combat helicopters.
- **Igla-1N:** A version with heavier warhead at the cost of a slight reduction in range and speed.
- **Igla-1A:** Export version
- **Igla-S (SA-24 Grinch):** Newest variant with improved range, seeker, resistance to countermeasures, and warhead.
- **Strelets Igla-S:** The Strelets is designed for remote automated firing of the Igla and Igla-S surface-to-air missile by single shot, ripple or in salvo. In service with Syria
- **3M-47 Gibka:** A turret for ships that is equipped with Igla missiles.
- **Komar:** Another turret for ships that is equipped with Igla missiles.

System

Alternative Designation: 9K310 Igla-1 (SA-16 Gimlet)

Type: Russian Man-Portable Infrared Homing Surface-to-Air Missile

Manufacturer: KB Mashinostroyeniya – developer of the system

Family: Igla

Crew: ea1

In Service: 1981-Present

Dimensions

Length: m1,574

Diameter: mm72

Height: INA

Weight, Missile Only: kg10.8
Weight, Full System: kg13.9

Missile System

↳*System*

Name: 9K310 Igla-1 (SA-16 Gimlet)
Type: Russian Man-Portable Infrared Homing Surface-to-Air Missile
Launcher Name: 9P322 fibre glass launch canister
Missile Name: 9M313 missile
Warhead Weight: kg1.17
Explosive Weight: grams390
Detonation Mechanism: contact and grazing fuzes
Engine: solid fuel rocket motor
Operational Range: km5.2
Flight Ceiling: km3.5
Speed: m/s570
Guidance System: dual waveband infra-red (S-version
Taget Engagement Altitude: 100 to 3,500 m
Taget Engagement Range: 500 - 5,000 m
Reaction Time: 5-10 seconds
IFF System: Yes

Notes:

The SAM-14 is a export of the Russian 9K310 Igla-1 (NATO: SA-16 Gimlet) The 9K310 Igla-1 system and its 9M313 missile were accepted into service in the Soviet army on 11 March 1981. The main differences from the Strela-3 included an optional Identification Friend or Foe system to prevent firing on friendly aircraft, an automatic lead and super elevation to simplify shooting and reduce minimum firing range, a slightly larger rocket, reduced drag and better guidance system extend maximum range and improve performance against fast and maneuverable targets, an improved lethality on target achieved by a combination of delayed impact fuzing, terminal maneuver to hit the fuselage rather than jet nozzle, an additional charge to set off the remaining rocket fuel (if any) on impact, an improved resistance to infrared countermeasures (both decoy flares and ALQ-144 series jamming emitters), and slightly improved seeker sensitivity. 9K38 Igla (SA-18) missile and launcher top and 9K310 Igla-1 (SA-16) missile and launcher below. The seeker has two detectors – a cooled MWIR InSb detector for detection of the target and uncooled PbS SWIR detector for detection of IR decoys (flares). The built-in logic determines whether the detected object is a target or a decoy. The latest version (Igla-S) is reported to have additional detectors around the main seeker to provide further resistance against pulsed IRCM devices commonly used on helicopters. The 9M313 missile features an aerospike mounted on a tripod (Igla's 9M39 missile has aerospike attached directly to the seeker dome), which reduces a shock wave, thus providing less dome heating and greater range. The name Igla is derived from these devices. Like many other MANPADS, Igla-1 and Igla feature so-called rolling airframe missiles. These missiles roll in flight (900 – 1200 rpm) so steering the missile requires just a single pair of control surfaces, unlike roll-stabilized missiles, which require separate control surfaces for pitch and yaw. Both 9M313 and 9M39 missiles contain a gas generator, which drives a small gas turbine to provide electrical power, and the pistons, which move the canards used to steer the missile in a bang-bang mode. In addition to that, two exhaust tubes of the gas generator are placed perpendicular to the steering canards to provide maneuverability immediately after launch when the missile airspeed is too low for canards to be effective. Later versions of Igla are reported to use proportional control to drive the canards, which enables greater precision and less oscillation of the flight path. According to the manufacturer, South African tests have shown the Igla's superiority over the contemporary (1982 service entry) but smaller and lighter American FIM-92A Stinger missile. According to Kolomna OKB, the Igla-1 has a Pk (probability of kill) of 0.30 to 0.48

against unprotected targets which is reduced to 0.24 in the presence of decoy flares and jamming. In another report, the manufacturer claimed a Pk of 0.59 against an approaching and 0.44 against receding F-4 Phantom II fighter not employing infrared countermeasures or evasive maneuvers

Mistral Franch Man-Portable Air-Defense System (MANPADS)



Tiers:



Variants:

- **Submarine Air Defence Weapon:** On 26 September 2012 DCNS at the company's Le Mourillon plant announced plans to design and build a submarine canister-based air defence weapon based on the Mistral. The concept is similar to the British Submarine Launched Airflight Missile developed by Vickers in the 1970s and tested on HMS Aeneas and three boats of the Gal-class.
- **SIMBAD-RC:** SIMBAD-RC is a naval remote controlled turret using Mistral missiles developed by MBDA.

System

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↳*Mistral MANPADS*

Name: Mistral
Type: Man Portable surface-to-air missile
Manufacturer: MBDA (France)
In Service: 1988-Present
Length: 1.86 m
DIameter: 90 mm
Crew: 1
Effective Firing Range: 6 km
Warhead: High Explosive with high density tungsten balls
Warhead Weight: 2.95 kg
Detonation Mechanism: Laser proximity or impact triggered
Engine: Solid Rocket Motor
Speed: m/s800
Guidance System: Infrared homing
Note: SIMBAD-RC is a naval remote controlled turret using Mistral missiles developed by MBDA

Notes:

Mistral is an infrared homing MANPADS manufactured by the European multinational company MBDA missile systems (formerly by Matra BAe Dynamics). Based on the French SATCP (Sol-Air À Très Courte Portée), the portable missile later to become the Mistral began development in 1974. It was initially deployed in 1988 for the first version (S1), 1997 for the second version (M2), and 2019 for the third version (M3). The basic Mistral missile is used with a man-portable launch unit. There are also launch units that allow the missile to be fired from armoured vehicles, ships or helicopters (such as the Aérospatiale Gazelle, Denel Rooivalk, or Eurocopter Tiger). To reject the flares ejected from the rear of the targeted aircraft, proportional navigation using a gyro as a reference is adopted for Mistral, instead of the pursuit method in earlier IR-guided MANPADS. To further enhance the ECCM capability, the seeker of Mistral has a very narrow field of view to reject decoys and interference, but the seeker can tilt in the range of +/− 38 degrees. On the launcher, the missile runs up the gyro in 2 seconds, and total reaction time is 5 seconds. The all-aspect two-color (2–4 and 3–5 μm) cooled IR-seeker of Mistral is developed by SAT, and the missile adopts both laser proximity and impact fuzes. A close-in weapon system based on Mistral is a six-missile version called Sadral, with a stabilized rapid-reload launcher that is fully automated. A CSEE developed fire control director is integrated to the launcher, consisted of TV camera and FLIR. Image produced by both directors appear on the screen in the operator console below deck, and the missiles are locked onto the target before being launched. A fully loaded Sadral launcher weighs 1080 kg, and the operator console weighs 280 kg. A two-missile unit installed on ships is called Simbad, and a newly launched four-missile version is called Tetral. An evolution of the Simbad is now proposed: Simbad RC. Both Tetral and Simbad RC are remote controlled from the ship's deck while the original Simbad is manually operated with a simple optical sight.

FIM-92 Stinger American Man-Portable Air-Defense System (MANPADS)







Tiers:



Variants:

- **The MANPADS has been adapted for launch from APC or IFV chassis. It has also been adapted for light utility vehicles and combat support vehicles, such as the German Wiesel-based Fliegerfaust-2 (FLF-2). A variety of air defense launcher systems can use Stinger, Mistral, or other MANPADS.:**
- **FIM-92A:** Stinger Basic: The basic model.
- **FIM-92B:** Stinger POST: In this version, the infrared seeker head was replaced by a combined IR/UV seeker that utilized rosette scanning. This resulted in achieving significantly higher resistance to enemy countermeasures (flares) and natural disturbances. Production ran from 1981 to 1987; a total of 600 missiles were produced.[
- **FIM-92C:** Stinger RMP: The resistance to interference was increased again by adding more powerful digital computer components. Moreover, the software of the missile could now be reconfigured in a short time in order to respond quickly and efficiently to new types of countermeasures. Until 1991, some 20,000 units were produced for the U.S. Army alone.
- **FIM-92D:** Various modifications were continued with this version in order to increase the resistance to interference.
- **FIM-92E:** Stinger—RMP Block I: By adding a new rollover sensor and revised control software, the flight behavior was significantly improved. Additionally, the performance against small targets such as drones, cruise missiles and light reconnaissance helicopters was improved. The first deliveries began in 1995. Almost the entire stock of U.S. Stinger missiles was replaced by this version.
- **FIM-92F:** A further improvement of the E version and the current production version.
- **FIM-92G:** An unspecified upgrade for the D variant.[
- **FIM-92H:** Indicates a D variant that has been upgraded to the E standard.
- **Stinger—RMP Block II:** This variant was a planned developed based on the E version. The improvements included an imaging infrared seeker head from the AIM-9X. With this modification, the detection distance and the resistance to jamming was to be greatly increased. Changes to the airframe would furthermore enable a significant increase in range. Although the missile reached the testing phase, the program was dropped in 2002 for budgetary reasons.
- **FIM-92J:** Block 1 missile upgrade to replace aging components to extend service life an additional 10 years. Upgrades include a proximity fuse warhead section, equipped with a target detection device to increase effectiveness against unmanned aerial vehicles.
- **FIM-92K:** variant of FIM-92J designed to use a vehicle datalink rather than the missile's own seeker for targeting.

System

Alternative Designation: FIM-92A Basic Stinger
System: Grip-stock (with battery coolant unit, IFF, impulse generator, and seeker redesign), missile, night sight, radio and

other acquisition aides

Crew : ea1, Normally 2 with a loader

In Service: 1981-Present

Armament

↳*Weapon 1*

Diameter : mINA

Fire on Move: Yes, in short halt

Launcher Name: Stinger grip-stock

Length : m1.52+ launch tube

Reaction Time : sec6 tracking and missile activation (3-5 cooling)

Reload Time : secless than 10

System Weight: 15.2 launch-ready 2.6 belt-pack IFF

Time between Launches : minINA

Type: Missile

Munition

↳*Munition 1*

Altitude, Maximum : m3500

Combat Load, Dismount : rds2.0

Combat Load, from AD vehicle : rds5.0

Combat Load, one: 1.0

Diameter : mm70.0

Fuze Type: Contact with time delay

Guidance: Cooled 2nd gen passive IR homing (4.1-4.4 mm)

Length : mm1.52

Name: FIM-92A

Probability of Hit: PCTINA

Propulsion: Solid fuel, dual-thrust (ejector motor and sustainer motor)

Range, Maximum : m4,000+

Range, Minimum : m200.0

Seeker Field of View : degINA

Self-Destruct Time: sec20.0

Speed : m/s745 m/s, Mach 2.2

Target Maneuver Limit: Up to 8 g

Tracking Rate: INA

Type: Frag-HE

Type: Missile

Weight : kg1.0

Weight : kg10.0

Fire Control System

ADAD: British passive thermal IR scanners on remote tripod or vehicle mount with 240 o FOV automatic cueing system.

IFF: AN/PPX-1 trigger-activated on grip-stock, with battery belt-pack

Target Alert Display Set (TADDS): US portable graphic display set w/audio alert, VHF radio, and IFF.

↳*Day Sight*

Acquisition Range : km4000+

Field of View : degINA

Field of View : degINA

Type: Ring and bead, most launchers Optical sight with lead bias available.

↳*Night Sight*

Type: Optional AN/PAS-18, Wide- Angle Stinger Pointer System (WASP) thermal sight.

↳*Night Sights*

Acquisition Range : km20-30 side or tail aspect, 10 head-on aspect

Field of View : deg20o x 12 o

↳*Radar*

Radar Equipment: Providing Omni-directional Reporting of Targets at Extended Ranges (REPORTER), German/Dutch EW system with I/J band radar and IFF. Range: 40 km. Altitude: 15-4000 m.

Radar Other: Several U.S. and foreign radars are available for use with Stinger.

Notes:

The FIM-92 Stinger is a Man-Portable Air-Defense System (MANPADS) that operates as an infrared homing surface-to-air missile (SAM). It can be adapted to fire from a wide variety of ground vehicles and helicopters (as an AAM). Developed in the United States, it entered service in 1981 and is used by the militaries of the United States and 29 other countries. It is principally manufactured by Raytheon Missile Systems and is produced under license by EADS in Germany and by Roketsan in Turkey, with 70,000 missiles produced.

HN-5A Chinese Man Portable Surface-to-Air Missile (MANPAD)




Tiers:



Variants:

- **LHN-5A:** The HN-5A has a greater detection range for the IR seeker and a reduced susceptibility IR background noise.
- **HN-5B:** The HN-5B has an increased maximum altitude of 8,202 ft (2,500 m).
- **HN-5C:** This is a mobile launcher system. There is one four-tube box on either side of unmanned pedestal. A laser rangefinder, thermal imager and TV camera for fire control are in a mount atop the pedestal. Eight reload missiles are in the vehicle body. Total mounted weight is 4,409 lb. (2,000 kg). This version has been displayed on a small flat-bed truck and a scale model of 6 x 6 wheeled armored reconnaissance vehicle. Originally, it was shown on the HRB-230 cross-country vehicle. During the 1997 Paris Air Show, a model of the WZ551 APC was on display with the HN-5C system mounted on the ve hicle's roof. The WZ551 version has a turret elevation limitation of -2/+80 degrees. The HN-5C is operated by a two-man crew and has a maximum effective range of 13,779 ft. (4,200 m) between an altitude limits of 164 ft (50 m) and 7,545 ft (2,300 m). The maximum target speed is 492 ft/s (150 m/s) for head-on intercept and 853 ft/s (260 m/s) for tail-on engagement. It is available f or export; the current production status of this HN-5C is unreported.

System

Alternative Designations: Red Cherry 5, Red Cherry 5A, HN-5A

Target: Rotary wing aircraft

Crew: Can be fired by one however, a second crew member assists with identification of the target

Reaction Time: secs<5

Family: HN-5

Dimensions

Weight: kg16

Length: m1.44

Diameter: mm72

Armament (Missile)

Engine: 1 x 2-stage solid-propellant rocket

Max Speed: Mach 1.5

Maximum Slant Range: km4.4

Minimum Slant Range: m800

Maximum Altitude: m2,300

Minimum Altitude: m80

Maximum Target Speed (Head On): kph550

Maximum Target Speed (Tail Chase): kph950

Warhead: HE / Frag

Counter-Counter Measures: Missile has a filter to reduce chances of missile being diverted by flares

Notes:

The Chinese Hong Nu (Red Cherry) 5 (HN-5) is a man-portable surface-to-air missile (SAM), designed to engage propeller-driven aircraft and helicopters. It began as a copy of the Soviet SA-7 Grail, but has been updated as the HN-5A. The original HN-5 guidance technology was relatively primitive, using an uncooled lead sulfide (PbS) infrared (IR) seeker and following the target's flight path until intercept. The uncooled IR seeker proved very susceptible to homing on the hottest object in its field of view, which was often some thing other than an aircraft. The HN-5A has a cooled seeker with a background noise rejection filter, greater detection range and proportional navigation, which steers the missile on an interception course. It also has a heavier warhead. The HN-5A has replaced the HN-5 in production and has been offered for export. The launch tube has simple sights. The power supply is under the tube. The missile has a long pipe-like body with very small foreplanes and angled steering vanes extending to the rear. The launch procedure for the HN-5 was nearly identical to the SA-7.

FN-6 Chinese Man-Portable Air Defence System (MANPADS)




Tiers:



Variants:

- **FN-6A:** Vehicle mounted version of FN-6 first revealed to public in 2005. The system is based on a Chinese HMMWVS, 4x4 light tactical vehicle.
- **QW-1:** Export version of FN-6
- **FN-16:** FN-16 is an improvement of earlier FN-6, with better all aspect attack capability and better resistance against electronic countermeasures. Another major improvement is in its seeker, which in addition to the original IR guidance, UV guidance is also incorporated, a practice adopted in the later version of FIM-92 Stinger. Like its predecessor FN-6, FN-16 can also be fitted with both IFF systems used on FN-6, and just like FN-6, FN-16 is re-designated as FY-16 (Fei Ying meaning Flying Eagle) when equipped with IFFs.
- **HN-6:** HN-6 is a further development of FN/FY-6/16. HN-6 utilizes fire control systems (FCS) of earlier FN/FY-6/16 MANPADS, but a new FCS sight of unknown designation has also been developed. In addition to improved performance over the original FN/FY-6/16 MANPADS, HN-6 incorporates a protective cap over the seeker of missile, offering better protection against the environmental elements. Based on the photos and video clips of PLA training, this protective cap does not appear to be automatically ejected when the missile is fired, but instead, it is manually removed before firing the missile. Another improvement of HN-6 over the earlier FN/FY-6/16 MANPADS is that it incorporates a fire station similar to that of RBS 70 and Mistral: a seat is attached to the light weight tripod firing stand that can be folded for transportation and storage, and the operator is protected by a bulletproof glass shield.

System

Alternative Designation: FN-6 or Fei Nu-6
Description: Shoulder fired, IR homing, heat seeking, surface to air missile designed to destroy fixed wing aircraft, rotary wing aircraft, and UAVs
Propellant: Solid
Maximum Velocity: m/s600
Maximum Range: m5,500
Maximum Altitude: km3.8
Minimum Range: m500
Minimum Altitude: m15
Attack Characteristics: Missile can attack incoming, outgoing, and crossing aircraft
Proximity fuze: Yes
Crew: 2 (can be fired without second team member)
Guidance System: Infrared Homing
Fire-and-Forget: Yes

Dimensions

Missile Weight: kg10.7

System Weight: kg17

Missile Length: mm1495

Missile Diameter: mm72

Fin Span: m0.18

Additional Options (Not required for missile to fire)

IFF: Yes

Enhanced Optical Sight: Yes

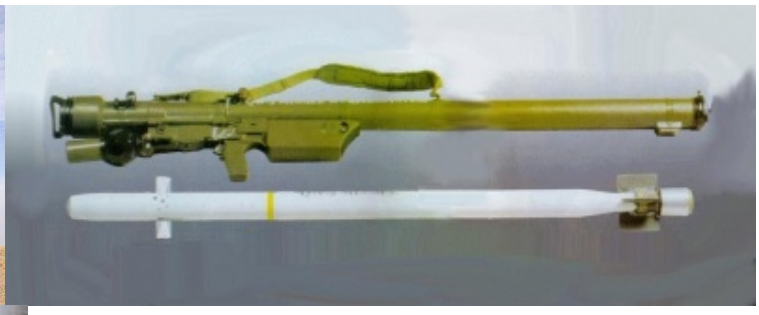
Night Sight: Yes

Notes:

The FN-6 is a man-portable air defense missile system (MANPADS) designed and manufactured in China by the Defense Company Poly Technologies. it is deployed as a two-man team however, a second soldier is not required to put ready the system to fire or fire the system. It is a third generation passive infrared (IR) man portable air defense system. The FN-6 has the capability of all-direction attack and anti-infrared jamming. The FN-6 is a fire-and-forget system that is easy to transport and use. The FN-6 is especially designed to engage low flying targets flying at or less than 300m/s. The weapon was specifically designed to be used against targets flying at low and very low altitudes. The FN-6 was developed in parallel with the Qian Wei (QW) missile series. FN-6, or FeiNu-6, is the export name given to the export version derived from this system, and it is known as HongYing-6 (Chinese: □□; pinyin: hóng yīng; lit.: 'red tassel') in the PLA. The training simulator of FN-6 is not developed by the contractor of the missile system, but instead, the simulator is developed by PLA itself after the missile was purchased, and the general designer of the training simulator of FN-6 is Mr. Liu Weixing. The training simulator of FN-6 is also used for later versions of MANPADS developed from FN-6. Export sales of the weapon is the responsibility of China National Precision Machinery Import and Export Corporation, a state owned trading company responsible for representing the domestic defense production industry in air defense related products. According to Janes, the FN-6 is a third generation, passive infrared, man portable air defense system (MANPADS). It is equipped with a digital infrared seeker with a strong resistance to flares, solar heat and heat from the ground. The pyramid shaped nose of the missile houses the four unit infrared seeker. The handle of the launcher houses the batteries and cooling system. An IFF antenna and an optional clip-on optical sight are fitted on to the launcher. The missile is capable of all-aspect attack and has a 70% single shot hit probability. It can engage targets maneuvering at up to 4 g. When FN-6 MANPADS can be equipped with night vision equipment, and it can also be equipped with IFF systems, two of which were shown to public, one of which is similar in appearance to AN/PPX-1 IFF of FIM-92 Stinger, while the other IFF system is a fish bone configuration. When equipped with IFF system, the name is changed from FN-6 to FY-6, or short for Fei Ying, meaning Flying Eagle.

QW-2 Chinese Man-Portable Infrared Homing Guided Surface-to-Air Missile







Tiers:

1 **2** 3 4

System

:
:
:

↳***QW-2 Vanguard 2 Man-Portable Infrared Homing Guided Surface-to-Air Missile***

Name: QW-2
Type: Infrared Homing Guided Surface-to-Air Missile
Manufactured: Shenyang-based CASIC 119 Factory
Length: 1.59 m
Diameter: INA
Weight: 11.32 kg
Detonation Mechanism: Impact & Proximity
Engine: Rocket
Propellant: Solid Rocket
Operational Range: 6 km maximum
Flight Ceiling: 4 km
Flight Altitude: 10 meter minimum
Maximum Speed: > 600 m/s
Guidance System: Infrared Homing

Launch Platform: MANPADS, Type 95 SPAAA

Notes:

The QW-2 is a Chinese all-aspect man-portable infrared homing guided surface-to-air missile. It is not clear when the missile first entered service, but it is likely to have been between 1998 and 2002. The QianWei 2 (or Vanguard 2, its export name) is the third-generation shoulder-launched, all-aspect IR-homing, 'fire-and-forget' surface-to-air missile developed by Shenyang-based CASIC 119 Factory (Shenyang Hangtian Xinle Ltd). The QW-2 was first revealed during the 1998 Farnborough Airshow. The missile and launcher of the QW-2 bear strong resemblance to those of the Russian 9K310 Igla-1, and the two missile systems are believed to be comparable in performance. QW-2 is a development of the QW-1 Vanguard series, and is considered by many domestic Chinese media sources as the Chinese equivalent of FIM-92E Stinger. Compared to the QianWei 1, the minimum operating altitude of the QianWei 2 has been reduced from 30m to 10m; the operating range has been increased from 5 km to 6 km; and the missile’s reaction time has been reduced to below 5 seconds. The QianWei 2 features a newly developed dual-band passive IR seeker with strong resistance to heat flares dispensed by the target and solar/ground heat, thus improving the missile’s performance in day/night, all-weather conditions.

SAM-18 (SA-18 Grouse) Iranian Man-Portable Air-Defense Missile System (MANPADS)







Tiers:



Variants:

- **Igla-1E:** Export version.
- **Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Igla-1D:** Igla-1D
- **Igla-1V:** Air-launched version, mainly for combat helicopters.
- **Igla-1N:** A version with heavier warhead at the cost of a slight reduction in range and speed.
- **Igla-1A:** Export version
- **Strelets Igla-S / Igla:** The Strelets is designed for remote automated firing of the Igla and Igla-S surface-to-air missile by single shot, ripple or in salvo. In service with Syria
- **3M-47 Gibka:** A turret for ships that is equipped with Igla missiles
- **Komar:** Another turret for ships that is equipped with Igla missiles

System

Alternative Designation: 9K38 Igla; SA18 Grouse
Type of Targets: Tactical aircraft, helicopter, UAV and cruise missile
Family: 9K38 Igla
Crew: ea1
Reaction Time: 5-10 Seconds
Note: The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1)

Dimensions

Length, Missile: m1.574
Diameter, Missile: mm72
Height: INA

Weight, Combat: See Missile Information

Missile System

↳*Missile Launcher*

Name: 9M 313–1 launching mechanism
Type: Portable Air-Defense Missile System (MANPADS)
Note: There is also a two-barrel 9K38 missile launcher called Djigit

↳*Missile*

Name: 9M39 Missile
Type: Portable Air-Defense Missile System (MANPADS)
Engine: Solid Fuel Rocket Motor
Length: m1.574
Diameter: mm72
Weight, Full System: kg17.9
Weight, Missile: kg10.8
Weight, Warhead: kg1.7
Warhead Type: Directed-energy blast fragmentation
Fuze Type: Delayed impact, magnetic and grazing
Target Engagement: m5,200
Speed: m/s600
Maximum Effective Range: m5,200
Maximum Target Speed, Receding: m/s360
Maximum Target Speed, Approaching: m/s320
Seeker Head Type: Nitrogen-cooled, Indium antimonide (InSb) and uncooled lead sulfide (PbS)
Seeker Scanning: FM-modulated
Maximum Altitude: m3500
Minimum Altitude: m10
Guidance System: Passive IR homing device and night vision (operating in the medium IR range)
NOTE: Missile is pitched by guidance unit over the lead point to avoid premature ground detonation when engaging targets at less than 10m. This slows engagement time.

Notes:

The SA-18 Grouse or Igla or 9K38 is a Russian made man-portable infrared homing surface-to-air missile defence system (SAM/MANPAD). This is a third-generation, man-portable, surface-to-air missile system and it is given the Russian industrial index number 9K38, for the complete system. The SA-18 Grouse with its 9M39 missile was accepted into service in the Soviet Army in 1983. The full-capability 9K38 Igla with its 9M39 missile was finally accepted into service in the Soviet Army in 1983. The main improvements over the Igla-1 included much improved resistance against flares and jamming, a more sensitive seeker, expanding forward-hemisphere engagement capability to include straight-approaching fighters (all-aspect capability) under favourable circumstances, a slightly longer range, a higher-impulse, shorter-burning rocket with higher peak velocity (but

approximately same time of flight to maximum range). The naval variant of 9K38 Igla has the NATO reporting name SA-N-10 Grouse. The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1). There is also a two-barrel 9K38 missile launcher called Djigit.

SAM-14 (SA-14 Gremlin) Iranian Man-Portable Air Defense Missile System (MANPADS)



Tiers:

1 2 3 4

System

Alternative Designations: 9K34 Strela-3 SA-14

Target: Air Defense

Description: The 9K34 Strela-3, NATO reporting name: SA-14 Gremlin) is a man-portable air defense missile system (MANPADS) developed in the Soviet Union as a response to the poor performance of the earlier 9K32 Strela 2 (SA-7 Grail) system.

Crew: 1, Normally 2 with a loader

Armament

Launcher Name: 9K34 Strela-3 (SA-14 Gremlin)

Missile Name: 9M36 or 9M36-1

Length: m1.4

Diameter: mm75

Weight: kg10.3

Reaction Time: sec25

Fire on the Move: Yes, in short halt

Max Range: m6,000

Min Range: m600

Max Altitude: m6,000

Min Altitude: m10; 0 with degraded Ph

Fin Span: INA

Missile Speed: m/s600

Propulsion: 2-stage solid-propellant rocket

Guidance: 1-color passive IR homing

Seeker Field of View: INA

Tracking Rate: INA

Warhead Type: Frag-HE

Warhead Weight: kg1.0

Fuze Type: Contact/grazing

Probability of Hit: Ph%50 FW/50 heli

Weapons and Ammunition Types

Ready missiles: Typical Combat Load One-man 1 Normal Dismount 2 From AD Vehicle 5

Fire Control

Sights with magnification: Launch tube has simple sights

Gunner: INA

Gunner Field of View: INA

Gunner Acquisition Range: INA

Gunner Night Sight: None standard, but available

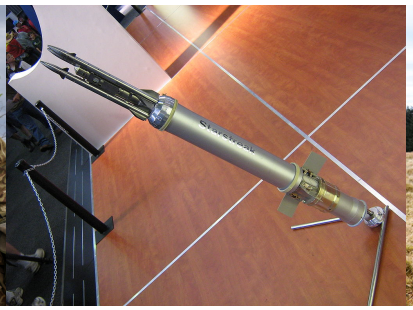
Acquisition Range: 6,000

IFF: Yes

Notes:

The 9K34 Strela-3, NATO reporting name: SA-14 Gremlin is a man-portable air defense missile system (MANPADS) developed in the Soviet Union as a response to the poor performance of the earlier 9K32 Strela 2 (SA-7 Grail) system. The missile was largely based on the earlier Strela 2, and thus development proceeded rapidly. The new weapon was accepted into service in the Soviet Army in January 1974. The most significant change over the Strela 2 was the introduction of an all-new infra-red homing seeker head. The new seeker worked on FM modulation (con-scan) principle, which is less vulnerable to jamming and decoy flares than the earlier AM (spin-scan) seekers, which were easily fooled by flares and even the most primitive infrared jammers. The new seeker also introduced detector element cooling in the form of a pressurized nitrogen bottle attached to the launcher. The effect of cooling was to expand the seeker's lead sulphide detector element's sensitivity range to longer wavelengths (slightly over 4 µm as opposed to 2.8 µm of uncooled PbS elements). In practice this made possible the tracking of cooler targets over longer ranges, and enabled forward-hemisphere engagement of jets under favourable circumstances. The seeker also had better tracking rate, enabling the missile to track maneuvering of fast and approaching targets. A negative side effect from the aforementioned improvements was increased missile weight, which caused a slight decrease in the kinematic performance of the original Strela-2 (SA-7). Against relatively slow, low-altitude battlefield air threats the overall effectiveness was much improved. Strela-3 missiles have been exported to over 30 countries. The original Strela-3 missile was the 9M36. The follow-on to the Strela-3 was Igla. The naval version of this missile has the NATO reporting name of SA-N-8.

Starstreak British Short-Range Man-Portable Air-Defense System (MANPADS)


Tiers:



Variants:

- **Starburst:** Javelin SAM launcher adapted for Starstreak LBR guidance- in production
- **Lightweight Multiple Launcher (LML):** Pedestal launcher for three missiles (above). The launcher can also mount on a light vehicle, e.g., TUV. A demonstrator is LML on a Panhard tactical truck.
- **Starstreak II:** Improved launcher uses Starstreak or Starstreak II missile. It has an auto-tracker for hands-free guidance. It was fielded in 2010.
- **Starstreak Lightweight Vehicle (LWV):** Land Rover truck converted into an SP SAM system with a 6-canister launcher, ADAD auto-tracker, and TV/ thermal FCS. This launcher can be mounted on other vehicles.
- **Armored Starstreak or (SP HVM):** Vehicle is a Stormer tracked APC chassis, with an 8-missile launcher. The passive IR fire control system uses ADAD, an auto-tracker and thermal sight. The launcher can be mounted on other vehicles.
- **Seastreak:** Single-stage missile naval variant in a 12-missile launcher, with mm-wave radar FCS.
- **Thor:** British Multi-Mission Air Defense System is a RWS, with 4 missile launchers, TV, FLIR, and an auto-tracker. Weighing .5 mt, it mounts on trucks, vans, TUVs, APCs, etc., with a remote operator. Designed for Starstreak, launchers, it can also mount other MANPADS, and ATGMs, such as Ingwe, TOW, HELLFIRE, Mokopa, Spike, etc.
- **Lightweight Multi-Role Missile/LMM:** A multi-role missile options with a single 3-kg tandem (HEAT/HE) warhead and proximity fuze. At 13 kg, the lower-cost missile flies 8-km at 1.5 Mach. It was due in 2013 and was successfully launched by a Camcopter S-100 UCAV variant. Other projected upgrades are semi-active laser- homing and/or dual-mode (LBR/SAL-H).
- **Low-cost air defense/anti-armor (multi-role) system.:** Optional use: as a low-cost air defense/anti-armor (multi-role) system, STARSTREAK can be employed against ground targets, such as light armored vehicles, and snipers in bunkers or buildings. The missile and its darts, with a unique combination of penetrator and following frag-he, have been successfully tested against vehicle targets. With a missile cost of 1/2 to 1/3 of competing MANPADS, the system could be used as a fire support asset to complement ATGM launchers and vehicle weapons
- **The most common launcher used is SL. Optional Use: As a low-cost air defense/anti-armor (multi-role) system, Starstreak can be employed against ground targets, such as light armored vehicles, and snipers in bunkers or buildings. The missile and its darts, with a unique combination of penetrator and following Frag- HE, have been successfully tested against vehicle targets. With a missile cost of 1/2 to 1/3 of competing MANPADS, the system could be used as a fire support asset to complement ATGM launchers and vehicle weapons.:**

System

Alternative Designation: Man portable Shoulder- Launched (SL) Starstreak
Country of Origin: Great Britain.
Crew : ea2.0
Reaction Time : secless than 6
Reload Time : secless than 25 est
Time between Launches : minless than 30 sec

↳*Target*

Type: FW, heli, ground vehicles

Launcher

Name: Aiming Unit

Armament

Combat Load : rds5.0

Combat Load, Dismount : rds3.0

Fire on Move: no

↳*Weapon 1*

System Dimensions: See Missile

System Weight: kg24.3 with missile

Fire Control System

Other: ADAD: British passive thermal IR scanners on remote tripod or vehicle mount with 240 degree FOV automatic cueing Missile team employs an azimuth plotting board (e.g. Russian 1L15-1) for direction of approach on aerial targets.

↳*Day Sight*

Acquisition Range : km7000+

Field of View : degINA

Name: Avimo stabilized optical sight with lead bias system

↳*Night Sight*

Acquisition Range : km4 to 5 est

Name: Thales clip-on thermal sight

Ammunition

↳*Ammunition (Option 1)*

Name: Starstreak

Type: Three 25mm darts: Tungsten KE tip and case; HE fill

Altitude : m0-5000

Length : m1.4

Diameter : mm127.0

Weight : kg14.0

Flight Time : sec5 to 7

Fuze Type: Contact wit time delay

Guidance: Laser beam rider SACLOS

Penetration : mm KE120+ all LAVs (equal to 3 x 40- mm APFSD-T rds) HE detonates after for frangible effects

Probability of Hit: PCT60 FW, more than 95 heli (each dart 67% for heli)

Propulsion: Canister launch booster, bus missile, and 3 darts (sub-missiles)

Range, Maximum : m7000 (guided)

Range, Minimum : m300.0

Self-Destruct Range: km5.5

Speed : m/s1364, Mach 4

Other: Starstreak II: Improved missile has 8-km range and better precision. Fielded 2010

Notes:

Starstreak is a British short range man-portable air-defence system (MANPADS) manufactured by Thales Air Defence (formerly Shorts Missile Systems), in Belfast. It is also known as Starstreak HVM (High Velocity Missile). After launch, the missile accelerates to more than Mach 4, making it the fastest short-range surface-to-air missile in the world. It then launches three laser beam riding submunitions, increasing the likelihood of a successful hit on the target. Starstreak has been in service with the British Army since 1997. In 2012 Thales rebranded the system under the ForceSHIELD banner. The Starstreak missile is transported in a sealed launch tube. This tube is attached to an aiming unit for firing. The operator tracks the target using the aiming unit's optically stabilized sight. The process of tracking the target allows the aiming unit to compute the right trajectory to bring the missile together with the target. The operator can indicate wind direction to the unit and, in the case of a long range target, provide superelevation. When the initial tracking is complete, the operator fires the missile by pressing a button. The missile then fires the first-stage rocket motor, which launches the missile from the tube – but burns out before leaving the tube to protect the operator. Four meters away from the operator, when the missile is a safe distance away, the second stage fires, which rapidly accelerates the missile to burn out velocity of more than Mach 4. As the second stage burns out, three dart sub-munitions are released. The dart housing is made from a tungsten alloy. The darts are each 396 millimetres (15.6 in) long with a diameter of 22 millimetres (0.87 in) and weigh about 900 grams (32 oz). Around half the weight of each dart approximately 450 g (16 oz), is its explosive charge, detonated by a delayed-action, impact activated fuze. Each dart consists of a rotating fore-body with two canard fins attached to a non-rotating rear assembly which has four fins. The rear assembly of each dart also houses the electronics that guide the missile, including a rearwards facing sensor. The darts do not home in on laser energy reflected from the target but instead the aiming unit projects two laser beams which paint a two dimensional matrix upon the target. The lasers are modulated and by examining these modulations the sub-munition's sensor can determine the dart's location within the matrix, the dart is then steered to keep it in the centre of the matrix. The sub-munitions steer by briefly decelerating the rotating fore-body with a clutch. The front wings then steer the missile in the appropriate direction. The three sub-munitions fly in a formation about 1.5 meters in radius, and have enough kinetic energy to manoeuvre to meet a target evading at 9 g at 7,000 meters. Earlier laser guidance systems used a single beam that had to be kept on the target at all times, the missile homing in on laser energy reflected off the target, if it moved off the target, the reflection would end and guidance would be lost until the target was regained. The problem could be reduced by making the laser's beam wider, but only at the cost of lowering accuracy and reducing the amount of energy being reflected. Starstreak's system allows for the beam area to be much larger than the target while retaining pinpoint accuracy. On impact with the target, a delayed action fuze is triggered. This gives time for the projectile to penetrate the target before the explosive warhead detonates. The tungsten housing is designed to fragment and produce maximum damage inside the target. A demonstration was conducted in September 1999 that showed the missile being used against an FV432 armoured personnel carrier, showing the missile's effectiveness as a surface-to-surface weapon. Each sub-munition dart travelling at 4,500 km/h (1,250 m/s, 4,100 ft/s, 2,800 mph) has comparable kinetic energy to a shell from a Bofors 40 mm gun and probably has sufficient energy to penetrate the front armour of an infantry fighting vehicle. However, it lacks the armour penetration capabilities of a purpose-built anti-tank guided missile or of a dual purpose missile (such as the Air Defence Anti-Tank System).

9K310 Igla-1 (SA-16 Gimlet) Russian Man-Portable Infrared Homing Surface-to-Air Missile





Tiers:

1 2 3 4

Variants:

- **Igla-1E:** Export version.
- **Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Igla-1D:** A version for paratroopers and special forces.
- **Igla-1V:** Air-launched version, mainly for combat helicopters.
- **Igla-1N:** A version with heavier warhead at the cost of a slight reduction in range and speed.
- **Igla-1A:** Export version
- **Igla-S (SA-24 Grinch):** Newest variant with improved range, seeker, resistance to countermeasures, and warhead.
- **Strelets Igla-S:** The Strelets is designed for remote automated firing of the Igla and Igla-S surface-to-air missile by single shot, ripple or in salvo. In service with Syria
- **3M-47 Gibka:** A turret for ships that is equipped with Igla missiles.
- **Komar:** Another turret for ships that is equipped with Igla missiles.

System

Alternative Designation: 9K310 Igla-1 (SA-16 Gimlet)
Type: Russian Man-Portable Infrared Homing Surface-to-Air Missile
Manufacturer: KB Mashinostroyeniya – developer of the system
Family: Igla
Crew: ea1
In Service: 1981-Present

Dimensions

Length: m1,574
Diameter: mm72
Height: INA
Weight, Missile Only: kg10.8
Weight, Full System: kg13.9

Missile System

↳ ***System***

Name: 9K310 Igla-1 (SA-16 Gimlet)
Type: Russian Man-Portable Infrared Homing Surface-to-Air Missile
Launcher Name: 9P322 fibre glass launch canister
Missile Name: 9M313 missile
Warhead Weight: kg1.17
Explosive Weight: grams390
Detonation Mechanism: contact and grazing fuzes
Engine: solid fuel rocket motor
Operational Range: km5.2
Flight Ceiling: km3.5
Speed: m/s570
Guidance System: dual waveband infra-red (S-version
Taget Engagement Altitude: 100 to 3,500 m
Taget Engagement Range: 500 - 5,000 m
Reaction Time: 5-10 seconds
IFF System: Yes

Notes:

The 9K310 Igla-1 system and its 9M313 missile were accepted into service in the Soviet army on 11 March 1981. The main differences from the Strela-3 included an optional Identification Friend or Foe system to prevent firing on friendly aircraft, an automatic lead and super elevation to simplify shooting and reduce minimum firing range, a slightly larger rocket, reduced drag and better guidance system extend maximum range and improve performance against fast and maneuverable targets, an improved lethality on target achieved by a combination of delayed impact fuzing, terminal maneuver to hit the fuselage rather than jet nozzle, an additional charge to set off the remaining rocket fuel (if any) on impact, an improved resistance to infrared countermeasures (both decoy flares and ALQ-144 series jamming emitters), and slightly improved seeker sensitivity. 9K38 Igla (SA-18) missile and launcher top and 9K310 Igla-1 (SA-16) missile and launcher below. The seeker has two detectors – a cooled MWIR InSb detector for detection of the target and uncooled PbS SWIR detector for detection of IR decoys (flares). The built-in logic determines whether the detected object is a target or a decoy. The latest version (Igla-S) is reported to have additional detectors around the main seeker to provide further resistance against pulsed IRCM devices commonly used on helicopters. The 9M313 missile features an aerospike mounted on a tripod (Igla's 9M39 missile has aerospike attached directly to the seeker dome), which reduces a shock wave, thus providing less dome heating and greater range. The name Igla is derived from these devices. Like many other MANPADS, Igla-1 and Igla feature so-called rolling airframe missiles. These missiles roll in flight (900 – 1200 rpm) so steering the missile requires just a single pair of control surfaces, unlike roll-stabilized missiles, which require separate control surfaces for pitch and yaw. Both 9M313 and 9M39 missiles contain a gas generator, which drives a small gas turbine to provide electrical power, and the pistons, which move the canards used to steer the missile in a bang-bang mode. In addition to that, two exhaust tubes of the gas generator are placed perpendicular to the steering canards to provide maneuverability immediately after launch when the missile airspeed is too low for canards to be effective. Later versions of Igla are reported to use proportional control to drive the canards, which enables greater precision and less oscillation of the flight path. According to the manufacturer, South African tests have shown the Igla's superiority over the contemporary (1982 service entry) but smaller and lighter American FIM-92A Stinger missile. According to Kolomna OKB, the Igla-1 has a Pk (probability of kill) of 0.30 to 0.48 against unprotected targets which is reduced to 0.24 in the presence of decoy flares and jamming. In another report, the manufacturer claimed a Pk of 0.59 against an approaching and 0.44 against receding F-4 Phantom II fighter not employing infrared countermeasures or evasive maneuvers

9K388 Igla-S (SA-24 Grinch) Russian Man-Portable Air-Defense Missile System (MANPADS)







Tiers:



Variants:

- **Igla-1E:** Export version.
- **Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Igla-1D:** Igla-1D
- **Igla-1V:** Air-launched version, mainly for combat helicopters.
- **Igla-1N:** A version with heavier warhead at the cost of a slight reduction in range and speed.
- **Igla-1A:** Export version
- **Strelets Igla-S / Igla:** The Strelets is designed for remote automated firing of the Igla and Igla-S surface-to-air missile by single shot, ripple or in salvo. In service with Syria
- **3M-47 Gibka:** A turret for ships that is equipped with Igla missiles
- **Komar:** Another turret for ships that is equipped with Igla missiles

System

Alternative Designation: Igla-S (SA-24 Grinch

Type of Targets: Tactical aircraft, helicopter, UAV and cruise missile

Family: 9K38 Igla

Crew: ea1

Igla-S Package: The Igla-s (SA-24 Grinch) System includes: Combat equipment including the 9M342 missile and the 9P522 launching mechanism - Maintenance equipment, including the 9V866-2 mobile test station and the 9F719-2 test set - Training facilities - Night firing devices

Reaction Time: 5-10 Seconds

Dimensions

Length, Missile: m1.574

Diameter, Missile: mm72

Height: INA

Weight, Combat: See Missile Information

Missile System

↳*Missile Launcher*

Name: 9P522 launching mechanism

Type: Portable Air-Defense Missile System (MANPADS)

↳*Missile*

Name: 9M342 missile

Type: Portable Air-Defense Missile System (MANPADS)

Length: m1.574

Diameter: mm72

Weight, Full System: kg19

Weight, Missile: kg11.7

Weight, Warhead: kg2.5

Warhead Type: Directed-energy blast fragmentation

Fuze Type: Delayed impact, magnetic and grazing

Target Engagement: km6

Speed: m/s570

Maximum Effective Range: m6,000

Maximum Target Speed, Receding: m/s400

Maximum Target Speed, Approaching: m/s320

Seeker Head Type: INA

Seeker Scanning: FM-modulated

Maximum Altitude: m3500

Minimum Altitude: m10

Guidance System: Passive IR homing device and night vision (operating in the medium IR range)

Notes:

The Igla man-portable air-defense systems (MANPADS) are one of the best-selling arms. This system belongs to the second-generation MANPADS meeting most stringent requirements to combat effectiveness in harsh jamming environment. In 2004 the Russian army adopted the new MANPADS - Igla-S (sometimes called "Igla-Super") which is much more sophisticated and efficient in countering air threats. Serial production of the "Igla-S" ("Needle-S") portable antiaircraft missile complex (PAAMC) is conducted at the Degtyarev factory in the city of Kovrov. This newest PAAMC was awarded the State premium. The "Igla-S" PAAMC by its capabilities is significantly superior to the "Igla" PAAMC, which entered service in 1983. The "Igla-S" tactical and technical characteristics enable it to destroy targets at altitudes up to 5-7 km. The limiting altitude of effective target destruction for the "Igla-S" complex is 3.5 km, according to Deputy Director General of the enterprise Vasily Russu. According to him, foreign customers also display serious interest in the "Igla-S" PAAMC. In 1971 the USSR started development of a new generation man-portable air defence missile system (code-named "Igla"). The Igla MANPADS, as a whole, was to be developed by the Kolomna-based KBM machine-building design bureau headed by S.P.Nepobedimy, and the missile's thermal homing head - by the Leningrad-based LOMO optical-mechanical association headed by O.A. Artamonov. Difficulties connected with the

complexity of creating jam-resistant seeker ruined the timetable of the seeker's development. Therefore it was decided to take an interim decision and make a simplified version of the Igla system equipped with the seeker from the Strela-3 older-generation MANPADS. That Igla entered service on 11 March 1981. The genuine Igla was successfully tested in 1982 and entered service with the Soviet Army on 23 September 1983. The Igla system boasts high jamming immunity attained thanks to excellent target selectivity against the man-made interference background. This advantageous capability was provided by a new dual-channel optical homing head with the logic unit for a true target selection against clutter. The development of the Igla MANPADS was awarded with the State Prize of the USSR. In the 1990s the KBM continued improving the Igla MANPADS. As a result, a new Igla-S system entered service with the Russian Army in 2004. The most recent system is substantially more efficient than the Igla and the US Stinger MANPADS. The Igla-S is armed with the increased-weight warhead and a contact-proximity fuse. Its control algorithm ensures selection of the most optimal moment for the warhead's explosion as far as its effectiveness is concerned, both in the contact and non-contact modes. Besides, the Igla-S control system architecture is based on revolutionary (compared to the Igla) principles providing considerably improved missile accuracy. Designers and other specialists of the KBM and its subcontractors were awarded with the State Prize of Russia for the development and introduction into production of the Igla-S MANPADS. On 13 August 2003 Hemant Lakhani, a British national born in India, was charged by the US Government with attempting to provide material support to terrorists and attempting to sell arms without a license. Lakhani sought to arrange for the sale of at least another 50 anti-aircraft missiles to a cooperating witness, who was posing as a representative of a Somali terror organization. Two other defendants were arrested. Both of them helped in a planned money transfer that was part of the transaction. The complaint states that during a video- and audio-taped meeting at a hotel overlooking Newark Airport in September 2002, Lakhani and the cooperating witness looked out and gestured at departing commercial aircraft. Lakhani allegedly said he understood the purpose of the sale was to shoot down an aircraft and cause economic harm to the United States - to "make one explosion ... to shake the economy." The discussions continued about importation of the missile, and on Aug. 17, 2002, Lakhani said he understood that the buyer of the missile had wanted it for "the anniversary" - a reference to the Sept. 11, 2001, terrorist attacks on America. Three days later, Lakhani allegedly faxed the cooperating witness a document listing the price for an "Igla-S portable anti-aircraft missile complex," including a price breakdown between the missile and its launcher. In more recorded conversations during August 2002, Lakhani allegedly said the supplier was concerned that the deal for just one missile was "too risky," and that he had committed to the supplier that there would be a purchase of at least an additional 20 missiles. The complaint further alleges that on or about July 12, 2003, Lakhani traveled to Moscow to meet with the suppliers and the government's cooperating witness. At a meeting two days later, Lakhani met with the witness and two officers of the Russian Federal Security Service (FSB), posing as the suppliers. The FSB officers showed Lakhani what appeared to be an actual surface-to-air missile, which was actually an unarmed replica. In subsequent meetings, Lakhani allegedly discussed payment arrangements and his desire to arrange a deal for the purchase of an additional 50 surface-to-air missiles. The Igla-S (SA-24) is Russia's most advanced MANPADS and considered one of the most lethal portable air defense systems ever made. Starting in 2005 the US Government raised its concerns with the Government of Russia (GOR) about the Government of Venezuela's (GOV) possible acquisition of MANPADS and other conventional weapons. In particular, the US highlighted the risk these could be diverted to the Revolutionary Armed Forces of Colombia (FARC) or other regional terrorists and non-state actors. Venezuela's tactical air defense inventory consists of 1970s-era Swedish (RBS-70) and 1980s-era French systems (Mistral), which are both crew-served systems. If the SA-24 transfer occurred, it would be Venezuela's first man-portable air defense weapon. The United States and Russia have been very involved in efforts to prevent the proliferation of MANPADS and strengthen controls over their export. Of particular concern is preventing the transfer of such systems into regions known to foster unreliable end-users. The US was concerned with Venezuela's ability to properly secure and safeguard small arms and light weapons (SA/LW). The US saw no indication that Venezuela was prepared to implement adequate physical security and stockpile management practices for such systems consistent with international standards. In 2005, The US reiterated US concerns regarding arms sales to Venezuela during a meeting with Anatoliy Antonov, MFA Director for Disarmament and Security Affairs. Antonov said that he and his Department's experts had carefully considered the points the US had presented and had shared them with Russian services. Antonov stressed that there was no international restriction on selling arms, including MANPADS, to Venezuela. Russia recognized the US as a competitor in the international arms trade, with the motivation of restricting Russia's market access. Antonov said Russia respected the US right to determine US policy on arms sales to Venezuela, but added, "that is your decision, not ours; we have our own policy." The U.S. and Russia have committed to enhancing the control of MANPADS to prevent their acquisition and use by non-state actors and the proliferation to countries that do not have strong export control and stockpile management procedures. During the US-Russia MANPADS Arrangement Expert Meeting in 2006, when the US raised this issue with regard to Venezuela, Russia offered no assurances that it would not sell Igla-S to the GOV. However, it was suggested that, if a transfer occurred, the system would likely be vehicle-mounted. On November 19, 2008 the Russian News & Information Agency Novosti (RIA Novosti) reported that Rosoboronexport signed a major contract for the sale of Igla-S MANPADS to Venezuela. The media report also revealed that a manager of LOMO, a partner company in the production of Igla-S, stated that this implied the contract for the delivery of several hundred Igla-S MANPADS. At the end of January the US received reports that Venezuela had deployed ten Venezuelan specialists to Kolomna, Russia, to begin training on the Igla-S MANPADS. Reporting indicates that five of the ten specialists were to take part in Igla-S equipment acceptance inspections, sometime in the last ten days of February 2009. Russia advised that it had stringent end-use requirements (consistent with the Wassenaar guidelines) for such sales and requested more specific information on why the U.S. views this possible transaction as a risk. Information gleaned from FARC hard-drives obtained by the Colombian government in March 2008 indicated Venezuelan government officials had tried to facilitate black and gray arms market deals for the FARC. This information was widely disseminated in major mainstream international media outlets. More specifically, information on the hard-drives indicated specific discussions between the Government of Venezuela and FARC on the provision of MANPADS. In light of Venezuela's relationship with the FARC, corruption within the Venezuelan military, and the

US assessment that Venezuela's stockpile and security management practices do not meet international standards, the US was concerned there is a significant risk that these weapons could be diverted to the FARC. The US did not rule out the possibility that the transfer of the IGLA-S weapon system could displace and make available existing weapon systems for FARC's use. The US feared that should these sophisticated systems fall into the hands of the FARC, they could possibly be sold or traded to drug organizations, including those in Mexico, which are actively seeking to acquire powerful and highly sophisticated weapons for use against government forces. The U.S. was particularly concerned about this possibility because FARC's acquisition of MANPADS would constitute a new capability for the group to undermine peace and security in the region as well as threaten counter-narcotics operations in Colombia. Given these serious risks, the US had serious concerns about this transaction going forward.

Dual Mount Stinger American Man-Portable Air-Defense System (MANPADS)



Tiers:



Variants:

- **The MANPADS has been adapted for launch from APC or IFV chassis. It has also been adapted for light utility vehicles and combat support vehicles, such as the German Wiesel-based Fliegerfaust-2 (FLF-2). A variety of air defense launcher systems can use Stinger, Mistral, or other MANPADS.:**
- **FIM-92A:** Stinger Basic: The basic model.
- **FIM-92B:** Stinger POST: In this version, the infrared seeker head was replaced by a combined IR/UV seeker that utilized rosette scanning. This resulted in achieving significantly higher resistance to enemy countermeasures (flares) and natural disturbances. Production ran from 1981 to 1987; a total of 600 missiles were produced.[
- **FIM-92C:** Stinger RMP: The resistance to interference was increased again by adding more powerful digital computer components. Moreover, the software of the missile could now be reconfigured in a short time in order to respond quickly and efficiently to new types of countermeasures. Until 1991, some 20,000 units were produced for the U.S. Army alone.
- **FIM-92D:** Various modifications were continued with this version in order to increase the resistance to interference.
- **FIM-92E:** Stinger—RMP Block I: By adding a new rollover sensor and revised control software, the flight behavior was significantly improved. Additionally, the performance against small targets such as drones, cruise missiles and light reconnaissance helicopters was improved. The first deliveries began in 1995. Almost the entire stock of U.S. Stinger missiles was replaced by this version.
- **FIM-92F:** A further improvement of the E version and the current production version.
- **FIM-92G:** An unspecified upgrade for the D variant.[
- **FIM-92H:** Indicates a D variant that has been upgraded to the E standard.
- **Stinger—RMP Block II:** This variant was a planned developed based on the E version. The improvements included an imaging infrared seeker head from the AIM-9X. With this modification, the detection distance and the resistance to jamming was to be greatly increased. Changes to the airframe would furthermore enable a significant increase in range. Although the missile reached the testing phase, the program was dropped in 2002 for budgetary reasons.
- **FIM-92J:** Block 1 missile upgrade to replace aging components to extend service life an additional 10 years. Upgrades include a proximity fuse warhead section, equipped with a target detection device to increase effectiveness against unmanned aerial vehicles.
- **FIM-92K:** variant of FIM-92J designed to use a vehicle datalink rather than the missile's own seeker for targeting.

System

Alternative Designation: Dual Mount Stinger (DMS)
Type: Man-Portable Air-Defense System (MANPADS)
Manufacturer: Prime contractor: Raytheon Missile Systems (formerly Hughes Missile Systems; formerly General Dynamics), Tucson, Ariz. Prime contractor (Europe): Daimler-Benz Aerospace (now DaimlerChrysler) (Dasa), Munich, Germany
Crew : ea1, Normally 2 with a loader
In Service: 1997-Present

Main Weapon System

↳*Launcher*

Note: Two Stinger fire-and-forget missiles mounted on a tripod with an operator's seat and controls. It can be mounted on a light utility truck or on deck of a small patrol boat.
System Weight: 15.2 kg

↳*Missile*

Name: Stinger
Type: Man-Portable Air-Defense System (MANPADS)
Length: 1.52 m
Diameter: 70 mm
Missile Weight: 10.0 kg
Warhead Weight: 3.0 kg
Engine: 1 x Atlantic Research Mk 27 dual-thrust solid-fuel rocket
Maximum Speed: Mach 2.2
Maximum Range: 4.8 km
Maximum Altitude: 3,800 m
Warhead: penetrating high-explosive; impact fuze
Optics: optical sight (some thermal imaging capability) proportional navigation with lead bias and Target Adaptive Guidance (TAG)
Guidance System: all-aspect passive infrared homing

Fire Control System

ADAD: British passive thermal IR scanners on remote tripod or vehicle mount with 240 o FOV automatic cueing system.
IFF: AN/PPX-1 trigger-activated on grip-stock, with battery belt-pack
Target Alert Display Set (TADDS): US portable graphic display set w/audio alert, VHF radio, and IFF.

↳*Day Sight*

Acquisition Range : km4000+
Field of View : degINA
Field of View : degINA
Type: Ring and bead, most launchers Optical sight with lead bias available.

↳*Night Sight*

Type: Optional AN/PAS-18, Wide- Angle Stinger Pointer System (WASP) thermal sight.

↳*Night Sights*

Acquisition Range : km20-30 side or tail aspect, 10 head-on aspect
Field of View : deg20o x 12 o

↳***Radar***

Radar Equipment: Providing Omni-directional Reporting of Targets at Extended Ranges (REPORTER), German/Dutch EW system with I/J band radar and IFF. Range: 40 km. Altitude: 15-4000 m.

Radar Other: Several U.S. and foreign radars are available for use with Stinger.

Notes:

The Dual Mount Stinger (DMS) is a tripod-mounted launch platform for the Stinger Missile developed by Hughes Missile Systems Company (HMSC) for the SHORAD Project Office. (HMSC was later sold to Raytheon Corporation and is currently operating as Raytheon Missile Systems Corporation [RMSC].) Tripod-mounted missile launch devices are not a new concept. Developed for FMS customers, the DMS Weapon System consists of the DMS launcher with two Stinger tactical missiles (Guided Missile, Intercept Aerial). This system provides air defense capability from a fixed ground position. A self-contained system, the DMS includes its own electrical power system, argon coolant, and sighting units. Easily disassembled into portable components that require minimal set-up time, the DMS can be operated autonomously or in conjunction with an external early warning command and cueing/control system. The DMS launcher has provisions to receive Forward Area Air Defense Data Link or Ground Based Data Link cueing data, which can be from either two-dimensional (2D) or three-dimensional(3D) sensors. Cueing data from a 2D system give the approach direction (azimuth) and range of the target aircraft, while cueing data from a 3D system give the approach direction (azimuth), range of the target aircraft, and elevation angle. Since the United States had no requirement for this system in 1997, its development and fielding presented a unique set of challenges. A current FMS customer approached the SHORAD Project Office with the requirement for a tripod launcher, and we immediately started the research necessary to meet the requirement. The sale of this system, even though it technically did not exist at the time, required the same U.S. Department of State approval as any other FMS case. In August 1998 the Taipei Economic and Cultural Representative Office (TECRO) in the United States requested a possible sale of 61 Dual Mount STINGER Missile Systems consisting of: 61 Dual Mount STINGER (DMS) launchers (includes elevation assembly, tripod assembly, and sights) with coolant units, 61 STINGER RMP (-) captive flight trainers, 728 complete STINGER RMP (-) missile rounds (less battery coolant unit), 132 AN/VRC-91 export version Single Channel Ground/Air Radio System (SINCGARS) radios, spare and repair parts, support equipment, Interrogator Friend or Foe interrogator sets, interrogator programmers, utility carrier trucks, aerial flight handling and launcher trainers, coolant units, gas bottles, publications and documentation data, personnel training and training equipment, U.S. Government and contractor engineering and logistics personnel services, U.S. Government Quality Assurance Teams, Mobile Training Teams, and other related elements of logistics support. The estimated cost was $180 million. The Short Range Air Defense (SHORAD) Project Office obtained necessary approvals and built the customer a Stinger Missile Launcher that ultimately met their requirements in a timely and cost-effective manner.

RBS 70 Swedish Man-Portable Air Defense Missile System (MANPADS)





Tiers:



Variants:

- **RBS 70:** Original production model from 1977. It is sometimes referred to as the "Mk.0".
- **RBS 70 Mk.1:** Improved RBS-70 with an increased range, introduced in 1990.
- **RBS.90:** Further development of the Mk.1 introduced in 1991, with improved guidance and optics, to include a wider-angle laser and sight, a passive thermal imaging capability, and a fire control unit that mounts two or three launch tubes instead of one. The RBS.90 model was developed especially for the Swedish armed forces. It is also called the RBS 70 Mk.1+.
- **RBS 70 Mk.2:** Successor to the Mk.1 series, with a further increased range, and increased armor penetration as well. Introduced in 1995.
- **Bolide:** Further development of the Mk.2 first introduced in 2005, with radically improved performance. The name is often capitalized as "BOLIDE". Employs the BORC thermal imaging sight, and has uncooled laser diodes (previous models required Freon coolant).
- **RBS 70 NG:** The latest weapon in the series, the RBS 70 NG ("Next Generation") employs improved sights and optics, and a telemetry system allowing for improved training and after-action analysis. The missile itself is apparently the same as that of the Bolide.
- **Lvrbv 701:** The Lvrbv 701 ("Luftvärnsrobotvagn 701") is an armored, fully-tracked air defense vehicle utilizing the RBS 70. It utilizes a chassis converted from the retired 1950s-era Ikv 103 self-propelled howitzer. Sweden was the sole user of the Lvrbv 701, and retired them all by 2000.
- **ASRAD-R:** The ASRAD-R (Advanced Short Range Air Defense System - RBS) is a turret utilizing a MANPADS missile, Active Electronically Scanned Array (AESA) radar, and an infra-red search and track. First demonstrated on an M113 Gavin chassis, it was adopted by several nations on a variety of platforms. The missiles used in this system vary, and include both the FIM-92 Stinger and the Bolide.
- **ItO 2005:** Mobile air defense system including an ASRAD-R turret and the Bolide missile system, mounted on a Sisu Nasu chassis. Operated by Finland.

System

Alternative Designation: RBS 70
Type: Man-Portable Air Defense Missile System (MANPADS)
Manufacturer: Bofors Defence (1980s–2000) Saab Bofors Dynamics (since 2000)
Family: RBS
Crew: ea1
Layout: The RBS-70 uses a pedetal launcher on which a single operator is seated. The operator identifies targets or receives target information from mobile radar systems such as the Giraffe. The SACLOS guidance requires the operator to keep the target within the crosshairs while the missile uses laser beam riding guidance to reach the target. The laser receiver is in the tail of the missile and is very hard to jam. This required exhaust vents in the middle of the missile. The laser seeker and warhead are in the nose.
Engine: Booster and sustainer with smokeless solid propellant

Warhead: 1.1 kg Combined with 3,000 tungsten spheres and shaped charge

Detonation Mechansim: Adaptive proximity fuze function with 3 selectable modes (Off, Normal, Small target)

Operational Range: 250 m – 8 km

Flight Altitude: 5,000 m

Speed: Mach 1.6 (Mark 0/1) Mach 2 (5 km in 12 seconds) (Mark 2/BOLIDE)

Guidance System: Laser beam riding missile

Mobility: The RBS-70 is man portable by three men, but only over short distances. The launcher is rather heavy, especially with night sight fitted. Usually the launcher is transported in a utility vehicle or truck. The launcher can also be mounted on vehicles.

Users: The RBS-70 was first adopted by the Swedish military to realize their doctrine of mobile warfare with limited maintainance systems. The RBS-70 has been exported to a large number of nations, mainly in Europe and Asia.

Dimensions

Length: m1.32

Width: mm106

Wingspan: 32 cm

Weight, Combat: 87 kg (Stand + Sight + Missile)

Notes:

The RBS-70 is a modern man portable SAM system of Swedish origin. It was developed as a highly mobile system to primarily protect predefined areas, not troops on the move. The manual SACLOS guidance sets this system apart from the more common infrared homing MANPADS designs. The RBS-70 uses a pedetal launcher on which a single operator is seated. The operator identifies targets or receives target information from mobile radar systems such as the Giraffe. The SACLOS guidance requires the operator to keep the target within the crosshairs while the missile uses laser beam riding guidance to reach the target. The laser receiver is in the tail of the missile and is very hard to jam. This required exhaust vents in the middle of the missile. The laser seeker and warhead are in the nose. RBS 70 (Robotsystem 70, "robot" meaning "missile" in this context in Swedish) is a man-portable air-defense system (MANPADS) designed for anti-aircraft warfare in all climate zones and with little to no support from other forces. Originally designed and manufactured by the Swedish defence firm of Bofors Defence (now Saab Bofors Dynamics, since 2000). It uses the RB 70 missile which is also in use in a number of other Swedish missile systems. The RBS 70 was developed to supply the Swedish air defense with a low-cost, easy-to-use and effective short-range SAM system. Before RBS 70 the mainstay of Swedish air defense was American MIM-23 Hawk systems (RBS 77 and RBS 97 "Swedish HAWK"), American Redeye (RBS 69) and the Swedish Bofors m/48 AAA. The Swedish Army has decided to replace the RBS 70 with a ground-launched version of the IRIS-T missile. The RBS 70 is a Short-range Air Defense (SHORAD) laser guided missile system. Mk 1 and Mk 2 followed shortly and are the standard RBS 70 with a range of 5,000–6,000 m and a ceiling of 3,000 m. Currently, RBS 70 is operational in 18 customer countries, on all continents and in arctic, desert, and tropical environments. In 2003 the "BOLIDE" upgrade system was introduced to the RBS 70.[3] The BOLIDE missile is an RBS 70 Mk 2 upgrade that is faster (Mach 2 vs Mach 1.6), with a range up to 8 km (5.0 mi) and can reach an altitude of 6 km. Deliveries were initiated in 2005. In 2011, Saab Bofors Dynamics (successor company of Bofors Defence) announced the introduction of the new RBS 70 New Generation (RBS 70 NG). The upgraded version included an improved sighting system capable of night vision and improved training and after-action review features.

QW-4 Chinese Man-Portable Infrared Guided Surface-to-Air Missile



Tiers:



Variants:

- **QW-1M:** QW-1M is a development of QW-1, and first revealed in Zhuhai Air Show. The missile is considered as a third generation MANPAD by Chinese, and many domestic Chinese media sources claim that it is the Chinese equivalent of Soviet SA-18 Grouse, which it strongly resembles. Like its predecessor QW-1, QW-1M also appeared to incorporate technologies of FIM-92 Stinger. Various western sources have postulated that China had likely obtained FIM-92 Stinger samples from either Afghan guerrilla or Pakistan, or even Iran, but such claims have yet to be confirmed. The missile is slightly heavier than QW-1, weighing at 18 kg for the entire system, and it is claimed to have better ECCM capability and better capability to engage low-flying aircraft in comparison to QW-1.[citation needed] Some have been supplied to Kata'ib Hezbollah.
- **QW-1A:** QW-1A is a derivative of QW-1M, with the adaptation of man-portable radar weighing 30 kg and a range of 15 km, and it is carried by the observer. The associating fire control system enables various QW-1A units to be linked up and thus increasing the effectiveness by forming an air defense network, which in turn, could be integrated into large air defense network. Although the entire QW-1A system including radar / fire control system could be carried by a crew of 2-men team, it is often mounted on vehicles.
- **QW-11 (QW-1G):** QW-11 is a development of QW family that is specifically designed to engage terrain hugging cruise missiles, while retaining the capability of engaging low-flying aircraft. QW-11 was first revealed at Zhuhai Air Show in 2002. A new combined impact and proximity fuze is developed to provide better capability against cruise missiles. Length: 1.477 m Missile weight: 10.69 kg System weight: 16.9 kg Warhead: 1.42 kg Range: 0.5 – 5000 m Altitude: 30 m - 4 km Reaction time: 10 sec
- **QW-18:** QW-18 is the development of the QW-11G with an improved seeker. QW-18 first appeared in Zhuai Air Show with QW-11 and QW-11G in 2002. An enhanced dual band infrared seeker is developed so that the target is not only tracked via the exhaust heat, but also the temperature difference of the skin of the target. These improvements provided better capabilities against terrain-hugging cruise missiles at supersonic speed. Externally, QW-18 is identical to QW-11G / QW-11.
- **QW-2:** QW-2 is a missile with all aspect attack capability and improved ECCM capability. There are two types of seeker for QW-2: the first is the dual band infrared passive seeker first revealed in 1998, and an imaging IR (ImIR) seeker has been designed sometimes later. The fuse is similar to that of QW-18. The minimum altitude is decreased to 10 m, thus further improving the capability against low-flying cruise missile and hovering helicopters that suddenly pop up from hiding.
- **QW-3:** This is the Chinese equivalent of French Mistral missile, with fuse developed from that of QW-2. The missile is unique among Chinese MANPAD in that this is the only surface-to-air missile that adopts the semi-active laser guidance similar to AGM-114 Hellfire. The gyro stabilized seeker provides very high degree of accuracy and is extremely effective against low altitude cruise missiles. The 15 degrees per second tracking rate of the seeker is relatively low in comparison for other MANPAD for supersonic targets in high g maneuver at very high altitudes, but this is by no means handicapping the performance because such targets are not intended to be for QW-3, which is specifically designed to engage terrain hugging helicopters and UAV's and other fast flying targets at extremely low altitudes, including supersonic sea skimming cruise missiles.
- **QW-4:** The newest member of QW series with the fuze similar to that of QW-2, and a new thermal imaging seeker. The new fully electric control surfaces provide smoother flight path curves, thus greatly improved accuracy.
- **Anza Mk 2:** INA
- **Anza Mk 3:** INA
- **TD-2000B:** To increase the capability of TD-2000, China National Precision Machinery Import and Export Corporation (CNPMIEC) also revealed a development of TD-2000, dubbed as TD-2000B at the same Zhuhai Airshow, where TD-2000B was displayed as part of the subsystem of TD-2000B. The primary improvement over the original system is the extra

C4ISR capability added so that in addition to control the QW-4 missiles of TD-2000, TD-2000B can also simultaneously control up to 6 anti-aircraft artillery pieces.

System

:
:
:

↳ ***QW-4 Man-Portable Infrared Guided Surface-to-Air Missile***

Name: QW-4
Type: Infrared Imaging Guided Surface-to-Air Missile
Manufactured: China Precision Machinery Import-Export Corp. (CPMIEC), Beijing, China China Aerospace Science and Industry Corporation (CASIC), Shenyang, China
Length: 2.10 m
Diameter: 72 mm
Launcher Weight: INA
Missile Weight: 23.0 kg
Propulsion: two-stage solid-propellant rocket
Maximum Speed: 750 m/sec, Mach 2.2
Maximum Engagement Altitude: 4km
Minimum Engagement Altitude: 4 m
Maximum Range: 8,000 m
Minimum Range: 8 m
Guidance System: Infrared Imaging Guidance System

Notes:

The newest member of QW series with the fuze similar to that of QW-2, and a new thermal imaging seeker. The new fully electric control surfaces provide smoother flight path curves, thus greatly improved accuracy.

QW-18 Chinese Man-Portable Infrared Guided Surface-to-Air Missile







Tiers:



Variants:

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- **QW-1A:** QW-1A is a derivative of QW-1M, with the adaptation of man-portable radar weighing 30 kg and a range of 15 km, and it is carried by the observer. The associating fire control system enables various QW-1A units to be linked up and thus increasing the effectiveness by forming an air defense network, which in turn, could be integrated into large air defense network. Although the entire QW-1A system including radar / fire control system could be carried by a crew of 2-men team, it is often mounted on vehicles.
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- **Anza Mk 2:** INA
- **Anza Mk 3:** INA
- **TD-2000B:** To increase the capability of TD-2000, China National Precision Machinery Import and Export Corporation (CNPMIEC) also revealed a development of TD-2000, dubbed as TD-2000B at the same Zhuhai Airshow, where TD-2000B was displayed as part of the subsystem of TD-2000B. The primary improvement over the original system is the extra C4ISR capability added so that in addition to control the QW-4 missiles of TD-2000, TD-2000B can also simultaneously control up to 6 anti-aircraft artillery pieces.

System

:
:
:

↳ ***QW-18 Man-Portable Infrared Guided Surface-to-Air Missile***

Name: QW-18
Type: Infrared Imaging Guided Surface-to-Air Missile
Manufactured: China Precision Machinery Import-Export Corp. (CPMIEC), Beijing, China China Aerospace Science and Industry Corporation (CASIC), Shenyang, China
Length: 2.10 m
Diameter: 72 mm
Launch Tube Weight: 4 kg
Firing Unit Weight: 1.7 kg
Total System Weight: 18 kg
Launch Mode: Shoulder-Fired
Mode of Attack: Omi-Direction
Guidance System: Infrared Imaging Guidance System
Target Speed: 300 m/s
Missile Speed: 600 m/s
Interception Altitude: 10-4,000 m
Self-Destruction Time: 14-18 seconds
Shelf Life: 10 Years

Notes:

QW-18 is a new all-climate man transportable shoulder-fired anti-aircraft missile system, with outstanding anti-interference function of the infrared, to attack the enemy to all low-altitude, low altitude strikes, and speeds of 300 m / s following a variety of flying target. QW-18 biggest function is the usage of a twin-band passive infrared seeker, the target plume and skinning heat detection, as a way to firmly lock the goal. QW-18 system can combine with other air defense weapons to shape a entire air defense system, together with the combination of anti-aircraft missile and artillery guns systems; can also be converted into air to air missiles and small vessels in the configuration on the ship-air missiles and so on.

9K32 Strela-2 (SA-7 Grail) Russian Man Portable Surface-to-Air Missile (MANPAD)



Tiers:



Variants:

- **Strela 2M/A:** Yugoslav upgraded version with larger warhead
- **CA-94 and CA-94M:** Romanian license-built versions of the SA-7a and SA-7b, respectively
- **HN-5:** Chinese unlicensed copy
- **Anza Mk-I:** Pakistani license-built copy of Chinese HN-5
- **Ayn al Saqr:** Egyptian copy
- **Hwasung-Chong:** North Korean license-built copy of Egyptian Ayn al Saqr system

System

Alternative Designations: 9K32M Strela-2; SA-7 Grail
Target: FW, heli
Crew: 1, Normally 2 with a loader

Armament

Launcher: INA
Name: 9M32M
Length: m1.40
Diameter: mm70
Weight: kg9.97
Reaction Time (acquisition to fire): sec5-10
Time Between Launches: INA
Reload Time: sec6-10
Fire on the Move: Yes, in short halt
Range: m500-5,000
Max Altitude: m4,500
Min Altitude: m18, 0 with degraded Ph
Missile Speed: m/s580
Propulsion: Solid fuel booster and solid fuel sustainer rocket motor. Guidance: Passive 1-color IR homing (operating in the edium IR range)

Guidance: Passive 1-color IR homing (operating in the medium IR range)

Warhead Type: HE

Warhead Weight: kg1.15

Fuze Type: Contact (flush or grazing)

Probability of Hit: Ph%30 FW/40 heli

Self-Destruct: sec15

Countermeasure Resistance: The seeker is fitted with a filter to reduce effectiveness of decoy flares and to block IR emissions.

Weapons and Ammunition Types

Ready Missile: Typical Combat Load 1 Normal Dismount 2 From AD Vehicle 5

Fire Control

Sights with Magnification: Launcher has a sighting device and a target acquisition indicator. The gunner visually identifies and acquires the target.

Field of View (o): INA

Night Sight: None Standard

Acquisition Range (m): INA

IFF: Yes (see NOTES)

Main Armament Ammunition

Type: Frangible APDS (FAPDS) for upgrades. On impact with the target surface, the penetrator breaks into several KE fragments. The round has Frag-HE effects with the higher velocity and flat trajectory of a sabot round.

Tactical AA range: m3,500 (self-destruct)

Tracer Range: INA

Effective Altitude: m3,100

Min Altitude: m0

Self-Destruct: sec6-12

Range: m4,000

Tactical AA Range: m3,500

Effective: m3,500

Self-Destruct Time: sec6-12

Penetration: 115+ at 1,000 m

Type: APDS-T

Other Ammunition Type: HEI

Notes:

The 9K32 Strela-2 (Russian: Стрела, "arrow"; NATO reporting name SA-7 Grail) is a light-weight, shoulder-fired, surface-to-air missile (or MANPAD) system. It is designed to target aircraft at low altitudes, with passive infrared homing guidance and destroy them with a high explosive warhead. Broadly comparable in performance with the US Army FIM-43 Redeye, the Strela-2 was the first Soviet man-portable SAM – it entered use in 1968, and full-scale production began in 1970. The Strela-2 was a

staple of the Cold War and was produced in huge numbers for the Soviet Union and their allies, as well as revolutionary movements.[4] Though since replaced with more modern systems, the Strela and its variants remain in service in many countries, and have seen widespread use in nearly every regional conflict since 1972.

QW Family (QW-1, QW-2, QW-3) of Chinese Man-Portable Infrared Guided Surface-to-Air Missiles





Tiers:



Variants:

- **QW-1M:** QW-1M is a development of QW-1, and first revealed in Zhuhai Air Show. The missile is considered as a third generation MANPAD by Chinese, and many domestic Chinese media sources claim that it is the Chinese equivalent of Soviet SA-18 Grouse, which it strongly resembles. Like its predecessor QW-1, QW-1M also appeared to incorporate technologies of FIM-92 Stinger. Various western sources have postulated that China had likely obtained FIM-92 Stinger samples from either Afghan guerrilla or Pakistan, or even Iran, but such claims have yet to be confirmed. The missile is slightly heavier than QW-1, weighing at 18 kg for the entire system, and it is claimed to have better ECCM capability and better capability to engage low-flying aircraft in comparison to QW-1. Some have been supplied to Kata'ib Hezbollah.
- **QW-1A:** QW-1A is a derivative of QW-1M, with the adaptation of man-portable radar weighing 30 kg and a range of 15 km, and it is carried by the observer. The associating fire control system enables various QW-1A units to be linked up and thus increasing the effectiveness by forming an air defense network, which in turn, could be integrated into large air defense network. Although the entire QW-1A system including radar / fire control system could be carried by a crew of 2-men team, it is often mounted on vehicles.
- **QW-11 (QW-1G):** QW-11 is a development of QW family that is specifically designed to engage terrain hugging cruise missiles, while retaining the capability of engaging low-flying aircraft. QW-11 was first revealed at Zhuhai Air Show in 2002. A new combined impact and proximity fuze is developed to provide better capability against cruise missiles. Length: 1.477 m Missile weight: 10.69 kg System weight: 16.9 kg Warhead: 1.42 kg Range: 0.5 – 5000 m Altitude: 30 m - 4 km Reaction time: 10 sec
- **QW-11G:** Improved version of QW-11 with enhanced ECCM capability was displayed at same Zhuai Air Show with QW-11 in 2002. The suffix G stands for Gaijin or Gailiang in Chinese, meaning improvement. The QW-11G system does not have dimensional changes physically so that QW-11 missile can be directly used for QW-11G.
- **QW-18:** QW-18 is the development of the QW-11G with an improved seeker. QW-18 first appeared in Zhuai Air Show with QW-11 and QW-11G in 2002. An enhanced dual band infrared seeker is developed so that the target is not only tracked via the exhaust heat, but also the temperature difference of the skin of the target. These improvements provided better capabilities against terrain-hugging cruise missiles at supersonic speed. Externally, QW-18 is identical to QW-11G / QW-11.
- **QW-2:** QW-2 is a missile with all aspect attack capability and improved ECCM capability. There are two types of seeker for QW-2: the first is the dual band infrared passive seeker first revealed in 1998, and an imaging IR (ImIR) seeker has been designed sometimes later. The fuse is similar to that of QW-18. The minimum altitude is decreased to 10 m, thus further improving the capability against low-flying cruise missile and hovering helicopters that suddenly pop up from hiding.
- **QW-3:** This is the Chinese equivalent of French Mistral missile, with fuse developed from that of QW-2. The missile is

unique among Chinese MANPAD in that this is the only surface-to-air missile that adopts the semi-active laser guidance similar to AGM-114 Hellfire. The gyro stabilized seeker provides very high degree of accuracy and is extremely effective against low altitude cruise missiles. The 15 degrees per second tracking rate of the seeker is relatively low in comparison for other MANPAD for supersonic targets in high g maneuver at very high altitudes, but this is by no means handicapping the performance because such targets are not intended to be for QW-3, which is specifically designed to engage terrain hugging helicopters and UAV's and other fast flying targets at extremely low altitudes, including supersonic sea skimming cruise missiles.

- **QW-4:** The newest member of QW series with the fuze similar to that of QW-2, and a new thermal imaging seeker. The new fully electric control surfaces provide smoother flight path curves, thus greatly improved accuracy.
- **Anza Mk 2:** This is the Pakistani version of the QW-1. There are no known differences in performance. It entered service in 1994.
- **Anza Mk 3:** This is a Pakistani variant of the QW-2.
- **CQW-2:** Vehicle mounted version of QW-2 mounted on a 4 x 4 high mobility armored vehicle with three crew members: commander, driver and gunner. The fire control systems mainly consisted of radar and electro-optical system. Once the target is acquired by radar, it is passed to the electro-optical system for tracking and engagement. The onboard system allows the gunner to fire either a single missile or two missiles at a time, and there is a total of 8 missiles. Inside the vehicle, there are another additional 8 missiles for reload. The missiles of CQW-2 are interchangeable with that of MANPAD version, but they cannot be directly interchanged in the field. The prefix C standards for Che-zai in Chinese, meaning vehicle mounted.
- **TB-1:** TB-1 is a missile derived from QW series, first revealed at the 8th Zhuhai Airshow held in the 4th Quarter of 2010 by its developer, China Aerospace Science & Industry Corporation. TB-1 utilizes the airframe of QW-1/2 and the seeker of QW-3, and thus has the same diameter of QW-1/2 and the main stage of QW-3, around 70 millimeter. TB-1 is designed to engage both aerial and ground targets by adopting a specially designed shaped charge armor-piercing blast-fragmentation warhead, so that it can successfully destroy armored vehicles and light tanks, in addition to aerial targets QW-1/2/3 could destroy. At its public debut, a twin launcher was shown.
- **FLS-1:** Naval version of QW-3 with launcher looks very similar to that of RIM-116 Rolling Airframe Missile externally. Although many Chinese media sources claim that it is the equivalent of RIM-116 Rolling Airframe Missile, with the total weight less than a ton (a single launcher containing missiles). When QW-3 missiles are used, the FLS-1 system actually lacks the fire-and-forget capability of the RAM. However, the FLS-1 system can also be used to deploy the infrared guided TY-90, and thus becoming a fire-and-forget capable SAM system like American RIM-116 Rolling Airframe Missile. The fire control system includes radar and electro-optics, that can be either dedicated or utilizing the existing systems on board the naval vessel. The FLS-1 system with QW-3 missiles has been retrofitted to fast attack craft of the PLAN, but FLS-1 system with TY-90 has not entered services (as of 2008) despite successfully completing acceptance tests and receiving state certification. Although naval versions of other members of QW family have been successfully developed, they were not accepted into service with the exception of FLS-1. Instead, the Chinese deploy other QW missiles in the similar way United States Navy deploys FIM-92 Stinger missiles on board ships: sailors and marines on board ships were organized into MANPAD Gunnery Detachment to station on board ships, and fire the missile like the way the missiles are shoulder-fired on land.
- **FLV-1:** Vehicle mounted version for all QW series of missiles, development of CQW-2. In addition to QW series of missiles, other Chinese built MANPAD missiles such as HN-5 series and FN-6 series can also be used (though for QW-3, the launcher must be modified to accommodate the larger missile). The missiles are also mounted a high mobility 4 x 4 armored vehicle with same configuration, and the speed of the vehicle is greater than 85 km per hour and range is slightly greater than 600 km. The fire control system also works in the way similar to that of CQW-2, and the radar of FLV-1 has a range of 18+ km. The reaction of the entire system is less than 8 seconds. The missiles of FLV-1 can be directly removed from the vehicle mount and rapidly used by infantry in the field as shoulder fired missiles. Vehicle speed: > 85 km / hour Vehicle range: > 600 km Radar range: > 18 km Missile: Configuration of 2, 4, or 8 (usually 8) Reload: 8 total Reaction time: < 8 seconds
- **FLG-1:** Development of FLV-1 with upgraded C4I system so that in addition to the missiles of FLV-1, up to half a dozen towed anti-aircraft artillery could also be controlled at the same time. Since the towed anti-aircraft artillery lacked fire control system and the FLV-1 system lacks any guns, the combined anti-aircraft artillery and air defense missile system overcomes the disadvantage for both and greatly improved the performance in comparison to separate individual system. The FLG-1 system can be integrated into larger air defense network.
- **FL-2000(V):** FL-2000(V) (short for Flying Leopard 2000 Vehicle mounted) is the latest member which first made its public debut in China at the end of 2004 during the 5th Zhuhai Airshow. FL-2000(V) is a development of FLG-1 which utilizes modular design concept, enabling the system to incorporate a wide range of missiles and systems developed earlier. Laser designator is added the existing fire control system (FCS) so that the semi-active laser guided QW-3 can be directly used in the air defense system, instead of having to modify the earlier FCS first. Another significant improvement over FLG-1 is that FL-2000(V) incorporates the land-based version of FLS-1, and due to the modular design, the land-based version FLS-1 system is interchangeable with other land based system, and thus can be mounted on same chassis. FL-2000(V) system consists of 3 versions, FL-2000A, FL-2000B and FL-2000C. The A version is the basic model, with each vehicle has its own FCS, controlling missiles carried and AAA assigned. The B version incorporates a command vehicle so that several A versions and associating AAA can be integrated as a network to fight together. The C version incorporates TY-90 missile, further expanding capability.
- **TD-2000:** At the 7th Zhuhai Airshow held at the end of 2008, China National Precision Machinery Import and Export

Corporation (CNPMIEC) revealed a new family of mobile SAM system based on QW-4. The new SAM systems in dubbed as TD-2000, which is based on the 4 x 4 ZFB05 armored vehicle manufactured by Shaanxi Baoji Special Vehicles Manufacturing Co. Ltd. A total of 8 QW-4 missiles are mounted atop of the vehicle in two groups of 4, with the electro-optical (optronic) fire control systems (FCS) in the middle. The optronic FCS is the OT-3, derived from OFC-3 optronic FCS used on Type 730 CIWS, and developed by the same manufacturer of OFC-3. The range of the optronic FCS is greater than 15 km, and the reaction time is less than 6 seconds, and it weighs around 110 kg. The reaction time of the missile is less than a second. Missiles of TD-2000 can be fired simultaneously in pairs, either a pair or two pairs, against a single target, or simultaneously against two different targets, and all missiles can be reloaded within 7 minutes. TD-2000 can fire its missiles from traveling state in less than 5 to 10 minutes. TD-2000 features a built-in-test/diagnostic system which greatly improves its reliability and maintainability. Specifications: Operating temperature: −40 to 50 °C Mean time between failure: > 100 hours Mean time between catastrophic failure: > 250 hours Mean time to repair: < 0.5 hour

- **TD-2000B:** To increase the capability of TD-2000, China National Precision Machinery Import and Export Corporation (CNPMIEC) also revealed a development of TD-2000, dubbed as TD-2000B at the same Zhuhai Airshow, where TD-2000B was displayed as part of the subsystem of TD-2000B. The primary improvement over the original system is the extra C4ISR capability added so that in addition to control the QW-4 missiles of TD-2000, TD-2000B can also simultaneously control up to 6 anti-aircraft artillery pieces.
- **FL-9:** FL-9 is another SAM system utilizing QW series MANPADS, and it is not to be confused with the Chinese anti-shipping missile also designated as FL-9, which is a derivative of TL-6. FL-9 SAM system is similar to FL-2000C in that both utilizes QW series MANPAD and TY-90. FL-9 is a highly automated system that the operation of engaging targets can be performed by a single person. The vehicle carries a total of six missiles, three on each side of the FCS arranged in the following way: one TY-90 atop of two QW-18. The FCS included TV, IR and laser. Another improved feature of FL-9 is that in addition to SAMs, surface-to-surface missile can also be deployed on the same platform.

System

Manufactured: China Precision Machinery Import-Export Corp. (CPMIEC), Beijing, China China Aerospace Science and Industry Corporation (CASIC), Shenyang, China

Launch Mode: Shoulder-Fired

Mode of Attack: Omi-Direction

Guidance System: Infrared Imaging Guidance System

Engine: Rocket

Propellant: Solid

Dimensions

QW-1 Missile Weight: kg10.7

QW-1 Missile and Launcher Weight: kg16.5

QW-1M Missile and Launcher Weight: kg18

QW-2 Missile Weight: kg11.3

QW-2 Missile and Launcher Weight: kg18

QW-3 Missile and Launcher Weight: kg23

Diameter (All missiles): mm72

QW-1 Length: m1.53

QW-2 Length: m1.59

QW-3 Length: m2.10

Performance QW-1

Speed: Mach 1.81

Minimum Engagement Altitude: 30m

Maximum Engagement Altitude: 4,000m

Minimum Range: .5km

Maximum Range: 5km

Warhead: 1.5kg HE / Frag

Fuze: Impact

Self Destruct Time: 14 - 18 seconds

Battery Life: 50 seconds

Ready from the March: In 10 seconds

Performance QW-2

Speed: Mach 1.81

Minimum Engagement Altitude: 10m

Maximum Engagement Altitude: 3,500m

Minimum Range: .5km

Maximum Range: 6km

Warhead: 1.42kg HE

Fuze: Active laser

Performance QW-3

Speed: Mach 2.2

Minimum Altitude: 4m

Maximum Altitude: 5,000m

Minimum Range: 8m

Maximum Range: 8,000m

Guidance

QW-1 / QW-2: Infrared

QW-3: Semi-active Laser

QW-4: Imaging Laser

Notes:

The QW-1 (Qianwei-Advanced Guard) Vanguard infrared-guided surface-to-air missile (SAM) is similar in appearance to the U.S. FIM-92 Stinger. It was first developed as a replacement for the HN-5 shoulder-launched SAM (the Chinese version of the Russian SA-7 Grail), but is also can be deployed on light helicopters. The missile is similar in appearance to the Stinger, though it has only two forward control fins compared to the Stinger's four. It has four cropped delta wings at the rear. It is carried in a launch canister, the wings kept folded and deploying after launch. The nose is rounded and blunt. There is a slight taper at the tail of the missile where the rear wings are located, just forward of the launch booster. The QW-1 is easily identified by the vertically mounted cylindrical battery/coolant module. The missile can be shoulder-fired, launched from tripod or vehicle- or ship-mounted launcher. The missile reportedly can maneuver at up to 16 Gs. Guidance consists of a cooled, two-color infrared (IR) seeker with IR Counter-Counter Measures. The missile includes a short-lasting boost phase to clear it from the canister, after which the booster is discarded and the sustainer motor activates. The QW-1 is operated by a two-man-team. The gunner carries the missile, while the operator conducts target detection tasks. Once a target is visually detected, a suitable launch location is

selected and the end caps are removed from the launcher. The gunner activates the battery and the coolant, cooling the infrared seeker to the operating temperature. At that point, the gunner tracks the target until the missile locks on, which is indicated by a flashing light and a tone. The missile is fired and then the infrared seeker activates for terminal guidance. Initial operational capability (IOC) was reached in 1992 as a shoulder-launched anti-aircraft missile. It was first displayed and offered for export in 1994. There is no confirmation that the missile is serving as an Air to Air Missile (AAM). A naval SAM version has also been reported. An improved variant, the QW-2 AAM, was first offered for export in 1998 and began production in 1999. The QW-2 entered service in 2000. Bangladesh manufactures the QW-2 under license for its ground and naval forces. The missile is replacing the HN-5A system in Bangladeshi service. In 2008, the Indonesian air force ordered 26 QW-3 man-portable air defense systems and a number of missiles. Indonesian marines also utilize QW-3 missile systems mounted on 4 x 4 vehicles. The air force in 2008 also placed a US$35 million order for two TD-2000B combined gun and missile short-range air defense systems utilizing QW-3 missiles. In September 2009, Indonesia announced that it would acquire QW-3 missiles for the Paskhas special air force unit. QW-2 Vanguards were photographed in South Sudan in service with the Sudanese People’s Liberation Army (SPLA), according to Armament Research Services in mid-January of 2015. (The SPLA, formerly a guerrilla group, kept the same name as the nation's regular army) Ref: Military Periscope, October 2017

→Air Defense Command and Control Systems

Barnaul-T Russian Air Defense Command and Control System





Tiers:



System

Alternative Designation: Barnaul-T
Type: Russian Air Defense Command and Control System
Mission: Designed to detect aerial targets and control air defense systems of the Army, marine units and the Airborne Force.
Crew: It is manned by a driver, commander, and two crew to control the radar and C2 equipment, with the control stations housed in the crew compartment
Chassis: MT-LBU
Interoperability: interoperability with other combatant arms and services of the armed forces
Software: Current hardware/software can be modified to ensure interface with foreign-made radar data sources and SAM systems
Emplacement: Maximum set up time of five minutes from road march to combat readiness configuration
Displacement: min7
Note: The new air defence control system use of automation equipment at tactical level increases the efficiency of short-range SAM systems by up to 20% and reduces the expenditure of missiles per killed target by up to 30%

Dimensions (Chassis: MT-LBU)

Length: m6.45
Width: m2.86
Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive (Chassis: MT-LBU)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Communications

Tactical Radio: Either the Azart-P (4km), Azart-N (12km), and Azart-BM (40km).

Main Weapon System

↳*System*

Name: PKT

Type: 7.62 mm, Machine-Gun

Caliber: mm7.62

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: INA

Main Gun Stabilization: No

Range, Day Sight: m1,500

Range, Thermal Sight: INA

↳*Intelligence and Control Module (MRU-D)*

Name: 9S932-1 intelligence and control module

Target Designation and Cease-Fire Command Generation Period: sec+2

Number of Automated 9S931-1 MP-K Workstations: ea6

Number of Automated 9S931 MP Workstations: ea4

Number of Automated 9S932 MRU-B Workstations: ea3

Number of Automated 9S933 PMUO Workstations: ea1

Remote Workstations, 9S931-1 MP-K: ea3

Remote Workstations, 9S931 MP: ea2

Remote Workstations, 9S932 MRU-B, 9S933 PMUO: ea1

Communication Range in a Stationary Position: 9S931-1 MP-K, 9S931 MP, 9S932 MRU-B is 20 km. 9S933 PMUO is 3 km

Communication Range on the Move: 9S931-1 MP-K, 9S931 MP, 9S932 MRU-B is 10km. 9S933 PMUO is 1 km.

↳*Radar*

Name: 1L122-1E Radar

Type: Radar that locates and tracks low-altitude aerial targets such as unmanned aerial vehicles (UAVs), helicopters, and ground attack aircraft

Maximum Range: km40

Targets: Capable of simultaneously tracking up to 100 different targets

Radar Refresh Rate: Automatic refresh rate of 1-12 seconds

Continuously Operation: 72 hours on internal power source

:

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

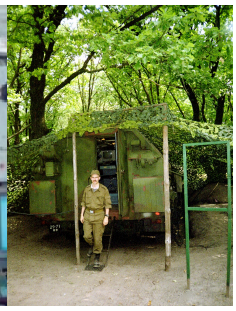
Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The Barnaul-T air defense control system is designed to detect aerial targets and control air defense systems of the Army, marine units and the Airborne Force. The systems uses the 9S932-1 intelligence and control module with 1L122-1E radar mounted on an MT-LBu tracked chassis. Baseline air defence command & control subsystem of the integrated troop and weapon management system. The Barnaul-T baseline air defence command and control subsystem is designed to fit tactical units' air defence (AD) control posts (CP) with advanced automation, communication, and data exchange equipment in order to effectively control air defence troops and weapons, coordinate their activities, and increase their mobility and survivability under any combat conditions. The Barnaul-T baseline set is used to equip: * AD division/brigade CP (mission planning module (MPM) mounted on the 9S931-1 wheeled chassis); * AD regiment CP (MP-K 9S931-1 and 9S931 MPM); * AD battalion CP (9S931 MPM); * Battery command and control (C2) post (9S932-1 reconnaissance and control vehicle with 1L122-1E radar); * MANPADS platoon C2 post (9S933 portable fire control unit); * SAM squad – 9S935 MANPADS squad automation equipment set. The configuration of the Barnaul-T baseline set depends on the organizational structure of Customer's tactical military units. The baseline set performs the following major tasks in automated mode: * Athering (reception) of air situation data from superior, interacting, and subordinate C2 posts, and a heliborne radar picket system; target tracking, radar data identification and display; reception and display of data on the friendly aircraft patrol area, interception lines, flight corridors, and joint action and cooperation areas; * Reception of alerts and battle commands from the superior C2 post, generation of reports based on them and target tracks with flight parameters; * Control over subordinate C2 posts and radars, transmission of alert information and data on the areas (sectors) of responsibility to such C2 posts and radars; reception, processing, display, and transmission of operational/tactical information on the position, status, and battle readiness of friendly troops; target allocation at each level of command, transmission of target designation and cease-fire commands to subordinate assets, based on the battle readiness, availability of free target channels and missiles; * Equipment test, engagement process recording; * Stand-alone and system-level integrated training of combat crews.

9S52 Polyana-D4 ASU Russian 6x6 Air Defense Command and Control Vehicle

Tiers:

1 2 **3** 4

Variants:

- **9S52M D4M Polyana system:** produced by Belarusian GNPO Agat, also developers of the Buk-MB modernisation of Buk-M1.

System

Alternate Designation: 9S52 Polyana-D4 ASU
In Service: 1986-Present
Type: Air Defense Command and Control System
Chassis: Ural 375
Composition: Combat Control Post; COmmand-Staff Vehicle; Autonomous Automated Workstation; SPTA and Maintenance Trailer; Two ED1x30-T400-1RAM3 Mobile Electric Power Stations

↳*Dimensions (Chassis: Ural 375D)*

Height, Overall : m2.68
Length, Overall : m7.36
Width, Overall : m2.67
Weight, Gross Vehicle: mt13.2

Cargo Space (Chassis: Ural 375D)

↳*Dimensions (Chassis: Ural 375D)*

Cargo Bed Area : m29.5
Height : m0.872
Length : m3.9
Width : m2.43

Automotive (Chassis: Ural 375D)

Engine Name: ZiL-375 Diesel

Engine Type: V8, 180 hp, Gasoline

Engine Power: hp180

Cooling System: Liquid

Fuel Capacity , Aux : liters60.0

Fuel Capacity, Main Tank: liters300.0

Maximum Road Speed: km/h75

Maximum Range: km750

Towing Capability, Off-Highway: kg5000.0

Towing Capability, Off-Highway: kg10000.0

Gradient: %65

Side Slope: %40

Vertical Step: m0.8

Trench: m0.7

Fording: m1.2

Command and Control, Communication Equipment

Number of Interfaces with Superior CPs: ea1

Number of Interfaces with Radar Data Sources: up to 3

Number of Air Targets Tracked Simultaneously: up to 250

Automated Workstation in CCP: ea8

Automated Workstation in CSV: ea3

Data Transfer Channels in CCP: ea16

Data Transfer Channels in CSV: ea4

Continuous Operation Time: not less than 72 hours

Into/Out-of-Action Time: Not more than 35 min

Radar Data Gathering and Processing: Yes

Air Situation Monitoring: Yes

Ground Situation Data: Yes, receiving, gathering, and processing

Automated Data Registration and Recording: Yes

Ciphering Equipment Capable: Yes

Operating Temperature: -40 deg C to +50 deg C

Notes:

9S52 Polyana-D4 ASU is a Soviet/Russian automated command and control system for air defence troops. May act as an upper level command post (CP) of the SAM brigade including S-300V as well as the 9K37 Buk complex. And also other means, including aircraft. Developed by Scientific Research Institute of the automatisation technics of Minradioprom. Chief designer - G.A.Burlakov. Development works started under the Decisions of the Special Commission of the Presidium of the USSR Soviet Ministry on military-industrial questions dated June 29, 1977 and August 27, 1981. Mass production of the system organized at the Minsk Electromechanical Plant (currently GNPO Agat), but later transferred to Penza, former Minradioprom factory. In

service since 1986. Chassis: Ural 375D

PPRU-M1 Russian Air Target Reconnaissance and Control Post




Tiers:



Variants:

- **PPRU-1M-2:** The PPRU-1M-2 replaces the analogue Dog Ear Radar with the VNIIRT 9S80M1-2 X-band radar.

System

Alternative Designation: PPRU-M1
Type: Air Target Reconnaissance and Control Post
Crew: eaINA
Chassis: MT-LBu

Dimensions (MT-LBu)

Length: 7.21 m
Width: 2.85 m
Height: 1.905 m
Weight, Combat: 15,550 kg
Ground Pressure: INA

Automotive (MT-LBu)

Engine Name: YaMZ-238N
Engine Type: V-8 diesel
Engine Power: 300 hp at 2,100 rpm
Cruising Range: km
Speed, Maximum: 61.5 km/h (road) 30 km/h (off-road)
Speed, Average Cross: INA
Speed Maximum Swim: 6 km/h
Fording Depth: INA
Suspension: Torsion bar

Radar System

Radar Name: 9S80 (Dog Ear)

Radar Operating Waveband: cm

Maximum Target Acquisition Range, at over 500 m: 34

Maximum Target Acquisition Range, at 25 m: 22

Automatic Target Tracking Capability: not less than 40 targets

Number of Objects Controlled Simultaneously: up to 6

Continous Operation Time: 24 hours

In/Out-of-Action Time: Not more than 5 minutes

Protection

Hull Armor: Welded aluminum

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The legacy PPRU M/M1 series of command posts were used primarily to support the 9K35/SA-13 Gopher and 2K22/SA-19 Grison point defence SAM system. The design remains in production. Early variants used the X-band 9S80/9S80M/M1 Ovod / Dog Ear as a battery acquisition radar. The most recent variant, displayed at MAKS 2007, includes the new design digital solid state VNIIRT 9S80M1-2 X-band radar, replacing the analogue Dog Ear. The MTLBu chassis is employed. he PPRU-M1 air target reconnaissance and control post is designed to control, both on the move and at halt, combat actions and fire delivery of air defence units armed with close/short-range antiaircraft artillery and missile systems. Composition: *radar *computer control system *multichannel data transceiver *external and internal communication aids *navigation and survey system *training facility *life support system *power supply system *tracked chassis, the MT-LBu multipurpose light armoured extended tractor *single spare parts, tools and accessories kit The PPRU-M1 CP provides full control of combat operations of any AD unit irrespective of its armaments and table of organisation. It exercises combat control of units armed with man portable surface-to-air missile systems via coded datalinks provided that MANPADS operators employ the 1L15/1L110 hand-held electronic data displays. The PPRU-M1 CP can be operated in various climates at ambient temperatures from -20°C to +50°C, relative air humidity of 98%, and wind speed of 30 m/s.

Cruise Missiles

→Short-Range Cruise Missiles (SRCM) (Less than 600 km)

→→Ground-Launched Cruise Missiles (GLCM) (Less than 600 km)

SS-N-27 Sizzler Russian Multi-Purpose Short Range Cruise Missile



Tiers:



Variants:

- **3M14K (SS-N-30A):** An inertial guidance land attack variant deployed by the Russian Navy. The submarine-launched weapon has a basic length of 6.2 m (20 ft), with a 450 kg (990 lb) warhead. Its range is 2,500 km (1,600 mi), allowing the Russian Navy to strike targets throughout central Western Europe (including all of the UK, northern France including Paris, and most of Germany) from beyond the GIUK gap. Its subsonic terminal speed is Mach 0.8.
- **3M14T:** The inertial guidance land attack variant which is deployed by the Russian Navy. A surface ship with VLS launched missile, with thrust vectoring booster, its basic length is 8.9 m (29 ft), its warhead weight and other performance are the same as the 3M14K. Russia fired 26 3M14T cruise missiles from four surface ships in the Caspian Sea against 11 targets in Syria on 7 October 2015.
- **3M-14TE:** An inertially guided, ship launched, land attack variant with VLS and a thrust vectoring booster. Its basic length is 8.9 m (29 ft), its warhead weight and other performances are the same as the 3M-14E. Its subsonic terminal speed is 0.8 mach, with a range of 300 km (190 mi) at supersonic speed.
- **91RE1:** A submarine-launched anti-submarine variant, it consists of two stages, one solid booster with four grid fins and one anti-submarine light torpedo. Its basic length is 7.65 m (25.1 ft), it has a range of 50 km (31 mi). It can reach supersonic speed. The torpedo has a warhead weight of 76 kg (168 lb). It is similar to the American ASROC/SUBROC missile/torpedo system. It follows a ballistic path on the surface, with a speed of Mach 2.5.
- **91RTE2:** Surface ship, VLS launched anti-submarine variant; it consists of three stages, one booster with thrust vector nozzle, one conventional booster, and one anti-submarine light torpedo. Its basic length is 8.9 m (29 ft), with a range of 40 km (25 mi) at supersonic speed. The torpedo has a warhead weight of 76 kg (168 lb). The lightest of all variants, with a launch weight of 1,300 kg (2,900 lb). Speed is Mach 2.
- **Club-M:** Land-based anti-ship missile for coastal defense. Range 300 km, includes supersonic terminal sprint phase.

System

Alternate Designation: SS-N-27, SS-N-27A, SS-N-27B, Sizzler, 3M54, 3M54M, 3M54E, 3M-54E1, 3M54TE, 3M54TE1,

3M54AE, 3M54AE1, 3M54-1, 3M14, Biryuza, 91R1, 91RT2

Class: Anti-Ship and Land Attack

Effective Range: 220 km (3M54), 300 km (3M54M1)

Circular Error Probability: m3

Basing: Submarine, Ship, Aircraft, Ground

Dimensions

Length: 8.22m for 3M54 (6.2 m for 3M54M1)

Missile Weight: 1,920 kg for 3M54 (1,570 kg for 3M54M1)

Diameter: m0.533

Fin Span: INA

Payload

Type: Single warhead

Warhead Type: Conventional or Nuclear

Warhead Weight: 200 kg HE for 3M54 (450kg HE for 3M54M1)

Nuclear Yield: INA

Conventional Warhead Weight: 400-500kg

Conventional Warheads Available: HE

Propulsion Characteristics

Engine: Turbojet (3M54 is three stage, 3M54M1 is two stage)

Propellant: Solid

Speed: Mach 0.8 - Mach 2.9

Flight Ceiling: m1,000

Flight Altitude: 50-150m AGL (20m ASL)

Fire Control

Guidance System: See variant

Notes:

The SS-N-27, Sizzler is a Russian short-range anti ship cruise missile that can be launched from land, sea, and air (in different variants). The Sizzler is the "AK-47" of Russian cruise missiles with almost limitless variants (See "Variants" on this page). The Sizzler is part of the Kalibr family.

Rubezh-ME Russian Coastal Defense Missile System





Tiers:



Variants:

- **Rubezh:** The Rubezh system uses improved P-15M missiles. These missiles are recoilless upon launch. Maximum range of fire is 80 km. This missile travels at a speed of 1 100 km/h (Mach 0.9). The missile travels at an altitude of 25, 50 or 250 m above sea level, depending on the setting which is pre-programmed before launch. Missile attacks its targets from the top.

System

Alternative Designation: Rubezh-ME

Type: Coastal Defense Missile System

Crew: ea2

Chassis: KamAZ-6350

Displacement Time: less than 10 minutes

Emplacement Time: less than 10 minutes

Fire on the Move: INA

Note #1: A typical battery of the Rubezh-ME includes up to 8 launcher vehicles with missiles and a mobile command post, equipped with Monolith-B radar. It is based on the same KamAZ 8x8 military truck chassis. Each launcher vehicle is supported by an associated reloading vehicle, which is fitted with a crane and carries reload missiles.

Note #2: The Rubezh-ME battery can launch up to 32 anti-ship cruise missiles. This is sufficient to disrupt operations of a large hostile battlegroup. Once the missiles are launched it takes 30-40 minutes to reload the launcher vehicles.

Dimensions

Length: 10 m

Width: 2.5 m

Height: 4 m

Weight, Combat: 26 tons

Automotive

Engine Name: KamAZ-740.50-360

Engine Type: Diesel

Engine Power: hp360

Range: up to 1 000 km

Speed, Maximum Road: km/h75

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: 0.6 m

Trench: 0.6 - 1.4 m

Fording Depth: mup to 1.75 m

Missile System

Name: Kh-35UE

Type: Cruise Missile

Manufacturer: 440 cm

Length: 440 cm

Diameter: 42.0 cm

Wingspan: 133 cm

Weight: 610 kg

Warhead: 145 kg High Explosive Fragmentation (HE-FRAG) warhead.

Warhead Weight: 145 kg

Engine: R95TP-300 Turbojet Kh-35 / Turbofan Kh-35U 360 kgf

Propellant: kerosene

Operational Range: 260 km

Flight Altitude: 10-15 m en route and about 4 m at terminal area

Maximum Speed: 980–1,164 km/h

Guidance System: inertial guidance and ARGS-35E X-band terminal active radar homing

Basic Load: The launcher vehicle carries 4 containerized Kh-35UE missiles.

Fire Control

↳*Fire Control System*

Name: INA

Computerized FCS: Yes

Direct Fire: No

Indirect Fire: Yes

↳*Radar*

Name: 1 x Mineral-ME1 active radar

Type: Active Search Radar

Range: 250 km

Number of Targets System can Track: up to 200 targets

Protection

Hull Armor: Protection from small arms and shell splinters

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: INA

NBC Protection: INA

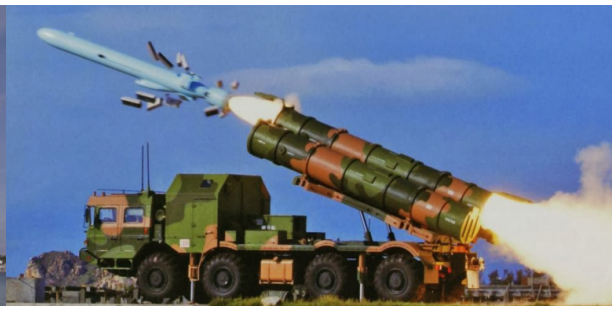
Smoke Equipment: INA

Notes:

At IMDS 2019, a new version of the Russian Bal-E coastal defence system is presented for the 1st time. The Rubezh-ME, dedicated to the export market, is based on a Kamaz 63501 8x8 chassis which is more compact than the MZKT-7930 of the original Bal-E. The Rubezh-ME still uses the same familly of KH-35 anti-ship missile. The system is paired with its Monolith-B self-propelled commmand vehicle with control and communication unit. The Rubez-ME can be deployed in less than 15 min, be positioned up to 1km above sea level and 10km from the coast line. The Monolith-B radar allows the Rubezh-ME to engage targets up to 250 km in active mode and up to 450km in passive mode, the systems also allows to track 30 targets in active mode, 50 in passive detection mode and 10 in targeting mode. The KH-35E missile has a range of 5 to 130km and the KH-35UE allows the Rubezh-ME to engage from 7 to 260km.

CM-602G Chinese Cruise Missile






Tiers:

1 **2** 3 4

Variants:

- **YJ-62:** The YJ-62 (Chinese: □□-62; pinyin: yingji-62; literally: 'eagle strike 62') is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy.
- **C-602:** The C-602 is the export version of the YJ-62, claimed to have a range of 280 km, a 300 kg (660 lb) semi-armour-piercing warhead, and GPS guidance. The reduced range is in accordance with Missile Technology Control Regime restrictions. The C-602 was revealed in September 2005, and displayed outside of China for the first time at the African Aerospace and Defence exhibition in 2006.

System

:
:
:

↳ ***System***

Name: CM-602G Missile
Type: Cruise Missile
Missile Basic Load: INA
Length: INA
Diameter: INA
Weight: INA
Warhead Weight: 480 kg (1,060 lb) penetrating blast/fragmentation warhead
Detonation Mechanism: Semi-armor-piercing
Flight Altitude: 7 – 10 meter terminal

Operational Range: 290 km

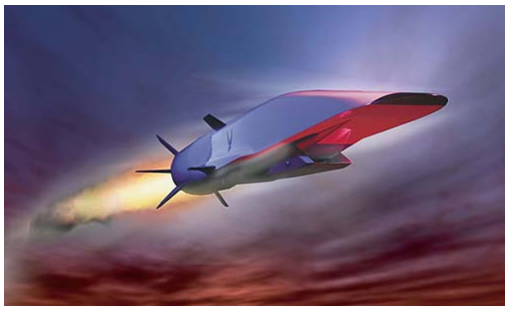
Speed: Mach 0.6-0.8

Guidance System: inertial guidance system using GPS data which may be augmented to provide man-in-the-loop control.

Notes:

The CM-602G is a land-attack version of the C-602. It is advertised as having a range of 290 km (180 mi), a 480 kg (1,060 lb) penetrating blast/fragmentation warhead, and an inertial guidance system using GPS data which may be augmented to provide man-in-the-loop control. The missile was revealed at the China International Aviation & Aerospace Exhibition in 2012. The YJ-62 is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy. n a September 2014 article published in Joint Forces Quarterly, the YJ-62 is credited with a 210 kg (460 lb) warhead, a speed of Mach 0.6–Mach 0.8 (735–980 km/h; 457–609 mph), and a sea-skimming terminal attack height of 7–10 metres. The missile has an inertial guidance system using GPS and BeiDou data, and an active terminal sensor. YJ-62A is credited with a range of up to 400 km (250 mi; 220 nmi). In lieu of official data, the United States Navy's Office of Naval Intelligence believes it is likely the YJ-62 has a longer range than the 150 nautical miles (170 mi; 280 km) of the C-602 export version, at least 400 km. The missile is deployed aboard Type 052C destroyers, and by coastal defence units using three-round transporter erector launchers.

BrahMos II Indian/Russian Multi-Role Short Range Cruise Missile



Tiers:

1 2 3 4

System

Alternate Designation: BrahMos 2, BrahMos Mark 2, BrahMos-II(K)

Country of Origin: Russia / India cooperative effort

Basing: Submarine, ship, ground, air

Launch Platform(s): TBD

Effective Range: km~600

Circular Error Probability: m~1

Dimensions

Length: mINA

Missile Weight: kgINA

Diameter: mINA

Fin Span: mINA

Payload

Warhead Type: INA

Warhead Options: INA

Nuclear Yield: mTINA

Conventional Warhead Weight: kgINA

Conventional Warheads Available: INA

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Chemical Capable: INA

Propulsion Characteristics

Engine: 2 stage, boost and scram jet

Propellant: Russia working on a unique fuel

Speed: ~Mach 7

Flight Ceiling: INA

Attack Altitude: INA

Fire Control

Guidance System: INA

Notes:

BrahMos-II BrahMos Mark II (not to be confused with BrahMos-I, Block-2) is intended to be a hyper-sonic cruise missile currently under joint development by Russia and India, which have together formed BrahMos Aerospace Private Limited. It is the second of the BrahMos series of cruise missiles. The BrahMos-II is expected to have a range of 450 kilometers and a speed of Mach 7. During the cruise stage of flight the missile will be propelled by a scram jet air breathing jet engine. http://defencenews.in/article/Meet-BrahMos-II-The-Super-Hypersonic-Missile-Russia-and-India-May-Never-Build-583398 Russia's military made headlines in 2018 when it announced it had hypersonic missiles that are ready for combat. While many nations are developing these advanced weapons, Russia appears to hold the lead and is not stopping, with Putin announcing that Russia plans to field even more in 2019 . But what about the joint Russian/Indian hypersonic missile project? Following the development of the supersonic BrahMos anti-ship cruise missile during the 2000s, the joint venture, BrahMos Aerospace, announced the development of a hypersonic BrahMos II in 2008 . But ten years later, as Russia fields its first hypersonic missiles, where is the BrahMos II? The short answer is that the BrahMos II is not coming any time soon. While Russian hypersonic missile programs have steadily proceeded, BrahMos II development has intermittently started and stopped multiple times, with deadlines and dates changing almost every year. It's possible that it may never enter service. ...This was not to be. At Aero India 2015, the new CEO of BrahMos Aerospace, Sudhir Mishra said that scientists had quietly begun work on the hypersonic version of the supersonic BrahMos missile. He expressed the view that the India may be the first country in the world to field a hypersonic missile "in the next 7-12 years". This pushed the timeline for the BrahMos II back to 2022-2027. But in 2016, the marketing director of BrahMos Aerospace, Praveen Pathak, suggested that this was not true in an interview with the Russian TASS news service. He said that work on the hypersonic BrahMos would begin in 2022 , and that a prototype would be ready two years later in 2024. At this point, it's likely that earlier work on the hypersonic missile was wiped clean, since Pathak suggested that the missile's shape and design were not known. During the interview, he stated that "the preliminary design is now being developed." In 2018 this was pushed back further. Mishra told the Times of India that "We will require seven to ten years from now to become a hypersonic missile system," suggesting that the hypersonic BrahMos would only reach service between 2025 and 2028. So where does the BrahMos II stand in 2019? In a report about the BrahMos at Aero India 2019, it was simply said that the hypersonic version would exist "in a few years." While this is far more realistic, given that Russia has nearly completed development of its own missiles, time will tell if the BrahMos II is delayed yet again.

Polyphem German and French Multi-Role Short Range Cruise Missile





Tiers:

1 2 3 **4**

Variants:

- **Polyphem-H:** Helicopter launched variant
- **Polyphem-S:** Ship launched variant
- **Triton:** Submarine launched variant

System

Alternate Designation: Trilateral fibre-optic guided missile system (TRIFOM), Polyphem-S, Polyphem-H, Triton

Basing: Submarine, Ship, Truck

Launch Platform(s): Braunschweig class corvette, Mercedes TEL

Effective Range: km60

Circular Error Probability: m1

Dimensions

Length: m2.7

Missile Weight: kg130

Diameter: mINA

Fin Span: mINA

Payload

Warhead Type: Single

Warhead Options: Conventional

Nuclear Yield: mTNA

Conventional Warhead Weight: kg20

Conventional Warheads Available: Hollow charge with a hull of splinters

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: NA

Propulsion Characteristics

Engine: Booster for launch and turbo-jet for flight

Propellant: Solid

Speed: 120—180 m/s (around 430—650 km/h)

Flight Ceiling: m600

Minimum Altitude: m20

Attack Altitude: INA

Fire Control

Guidance System: Primary guidance came from fiber optics to send and receive messages to and from the launch site. The missile was also capable of automatic flight using advanced image processing algorithms, electro-optical converters and radio links. The firing station has a global positioning system (GPS) Navstar navigation reference unit, a north-seeking device and a command, control, communications and information (C3I) system interface.

Notes:

The Polyphem was a proposed light-weight fibre-optic wire-guided surface-to-surface missile with a range of 60 km. It used a solid propellant booster rocket to launch the missile out of its canister to an initial height so that the wings and control surfaces can unfold and a more fuel economic turbojet cruise engine would kick in to propel the missile. The missile could be programmed to follow a preset course, using GPS or inertial guidance. An infrared seeker could be used to automatically pick a target and for the terminal guidance phase, but it was also possible to transfer the thermal images back to the launching platform via a 200 MBit/s data link provided by an optical fibre, and manually select the target. The fibre-optic guided Polyphem missile was intended for two kinds of mission: isolated strikes from light land vehicles against long-range targets or from small ships or helicopters against land-based targets. The Polyphem program was started in 1994 by Germany, France and Italy. Italy later left the project. A naval version, called Polyphem-S, was initially selected for the Braunschweig class corvette as anti-ship and land-attack missile, but that has been cancelled. The Polyphem program as a whole was cancelled in 2003.

SS-N-26 Strobile Russian Anti-Ship Short Range Cruise Missile





Tiers:



Variants:

- **3M55 Oniks:** Base version for Russia.
- **Oniks-M:** Version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Bastion-P is a coastal defense version of the P-800. It entered Russian service in 2010. The P-800 missile used in the Bastion-P remains essentially unchanged. Its launch platform is based upon a Belarusian MZKT-7930 special wheeled chassis. This gives the Bastion-P excellent mobility, including rough terrain. The Bastion-P launcher vehicle carries two P-800 missiles
- **Kh-61:** Air launched air to surface version.

System

Alternate Designation: Yakhont, 3M55, Ruby, Kh-61, P-800 Oniks, Yakhont-M, Stallion, Bastion-P, Bastion-S,

Class: Anti-Ship, Land Attack

Effective Range: 600km (Export: 300km)

Circular Error Probability: m1.5

Basing: Ground, Ship,Submarine, Aircraft

Transporter-Erector-Launcher: K-340P for ground launch can carry two missiles and each missile can be launched 5 seconds apart

Dimensions

Length: 8.6m (8.3m for air to surface version)

Missile Weight: kg3,000

Diameter: m.7

Fin Span: m1.7

Payload

Type: Single warhead

Warhead Type: Semi-armor piercing and HE (Export version: HE)

Nuclear Warhead Weight: NA

Nuclear Yield: NA

Conventional Warhead Weight: 200kg HE / 250kg Armor Piercing

Conventional Warheads Available: HE sub-munitions, semi-armor piercing

Propulsion Characteristics

Engine: Booster / Ramjet

Propellant: Solid-fuel Booster; Liquid-Fuel Ramjet Sustainer

Speed: 750 m/s (Mach 2.6)

Flight Altitude: 10,000–14,000 m

Minimum Altitude: m10

Surface Speed: Mach 2

Fire Control

Guidance System: GPS, mid-course inertial guidance, active radar homing, passive radar seeker head

Radar homing: All-weather monopulse active-passive with frequency hopping

Countermeasures: Active spoofing, dipole clouds

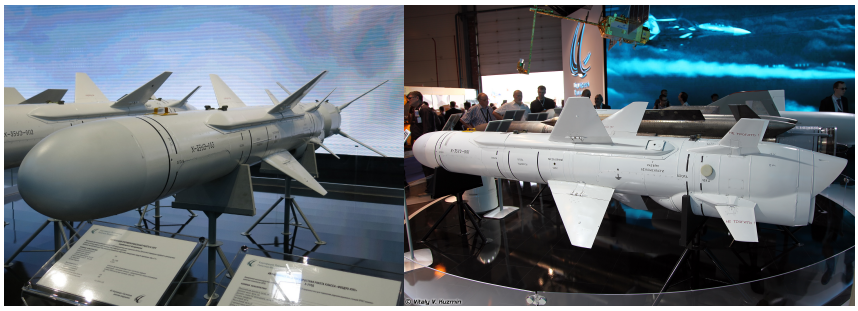
Radar Range: km50

Seeker: Granit-Elektron seeker

Notes:

The SS-N-26 Strobile was first developed in 1993 by NPO Mashinostroyenia. In 1999, they developed the ground-launched export version, the Yakhont, and an air-launched version, the Yakhont-M. A sub-launched version has been developed to be fitted to Yasen-class attack submarines, and the Bastion-P and Bastion-S launch systems have since been developed. The Strobile was first deployed in 2002 on Russia’s Nakat-class missile ship. Though originally designed to be an anti-ship missile, the Bastion missile launch systems were first deployed in 2015 with the Russian Army and the missiles were used in a surface to surface role. In 1988, Russia and India collaborated on a joint venture called Brahmos Aerospace Ltd, which produced the Brahmos missile, a supersonic cruise missile based on the Yakhont.

Kh-35UE Russian Cruise Missile



Tiers:

1 **2** 3 4

Variants:

- **Kh-35 (3M-24):** Base naval version for Russia (2003).
- **Kh-35E (3M-24E):** Export version of Kh-35 (1996).
- **Kh-35U:** Base upgrade unified missile (can be used with any carrier), version for Russia in production (as of July 1, 2015). Capable of striking land targets.
- **Kh-35UE:** Export version of Kh-35U, in production.
- **Kh-35V:** Version for Russia, launched from a helicopter.
- **3M-24EMV:** Export version of Kh-35 missile-target without warhead for Vietnam.
- **Kh-35 Uran/Uran-E:** Shipborne equipment of the control system with a missile Kh-35/Kh-35E
- **Bal/Bal-E:** Coastal (SSC-6 Sennight) missile complex with Kh-35/Kh-35E missiles (2008).
- **KN-09 Kumsong/GeumSeong-3:** (Venus 3 □□3□ □□3□) - KN0v 0x 01, KN19 Reported North Korean copy of the Kh-35U. Kumsong-3 is a North Korean domestic variant/clone of Kh-35 likely based on Kh-35U due to range.Demonstrated range in 2017, June 8 test is 240 km.
- **Kh-37 or Kh-39:** possible name for nuclear-tipped variant.
- **KCT-15:** License-produced Kh-35E by Vietnam
- **Neptune:** Ukrainian derivative
- **VCM-01:** customized version of the Russian-made Kh-35UE produced under license in Vietnam.

System

Name: Kh-35UE
Type: Cruise Missile
Manufacturer: 440 cm
Length: 440 cm
Diameter: 42.0 cm
Wingspan: 133 cm
Weight: 610 kg
Warhead: 145 kg High Explosive Fragmentation (HE-FRAG) warhead.
Warhead Weight: 145 kg
Engine: R95TP-300 Turbojet Kh-35 / Turbofan Kh-35U 360 kgf
Propellant: kerosene
Operational Range: 260 km
Flight Altitude: 10-15 m en route and about 4 m at terminal area

Maximum Speed: 980–1,164 km/h

Guidance System: inertial guidance and ARGS-35E X-band terminal active radar homing

Basic Load: The launcher vehicle carries 4 containerized Kh-35UE missiles.

Notes:

The Kh-35UE air-to-surface/anti-ship missile is a modern variant of the Kh-35E air-launched missile. It is in service with the Russian Navy, Indian Navy, and the Vietnamese People’s Navy. The high-subsonic missile offers improved performance and range than its predecessor. It is guided by inertial and satellite navigation systems, as well as an active-passive radar seeker, which ensure better accuracy, and resistance against jamming. The advanced seeker further offers a 50km lock-on range compared with the 20km range of the Kh-35E. Fitted with a 145 kg high-explosive fragmentation penetrator warhead, the Kh-35UE missile is available in aircraft and helicopter-launched versions, which can strike targets within the range of 260km.

→→Air-Launched Cruise Missiles (ALCM) (Less than 600 km)

C-802 Chinese Anti-Ship Cruise Missile




Tiers:



Variants:

- **YJ-83:** The YJ-83 (Chinese: □□-83; pinyin: yingji-83; literally: 'eagle strike 83'; NATO reporting name: CSS-N-8 Saccade) is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy.
- **C-801:** The C-801 is the export version of the YJ-8. The C-801 was not marketed after 2003.
- **C-802:** The C-802 is the export version of the YJ-83; It is powered by the French TRI 60-2 turbojet and has a range of 65 nautical miles (120 km). The C-802A and C-802AK are the export surface- and air-launched variants. The C-802A has a range of 100 nautical miles (190 km).

System

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↳***C-802 Anti-Ship Cruise Missile***

Name: C-802
Type: Anti-Ship Cruise Missile
Manufacturer: China Aerospace Science and Industry Corporation
Length: INA
Diameter: INA
Weight: INA
Warhead: 190 kg high-explosive fragmentation
Engine: French TRI 60-2 turbojet
Operational Range: 125 km
Maximum Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance

Notes:

The C-802 is the export version of the YJ-83; It is powered by the French TRI 60-2 turbojet and has a range of 65 nautical miles (120 km). The C-802A and C-802AK are the export surface- and air-launched variants. The C-802A has a range of 100 nautical miles (190 km). The YJ-83 (Chinese: □□-83; pinyin: yingji-83; literally: 'eagle strike 83'; NATO reporting name: CSS-N-8 Saccade) is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy. The US military considers the C-802 and C-802A as parts of the YJ-83 family. The C-802 precedes the closely related YJ-83; strictly speaking, only the C-802A is the export development of the YJ-83. The C-802 is sometimes and erroneously considered the export version of the YJ-82; the two are separate developments. A prospective "C-803" was erroneously promulgated as the export version of the YJ-83 by enthusiasts in the late-1990s. As yet, no such missile exists.

YJ-83 (CSS-N-8 Saccade) Chinese Anti-Ship Cruise Missile



Tiers:



Variants:

- **C-802:** The C-802 is the export version of the YJ-83; It is powered by the French TRI 60-2 turbojet and has a range of 65 nautical miles (120 km). The C-802A and C-802AK are the export surface- and air-launched variants. The C-802A has a range of 100 nautical miles (190 km).

System

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↳***Missile***

Name: YJ-83 (CSS-N-8 Saccade)
Type: Subsonic anti-ship cruise missile
Manufacturer: China Aerospace Science and Industry Corporation
Length: INA
Diameter: INA
Warhead Type: High-explosive fragmentation
Warhead Weight: kg190
Operational Range: km180
Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance
Basic Load: ea2

Notes:

The YJ-83 (Chinese: □□-83; pinyin: yingji-83; literally: 'eagle strike 83'; NATO reporting name: CSS-N-8 Saccade) is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy. The YJ-83 uses microprocessors and a strapdown inertial reference unit (IRU); these are more compact than the equivalent electronics used in the YJ-8 and the export C-802, allowing the YJ-83 to have a 180-km range at Mach 0.9. The missile is powered by the Chinese CTJ-2 turbojet, and carries 190-kg high-explosive fragmentation warhead. Terminal guidance is by an active radar. The YJ-83K, the air-launched variant, has a range of 200 km. This data may be for an improved YJ-83A; the original

YJ-83 may have shorter range, at 120 km and 130 km for the surface- and air-launched versions, respectively. The YJ-83KH has an electro-optical seeker, and may receive course corrections by remote link. The YJ-83 entered service with the People's Liberation Army Navy in 1998-1999 and has equipped a large number of its surface warships. The YJ-83K equips the Xian JH-7 and H-6G.

YJ-12 Chinese Supersonic Anti-Ship Cruise Missile



Tiers:



Variants:

- **YJ-12:** INA
- **YJ-12A:** Naval surface-based variant, launched by rocket booster[
- **YJ-12B:** Land-based variant with 160 nmi (180 mi; 300 km) range
- **CM-400AKG:** The CM-400AKG is an air-launched supersonic surface attack cruise missile, believed to be the export version of the YJ-12. The 910 kg (2,000 lb) missile is 0.4 m (1.3 ft) in diameter and has a range of between 54–130 nmi (62–150 mi; 100–241 km) while carrying either a 150 kg (330 lb) blast or 200 kg (440 lb) penetration warhead. It has three guidance options, including inertial navigation system (INS) coupled with satellite positioning to get within 50 m, an onboard IR/TV seeker for terminal guidance and 5 m accuracy, and passive radar to supplement the seeker, which delivers (strangely worse) 5–10 m accuracy. One unusual characteristic is that it does not fly at low altitude to avoid detection, but rather uses “high altitude launching” to achieve “higher aircraft survivability.” It may have a top speed of Mach 5.
- **CM-302:** In November 2016, CASIC unveiled the CM-302 as the export version of the YJ-12. It is marketed as "the world's best anti-ship missile" that it is supersonic throughout its flight, can be launched from air, land, and naval platforms, can disable a 5,000-tonne warship, and be used in a land attack role. Assuming physical characteristics similar to the YJ-12, the missile is likely 7 m (23 ft) long and 0.6 m (2.0 ft) diameter, with an estimated weight of 2,000–2,500 kg (4,400–5,500 lb). It is stated to have a range of 280 km (170 mi; 150 nmi), a 250 kg (550 lb) warhead, guided by BeiDou which can be updated by data-link with an active radar seeker for terminal homing to achieve a 90% probability of hitting its target, while traveling at a mid-course speed of Mach 1.5-2 and accelerating to Mach 3 or higher during the terminal flight phase.

System

Alternative Designation: YJ-12

Type: Supersonic Anti-Ship Cruise Missile

Manufacturer: INA

In Service: 2015-Present

Main Weapon System

↳*Launcher*

Launch Platforms: *H-6 *JH-7B *YJ-12B

↳*Missile*

Name: YJ-12 Missile

Type: Supersonic Anti-Ship Cruise Missile

Length: 6.3 m

Diameter: 0.756 m

Weight: 2,500 kg

Warhead Type: HE-FRAG

Engine: integrated ramjet/booster propulsion system

Operational Range: 500 km

Maximum Speed: Mach 3

Guidance System: Inertial with active radar homing

Notes:

The YJ-12 (Chinese: □□-12; pinyin: yīngjī-12; literally: 'Eagle Strike 12') is a Chinese supersonic anti-ship cruise missile. The YJ-12 is an air-launched missile that resembles a lengthened Kh-31 and is close in shape to the GQM-163 Coyote aerial target. A 2011 article in the United States Naval War College Review credited the "YJ-91/YJ-12" with a range of 400 km and a 205 kg high explosive warhead, compared to the 130 km (81 mi; 70 nmi) range of a Harpoon anti-ship missile. Furthermore, an aircraft could launch the "YJ-91/YJ-12" while still 230 km beyond the range of SM-2 and Sparrow anti-air missiles, which have ranges of less than 170 km. According to Chinese sources, the YJ-12 has a speed of around Mach 2 if launched from low altitude and up to Mach 3.2 if launched from high altitude, with a maximum range of around 380 km (240 mi; 210 nmi) depending on launch altitude; terminal attack altitude is 15 meters. In a September 2014 article published in Joint Forces Quarterly, the missile was credited with a range of up to 250 km and a speed of Mach 2.5. In February 2015, military expert Li Li claimed the YJ-12 has a 400–500 kg (880–1,100 lb) warhead and a range of 300 km (190 mi; 160 nmi) when traveling at Mach 3, or 400 km at a speed of Mach 4. Speed and range varies on launch altitude and flight path, achieving maximum performance at an altitude of 40 km (130,000 ft) and degrading as it gets lower. Although actual warhead weight may be roughly 200 kg, its supersonic speed enables lethality equivalent to a subsonic missile equipped with a 400–500 kg warhead. The YJ-12 can also do evasive maneuvers to avoid anti-missile threats. A saturation attack by YJ-12's fired at long range would pose a grave threat to American carrier strike groups; once the wave of sea-skimming missiles appeared over the horizon and was detected by ships' own sensors, they would only have some 45 seconds to engage before impact and if there were enough, short range defenses would be overwhelmed. Given that fighters such as the Su-30MKK and J-11B have a combat radius of about 1,500 km, equipping them with the YJ-12 gives them a potential strike range out to 1,900 km (1,200 mi; 1,000 nmi). The U.S. Navy's counter is to use the Cooperative Engagement Capability to detect and destroy the YJ-12's launch aircraft with SM-6 missiles and fighters at long range before they can be fired. It has been test-launched from Xian H-6 bombers and will be fitted on the JH-7B. Reportedly, they may also be launched from the J-10, Su-30MKK, the J-11, and J-16.

C-801 Chinese Anti-Ship Cruise Missile




Tiers:



Variants:

- **C-801:** The C-801 is the export version of the YJ-8. The C-801 was not marketed after 2003.
- **YJ-8:** Basic version with fixed wings
- **YJ-8A:** Modified YJ-8 with folding wings.
- **YJ-81:** Air-launched version without the booster.
- **YJ-82:** Submarine-launched version.
- **C-801K:** Export version of the YJ-81
- **C-801Q:** Export version of YJ-82.

System

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↳*C-801 Anti-Ship Cruise Missile*

Name: C-801
Type: Anti-Ship Cruise Missile
Length: 5.81 m
Diameter: INA
Weight: 815 kg
Warhead Weight: 165 kg
Engine: Rocket
Propellant: solid rocket
Operational Range: 42 km
Flight Altitude: 5-7 m
Maximum Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance

Notes:

The C-801 is the export version of the YJ-8.[4][3] The C-801 was not marketed after 2003. The YJ-8 (Chinese: □□-8; pinyin: yingji-8; literally: 'eagle strike 8'; NATO reporting name: CSS-N-4 Sardine) is a Chinese surface-launched subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation (CASIC) Third Academy. The YJ-8 was developed into air-launched (YJ-81) and submarine-launched (YJ-82) variants. The YJ-8 is either based on, or is a heavily modified copy of, the MM38 Exocet; the two missiles share virtually identical operational profiles. The replication of the MM38's "revolutionary flight profile" in less than ten years and with an immature industrial base strongly suggests that China had access to proven technology. The YJ-8 was a "radical departure" from China's first anti-ship missiles derived from the P-15 Termit. The YJ-8 carried a smaller warhead, but had the same range and speed while being significantly smaller and lighter.

Kh-61 Russian Supersonic Cruise Missile



Tiers:



Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

System

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↳*System*

Name: Kh-61
Type: Supersonic Anti-Ship Cruise Missile
Manufacturer: NPO Mashinostroyeniya
Length: 8.9 m
Diameter: 0.7 m
Weight: 3,000 kg
Wingspan: 1.7 m
Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE
Detonation Mechanism: delay fuze
Engine: Ramjet 4 tons of thrust
Propellant: kerosene liquid fuel
Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi) depending on altitude (Yakhont export version)
Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

Accuracy: m1.5

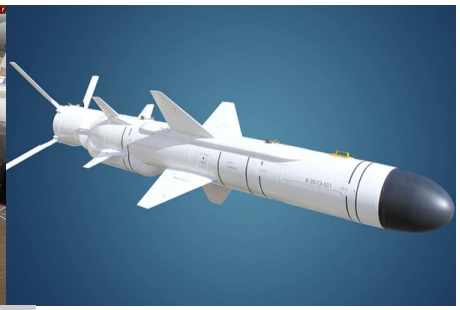
Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

Notes:

Kh-61 - Air launched air to surface version of the P-800 The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile". Development officially started in 1983, and in the 1990s the anti-ship missile was tested on the Project 1234.7 ship. In 2002 the missile passed the whole range of trials and was commissioned. It is reportedly a replacement of the P-270 Moskit, but possibly also of the P-700 Granit. The P-800 was used as the basis for the joint Russian-Indian supersonic missile BrahMos. The missile is carried in flight by aerodynamic lift. The solid-propellant booster is located in the ramjet's combustion chamber and is ejected by the airflow after it has burned out. Advantages *Over-the-horizon firing range *Full autonomy of combat use ("fire and forget") *A set of flexible ("low-profile sea-skimming", "high-low") trajectories *High supersonic speed in all phases of flight *Full harmonization for a wide range of platforms (surface ships, submarines and land-based launchers) * Possible use of the missile in electronic countermeasures environment and under enemy fire

→→Vessel-Launched Cruise Missiles (VLCM) (Less than 600 km)

KH-35 Russian Anti-Ship Cruise Missile


Tiers:



Variants:

- **Kh-35 (3M-24):** Base naval version for Russia (2003).
- **Kh-35E (3M-24E):** Export version of Kh-35 (1996).
- **Kh-35U:** Base upgrade unified missile (can be used with any carrier), version for Russia in production (as of July 1, 2015).[12][22] Capable of striking land targets.
- **Kh-35UE:** Export version of Kh-35U, in production.
- **Kh-35V:** Version for Russia, launched from a helicopter.
- **3M-24EMV:** Export version of Kh-35 missile-target without warhead for Vietnam.
- **Kh-35 Uran/Uran-E:** (SS-N-25 'Switchblade', 3M-24) - Shipborne equipment of the control system with a missile Kh-35/Kh-35E
- **Bal/Bal-E:** Coastal (SSC-6 Sennight) missile complex with Kh-35/Kh-35E missiles (2008).
- **KN-09 Kumsong/GeumSeong-3:** (Venus 3 □□3□ □□3□) - KN0v 0x 01, KN19 Reported North Korean copy of the Kh-35U. Kumsong-3 is North Korean domestic variant/clone of Kh-35 likely based on Kh-35U due to range.[25] Demonstrated range in 2017, June 8 test is 240 km.
- **Kh-37 or Kh-39:** possible name for nuclear-tipped variant.
- **KCT-15:** License-produced Kh-35E by Vietnam.
- **Neptune:** Ukrainian derivative

System

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↳***KH-35 Anti-Ship Cruise Missiles***

Name: KH-35

Type: Anti-Ship Cruise Missiles

Manufacturer: Tactical Missiles Corporation

Length: 385 cm

Diameter: 42.0 cm

Weight: 520 kg

Wingspan: 133 cm

Warhead: HE fragmentation shaped charge

Warhead Weight: 145 kg

Engine: R95TP-300 Turbojet Kh-35 / Turbofan Kh-35U 360 kgf

Propellant: kerosene

Operational Range: 130 km

Flight Altitude: 10-15 m en route and about 4 m at terminal area

Speed: Mach 0.8–Mach 0.95 (609–723 mph; 980–1,164 km/h)

Guidance System: inertial guidance and ARGS-35E X-band terminal active radar homing

Launch Platform: Tupolev Tu-142, Su-24, MiG-29M/K, Sukhoi Su-35, Su-27SM, Su-30MKI//SM, Su-34, HAL Tejas, Ka-27, Ka-28, Ka-52, T-50, also ships and boats, coastal, LACM, TEL variants

Notes:

The Zvezda Kh-35 (Russian: X-35 , AS-20 'Kayak') is a Soviet turbojet subsonic cruise[8] anti-ship missile. The same missile can also be launched from helicopters, surface ships and coastal defence batteries with the help of a rocket booster, in which case it is known as Uran ('Uranus', SS-N-25 'Switchblade', GRAU 3M24) or Bal ('Ball', SSC-6 'Sennight', GRAU 3K60). It is designed to attack vessels up to 5,000 tonnes. Zvezda started work on the Kh-35 in 1983 by a decree of the USSR Council of Ministers and the USSR CPSU Central Committee to arm ships of medium tonnage. The Kh-35 missile is a subsonic weapon featuring a normal aerodynamic configuration with cruciform wings and fins and a semi submerged air duct intake. The propulsion unit is a turbofan engine. The missile is guided to its target at the final leg of the trajectory by commands fed from the active radar homing head and the radio altimeter. Target designation data can be introduced into the missile from the launch aircraft or ship or external sources. Flight mission data is inserted into the missile control system after input of target coordinates. An inertial system controls the missile in flight, stabilizes it at an assigned altitude and brings it to a target location area. At a certain target range, the homing head is switched on to search for, lock on and track the target. The inertial control system then turns the missile toward the target and changes its flight altitude to an extremely low one. At this altitude, the missile continues the process of homing by the data fed from the homing head and the inertial control system until a hit is obtained. The Kh-35 can be employed in fair and adverse weather conditions at sea states up to 5-6, by day and night, under enemy fire and electronic countermeasures. Its aerodynamic configuration is optimized for high subsonic-speed sea-skimming flight to ensure stealthy characteristics of the missile. The missile has low signatures thanks to its small dimensions, sea-skimming capability and a special guidance algorithm ensuring highly secure operational modes of the active radar seeker. Its ARGS-35E active radar seeker operates in both single and multiple missile launch modes, acquiring and locking on targets at a maximum range of up to 20 km. A new radar seeker, Gran-KE has been developed by SPE Radar MMS and will be replacing the existing ARGS-35E X band seeker.

3M55 Oniks Russian Supersonic Anti-Ship Cruise Missile



Tiers:

1 2 3 4

Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

System

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↳*System*

Alternate Names: English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile".
Type: Supersonic Anti-Ship Cruise Missile
Manufacturer: NPO Mashinostroyeniya
Length: 8.9 m
Diameter: 0.7 m
Weight: 3,000 kg
Wingspan: 1.7 m
Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE
Detonation Mechanism: delay fuze
Engine: Ramjet 4 tons of thrust
Propellant: kerosene liquid fuel
Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi)

depending on altitude (Yakhont export version)

Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

Accuracy: m1.5

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

Notes:

3M55 Oniks – Base version for Russia. The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile". Development officially started in 1983, and in the 1990s the anti-ship missile was tested on the Project 1234.7 ship. In 2002 the missile passed the whole range of trials and was commissioned. It is reportedly a replacement of the P-270 Moskit, but possibly also of the P-700 Granit. The P-800 was used as the basis for the joint Russian-Indian supersonic missile BrahMos. The missile is carried in flight by aerodynamic lift. The solid-propellant booster is located in the ramjet's combustion chamber and is ejected by the airflow after it has burned out. Advantages *Over-the-horizon firing range *Full autonomy of combat use ("fire and forget") *A set of flexible ("low-profile sea-skimming", "high-low") trajectories *High supersonic speed in all phases of flight *Full harmonization for a wide range of platforms (surface ships, submarines and land-based launchers) * Possible use of the missile in electronic countermeasures environment and under enemy fire

C-602 Chinese Anti-Ship Cruise Missile







Tiers:



Variants:

- **YJ-62:** The YJ-62 (Chinese: □□-62; pinyin: yingji-62; literally: 'eagle strike 62') is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy.
- **CM-602G:** The CM-602G is a land-attack version of the C-602. It is advertised as having a range of 290 km (180 mi), a 480 kg (1,060 lb) penetrating blast/fragmentation warhead, and an inertial guidance system using GPS data which may be augmented to provide man-in-the-loop control. The missile was revealed at the China International Aviation & Aerospace Exhibition in 2012.

C-602 Anti-Ship Cruise Missile

↳*System*

Name: C-602 Missile
Type: Anti-Ship Cruise Missile
Manufacturer: China Aerospace Science and Industry Corporation
Proliferation: Widely Proliferated
Length: INA
Diameter: INA
Weight: INA
Warhead Weight: 300 kg (660 lb) semi-armour-piercing warhead
Detonation Mechanism: Semi-armor-piercing
Flight Altitude: 7 – 10 meter terminal
Operational Range: 200 km
Speed: Mach 0.6-0.8
Guidance System: GPS guidance
Launch Platform: TEL Type 052C destroyer

Notes:

The C-602 is the export version of the YJ-62, claimed to have a range of 280 km, a 300 kg (660 lb) semi-armour-piercing warhead, and GPS guidance. The reduced range is in accordance with Missile Technology Control Regime restrictions. The C-602 was revealed in September 2005, and displayed outside of China for the first time at the African Aerospace and Defence

exhibition in 2006. The YJ-62 is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy. n a September 2014 article published in Joint Forces Quarterly, the YJ-62 is credited with a 210 kg (460 lb) warhead, a speed of Mach 0.6–Mach 0.8 (735–980 km/h; 457–609 mph), and a sea-skimming terminal attack height of 7–10 metres. The missile has an inertial guidance system using GPS and BeiDou data, and an active terminal sensor. YJ-62A is credited with a range of up to 400 km (250 mi; 220 nmi). In lieu of official data, the United States Navy's Office of Naval Intelligence believes it is likely the YJ-62 has a longer range than the 150 nautical miles (170 mi; 280 km) of the C-602 export version, at least 400 km. The missile is deployed aboard Type 052C destroyers, and by coastal defence units using three-round transporter erector launchers.

YJ-62 Chinese Anti-Ship Cruise Missile




Tiers:

1 **2** 3 4

Variants:

- **C-602:** The C-602 is the export version of the YJ-62, claimed to have a range of 280 km, a 300 kg (660 lb) semi-armour-piercing warhead, and GPS guidance. The reduced range is in accordance with Missile Technology Control Regime restrictions. The C-602 was revealed in September 2005, and displayed outside of China for the first time at the African Aerospace and Defence exhibition in 2006.
- **CM-602G:** The CM-602G is a land-attack version of the C-602. It is advertised as having a range of 290 km (180 mi), a 480 kg (1,060 lb) penetrating blast/fragmentation warhead, and an inertial guidance system using GPS data which may be augmented to provide man-in-the-loop control. The missile was revealed at the China International Aviation & Aerospace Exhibition in 2012.

System

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↳*System*

Name: YJ-62 Missile
Type: Anti-Ship Cruise Missile
Manufacturer: China Aerospace Science and Industry Corporation
Missile Basic Load: INA
Length: INA
Diameter: INA
Weight: INA
Warhead Weight: 210 kg
Detonation Mechanism: Semi-armor-piercing
Operational Range: 400 km
Flight Altitude: 7 – 10 meter terminal
Speed: Mach 0.6-0.8
Guidance System: Inertial/active terminal guidance

Launch Platform: TEL Type 052C destroyer

Notes:

The YJ-62 (Chinese: □□-62; pinyin: yingji-62; literally: 'eagle strike 62') is a Chinese subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation Third Academy. n a September 2014 article published in Joint Forces Quarterly, the YJ-62 is credited with a 210 kg (460 lb) warhead, a speed of Mach 0.6–Mach 0.8 (735–980 km/h; 457–609 mph), and a sea-skimming terminal attack height of 7–10 metres. The missile has an inertial guidance system using GPS and BeiDou data, and an active terminal sensor. YJ-62A is credited with a range of up to 400 km (250 mi; 220 nmi). In lieu of official data, the United States Navy's Office of Naval Intelligence believes it is likely the YJ-62 has a longer range than the 150 nautical miles (170 mi; 280 km) of the C-602 export version, at least 400 km. The missile is deployed aboard Type 052C destroyers, and by coastal defence units using three-round transporter erector launchers. In a September 2014 article published in Joint Forces Quarterly, the YJ-62 is credited with a 210 kg (460 lb) warhead, a speed of Mach 0.6–Mach 0.8 (735–980 km/h; 457–609 mph), and a sea-skimming terminal attack height of 7–10 metres. The missile has an inertial guidance system using GPS and BeiDou data, and an active terminal sensor. YJ-62A is credited with a range of up to 400 km (250 mi; 220 nmi). In lieu of official data, the United States Navy's Office of Naval Intelligence believes it is likely the YJ-62 has a longer range than the 150 nautical miles (170 mi; 280 km) of the C-602 export version,[2] at least 400 km. The missile is deployed aboard Type 052C destroyers, and by coastal defence units using three-round transporter erector launchers.

→→Submarine-Launched Cruise Missiles (SLCM) (Less than 600 km)

P-800 Bolid Russian Supersonic Anti-Ship Cruise Missile



Tiers:

1 2 3 4

Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

System

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↳***System***

Name: P-800 Bolid
Type: Supersonic Anti-Ship Cruise Missile
Manufacturer: NPO Mashinostroyeniya
Length: 8.9 m
Diameter: 0.7 m
Weight: 3,000 kg
Wingspan: 1.7 m
Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE
Detonation Mechanism: delay fuze
Engine: Ramjet 4 tons of thrust
Propellant: kerosene liquid fuel
Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi)

depending on altitude (Yakhont export version)

Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

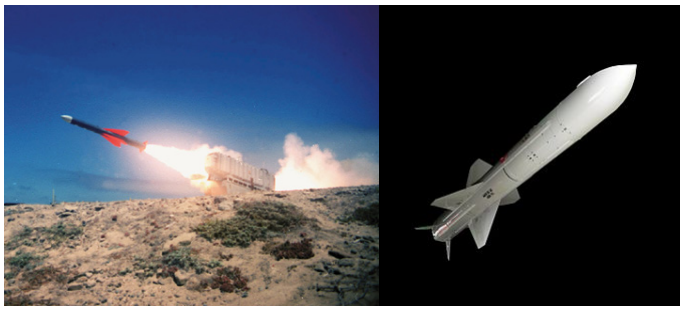
Accuracy: m1.5

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

Notes:

P-800 Bolid - Submarine-launched Version of theP-800 Oniks The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile". Development officially started in 1983, and in the 1990s the anti-ship missile was tested on the Project 1234.7 ship. In 2002 the missile passed the whole range of trials and was commissioned. It is reportedly a replacement of the P-270 Moskit, but possibly also of the P-700 Granit. The P-800 was used as the basis for the joint Russian-Indian supersonic missile BrahMos. The missile is carried in flight by aerodynamic lift. The solid-propellant booster is located in the ramjet's combustion chamber and is ejected by the airflow after it has burned out. Advantages *Over-the-horizon firing range *Full autonomy of combat use ("fire and forget") *A set of flexible ("low-profile sea-skimming", "high-low") trajectories *High supersonic speed in all phases of flight *Full harmonization for a wide range of platforms (surface ships, submarines and land-based launchers) * Possible use of the missile in electronic countermeasures environment and under enemy fire

SM39 Exocet French Anti-Ship Cruise Missile



Tiers:



Variants:

- **MM38 (surface-launched):** deployed on warships. Range: 42 km. No longer produced (1970). A coast defence version known as "Excalibur" was developed in the United Kingdom and deployed in Gibraltar from 1985–1997.
- **AM38 (helicopter-launched:** tested only
- **AM39 (air-launched):** B2 Mod 2: deployed on 14 types of aircraft (combat jets, maritime patrol aircraft, helicopters). Range between 50 and 70 km, depending on the altitude and the speed of the launch aircraft.
- **SM39 (submarine-launched):** B2 Mod 2: deployed on submarines. The missile is housed inside a watertight launched capsule (VSM or véhicule Sous marin), which is fired by the submarine's torpedo-launch tubes. On leaving the water, the capsule is ejected and the missile's motor is ignited. It then behaves like an MM40. The missile will be fired at depth, which makes it particularly suitable for discreet submarine operations.
- **MM40 (surface-launched):** Block 1, Block 2 and Block 3: deployed on warships and in coastal batteries. Range: 72 km for the Block 2, in excess of 180 km for the Block 3.
- **MM40 Block 3:** In February 2004, the Délégation Générale pour l'Armement (DGA) notified MBDA of a contract for the design and production of a new missile, the MM40 Block 3. It has an improved range, in excess of 180 kilometres (97 nautical miles)—through the use of a turbojet engine, and includes four air intakes to provide continuous airflow to the power plant during high-G manoeuvres. The Block 3 missile accepts GPS guidance system waypoint commands, which allow it to attack naval targets from different angles and to strike land targets, giving it a marginal role as a land-attack missile. The Block 3 Exocet is lighter than the previous MM40 Block 2 Exocet.

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Name: SM 39 Exocet
Type: Anti-Ship Cruise Missile
Manufacturer: 1979–1999: Aérospatiale 1999–2001: Aérospatiale-Matra 2001–present: MBDA
Length: 5.80 m
Diameter: 348 mm
Wingspan: 1.14 m
Weight: 666 kg
Configuration: slim, pointed cylinder cruciform cropped and swept delta mainplanes indexed in-line with small

cruciform tail planes
Propulsion: 2 x SNPE double-base Nitramite smokeless solid-propellant rockets. 1 x Epervier booster with 2.4 sec burn. 1 x Eole V sustainer with 200-220 sec burn
Speed: 594 kt (684 mph; 1,100 km/h) or Mach 0.93
Maximum Range: 50 km
Minimum Range: 4 km
Peak Altitude: 50 m
Warhead: 363 lb. (165 kg) Hexolite blast fragmentation
Sensor and Fire Control: TRT AHV-7 radio altimeter inertial navigation during first part of flight Electronique Marcel Dassault ADAC or Super ADAC I/J-band active radar homing in terminal phase that begins search approx 5.4 nm (6.2 mi.; 10 km) from target's estimated position.

Notes:

The Exocet (French pronunciation: [ɛgzɔsɛ]; French for "flying fish") is a French-built anti-ship missile whose various versions can be launched from surface vessels, submarines, helicopters and fixed-wing aircraft. The Exocet is built by MBDA, a European missile company. Development began in 1967 by Nord as a ship-launched weapon named the MM 38. A few years later Aerospatiale and Nord merged. The basic body design was based on the Nord AS30 air-to-ground tactical missile. The air-launched Exocet was developed in 1974 and entered service with the French Navy five years later. The relatively compact missile is designed for attacking small- to medium-size warships (e.g., frigates, corvettes and destroyers), although multiple hits are effective against larger vessels, such as aircraft carriers. It is guided inertially in mid-flight and turns on active radar late in its flight to find and hit its target. As a countermeasure against air defence around the target, it maintains a very low altitude during ingress, staying one to two meters above the sea surface. Due to the effect of the radar horizon, this means that the target may not detect an incoming attack until the missile is only 6,000 m from impact. This leaves little time for reaction and stimulated the design of close-in weapon systems (CIWS). Its rocket motor, which is fuelled by solid propellant, gives the Exocet a maximum range of 70 kilometres (43 mi; 38 nmi). It was replaced on the Block 3 MM40 ship-launched version of the missile with a solid-propellant booster and a turbojet sustainer motor which extends the range of the missile to more than 180 kilometres (110 mi; 97 nmi). The submarine-launched version places the missile inside a launch capsule.

→→Multiple-Launch Platform Cruise Missiles (MLPCM) (Less than 600 km)

Brahmos Russian Medium-Range Ramjet Supersonic Cruise Missile






Tiers:

1 2 3 4

Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

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Name: P-800 Yakhont
Type: Supersonic Cruise Missile
Manufacturer: BrahMos Aerospace Limited
Type: The BrahMos (designated PJ-10) is a medium-range ramjet supersonic cruise missile that can be launched from submarine, ships, aircraft, or land. It is the fastest supersonic cruise missile in the world.
Length: 8.4 m
Diameter: 0.6 m
Weight: 3,000 kg (6,600 lb) 2,500 kg (5,500 lb) (air-launched)
Wingspan: 1.7 m

Warhead: 200 kg (440 lb) conventional semi-armour-piercing and nuclear 300 kg (660 lb) (air-launched) Both manufactured indigenously by the Indian Ordnance Factories

Detonation Mechanism: delay fuze

Engine: First stage: Solid rocket booster Second stage: Liquid ramjet Both manufactured by Ordnance Factory Board

Propellant: First stage: Solid fuel, Second stage: Liquid fuel

Operational Range: Surface/Sea Platform - 500 km (310 mi; 270 nmi) (original/export) To be upgraded to 600 km (370 mi; 320 nmi) Air Platform - 400 km (250 mi; 220 nmi)

Flight Ceiling: 15 km

Flight Altitude: Sea skimming, as low as 3–4 meters

Speed: Mach 3

Guidance System: Mid-course: Inertial navigation system Terminal: Active radar homing, GPS/GLONASS/GAGAN satellite guidance

Accuracy: m1

Launch Platform: Ship, submarine, aircraft, and land-based mobile launchers.

Notes:

The BrahMos (designated PJ-10) is a medium-range ramjet supersonic cruise missile that can be launched from submarine, ships, aircraft, or land. It is the fastest supersonic cruise missile in the world. It is a joint venture between the Russian Federation's NPO Mashinostroyeniya and India's Defence Research and Development Organisation (DRDO), who together have formed BrahMos Aerospace. It is based on the Russian P-800 Oniks cruise missile and other similar sea-skimming Russian cruise missile technology. The name BrahMos is a portmanteau formed from the names of two rivers, the Brahmaputra of India and the Moskva of Russia. It is the world's fastest anti-ship cruise missile in operation. The land-launched and ship-launched versions are already in service. An air-launched variant of BrahMos appeared in 2012 and entered service in 2019. A hypersonic version of the missile, BrahMos-II, is also presently under development with a speed of Mach 7-8 to boost aerial fast strike capability. It is expected to be ready for testing by 2020. India wanted the BrahMos to be based on a mid range cruise missile like the P-700 Granit. Its propulsion is based on the Russian missile, and missile guidance has been developed by BrahMos Aerospace. The missile is expected to reach a total order of US$13 billion. In 2016, as India became a member of the Missile Technology Control Regime (MTCR), India and Russia are now planning to jointly develop a new generation of Brahmos missiles with 600 km-plus range and an ability to hit protected targets with pinpoint accuracy. In 2019, India upgraded the missile with a new range of 500 km. Versions: Surface-launched, Block I *Ship-launched, anti-ship variant (operational) *Ship-launched, land-attack variant (operational) *Land-launched, land-attack variant (operational) *Land-launched, anti-ship variant (In induction, tested on 10 December 2010) Surface-launched, upgraded variants *BrahMos Block II land-attack variant (Operational) *BrahMos Block III land-variant (being inducted) *Anti-aircraft carrier variant (tested in March 2012) – the missile gained the capability to attack aircraft carriers using the supersonic vertical dive variant of the missile that could travel up to 290 km. Air-launched *Air-launched, anti-ship variant (In induction) *Air-launched, land-attack variant (In induction) Submarine-launched *Submarine-launched, anti-ship variant – Tested successfully for the first time from a submerged pontoon on 20 March 2013. *Submarine-launched, land-attack variant (under development, expected completion in 2011)

P-800 Yakhont Russian Supersonic Anti-Ship Cruise Missile




Tiers:



Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

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Alternate Name: The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting code name SS-N-26 "Strobile".
Type: Supersonic Anti-Ship Cruise Missile
Manufacturer: NPO Mashinostroyeniya
Length: 8.9 m
Diameter: 0.7 m
Weight: 3,000 kg
Wingspan: 1.7 m
Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE
Detonation Mechanism: delay fuze
Engine: Ramjet 4 tons of thrust
Propellant: kerosene liquid fuel
Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi)

depending on altitude (Yakhont export version)

Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

Accuracy: m1.5

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

Notes:

P-800 Yakhont – Export version of Oniks. The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile". Development officially started in 1983, and in the 1990s the anti-ship missile was tested on the Project 1234.7 ship. In 2002 the missile passed the whole range of trials and was commissioned. It is reportedly a replacement of the P-270 Moskit, but possibly also of the P-700 Granit. The P-800 was used as the basis for the joint Russian-Indian supersonic missile BrahMos. The missile is carried in flight by aerodynamic lift. The solid-propellant booster is located in the ramjet's combustion chamber and is ejected by the airflow after it has burned out. Advantages *Over-the-horizon firing range *Full autonomy of combat use ("fire and forget") *A set of flexible ("low-profile sea-skimming", "high-low") trajectories *High supersonic speed in all phases of flight *Full harmonization for a wide range of platforms (surface ships, submarines and land-based launchers) * Possible use of the missile in electronic countermeasures environment and under enemy fire

→Medium-Range Cruise Missiles (MRCM) (601 km - 1,000 km)

→→Ground-Launched Cruise Missiles (GLCM) (601 km - 1,000 km)

3M22 Tsirkon Russian Multi-Role Long Range Cruise Missile



Tiers:



System

Alternate Designation: 3M22, Zircon, Tsirkon, Cyrkon, SS-N-33

Maximum Effective Range: km1,000

Launch Platform: Submarines, surface ships

Dimensions

Length: m10

Warhead Weight: kg300-400

Propulsion Characteristics

Engine: Two-stage: solid fuel in the first stage, scramjet motor in the second

Propellant: Solid

Speed: Up to Mach 9

Fire Control

Note:: Reports indicate that the 3M22 can be remotely piloted, given a target based upon GPS data and can have that data changed while in flight.

Guidance System: Active and passive radar

Notes:

The 3M22 Zircon, also spelled Tsirkon (Russian: Циркон, NATO reporting name: SS-N-33) is a scramjet powered maneuvering anti-ship hypersonic cruise missile developed by Russia. Zircon is believed to be a maneuvering, winged hypersonic cruise missile with a lift-generating center body. A booster stage with solid-fuel engines accelerates it to supersonic speeds, after which a scramjet motor with liquid-fuel in the second stage accelerates it to hypersonic speeds. The missile represents a further development of the HELA (Hypersonic Experimental Flying Vehicle) developed by NPO Mashinostroyeniya that was on display at the 1995 MAKS air show. Zircon can travel at a speed of Mach 9. Such high speeds would likely create a cloud of plasma around the missile, absorbing any radio waves and making the missile virtually invisible to radars (plasma stealth). This has led to concerns that it could penetrate existing naval defense systems. Zircon exchanges information in flight and can be

controlled by commands if necessary. Zircon will be first deployed with the Kirov-class battlecruisers Admiral Nakhimov and Pyotr Velikiy after 2020. These ships will have their P-700 Granit anti-ship missiles replaced with the 3S-14 universal VLS cells capable of carrying the Oniks, Kalibr and Zircon missiles; each vessel is to be equipped with 72 such missiles. After completion of their refit, the ships could carry 40–80 anti-ship missiles of different types. Another platforms is to likely include Admiral Grigorovich class and Admiral Gorshkov-class frigates, as well as various guided missile corvettes of the Russian Navy, including Buyan class, Karakurt class or Gremyashchiy class, mainly due to the installation of the compatible 3S-14 vertical launchers. In November 2017, Colonel General Viktor Bondarev revealed the Zircon missile was already in service with the Russian Armed Forces. On 20 February 2019, Russian President Vladimir Putin stated the missile is capable to accelerate up to Mach 9 and destroy both sea-going and land targets within 1,000 km (540 nmi; 620 mi) distance. Reports suggest that after the fielding of the 3M22 to naval forces, production of a lighter version of the Tsirkon will be developed to be deployed from strategic bombers. US reports state that the most likely bomber to carry the airborne version of the 3M22 will be the Tupolev Tu-160/M/M2 "Blackjack"

→→Air-Launched Cruise Missiles (ALCM) (601 km - 1,000 km)

→→Vessel-Launched Cruise Missiles (VLCM) (601 km - 1,000 km)

3M54T (SS-N-27 Sizzler) Russian Anti-Shipping Cruise Missile




Tiers:



Variants:

- **3M54K:** 3M54K: A submarine-launched anti-shipping variant deployed by the Russian Navy. Its length is 8.22 m (27.0 ft), with a 200 kg (440 lb) warhead. Its range is 440–660 km (270–410 mi). It is a Sea-skimmer with a final stage flight altitude of 4.6 metres (15 ft) and a supersonic terminal speed of Mach 2.9 (3,550 km/h; 2,210 mph).
- **3M54T:** 3M54T An anti-shipping variant deployed by the Russian Navy on surface ships. It is launched with a VLS, has a Thrust vectoring booster, and is 8.9 m (29 ft) long. Its warhead weight and other performances are the same as the 3M-54K.
- **3M14K (SS-N-30A):** 3M14K (SS-N-30A) An inertial guidance land attack variant deployed by the Russian Navy. The submarine-launched weapon has a basic length of 6.2 m (20 ft), with a 450 kg (990 lb) warhead. Its range is 2,500 km (1,600 mi), allowing the Russian Navy to strike targets throughout central Western Europe (including all of the UK, northern France including Paris, and most of Germany) from beyond the GIUK gap. Its subsonic terminal speed is Mach 0.8.
- **3M14T:** 3M14T is the inertial guidance land attack variant which is deployed by the Russian Navy. A surface ship with VLS launched missile, with thrust vectoring booster, its basic length is 8.9 m (29 ft), its warhead weight and other performance are the same as the 3M14K. Russia fired 26 3M14T cruise missiles from four surface ships in the Caspian Sea against 11 targets in Syria on 7 October 2015.
- **Kalibr-M:** Kalibr-M is a new version of Kalibr with larger warhead and extended range to 4,500 km. The ship, submarine, air, and land-launched versions are in development.

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Name: 3M54T An anti-shipping variant deployed by the Russian Navy on surface ships. It is launched with a VLS, has a Thrust vectoring booster, and is 8.9 m (29 ft) long. Its warhead weight and other performances are the same as the 3M-54K.
Type: Anti-Ship Cruise Missile
Manufacturer: Novator Design Bureau, KTRV, MKB Fakel, NPO Mash, Raduga, NPO Zvezda Strela (Orenburg)
Length: Varies on variant, from 6.2 m to 8.9 m

Diameter: 0.533 m

Warhead: 400-500 kg HE or thermonuclear

Weight: Varies on variant, from 1,300 kg-1780 kg-2300 kg

Engine: Multi-stage solid-fuel rocket, turbojet engine for 3M-54/E/TE/E1/TE1, -14/E/TE, solid fuel rocket for 91RE1/RTE2

Operational Range: 91RE1: 50 km 3M-54E (export version): 220 km 3M-54E1/3M-14E (export version): 300 km 3M-54/3M-54T: 660 km 3M-14/3M-14T: 1,500-2,500 km Kalibr-M: 4,500 km

Flight Ceiling: 1,000 m

Flight Altitude: 50-150 m AGL 20 m over water

Speed: 0.8-2.5-2.9 Mach

Guidance System: Inertial guidance plus terminal Active radar homing, By satellites, DSMAC

Accuracy: 3 m (Club-S/Kalibr-PL)

Launch Platforms: naval ships, submarines, containers, airplanes, TEL

Notes:

3M54T An anti-shipping variant deployed by the Russian Navy on surface ships. It is launched with a VLS, has a Thrust vectoring booster, and is 8.9 m (29 ft) long. Its warhead weight and other performances are the same as the 3M-54K. The 3M-54 Kalibr, (Калибр, caliber), also referred to it as 3M54-1 Kalibr, 3M14 Biryuza (Бирюза, turqoise), (NATO codenames SS-N-27 Sizzler and SS-N-30A), 91R1, 91RT2 is a group of Russian surface ship-, submarine-launched and airborne anti-ship and coastal anti ship (AShM), land attack cruise missiles (LACM) and anti-submarine missiles developed by the Novator Design Bureau (OKB-8). Derived export versions are the 3M54E, 3M54E1, 3M14E, 91RE1, 91RTE2. The 3M54T, 3M54K, 3M54A, 3M54E (3M54TE), 3M54KE and 3M54AE have a second stage that performs a supersonic sprint in the terminal approach to the target, reducing the time that target's defense systems have to react. The 3M54T1, 3M54K1, 3M54A1, 3M54E1 (3M54T/K/AE1) only travels at subsonic speeds, although its range is accordingly greater than those of the supersonic versions. Club is the designation used for the export versions. The missile is a modular system with five versions: two anti-shipping types, one for land attack and two anti-submarine types. The missile is designed to share common parts between the surface and submarine-launched variants but each missile consists of different components, for example, the booster. The missile can be launched from a surface ship using a Vertical Launch System (VLS). It has a booster with thrust vectoring capability. The missile launched from a submarine torpedo tube has no need for such an addition but has a conventional booster instead. The air launched version is held in a container that is dropped as the missile launches, detaching from the container. Kalibr land attack versions in use by Russia have various claimed maximum ranges. The U.S. Department of Defense estimates its range at 1,400 km (870 mi), and Russian Defence Minister Sergei Shoigu put its range at "almost 1,500 km (930 mi)." Following its first operational firing in October 2015, Russian Ministry of Defence statements suggested a range of 2,000 km (1,200 mi), while a December 2015 Office of Naval Intelligence report gathered a number of Russian statements projecting ranges between 1,500-2,500 km (1,600 mi). Discrepancies in range values may be attributed to political declarations for strategic effect, or potentially longer 2,500 km-range claims could be associated with a thermonuclear armed variant while shorter 1,500 km-range estimates are for the conventionally armed missile. The Russian domestic variant (3M54T / 3M54K) and export variants (3M54TE/3M54KE) fly at sub-sonic speeds while achieving supersonic speed as they near their target. They are also capable of performing very high angled defensive high speed maneuvers in contrast to the common linear flight path of other anti-ship cruise missiles.

→→Submarine-Launched Cruise Missiles (SLCM) (601 km - 1,000 km)

3M54K (SS-N-27 Sizzler) Russian Land Attack Cruise Missile



Tiers:



Variants:

- **3M54K:** 3M54K: A submarine-launched anti-shipping variant deployed by the Russian Navy. Its length is 8.22 m (27.0 ft), with a 200 kg (440 lb) warhead. Its range is 440–660 km (270–410 mi). It is a Sea-skimmer with a final stage flight altitude of 4.6 metres (15 ft) and a supersonic terminal speed of Mach 2.9 (3,550 km/h; 2,210 mph).
- **3M54T:** 3M54T An anti-shipping variant deployed by the Russian Navy on surface ships. It is launched with a VLS, has a Thrust vectoring booster, and is 8.9 m (29 ft) long. Its warhead weight and other performances are the same as the 3M-54K.
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- **3M14T:** 3M14T is the inertial guidance land attack variant which is deployed by the Russian Navy. A surface ship with VLS launched missile, with thrust vectoring booster, its basic length is 8.9 m (29 ft), its warhead weight and other performance are the same as the 3M14K. Russia fired 26 3M14T cruise missiles from four surface ships in the Caspian Sea against 11 targets in Syria on 7 October 2015.
- **Kalibr-M:** Kalibr-M is a new version of Kalibr with larger warhead and extended range to 4,500 km. The ship, submarine, air, and land-launched versions are in development.

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Name: 3M54K (SS-N-27 Sizzler) Russian Land Attack Cruise Missile
Type: Anti-Ship Cruise Missile
Manufacturer: Novator Design Bureau, KTRV, MKB Fakel, NPO Mash, Raduga, NPO Zvezda Strela (Orenburg)
Length: Varies on variant, from 6.2 m to 8.9 m
Diameter: 0.533 m
Warhead: 400-500 kg HE or thermonuclear
Weight: Varies on variant, from 1,300 kg-1780 kg-2300 kg

Engine: Multi-stage solid-fuel rocket, turbojet engine for 3M-54/E/TE/E1/TE1, -14/E/TE, solid fuel rocket for 91RE1/RTE2
Operational Range: 91RE1: 50 km 3M-54E (export version): 220 km 3M-54E1/3M-14E (export version): 300 km 3M-54/3M-54T: 660 km 3M-14/3M-14T: 1,500-2,500 km Kalibr-M: 4,500 km
Flight Ceiling: 1,000 m
Flight Altitude: 50-150 m AGL 20 m over water
Speed: 0.8-2.5-2.9 Mach
Guidance System: Inertial guidance plus terminal Active radar homing, By satellites, DSMAC
Accuracy: 3 m (Club-S/Kalibr-PL)
Launch Platforms: naval ships, submarines, containers, airplanes, TEL

Notes:

3M54K: A submarine-launched anti-shipping variant deployed by the Russian Navy. Its length is 8.22 m (27.0 ft), with a 200 kg (440 lb) warhead. Its range is 440–660 km (270–410 mi). It is a Sea-skimmer with a final stage flight altitude of 4.6 metres (15 ft) and a supersonic terminal speed of Mach 2.9 (3,550 km/h; 2,210 mph). The 3M-54 Kalibr, (Калибр, caliber), also referred to it as 3M54-1 Kalibr, 3M14 Biryuza (Бирюза, turqoise), (NATO codenames SS-N-27 Sizzler and SS-N-30A), 91R1, 91RT2 is a group of Russian surface ship-, submarine-launched and airborne anti-ship and coastal anti ship (AShM), land attack cruise missiles (LACM) and anti-submarine missiles developed by the Novator Design Bureau (OKB-8). Derived export versions are the 3M54E, 3M54E1, 3M14E, 91RE1, 91RTE2. The 3M54T, 3M54K, 3M54A, 3M54E (3M54TE), 3M54KE and 3M54AE have a second stage that performs a supersonic sprint in the terminal approach to the target, reducing the time that target's defense systems have to react. The 3M54T1, 3M54K1, 3M54A1, 3M54E1 (3M54T/K/AE1) only travels at subsonic speeds, although its range is accordingly greater than those of the supersonic versions. Club is the designation used for the export versions. The missile is a modular system with five versions: two anti-shipping types, one for land attack and two anti-submarine types. The missile is designed to share common parts between the surface and submarine-launched variants but each missile consists of different components, for example, the booster. The missile can be launched from a surface ship using a Vertical Launch System (VLS). It has a booster with thrust vectoring capability. The missile launched from a submarine torpedo tube has no need for such an addition but has a conventional booster instead. The air launched version is held in a container that is dropped as the missile launches, detaching from the container. Kalibr land attack versions in use by Russia have various claimed maximum ranges. The U.S. Department of Defense estimates its range at 1,400 km (870 mi), and Russian Defence Minister Sergei Shoigu put its range at "almost 1,500 km (930 mi)." Following its first operational firing in October 2015, Russian Ministry of Defence statements suggested a range of 2,000 km (1,200 mi), while a December 2015 Office of Naval Intelligence report gathered a number of Russian statements projecting ranges between 1,500-2,500 km (1,600 mi). Discrepancies in range values may be attributed to political declarations for strategic effect, or potentially longer 2,500 km-range claims could be associated with a thermonuclear armed variant while shorter 1,500 km-range estimates are for the conventionally armed missile. The Russian domestic variant (3M54T / 3M54K) and export variants (3M54TE/3M54KE) fly at sub-sonic speeds while achieving supersonic speed as they near their target. They are also capable of performing very high angled defensive high speed maneuvers in contrast to the common linear flight path of other anti-ship cruise missiles.

P-1000 Vulkan Russian Supersonic Cruise Missile





Tiers:



Variants:

- **P-500 Bazalt:** The P-500 Bazalt (Russian: П-500 «Базальт»; English: basalt) is a turbojet-powered, supersonic cruise missile used by the Soviet and Russian navies. Its GRAU designation is 4K80[2] and its NATO reporting name is SS-N-12 Sandbox, modern version is P-1000 Vulkan AShM SLCM.

P-1000 Vulkan Cruise Missile

↳*System*

Name: P-1000 Vulkan
Type: Cruise Missile
Basic Load: 16 x Missiles (8 x 2) P-1000 Vulcan (SS-N-12 Sandbox) anti-ship missiles
Manufactuer: P.A. Strela
Length: 11.7 m
Diameter: 0.88 m
Wingspan: 2.6 meters
Weight: 2 tons
Warhead: High explosive or nuclear
Warhead Weight: 1,000 kg
Blast Yield: 350 kt
Engine: Turbojet
Operational Range: 800 km
Flight Altitude: 50–5,000 m

Speed: Mach 2.5

Guidance System: Semi-active radar homing, terminal active radar homing

Launch Platform: Echo II & Juliett-class submarines Kiev-class aircraft carrier & Slava-class cruiser.

Notes:

An improved version of the P-500 was installed on three Echo II submarines towards the end of the Cold War. The P-1000 Vulkan (GRAU 3M70) presumably has the same firing range and maximum speed with the P-500 Bazalt (range 800 km). The missile weight was increased by 1–2 tons. The missile has a turbojet engine and a starting powder accelerator. High-altitude flight regimes are presumably the same as that of P-500. The P-1000 was ordered on 15 May 1979 from NPO Mashinostroyeniya Chelomey; it first flew in July 1982 and was accepted for service on 18 December 1987. It was installed on three Echo II submarines of the Northern Fleet between 1987 and 1993; the conversion of two units of the Pacific Fleet, the K-10 and K-34, was abandoned due to lack of funds. Of the submarines that did receive the P-1000, the K-1 was decommissioned after a reactor accident in 1989, the K-35 was stricken in 1993 and the K-22 in 1995.The P-1000 has been installed on the Slava class cruiser Varyag, and some sources report P-1000 missiles on her sister ship Moskva. The P-500 Bazalt (Russian: П-500 «Базальт»; English: basalt) is a turbojet-powered, supersonic cruise missile used by the Soviet and Russian navies. Its GRAU designation is 4K80 and its NATO reporting name is SS-N-12 Sandbox, modern version is P-1000 Vulkan AShM SLCM. The P-500 Bazalt has a 550 km range and a payload of 1,000 kg, which allows it to carry a 350 kt nuclear or a 950 kg semi-armor-piercing high-explosive warhead. The P-500 Bazalt uses active radar homing for terminal guidance, and can receive mid-course correction from the Tupolev Tu-95RTs Bear D, the Kamov Ka-25K Hormone B and the Kamov Ka-31. The missiles were intended to be used in salvos; a submarine could launch eight in rapid succession, maintaining control of each through a separate datalink. In flight the group could co-ordinate their actions; one would fly to a higher altitude and use its active radar to search for targets, forwarding this data to the other missiles which remained at low altitude. The missiles were programmed so that half of a salvo would head for a carrier target, with the rest dividing between other ships. If the high-flying missile was shot down, another from the salvo would automatically pop up to take its place. All of the missiles would switch to active radar for the terminal phase of the attack.

→→Multiple-Launch Platform Cruise Missiles (MLPCM) (601 km - 1,000 km)

Oniks-M Russian Supersonic Cruise Missile

Tiers:



Variants:

- **3M55 Oniks:** Base version for Russia.
- **P-800 Yakhont:** Export version of Oniks.
- **P-800 Bolid:** Submarine-launched version of Yakhont.
- **Brahmos:** Co-developed by Russia and India, based on Oniks, produced by BrahMos Aerospace Private Limited in India. BrahMos-II, a hypersonic version is also being developed.
- **Bastion-P:** Coast mobile missile system. Officially it entered service in 2015.
- **Kh-61:** Air launched air to surface version.
- **Oniks-M:** version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities

System

:
:
:

↳***System***

Name: Oniks-M
Type: Supersonic Anti-Ship Cruise Missile
Manufacturer: NPO Mashinostroyeniya
Length: 8.9 m
Diameter: 0.7 m
Weight: 3,000 kg
Wingspan: 1.7 m
Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE
Detonation Mechanism: delay fuze
Engine: Ramjet 4 tons of thrust
Propellant: kerosene liquid fuel
Operational Range: km800
Flight Ceiling: 14,000 m
Flight Altitude: 10 meters or higher
Speed: Mach 2
Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head
Accuracy: m1.5

ECCM Capable: Yes

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

Notes:

Oniks-M - version of Oniks with improved range (up to 800 km), accuracy and ECCM capabilities. The P-800 Oniks (Russian: П-800 Оникс; English: Onyx), also known in export markets as Yakhont (Russian: Яхонт; English: ruby), is a Soviet / Russian supersonic anti-ship cruise missile developed by NPO Mashinostroyeniya as a ramjet version of P-80 Zubr. Its GRAU designation is 3M55, the air launched Kh-61 variant also exists. The missile has the NATO reporting codename SS-N-26 "Strobile". Development officially started in 1983, and in the 1990s the anti-ship missile was tested on the Project 1234.7 ship. In 2002 the missile passed the whole range of trials and was commissioned. It is reportedly a replacement of the P-270 Moskit, but possibly also of the P-700 Granit. The P-800 was used as the basis for the joint Russian-Indian supersonic missile BrahMos. The missile is carried in flight by aerodynamic lift. The solid-propellant booster is located in the ramjet's combustion chamber and is ejected by the airflow after it has burned out. Advantages *Over-the-horizon firing range *Full autonomy of combat use ("fire and forget") *A set of flexible ("low-profile sea-skimming", "high-low") trajectories *High supersonic speed in all phases of flight *Full harmonization for a wide range of platforms (surface ships, submarines and land-based launchers) * Possible use of the missile in electronic countermeasures environment and under enemy fire

→Long-Range Cruise Missiles (LRCM) (More than 1,000 km)

→→Ground-Launched Cruise Missiles (GLCM) (More than 1,000 km)

9M730 Burevestnik (Storm Petrel) Russian Nuclear Powered Cruise Missile



Tiers:

1 2 3 4

System

Alternate Designation: KY30, SSC-X-9, “Skyfall.”

Maximum Effective Range: Unlimited

Launch Platform: INA

Warhead Type: Nuclear

MIRV: INA

Circular Error Probability: INA

Dimensions

Length: INA

Warhead Weight: INA

Missile Weight: INA

Diameter: INA

Fin Span: INA

Propulsion Characteristics

Engine: Nuclear reactor

Propellant: Nuclear

Speed: INA

Flight Ceiling: INA

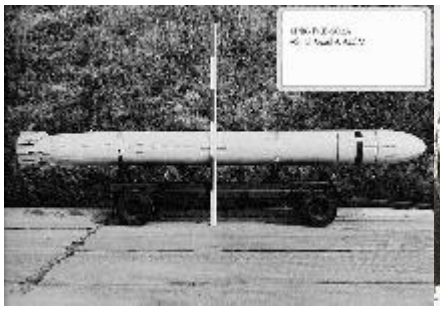
Fire Control

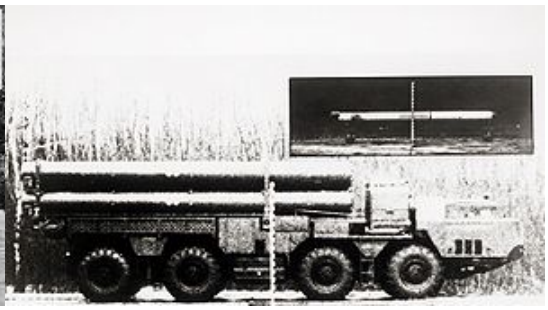
Guidance System: INA

Notes:

The 9M730 Burevestnik (Russian: Буревестник; "Storm Petrel", NATO reporting name: SSC-X-9 Skyfall) is a Russian experimental nuclear-powered, nuclear-armed cruise missile under development for the Russian Armed Forces. The missile is claimed to have virtually unlimited range. This type of weapon flies under the ballistic weapon shield and can stay airborne for days to avoid missile defenses and is part of President Putin's broader program to attempt to re-balance his nuclear strike capability. The Russian defense industry began developing an intercontinental-range nuclear-powered cruise missile capable of penetrating any interceptor-based missile defense system. It is said to have unlimited range and ability to dodge missile defenses. A major stage of trials of the cruise missile of the Burevestnik complex, the tests of the nuclear power unit, were successfully completed in January 2019. Many skeptics say that the technology to produce such a weapon without littering the earth from launch site to impact site with radioactive material is still far away.

SS-N-21 Sampson (RK-55) Russian Multi-Role Long Range Cruise Missile





Tiers:



Variants:

- **Kh-55 (AS-15 'Kent'):** Air launched version
- **Kh-65:** A tactical modification of the strategic Kh-55. According to the first available information (1992 Moscow Air Show), its range was to be 500-600km. According to terms of the SALT-2 Treaty, any aircraft carrying missiles with a range longer than 600 km will be regarded as a strategic one and the number of such aircraft is strictly limited. A full-sized version of the Kh-65SE was displayed for the first time in 1993 (Abu Dabi, then 1993 in Zhukovskiy and Nizhniy Novgorod). The missiles shown at the exhibitions did not differ from the earlier versions except for their range, quoted as 250km when launched from low altitude and 280km when launched from high altitude. The Kh-65 was intended for use against large targets with a larger than 300m2 effective reflecting surface area, particularly warships, under conditions of strong electronic interference. It approaches the target guided by an inertial navigation system while flying at a low altitude. Having reached the region where the target is located, it rises to a higher altitude and its active-radar target seeking system turns on.

System

Alternate Designation: RK-55, 3M10, Granat, SSC-X-4, Slingshot, 3K10, SS-CX-7/SS-CX-8

Launch Platform(s): Submarines: Victor 3 (Project 671RTM), Akula 1/2 (Project 971), Sierra 1/2 (Project 945), Yankee Notch (Project 667AR/AT), and possibly Delta 1/2/3 class submarines; TEL based on the MAZ 543*

Basing: Submarine-launched, Ground launched from a TEL*

Effective Range: 2,400 km (submarine launch), 3,000 (ground launch)*

Circular Error Probability: m150

Class: Subsonic cruise missile

* **Note:** All ground launch versions of the RK-55 were to be destroyed within 3 years of the signing of the INF.

Dimensions

Length: m8.09

Missile Weight: kg1,700

Diameter: m.51

Fin Span: m3.1

Payload

Warhead Type: Single

Warhead Options: Conventional and Nuclear

Nuclear Yield: kT200

Conventional Warhead Weight: kg410

Conventional Warheads Available: HE

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Propulsion Characteristics

Engine: R95-300 Turbofan

Propellant: Solid

Speed: km/h720

Flight Ceiling: INA

Attack Altitude: INA

Fire Control

Guidance System: Sprut inertial guidance plus TERCOM

Notes:

The RK-55 is the submarine/ground-launched component of the “55” series of cruise missiles which also included the Kh-55 air-launched missile. This family of cruise missiles was the Soviet Union’s response to the U.S. Tomahawk series. The ground-launched variant was dismantled and destroyed due to the signing of the 1987 INF Treaty.

Kh-47M2 Kinzhal (Dagger) Russian Cruise Missile





Tiers:

1 **2** 3 4

System

Alternate Designation: Dagger, Kinzhal

Maximum Effective Range: 2,000km when launched from the MiG-31B; 3,000km when launched from the Tu-22M3)

Launch Platform: MiG-31B aircraft (estimated 10 aircraft are capable of deploying the Kh-47M2); Tu-22M3

Warhead Type: Nuclear (100-500kT) / Conventional (HE-Frag)

MIRV: No

Circular Error Probability: m20

Dimensions

Length: m8

Warhead Weight: kg500

Missile Weight: kg4,400

Diameter: m1

Fin Span: m1.5

Propulsion Characteristics

Engine: INA

Propellant: Solid

Speed: Mach 10

Flight Ceiling: km20

Fire Control

Guidance System: Inertial guidance and satellite navigation with a terminal seeker; remote control and optical homing system

Notes:

The Kh-47M2 Kinzhal (Dagger) entered service in December 2017, is a Russian, nuclear-capable, air-launched, ballistic missile (ALBM). It has a claimed range of more than 2,000 km (1,200 mi), Mach 10 speed, and an ability to perform evasive maneuvers at every stage of its flight. It can carry both conventional and nuclear warheads and can be launched from MiG-31K interceptors

Tu-22M3 bombers. It has been deployed at airbases in Russia's Southern Military District. The missile is designed to target US and NATO warships posing a threat to strategic missile systems in Russia’s European region. It has an additional task of destroying NATO missile defense systems, ballistic missile defense ships, and land objects close to Russia borders. It is allegedly designed to overcome any known or planned US air or missile defense systems including MIM-104 Patriot, Terminal High Altitude Area Defense and Aegis Combat System. The missile first stage is probably shared with 9K720 Iskander and the guidance section is specifically designed for this missile. The missile accelerates to hypersonic speed within seconds of launch and, as mentioned, performs maneuvers at all stages of the flight trajectory to evade enemy missile defenses. Russian media claims the missile's range is 2,000 kilometres (1,200 mi; 1,100 nmi) when carried by the MiG-31K and 3,000 kilometres (1,900 mi; 1,600 nmi) when carried by the Tu-22M3.

SS-N-30A (3M-14 Kalibr) Russian Multi-Role Long Range Cruise Missile





Tiers:



Variants:

- **3M-54T Kalibr-NK:** Export version with a 300km range.
- **3M-14K Kalibr-PL:** The 3M-14K Kalibr-PL is similar to the 3M-14T except that is launched from a submarine. This variant was reported to have been launched from an improved Kilo-class submarine in the Mediterranean to strike targets inside Syria in December 2015.

System

Alternate Designation: 3M-54, Kalibr

Date of Introduction: 2015

Class: Sea-launched Land Attack Cruise Missile

Basing: Ship, Submarine

Launch Platforms: Kalibr-PL (sub-surface ships) – Kilo, Lada, Akula, Yasen, Borei class submarines; Kalibr-NK (surface ships) – Admiral Gorshkov, Admiral Grigorovich, Gepard, Gremyashchy, second batch of Steregushchy, and Buyan-M class ships

Effective Range: km2,500

Circular Error Probability: m3

Transporter-Erector-Launcher: NA

Dimensions

Length: m6.2

Missile Weight: kg1,300

Diameter: m.533

Fin Span: INA

Payload

Warhead Type: Single

Warhead Options: HE, possibly nuclear capable

Nuclear Yield: INA

Conventional Warhead Weight: kg450

Conventional Warheads Available: HE

Multiple Independent Reentry Vehicle (MIRV) Capable: Yes, 1, yield unknown

Propulsion Characteristics

Engine: Turbojet

Stages: 2

Propellant: 1st stage liquid-fuel booster; 2nd stage solid-fuel, turbojet engine

Speed: km/h965

Flight Ceiling: m1,000

Attack Altitude: 20m over sea; 50m over ground

Fire Control

Guidance System: Inertial; TERCOM; GLONASS GPS; Terminal-Phase Active Radar Seeker

Notes:

Kalibr cruise missiles are believed to be the land-attack version the Klub (Club) family. Although commonly referred to as the Kalibr cruise missile in media reports, the SS-N-30A is in fact just one part of the larger Kalibr family of Russian sea-launched missiles, which includes the SS-N-27 (Sizzler) anti-ship cruise missile and the 91R anti-submarine missile. All three Kalibr missiles share common Kalibr vertical launch system (VLS) tubes, which are quickly becoming a mainstay of the Russian Navy’s cruise missile launch capabilities. Russia plans to equip most of its submarines and surface ships with the respective versions of the Klub anti-ship and Kalibr land-attack cruise missiles. Novator Design Bureau, the designers of the Klub launch system, have developed a shipping container version of the launcher, capable of holding up to four missiles. This shipping container version allows the cruise missile to be forward deployed on ships, trucks, and trains without detection.

Kh-101 / Kh-102 Russian Air Launched Cruise Missile







Tiers:



System

Alternate Designation: NA
Class: Air Launched Cruise Missile
Effective Range: 5,000km (a source said that the range could be as high as 10,000km)
Circular Error Probability: m6
Basing: Tu-160 "Blackjack" (12 missiles), Tu-22M3/5 "Backfire" C (4 missiles), Tu-95M16 "Bear-H" (8 missiles), and Su-27IB (INA), Su-34 (2 missiles)

Dimensions

Length: m7.45
Missile Weight: kg2,400
Diameter: m.5
Fin Span: mINA

Payload

Warhead Options: Conventional and Nuclear
Warhead Type: Kh-101 = Conventional; Kh-102 = Nuclear
Warhead Weight: kg450
Nuclear Yield: mT250
Conventional Warhead Weight: kg400
Conventional Warheads Available: HE, Fragmentation, Submunitions

Propulsion Characteristics

Engine: TRDD-50A Turbofan
Propellant: INA
Speed: km/h900
Flight Ceiling: m6,000
Minimum Flight Altitude: m30
Cruise Altitude: 30-70m above the ground
Endurance: hours10

Fire Control

Guidance System: Inertial, Electro-optical correction, GLONASS satellite navigation, and IR TV terminal guidance
Note:: For inflight course correction, the missile uses a pre-loaded map in its onboard computer to perform terrain comparison.

Notes:

The Kh-101 / Kh-102 Raduga is a new line of conventional and nuclear capable air-launched cruise missiles (ALCM) developed and deployed by Russia. A stealthy missile, the Kh-101 / Kh-102 is designed to defeat air defense systems by flying low and hugging the terrain to avoid their radar systems. The Kh-101 is the conventional warhead version while the Kh-102 is the nuclear capable version of the Raduga. The missile also has radar absorbing capabilities which make it difficult to detect. It boasts a radar cross section of .01 square meters. The missile has no booster engine and therefore, relied on the altitude of its launch aircraft to assist it in reaching attack speed. The altitude window is 3,000m to 12,000m flying at a speed of 900km/h.

SSC-8 (9M729) Russian Multi-Role Long Range Cruise Missile







Tiers:

1 2 3 4

System

Alternate Designation: SSC-X-8
Class: Ground Launched Cruise Missile
Effective Range: km50-2,500
Launch Platform: Ground Launched
Circular Error Probability: m5
Basing: Road mobile, likely via YaMZ-846 diesel
Transporter-Erector-Launcher: Likely the 9P701
Note: The launcher vehicle of the SSC-8 can carry at four 9M728 or 9M729 missiles.

Dimensions

Length: m8
Missile Weight: kg2,300
Diameter: m.5
Fin Span: m3

Payload

Missile Name: 9M729 (R-500 and is known in the West as SSC-7).
Warhead Type: Single Warhead
Warhead Options: Conventional and Nuclear

Warhead Weight: 400-500KG

Maximum Range: km480

Conventional Warhead Weight: kg500

Conventional Warheads Available: HE, Cluster munitions, Fuel-air explosive, Bunker buster

MIRV and Yield: No MIRV capability / Low-yield (N/A)

Nuclear Warhead Yield: This missile was designed to carry a low-yield nuclear warhead. It could have a yield of around 10-50 kT.

Guidance System: GLONASS satellite navigation system

Accuracy: m5

Targets: This missile can destroy important enemy targets, such as concentrations of troops and armored vehicles, air defense batteries, supply depots, industrial installations, airfields, command centers and so on.

Note: Some sources report that the 9M729 potentially might have a range of around 2 000-2 500 km. There are even assessments that this missile could actually have a range of up to 5 500 km. Russian officials have long said they could extend the reach of their Iskander systems with little difficulty.

Propulsion Characteristics

Engine: 1 stage

Propellant: Solid

Speed: INA

Flight Ceiling: INA

Fire Control

Guidance System: GLONASS satellite navigation system, produced by GosNIPP

Notes:

The SSC-8 is a Russian ground-launched cruise missile labeled a "missile of concern" by the US after being test launched from a road-mobile launcher in violation of the Intermediate-Range Nuclear Forces (INF) Treaty. Moscow claims the missile is fully compliant with the INF. The missile is likely a ground-launched variant of the Russian Navy's 3M-54 Kalibr missile (NATO: SS-N-27 "Sizzler") or another version of the Iskander-K or Kh-101. It is estimated that the Russians have fielded two battalions of SSC-8s. Each battalion has four launchers and each launcher has six missiles. Experts believe that there are less that 100 missiles that have been produced as of Dec, 2018. The missile is likely a ground-launched variant of the Russian Navy’s 3M-54 Kalibr missile (NATO: SS-N-27 Sizzler). It has also been reported as a modified version of the Iskander-K or Kh-101. It was originally designated in U.S. reports as the SSC-X-8, but officials removed the “X” when it transitioned from an experimental to operational weapon.6 The missile was developed by Russian company NPO Novator.

Kh-55 Russian Multi-Role Long Range Cruise Missile



Tiers:



Variants:

- **Kh-555:** A conventional variant of the Kh-55. The nuclear warhead has been replaced by a 400kg unitary HE, penetration HE, or submunitions warhead. Other notable changes include the following: Larger conformal fuel tanks (compared to the Kh-55SM), reduced radar cross-section, improved accuracy, increased range, 3,500 km.
- **Kh-65SE and Kh-SD:** The Kh-65SE is a conventional version designed for export, although no exports have been documented. It is capable of carrying a 410kg HE warhead 600km. 1995, a similar missile called the Kh-SD was reported. This missile would have fallen within the guidelines of the Missile Technology Control Regime due to its reduced range of 300km. Although, in 1999 the range was reportedly increased to 600km. Its exact status is unknown.
- **Kh-55SM:** An extended range version. To achieve the extra range, conformal fuel tanks are mounted on both sides of the fuselage. It also has a more powerful engine, producing 450 kg of thrust. Other differences include a slightly larger body diameter due to the fuel tanks, 0.77 m, an increased launch weight, 1,500 kg, and increased range, 3,000 km.
- **Kh-55OK:** Version with optical guidance.
- **Kh-BD:** A future cruise missile with a range of 3 000 km, or greater. In 2017 this missile was at the project stage. It is planned with conventional and nuclear warheads. It should be carried by modernized Tu-160M2 bombers.
- **Soumar:** Soumar is an unlicensed Iranian copy of the Kh-55. Unlike the original Kh-55, the Soumar is ground-launched. In 2001 Ukraine sold twelve Kh-55 missiles without nuclear warheads to Iran. Existence of the Soumar missile was revealed in 2015.
- **Meshkat / Hoveizeh:** Meshkat / Hoveizeh is a more recent Iranian missile based on the Kh-55, which is believed to have a range of 1,200km, an increased range over the Soumar. According to one source, the Iranians are having a difficult time developing a warhead for the cruise missile.
- **CJ-10:** CJ-10 is a Chinese land attack cruise missile, which is believed to be based on the Kh-55 technology. In 1995 production unit of the Kh-55 missiles was delivered to Shanghai and appears to have been used to produce similar cruise missiles in China. Other sources suggest that in 2000 Ukraine exported six Kh-55SM missiles to China.

System

Alternate Designation: X-55, RKV-500, AS-15, Kent, X-65C3, Kh-SD

Basing: Aircraft

Launch Platform(s): Tu-95 MS6 ‘Bear H6’ (6 or 16 depending on version), Tu-142M ‘Bear F’, Tu-95 MS16 ‘Bear H16’, Tu-160 ‘Blackjack’ (12 missiles), Su-34 'Fullback' (1 missile)

Effective Range: 3,500km

Circular Error Probability: m25

Class: Subsonic cruise missile

Dimensions

Length: m6.04

Missile Weight: kg1,210

Diameter: m.514

Fin Span: m3.1

Payload

Warhead Type: Single

Warhead Options: Conventional and Nuclear

Nuclear Yield: 200-250kT

Conventional Warhead Weight: kg410

Conventional Warheads Available: HE

Multiple Independently targetable Reentry Vehicle (MIRV) Capable: INA

Propulsion Characteristics

Engine: R95-300 Turbofan

Propellant: Jet fuel

Speed: Mach .75

Flight Ceiling: m12,000

Minimum Altitude: m40

Attack Altitude: 40m - 110m

Fire Control

Guidance System: Inertial guidance with Doppler radar/terrain map updates

Notes:

The Kh-55 (Russian: X-55, also known as RKV-500; NATO reporting name: AS-15 'Kent') is a Soviet/Russian subsonic air-launched cruise missile, designed by MKB Raduga. It has a range of up to 2,500 km (1,350 nmi) and can carry nuclear warheads. Kh-55 is launched exclusively from bomber aircraft

→→Air-Launched Cruise Missiles (ALCM) (More than 1,000 km)

→→Vessel-Launched Cruise Missiles (VLCM) (More than 1,000 km)

→→Submarine-Launched Cruise Missiles (SLCM) (More than 1,000 km)

Missile de Croisière Naval French Long-Range Cruise Missile





Tiers:



Variants:

- **Storm Shadow:** Low-observable air-launched cruise missile

Missile de Croisière Naval Long-Range Cruise Missile

↳***System***

Name: Missile de Croisière Naval
Type: Long-Range Cruise Missile
Manufacturer: MBDA
Length: 6.5 m
Diameter: 500 mm
Wingspan: 2.85 m
Engine: Microturbo
Effective Firing Range: >1,000 km (620 mi; 540 nmi
Speed: 800 km/h (500 mph; 430 kn; Mach 0.65)
Guidance System: inertial guidance, topographic (TERCOM/TERPROM), active radar homing and infrared guidance, GPS
Accuracy: Metric
Launch Platform: FREMM frigates Barracuda submarines Scorpène submarines

Notes:

MBDA developed a longer-range sea-launched variant for the French Navy, called Missile de Croisière Naval (MdCN standing for Naval Cruise Missile), to be deployed on FREMM multipurpose frigates from 2015, and on Barracuda-class submarines from 2018, using the A70 version of the Sylver launcher on the former and the 533 mm torpedo tubes on the latter. As the missile is

not launched from a plane, as is SCALP/Storm Shadow, a booster has been included. The submarine version is encapsulated in an hydrodynamic hard container which is ejected when the missile reaches the surface. To provide a comparable range to the BGM-109 Tomahawk, the range of the MdCN (well over 1000 km) is significantly larger than the SCALP/Storm Shadow. The smaller Scorpène-class submarines can also carry the MdCN missile. France originally ordered 50 MdCN for its FREMM frigates in 2006, delivery was expected in 2012. A further 100 surface-launched missiles were ordered in 2009, along with 50 for the planned Barracuda-class submarines. The €1.2bn (FY2011) project was to deliver 200 missiles at a unit cost of €2.48m, or €6m including development costs. MdCN first flight test from a vertical launcher took place on 28 May 2010 and its first submarine launch test took place on 8 June 2011. MdCN's first complete qualification firing took place on 9 July 2012 at the Biscarosse test range. During its third development firing, MdCN met all its test requirements perfectly including the validation of the terminal autonomously guided phase with IR target scenario reconnaissance, which provides the weapon with its exceptionally high precision. On 24 October 2012, MdCN was tested "end-to-end" in the submarine launch configuration for the first time, adjacent to the Île du Levant test centre. The MdCN entered service with FREMM frigates in February 2017. The MdCN was used in its first operational strike during the April 2018 bombing of Damascus and Homs against alleged Syrian chemical weapons production site, in coordination with the United States and United Kingdom, but without approval from the UN. In addition to nine Scalp EG missiles fired from French aircraft, the FREMM frigates Aquitaine, Provence, and Languedoc launched three MdCN missiles.

→→Multiple-Launch Platform Cruise Missiles (MLPCM) (More than 1,000 km)

Tomahawk American Land Attack Cruise Missile






Tiers:



Variants:

- **BGM-109A:** BGM-109A Tomahawk Land Attack Missile – Nuclear (TLAM-N) with a W80 nuclear warhead. Retired from service sometime between 2010 and 2013. Reports from early 2018 state that the U.S. Navy is considering (re)introducing a (yet unknown type of) nuclear-tipped cruise missile into service.
- **RGM/UGM-109B:** RGM/UGM-109B Tomahawk Anti-Ship Missile (TASM) – active radar homing anti-ship missile variant; withdrawn from service in 1994 and converted to Block IV version.
- **BGM-109C:** BGM-109C Tomahawk Land Attack Missile – Conventional (TLAM-C) with a unitary warhead. This was initially a modified Bullpup warhead.
- **BGM-109D:** BGM-109D Tomahawk Land Attack Missile – Dispenser (TLAM-D) with cluster munitions
- **RGM/UGM-109E:** RGM/UGM-109E Tomahawk Land Attack Missile (TLAM Block IV) – improved version of the TLAM-C.
- **BGM-109G Ground Launched Cruise Missile:** BGM-109G Ground Launched Cruise Missile (GLCM) – with a W84 nuclear warhead; withdrawn from service in 1991 to comply with the INF Treaty.
- **AGM-109H/L:** AGM-109H/L Medium Range Air-to-Surface Missile (MRASM) – a shorter-range, turbojet powered air-launched cruise missile with cluster munitions; never entered service, cost US$569,000 (1999).

System

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:
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↳***System***

Name: Tomahawk Missile
Type: Long-Range Cruise Missile
Manufacturer: General Dynamics (initially) McDonnell Douglas Hughes Aircraft Corporation Raytheon
Launcher: 8-tubed Lockheed-Martin Mark 41 VLS system

Missile Basic Load: INA
Length: Without booster: 18 ft 3 in (5.56 m) With booster: 20 ft 6 in (6.25 m)
Diameter: 0.52 m
Wingspan: 2.67 m
Weight: 2,900 lb (1,300 kg), 3,500 lb (1,600 kg) with booster
Warhead: Nuclear: W80 warhead (retired) Conventional: 1,000 pounds (450 kg) high explosive or submunition dispenser with BLU-97/B Combined Effects Bomb or PBXN
Detonation Mechanism: FMU-148 since TLAM Block III, others for special applications
Engine: Williams International F107-WR-402 turbofan using TH-dimer fuel and a solid-fuel rocket booster
Operational Range: Block II TLAM-A – 1,350 nmi (1,550 mi; 2,500 km) Block III TLAM-C, Block IV TLAM-E – 900 nmi (1,000 mi; 1,700 km) Block III TLAM-D – 700 nmi (810 mi; 1,300 km)
Flight Altitude: 98–164 ft (30–50 m) AGL
Speed: Subsonic; ~Mach 0.74. about 550 mph (480 kn; 890 km/h)
Guidance System: GPS, INS, TERCOM, DSMAC, active radar homing (RGM/UGM-109B)
Launch Platforms: Vertical Launch System (VLS) and horizontal submarine torpedo tubes (known as TTL (torpedo tube launch))

Notes:

The Tomahawk (/ˈtɒməhɔːk/) Land Attack Missile (TLAM) is a long-range, all-weather, jet-powered, subsonic cruise missile that is primarily used by the United States Navy and Royal Navy in ship- and submarine-based land-attack operations. It was designed and initially produced in the 1970s by General Dynamics as a medium- to long-range, low-altitude missile that could be launched from a surface platform. The missile's modular design accommodates a wide variety of warhead, guidance, and range capabilities. At least six variants and multiple upgraded versions have been introduced since then, including air-, sub-, and ground-launched variants and conventional and nuclear-armed ones. As of 2019, only non-nuclear, sea-launched variants are currently in service. The U.S. Navy launched the BGM-109 Tomahawk project, hiring James H. Walker and a team of scientists at the Applied Physics Laboratory near Laurel, Maryland. Since then, it has been upgraded several times with guidance systems for precision navigation. In 1992–1994, McDonnell Douglas Corporation was the sole supplier of Tomahawk Missiles and produced Block II and Block III Tomahawk missiles and remanufactured many Tomahawks to Block III specifications. In 1994, Hughes outbid McDonnell Douglas Aerospace to become the sole supplier of Tomahawk missiles. It is now manufactured by Raytheon. In 2016, the U.S. Department of Defense purchased 149 Tomahawk Block IV missiles for $202.3 million. Ground-launched cruise missiles (GLCM) and their truck-like launch vehicles were employed at bases in Europe; they were withdrawn from service to comply with the 1987 Intermediate-Range Nuclear Forces Treaty. Many of the anti-ship versions were converted into TLAMs at the end of the Cold War. The Block III TLAMs that entered service in 1993 can fly 3 percent farther using their new turbofan engines and use Global Positioning System (GPS) receivers to strike more precisely. Block III TLAM-Cs retain the Digital Scene Matching Area Correlation (DSMAC) II navigation system, allowing three kinds of navigation: GPS-only, which allow for rapid mission planning, with some reduced accuracy, DSMAC-only, which take longer to plan but terminal accuracy is somewhat better; and GPS-aided missions that combine DSMAC II and GPS navigation for greatest accuracy.Block IV TLAMs have an improved turbofan engine that allows them to launch more quickly, get better fuel economy, and change speeds in flight. The Block IV TLAMs can loiter better and have a real-time targeting system for striking fleeing targets and electro-optical sensors that allow real-time battle damage assessment. The Block IVs can be given a new target in flight and can transmit an image, via satcom, immediately before impact to help determine whether the missile is on target and the likely damage from the attack.

Communication Equipment

→Very High Frequency (VHF) Radios

→→Man-Portable VHF Radios

R-168-100U-2 Russian Mobile VHF Radio Station



Tiers:



System

:

↳***Radio #4***

Name: R-168-100U-2
Quantity: ea2
Type: VHF
Frequency: MHz30-108
Capabilities: FH Voice Data Retrans
Maximum Range: km25-60
Mount Type: Vehicle
In Service: Yes
Reorganization speed: 100 sk / with
Speed of Information Transfer, Speech: kbps16
Speed of Information Transfer, Data: kbps1,2... 16
Number of Radio Channels: ea2
Interval of Working Temperatures: - 40°C... + 55°C
Antena: R-168BShDA antenna
Weight, Transciever: kg3
Weight, VUFUS-25 block: kg19
Weight, VUFUS-100 block: kg18

Weight, UM-100 block: kg20
Weight, block of BV-25 fans: kg1

Notes:

Mobile VHF radio station of range R-168-100U-2 Provides a radio communication in radio networks of a tactical control link a regiment - a battalion - a company. Types of work · Phone with frequency modulation. · Phone with cryptographic protection of speech information. · Data transmission. Operating modes Fixed Frequency (FF) (simplex, two-frequency simplex). Pseudorandom Reorganization of Working Frequency (PRWF) (simplex). Adaptive Communication (AC) (simplex, two-frequency simplex). The scanning reception at 8 in advance prepared frequencies. Work with a suppressor of noise. Relaying. The manual and automated record radiodanngkh from the input equipment of radio data with the optical interface (UVRD-O) or from the external COMPUTER (change of frequencies and the address). Emergency deleting of radio data. Transfer and reception of circular, address and voice-frequency calls. Work on 8 in advance prepared channels (APC). Management from the external COMPUTER on RS-232C joint. Voice informant of actions of the operator. Dialogue mode. The automated working capacity control.

MR3000P American VHF Tactical Handheld Radio



Tiers:



System

Alternative Designation: MR3000P

Type: VHF Tactical Handheld Radio

Crew: ea1

Multiband Capability: Multiband capability (25 MHz to 146 MHz)

Embedded EPM: Embedded EPM (ECCM) in line with R&S®SECOM-P

Output power: 5W RF output power

Secure Transmission: Secure transmission of voice, data, and short messages

Selective Calling: Selective calling with sender authentication

MTBF: > 10 000 hours

Maximum Range: INA

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The R&S®MR3000P is a small, lightweight, handheld transceiver that perfectly complements the R&S®M3TR family. Though compact, the R&S®MR3000P has all the features required of a tactical transceiver. It provides reliable connections, even in topographically difficult terrain, and is suitable for flexible integration into tactical networks. Since the transceiver can interoperate with the R&S®M3TR, it enables continuous radiocommunications both within and between forces. The expanded frequency range of the handheld transceiver also supports interoperability. It covers tactical VHF as well as parts of the HF and VHF air traffic control bands.

R-168-5UN(1)E Russian VHF Manpack-Vehicular Radio Station



Tiers:



System

↳*VHF Radio*

Name: R-168-5UN-1
Manufacturer: Yaroslavl Radioworks Corp
Quantity: ea1
Type: VHF
Frequency: MHz30-88
Capabilities: FH Voice Data
Maximum Range: km8-12
Mount Type: Manpack
In Service: Possibly Replaced
Battery: Battery 10NKGTs 6-2
Antenna: Rod antenna ASh-1.5
Handset: Handset MTT-1
Types of Operation: FM telephony with and without cyphering, transmission-reception of digital data from external terminal at the rate of 1.2 kb/s to 16 kb/s
Types of Data Transmitted: Analog, clear and secure with the built-in ciphering unit; digital, from an external terminal; tone call at frequency of 1000 Hz

Notes:

The R-168-5U(N)1E VHF manpack-vehicular radio station provides clear and secure radio communications in tactical command level radio networks in harsh ECM environment. The radio station is produced as a manpack, vehicular or fixed version. R-168-5UN(1)E replaces R-159 (16 kg), R-159M (16 kg), R-163-10U (14 kg). The BTR-80 is an 8×8 wheeled amphibious armoured personnel carrier (APC) designed in the USSR. The BTR-80 is a modern, lightly armored vehicle with a diesel power plant. It is manufactured at the Gorkiy Automobile Factory in Nizhniy Novgorod and has been in service since the early 1980s. The BTR-80 is a lightly armored amphibious vehicle with a collective chemical-biological-radiological (CBR) protective system. Operated by a crew of three, the vehicle can carry a squad of seven infantry troops. The BTR-80 8 x 8 armored personnel carrier is intended to carry personnel on the battlefield and provide close fire support. It can also carry out reconnaissance, combat support and patrol missions. It entered service with the Russian army in the late 1980's and has since been used in a number of military conflicts, including UN peacekeeping operations. The vehicle is in production and in service with the Russian

army and with a number of other countries.The BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Although the armament is same as BTR-60 and BTR-70, except for added smoke grenade dispensers on the back of the turret, the conical turret has been improved and the gun can elevate higher.

Panther V (BCC 67/VRQ 327) British Portable VHF Frequency Hopping Secure EPM Radio







Tiers:



System

Country of Origin: United Kingdom
Description: Hand-held Squad/Platoon
Manufacturer: Thales
In Service: Yes
Frequency Range: MHz30-180
Vehicle Fit: 20 Watts
Applique Amplifier: Yes, a 50 Warr Amplifier is avalable
Integral Vehicle Harness Interface: Yes
Dedicated GPS Interface: Yes
2 and 3 way re-broadcast Facility: Yes
Display: Alphanumeric Display
Note: Smallest 20 Watt EPM manpack/ vehicle transceiver available

BCC 67 PANTHER V-VHF Manpack Radio

Type: VHF
Frequency: MHz30-108
RF Output Power: selectable up to 5 W
Power: 20 W boosted mode at 24 V DC (vehicle configuration)
Weight: 5.9 kg with battery
Battery Life: 32 hr with rechargeable Li-Ion battery pack
Mount Type: Portable or Vehicle

VRQ 327 PANTHER V-VHF Vehicle Station

Type: VHF
Frequency: 30-108

RF Output Power: selectable up to 50 W

Width: mm230

Height: mm160

Depth: mm230

Weight: INA

Mount Type: Vehicle

BCC 69 PANTHER P-VHF Handheld Radio

Type: VHF

Frequency: 30-88

RF Output Power: selectable up to 5 W

Weight: 900 g with battery

Battery Life: 18 hr with rechargeable Li-Ion battery

Notes:

The Panther V manpack transceiver provides 5 and 20 watts of RF power with un-matched co-site capability enabling operation in multiradio locations where the majority of similar manpack radios would fail. The transceiver’s superior co-site performance also enables the manpack to be operated in a vehicle clip-in configuration, with co-located 50 watt VHF radios, delivering up to 20 watts through the vehicle antenna. The Panther V (BCC 67/VRQ 327) British Portable VHF Frequency Hopping Secure EPM Radio consists of the following: 1. BCC 67 PANTHER V-VHF Manpack Radio 2. BCC 69 PANTHER P-VHF Handheld Radio 3. Option - VRQ 327 PANTHER V-VHF Vehicle Station

R-168-0,1U(M)E Russian VHF Handheld Radio Station



Tiers:

1 2 **3** 4

System

:

↳*VHF Radio*

Name: R-168-0.1UM
Quantity: ea3
Type: VHF
Frequency: MHz45-56
Capabilities: Voice Data
Maximum Range: km1.2
Mount Type: Portable
In Service: Yes
Power Supply: 6NKGTs-0.94
Antenna: antenna-feeder device with wide-band matching unit
Telephony: 16 kb/s secure voice telephony
Data Transmission Rate: data transmission at the rate of 1.2 to 16 kb/s via interfaces RS-232 or S1FL
Data Recording: automated radio data recording
Types of Data Transmitted: analog clear, non-protected with built-in cyphering unit; analog secure, protected with built-in cyphering unit; digital, from external terminal; tone call at frequency of 1000 Hz

Notes:

The R-168-0.1U(M)E, R-168-0.1U(M)1E VHF handheld radio stations ensure clear and secure radio communications in tactical command level radio networks in harsh ECM environment. VHF handheld radio set R-168-0,1U (M)1E is intended for radio communication of platoon- squad – soldier level. By their tactical and technical characteristics, the R-168-0.1(U)ME and R-168-0.1(U)M1E radios are recommended to be used instead of analogues: R-147, R-158, R-162-0.1, R-163-0.5R, R-163-1U, R-168-0.1UE, R-168-0.5UE and Barmitsa-RS.

→→Vehicle-Mounted VHF Radios

R-168-25UE Russian Vehicular Radio Set





Tiers:



System

:

↳*VHF Radio*

Name: R-168-25U-2
Quantity: ea2
Type: VHF
Frequency: MHz30-180
Capabilities: FH Voice Data Retrans
Maximum Range: km25-40
Mount Type: Vehicle
In Service: Yes
Length: mm205
Width: mm175
Height: mm95
Weight: kg3
Operation Modes: Fixed Frequency (FF) (simplex, two-frequency simplex). · Pseudorandom Reorganization of Working Frequency (PRWF) (simplex). · Adaptive Communication (AC) (simplex, two-frequency simplex). · The scanning reception at 8 in advance prepared frequencies. · Work with a suppressor of noise · Relaying. · The manual and automated record of the radio data with the optical interface (UVRD-O) which are radio given from the input equipment or from the external COMPUTER. · Emergency deleting of radio data. · Transfer and reception of circular, address and voice-frequency calls. · Management from the external COMPUTER on RS-232C joint. · Voice informant of actions of the operator. · Dialogue mode. · The automated working capacity control. · A simplex or a two-frequency simplex on one of 8 in advance prepared frequencies. · Simultaneous transfer of speech information and data.
Type of Work: - Phone (TLF) with the frequency modulation (FM). - TLF with technical masking of speech information. - Data transmission from the external equipment.

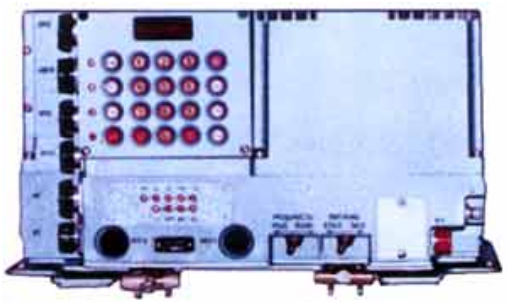
Notes:

Multifunctional R-168-25UE-2 radio stations are designated for open and masked communications on moderately rugged terrain. The digital radio stations operate in frequency retuning regime, are highly protected from jamming and sustainable against radio-electronic warfare. The equipment can uninterruptedly operate in harsh climatic conditions, sustain heavy shocks and vibration and is immune to sand and moisture. Provides a radio communication in radio networks of a tactical control link a regiment - a battalion - a company.

→High Frequency (HF) Radios

→→Man-Portable HF Radios

R-163-50K Russian Mobile HR Telephone and Telegraph Radio



Tiers:

1 **2** 3 4

System

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↳***R-163-50K HF Telephone and Telegraph Radio***

Frequency Range: MHz30-80
Frequency Spacing: KHz1
TransmissionRange: km20-60
Weight of Transceiver: Kg35
Antennas: 2m and 4 m whip
Input of Frequency, Setting of Modes: keypad controlled
Tuning Time: sec15
Retuning Time Between preset Frequencies: sec1,5
The number of preset frequencies: ea16
Power Supply: volts27
Note: Also equipped on the BRM-3K Rys, T-72AG, T-90 MBT, and the T-90S MBT.

Notes:

Radio set R-163-50K is intended to provide HF telephone and telegraph radio communication between mobile and fixed objects. R-163-50K ensures the following duties: * telephony with SSBM (single-sideband modulation) on USB (upper sideband) (radiation A3J); * telegraphy with on-off keying of the carrier (radiation A1); * FSK (frequency-shift keying) telegraphy with carrier frequency shift ±250 Hz (radiation F1); * telegraphy, 150 bit/s, FSK with carrier frequency shift ±250 Hz (radiation F1); * reception and transmitting of address call, telecode information and call tones with light indication at the display; * remote control by the control panel up to 10m; antenna matching device can be remote up to 5m; * scanning reception. The control of the radio set is carried out with the help of the built-in microcomputer. R-163-50K provides the work at "simplex" and "two-

frequency simplex" modes.

→→Vehicle-Mounted HF Radios

R-1685KVE Russian Vehicle-Mounted HF Radio Set



R-168-5KVE

Tiers:



System

↳***Radio***

Name: R-168-5KVE
Manufacturer: Sarapul Radioplant OJSC
Type: HF
Frequency: MHz1.5-30
Capabilities: Voice Telegraph
Maximum Range: km15-300
Mount Type: Vehicle
In Service: Yes

Notes:

VHF vehicular radio set R-168-5UVE is intended for open and masked radio communication in radio networks of tactical control. There is very little information on the R-168-5UVE

R-168-100KA Russian Vehicle Mounted HF Radio Station



Tiers:

1 2 3 4

System

:

↳*Radio #5*

Name: R-168-100KA
Quantity: ea1
Type: HF
Frequency: MHz1.5-30
Capabilities: FH Voice Data Telegraph Retrans
Maximum Range: km25-360
Mount Type: Vehicle
In Service: Yes
Dimensions, A-100KAE Transceiver: 410mm x 260mm x 285mm
Dimensions, Automated ASU-100KA: 446mm x 295mm x 250mm
Dimensions,Secondary Power Supply of BP-100K: 175mm x 263mm x 285mm
Weight, A-100KAE transceiver: kg28
Weight, Automated ASU-100KA: kg19
Weight, Secondary Power Supply of BP-100K: kg9
Speed of Information Transfer: bps1200, 2400
Working Temperatures: - 40°C... +60°C

Notes:

Provides the radio communication opened and closed by the built-in device of technical masking in radio networks of a technical control link at installation in objects on wheel base. Types of work: - Phone with one-band modulation of TLF (OHM). - Phone with technical masking of speech information of TLF-TM. - Automatic telegraph of ChT-200, ChT-500 (BD1, BD2). - Telegraph of ChT-200, ChT-500 for acoustical reception (ChT1, ChT2). - Amplitude telegraph of AT. - Transfer and reception of signals of address, circular and voice-frequency calls (AV, TsV, TV). - Transfer and reception of information in a digital form on S1-FL joint with use of the R-168 UPS-2 modem. Operating modes: - Fixed Frequency a Simplex (FFS). - Fixed Frequency a Two-frequency Simplex (FFTFS). - Pseudorandom Reorganization of Working Frequency (PRWF). - Adaptive Communication (AC). -

The scanning reception on 2 - 8 spare frequencies (joint venture). - The manual and automated input of radio data. - Reception on duty with a ban of an exit to transfer (DP). - Work on 8 in advance prepared channels (APC). - Management of work from the built-in control panel. - Management of work from the remote control - Management of work from the external COMPUTER of object on RS-232C joint sispolzovaniyem the R-168 UPS-2 modem. - The automated working capacity control.

→Ultra High Frequency (UHF) Radios

→→Man-Portable UHF Radios

→→Vehicle-Mounted UHF Radios

UM600 Norwegian Vehicle-Mounted UHF IP Broadband Radio





Tiers:



System

Type: UHF IP Broadband Radio
Mount: Vehicle
Height: mm40
Width: mm245
Depth: mm138
Weight: kg1.55
Input Voltage: 9-32 VDC through PMU
Power Consumption: watts35
Frequency Range: 225-400 MHz
RF Bandwidth: up to 5 MHz
Output power: up to 5 W
Military ODU connectors: Yes
Operating temperature: -35oC to +55oC
Environment: MIL-STD 810
EMC: MIL-STD 461
Dual audio channel: Yes
Ad-Hoc: Ad-hoc, fully automatic multi-hop capabilities (MANET)
Encryption: mbedded AES256 encryption, no need for external encryption
Software: Through Software Defined Radio (SDR) the waveform can be optimized to fit the application

Note: Fully integrated with Kongsberg CMS management system

Notes:

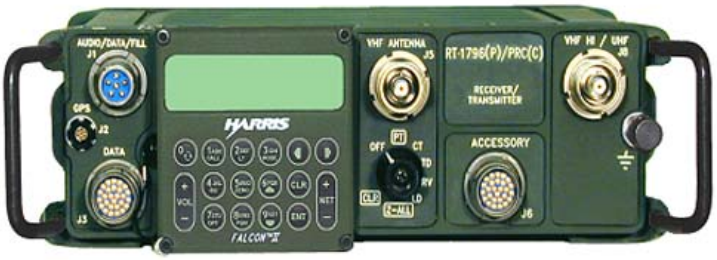
The UM600 high capacity UHF radio supports tactical operations in mobile platforms. High data throughput is ensures with a transmission range suited for vehicles at the tactical edge of an operation. UM600 has full router functionality including multi-hop features ensuring that data is reaching its destination correct and timely. UM600 can support up to 2.5 Mbit/s. For harsh operational environment the radio is optimized at a data rate of 900 kbit/s. UM600 can be configured to operate in a mixed TDMA mode supporting a number of voice channels as well as guaranteed access for time critical data. This mode is the optimum choice for handling all communication needs within e.g. an 8x8 Company.

→Multiband Radios

AN/PRC-117G American Multiband Manpack Radio







Tiers:



Variants:

- **AN/PRC-117 Version F (Foxtrot):** Version F (Foxtrot), namely AN/PRC-117F-MP Falcon II series, covering the 30-512 MHz frequency range, provided without internal GPS (optionally an external commercial GPS can be connected, or a GPS SAASM as a Precision Lightweight GPS Receiver [PLGR] or a Defense Advanced GPS Receiver [DAGR])
- **AN/PRC-117 Version G (Golf):** Version G (Golf), namely AN/PRC-117G-MP Falcon III series, covering the 30-2000 MHz frequency range, and provided with internal SAASM GPS (optionally an external commercial GPS can be connected)

System

Alternative Designation: AN/PRC-117
Type: Multiband Manpack Radio
Crew: ea1
Frequency Range: 30 MHz to 2 GHz
Presets: 100 (110 including DAMA)
Transmission Modes: FM, AM, PSK, CPM
Tuning Resolution: 10 Hz
Model: RT-1796 (P)(C)/U
Transmitter Output Power: 1 W to 20 W (Max)
Transmitter, Harmonic Suppression: –40 dBc
Transmitter, Frequency Stability: +/- 1.0 ppm
Receiver, FM Sensitivity: -118 dBm (10 dB SINAD)
Receiver, Adjacent Channel Rejection: 60 dB

Fill Devices: AN/CYZ-10 DTD, AN/PYQ-10 SKL (Supports DS-101, DS-102 and Mode 2/3)

Crypto Modes: KY-57, ANDVT/KYV-5, KG-84C, FASCINATOR

Radios: AN/PRC-152; AN/PRC-148; AN/PRC-119A/B/G; AN/PRC-113; AN/PRC-77; AN/PSC-5; Other versions of the AN/PRC-117

External Data: RS-232, MIL-STD-188-114A

Remote control: RS-232, RS-422

Antenna Ports: Separate VHF, VHF-HI/UHF

Audio: Six-pin Standard

Power: Two BA-5590, BB-390A/U, BB-2590, or BB-590 batteries

Operating Temperature: -40 °C to 70 °C

Line of Sight: VHF/UHF AM/FM; SINCGARS ECCM; HAVE QUICK II ECCM; ANW2 - Advanced Networking Wideband Waveform (Harris); SRW Soldier Radio Waveform; NATO SATURN waveform, per NATO STANAG 4372 - optional

SATCOM: MIL-STD-188-181-B/C; MIL-STD-188-182-A; MIL-STD-188-183-A/B; High performance waveform (HPW); Mobile User Objective System (MUOS) - optional

Dimensions

Height: 3.7 in (w/o battery case)

Width: 7.4 in (w/o battery case)

Depth: 8.8 in (w/o battery case)

Weight, Combat: 8.2 lbs (without batteries)

Notes:

The AN/PRC-117 Multiband Manpack Radio, or Multiband Multi Mission Radio (MBMMR), is a man-portable, tactical software-defined combat-net radio, manufactured by Harris Corporation, in two different version: Version F (Foxtrot), namely AN/PRC-117F-MP Falcon II series, covering the 30-512 MHz frequency range, provided without internal GPS (optionally an external commercial GPS can be connected, or a GPS SAASM as a Precision Lightweight GPS Receiver [PLGR] or a Defense Advanced GPS Receiver [DAGR]); Version G (Golf), namely AN/PRC-117G-MP Falcon III series, covering the 30-2000 MHz frequency range, and provided with internal SAASM GPS (optionally an external commercial GPS can be connected). Both radios have NSA certification for the transmission of voice and data traffic up to the Top Secret level. The designation AN/PRC translates to "Army Navy / Portable Radio Communications" used for two way Communications, according to Joint Electronics Type Designation System guidelines. The radios are also provided in a vehicular configuration under the AN/VRC-103 nomenclature.

MR300xH/U American Advanced Multiband Tactical Radios





Tiers:



System

Alternative Designation: MR300xH/U
Type: Advanced Multiband Tactical Radios
Manufacturer: Rohde and Schwarz
Crew: ea1
Software: Software-configurable
Multiband Capability: Multiband capability (1.5 MHz to 512 MHz with external devices)
Multiwaveform Capability: Multiwaveform capability (HF House, VHF/UHF tactical and G-A-G waveforms)
Embedded EPM: Embedded EPM (ECCM) in line with R&S®SECOM and R&S®SECOS, HAVE QUICK II
GPS: Integrated GPS, position report
Data Rate: Integrated GPS, position report
IP: IP over air capability (R&S®IPoA)
Voice Operation: SIP based remote voice operation
MTBF: > 7500 hours

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The |R&S MR300x radios form a family of high-performance digital radios covering the HF, VHF and UHF bands. Thanks to various high-speed data modes and protocols as well as multiple anti-jam modes for HF, VHF and UHF, they perfectly integrate into tactical communications networks. The radios are software-configurable and reprogrammable. Manpacks of the R&S®M3TR family are based on one mechanical platform, with a common logistics concept, identical physical interfaces and one human-machine interface (HMI).

→Telephones

→→Wireless Telephones

Iridium Extreme PT American Satellite Phone





Tiers:



System

Alternative Designation: Iridium Extreme PT
Type: Satellite Phone
Manufacturer: Iridium
Crew: ea1
Physical Features: • Meets military-grade durability standards • Jet-water, shock and dust resistance (IP65-rated) • Compact, lightweight design for ultimate portability • Diamond treaded, taper grip for in-hand ergonomics • Integrated loudspeaker • Rugged, high-gain antenna • Daylight-readable, glare-resistant display • 2.5mm headset and hands-free capability • Mini-USB data port
Operating Temperature: 10C to +55C operating temperature
Phone Mode Battery Duration: - Standby: Up to 54 hours - Talk time: Up to 6.5 hours
PTT Mode Battery Duration: - Standby: Up to 16.5 hours - Talk time: Up to 5 hours

Dimensions

Length: 140 mm
Width: 60 mm
Depth: 32 mm
Weight, Combat: 268g weight

Notes:

The Iridium Extreme® Push-to-Talk (PTT) is the device for global dependability, adaptability and durability. Only Iridium can deliver the power of fast, simple and secure group communication with the toughest, most feature-rich PTT-enabled satellite phone on the market. Versatile Communications at the Push of a Button Iridium Extreme® PTT takes reliable group communications to the next level with unique features and capabilities, including: *Everything offered within the Iridium Extreme® plus Push-to-Talk functionality *Global PTT capabilities and configurable talkgroups *A reinforced PTT button *A high audio loudspeaker *Enhanced SMS and email messaging capability *GPS-enabled location-based services *SOS access in Phone Mode *Phone Mode battery duration: standby up to (54) hours; talk time up to (6.5) hours *PTT Mode battery duration: standby up to (16.5) hours; Talk time up to (5) hours Ruggedly engineered to support high intensity users in some of the harshest

conditions, Iridium Extreme® PTT features: *Military-grade (MIL-STD 810F) durability *An Ingress Protection (IP) rating of IP65 *Jet-water, shock and dust resistance *Diamond treaded, tapered grip to provide superior in-hand ergonomics

Hagelin HC-2423, Swiss, Secure GSM Telephone



Tiers:



System

:

↳*Dimensions*

Height: mm105

Width: mm50

Weight: g106

↳*Features*

Voice: Yes

Data: Yes

Internet Technical Standard: WAP 1.1

Contact List: Contacts100

↳*Network Services*

Regionl Standard: European

GSM Standard: Mhz900/1800

Call Forwarding: Yes

Short Message Service (SMS): Yes

Anonymous Calling: Yes

Cryptographic Data

↳*Algorithm*

Profiling Variety: variables10^506

↳*Cryptography*

Symmetric Calcualtion: Direct, Derived

Asymmetric Calculation: Public Key

Key Variety: variables2^128

Key Capacity: keys999

Password Protection: Yes

Admin Password Protection: Yes

Manual Key Managment: Yes

Automated Key Transfer: Yes

Notes:

HC-2423 was a handheld GSM 1 mobile telephone set with built-in encryption facilities, made by Crypto AG (Hagelin) in Zug (Switzerland) in the early 2000s. The unit could be used on any public GSM 900/1800 network in the world, and was compatible with the HC-2203 PSTN encryption. The GSM system uses TDMA to split a frequency into time slots. Probably the most useful thing to know about the Global System for Mobile communications (GSM) is that it is an international standard. If you travel in Europe and many other parts of the world, GSM is the only type of cellular service available. GSM cell phone with integrated Endto-End Encryption (hardware module) for secure phone communication in GSM 900/1800 networks.

IsatPhone 2 American Inmarsat Satellite Phone



Tiers:



System

Alternative Designation: IsatPhone 2
Type: Inmarsat Satellite Phone
Manufacturer: Inmarsat
Crew: ea1
Display: High-contrast colour screen
Interfaces: Micro USB Audio socket Antenna port Bluetooth 2.0
Durability: IP65 IK04
Operating Range: -20°C to +55°C (-4°F to +131°F)
Storage Range: -20ºC to +70ºC (-4ºF to +158ºF) (with battery)
Charging Range: 0°C to +45°C (+32°F to +113°F)
Battery: Type: Lithium-ion, 3.7 volts Talk time: Up to 8 hours Standby time: Up to 160 hours
Satellite Telephony: 2.4kbps voice codec
Voicemail: Speed dial 1
Supplementary Voice Services: Call history Caller ID Call waiting Call divert Call holding Conferencing Call barring Speed dialling Fixed number dialling
Text-to-Text: 160 Latin / ~74 non-Latin characters Up to 10 concatenations Standard and predictive text
Text-to-Email: 160 Latin / ~74 non-Latin characters Up to 10 concatenations Incoming email – 160 Latin characters / ~74 non-Latin characters
GPS Locattion Data: View position Send as text or email
Reliable Network: Operates over our global I-4 satellite network, ensuring reliable call stability and seamless roaming worldwide.
Global Coverage: IsatPhone 2 coverage is worldwide, apart from the Poles. Calls are made via a single, global network so there are no roaming charges.

Dimensions

Length: 169mm

Width, without Antenna: 52mm
Width, with Antenna: 75mm
Depth, in Hand: 29mm
Depth, at Deepest Point: 36mm
Weight: 318g (11.2oz) – including battery

Notes:

IsatPhone 2 is the latest addition to our handheld satellite phone portfolio, offering a range of new features to ensure you stay connected in even the most extreme and remote locations. IsatPhone 2 is a tough phone for a tough world. The robust handset has been engineered to cope with anything that nature can throw at it – from searing heat to icy blasts, desert sandstorms or monsoon rain. And with fast network registration, an unrivalled battery life offering 8 hours' talk time and up to 160 hours on standby, you know you can always depend on IsatPhone 2. What’s more, IsatPhone 2 gives you the excellent voice clarity and call stability you expect from the world-leading Inmarsat network.

→→Wired Telephones

→→Satellite Telephones

R-438M Belozer Russian Mobile Satellite Communication Station



Tiers:



System

:

↳***Radio #6***

Name: R-438M Belozer
Quantity: ea1
Type: Portable SATCOM System
Frequency: INA
Capabilities: Voice Data
Maximum Range: km5,000
Mount Type: Manpack
In Service: Yes
Transfer Rates: bps1,200
Two Channel Receiving Mode: Yes
Note: There is very little information about the R-438M Belozer

Notes:

The station is designed to provide satellite radio communications for units operating detached from the main forces, as well as for use as a commander’s personal station. It provides a full autonomy of operation transmitting voice, digital, and text messages, automated functional testing, and interface with a wide range of peripheral devices through ports RS-232C, C1-FL-BI. The radio station can be carried by one person. Mode of work: Duplex telecommunication; Simplex data communication; Formalized service communication mode; Transfer rates of 1200 bps; Two channel receiving mode. As compared to the stations of the previous generation, the data speed has increased by several times. On the move, the station is the size of a school backpack and can be carried by one person; it weighs 16 kg. Set up time is about 30 sec. The station provides formalized service communication and a secure telephone mode. The station operates in the range of 4 GHz to 6 GHz. Data transfer rate is 1200 bps. The advantages of satellite communication are a large range of reliable signals, especially in areas with difficult terrain, regardless of the weather conditions and time of day and year, and a highly secure protection. Yaroslavl Radio

Manufacturing Plant started production of the portable satellite radio station R-438 Barrier-T in 1998-2000 and the R-438M Belozer in 2002-2003.

→Tactical Broadband Wireless Modules

UM620 Norwgian Tactical Broadband Wireless Module





Tiers:



System

Alternative Designation: UM620
Type: Tactical Broadband Wireless Module
Crew: ea1
Radio Features: The UM620 operates from 225 to 400 MH z to provide a good balance bet ween range in non-LOS terrain, data rate and RF power output. The radio has proven multipath capabilities and selec table RF output from 100mW to 20W. The radio can provide different net work capacities based on selec ted RF bandwidth and coding. The radio may operate in a pure data radio mode or in combined voice and data modes. Dynamic configuration of wave-form is possible.
Software: Depending on chosen net work operation, the radio can handle a number of parallel voice net works and IP multi hop data net works in one RF network.
Mounting: The UM620s small size and weight allows for flexible mounting in the Power Mounting Unit (PMU) or in a combined Dual Channel Radio mount.
MIL-STD: The UM620 complies with MIL-STD 810G requirements to tac tical equipment.
Protocols: IP versions IPv4 / IPv6 LAN protocols Ethernet
Services: Network Service DHCP External networks OSPF/RIP/Static routing Multi hop capability Voice and data Multicast Unicast
Mangement: Web (https) SNMPv3
RF Characteristics: Frequency Range 225-400 MHz Power 100mW to 20 W
Network Capacity: Voice: up to 5 voice nets Data rates: up to 2500 kbps RF bandwidth: up to 5 MHz
LAN: IEEE 802.3 10/100 Base-T/TX
Audio: Dual channel
GPS: External Internal
Power Supply: Input Voltage 11-32 V DC
Operating Temperature: -35ºC to +55ºC

Dimensions

Height: 55 mm

Width: 245 mm

Depth: 156 mm

Weight, Combat: 2.2 kg

Notes:

UM620 – TACTICAL BROADBAND WIRELESS MODULE Robust broadband wireless connec tion for mobile combat zone users UM620 operates without any Master in the network. UM620 provides ad-hoc functionality for fast and easy establishment of networks. Voice connection to intercom systems is utilized through digital or analogue interface. UM620 provides DHCP services and routing for connected LAN subscribers. Multi hop capability ensures the user to reach intended destination for both voice and data. The software defined solution of UM620 and the radio’s flexible software facilitates new services to be implemented in support of customer specific applications. The UM620 is easy to use, and managed using the integrated web-based management system or by using the SNMP interface. DISMOUNTED CAPABILITY The UM620 is fully compatible with the soldier radio SR600, and enables integration between vehicles and dismounted troops. NETWORK SERVICES The UM620 provides an Ethernet interface with DHCP server capability to the local LAN of the vehicle. Various IP routing services are provided within the radio network as well as towards external networks. Multicast and Unicast services are supported.

→Tactical Routers

IPX600 Norwegian Tactical Router





Tiers:



System

Alternative Designation: IPX600
Type: Tactical Router
Crew: ea1
Port Connections: 5 x WAN 2 x LAN 1 x Fibre 1 x Operation and Maintenance
Subscribers: 15 x Legacy Telephones 100 x VoIP Telephones
Protocols: SIP Q.931/QSIG RIPv2 and RIPng STANAG 4206 OSPFv2 and OSPFv3 STANAG 4578 Ed.1 BGP CPX Trunk Group PIM-SM PIM-SSM RTP NTP
Services: IPv4 and IPv6 DHCP Server /Client Call Handling NTP Server SIP Telephones Remote Management From CMS
Interfaces: Ethernet: 10/100BASE-T/TX ITU-T: V.11 256, 512, 1024, 2048, 4096, 8192, 8448 kbit/s ITU-T: G.703 256, 512, 1024, 1544, 2048, 4096, 8192, 8448 kbit/s EUROCOM D/1: 256, 512, 1024, 2048, 4096, 8192, 8448 kbit/s STANAG 4206: 256, 512 kbit/s STANAG 4578 Ed. 1: 2048 kbit/s Fibre: 1 Gbit/s
Power Supply: Input Voltage: 19-32 VDC Power consumption: 100 W
Operating Temperature: -40ºC to +55ºC
MIL-STD: Environment: MIL-STD 810 EMC: MIL-STD 461
Features: •Integrated Call Control, supports up to 100 VoIP telephones • Voice, data and management service integration with legacy EriTac (circuit switched) and TacLAN (Combat level IP system) • Supports traditional EriTac/EUROCOM terminals • Media Gateway supporting SIP , STANAG, ISDN and EUROCOM GWs, enabling for example calls between Eurocom and Voice over IP subscribers • Multimedia access unit via Optical Fibre or Radio Lin

Dimensions

Height: 177 mm
Width: 483 mm
Depth: 350 mm
Weight, Combat: 19 kg

Notes:

TACTICAL ROUTER/MEDIA GATEWAY The Link Between EriTac and IP Networks IPX600 is a high capacity Router and TDM switch

with a range of functions. IPX600 is the main networking component of K-TaCS, Tactical Communication System from KONGSBERG. IPX600 integrates IP networks and legacy tactical networks and Provides IP networks with Military Gateways. IPX600 is a configurable media gateway and router, supporting a range of different interfaces. IPX600 provides a wide range of IP and circuit switched network services. Its small size and low weight together with its inherent properties for communication readiness, makes IPX600 particularly suitable for communicationn between tactical units frequently on the move. Management is performed through the Communication Management System CMS. CMS is an intuitive, easy to use menu based system. Predefined configurations may be used. IPX600 is fully ruggedised, designed for harsh environments.

→Tactical Amplifiers

VK3150 American 150 W HF Power Amplifier





Tiers:



System

Alternative Designation: VK3150

Type: 50 W HF Power Amplifier

Crew: ea1

Operation: The R&S®VK3150 provides medium-power/medium-range communications links. Typical applications include mobile or base station installations for general-purpose HF SSB voice and data communications.

Frequency Range: Supports continuous operation across the 1.5 MHz to 30 MHz band with 150 W transmit power

Frequency Hopping: The power amplifier section is of broadband design and fully supports frequency-agile operating modes (automatic link establishment, slow frequency hopping).

Mounting: The HF power amplifier is mounted separately on an independent shockmount with room for proper air flow. This provides additional flexibility when installing tactical radio systems into vehicles.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The R&S VK3150 150 W HF power amplifier increases the HF output power of the R&S MR300xH/U manpack radios to 150 W PEP or 100 W average. The R&S®VK3150 provides medium-power/medium-range communications links. Typical applications include mobile or base station installations for general-purpose HF SSB voice and data communications. Continuous coverage is provided over the 1.5 MHz to 30 MHz frequency range. The power amplifier section is of broadband design and fully supports frequency-agile operating modes (automatic link establishment, slow frequency hopping). When used with the automatic R&S®FK3150 HF antenna tuning unit, the output of the R&S®VK3150 is automatically matched to most rod and whip antennas. Built-in self-test features permit operators or maintenance personnel to fully check the transceiver and the power amplifier down to the module level. Fault conditions are displayed on the transceiver‘s front-panel display. The R&S®MR300xH/U manpack acts as an exciter for the power amplifier, avoiding the disadvantages of transceiver/ booster solutions with respect to unwanted emissions. The HF power amplifier is mounted separately on an independent shockmount with room for proper air flow. This provides additional flexibility when installing tactical radio systems into vehicles. The R&S®VK3150 uses rugged tactical packaging and meets the same environmental specifications for temperature, shock, vibration, and submersibility as the rest of the R&S®M3TR family.

VT3050 American 50 W VHF/UHF Power Amplifier



Tiers:

1 2 3 4

System

Alternative Designation: VT3050

Type: 50 W VHF/UHF Power Amplifier

Manufacturer: Rhode and Schwarz

Crew: ea1

Operation: The R&S®VT3050 50 W VHF/UHF power amplifier supports continuous operation across the 30 MHz to 512 MHz band with 50 W transmit power.

Family: The R&S®VT3050 is a member of the R&S®M3TR family of multiband tactical radio systems.

Voice and Data: This power amplifier meets the need for military voice and data communications in all analog and digital fixed frequency and frequency hopping modes supported by the R&S®MR300xH/R&S®MR300xU tactical radio.

High-Speed Radio Modem: The amplifier is especially designed for high linearity to satisfy the requirements of the R&S®M3TR family's high-speed radio modem for 72 000 bit/s.

Collocation Option: A collocation option is available for the VHF low band (30 MHz to 88 MHz). The co-site filter is factory-installed. Fully automatic operation (controlled from the transceiver) and rapid tuning capability are provided

Multiband Operation: An R&S®M3TR VHF/UHF system can be easily upgraded to multiband operation. The serial control bus of the R&S®M3TR allows combinations of radios with up to two external amplifiers

Frequency Range: 1.5 MHz to 512 MHz

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The R&S VT3050 50 W VHF/UHF power amplifier supports continuous operation across the 30 MHz to 512 MHz band with 50 W transmit power. The R&S®VT3050 is a member of the R&S®M3TR family of multiband tactical radio systems. This power amplifier meets the need for military voice and data communications in all analog and digital fixed frequency and frequency hopping modes supported by the R&S®MR300xH/R&S®MR300xU tactical radio. The amplifier is especially designed for high linearity to satisfy the requirements of the R&S®M3TR family's high-speed radio modem for 72 000 bit/s. It supports medium to fast frequency hopping. A collocation option is available for the VHF low band (30 MHz to 88 MHz). The co-site filter is factory-

installed. Fully automatic operation (controlled from the transceiver) and rapid tuning capability are provided. An R&S®M3TR VHF/UHF system can be easily upgraded to multiband operation. The serial control bus of the R&S®M3TR allows combinations of radios with up to two external amplifiers. By adding an R&S®VK3150 HF amplifier and an R&S®FK3150 antenna tuning unit, the system can be expanded to a frequency range of 1.5 MHz to 512 MHz.

→Antennas

GATR 1.2M American Inflatable Antenna



Tiers:



System

Alternative Designation: GATR 1.2m
Type: Inflatable Antenna
Crew: ea2
Band: Ku-Band; X-Band
Emplacement Time: Under 20 minutes on satellite
Displacement Time: Under 20 minutes on satellite
Optics: Prime focus
Reflector Construction: Flexible parabolic fabric
Az/El/Pol: Manual point and align
Modem: Works with all standard SATCOM modems
Satellite Location Controller: iDirect SNR tuning. Satellite acquisition, peaking, and cross pol adjustment using GPS or compass, and level inputs
Interface: CAT-5 cable for IP applications
Elevation: 5 to 90 deg
Azimuth: +/-10 deg of hold-downs
Polarization, Ku-Band: Linear
Polarization, X-Band: Circular
Transmit Gain (Mid-band), Ku-Band: 43.0 dBi
Transmit Gain (Mid-band), X-Band: 37.0 dBi
Receive Gain (Mid-band), Ku-Band: 41.5 dBi
Receive Gain (Mid-band), X-Band: 36.1 dBi
Satellite System Compliance, Ku-Band: Intelsat
Satellite System Compliance, X-Band: Skynet and XTAR

Operating Temperature: Operational: -32 to +55°C Storage: -40 to +60°C
Wind Load: Operational: 40 mph (64 kph) Survivable: 60 mph (97 kph) with anchor spikes
Power: 100-277V AC

Dimensions

Length, Standard Case: 79 cm
Width, Standard Case: 51 cm
Height, Standard Case: 30.5 cm
Weight: 34 kg

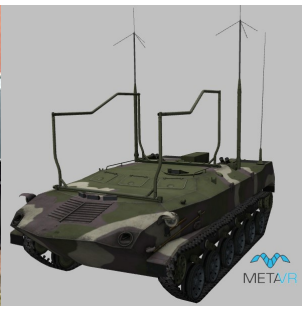
Notes:

From an innovative, ultra-portable design, the GATR 1.2m Antenna System provides high-bandwidth communications for transmission of secure and non-secure data, voice and video transmissions. Incorporating an inflatable radome and flexible parabolic reflector mounted at its equator, GATR 1.2M features a single Ku-band 1.2-meter satellite terminal, all in a compact system that fits comfortably into one airline-checkable case weighing less than 75 pounds (34 kg). A 50-percent reduction in pack-out weight and volume compared to deployable rigid antennas of similar size, making it ideal for first-in deployments, remote applications and contingency scenarios where transportation and space are limited. Plus, set up takes less than 20 minutes.

Command and Control (C2) Systems

→Command and Control (C2) Vehicles

BMD-KShM Russian Command Post Vehicle

Tiers:



Variants:

- **BMD:** First production model.
- **BMD-1K:** (K stands for komandirskaya – command) – Command variant fitted with R-126 and R-107 transceivers, two Clothes Rail antennas and a generator box. It's sometimes called BMD-K
- **BMD-1P:** BMD-1 modernization with its 9S428 ATGM launcher replaced by pintle-mounted 9P135M-1 ATGM launcher capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. Entered service in 1977.
- **2S9 NONA Russian 120mm Self-Propelled Mortar (SPM):** The 120 mm SO-120 2S9 Anona (Anemone) self-propelled gun/mortar (SPG/M) was first seen in public in May 1985 and is an airborne artillery assault vehicle that was developed to carry out two tactical functions.
- **2S9-1 Russian 120mm Self-Propelled Mortar (SPM):**
- **2S9-1M:** The 2S9-1M is an upgraded variant of the baseline SO-120 2S9 Anona-S. The upgraded vehicle is designed to maintain the battlefield viability of the original SO-120 until a replacement - likely to be the Lotus fire support vehicle based on the BMD-4M - can be developed and introduced into service.
- **BMD-1PK:** (K stands for komandirskaya – command) – Command variant of BMD-1P. It is fitted with an additional R-123M radio set, a generator, the GPK-59 gyroscopic compass, the PRKhR radiation and chemical reconnaissance unit and two attachable tables. The machine gun mounted in the left corner of the bow of the hull has been eliminated as well as one of the seats. The crew consists of 6 men. The ammo load was reduced by one 9M113 "Konkurs" (AT-5 Spandrel) ATGM and 250 7.62 mm machine gun rounds
- **BMD-1M:** BMD-1 with smoke grenade launchers on the rear of the turret, improved ventilation and road wheels
- **BMD-2 (Ob'yekt 916):** BMD-1 variant with a new one-man turret armed with stabilized 30 mm 2A42 multi-purpose autocannon and 7.62 mm PKT coaxial tank machine gun (mounted on the right hand side of the main gun). The vehicle carries 300 rounds for the main gun (180 AP and 120 HE) and 2,940 rounds for the machine gun. The gun has a maximum elevation of 75° and can be used to fire at air targets. The turret is also armed with pintle-mounted 9P135M launcher, on the right hand side of the roof of the turret, with semi-automatic control capable of firing SACLOS guided 9M113 "Konkurs" (AT-5 Spandrel) and 9M113M "Konkurs-M" (AT-5B Spandrel B) ATGMs. The new turret seats the gunner on the left hand side of the main gun. On top of the turret there's one single piece circular hatch opening to the front. Located in front of the said hatch is the gunner's sight which is the same one as the one used in BMP-2. Another gunner's sight is located on the left hand side of the main gun and moves in vertical planes along with it. It is a high angle of fire sight used when the gunner is aiming at air targets. The vehicle also has additional periscopes that provide it with vision on the sides. A white searchlight is mounted in front of the turret. The amount of bow mounted tank machine guns decreased from two to one. The right hand side bow mounted machine gun was preserved. NATO gave it the designation BMD M1981/1
- **BTR-D (Ob'yekt 925):** Lengthened variant (with 6 rather than 5 road wheels), slightly up-armoured at the front. The BTR-D has no turret, but is armed with two bow-mounted machine guns PKB and can be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Entered service in 1974 and can carry 10 passengers. Combat weight: 8.5 tons.

System

Alternative Designation: BMD-KShM

In Service: 1969-Present

Manufacturer: Volgograd Tractor Plant

Type: Command Post Vehicle; Airborne Amphibious Infantry Fighting Vehicle (IFV)

Family: 2S923

Crew: ea2 (driver, gunner)

Passengers: 6 troopers (including commander and machine gunner seated next to the driver and 3 men in the troop compartment)

Chassis: S-120 and based on the aluminium hull of the BTR-D airborne multi-purpose tracked armoured personnel carrier

Displacement Time: min30

Emplacement Time: min30

Airborne Capable: Yes

Parachute System: PRSM-916 parachute system, or the PRSM-925 for combat deployments

Airdrop Height: m500-1,500

Note: The BMD-1 can be distinguished from all other BMD variants firstly by the large gun that is its main armament, and secondly by its road wheels that have a star-shaped centre and dual rims.

Dimensions

Length: m5.1

Width: m2.53

Height: m1.97

Weight, Combat: tons7.5

Ground Pressure: kg/mINS

Automotive

Engine Name: 5D20

Engine Type: V-6, water cooled, Diesel Engine

Engine Power: hp240

Cruising Range: km320

Speed, Maximum Road: km/h70

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Graident: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.6

Fording Depth: mAmphibious

Communications

Type: R-173

Note: There is no information available that outlines what type of Command and Control Equipment is installed in the BMD-KShM.

Main Gun

↳*System*

Name: 2A28 Grom 73mm smooth bore semi-automatic gun

Type: mm73

Manufacturer: KBP

Length, Barrel: mm1,195

Height: mm322

Weight: kg115

Width: mm218

Electric Motor: Yes, with a manual mechanical backup

Magazine Type: forty-round mechanized conveyor double-row magazine

Max Rate of Fire: rds/min8-10

Loader Type: M3 electromechanical autoloader with ammunition conveyor

Max Elevation: deg+33

Min Elevation: deg-4

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Note: The BMD-1 can also fire ATGM launcher (three 9M14M or 9M113 or 9M111M ATGMs)[4][9]

↳*Ammunition (Option 1)*

Type: OG-15V HE-Frag

Caliber: mm73

Muzzle Velocity: m/s290

Basic Load: 16 Total OG-15V HE-Frag Projectiles

Weight: kg4.57

Shell: kgOG-9 shell with a 0.73 kg (1 lb 10 oz) TNT bursting charge

↳*Ammunition (Option 2)*

Type: PG-15V (HEAT)

Caliber: mm73

Muzzle Velocity: m/s400

Stabilizer Type: fixed fin-stabilized rocket-assisted round.

Basic Load: 24 Total PG-15V Projectiles

Weight: kg3.47

Shell: kg2.6

Explosive Type: mmRDX explosive charge in the warhead

Explosive Weight: kg0.322

Penetration: mm280-350

Note: Once the projectile has travelled 10–20 m (33–66 ft), the rocket motor starts and accelerates it to 700 m/s (2,300 ft/s).

Anti-Tank Guided Weapons (ATGW)

Name: Kolomna Malyutka (Baby) 9M14

Type: wire-guided ATGW

Minimum Range: m500

Maximum Range: m3,000

Maximum Speed (throughout the Flight): m/s130

Flight Time: sec25

Warhead Type: HEAT Warhead

Penetration: mm400

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Max Rate of Fire: rds/min650

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

In Service: 1961-present

Manufacturer: Degtyaryov plant

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Overall): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Muzzle Velocity: m/s825
Basic Load: ea1,500
Maximum Effective Range (With Sight Adjustments): m100-1,500

Fire Control

Name: INA
Computerized FCS: Yes
Thermal Sight Vehicle Commander: Yes, with three day vision devices
Thermal Sight Gunner: Yes, dual-mode 1PN22M1 monocular periscopic sight mounted on the left side of the turret roof.
Driver Sight: TNPO-170 periscope
Main Gun Stabilization: INA
Indirect Fire: Yes
Direct Fire: INA
Land Navigation: Yes
Searchlight: IR searchlight

Protection

Armor Type: Welded aluminium alloy
Gun Mantlet: mm33
Turret Armor: 23 mm at 42° turret front 19 mm at 36° turret side 13 mm at 30° turret rear 6 mm turret top
Hull Armor: 15 mm at 50° lower hull front, 10 mm rest of the hull
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: Available
NBC Protection: PAZ NBC system
Smoke Equipment: INA
Fire-Extinguishing System.: PPO centralised ethylene-bromide fire-extinguishing system

Notes:

The BMD-KShM: command post vehicle is a variant of the BMD-1. The BMD-1 is an airborne infantry tracked armoured vehicle, which entered in the service to the Russian army airborne units in 1969 and was first show to the public during a parade held in Moscow in November 1973. The vehicle was called the M1970 before its Russian designation became known. Development started in 1965 and limited production began in 1968 and ended in 1969. After operational trials it was deployed in limited numbers by 1969 and the serial production started in 1970, although the vehicle weight 500 kg more than what the

requirements stated (7.5 tonnes and 13.3 tonnes when loaded with equipment). In late 1970s a new modernized vehicle received a designation BMD-1P following adoption of the new 9P135M-1 ATGM launcher instead of 9S428 ATGM launcher, firing the 9M113 "Konkurs" (AT-5 Spandrel). In 1983, based on the combat experience in Afghanistan a decision was made to produce a new variant of the BMD with a weapon capable of engaging targets such as those faced by the airborne troops in that conflict. This resulted in "Ob'yekt 916" which later became BMD-2. A lengthened chassis of BMD-1 served as a basis for the BTR-D airborne multi-purpose tracked APC which itself served as a basis for many specialized airborne vehicles. The BMD-1 is always currently used by the Russian airborne troops. BMD-1 and BMD-1PK IFVs are used by Russian airborne units of KFOR. BMD-1 IFVs were used by Russian airborne units of SFOR.

9S737 Ranzhir Russian 6x6 Mobile Command Center






Tiers:

1 2 **3** 4

Variants:

- **9S737M Ranzhir-M:** INA

System

Alternative Designation: 9S737 Ranzhir
Type: Russian 6x6 Mobile Command Center
Manufacturer: AGAT–Control Systems
Family: Ranzhir
In Service: 1989-Present
Chassis: Tata LPK 2518
Crew: INA
Passenger Capacity: INA
Note #1: There is very little unclassified information about the 9S737 Ranzhir
Note #2: The Ranzhir E/M is also available in a lower cost truck variant, intended for applications where high road mobility is important. For instance a wheeled Tor M2E or Pantsir S1 battery would used the wheeled variant to match the high road speed of the TELARs.

Dimensions

Length: 7.18 m
Width: 3.35 m
Height: INA

Ground Clearance: 0.25 m

Weight, Combat: 25000 kg

Automotive

Engine Name: CUMMINS ISBe5.9 180 40

Engine Type: Diesel

Engine Power: 134 Kw@ 2500 r/min

Gear Box: 6 Speed

Cruising Range: INA

Speed, Maximum Road: 65 kph

Speed, Average Cross: INA

Speed Maximum Swim: No Amphibious

Fuel Capacity: 300 liters

Communications

Note: Either the Azart-P (4km), Azart-N (12km), and Azart-BM (40km)

Fire Control

Laser Target Desinator: INA

Quantity of tracked air objects (using data from the HCP, combat vehicles, radar): up to 80

Rate of Data exchange with combat vehicles: sec1

Rate of Data issue to the higher command post: sec5

Time for mission setting, in Automatic Mode: sec1

Time for mission setting, in Manual Mode: sec5

Protection

Armor: Protection from small arms fire and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Ranzhir series of mobile command posts was originally developed for the PVO-SV to provide a tracked and hardened ADCP for batteries of point defence weapons, such as SPAAGs and SAM systems. 9S737 vehicle was designed by Belarusian scientific and research institute of automatization technologies (NIISA), currently "AGAT–Control Systems". A. V. Shershnev was appointed chief designer of 9S737 vehicle. State trials of the system were held from August 1987 till June 1988 at Embi testing range (nowadays at Kazakhstan). In 1989 it was approved for military. Mass production was started at Minsk NPO Agat, but later transferred to Radiozavod (Penza) Early variants were deployed to provide battery C3 for the SA-15, SA-17, SA-19 systems. More recent variants are used with the SA-13, replacing legacy ADCPs, and the new wheeled SA-15 and SA-22, in a wheeled configuration. A single Ranzhir usually supports 4 to 6 TELARs, SPAAGMs or SPAAGs.

1V110 Russian Artillery Command and Reconnaissance Vehicle





Tiers:

1 2 3 4

System

Alternative Designation : M1979-1

Chassis: AZ-66B, 4x4 wheeled, Box Body Van

Crew : ea5

Dimensions

Height, Overall: m2.44

Length, Chassis Overall: m5.66

Width, Overall: m2.34

Weight, Combat: mT3.6

Automotive

Engine Name: ZMZ-66

Engine Power : hp115

Engine Type: Water-cooled, gasoline

Range, Cruising : km875

Speed, Average Cross-Country: INA

Speed, Maximum Off-Road: km/h35

Speed, Maximum Road : km/h87

Maximum Fording Depth: m1

Communications

Radios: R-123M radio (3 each)

Fire Control System

Fire direction: Automated fire direction: 1V520. Manual fire direction: PUO-7. The vehicle is equipped with the APK automated firing data receiver.

Other: DSP-30 laser rangefinder, K-1 collimator

Notes:

In 1979, the Soviet Union introduced a similar wheeled ACRV set for multiple rocket launcher and towed cannon units. The eight-vehicle set consists of three 1V110 battery senior officer's vehicles, three 1V18 battery commander's vehicles, one 1V19 battalion commander's vehicle, and one 1V111 battalion chief of staff's vehicle. Early versions of the 1V17 ACRV set included a 1V111 equipped with a modified ZIL-130-mounted 9S77M instead of the ZIL-131. There have been no upgrades to the 1V17 like that of the 1V12 to 1V12M. The ACRV 1V110 battery FDC serves the same function as the ACRV 1V13 (1V12 ACRV Complex) and is similarly equipped. However, the land navigation system is a different model.

R-149BMR Russian 8x8 Amphibious Armored Command and Signal Vehicle




Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: R-149BMR

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Crew: ea3

Personnel: ea7

Note: See Communications for a detailed list of C2 equipment

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Note: Onboard automated workstations (AWS) interact with communications and navigation equipment and allow for information collection, input, processing, recording, display (to include on electronic maps), database maintenance, and output in both text and video formats. In addition, they ensure accurate navigation and automatically display the vehicle's coordinates on the electronic map

↳*Radio #1*

Name: R-168-0.1UM

Quantity: ea3

Type: VHF

Frequency: MHz45-56

Capabilities: Voice Data

Maximum Range: km1.2

Mount Type: Portable

In Service: Yes

Power Supply: 6NKGTs-0.94

Antenna: antenna-feeder device with wide-band matching unit

Telephony: 16 kb/s secure voice telephony

Data Transmission Rate: data transmission at the rate of 1.2 to 16 kb/s via interfaces RS-232 or S1FL

Data Recording: automated radio data recording

Types of Data Transmitted: analog clear, non-protected with built-in cyphering unit; analog secure, protected with built-in cyphering unit; digital, from external terminal; tone call at frequency of 1000 Hz

Note #1: VHF handheld radio set R-168-0,1U (M)1E is intended for radio communication of platoon- squad – soldier level

Note #2: The R-168-0.1U(M)E, R-168-0.1U(M)1E VHF handheld radio stations ensure clear and secure radio communications in tactical command level radio networks in harsh ECM environment

Note #3: By their tactical and technical characteristics, the R-168-0.1(U)ME and R-168-0.1(U)M1E radios are recommended to be used instead of analogues: R-147, R-158, R-162-0.1, R-163-0.5R, R-163-1U, R-168-0.1UE, R-168-0.5UE and «Barmitsa-RS»

↳*Radio #2*

Name: R-168-5UN-1

Manufacturer: Yaroslavl Radioworks Corp

Quantity: ea1

Type: VHF

Frequency: MHz30-88

Capabilities: FH Voice Data

Maximum Range: km8-12

Mount Type: Manpack

In Service: Possibly Replaced

Battery: Battery 10NKGTs 6-2

Antenna: Rod antenna ASh-1.5

Handset: Handset MTT-1

Types of Operation: FM telephony with and without cyphering, transmission-reception of digital data from external terminal at the rate of 1.2 kb/s to 16 kb/s

Types of Data Transmitted: Analog, clear and secure with the built-in ciphering unit; digital, from an external terminal; tone call at frequency of 1000 Hz

Note #1: The R-168-5U(N)1E VHF manpack-vehicular radio station provides clear and secure radio communications in tactical command level radio networks in harsh ECM environment. The radio station is produced as a manpack, vehicular or fixed version

Note #2: R-168-5UN(1)E replaces R-159 (16 kg), R-159M (16 kg), R-163-10U (14 kg)

↳***Radio #3***

Name: R-168-25U-2

Quantity: ea2

Type: VHF

Frequency: MHz30-180

Capabilities: FH Voice Data Retrans

Maximum Range: km25-40

Mount Type: Vehicle

In Service: Yes

Length: mm205

Width: mm175

Height: mm95

Weight: kg3

Operation Modes: Fixed Frequency (FF) (simplex, two-frequency simplex). · Pseudorandom Reorganization of Working Frequency (PRWF) (simplex). · Adaptive Communication (AC) (simplex, two-frequency simplex). · The scanning reception at 8 in advance prepared frequencies. · Work with a suppressor of noise · Relaying. · The manual and automated record of the radio data with the optical interface (UVRD-O) which are radio given from the input equipment or from the external COMPUTER. · Emergency deleting of radio data. · Transfer and reception of circular, address and voice-frequency calls. · Management from the external COMPUTER on RS-232C joint. · Voice informant of actions of the operator. · Dialogue mode. · The automated working capacity control. · A simplex or a two-frequency simplex on one of 8 in advance prepared frequencies. · Simultaneous transfer of speech information and data.

Type of Work: - Phone (TLF) with the frequency modulation (FM). - TLF with technical masking of speech information. - Data transmission from the external equipment.

Note #1: Provides a radio communication in radio networks of a tactical control link a regiment - a battalion - a company.

↳*Radio #4*

Name: R-168-100U-2

Quantity: ea2

Type: VHF

Frequency: MHz30-108

Capabilities: FH Voice Data Retrans

Maximum Range: km25-60

Mount Type: Vehicle

In Service: Yes

Reorganization speed: 100 sk / with

Speed of Information Transfer, Speech: kbps16

Speed of Information Transfer, Data: kbps1,2... 16

Number of Radio Channels: ea2

Interval of Working Temperatures: - 40°C... + 55°C

Antena: R-168BShDA antenna

Weight, Transciever: kg3

Weight, VUFUS-25 block: kg19

Weight, VUFUS-100 block: kg18

Weight, UM-100 block: kg20

Weight, block of BV-25 fans: kg1

↳*Radio #5*

Name: R-168-100KA

Quantity: ea1

Type: HF

Frequency: MHz1.5-30

Capabilities: FH Voice Data Telegraph Retrans

Maximum Range: km25-360

Mount Type: Vehicle

In Service: Yes

Dimensions, A-100KAE Transceiver: 410mm x 260mm x 285mm

Dimensions, Automated ASU-100KA: 446mm x 295mm x 250mm

Dimensions,Secondary Power Supply of BP-100K: 175mm x 263mm x 285mm

Weight, A-100KAE transceiver: kg28

Weight, Automated ASU-100KA: kg19

Weight, Secondary Power Supply of BP-100K: kg9

Speed of Information Transfer: bps1200, 2400

Working Temperatures: - 40°C... +60°C

↳*Radio #6*

Name: R-438M Belozer

Quantity: ea1

Type: Portable SATCOM System

Frequency: INA

Capabilities: Voice Data

Maximum Range: km5,000

Mount Type: Manpack

In Service: Yes

Transfer Rates: bps1,200

Two Channel Receiving Mode: Yes

Note: There is very little information about the R-438M Belozer

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

The R-149BMR is a Command and Signal variant of the BTR-80. The R-149BMR is typically used at the Russian equivalent to the United States Army's Brigade and Battalion Level. The BTR-80 is an 8×8 wheeled amphibious armoured personnel carrier (APC) designed in the USSR. The BTR-80 is a modern, lightly armored vehicle with a diesel power plant. It is manufactured at the Gorkiy Automobile Factory in Nizhniy Novgorod and has been in service since the early 1980s. The BTR-80 is a lightly armored amphibious vehicle with a collective chemical-biological-radiological (CBR) protective system. Operated by a crew of three, the

vehicle can carry a squad of seven infantry troops. The BTR-80 8 x 8 armored personnel carrier is intended to carry personnel on the battlefield and provide close fire support. It can also carry out reconnaissance, combat support and patrol missions. It entered service with the Russian army in the late 1980's and has since been used in a number of military conflicts, including UN peacekeeping operations. The vehicle is in production and in service with the Russian army and with a number of other countries.The BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Although the armament is same as BTR-60 and BTR-70, except for added smoke grenade dispensers on the back of the turret, the conical turret has been improved and the gun can elevate higher.

ASLAV-C Australian 8x8 Amphibious Armored Command and Control Vehicle



Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armoured Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilised M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
- **ASLAV Type II:** The ASLAV Type II has no turret and greater internal capacity and is derived from the Canadian Bison Armoured Personnel Carrier. The ASLAV Type II has a crew of two (commander and driver) and is armed with a pintle mounted M2 12.7 mm machine gun. In a number of vehicles, the standard machine gun pintle mount was replaced by a Kongsberg Protector remote weapon station (RWS), which can accommodate either a 12.7 mm machine gun or a Mk 19 40mm automatic grenade launcher. Using a common hull design installed with interchangeable Mission Role Installation Kits (MRIKs), it can be converted into any one of four variants.
- **ASLAV-PC (Personnel Carrier):** is an Armoured Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance
- **ASLAV-C (Command):** is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialised seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.
- **ASLAV-S (Surveillance):** is a specialised surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilising two specialist MRIKs.
- **ASLAV-F (Fitter):** is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** is an Armoured Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-C
Type: Armored Command and Control Vehicle
Family: ASLAV
In Service: In the Australian Army, the ASLAV equips the Cavalry Squadrons of the Royal Australian Armoured Corps. A Cavalry Squadron comprises a headquarters element, an echelon and three sabre troops of six ASLAVs, each troop is further

broken down into two patrols each comprising two ASLAV-25s and one ASLAV-PC. The ASLAV equips two squadrons from each of the Australian Army's Armoured Cavalry Regiments, the 1st Armoured Regiment in Adelaide, the 2nd Cavalry Regiment in Townsville, and the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane, as well as the School of Armour at Puckapunyal.

Crew: ea3

Passenger Capacity: In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.5

Trench: m2

Fording Depth: Amphibious

Note: The ASLAV-C is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Communications

VHF Radio: Yes

Note: ASLAV-C (Command) – is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts.

Main Gun

Note: The turret can be traversed and the main gun fired while vehicle is afloat.

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,200

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun

Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×51mm NATO (STANAG 2310)
Basic Load: 1,200

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: INA
Thermal Sight Gunner: INA
Main Gun Stabilization: INA
Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-C provides protection against small-arms fire, mine-blasts and artillery fragments.
Turret Armor: INA. The ASLAV-C is fitted with a two-man turret, similar to that of the LAV-25.
Applique Armor: Protection of this reconnaissance vehicle can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: INA

Notes:

ASLAV-C (Command) – is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialised seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level. The Australian Light Armoured Vehicle (ASLAV) is an eight-wheeled amphibious armoured reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armoured fighting vehicles. The ASLAV is a highly mobile, eight-wheel drive, amphibious armoured fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tyres through the use of solid-core run-flat tyres. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

Kushetka-B Russian 8x8 Amphibious Command and Staff Vehicle





Tiers:



System

Alternative Designation: R-149BMR

Crew: ea1 plus vehicle commander

Troop Capacity: eaVehicle holds 5-7 personnel; expect to see 4-6 staff personnel in this configuration. Normal configuration for rear compartment has 2 officer workstations and two radio operator consoles.

Weight, Combat: mt13

Chassis: K1Sh1 version UnSh wheeled 8x8, derived from the BTR-80

Firing Ports: Yes

↳*Dimensions*

Height, Overall: m2.63

Length, Overall: m7.65

Width, Overall: m2.9

Automotive

Engine Power: hp260

Range, Cruising: km600

Fording Depth: mAmphibious

Engine Type: Diesel

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h9

Speed, Average Cross: UNK

Speed, Cross: UNK

Speed, Maximum Off: 50

Communications

Encryption: Yes

Operate on the Move: Yes

WiFi Enabled: Yes

Intercom Name: AVSKU

↳*Radio 1*

Name: R-168-5UM-1

Quantity: ea1

Range: km20

Frequency Range: MHz30-88

Frequency Band: VHF

Duplex: Full

FH: Yes

Voice: Yes

Data: No

↳*Radio 2*

Name: R-168-25U-2

Quantity: 2

Range: km40

Frequency Range: MHz30-108

Frequency Band: VHF

Duplex: Half

FH: NO

Voice: Yes

Data: Yes

Retrans: Yes

↳*Radio 3*

Name: R-168-100U-2

Quantity: 2

Range: km60

Frequency Range: MHz30-108

Frequency Band: VHF

Duplex: Full

FH: Yes

Voice: Yes

Data: Yes

↳*Radio 4*

Name: R-168-100 KA

Quantity: 1

Range: km360

Frequency Range: MHz2-30

Frequency Band: HF

Duplex: Full

FH: Yes

Voice: Yes

Telegram: Yes

↳*Radio 5*

Name: R-438M

Quantity: each1

Range: km5000

Purpose: Portable SatCom System

Frequency Band: UHF

Voice: Yes

Data: Yes

↳*Radio 6*

Name: R-168-0.1UM

Quantity: 3

Range: km1

Frequency Range: MHz44-56

Frequency Band: VHF

Voice: Yes

Armament

↳*Weapon 1 (Turret Mounted)*

Name: PKM

Type: Machine Gun

Cailber/Length: mm7.62mm (7.62x54R)

Rate of Fire: rd/min250 practical / 650 cyclic, 2-10 round bursts

Loader Type: Belt-fed (100 round belts)

Fire on the Move: Yes

Ammunition

↳*7.62mm AP-I, API-T*

Range, Maximum Aimed: m1,500

Range, Maximum Effective, Day: m1,000

Range, Maximum Effective, Night: INA

Range, Maximum Effective, On the Move: m400-500

Armor Penetration: 8mm (RHA) at 500m

Range, Maximum Effective, Anti-Aircraft: INA

Sights

Sighting Range: m1,500

Magnification: INA

↳*Night Sights*

Available: Yes

Protection

Armor, Turret Front: mmProtected against 12.7mm rounds

NBC Protection: Collective

Smoke Equipment: VEESS, 6 x 81mm smoke grenade launchers

Notes:

The vehicle shares the same configuration as BMM medical vehicles and the 1V152 / Kapustnik-B ACRV. Other less similar users of the UNSH / 1KSH1 Chassis include the BREM-K recovery vehicle and several radio and IW vehicles. HF and VHF communication while moving and at a stop. "Kushetka-B" offers continuous 48 - hours operation under the following conditions: - operating temperature 223 K - 323 K (-50°C to +50°C); - air humidity not more 98%, when temperature is not more 298 K (25°C); - low atmospheric pressure not less 6x104 Pa (450 mm of mercury); - vibration up to 300 Hz. "Kushetka-B" is furnished with equipment of the third and fourth generation. Field of application- tactical link of non-automated and automated control systems. We are ready to work out and produce command-staff vehicles with any other communication facilities and equipment on the transport base to the Buyer's option.

FV 511 Warrior British Infantry Command Vehicle






Tiers:



Variants:

- **FV510 Infantry Section Vehicle:** This is the principal version operated by the British Army, as described above. 489 were produced (including 105 as platforms for the mobility of ATGW teams, originally equipped with MILAN and later with Javelin).
- **FV511 Infantry Command Vehicle:** 84 of these were produced.
- **FV512 Mechanised Combat Repair Vehicle.:** Operated by REME detachments in Armoured Infantry battalions. It is equipped with a 6.5 tonne crane plus power tools and is able to tow a trailer carrying two Warrior power packs or one Challenger power pack. 105 of these were produced.
- **FV513 Mechanised Recovery Vehicle (Repair):** Also operated by REME detachments in Armoured Infantry battalions. It is equipped with a 20 tonne winch and 6.5 tonne crane plus power tools and (like the FV512) is able to tow a trailer carrying two Warrior power packs or one Challenger power pack. 39 of these were produced.
- **FV514 Mechanised Artillery Observation Vehicle:** This is operated by the Royal Artillery as an Artillery Observation Post Vehicle (OPV) and is fitted with mast-mounted Man-packable Surveillance and Target Acquisition Radar (MSTAR) and Position and Azimuth Determining System (PADS), with Image Intensifying and Infra Red equipment. The only armament is the 7.62 mm machine gun, as the 30 mm Rarden cannon is replaced by a dummy weapon. This allows space for the targeting and surveillance equipment while still keeping largely the same outward appearance of a standard Warrior in order to avoid becoming a priority target. 52 of these were produced.
- **FV515 Battery Command Vehicle:** This is operated by the Royal Artillery. 19 of these were produced. Desert Warrior. This was an export version adapted for operations in hostile desert conditions. It was fitted with the Delco turret as used on the LAV-25 wheeled IFV, mounting a stabilised M242 Bushmaster 25 mm chain gun with coaxial 7.62 mm chain gun and 2 x Hughes TOW ATGM launchers (one mounted on each side). In 1993, Kuwait purchased 254 Desert Warrior vehicles.
- **Warrior 2000.:** This was a new version developed for the Swiss Army. It did not enter production. It featured an all-welded aluminium hull, increased armour, digital fire control system and more powerful engine. It was fitted with the Delco turret, or a Land Systems Hagglunds E30 turret with Alliant Techsystems Bushmaster II Mk 44 30 mm cannon.

System

Alternative Designation: FV 511 Warrior
Type: Infantry Command Vehicle
Manufacturer: GKN Sankey/BAe Systems

Estimated Service Life: years50+

Family: Warrior Class

Crew: ea3

Passenger Capacity: ea7

Dimensions

Length: m6.34

Width: m3.03

Height: m2.7

Weight, Combat: tons25.7

Automotive

Engine Name: Perkins CV8 TCA

Engine Type: Diesel

Engine Power: hp550

Cruising Range: km660

Speed, Maximum Road: km/h75

Speed, Average Cross: 50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.75

Trench: m2.5

Fording Depth: m1.3

Transmission: Allison X-300-4B transmission

Communications

Primary Radio: Bowman digital radio system

HF Radio: High Capacity Data Radio (HCDR)

Note: This variant comes in three configurations: battalion, company and platoon command vehicles, all-purpose outfitted by the British army. Command vehicles are outfitted with different types of radios, map boards and other staff support equipment, depending on the command level of the vehicle.

Main Gun

Note: A future upgrade to the Warrior will be a 40mm CTA International CT40 Cannon

↳*System*

Name: 30 mm L21A1 RARDEN cannon

Type: mm30

Load Type: Manual with three round clips

Automatic Firing Mode: rounds6

Overall Length: m3.15

Barrel Length: m2.44

Total Weight: kg110

Barrel Weight: kg24.5

Ammunition Types: Armour Piercing Secondary Effect (APSE), High Explosive Incendiary (HEI), Armour Piercing Discarding Sabot (APDS)

Maximum Effective Range: m2,000

Rate of Fire: rds/min90

↳***Ammunition***

Type: APSE, HEI

Caliber: mm30

Cartridge: 30×170mm

Basic Load: ea250

Muzzle Velocity: m/s1,070

Maximum Effective Range: m2,000

Coaxial Weapon System

↳***System***

Name: L94A1, Hughes EX-34 Chain Gun

Type: 7.62mm Chain Gun

Manufacturer: Heckler & Koch

In Service: 1980-present

Max Rate of Fire: INA

Weight: kg17.86

Total Length: m1.25

Barrel Length: mm703

Action: Electrically driven

Feed System: disintegrating link belt

Variants: EX-31, L95A1 (short barreled version)

↳***Ammunition***

Type: RIfle (Chain Gun)

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (linked)

Muzzle Velocity: m/s862

Basic Load: eaINA

Effective Firing Range: m200-3,000

Penetration: No, Low penetration makes it ineffective against armor

Fire Control

Name: INA

Computerized FCS: Yes, Fire-Control (STAG FC) . Dual channel sight with integrated FCS for gunner

Thermal Sight Vehicle Commander: Yes, Battle Group Thermal Imaging (BGTI) system

Thermal Sight Gunner: Yes, Battle Group Thermal Imaging (BGTI) system

Main Gun Stabilization: No

CCD Camera for Commander: Yes

Commander Flat Panel Display: Yes

Platform Battlefield Infrastructure System Application (P-BISA): Yes

Protection

Hull Armor (Front Arc): all-round protection against 25mm armor-piercing rounds

Hull Armor (Sides and Back): all-round protection against 14.5 mm armor-piercing rounds.

Turret Armor: all-round protection against 25mm armor-piercing rounds

Applique Armor: Yes, after 2007 the Warrior IFV have the Warrior Added Protection (WRAP 2) avaialble

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: Available, dozer blades or light mine-clearing ploughs.

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, two banks of four 66 mm smoke grenade

Firing Ports: No, to aid in protecting the vehicle

Engine Fire Protection System: Yes

Joint Combat Identification Marking System: Yes

Note: Around 70 vehicles, upgraded to Theatre Entry Standard Herrick (TES (H)) protection kit

Notes:

Command Vehicle This variant comes in three configurations: battalion, company and platoon command vehicles, all-purpose outfitted by the British army. Command vehicles are outfitted with different types of radios, map boards and other staff support equipment, depending on the command level of the vehicle. It is also fitted with the Vickers Defense Turret mounting the 30-mm Rarden cannon. The Warrior tracked vehicle family is a series of British armored vehicles, originally developed to replace the older FV430 series of armored vehicles. The Warrior started life as the MCV-80, "Mechanised Combat Vehicle for the 1980s". One of the requirements of the new vehicle was a top speed able to keep up with the projected new MBT, the MBT-80 - later canceled and replaced by what became the Challenger 1 - which the then-current FV432 could not. The project was begun in the 1970s. GKN Defence won the production contract in 1980. A total of 789 FV510 and variants were manufactured for the British Army, and 254 of a modified version (Desert Warrior) was produced for the Kuwaiti Army. The Warrior incorporates

several design features in keeping with the UK's battlefield experience. In particular, there are no firing ports in the hull, in line with British thinking that the role of the armored personnel carrier/infantry fighting vehicle (APC/IFV) is to carry troops under protection to the objective and then give firepower support when they have disembarked. The absence of firing ports also allows additional appliqué armor to be fitted to the sides of the vehicle, which is invariably applied to Warriors involved in active operations. The cage armor used at one stage was replaced in 2007 by "Wrap Two" appliqué armor. The basic armor provides all-around protection against small arms ball ammunition. The crew of a Warrior comprises the driver, seated in the front hull, and the gunner and commander, who are both seated in the turret. The embarked infantry section can number up to seven soldiers, who are seated facing each other in the rear hull compartment. Passenger access is through a single electric ram powered door at the rear of the hull, rather than a drop-down ramp as in the US M113 APC and M2 Bradley IFV. Warrior Section Vehicles are able to carry and support seven fully equipped soldiers together with supplies and weapons, including a number of anti-tank weapons, for a 48-hour battlefield day in nuclear/biological/chemical conditions. The Warrior is driven by a Perkins-Rolls-Royce V8 Condor engine through a four-speed automatic gearbox. It is capable of a road speed of 46 miles per hour (74 km/h). The Warrior has the speed and performance to keep up with a Challenger 2 main battle tank over the most difficult terrain. The vehicle is fitted with a two-man GKN Sankey turret, armed with a non-stabilized L21A1 30 mm RARDEN cannon capable of destroying some APCs at a maximum range of 1,500 meters (1,600 yd), and an L94A1 EX-34 7.62 mm Hughes Helicopters coaxial chain gun. It is fitted with two clusters of four defensive grenade launchers (usually used with Visual and Infrared Screening Smoke – VIRSS). All Warrior Infantry Section Vehicles are now equipped with Bowman radios, which replaced the earlier Clansman radios, for enhanced communications, command and control. When first introduced, the vehicles were fitted with passive Image intensifier night vision sights. These have since been progressively replaced with Thales Optronics Battle Group Thermal Imaging (BGTI) sights to upgrade night fighting capabilities, with 8x magnification. As of 2007, 350 vehicles were fitted with BGTI.

R-149MA3 Russian 8x8 Amphibious Command and Signal Armored Personnel Carrier (APC)



Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation:
Description: Command and Control Tactical 8 X 8 wheeled APC.
Crew: ea3
Personnel: ea7
In Service: 1990-Present

Dimensions

Length: m7.7
Width: m2.9
Height: m2.41
Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403
Engine Type: Water-cooled, V8 Diesel
Automotive Performance: hp260
Range, Cruising: km600
Speed, Maximum Road: km/h80
Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

↳*Radio #1*

Name: R-168-0.1UM

Quantity: ea1

Type: VHF

Frequency: MHz44-56

Capabilities: Voice Data

Maximum Range: km1.2

Mount Type: Portable

In Service: Yes

↳*Radio #2*

Name: R-168-25U-2

Quantity: ea2

Type: VHF

Frequency: MHz30-108

Capabilities: FH Voice Data Retrans

Maximum Range: km25-40

Mount Type: Vehicle

In Service: Yes

↳*Radio #3*

Name: R-168-MRA

Quantity: ea1

Type: UHF

Frequency: GHz1.5-1.75

Capabilities: Voice and Data

Maximum Range: 6-20

Mount Type: Vehicle

In Service: Yes

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳*Ammunition*

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

R-149MA3 unified command vehicle based on BTR-80 APC. Unified command vehicle R-149MA3 is designated for providing command management and communications for the units and servicemen of company-platoon-squad levels. See Communication Equipment. The BTR-80 is an 8×8 wheeled amphibious armoured personnel carrier (APC) designed in the USSR. The BTR-80 is a modern, lightly armored vehicle with a diesel power plant. It is manufactured at the Gorkiy Automobile Factory in Nizhniy Novgorod and has been in service since the early 1980s. The BTR-80 is a lightly armored amphibious vehicle with a collective chemical-biological-radiological (CBR) protective system. Operated by a crew of three, the vehicle can carry a squad of seven infantry troops. The BTR-80 8 x 8 armored personnel carrier is intended to carry personnel on the battlefield and provide close fire support. It can also carry out reconnaissance, combat support and patrol missions. It entered service with the Russian army in the late 1980's and has since been used in a number of military conflicts, including UN peacekeeping operations. The vehicle is in production and in service with the Russian army and with a number of other countries.The BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Although the armament is same as BTR-60 and BTR-70, except for added smoke grenade dispensers on the back of the turret, the conical turret has been improved and the gun can elevate higher.

FV105 Sultan British Amphibious Command and Control Vehicle





Tiers:

1 2 3 4

Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV105 Sultan
Type: Command and Control Vehicle
Manufacturer: Alvis Vehicles, Coventry, England
Family: e Combat Vehicle Reconnaissance (Tracked), CVR(T), family
In Service: 1979-? (Great Britain) 1979-Present (see proliferation)
Crew: eaThe FV105 Sultan accommodates a crew of 5-6, including commander, driver, radio operator and watchkeepers.
Note #1: The rear of the FV105 Sultan is designed to be extended by an attached tent.
Note #2: Airportable

Dimensions

Length: m4.82	
Width: m2.28	
Height: m2.6	
Weight: tons8.346	
Ground Pressure: 0.36 kg/cm sq	
Ground Clearance: m0.36	

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)	
Type: Diesel	
Engine Power: hp195 hp	
Cruising Range: 640	
Speed, Maximum Road: km/h80	
Speed, Average Cross: INA	
Speed Maximum Swim: km/h6.4	
Gradient: deg60	
Side Slope: deg30	
Vertical Step: m0.5	
Trench: m2	
Fording Depth: m1	
Fording with Preperation Depth: mAmphibious	
Transmission: Self Change Gears TN15X	
Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers	
Fuel Capacity: 423 liters	

Main Weapon System

↳*System*

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun	
Type: 7.62mm General Purpose Machine Gun	
Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance	
Proliferation: + 1 Million	
Max Rate of Fire: rds/min650-1,000	
Length, Total: mm1,263	
Length, Barrel: mm630	
Width: mm118.7	

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳*Ammunition*

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea3,000

Fire Control

Name: INA

Computerized FCS: INA

Commander Cupola: No. 27 cupola with five day periscopes for all-around observation and a single wide-angle day periscope with a forward-sloping window and an interchangeable passive night sight.

Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.

Gunner Periscopes: ea2

Navigation System: Yes

Night Vision: Rank Precision Industries passive night sight

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: mmINA

Explosive reactive armor: mmINA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Survivability Equipment: Enhanced mine protection available

Notes:

The FV105 Sultan is a British Army command and control vehicle based on the CVR(T) platform. It has a higher roof than the APC variants, providing a more comfortable "office space" inside. This contains a large vertical map board and desk along one side, with a bench seat for three people facing it. Forward of this are positions for the radio operator, with provision for four radios, and vehicle commander, whose seat can be raised to give him access to the pintle-mounted G.P.M.G. The driver sits forward of this in a small compartment beside the engine space, on a chair with a spring-loaded seat that allows him to recline inside the vehicle or sit upright with his head out of the hatch.

1V15 Russian Artillery Command and Reconnaissance Vehicle





Tiers:

1 2 **3** 4

Variants:

- **1V15M:**

System

Alternative Designation: M1974-2B
Crew: ea7
Chassis: MT-LBu

Dimensions

Height, Overall: m2.72
Length, Chassis Overall: m7.26
Width, Overall: m2.85

Automotive

Engine Name: YaMZ-238
Engine Power: hp240
Engine Type: Diesel
Speed, Cross: INA
Speed, Maximum Road: km/h60
Speed, Maximum Swim: km/h4.5
Speed, Maximum Off: 26

Fording Depth: Amphibious

Communications

↳*Radio*

Radios: R-123M (2 each), R-107M (1 each), R-111 (1 each), R-130M (1 each)

Sensors / Components

Fire Direction (Automated): 1V520

Fire Direction (Manual): PUO-7

Navigation: 1T121-M Navigation System

Other Equipment: 1D15 laser rangefinder, DSP-30 rangefinder, 1PN44 day / night sight, PAB-2AM aiming circle, DS-1 stereoscopic rangefinder, VOP vision blocks and driver periscopes.

Armament

↳*Weapon 1 (TC's Weapon)*

Name: PKT

Cailber/Length: mm7.62

Type: Machine Gun

Range, Direct Fire: m1500

Range, Maximum Effective, Day: m1000

Range, Maximum Effective, Night: m1000

Rate of Fire, Cyclic: rd/min650 (2-10 round bursts)

Fire on Move: Yes

Protection

Armor, Hull: mm15

Armor, Turret Front: mm20

NBC Protection: Yes

Smoke Equipment: No

Notes:

The ACRV 1V15 is the battalion commander's vehicle of the 1V12 ACRV complex. The 1V15 can be distinguished from the 1V14 by the external antenna bracket on the rear of the vehicle. The ACRV is equipped with the 1T121 land navigation system, a 1D15 laser rangefinder, and the 1PN44 day/night sight mounted in a basket turret. The observer uses an analog coordinate converter to translate the polar location data when determining rectangular target coordinates. The 1V520 fire direction computer may be transported internally and dismounted at a command observation post. The artillery commander, assisted by target acquisition, fire direction, and communications personnel mans the vehicle. The artillery commander decides how to attack targets of opportunity and targets relayed to him be the supported maneuver unit.

PU-12M6 Russian 8x8 Mobile Command and Control Vehicle




Tiers:

1 2 3 4

Variants:

- **PU12M7 Battery Command Post:**

System

Alternative Designation: PU-12M6
Type: Battery Command Post Vehicle
Manufacturer: INA
Family: PU-12M Series
In Service: Late 1980s - Present
Crew: INA
Chassis: BTR-80
Passenger Capacity: INA
Note: There is very little unclassified information available online about the PU-12M6

Dimensions (Chassis: BTR:80)

Length: m7.7
Width: m2.9
Height: m2.41
Weight, Combat: tons13.6

Automotive (Chassis: BTR:80)

Engine Name: KamAZ-7403
Engine Type: Water-cooled, V8 Diesel
Engine Power: hp260
Maximum Range: km600
Speed, Maximum Road: km/h80
Speed, Average Cross: km/h50

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: Amphibious

Communications

Note: The R-161 Poisk family was widely fielded in the 1980-1990s, and has since been replaced by the R-166 Artek family which was developed in the late 1990s. The R-176 Antey family is the next generation of the Russian Ground Forces' long range, over-the-horizon radios for operational and strategic level control. Among other technological innovations, the R-176 Antey family, is reportedly a Software Defined Radio (SDR), meaning a radio that is primarily manipulated through software instead of hardware such as mixers, filters, modulators/demodulators, etc. These types of radios are capable of receiving and transmitting different waveforms based solely on the software used, instead of requiring physical modifications of hardware.

Command and Control System

Onboard Power Supply System: Yes

Navigation System: Yes, using GLONASS

Survey System: Yes

Data Transmission and Reception Equipment: Yes

Control of Short-Range Air Defence Missile Batteries: Via Coded Datalink: up to 6

Control of Short-Range Air Defence Missile Batteries: Via Telephone Link: up to 4

Control of Short-Range Air Defence Missile Batteries: Igla MANPADS (via coded datalink): up to 6

Number of Received Targets: up to 99

Coordinates Measurement Envelope: up to 100 km

Coordinates Measurement Envelope Maximum Altitude: up to 25 km

Data Transmission Range via field Telephone Wire: up to 15 km

Fire Control

Laser Target Desinator: No

Night Vision Devices: Yes

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Applique Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Life Support System: Yes

Notes:

The PU-12M6 mobile control post is designed to automate combat control of weapons employment by AD units on the move and at halt under air attack. It is a battery CP intended to operate as part of special purpose automated control systems. The PU-12M6 mobile CP is mounted on the BTR-80 wheeled armoured personnel carrier fitted with: • life support system; • power supply system; • navigation and survey system ; • radiation and chemical agent sensors; • night vision devices; • data transmission and reception equipment; • com munications aids; • spare parts, tools and accessories kit.

R-142 NSA Russian 6x6 Command and Control Vehicle



Tiers:



System

Alternative Designations: INA

Type: C2 Vehicle

Chassis: GAZ-66 truck

Crew: ea2

Troop Compartment Capacity: 7

Dimensions

Length: m7.73

Width: m3.34

Height: m3.375

Weight: mtons7

Ground Pressure: kg/cm2550

Cargo Bed Length: mm4,890

Cargo Bed Width: mm2,470

Cargo Bed Height: mm890

Cargo Bed Area: m212

Automotive

Troop Capacity: 7

Payload on/off Highway: kg6,000

Turning Radius: m10

Wheels: ea6

Size: mm533 X 610

Central Tire Pressure Regulation System: Yes

Engine V8, diesel turbocharged: hp165

Cooling: Water

Cruising Range (road): km1000

Speed: km/h85

Left Tank: liters120

Right Tank: liters120

Off Highway: km2,000

On Highway: km7,000

Gradient (loaded): deg31

Fording Depths: m0.5

Communications

Command level: Division, brigade, and battalion

Intercoms: 2

Communications links: 1-12

Encryption E-24D: Yes

Digital navigation monitor GLONASS: Yes

Graphic display: Yes

Automated networks: Yes

Emplace Time: min2-3

Vehicle can communicate on the move: Yes

CP can operate autonomously/in network: Yes/Yes

Onboard generator: Yes

Whip antennae for mobile comms: 2 HF whips, 3 VHF

Other antennae: VHF discones masted, HF dipoles and 11-m mast

↳*R-173M Standard VHF Radio*

Frequency Range: MHz0-80

Transmission Range: km32

↳*R-171M Full duplex, voice/digital VHF Radio*

Frequency Range: MHz30-76

Transmission Range: km35-80

↳*R-163-50K HF telephone and telegraph radio communication*

Frequency Range: MHz30-80

Frequency Spacing: INA

TransmissionRange: km20-60

Weight of Transceiver: Kg35

Antennas: 2m and 4 m whip

Input of Frequency, Setting of Modes: keypad controlled

Tuning Time: sec15

Retuning Time Between preset Frequencies: sec1,5

The number of preset frequencies: ea16

Power Supply: volts27

↳*R-163-10V voice/telegraph HF/VHF Radio*

Frequency Range: MHz2-30

Transmission Range: km10-30

↳*R-438 Barrier-T Satellite Radio*

Transmission Range: km5000

Notes:

R-142 was a complete mobile HF and VHF radio system, developed in the USSR and used in the Warsaw Pact countries during the Cold War, consisting of a fairly large metal rack with a number of radio transceivers, intercoms, interfaces, control units and encryption devices. The radio station was generally housed inside a communications shelter mounted on a GAZ-66 truck. The van body is divided into a forward and rear section. The forward section houses most of the radios and has 2 radio operator stations. The rear section has a table with cushioned bench seats capable of seating 3 on each side. The Erika UHF and the ICOM VHF aviation band radio are located in the rear along with 2 intercom/switching units allowing the use of the R-168 series radios.

1V13 Russian Artillery Command and Reconnaissance Vehicle





Tiers:

1 **2** 3 4

System

Alternative Designation: M1974-1

Manufacturer: Ob'yekt 10

Crew: ea6

Chassis: MT-LBu

Dimensions

Length: 7.21 m

Width: 2.85 m

Height: 1.905 m

Weight, Combat: mt15.7

Automotive

Engine Type: YaMZ-238, 240hp Diesel

Speed, Maximum Road: km/h62

Speed, Maximum Off: 26

Speed, Cross: INA

Speed, Maximum Swim: km/h6

Fording Depth: Amphibious

Range: km500

Gradient: %60

Side Slope: %30

Communications

↳*Radio*

Name: R-123M (3 each)

Armament

↳*Weapon 1 (TC's Weapon)*

Name: DShK
Type: Heavy Machine Gun
Cailber/Length: mm12.7
Range, Direct Fire: m1500
Range, Maximum Effective, Day: m1500
Range, Maximum Effective, Night: m1500
Rate of Fire, Cyclic: rd/min80-100
Fire on Move: Yes

Sensors / Components

Fire Direction (Automated): APK automated firing data receiver
Fire Direction (Manual): PUO-7
Navigation: 1T121-M Navigation System
Other Equipment: DSP-30 rangefinder, K-1 collimator, roof-mounted periscopic aiming circle, VOP-7 vision blocks and driver periscopes.

Protection

Armor, Hull: mm15
Armor, Turret Top: INA
Armor, Turret Front: mm20
NBC Protection: Yes
Smoke Equipment: No

Notes:

The set provides the command and control vehicles for the self propelled cannon battalions. The eight-vehicle set consists of three 1V13 battery senior officers' vehicles, three 1V14 battery commander's vehicles, one 1V15 battalion commander's vehicle, and one 1V16 battalion FDC/chief of staff's vehicle. The 1V12M Faltset ACRV set is a modernized version of the system. The installation of an upgraded electronics package in the vehicles created the requirement for an external-mounted power generator. In addition to freeing a small amount of space inside the vehicle, the external mounting reduces the internal noise level. The ACRV 1V13 is the battery FDC of the 1V12 ACRV complex. The battery senior officer, assisted by fire direction and communication personnel, mans the vehicle. It has direct radio communications with the battery COP, the battalion COP, and the battalion FDC. The vehicle is equipped with a land navigation system and has a roof mounted periscopic aiming circle. The roof mounted periscopic aiming circle allows the battery senior officer to ability to lay the howitzers for direction from within his vehicle. There is no battlefield observation equipment present on the 1V13.

1V119 Russian Artillery Command and Reconnaissance Vehicle





Tiers:

1 2 3 4

System

Alternative Designations: 1V119 Spektr

Crew: ea6

Platform (chassis): BMD-1

Dimensions

Combat Weight: mt6.7

Chassis Length Overall: m5.88

Height Overall: m1.97

Width Overall: m2.63

Automotive

Engine Type: Type 5D20, 240 hp V-6, liquid-cooled diesel

Cruising Range: km500

Max Road Speed: km/h61

Max Off-Road Speed: km/h35

Cross-Country Speed: INA

Max Swim Speed: km/h10

Fording Depths: mAmphibious

Communication

Radio: R-123M (3 each), R-107M (1 each)

Sensors/Components

Navigation: 1T121-M Navigation System

Automatic Fire direction: 1V520

Manual Fire direction: PUO-7

Other equipment: 1D15 laser rangefinder, DSP-30 rangefinder, 1PN44 day/night sight, PAB-2AM aiming circle, DS-1 stereoscopic rangefinder, VOP-7 vision blocks and driver’s periscopes

Protection

Armor Turret Front: INA

Armor Turret Top: INA

Armor Hull: mm15

NBC Protection System: Yes

Smoke Equipment: No

Notes:

The ACRV 1V119 is associated with the deployment of the 2S9 Nona-S 120mm combination gun and can be parachute landed with airborne troops. The 1V119’s sensor and fire direction package is similar to the ACRV 1V14.

BTR-60-R-145BM Russian 8x8 Command Post and Communication Center Vehicle



Tiers:



Parent:

BTR-60 Russian Armored Personnel Carrier (APC)

Variants:

- **BTR-60P:** Initial model with open top, pintle-mounted 7.62-mm machine gun
- **BTR-60PA/BTR-60PK (12 passengers only):** Covered top, NBC protection, pintle-mounted 7.62-mm MG, still exit over top
- **BTR-60PB (space for 8 soldiers for dismounted operations):** Most common variant with BRDM-2 MG turret with a 14.5-mm MG & coaxial 7.62-mm; troops exit over top
- **Modernized BTR-60PB:** BM2 Turret with 30-mm 2A42 Cannon & 7.62-mm PKTM MG; 30-mm AGS-17 AGL on left side
- **BTR-60U:** Command vehicle with additional radios
- **BTR-60 PU-12/12M:** Anti-Aircraft units' command vehicle
- **BTR-60 MS:** Radio vehicle with High Ball antenna
- **BTR-60 VVS:** Sans turret with additional radios
- **BTR-60 PBK:** BTR-60PB with 3 radios
- **BTR-60 1V18:** Artillery observation vehicle
- **BTR-60 1V19:** BTR-60 1V18 for FDC operations
- **BTR-60 R-145BM:** Communications vehicle with 5 radios
- **BTR-60 R-975:** Forward air-control vehicle with turret
- **BTR-60-Z-351BR:** Power production vehicle with generator
- **BTR-60-P-238BT:** Switchboard vehicle for communications
- **BTR-60-P-240BT:** Integrates radio & wire communications- R-123M radio & R-241 switchboard
- **BTR-60-P241BT:** Equipped with P-241 telephone system
- **BTR-60-R-137B:** Communications vehicle with turret
- **BTR-60 ACRV:** Artillery Battery C2 & recon vehicle
- **BTR-60-R-145:** Additional radio, but no turret
- **BTR-60-R-156BTR:** C2 vehicle with additional radios
- **BTR-60-R-409BM:** Relay vehicle-R-409 & R-123M radios
- **BTR-60PAU (Bulgaria):** Artillery command vehicle
- **BTR-60PB-MD (Bulgaria):** Upgraded engine, radios, & NBC equipment
- **BTR-60P Maintenance Assistance (MTR-2):** Maintenance vehicle with tarp over troop compartment
- **BTR-60 SPAAG (Cuba):** Twin 30-mm anti-aircraft cannons
- **BTR-60 Djibouti (Djibouti):** AML-90 turret on BTR-60
- **BTR-60BD:** Speed increased to 100 km/h & range to 800 km
- **MTP-2:** Armored Recovery Vehicle
- **BTR-60PZ:** Final production model with 1PZ-2 roof-mounted periscope
- **BTR-60-R-140BM:** C2 vehicle with turret
- **MEP:** Infantry command post
- **BTR-60PB FAC:** Turreted FAC vehicle without the gun

System

Alternative Designations: BTR-60-R-145BM

Manufacturer: Gorkovsky Avtomobilny Zavod (Soviet Union) Ratmil Regie Autonoma (Romania, TAB-71)

Description: 8 X 8 wheeled APC designed to replace the BTR-152; original design (BTR-60) had an open top & 14 soldiers had to exit over the sides; 3 firing ports on each side of vehicle

Crew: ea2

Passengers: eaINA

Dimensions

Length: m7.56

Width: m2.83

Height: m2.31

Weight, Combat: tons10.3

Automotive

Engine Name: Two(2) x GAZ-40P

Engine Type: 6-cylinder gasoline

Engine Power: hp90 hp each, 180 hp combined

Range, Crusing: km500

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Fuel Capacity: INA

Note: The BTR-60 is fully amphibious, propelled in the water by a jet centrally mounted at the rear of the hull

Communications

Radio #1: Two(2) x R-11/171 Radios

Radio #2: One(1) x R-123/173 Radio

Radio #3: One(1) x R-145 Radio

Radio #4: One(1) x R-130M

Radio #5: One(1) x R-8XX Ground-to-air Radio set

Main Weapon System

Note: The BTR-60-R-145 has removed the turret and the 14.5mm Heavy Machine Gun in order to facilitate the room needed for the additional Radio Equipment

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: General Purpose Machine Gun
Caliber: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces
Manufacturer: Degtyaryov plant
In Service: 1961-Present
Proliferation: + 1 Million
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds/min250-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length, Total: mm1,203
Length, Barrel: mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights
Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S
Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR km
Muzzle Velocity: m/s855
Basic Load: ea2,500
Accuracy of fire at 300 m: mm90

Fire Control

Name: INA
Computerized FCS: INA
Thermal Vehicle Commander: TKN-1
Thermal Gunner: PP-61A optical sight
Main Gun Stabilization: INA
Turret Type: BPU-1 turret
Infrared Light: OU-3 infrared light

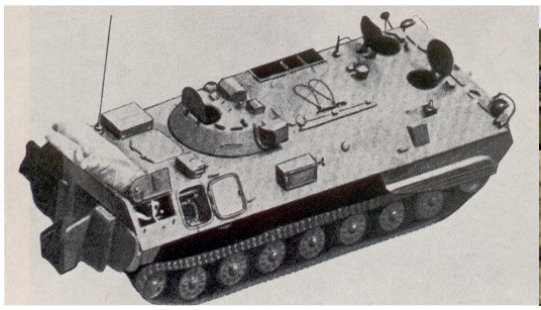
Protection

Armor Material: Welded steel
Armor Hull: 7 mm at 86° hull upper front 9 mm at 47° hull lower front 7 mm hull sides 5 mm hull upper rear 7 mm hull lower rear 5 mm hull floor 7 mm hull roof
Armor (turret front): mm10 mm turret front 7 mm turret sides 7 mm turret sear 7 mm turret roof
Applique Armor: mmNo
Explosive Reactive Armor: mmNo
Active Protection System: No
Self-entrenching Blade: No
NBC Protection System: Collective (closed vehicles)
Smoke Equipment: No
Survivability Equipment: No

Notes:

The BRT-60-R-145BM Russian Command Post and Communication Center Vehicle is a variant of the BTR-60 that has removed the turret and equipped the vehicle with a R-245 radio and other communications equipment. Additional equipment includes: Two x R-111/171, one x R-123/173, one x R-130M and one x R-8xx ground-to-air radio sets.

1V14 Russian Artillery Command and Reconnaissance Vehicle





Tiers:



System

Alternative Designation: M1974-2A

Manufacturer: Ob'yekt 10

Crew: ea6

Chassis: MT-LBu

Dimensions

Height, Overall: m2.72

Length, Chassis Overall: m7.26

Width, Overall: m2.85

Weight, Combat: 15.7 mt

Automotive

Engine Name: YaMZ-238

Engine Power: hp240hp

Engine Type: Diesel

Speed, Maximum Road: km/h60

Speed, Maximum Swim: km/h4.5

Fording Depth: mAmphibious

Speed, Cross: INA

Speed, Maximum Off: 26

Communications

↳*Radio*

Name: R-123M (3 each), R-107M (1 each)

Armament

↳*Weapon 1 (TC's Weapon)*

Name: PKT
Type: Machine Gun
Cailber/Length: mm7.62
Range, Direct Fire: m1,500
Range, Maximum Effective, Day: m1,000
Range, Maximum Effective, Night: m1,000
Range, Maximum Effective, On the Move: mYes
Rate of Fire, Cyclic: 650, 2-10 round bursts
Fire on Move: Yes

Sensors / Components

Fire Direction (Automated): 1V520
Fire Direction (Manual): PUO-7
Navigation: 1T121-M Navigation System
Other Equipment: 1D15 laser rangefinder, DSP-30 rangefinder, 1PN44 day/night sight, PAB-2AM aiming circle, DS-1 steroscopic rangefinder, VOP-7 vision blocks and driver periscopes.

Protection

Armor, Hull: mm15
Armor, Turret Top: INA
NBC Protection: Yes
Smoke Equipment: No

Notes:

The ACRV 1V14 is the battery commander's vehicle of the 1V12 ACRV complex. The ACRV is equipped with the 1T121 land navigation system, a 1D15 laser rangefinder, and the 1PN44 day/night sight mounted in a basket turret. The observer uses an analog coordinate converter to translate the polar location data when determining rectangular target coordinates. The 1V14 has an internal power generator. The 1V520 fire direction computer may be transported internally and dismounted at a command observation post. The artillery commander, assisted by target acquisition, fire direction, and communication personnel mans the vehicle. The artillery commander decides how to attack targets of opportunity and targets relayed to him by the supported maneuver unit.

BTR-80K Russian 8x8 Amphibious Armored Command Vehicle





Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: BTR-80K
Description: 8x8 Amphibious Armored Command Vehicle
Crew: ea3
Personnel: ea7

Dimensions

Length: m7.7
Width: m2.9
Height: m2.41
Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403
Engine Type: Water-cooled, V8 Diesel
Automotive Performance: hp260
Range, Cruising: km600
Speed, Maximum Road: km/h80
Speed, Maximum Off-Road: km/h60
Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Primary: 2 X R-173

Secondary: R-163-50У series of radio equipment.

Intercome: R-174

Telescopic Antenna Mast: Yes

IFF Interrogator: Yes

Headset: TSh-4 interphone headsets with GVSh-T-13 head and chest set.

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Aiming Ring: PAB- 2M artillery periscope aiming ring

Night Vision Sight: TNP-165A night vision sight

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

BTR-80K (GAZ-59031) (kommandnyj) – command vehicle APC with telescopic antenna mast, TNA-4 navigation device and R-163-50У series of radio equipment. The BTR-80K is intended to enable the infantry battalion commander to command sub-units and maintain communications with headquarters. It is based on the BTR-80, with the same 14.5mm and 7.62mm machine guns, but has a number of extra systems necessary for this mission. These include: two VHF-173 radio sets, antenna device set for UHF antenna, IFF automatic interrogator, TNA-4 navigational aid, PAB- 2M artillery periscope aiming ring, TNP-165A night vision sight and TSh-4 interphone headsets with GVSh-T-13 head and chest set. The BTR-80 is an 8×8 wheeled amphibious armoured personnel carrier (APC) designed in the USSR. The BTR-80 is a modern, lightly armored vehicle with a diesel power plant. It is manufactured at the Gorkiy Automobile Factory in Nizhniy Novgorod and has been in service since the early 1980s.

The BTR-80 is a lightly armored amphibious vehicle with a collective chemical-biological-radiological (CBR) protective system. Operated by a crew of three, the vehicle can carry a squad of seven infantry troops. The BTR-80 8 x 8 armored personnel carrier is intended to carry personnel on the battlefield and provide close fire support. It can also carry out reconnaissance, combat support and patrol missions. It entered service with the Russian army in the late 1980's and has since been used in a number of military conflicts, including UN peacekeeping operations. The vehicle is in production and in service with the Russian army and with a number of other countries.The BTR-80 is superior to BTR-60/70 with a larger chassis, high-angle-of- fire turret, and single more powerful diesel engine (vs gasoline). Although the armament is same as BTR-60 and BTR-70, except for added smoke grenade dispensers on the back of the turret, the conical turret has been improved and the gun can elevate higher. The Soviets-based the BTR-80 on the BTR-70 APC. It has a single 260-hp, V-8 turbocharged, water-cooled, diesel engine, an improvement over the twin gasoline engines installed in the BTR-60 and BTR-70 vehicles. The reconfigured rear portion of the hull accommodates the new, single engine. The Soviets removed the roof chamfers of the modified BTR-70, raised the rear, and squared off the rearward-sloping engine compartment. Standard equipment includes TNPO vision blocks, TNP-B and TKN-3 optical devices for the driver and commander, an OU-3GA2M infrared search light, six 81 mm smoke grenade launchers 902V "Tucha", a radioset (R-173 or R-163-50U), an intercom, and hydrojets for amphibious propulsion. The Soviets modified the truncated cone turret used on the BTR-70 for the BTR-80 by redesigning the mantlet. This allows the 14.5 mm (0.57 in) KPVT and coaxial 7.62 mm (0.3 in) PKT machine guns to be elevated to a maximum of 60 degrees. This high angle of fire is useful in engaging targets on steep slopes, in urban fighting, and for engaging low slow flying air targets.[5] The Soviets had also modified the design and positioning of the firing ports; the ports are now round, rather than tear-shaped, and have ball mounts similar to those used on the BMP-1. The forward firing ports now sit in angled recesses, which allows infantry to fire to the front of the vehicle. The redesigned side doors are split horizontally. The upper portion opens forward; this gives dismounting troops some protection against small arms fire from the front of the vehicle. The lower portion opens down, forming a step. Six smoke grenade projectors are mounted on the rear of the turret. The BTR-80 can climb a slope with up to 60% gradient and climb a vertical step of 0.5 m.

R-149AKSh-1 Russian 6x6 Command and Signal Vehicle





Tiers:



System

Alternative Designation: R-149AKSh-1

Type: Command and Signal Vehicle

Manufacturer: Kamaz

Family: INA

In Service: After 2010-Present

Cab Seating: driver/electrician, and an officer compartment with 5 crew workstation

Passenger Capacity: INA

Configuration: 6x6

Liter/Stretcher Capacity: INA

Dimensions

Length: m7.85

Width: m2.5

Height: m3.29

Weight, Combat: INA,

Maximum Load: tons6

Automotive

Engine Name: KamAZ-740.13-260 Diesel

Engine Type: Diesel

Engine Power: hp260

Cruising Range: km1,000

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.75

Maximum Load: tons6

Note #1: Engine is also equipped with cold weather starting device and can be started at temperatures down to -50°C

Note #2: Vehicle has a full-time all-wheel drive and is fitted with a central tyre inflation system

Communications

↳*Radio #1*

Name: R-168-100U-2

Quantity: ea2

Type: VHF

Frequency: MHz30-108

Capabilities: FH, duplex, voice/data, FH VOice Data Retrans

Maximum Range: km25-60

Mount Type: Vehicle

In Service: Yes

↳*Radio #2*

Name: R-168-5KV

Quantity: ea2

Type: HF

Frequency: MHz1.5-30

Capabilities: Voice Telegraph

Maximum Range: km15-300

Mount Type: Vehicle

In Service: Yes

↳*Radio #3*

Name: R-168-5UN-2

Quantity: ea1

Type: VHF

Frequency: MHz30-108

Capabilities: FH Voice

Maximum Range: km10-20

Mount Type: Man-Portable

In Service: Yes

↳*Radio #4*

Name: R-168-MRA

Quantity: ea1

Type: UHF

Frequency: GHz1.5-1.75

Capabilities: Voice Data

Maximum Range: km6-20

Mount Type: Vehicle

In Service: Yes

↳*Radio #5*

Name: R-612-18 100-172/220-400

Quantity: ea1

Type: VHF/UHF

Frequency: INA

Capabilities: Aviation band, Voice Data

Maximum Range: km15-35

Mount Type: INA

In Service: Yes

Protection

Armor: INA, It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The R-149AKSH is a Command and Signal Vehicle adopted from a KamAZ-530 General Utility Truck. The Truck is divided into an electronics compartment with 3 crew workstations and a work area for the driver/electrician, and an officer compartment with 5 crew workstations. Chassis: The KamAZ-5350 general utility truck is a member of Mustang family. This family of military trucks includes the KamAZ-4350 (4x4) and KamAZ-6350 (8x8) with numerous variants. This general utility truck is a further development of the KamAZ-4310, which was launched in the early 1980s. It was officially accepted to service with the Russian Army in 2002 and a small-scale production commenced in 2003.

1V152 FIST Kapustnik-B Russian 8x8 Amphibious Command and Forward Observer Vehicle




Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
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- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
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- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
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- **Saur 2 (Romania):** Improved Saur 1 prototype
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- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
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- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: 1V152 FIST

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Manufacturer: Arzamas

In Service: 1986-Present

Chassis: BTR-80

Crew: ea3

Personnel: ea7

Note #1: The crew enter and exit through enlarged side hatches, which are clamshell hatches opening upwards and downwards

Note #2: The 1V152 also carries an assortment of maps and map markers, manual plotting devices, and hand-held calculators as a backup for the computers

Dimensions (Chassis: BTR-80)

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive (Chassis: BTR-80)

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Winch: Yes, The 1V152s have a winch in the front with a capacity of 4.5 tons and 60 meters of cable

Internal Generator: Yes, The 1V152 has an internal 4kW generator to power electronics and sensors when the vehicle's engine is off

Communications

Antenna Placement: There are special, folding or retractable antennas on the front left of the passenger compartment, on the right rear of the same compartment, and on the front left of the bow roof

Antenna: The 1V152 has a 10-meter extendible antenna for extended-range communications and more advanced whip antennas

Note: There is very little information about the radios equipped on the 1V152 FIST

↳*Radio #1*

Name: INA

Type: Long-Range VHF Radio

Data Capable: Yes

↳*Radio #2*

Name: INA

Type: Long-Range VHF Radio

Data Capable: Yes

↳*Radio #3*

Name: INA

Type: Long-Range HF Radio

Data Capable: No

↳*Radio #4*

Name: INA

Type: Medium-Range Radio

Data Capable: INA

↳*Radio #5*

Name: INA

Type: Short-Range Radio

Data Capable: INA

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA
Type: API-T
Caliber: mm14.5
Cartridge: 14.5×114 mm
Muzzle Velocity: m/s1,005
Basic Load: ea500
Effective Range (Day): m2,000
Effective Range (Night): INA
Tactical Range: m1,500-2,000
Armor Penetration: 20 at 1,000 m/ 30 at 500 m
Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Caliber: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds.min250-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length, Total: mm1,203
Length, Barrel: mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights
Effective Firing Range (With Sight Adjustments): m100-1,500

↳***Ammunition***

Name: 57-N-323S
Type: Rifle
Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: Yes; however the computer does not compute fire solutions, though it can calculate corrections to observed fire

Computerized FCS Upgrade: Later versions increase the capabilities and reliability of the main computer to allow it to tie into the new GLONASS system or the inertial navigation system, and give recommendations on what round might be the most effective. The improved version has an advanced active/passive IR viewer with a range of 1500 meters in the passive mode and 3000 meters in the active mode.

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Night Vision: Name: INA; extensive night vision equipment. Passive IR (D, C), Advanced Active/Passive IR (Turret), Image Intensification (C, Turret), Thermal Imaging (Turret)

Day Vision: Name: INA; extensive Day vision equipment

Laser Rangefinder: Yes

Vision Blocks: The commander and driver have vision blocks to the front and to their respective sides to supplement this, and each have a night vision block

Turret Elevation: The turret has electric traverse and elevation

Inertial Navigation System and Sensors: Yes

Targeting Information: The 1V152 FIST provides targeting information to artillery, mortar, or MRL batteries

Hand-Held Laser Rangefinder: Yes, this laser rangefinder can be connected by a cable to the vehicle’s artillery fire control computer to feed information directly to it

Hand-Held Image Intensifier: YEs, along with several pairs of binoculars

Laser Designator: Yes

Thermal Imager: Yes

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Bullet-Resistant Windows: Yes

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Radiological Shielding: Yes

Smoke Equipment: The turret has a cluster of four smoke grenade launchers on either side of the turret

Notes:

The 1V152 is called a “unified command vehicle;” of somewhat modular interior design, there are two versions of the 1V152, a FIST vehicle and an FDC vehicle. Both carry the same designation, but have different equipment and different capabilities. The BTR-80 1V152 version is used by battalion commanders and forward observers in field artillery units. This variant contains special navigation, range finding, and vision equipment The 1V152 FIST version uses a wider and somewhat taller turret which not only houses the gunner/observer, but a large array of vision equipment, including extensive night vision equipment and day vision equipment along with a laser rangefinder. The original 1V152 had a relatively simple control computer to tie together the inertial navigation system and the sensors and provide targeting information to artillery, mortar, or MRL batteries. This computer does not compute fire solutions, though it can calculate corrections to observed fire. The 1V152 FIST has three long-range radios (two of them data capable), one medium-range radio, and one short-range radio. The 1V152 has an internal 4kW generator to power electronics and sensors when the vehicle’s engine is off. The 1V152 has a 10-meter extendable antenna for extended-range communications and more advanced whip antennas. The 1V152 also carries an assortment of maps and map markers, manual plotting devices, and hand-held calculators as a backup for the computers. The 1V152 carries not only a turret-mounted laser rangefinder, but also a hand-held laser rangefinder for use away from the vehicle; this laser rangefinder can be connected by a cable to the vehicle’s artillery fire control computer to feed information directly to it. The vehicle also carries a hand-held image intensifier and several pairs of binoculars. Later versions increase the capabilities and reliability of the main computer to allow it to tie into the new GLONASS system or the inertial navigation system, and give recommendations on what round might be the most effective. This computer can produce limited fire solutions, though they will not be as accurate as those produced by a dedicated FDC. The improved version has an advanced active/passive IR viewer with a range of 1500 meters in the passive mode and 3000 meters in the active mode; the 1V152 FIST has a small IR searchlight for use when the IR is in the active mode. The improved version adds a thermal imager and a laser designator.

1V18/1V19 Russian Artillery Command and Reconnaissance Vehicle





Tiers:

1 2 3 4

System

Alternative Designations: M1979-2A (1V17), M1979-2B (1V18)

Crew: ea6

Platform: BTR-60PB

Dimensions

Combat Weight: mt10.1

Chassis Length Overall: m7.22

Height Overall: m2.06

Width Overall: m2.82

Automotive Performance

Engine Type: 2 GAZ-49B 90 hp (180 hp total) in-line, water-cooled gasoline

Cruising Range: km500 km

Max Road Speed: km/h80

Max Off-Road Speed: km/h60

Cross-Country Speed: INA

Max Swim Speed: km/h10

Fording Depths: Amphibious

Radio: 1V18: R-123M (3 each), R-107M (1 each) 1V19: R-123M (2 each), R-107M (1 each), R-111 (1 each), R-130M (1 each)

Sensors/Components

Navigation: 1T121-M Navigation System

Automated Fire direction: 1V520

Manual Fire direction: PUO-7

Other equipment: 1D15 laser rangefinder, 1PN44 day/night sight, PAB-2AM aiming circle, DS-1 stereoscopic rangefinder

Protection

Armor Turret Front: Protected against 12.7mm
Armor Turret Top: Protected against 7.62mm
Armor Hull: Protected against 7.62mm
NBC Protection System: Yes
Smoke Equipment: No

Notes:

In 1979, the Soviet Union introduced a similar wheeled ACRV set for multiple rocket launcher and towed cannon units. The eight-vehicle set consists of three 1V110 battery senior officer’s vehicles, three 1V18 battery commander’s vehicles, one 1V19 battalion commander’s vehicle, and one 1V111 battalion chief of staff’s vehicle. Early versions of the 1V17 acrv set included a 1V111 equipped with a modified ZIL-130-mounted 9S77M instead of the ZIL-131. There have been no upgrades to the 1V17 like that of the 1V12 to 1V12m. The acrv 1V18 and 1V19 are the battery and battalion commander’s vehicles of the 1V17 ACRV complex. Both vehicles are equipped with the 1T121 land navigation system, a 1D15 laser rangefinder, and the 1PN44 day/night sight. The observer uses an analog coordinate converter to translate the polar location data when determining rectangular target coordinates. The 1V520 fire direction computer may be transported internally and dismounted at a command observation post.

1L122-1E Baurnal-T Russian Mobile Air Defence Command and Control System





Tiers:



System

Alternative Designation: 1L122-1E Baurnal-T

Type: Mobile Air Defence Command and Control System

Crew: INA

Mission: The Barnaul-T air defense control system is designed to detect aerial targets and control air defense systems of the Army, marine units and the Airborne Force. The systems uses the 9S932-1 intelligence and control module with 1L122-1E radar.

Chassis: BTR-MD Rakushka

Passenger Capacity: 13

Payload Capacity: 2,000 kg

Paradropped: The 1L122-1E Baurnal-T can be carried by and paradropped from most medium cargo aircraft with the crew of three inside. The Il-76 can carry two of these airborne APCs. A single vehicle can be carried underslung by the Mi-26 heavy cargo helicopter.

Radar Detection Range: 1-40 km

Traget Tracking Speed: The 1L122-1E (1L122-2E) radar makes it possible to detect the indicated types of air targets flying at a speed of up to 700 m / s

Detection Zone Azimuth: 360 deg

Detection Zone Elevation: -5 (0) - +45 (60) degrees

Effective Dispersion Area (EPR): the mean square errors of determining the coordinates of a single target with an effective dispersion area (EPR) of 1 square m.

Data Update Rate: 2 (4) or 4 (10) s

Displacement Time: INA

Emplacement Time: INA

Dimensions

Length: 6.1 m

Width: 3.1 m

Height: 2.5 m

Weight, Combat: 13.2 t

Antenna Length: 1,200 mm

Antenna Weight: 800 mm

Automotive

Engine Name: 2V-06-2

Engine Type: Diesel

Engine Power: hp450

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Sea State: It can operate up to a Sea State 3.

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m1.8

Fording Depth: Amphibious

Main Weapon System

↳***System***

Name: PKTM

Type: General-Purpose Machine Gun

Caliber: mm7.62

Manufacturer: Degtyaryov plant

Length: mm1098

Width: mm195

Height: mm170

Weight: 10.5 kg

Rate of Fire: 700-800 Rounds per minute

Muzzle Velocity: 850 ms

Maximum Firing Range: 4,000 m

Effective Firing Range: 1,500 m

Belt Capacity: 250 Rounds

Sights: Tangent iron sights

Ammunition

Type: Rifle
Caliber: mm7.62
Cartridge: 7,62x54R
Basic Load: INA

Auxiliary Weapon System

↳*System*

Name: AGS-17
Type: Automatic Grenade Launcher
Caliber: 30 mm
Length: 840 mm
Width: INA
Height: INA
Weight: 31 kg
Action: Blowback
Rate of Fire: 400 round/min
Muzzle Velocity: 185 m/s
Effective Firing Range: 800 to 1,700 m
Feed System: 29 grenades belt
Sights: Adjustable iron sights, optional mount required for optical sights

↳*Ammunition*

Type: Grenade
Caliber: 30mm
Cartridge: 30×29mm grenade
Basic Load: INA

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: INA
Thermal Sight Gunner: INA
Main Gun Stabilization: INA

Protection
↳

Hull Armor: Protection of this vehicle is very light due to weight limitations. Hull of the BTR-MD is welded from aluminum

armor. It provides protection only from small arms fire and artillery shell splinters. Vehicle is fitted with NBC protection and automatic fire suppression systems.

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

Barnaul-T is baseline air defence command & control subsystem of the integrated troop and weapon management system designed to detect aerial targets and control air defense systems of the Army, marine units and the Airborne Force. The Barnaul-T baseline air defence command and control subsystem is designed to fit tactical units' air defence (AD) control posts (CP) with advanced automation, communication, and data exchange equipment in order to effectively control air defence troops and weapons, coordinate their activities, and increase their mobility and survivability under any combat conditions. The systems use the 9S932-1 intelligence and control module with 1L122-1E radar mounted on a BTR-MD Rakushka amphibious tracked chassis or MT-LBU. The new air defence control system use of automation equipment at tactical level increases the efficiency of short-range SAM systems by up to 20% and reduces the expenditure of missiles per killed target by up to 30%. The Barnaul-T baseline air defence command and control subsystem is designed to fit tactical units' air defence (AD) control posts (CP) with advanced automation, communication, and data exchange equipment in order to effectively control air defence troops and weapons, coordinate their activities, and increase their mobility and survivability under any combat conditions. The Barnaul-T baseline set is used to equip *AD division/brigade CP (mission planning module (MPM) mounted on the 9S931-1 wheeled chassis); *AD regiment CP (MP-K 9S931-1 and 9S931 MPM); *AD battalion CP (9S931 MPM); *Battery command and control (C2) post (9S932-1 reconnaissance and control vehicle with 1L122-1E radar); *MANPADS platoon C2 post (9S933 portable fire control unit); *SAM squad – 9S935 MANPADS squad automation equipment set. The configuration of the Barnaul-T baseline set depends on the organizational structure of Customer's tactical military units.

XA-202 Finish 6x6 Armored Command Vehicle







Tiers:



Variants:

- **XA-202/XA-202S:** This is a command vehicle based on the XA-200 chassis. The hull is divided into four sections: auxiliary power unit (APU) room, engine room, driver/commander compartment and operator room. A ring mount for a 12.7-mm machine gun is fitted above the commander.
- **XA-203/XA-203S:** This is an armored personnel carrier variant with a combat weight of 23 tons, including a payload of 7 tons.
- **XA-220:** This is the latest variant, which was revealed by Patria in mid-2016. The vehicle offers more comfort, mine protection, armor protection, speed, all-terrain mobility and internal space compared to similar platforms, according to the manufacturer.

System

Alternative Designation: XA-202

Type: 6x6 Armored Command Vehicle

Manufacturer: Patria Vehicles, Hameenlinna, Finland

Family: XA Series

Crew: ea3

Passenger Capacity: ea8

Note: The vehicle can be fitted with a 78-ft 9-in (24-m) hydraulic mast, powered by the main engine's hydraulic pump. It has an automatic, hydraulically tightening guy rope system with a radius of 17 ft (5.2 m) and hydraulically powered support legs.

Dimensions

Length: 7.45 m

Width: 2.95 m

Height: 2.60 m

Ground Clearance: 0.40 m

Weight, Combat: 22,500 kg

Weight, Unloaded: 14,500 kg

Payload Weight: 8,000 kg

Automotive

Engine Name: Valmet 612DWIBIC (Euro 2)

Engine Type: turbocharged intercooled six-cylinder inline Diesel

Engine Power: 295 hp at 2,000 rpm

Power-to-Weight Ratio: 13.4 hp/ton

Fuel Capacity: 300 liters

Transmission: Allison MD 3560PR automatic w/torque converter(6 forward gears, 1 reverse in high range)

Axles: Sisu

Steering: hydraulic, power steering, first two axles

Brakes: dual circuit pneumatic

Suspensions: parabolic leaf springs with hydraulic shock absorbers

Maximum Speed on Road: 95 kph

Range: 600 km

Gradient: 60 percent

Side Slope: 60 percent

Fording: 1.5 m

Main Gun

Note: A ring mount for a 12.7-mm machine gun is fitted above the commander.

Protection

Hull Armor: High hardness welded armored steel

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Available

Smoke Equipment: INA

Notes:

XA-202/XA-202S This is a command vehicle based on the XA-200 chassis. The hull is divided into four sections: auxiliary power unit (APU) room, engine room, driver/commander compartment and operator room. A ring mount for a 12.7-mm machine gun is fitted above the commander. The XA-200 series armoured 6×6 wheeled vehicle is an updated production version of the XA series, of which over 700 vehicles have been produced. The series is manufactured by Patria Vehicles of Hameenlinna, Finland, formerly Sisu Vehicles. The vehicle is in service with the Finnish Army (104 XA-200 armoured personnel carriers), the Swedish

Army (86 XA-203S basic vehicles and 18 XA-202S command vehicles) and the Norwegian Army (32 XA-200 armoured personnel carriers). The AMOS advanced mortar system has been integrated on the XA-200 chassis and trialled and evaluated by the Finnish Army. 24 AMOS systems (developed by Patria Hagglunds) were ordered by Finland for integration on the Patria 8×8 armoured modular vehicle.

PU-12M7 Russian 8x8 Mobile Command and Control Vehicle



Tiers:

1 2 **3** 4

Variants:

- **PU12M6 Battery Command Post:**

System

Alternative Designation: PU-12M7
Type: Battery Command Post Vehicle
Manufacturer: INA
Family: PU-12M Series
In Service: Late 1980s - Present
Crew: INA
Chassis: BTR-80
Passenger Capacity: INA
Note: There is very little unclassified information available online about the PU-12M7

Dimensions (Chassis: BTR:80)

Length: m7.7
Width: m2.9
Height: m2.41
Weight, Combat: tons13.6

Automotive (Chassis: BTR:80)

Engine Name: KamAZ-7403
Engine Type: Water-cooled, V8 Diesel
Engine Power: hp260
Maximum Range: km600
Speed, Maximum Road: km/h80
Speed, Average Cross: km/h50

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: Amphibious

Communications

Note: The R-161 Poisk family was widely fielded in the 1980-1990s, and has since been replaced by the R-166 Artek family which was developed in the late 1990s. The R-176 Antey family is the next generation of the Russian Ground Forces' long range, over-the-horizon radios for operational and strategic level control. Among other technological innovations, the R-176 Antey family, is reportedly a Software Defined Radio (SDR), meaning a radio that is primarily manipulated through software instead of hardware such as mixers, filters, modulators/demodulators, etc. These types of radios are capable of receiving and transmitting different waveforms based solely on the software used, instead of requiring physical modifications of hardware.

Command and Control System

Onboard Power Supply System: Yes

Navigation System: Yes, using GLONASS

Survey System: Yes

Data Transmission and Reception Equipment: Yes

Control of Short-Range Air Defence Missile Batteries: Via Coded Datalink: up to 6

Control of Short-Range Air Defence Missile Batteries: Via Telephone Link: up to 4

Control of Short-Range Air Defence Missile Batteries: Tor-M1 launchers (via coded datalink): up to 4

Control of Short-Range Air Defence Missile Batteries: Igla MANPADS (via coded datalink): up to 6

Primary (Radar with Analogue output signal): ea1

Radars with Coded Output Signal: ea3

Number of Received Targets: up to 99

Coordinates Measurement Envelope: up to 100 km

Coordinates Measurement Envelope Maximum Altitude: up to 25 km

Data Transmission Range via field Telephone Wire: up to 15 km

Fire Control

Laser Target Desinator: No

Night Vision Devices: Yes

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Applique Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Life Support System: Yes

Notes:

The PU-12M7 mo bile control post is designed to automate combat control of weapons employment by AD units on the move and at halt under air attack. It is a battery CP intended to operate as part of special purpose automated control systems. Composition The PU-12M7 mobile CP is mounted on the BTR-80 wheeled armoured personnel carrier fitted with: • life support system; • self-contained po wer supply system ; • navigation and survey system ; • radiation and chemical agent sensors; • night vision devices; • data transmission and reception equipment; • com munications aids; • spare parts, tools and accessories kit.

Deimos-NSA Russian 6x6 Command and Control Vehicle



Tiers:



Variants:

- **R-142-R:** 2015 variant on a KamAZ-5350 chassis. Has video surveillance systems, GPS, replaces the single R-168-100U with two R-168-100U-2. Upgrades encryption with two T-231-2A and a T-236-V.

System

Alternative Designation: R-142 NSA
Crew: ea4
Generator: Yes

↳*Description*

Command Level: mDivision Brigade, and Battlalion
Troop Capacity: 6
Deployment / Emplacement Time: 5/40
Chassis: KamAZ-43114
Combat Weight: mt15.4
Chassis Length Overall: m7.94
Height Overall: 3.28
Width Overall: 2.5
Number of Axles: 3
Ground Clearance: mm390
Turning Radius: m11.3
Central Tire Pressure Regulation System: Yes

Automotive

Engine Name: V8 Turbocharged Diesel
Cooling: Water and Intermediate Air
Speed: km/h90

Cruising Speed: km/h60

Cruising Range: km965

Fuel Capacity Left Tank: l125

Fuel Capacity Right Tank: l170

Towing on Road: kg12000

Towing Off Road: kg7500

Gradient Loaded: deg31

Fording Depth: m1.75

Communications

Number of Communications Links: 7

Automated Networks: Yes

Communicate on the Move: Yes

Intercom Type: AVSKU

Encryption: Yes T-231-1

:

↳*Radio 1*

R-168-100KA:

Frequency Range: MHz1.5-30

Frequency Band: HF

Range: km360

Duplex: Full

FH: Yes

Voice: Yes

Telegraph: Yes

↳*Radio 2*

R-168-100U 30-108:

Frequency Range: MHz30-108

Frequency Band: VHF

Range: 60

Duplex: Full

FH: Yes

Voice: Yes

Telegraph: Yes

Radio 3

R-168-25U-2:

Frequency Range: MHz30-108

Frequency Band: VHF

Range: km40

Duplex: Full

FH: Yes

Voice: Yes

Telegraph: No

↳*Radio 4*

Erika 201-028 P45:

Frequency Range: MHz450-463

Frequency Band: UHF

Range: INA

Duplex: INA

FH: INA

Voice: INA

Telegraph: INA

↳*Repeater*

Erika 101RM-028:

Frequency Range:

Frequency Band: UHF

Range:

Duplex:

FH:

Voice:

Telegraph:

↳*Radio 5*

ICOM IC-A110:

Frequency Range: MHz118-137

Frequency Band: VHF Aviation Band

Range:

Duplex:

FH:

↳

Voice:

Telegraph:

Command

Command and Control:

Notes:

The van body is divided into a forward and rear section. The forward section houses most of the radios and has 2 radio operator stations. The rear section has a table with cushioned bench seats capable of seating 3 on each side. The Erika UHF and the ICOM VHF aviation band radio are located in the rear along with 2 intercom/switching units allowing the use of the R-168 series radios.

1V16 Russian Artillery Command and Reconnaissance Vehicle



Tiers:

1 2 **3** 4

System

Alternative Designation: M1974-3

Crew: ea7

Chassis: MT-LBu

Dimensions

Height, Overall: m2.72

Length, Chassis Overall: m7.26

Width, Overall: m2.85

Weight, Combat: mt15.7

Automotive

Engine Name: YaMZ-238

Engine Power: hp240

Engine Type: Diesel

Range, Cruising: km500

Speed, Maximum Road: km/h60

Speed, Maximum Off Road: km/h26

Speed, Maximum Swim: km/h4.5

Fording Depth: Amphibious

Communications

↳*Radio*

Name: R-123M (2 each), R-111M (1 each), R-130M (1 each), R-326 receiver (1 each)

Protection

Armor, Hull: mm15
Armor, Turret Front: mm20
NBC Protection: Yes
Smoke Equipment: No
Armor, Turret Top: INA

Armament

↳*Weapon 1 (Vehicle Commander's Weapon)*

Name: DShK
Cailber/Length: mm12.7
Type: Heavy Machine Gun
Range, Direct Fire: m1500
Range, Maximum Effective, Day: m1500
Range, Maximum Effective, Night: m1500
Rate of Fire: rd/min80-100
Fire on Move: Yes

Sensors / Components

Fire Direction (Automated): 9V59
Fire Direction (Manual): PUO-7

Notes:

The 1V16 is the simplest of the vehicles in the 1V12 ACRV complex and serves as the battalion FDC / Chief of Staff's vehicle. Normally, the battalion chief of staff, assisted by fire direction and communication personnel mans the vehicle. It has neither battlefield observation optics nor a navigation system. However, the vehicle is equipped with the standard VOP-7 vision blocks and driver's periscopes. It is equipped with extra radios and has an extendable antenna mast mounted on the vehicle rear. The 9V59 fire direction computer is mounted in the vehicle. The 9V59 fire control computer comes in several different models believed to be designated a 9V59-1, -2, and -3. For example, the 9V59-2 is associated with 152mm artillery units. The 9V59 fire control computer is probably a 4-bit computer and, although quite rugged, is assessed to have a low mean time between failures because of a larger number of discrete components. The 1V510 is assessed to be a replacement for the 9V59 fire control computer. The 1V510 is capable of performing survey calculations and technical firing data. The system is assessed to be 33% faster than the 9V59.

1V152 FDC Kapustnik-B Russian 8x8 Amphibious Command and Fire Control Vehicle



Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers.
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port.
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: 1V152 FDC
Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left
Manufacturer: Arzamas
In Service: 1986-Present
Chassis: BTR-80
Crew: ea3
Personnel: ea7
Inertial Navigation: Yes
Gyroscopic Backup: Yes
Note: The crew enter and exit through enlarged side hatches, which are clamshell hatches opening upwards and downwards

Dimensions (Chassis: BTR-80)

Length: m7.7
Width: m2.9
Height: m2.41
Weight, Combat: tons13.6

Automotive (Chassis: BTR-80)

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Winch: Yes, The 1V152s have a winch in the front with a capacity of 4.5 tons and 60 meters of cable

Internal Generator: Yes, The 1V152 FDC carries an internal 4kW generator to power its electronics while the engine is turned off

Communications

Antenna: There are special, folding or retractable antennas on the front left of the passenger compartment, on the right rear of the same compartment, and on the front left of the bow roof

Note: There is very little information about the type of Radios the 1V152 are equipped with

↳*Radio #1*

Name: INA

Type: Long-Range Radio

Data Capable: Yes

↳*Radio #2*

Name: INA

Type: Long-Range Radio

Data Capable: Yes

↳*Radio #3*

Name: INA

Type: Medium-Range Radio

Data Capable: INA

↳*Radio #4*

Name: INA

Type: Short-Range Radio

Data Capable: INA

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳*Ammunition*

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

Note: The 1V152 FDC uses the same turret as the BTR-80 from which it derived, but that turret does not have the PKT coaxial machine gun

Fire Control

Name: INA

Computerized FCS: Yes. The 1V152 FDC has a limited computer able to compute fire solutions (though only two at a time), and use the data transmitted by FIST vehicles (manual input must be used)

Computerized FCS Upgrade: Newer 1V152 FDCs add a more capable computer able to calculate multiple fire solutions at once as well as fully and semi-automatically integrate information from FIST vehicles with much reduced user input

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Night Vision: Name: INA; extensive night vision equipment. Passive IR (D, C), Advanced Active/Passive IR (Turret), Image Intensification (C, Turret), Thermal Imaging (Turret)

Day Vision: Name: INA; extensive Day vision equipment

Laser Rangefinder: Yes

Vision Blocks: The commander and driver have vision blocks to the front and to their respective sides to supplement this, and each have a night vision block

Turret Elevation: The turret has electric traverse and elevation

Survey System: a survey system to help lay out firing positions for the guns, mortars, or MRLs

GLONASS System: Yes

Hand-Held Laser Rangefinder: Yes, to help determine proper firing positions for its guns, mortars, or MRLs; this laser rangefinder can be connected to the computer by a cable, and directly input its information

Note: The 1V152 also carries an assortment of manual aids to producing fire positions and determining firing positions, in case of equipment failure

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Bullet-Resistant Windows: Yes

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Radiological Shielding: Yes

Smoke Equipment: The turret has a cluster of four smoke grenade launchers on either side of the turret

Notes:

The 1V152 is called a “unified command vehicle;” of somewhat modular interior design, there are two versions of the 1V152, a FIST vehicle and an FDC vehicle. Both carry the same designation, but have different equipment and different capabilities. The BTR-80 1V152 version is used by battalion commanders and forward observers in field artillery units. This variant contains special navigation, range finding, and vision equipment. The 1V152 FDC is the fire control component of the 1V152 system. In its original iteration, the 1V152 FDC carries two data-capable long-range radios, a medium-range radio, and a short-range radio. The 1V152 FDC has a limited computer able to compute fire solutions (though only two at a time), and use the data transmitted by FIST vehicles (manual input must be used). The 1V152 FDC uses the same turret as the BTR-80 from which it derived, but that turret does not have the PKT coaxial machinegun. On the roof is a 10-meter collapsible antenna, and several advanced whip antennas which are longer than normal whip antennas. The original 1V152 FDC is equipped with an inertial navigation system with gyroscopic backup. It has a survey system to help lay out firing positions for the guns, mortars, or MRLs. Newer 1V152 FDCs add a third long-range radio, a more capable computer able to calculate multiple fire solutions at once as well as fully and semi-automatically integrate information from FIST vehicles with much reduced user input. The newer 1V152 FDC also adds a GLONASS system and a hand-held laser rangefinder to help determine proper firing positions for its guns, mortars, or MRLs; this laser rangefinder can be connected to the computer by a cable, and directly input its information. The 1V152 also carries an assortment of manual aids to producing fire positions and determining firing positions, in case of equipment failure. The 1V152 FDC carries an internal 4kW generator to power its electronics while the engine is turned off.

BRDM-2M-98 & BRDM-2M-97 Polish Armored Staff Car



Tiers:

1 **2** 3 4

Variants:

- **BRDM-2-M98/Zbik-A/BRDM-2A:** Upgraded turret, 12.7mm machine gun, and battlefield surveillance system.
- **BRDM-2-M97/Zbik-A/BRDM-2B:** 20 upgrades including larger turret, 12.7mm machine gun, ATGM, night sensors, radar, and improved space design.
- **BRDM-2A (Russia):** Better engine and other upgrades.
- **BRDM-2SMD/BRDM-2D (Russia):** 145hp engine and other improvements.
- **BRDM-B (Czech Republic):** Overhead turret, 12.7mm machine gun, TV/thermal sight, new engine, and space for 6 soldiers.

System

Alternative Designation: BRDM-2A, BRDM-2B M97, Zbik-A, Zbik-B

Crew: ea4

Description: Improved BRDM-2 with auxiliary wheels removed; other weapons available; 2 soldiers can dismount for OP duty for short periods of time.

Ground Pressure: kg/cm2INA

Weight, Combat: mt8.0

↳*Dimensions*

Height, Overall: m2.57

Length, Chassis Overall: m5.78

Width, Overall: m2.78

Height, Overall: m2.57

Automotive

Engine Type: Diesel

Fording Depth: mAmphibious

Range, Cruising: km500

Speed, Average Cross: km/hINA

Speed, Maximum Off: INA

Speed, Maximum Road: km/h100

Speed, Maximum Swim: km/h10

Armament

↳*Weapon 1 (Machine Gun)*

Name: NSV-5

Cailber/Length: mm12.7

Type: Heavy Machine Gun

Estimated Ammunition Carried: RoundsTotal: 1000

Types of Ammunition Carried: AP-I (B-32), API-T (BZT-44), HE-I

Maximum Effective Range::

Day: m2000

Night: mINA

Anti-Aircraft: m1500

Armor Penetration: mmINA

Muzzle Velocity: m/s845

↳*Weapon 2 (ATGM)*

Name: HOT-3

Caliber: mm150

Type: ATGM

Ammunition: Tandem charge HEAT (est)

Maximum Effective Range: m4300

Minimum Range: m75

Armor Penetration: mm1250

Muzzle Velocity: m/s240

Protection

Active Protection System: INA

Armor, Applique: mmINA

Armor, Explosive Reactive: mmINA

Armor, Turret Front: mm14

NBC Protection: Collective

Self entrenching blade: No

Smoke Equipment: INA

Survivability Equipment: Internal fire suppression system

Notes:

The wheeled armored vehicle "model 98" is a new variant of the BRDM-2. This model is very different from the basic model of the original Russian vehicle BRDM-2. The vehicle has a wide variety of improvements including a new engine, a new access hatch on each side of the sides of the hull, a spare wheel placed at the rear of the hull, a more spacious crew compartment and better suited to current combat situations. This vehicle is currently used by the Polish army. A special effort has been made regarding the communication and navigation system. Thanks to all these improvements, the BRDM-2 has found a second youth, which still allows it a very long life in many army of the old Warsaw Pact. Indeed, these countries do not have a significant defense budget, they are forced to find compromises to keep their armies at an operational level worthy of armies like France or the United States. There are two other variants, the "Model 97", whose turret has been completely modified. They are wider and have smoke grenade launchers on the front left and right, and also a large net holder at the rear. One can also find on the roof of the turret, an anti-tank firing post. The "Model 98" has a 12.7 mm machine gun and a 7.62 mm machine gun, a passive night vision system for the vehicle manager and the driver and an optoelectronic recognition system. On all these vehicle models, we only find the four additional retractable wheels as on the original model. The vehicle is fully amphibious, it can move in the water at a speed of 9 to 10 km / hr.

BRDM 2U Russian 4x4 Command and Control Vehicle





Tiers:



System

Alternative Designation: BRDM-2UM, GAZ 41-08, BTR-40P-2, BTR-40PB

Crew: 4

Troop Compartment Capacity: 0

Dimensions

Length: m5.7

Width: m2.75

Height: m2.3

Weight, Combat: mT7

Automotive

Engine Name: GAZ-41 V8

Engine Type: Gasoline

Engine Power: hp140

Cruising Range: km750

Speed, Maximum Road: km/h95

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Fording Depth: Amphibious

Drive: 4x4 with 4 auxiliary wheels

Communications

↳*Radios*

Configuration 1: Two R-123 and one R-107

Configuration 2: One R-105M, one R-108M and one R-130M

Protection

Frontal Armor: mm10
Applique Armor: NA
Active Protection System: NA
NBC Protection: Collective
Smoke Equipment: NA

Notes:

The BRDM-2U command vehicle has no turret but carries a generator and extra radios. The increased number of antennas marks this version as a command and control vehicle. It is found in battalion and regimental headquarters of maneuver units and also is used extensively by artillery units. The BRDM-2U (BRDM-2UM) carries a 1 kW generator and extra radios (two R-123 and an R-107, or according to other sources one R-105M, one R-108M and one R-130M). On either side of the upper hull there is a big antenna base.

1V111 Russian Artillery Command and Reconnaissance Vehicle





Tiers:



System

Alternative Designations: M1979-3

Crew: ea5

Platform (chassis): Zil131 6x6 box body van

Dimensions

Combat Weight: mt6.7

Chassis Length Overall: m6.90

Height Overall: m2.48

Width Overall: m2.50

Automotive

Vehicle: ZIL 131 6x6 box body van

Engine Type: V8 gasoline

Cruising Range (km): km850 km

Max Road Speed (km/h): km/h80

Max Off-Road Speed (km/h): km/h35

Cross-Country Speed (km/h): INA

Fording Depth: m1.4

Communication

Radios: R-111M (1 each), R-123M (2 each) radios; R-130M short-wave radio (1 each), and R-326 receiver (1 each)

Sensors/Components

Fire direction: 9V59 fire-control computer

Protection

Note: The ZiL-131 is a light skinned vehicle and provides no protection to the crew

NBC: The staff van may have an overpressure system to provide protection against an NBC attack

Notes:

In 1979, the Soviet Union introduced a wheeled ACRV set for multiple rocket launcher and towed cannon units. The eight-vehicle set consists of three 1V110 battery senior officer's vehicles, three 1V18 battery commander's vehicles, one 1V19 battalion commander's vehicle, and one 1V111 battalion chief of staff's vehicle. Early versions of the 1V17 ACRV set included a 1V111 equipped with a modified ZIL-130-mounted 9S77M instead of the ZIL-131. There have been no upgrades to the 1V17 like that of the 1V12 to 1V12m. The ACRV 1V111 battalion FDC/Chief of staff's vehicle serves the same function as the ACRV 1V16 (1V12 ACRV complex) and houses the fire-direction computer. Like the 1V16, it is the simplest of the vehicles in the 1V17 ACRV complex and lacks a land navigation system.

→Command and Control Information Systems (C2IS)

Akatsiya-M ASU Russian Automated Command and Control System



Tiers:



System

Alternative Designation: Akatsiya-M
Type: Automated Command and Control System (ASU)
Manufacturer: INA
In Service: Yes
Fielded: fielded in Russia's operational-level Ground Forces' commands (12 Combined Arms Armies and 4 Army Corps)
Capabilities: The system will not only provide C2 and situational awareness for the operational commander regarding his own directly subordinate units, but will also allow for liaising with, or command and control of, attached subordinate units of the Navy, Aerospace Forces, and Airborne Troops. In addition, the Akatsiya-M will be integrated with the Russian National Defense Control Center.
Note: There is very little unclassified information about the Akatsiya-M

Dimensions

Length: mINA
Width: mINA
Height: mINA
Weight, Combat: INA

Notes:

The system provides the army commander and his staff with online information about the combat situation, including the status of our own troops and actions by the enemy. Based on these data, the commander will be able to give orders directly via Akatsiya to subordinate troops. According to experts, the new system will significantly outpace an enemy in decision-making and implementation on the battlefield. The Akatsiya-M technically consists of staff cars with special equipment based on KamAZ all-terrain four-axle trucks. This provides the system with high mobility. It can be deployed in minutes in any direction. Manufacture of the Akatsiya-M will begin this year and will go on until 2019. The Akatsiya-M will be in each combined-arms army and army corps. In total, more than 21 billion rubles have already been allocated for the creation of the system…The Akatsiya system was already deployed in the field in 2011. It supports the daily life of the military in peacetime. For example, through this system, the rear services keep records of stocks and the issuance of food, fuel and lubricants, and clothing. But the Akatsiya-M is a combat system. It is designed for combat, peacekeeping and special operations. The automated command and control system uses closed radio and satellite communication channels to create a single information field that ensures continuous exchange of information between command posts and headquarters. The automated command and control system also has integrated reconnaissance devices, including satellites and UAVs. The Akatsiya-M continuously receives and analyzes

data on the ongoing situation in real time: information on enemy actions and the aerial,ground, interference, radiation, chemical, and bacteriological environment. Also, data is disseminated on the combat readiness of our own troops' equipment, the availability of ammunition, fuel and lubricants, and even information about the moral and psychological state of personnel…The processed data is displayed in real time on an electronic chart. In that way, the commander can assess the situation in real time and make a decision in a few minutes. If there is a need, the commander can even give orders to a detachment of soldiers. The Akatsiya-M interacts with automated command and control systems of other military arms and branches. Thanks to this, the commander and army headquarters will be able to easily manage groups of troops which include Navy units and formations, Aerospace Forces, and Airborne Troops. The Akatsiya-M also exchanges information with the National Defense Control Center in real time. Automated Command and Control System (ASU) ACUs are seen as essential elements of reconnaissance-strike loops, as they facilitate rapid reconnaissance, planning, and most importantly, action.

Bittium Tough SDR Finish Tactical handheld Radio







Tiers:



System

Alternative Designation: Bittium Tough SDR

Type: Tactical handheld Radio

Crew: ea1

Frequency: The Tough SDR radios provide a uniquely wide frequency range, 30-2500 MHz, across several frequency bands.

Frequency Agility: Uniquely wide frequency range providing frequency agility and less interference

Several Routing Networks: Support for several routing networks and even thousands of radios in one network

Support for Different Waveforms: Support for several different waveforms with seamless porting also for legacy and national proprietary waveforms

Flexible Integration of Applications: Application sandbox for flexible integration of C2 applications, such as BMS and blue force tracking

Easy Operation: Best-in-class user interface and usability for easy operation

Secure: Access to information security implementation and certification both nationally and internationally

Dimensions

Length: INA

Width: INA

Height: INA

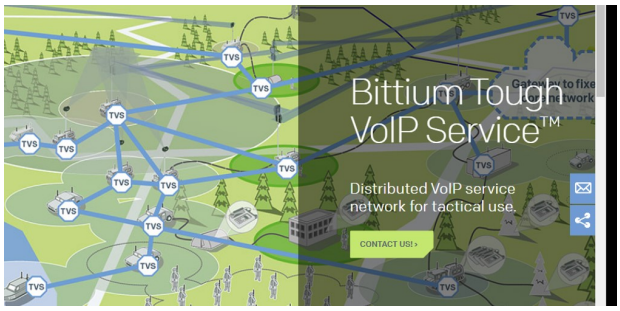
Weight, Combat: INA

Notes:

Bittium Tough SDR Handheld™ is the next generation software defined tactical radio for dismounted soldiers, such as squad or platoon leader. With the radio it is possible to bring broadband data transfer and voice to mobile troops across the battlefield. This improves the performance and the effectiveness of the tactical troops, and leading the troops is easier based on the up-to-date situational awareness and more reliable connections. With Bittium Tough SDR Handheld troops can communicate securely over narrowband and wideband waveforms. The radio can flexibly use the best performing waveform considering the conditions and the mission. The uniquely wide range of frequency bands in the radios improves combat survivability. Using several waveforms improves compatibility and enables operations on different levels and missions. Also legacy and national proprietary waveforms can be seamlessly ported to the radio with national COMSEC and TRANSEC. The Tough SDR radios provide a uniquely wide frequency range, 30-2500 MHz, across several frequency bands. Together with flexible configuration options and routing networks, even thousands of radios in one network are supported. Connectivity Across the Battlefield The Handheld radio is compatible with Bittium Tough SDR Vehicular™, which belongs to the same product family, and Bittium Tactical

Wireless IP Network™ (TAC WIN) system. With the Tough SDR radios, the TAC WIN system and the related waveforms, it is possible to bring broadband data and voice to all mobile troops starting from brigade level and all the way across the battlefield.

Bittium Tough VoIP Finish Distributed VoIP Service Network





Tiers:

1 2 3 4

System

Alternative Designation: Bittium Tough VoIP
Type: Distributed VoIP Service Network
Crew: INA
Designed for MANET Networks: Tough VoIP Service is designed to be operational in Mobile Ad Hoc Networks.
Easy Configuration: Requires only global parameters, no need to define network configuration for Tough VoIP Service nodes.
Seamless Connectivity: Connects users seamlessly across tactical and fixed networks.
Easy System Integration: Interoperability with 3rd party SIP VoIP services and VoIP clients.
Optimized for Tactical Networks: Optimized call features such as managed group calls, PTT calls, call prioritization (MLPP) and user mobility.
Bridging CNR to VoIP Networks: Enables voice communication between VoIP and CNR networks.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

Bittium Tough VoIP Service creates a highly resilient, distributed digital voice service in a tactical network. Tough VoIP Service can rapidly adapt to changes in the network, and the network can be split or merged while maintaining the service available for all clients that are accessible. When network islands merge with the network, the clients will have core network connection automatically.

Andromeda-D Russian Automated Command and Control (C2) System




Tiers:



System

Alternative Designation: Andromeda-D

Type: Automated Command and Control (C2) System

Purpose: Andromeda-D as a division-to-soldier system, with stationary points for commanders down to battalion, and vehicle-mounted systems for tactical units

Manufacturer: Scientific-Research Institute of Communications and Command and Control Systems

In Service: 2017-Present

Crew: eaRussian Airborne Troops

Polet-K System Enabled: Yes

GLONASS Receivers: Yes

Software Package: The Andromeda-D Software package includes digital maps for each of the users to be able to update the information about enemy positions, weapons and vehicles online. In most cases, the positions of the friendly forces are downloaded to the computers automatically using the GLONASS/GPS positioning of the switched-on computers

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Note: Airborne's Andromeda-D automated C2 system from the Sozvezdiye Corporation is a network of ES-1866 laptop computers enabling their users at all levels - from the branch's commander down to a squad leader - to swap real-time information

Automotive

Chassis: The Andromeda-D can be mounted on a variety of vehciles ranging from: biaxial Kamaz trucks; BTR-D Armored Personnel Carriers; and BMD-2 or BMD-4 Amphibious Infantry Fighting Vehicles

Operate on the Move: Yes

Note: mAndromeda-D is developed specifically for airborne troops and is adapted to loading onto a plane, flying and landing

Communications

Facsimile Communications: Yes
Video Conferencing: Yes
Data Transmission: Yes
Special Purpose Telephone Communication: Yes
Radio Channels: Available
Radio Relay Channels: Available
Satellite Communication Channels: Available

Notes:

The Andromeda-D ACS is a complex of automatic devices for equipping stationary and mobile troop command posts. The Andromeda-D is an automatic control system developed by Sozvezdie to meet the Russian Armed Forces requirement for network centric operations in real time. The Andromeda-D will make possible cooperation between ground and airborne forces installed on Armata, Kurganets and Boomerang armored vehicle families. The system provides real time information about the technical and tactical status of a given armored vehicle including speed, route, fuel and ammo reserves. The first stage of development of the new system will be completed by the end of 2017 with it going operational in 2018 or later. Andromeda-D affects the communications hardware supplied to the armored vehicles and above all software which is the key component of the new system. Actually, Andromeda-D was already being used by the Russian Airborne units within 2016.

Bittium Tough Comnode Finish Versatile Tactical IP Communication Device





Tiers:



System

Alternative Designation: Bittium Tough Comnode
Type: Versatile Tactical IP Communication Device
Crew: ea1
Versatile: The same device acts as a terminal, IP router, SHDSL repeater, CNR GW and SIP server.
Portable and Easy to Install: Small size and rugged form factor makes it easy to install anywhere and it is portable on the field.
Extensive Connectivity: Extensive connectivity with e.g. CNR interface, SHDSL, ETH, USB, WLAN, BT, SERIAL/AUDIO and GPS.
Military Grade IP Communications: Together with distributed VoIP service, Bittium Tough VoIP Service, and wide range of codecs.
Network Reliability: Dynamic routing capabilities improve network reliability.
Standard: MIL-STD-810G, MIL-STD-461G and MIL-STD-1275E standards compliant
Connectivity: Connectivity to 3rd party SIP servers and VoIP clients
IP address configuration: Automatic IP address configuration
Tactical IP Network: Fully independent tactical IP network using SHDSL and Ethernet connections

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

Bittium Tough Comnode is a versatile and rugged terminal and IP communication device for tactical networks. The device fulfils the data transfer needs for mobile troops for example as SIP phone, router and SHDSL modem. Bittium Tough VoIP Service™ can be run on the device to provide telephony and SIP server functionalities to other VoIP devices for accessing the VoIP network. Bittium Tough Comnode also provides wireless access point for mobile clients and enables using legacy Combat Net Radios (CNR) as part of the IP-based tactical communication system (Radio over IP, RoIP). Bittium Tough Comnode is also compatible with *Bittium Tactical Wireles IP Network™ (TAC WIN) system *Bittium Tough SDR™ products *Bittium Tough VoIP™

products

→Battlefield Management Systems (BMS)

Pak-IBMS (Rehbar) Pakistani Integrated Battlefield Management System



Tiers:

1 **2** 3 4

System

Alternative Designations: Pak-IBMS (Rehbar)
Description: IBMS provides near real time battlefield situational awareness (SA) data through an integrated network of both mobile and fixed nodes.
VHF: Digital signal multiband interoperability
UHF: Fiber optic backbone for transport to higher echelons
Features: Displays vehicles; Includes real time status and decision point warnings.
Vehicle Management: Records routes of registered vehicles
Command and Control: Adds and deletes vehicles for specific tasks. Associates vehicle echelon with assigned domains. Provides situational alerts.
Geographic Information System: Static and mobile management centers include routers and radio access points (RAP) to backbone. Tracking devices are installed in weapons platforms (including MBTs).

↳*Communications*

Frequency Band Types: HF / VHF / UHF / SHF
Communications Transmission Platforms: CNR / HCLOS / WLAN / SATCOM / Fiber Optics

Operational Features

Information Sharing: Safe and Secure Information Sharing through adhoc networking of radios
AAMG: Remote Operation of 12.7mm AAMG from inside the tank
Route Driving: Driver panel to facilitate driver to follow the correct route with the help of directional bars
Target Tracking: Auto Target Tracking for Arial and Ground Targets
Laser Target Indication: Laser Target Indication to indicate location of the hostile elements and its engagement
Hardware: Ruggedized hardware to work in harsh environmental conditions based on Military specifications

Notes:

Integrated Battlefield Management System (IBMS) is designed for the operations of amour units in the field to meet the requirements of future battlefield. The user-friendly system provides battlefield awareness through comprehensive land navigation system based on GPS and digitized maps. It enables commanders in mission planning, modification and dissemination of plans, monitoring of battlefield at tactical and operational level, through safe and secure radio network. Pak-IBMS(Rehbar) also facilitates commanders in remote firing of AAMG by auto tracking the aerial and ground targets from inside the tank. Major Modules Situational Awareness Module enables war-fighters to see integrated battlefield picture through displays of terrain information in the form of different types of stitched maps with zooming, panning and browsing capability. Tank commander can determine and display his own position with the help of integrated GPS and broadcast it to friendly elements in the communication range and similarly see other friendly elements in the vicinity. Combat Messaging System Module enables commanders to exchange critical information/ orders in near real time and save history of messages. It has capability to either select predefined messages or write free-form text messages and transmit it to any individual/group or all participants. Tactical Mission Planning Module helps commanders to prepare plans, overlays and mark no go areas on digital maps. The plans made during peace time can also be loaded, edited and modified based on intelligent information. The option of automatic saving of plans has also been incorporated to avoid any accidental loss of data. The provision to mark military symbols and add attributes to all types of entities has also been provided.

Radar Systems

→Ground Radars

→→Battlefield Surveillance and Reconnaissance Radars

P-35/P-37 (Bar Lock) Russian towed Two-Dimensional Target Acquisition and Ground Control Intercept (GCI) Radar



Tiers:



Variants:

- **ELSYS P-37 upgrade:** This variant, developed by ELSYS in Ukraine, replaces the existing traveling wave tube components with the MSHB 37R1 low-noise microwave amplifier and the SG-01-01 and VSS-1 units with the ELP-2 microwave receiver module.
- **JSC Lemz P-37 upgrade:** This modernization includes replacement of the magnetron and thyratron in the transmitting system, improving frequency stability and extending service life; replacing the vacuum-based traveling wave tube with a solid-state low-noise amplifier and other receiving system components; addition of bearings and separators in the antenna turntable to increase shelf-life by more than 50,000 hours; and installing digital processing equipment, including VP-118 systems designed to extract radar data from IFF, ADF for tracking processing and for information transmission in code that can be used by air traffic controllers.
- **RETIA P-37 upgrade:** Developed by Czech firm RETIA, this upgrade includes a new transmitter chain; new radio frequency block; new extractor; new display and communications unit; and built-in test equipment. It is designed to improve the radar's overall performance; ability to disseminate digital data; counter-countermeasures performance; and reliability and service life.
- **HM Arzenal upgrade:** Hungarian firm HM Arzenal developed this modernization for Hungary's P-37 radars. The first upgraded radar was delivered in 1999. Transmitter upgrades replaced the magnetron and thyratron blocks with improved versions. Transmitter protection systems and internal cabling was modified for various subsystems.
- **LOBB Banksa Bystrica upgrade:** This modernization was developed by Slovak firm LOBB Banksa Bystrica in cooperation with Lemz. It primarily focused on converting the radar to 3D and integrating the MSR 2000 IFF. The transmitting and receiving cabin, indication cabin, source trailer and transportation trailer were also updated.

System

Alternative Designation: P-35/P-37; NATO: Bar Lock
Type: Towed Two-Dimensional Target Acquisition and Ground Control Intercept (GCI) Radar
Crew: INA
Band: E-F (2-4 GHz)
Frequency: stacked beams 2,695-2,715 MHz 2,715-2,750 MHz 2,815-2,835 MHz 2,900-2,990 MHz 2,990-3,025 MHz 3,080-3,125 MHz

Maximum Range: 390 km

Accuracy Angular: 0.5 deg

Accuracy Range: 900 m

Power: 650 kW each beam

Beamwidth Transmit: 0.7 deg

Pulse Repetition Frequency: 375 Hz

Pulse Width: 1.83-3.1 microseconds

Azimuth Scanning Rate: 3 or 6 rpm

Dimensions

Antenna Length: INA

Antenna Height: 11 m

Antenna Width: 3 m

Weight: INA

Notes:

P-35/37 / BAR LOCK Radar Station or Radio-location Station (RLS) P-35 has a large tactical radius. It insures a circular scanning of the air space, detects the planes which are located in its operational zone and calculates their coordinates. The station P-35 has the following basic tactical and technical characteristics: Maximum range, depending on the type of plane and height of the flight-from 150 to 350 km. For example, the plane TU-104 which flies at an altitude of from 8,000 to 10,000 meters is detected at a distance of 350 km; the scanning zone: in altitude-up to 25,000m, in angle of location-up to 30 degrees; errors while determining the coordinates: in distance plus of minus 500m, in azimuth plus of minus 0.5 degrees; partitioning ability: in distance-500m, in azimuth-1.5 degrees; time for one circular scanning of the space is 20 or ten seconds, in accordance with a speed of rotation of the antenna-3 or 6 turns per minute. RLS P-35 has 6 channels. The 6 channels have frequencies in the the centimeter range. At the end of the 1950s, a circular review station (range finder) was developed and put into service - P-35 radar with enhanced power characteristics, with a smaller number of failures in the detection zone, with increased accuracy in determining the elevation angle (height) of the target. Just like the P-30 radar, the station was used in the country's Air Defense Forces, in the Air Force, in the air defense units of the Navy and in the radio engineering formations of the air defense forces of the Air Force. The station was developed at the plant number 37 GKRE. In contrast to the P-30 radar, in the P-35 station, the upper antenna mirror was installed horizontally with a certain inclination in the elevation plane, the available decimeter channel was replaced by a centimeter channel. The first serious Western attempt to measure the radiated power of a radar for intelligence purposes was made by CIA in 1958 on the Soviet early-warning radar known as BAR LOCK. The BAR LOCK was a new version of the Soviet multi-beam S-band family of radars which had undergone a rapid and widespread deployment in East Germany and other areas peripheral to the USSR. Intelligence indicated this new radar was deployed to detect and track the U-2 aircraft which were just beginning to make deep penetrations over the Soviet Union. Estimates of the BAR LOCK's radiated power output, based largely upon photographic evidence, ranged as high as 5 megawatts peak pulse power from each of its 5 transmitters. With 5 megawatts in each beam the BAR LOCK would have had ten times the power of previous similar radars and would have significantly improved the detection and tracking capabilities of the Soviet air defense system. To meet this threat to the U-2, those responsible for the reconnaissance program demanded firmer information on the BAR LOCK's power output and radiation pattern coverage. A laboratory that provided scientific back-up to the U-2 program assembled power-measurement equipment, crude by present-day standards, and installed it in a C-119 aircraft. With little advance testing, a series of flights was made through the air corridors to Berlin, where BAR LOCK signals were easily intercepted. The resulting power measurements at various vertical angles in the antenna pattern were not of high accuracy because of uncontrolled errors in the equipment. The data did indicate, however, somewhat less than one megawatt of peak power for each BAR LOCK transmitter, and this was later confirmed by other sources. Although not entirely successful in power measurement, this project suggested solutions to many technical problems and opened the way for follow-on developments. BAR LOCK, first sighted in late 1958, represented a major modification in Soviet early warning/GCI radar. The early multi-frequency, multi-beam Token was the forerunner for Big Bar in 1959. BAR LOCK was found to have evolved away from these radars. BAR LOCK is similar to Cross Out and Strike Out in that it has two horizontal reflectors, but the structural details were found to be entirely different. The power is believed to have been much higher than that for previously developed Soviet radars and it apparently had better capabilities for aircraft detection and tracking than previous Soviet EW/GCI radars. The introduction of BAR LOCK again evidenced that the Soviets were continuously increasing their ECCM capability with each new member of the GCI family. BAR LOCK provided the capability to shut off individual beams in order to overcome the effects of spot jamming and retained all

ECCM circuitry incorporated in Big Mesh. BAR LOCK proved to be the primary, long range, high performance radar in use by the Soviets at GCI sites. BAR LOCK's van mounted antennas were comprised of truncated parabolic mesh reflectors with clipped corners measuring 10 x 32 feet. These reflectors were also used in configuring the Big Bar radar system in 1959. Four beams emanated from the lower reflector and two from the upper. BAR LOCK was one of the more capable EW radars in the Soviet inventory and when collocated with height finders such as Side Net it was highly functional in a GCI role. It was put to wide spread use and was most likely the primary EW component at EW/GCI sites.

P-40 (Long Track) Russian Mobile 3-D UHF Radar System





Tiers:



System

Alternative Designations: P -40. The name LONG TRACK is actually the radar.
Chassis: A modified version of the AT-T heavy tracked transporter vehicle (426 U).
Engine: 465-hp diesel
Weight (mt): 35
Max Road Speed (km/h): 55

Radar

Antenna: Elliptical parabolic
Auxiliary Power Unit: 400 Hz gen and gasoline engine.
Frequency Band: E-band (UHF)
Frequency: 2.6 GHz
Sweep Rate (rpm): 12-15
Display range (nm): 200
Effective range (km): 167
Tracking range (km): 150
Effective altitude (km): 30
Track targets on Move: No
Emplacement time (min): INA
Displacement time (min): INA
Dead time (min): 0
Max targets displayed: >8
Associated SAMs: SA-4/GANEF, SA-6/GAINFUL, SA-8/GECKO
ADA Unit Level:: Employed at division and echelons above division The system is used in Tier 3 and 4 units.
Other Radars: The radar system links to the IADS to provide analog warning and to pass analog data.

Notes:

The P-40 was the first high-mobility radar to enter into service with the then new tactical anti-aircraft forces of the Soviet armed forces. The P-40 used the AT-T artillery tractor with tracked chassis, fitted with a 12-cylinder 4-stroke diesel engine with an output of 342 kW (465 hp) and producing a top speed of 55 km/h. The P-40 had a crew of 6 and a total weight of 35 tons, the radar being powered by a gas turbine running 400 Hz generator. The radar uses an open frame truncated parabolic antenna with a stacked antenna feed. The radar antenna is mounted on the truck used to transport it giving excellent mobility, the radar capable of being folded for stowage during transit. Azimuth was determined by mechanical scanning while the angle of the target is determined from within which beam of the antenna stack the target is detected, the radar does not carry a secondary antenna for IFF.

P-12 (Spoon Rest A) Russian Mobile Early Warning Radar




Tiers:



Variants:

- **Spoon Rest B (P-12):** Mast-mounted variant that operates at a lower VHF frequency than Spoon Rest A.
- **Spoon Rest D (P-18):** Mast-mounted variant with eight dipoles; operates in the VHF frequency range (150-170 MHz). Based on the Spoon Rest B. Characteristics include:

System

Alternative Designation: P-12; Spoon Rest A
Type: Mobile Early Warning Radar
Manufacturer: INA
Chassis: ZIL Trucks
Crew: INA
Band: 147-161 MHz
Maximum Range: 275 km
Vertical Beamwidth: 2.5 deg
Horizontal Beamwidth: 7-9 deg
Peak Power: 180-350 kW
Pulse Width: 4-6 microseconds
Pulse Repetition Frequency (PRF): 310-400 Hz

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

Spoon Rest is a Russian ground-based, early warning radar that later evolved into the Knife Rest** series. The very high frequency (VHF) radar is widely used with the Fan Song radar associated with the SA-2 Guideline surface-to-air missile (SAM) system. Spoon Rest A is the original version of the system and is mounted in two trailers. The system's generator is carried in

one of the trucks while the radar array and electronics cabinets are in the other. The large antenna is a six-dipole horizontal Yagi array mounted on top of a truck. The P-12 Yenisei was a development of the earlier P-10 radar, the P-12 being developed between 1954 and 1956. The P-12 was developed by the SKB Design Bureau, a division of State Plant No.197 named after V. I. Lenin who developed the previous P-10, the predecessor of the current Nizhny Novgorod Research Institute of Radio Engineering (NNIIRT). The Yenisei radar was accepted into service in 1956 following the successful completion of the radars test program. In 1958 a modernised variant of the P-12 passed the testing process and entered into service as the P-12M, the modernised radar featured the ability to shift the radar frequency within a range of 10 MHz. A further modernisation came in 1962 in the form of the P-12MP which featured improved reliability, reduced side lobe radiation and the ability to be paired with a centimeter band search radar, in 1970 the radar was provided with flicker equipment to improve immunity to anti-radiation missiles. The final variant of the P-12 was the P-12NP which was also produced as the P-12NA with a different transport chassis. The P-12NP compared with the previous P-12MP featured improved detection ranges and reliability as well as the ability to locate the control cabin up to 500 meters from the antenna to improve crew survivability as a result of attack on the radar. he main differences between the earlier P-10 and the P-12 included a new antenna feed system with lower side lobes, reduced to 4% of the main lobe. The P-12 also offered a greater frequency range and greater frequency agility, being able to retune to four pre-set frequencies automatically as well as automatic frequency fine tuning. Finally Yenisei had greater accuracy with improved detection range (250 km) and better protection against passive and active interference. In addition to frequency agility the P-12 was the first Russian radar system to use the coherent cancellation moving target indicator (MTI) method to eliminate ground clutter. The P-12 "Spoon Rest A" was mounted on two Zil trucks, though later with the P-12NP "Spoon Rest B" the radar antenna mast was mounted on a separate trailer cabin to allow for location away from the other components of the radar site, the P-12NA returned to a track based platform. The P-12 used a single antenna accomplishing both transmission and reception, the antenna was composed of twelve Yagi antenna mounted in sets of six with one set above the other. Azimuth was scanned mechanically by the antenna with a rotation of 10 r.p.m, elevation was determined using a Goniometer by comparing the phase comparison between the upper and lower antenna sets, in similar fashion to the original P-3 but since this reduced range it was rarely used. The P-12 used two indicators, a plan position indicator in addition to an E-scope to indicate height, the P-12 could integrate track information from an additional radar with both sets of information appearing on the plan position indicator A secondary radar for IFF was generally used in conjunction with the P-12 such as the NRZ-12 (NATO "Score Board")

HF 200 British Height Finding Radar





Tiers:

1 2 **3** 4

System

Alternative Designation: HF 200

Type: Height Finder Radar

Crew: INA

Frequency: A frequency in the range 2,800 - 3,010 MHz (E/F band).

Class of Equipment: Long range, medium power, fixed, nodding height finder operating in the E/F band.

Purpose of Equipment: a. Main Role. Height finding on aircraft at long, medium or short range in the UK and overseas. b. Subsidiary Role. Provision of limited volumetric cover in place of an inoperative main search radar.

Coverage: a. Azimuth. 0o to 360o by slewing at a maximum rate of 6 rev/min. b. Elevation. (1) -3o to +33o at 20 scans/minute to a range of 50 nm. (2) -3o to +18o at about 44 scans/minute from 50 to 100 nm range. (3) -3o to +9o at about 50 scans/minute from 100 to 150 nm range. (4) -3o to +6o at 56 scans/minute at a range of over 160 nm.

Coverage in Volumetric Role: a. Azimuth. Equivalent to 1.5 rev/mm over sector up to 45o b. Elevation. -3o to +6o.

Range Performance: About 120 nm on a 2 square metre target, 180 nm on a 10 square metre target and 210 nm on a 15 square metre target with 90% probability of paint, at 40,000 feet.

Discrimination: 1 nm at 150 nm in range, 12,000 ft at 150 nm in elevation.

Aerial Characteristics: a. Polarization. Vertical or circular. b. Beam Shape. (1) Horizontal beam width 3o at 3 dB points. (2) Vertical beam width 0.75o at 3 dB points.

Aerial Reflector: Double curvature, 35 ft high by 8 ft wide.

Aerial Feed: Horn wave guide.

Transmitter: a. Type. Magnetron. b. Pulse Width. 5 uS c. PRF. 200-250 pps. d. Peak Power Output. 2.5 MW.

Receiver: Two output channels: linear and logarithmic.

Signal Processing: Vertical or circular polarization, fast time constant (FTC) and swept gain. Instantaneous automatic gain control (IAGC) on logarithmic channel.

Accuracy: ± 1,000 ft at 150 nm, but about ±500 ft for relative heights at the same range.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

A Decca HF 200 height finder at RAF Boulmer with the RX12874 Passive Detection aerial and the redundant Type 80 modulator building in the background on the extreme left. The height finding element of the Linesman system, the HF 200 succeeded the American AN/FPS-6 height finder radars used in the Rotor system. The HF 200's (along with the AN/FPS-6) were also known as "Nodding Horrors" and they spewed hydraulic oil everywhere. HF 200 Mk3's were located at the three main linesman sites at R.A.F. Boulmer, R.A.F. Staxton Wold and R.A.F. Neatishead. A Mk4 was commisioned at R.A.F Saxa Vord in the Shetland Islands in 1979 and there was a Mk2 at R.A.F. Troodos, Cyprus. Dave Quantrill tells me that the Troodos Mk2 featured a valve console among other things and that it was a horrible thing! Note the barbed wire in the picture; for many years Linesman sites were protected only by a wire mesh perimeter fence but in the mid '70's the Ministry of Defence must have bought a job lot of barbed wire cheap from someone because they put it up everywhere! Interestingly enough no one seems to have considered what could be done about air strikes, mortars and rocket propelled grenades - the site was totally undefended from aerial attack and the perimeter fences were not patrolled! Once upon a time all of the antennas at R.A.F. Boulmer were painted in a pale blue shade, quite pretty really, and it has been suggested that this was to satisfy the whims of the then Duke of Northumberland who happened to own the land on which the operations site stood, or so the story went. Eventually though someone thought they really should be camouflaged so they were painted in a shade that in Scotland might be called "Sharnie Green"!

SBR-3 (IRL 136) Russian Man-Portable Short-Range Ground-Surveillance Radar





Tiers:



Variants:

- **IRL-136/SBR-3 Fara:** Russian-built version.
- **SSBR-3 Fara:** Version built by Kintex of Bulgaria.

System

Alternative Designation: SBR-3 Fara; IRL 136

Type: Man-Portable Short-Range Ground-Surveillance Radar

Crew: ea1

Manufacturer: Strela Research Institute, Russia (design) Rosvoorouzhenie (IRL-136) (Russian state export company), Russia Kintex, Bulgaria (under license as the Kintex Fara SSBR-3)

Band: J (10-20 GHz)

Emitted Power: 5 W

Power Consumption: 50 W

Coverage Area: 6 sq km

Detection Range, Personnel: 2 km

Detection Range, Vehicles: 4 km

Moving Target Velocity Range: 0.55 to 13.9 m/sec

Resolution Azimuth: 00-67 mils

Resolution Range: 100 m

Mean Time Between Failure (MTBF): 1,000 hours

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: kg18.3 kg

Note: can be packaged in a backpack, and is capable of being carried by one soldier.

Notes:

The IRL 136, also known as the SBR-3, is a short-range, ground-surveillance, man portable-Doppler radar used to track moving targets including vehicles and personnel. The system consists of a power and control unit; flat-array antenna/transmitter, which can be remoted from the former during operations; battery pack; a scanning device; headphones; support cabling; and associated mounting frames and devices. The total system, which weighs about 40 lbs (18.3 kg), can be packaged in a backpack, and is capable of being carried by one soldier.

SNAR10 Russian Battlefield Surveillance Radar





Tiers:



Variants:

- **SNAR-10M:** This updated vehicle replaces the BIG FRED radar with a Kredo-1E radar, for a ground vehicle detection range of 40 km. It also has digital display and communications.
- **SNAR-10M1:** Designed for reconnaissance of moving ground, air and surface targets. The radar can detect vehicles, soldiers, and exploding shells at a range of 200m – 40km.

System

Alternative Designations: Big Fred, 1RL232, 1RL232-1, Leopard
Crew: ea5
Platform: MT-LBu

Dimensions

Combat Weight: mT12.6
Chassis Length Overall: m7.62
Height Overall: m2.72
Width Overall: m2.85

Automotive Performance

Engine Type: YaMZ-238, 240 hp diesel
Cruising Range: km500
Max Road Speed: km/h60
Max Off-Road Speed: km/h26

Cross-Country Speed: INA

Max Swim Speed: Cannot swim due to the weight of the antenna

Fording Depths: INA

Sensors/Components

Antenna Type: Parabolic

Operating Band: K (34.55 to 35.25 GHz)

Detection Range Against Moving Vehicles, Without MTI (km): 16.0

Detection Range Against Moving Ships, Without MTI (km): 30.0

Detection Range Against Moving Shell Impact, Without MTI (km): 10.0

Detection Range Against Moving Vehicles, With MTI (km):: 10.0

Emplacement Time (minutes): 5.0

Displacement Time (minutes): 5.0

Armament

↳***PKT***

Caliber/Length: 7.62-mm

Type: Machine gun

Mount Type: Coaxial

Direct Fire Range: m1300

Max Effective Range Day: 1000m / 400-500m on the move

Max Effective Range Night: m800

Fire on Move: Yes

Rate of Fire: 600rpm cyclic in 2-10 round bursts

Protection

Armor Turret Front (mm): 20

Armor Turret Top (mm): INA

Armor Hull (mm): 15

NBC Protection System: Yes

Smoke Equipment: No

Notes:

The primary mission of the Big Fred radar is to detect and track both moving ground and water surface targets. Additionally, the radar can be used to provide friendly fire correction data to artillery units. The Snar 10 is not capable of amphibious operations (unlike other members of the MT-LBu family) due to the heavy turret. The vehicles are also equipped with a NBC filtration and over-pressure system.

PSNR-8 Kredo-M1 Russian Portable Ground Surveillance Radar System







Tiers:



System

Alternative Designation: PSNR-8 Kredo-M1
Type: Portable Ground Surveillance Radar System
In Service: 2002-Present
Family: INA
Crew: ea2-3
Operating Frequency Range: 2 cm (J)
Range, Scan Zone: 200 meters to 32 km
Azimuth, Scan Zone: from 12° to 180° with an adjustment discrete of 12°
Maximum Elevation, Scan Zone: deg+18
Minimum Elevation, Scan Zone: deg-18
Detection Range, Person: km7-8
Detection Range, Tank: km16
Detection Range, Truck: km32
Detection Range, 155mm Shell Explosion: km5
Power Consumption: w110
Continuous Operating Time: hours24
Median Errors in Determining the Coordinates for Range: m25
Median Errors in Determining the coordinates for Direction: 00–05 m (0.3°)

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg51

Notes:

The PSNR-8 Kredo-M1 portable ground surveillance radar system was adopted by the Russian Armed Forces only in 2002. The PSNR-8 Kredo-M1 portable ground surveillance radar system is designed to detect moving targets on the ground or water and to support artillery fire at any time of the day regardless of the season, and also in conditions of low visibility (fog, rain, snow, dust, or smoke)

702D Chinese Artillery Meteorological Radar Vehicle



Tiers:



System

Alternative Designation: 702D

Type: Artillery Meteorological Radar Vehicle

Crew: INA

Chassis: The shelter of the 702D Meteorological Radar can be mounted on a 4X4 North-Benz 2629 truck chassis.

702D Package Includes: Antenna assembly - Elevating ball guide screw mechanism - Main control console - Terminal computer system - Communication system - Power distribution box - Air conditioning unit

Detection Range: 200 km

Altitude Range: 25 km

Tracking Accuracy Angle: 0.1 deg

Tracking Accuracy Range: 15 m

Onboard Equipment: Circular antenna, Elevating ball guide screw mechanism, Main control console, Terminal computer system, Communication system, Power distribution box, Air conditioning unit

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Engine Name: Deutz 1013/1015

Engineer Type: Diesel

Engine Power: 220~480hp

Maximum Speed: 85 km/h

Maximum Range: 800 km

Fuel Capacity: INA

Protection

Hull Armor: INA
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
NBC Protection: INA
Smoke Equipment: No

Notes:

The 702D meteorological radar station consists of two truck shelters, the meteorological radar shelter and the meteorological support shelter. These two shelters are mounted on a 4x4 truck chassis. The systems is used by the Type 90B 122mm MLRS but can be also used by other artillery weapons.

RAC 3D (Flamingo) Danish Mobile 3D Short-Range Radar





Tiers:



System

Alternative Designation: RAC 3D Radar

Type: Mobile 3D Short-Range Radar

Manufacturer: Thales Raytheon Systems

Crew: INA

Coordination: The defense of strategic sites, as well as the protection troops on the move requires a multi-layered air defense. Associated with its integrated Command and Control (C2), the RAC 3D operates as a multi-mission system fully interoperable with higher levels of command such as national air defense or allied networks. The RAC 3D system activates weapon control orders and provides target-weapon pairing to co-ordinate any mix of MSAM, SHORADS and VSHORADS. The RAC 3D is also used as a gap-filler system for low altitude air defense.

Efficiency: Currently in production, the RAC 3D equips Armies and Air Forces in a number of European countries. More than 50 systems are already fielded, and the RAC 3D has successfully participated in extensive NATO trials.

Details: The RAC-3D is intended as a gap-filling and warning radar for air defense units. It is optimized for detecting low observable targets. To maximize low altitude capabilities, the radar is attached to a 13 m hydraulic mast, giving it a good capability against medium to very low-altitude targets. It can be unattended, as well as operated as either a stand-alone or networked with other radars.

Frequency: 4-8 GHz (G/H Band (NATO), C Band (IEEE))

Power Output: INA

PRF: Hz

Range Accuracy: 20 m (range), 0.4 degrees azimuth

Emplacement Time: 15 minutes

Displacement Time: 15 minutes

Instrumental Range: 100 km

Ceiling: 30,000 feet

Elevation Coverage: > 45°

Accuracy on Combat Aircraft, Range: 20 m/150m

Accuracy on Combat Aircraft, Azimuth: 0.4°/4°

Accuracy on Combat Aircraft, Elevation: 0.5°

IFF: Yes

Dimensions

Length: m6

Width: m6

Mast Height: m13

Weight, Combat: INA

Automotive

Note: There is no available information on what type of chassis the RAC 3D radar is stationed on.

Notes:

The RAC 3D is a three dimensional, multi-mode, radar for the co-ordination of medium-range, short-range and very-short range air defense weapon systems. It provides a 3D air picture up to 100 km. Highly mobile and optimized for detecting low observable targets, the RAC 3D is capable of operating under the most severe weather, jamming and propagation conditions. The RAC 3D detects and classifies modern threats, including medium to very low-altitude hovering helicopters. The RAC alert and co-ordination 3-D radar operates in the G/H-Band which offers, within a 100 km range envelope, the best trade-off between atmospheric attenuation, transmitting power resolution and antenna size versus detection of small targets, such as those flying at very low Altitude in heavy clutter. RAC 3D employs a state-of-the-art planar phased-array and a digital pulse compression. Tree types of the RAC radar station are in service: *A two-shelter radar station in order to separate the radar from the combat control system for alerting the surface-to-air missiles “Stinger”, in service with the Danish Army. *A compact radar station named “Flamingo” with the radar itself and the combat control system housed on a single shelter, is being supplied to the Austrian Army for surface-to-air missile “Mistral” alerting. *The Austrian Air Force has acquired RAC 3D compact radars as gap fillers. The RAC 3D alert and co-ordinating radar accomplishes the following tasks: *warning and control for anti-aircraft guns and missiles over a range of 80 km *detection and target identification *air situation analysis *Alerting of up to 12 “Mistral” or AAA units The RAC 3D gap filler radars accomplishes the following tasks: *Warning and control over a range of 100 km *Detection and target identification *Equipped with a computer and communications links two workstations interfaces with the country's air defence systems.

MSTAR (AN/PPS-5C) British Man-portable Surveillance and Target Acquisition Radar





Tiers:



System

Alternate Designation(s): MSTAR is used by the US Army as AN/PPS-5C and by the Australian Army as AMSTAR.

Type: Man-portable Surveillance and Target Acquisition Radar (MSTAR) is a lightweight all-weather battlefield Doppler radar

Manufacturer: MSTAR was developed and produced in UK in the mid 1980s by Thorn EMI Electronics (now part of Thales) and selected by competitive tender. MSTAR is now licensed and manufactured by DRS Technologies.

Purpose: It is usually used by artillery observers to acquire and engage targets in bad visibility or at night. It is capable of detecting, recognizing and tracking helicopters, slow moving fixed-wing aircraft, tracked and wheeled vehicles and troops, as well as observing and adjusting the fall of shot.

Frequency: J Band

Display: The radar display is an electro-luminescent screen that can be overlaid with a map grid. It also shows the areas of ground visible to the radar and those that are masked by terrain.

Target Location: arget location can be presented as either map coordinates or bearing and distance (polar coordinates) from the radar.

Target Detection Range: It can detect targets out to 30 kilometres (19 mi), with a maximum range of 42 kilometres (26 mi).

Emplacement: under three minutes.

Displacement: under three minutes.

Target Location Accuracy, Tange: ±10 m

Target Location Accuracy, Azimuth: ± 5 mils

Radar Controls and Interface: 12.1 inch SVGA flat-panel display, 800 x 600 pixel resolution, PentiumTMclass processor, 20 GB mass storage, 256 MB RAM, AGP high speed video graphics, MIL connector panel, full QWERTY keyboard, internal 3.5 inch FDD, internal PCMCIA interface, communication ports include parallel, RS-422, RS-232, Ethernet and USB, XML 2.0 ICD compliant/ USAF certified.

Note: The radar head (antenna and electronics) are connected by remoting cable to the display. The rotating head can be mounted on either a tripod on the ground or an elevated mast, the latter fitted to the Warrior Artillery Observation Post vehicle (FV514), or the Coyote Reconnaissance Vehicle. When fitted to the mast power is taken from the vehicle supply and the display is inside the vehicle.

Dimensions

Length: INA

Width: INA

Height: INA
Aerial head Assembly Weight: 9.6 kg
Main Electronics Assembly Weight: 13.0 kg
Radar Control and Display Unit Weight: 7.4 kg
Tripod Kit Weight: 4.8 kg
Ancillary Equipment Weight: 3.9 kg
Total Weight: 30 kg

Notes:

Man-portable Surveillance and Target Acquisition Radar (MSTAR) is a lightweight all-weather battlefield Doppler radar operating in the J band. It is usually used by artillery observers to acquire and engage targets in bad visibility or at night. It is capable of detecting, recognizing and tracking helicopters, slow moving fixed-wing aircraft, tracked and wheeled vehicles and troops, as well as observing and adjusting the fall of shot. The radar display is an electro-luminescent screen that can be overlaid with a map grid. It also shows the areas of ground visible to the radar and those that are masked by terrain. Target location can be presented as either map coordinates or bearing and distance (polar coordinates) from the radar. The complete radar weighs 30 kilograms (66 lb) It can detect targets out to 30 kilometres (19 mi), with a maximum range of 42 kilometres (26 mi). The radar head (antenna and electronics) are connected by remoting cable to the display. The rotating head can be mounted on either a tripod on the ground or an elevated mast, the latter fitted to the Warrior Artillery Observation Post vehicle (FV514), or the Coyote Reconnaissance Vehicle. When fitted to the mast power is taken from the vehicle supply and the display is inside the vehicle. For dismounted use the radar uses standard military rechargeable dry batteries and is man-carried in three loads. The radar can be set up in under three minutes. The requirement for MSTAR was developed in the early 1980s by the UK Ministry of Defence as a replacement for Radar GS No 14 (ZB298) that had entered service some 10 years earlier. The primary users of MSTAR, like its predecessor, were and are artillery observation parties, although it may be used by other reconnaissance and surveillance elements as required. MSTAR was developed and produced in UK in the mid 1980s by Thorn EMI Electronics (now part of Thales) and selected by competitive tender. MSTAR entered UK service in early 1991, slightly accelerated for use in the Gulf War. Its official UK designation is Radar, GS, No 22. In about 2005 MSTAR underwent an upgrading programme. MSTAR is used by the US Army as AN/PPS-5C and by the Australian Army as AMSTAR.[1] It is also used for border patrols, airports, coastal patrols, and high security areas. The Canadian Forces use the MSTAR on their Coyote Reconnaissance Vehicles. MSTAR is now licensed and manufactured by DRS Technologies.

9S15 Billboard (9S15M Obzor 3) Russian 3D Surveillance Radar System





Tiers:



9S15 BILL BOARD Surveillance Radar system

↳Radar

Name: 9S15 BILL BOARD Surveillance Radar system
Type: Phased-Array Surveillance Radar system
Traverse Range: deg360
Traverse Left: deg360
Traverse Right: deg360
Crew: ea4
Detection Range: km330
Aircraft Detection: At a range of 240 km aircraft are detected with a chance of 50%
Ballistic Missile Detection: It detects ballistic missiles at a range of about 150 km
Antenna Rotating Speed: sec6-12
Target Detection: up to 200 targets
Target Coverage Elevation: 0-55º in Elevation
Target Coverage Range: 10-250 km
Target Coverage Accuracy: 30-35 min of arc in azimuth and 250 m in range
Waveband: Centimetric
Scan Cycle: 6-8 seconds depending on operational mode
Reciever Sensitivity: 10-13 Watts
Note: This radar provides a highly mobile 3D search and acquisition capability, but is limited in low level coverage footprint by its antenna elevation. Its limited scan rate makes it unusable for high performance IRBM acquisition and tracking, which is the primary role of the 9S19 High Screen radar

Notes:

The fully mobile 9S15/9S15M Obzor 3 / Bill Board acquisition radar is a mechanically rotated 3D radar system, with electronic beam steering in elevation and an IFF array. It provides long range early warning of aerial threats and low end TBMs such as the Scud A and Lance for the S-300V/VM / SA-12/23 Giant/Gladiator SAM systems. There are a number of configurations,

associated with specific block upgrades to the S-300V / SA-12 series system, including a variant specific to the S-300VM / SA-23 system, the 9S15MV/MVZ The 9S15 has two basic modes of operation. The first is optimised for a 12 second sweep and is claimed to provide a 50% probability of detecting a fighter sized target at 130 nautical miles. The second mode employs a faster 6 second sweep period, and is used to detect inbound TBMs and aircraft, with a reduced detection range of about 80 nautical miles for fighters, and 50 to 60 nautical miles for TBMs like the Scud A or Lance. Cited range against aerial targets for the improved Bill Board B is in excess of 170 nautical miles for fighters.

Kasta 2E2 Russian 6x6 Low-Altitude All-Around 3-D Surveillance Radar System





Tiers:



System

Alternate Designation: Flat Face, 39N6E,
Waveband: Decimetric
Range: 5km to 150km
Azimuth: 360 degrees
Altitude: Up to 6km
Elevation: 25 degrees
Number of targets system can track: At least 50
Data update rate: 5 and 10 seconds
Clutter rejection factor: 54 dB
MTBF (Mean Time Between Failures): At lease 700 hours
Mean recovery time: Up to 0.3 hours
Time of continuous operation: At least 20 days
Emplacement / deplacement time: Up to 20 minutes
Power consumption: up to 23 kW
Crew: 2
System Composition: 3 trucks: Antenna truck, compost truck, and power plant truck

↳Measurement Accuracy

Range: 100m
Azimuth: 40 degree minimum arc
Altitude: 900m
Speed: 20m/s

↳Resolution

Range: 300m

Azimuth: 5.5 degrees

Dimensions (Chassis: KamAZ 5350)

Length: 7.85

Width: 2.5

Height: 3.29

Weight, Combat: tons9.2

Maximum Load: tons6

Automotive Dimensions (Chassis: KamAZ 5350)

Engine Name: KamAZ-740.13-260 Diesel

Engine Type: Diesel

Engine Power: hp260

Cruising Range: km1,000

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.75

Notes:

The Kasta-2E2 3D surveillance radar is designed to conduct air surveillance, find range, azimuth, altitude, and track air targets like airplanes, helicopters, unmanned aerial vehicles, and cruise missiles, including low- and extremely low-level and stealthy air targets, in a heavy clutter environment. The Kasta-2E2 low-altitude 3D all-round surveillance radar is designed to control airspace and to perform automatic detection, range/azimuth/altitude measurements and flight path characteristics of fixed-wing and rotary-wing aircraft, unmanned aerial vehicles and cruise missiles, including low-flying, terrain-hugging and stealth ones, in conditions of intensive clutter reflections from a background surface, local objects and weather formations. The Kasta-2E2 mobile automated solid-state low-altitude radar can be integrated into various military and civil-purpose systems used for air defence, coast and border control, air traffic control and air operations control in aerodrome zones. The radar features modular design with a solid-state emitter, digital data processing and automated operation, built-in functional testing system, a 14-m antenna tower to detect very low-flying air targets, high degree of immunity to interference from neighboring electronic assets when operating in close formations (protection rate – up to 50 dB). The Kasta-2E2 radar comprises a hardware vehicle, an antenna vehicle, a diesel-electric power plant mounted on all-terrain wheeled chassis; two single-axle trailers carrying auxiliary equipment; a remote workstation enabling radar control from a distance of up to 300 m. The radar can detect small-size targets, including low-speed ones, at great distances. It is a jam-immune, reliable, easy and safe to operate and maintain asset that can be shipped by various transportation means. At customer request, a containerized radar variant can be supplied to operate with its antenna mounted on an Unzha-type mast.The radar features long detection ranges for small-sized low-level targets, including low-speed ones, and good jamming immunity. It is economic, reliable, operationally safe, and easy in maintenance. It can be carried by various means of transportation. Ref: http://defensetechs.com/wp-

P-15 Tropa (FLAT FACE) Russian 2D UHF Radar System



Tiers:



FLAT FACE (P-15) Radar

↳*System*

Name: FLAT FACE (P-15) Radar
Alternative Designation: The P-15 "Tropa" (Russian: "Тропа"; English: "trail") or 1RL13 (also referred to by the NATO reporting name "Flat Face A" i
Function: Surveillance/Target Acquisition
Proliferation: The P-15 was operated by the Soviet Union from 1955. It has since become obsolete, but it was passed down to successor states after the fall of the Soviet Union. It has been largely superseded by its successor the P-19. North Korea may still have some of these in their inventory.
Vehicle Mount: Long-range surveillance and target acquisition is handled by the van-mounted P-15 FLAT FACE) radar.
Range: 200-250 km
Frequency: UHF, C band (UHF)
Associated Weapon System: SA_3 GOA possibly SA-8 GECKO SAM, LOW BLOW missile control radar
Number of Missiles: Can guide three missiles simultaneosly
Power: 380kw
PRF: 200-700pps
Parabolic Reflectors: Two eliptical parabolic reflectors measuring 11x5.5 m. Reflectors arranged one above the other on van roof.
Precision: 0.3 km range
Note #1: The P-15 radar has been replaced in many S-125 units by the P-15M SQUAT EYE radar.
Note #2: Target data generated by these tracking radars is passed to the battalion's LOW BLOW trailer-mounted fire control radar.

Notes:

The P-15 is a high mobility radar. With the antenna mounted directly on the single truck (Zil-157) used for transport, the system could be deployed and taken down in no more than 10 minutes. The P-15 uses two open frame elliptical parabolic antenna accomplishing both transmission and reception, each antenna being fed by a single antenna feed. The radar can rapidly shift its frequency to one of four preset frequencies to avoid active interference, with passive interference being removed by a coherent doppler filter. Azimuth was determined by mechanical scanning with an associated accompanying PRV-11 (NATO reporting

name "Side Net") used to determine elevation. A secondary radar for IFF is generally used in conjunction with the P-15, generally the 1L22 "Parol".

RASIT French 6x6 Ground-Surveillance Pulse Doppler Radar Vehicle





Tiers:

1 2 **3** 4

System

Alternative Designation : RASIT 3190B; RACIT E; DRPT-5; Basir 110D (Iran)

Description: Ground Surveillance Radar (GSR) can be operated by a crew of 1 or 2; entire system breaks down to 3 90-kg sections; vehicle or tripod- mounted

Crew : ea2 (operator & assistant operator); more for vehicle

↳*Dimensions*

Height, Overall : mVaries by vehicle

Length, Chassis Overall : mVaries by vehicle

Width, Overall : mVaries by vehicle

Weight, Combat: kg90

Automotive

Engine Name: Varies by vehicle

Engine Type: Varies by vehicle

Fording Depth : mVaries by vehicle

Range, Cruising : kmVaries by vehicle

Speed : km/hVaries by vehicle

Communications

↳*Radio*

Name: INA

Equipment

Antenna Type: Flat array type; slotted waveguide antenna; cable link

Azimuth Coverage : degOperator section: 10 to 240 (200 to 4300 mils)

Console: Digitally operated including display

Name: Radar Acquisition de Surveillance Intermediare (RASIT)

Radar: Motor-driven for azimuth adjustment with remote control

Operation

↳*Alternate Modes of Operation*

Mode 1: Magnified mode:

Mode 2: FDC mode:

Mode 3: Air Defense (AD) mode:

Mode 4: Early Warning mode:

Mode 5: GPS mode:

↳*Remote*

Display: Plotting table or mapping computer

Remote Operation: Console 300 m from dish

Remote user transmission: Standard interface; RASIT E can be integrated with battle management system using TCP/IP interface

Target acquisition: Automatically detects, tracks, & identifies all targets

Tone Signal: Yes

TV Monitor: Polar & Universal Transverse Mercator (UTM) coordinates

Performance

Countermeasure Resistance: ECCM & LPI capable

Resolution: +/- 10 m range; +/- 0.6 in azimuth

Surveillance Range (Personnel): km22.0

Surveillance Range (Vehicles): km35.0

Surveillance Range (Aircraft): km34.0

Tracking Speed: 103 km/hr

Transceiver

Accuracy: 90% probability of detection

Compatibility: With IFF systems & ECCM capabilities

Name: Transceiver

Polarization: Linear & circular

Power : W3000 (consumption); 150 (Output)

Signal: I-Band (8.00 10.00 GHz)

Width of radiation pattern lobe : deg-11 to 240

Notes:

RASIT (RAdar de Surveillance des InTervalles) is a ground-surveillance pulse doppler radar developed by Thomson-CSF (now Thales),[1] and fielded by several militaries. The original version of RASIT had a range of 20 kilometers and allowed a skilled operator to distinguish between personnel, vehicles, and aircraft.[2] RASIT operates in the I band and has a peak power of two kilowatts. The system is deployed on vehicles (although it can be removed from its mount and emplaced on the ground) and has been used by at least 32 nations.[3] The latest version of RASIT, the RASIT-E, has a range of 40 kilometers. RASIT was developed in the mid-1970s and over 700 units had been sold by 1996. The latest RASIT customer is Estonia, where the radar is used for border surveillance.

Watchman British Mobile Medium-Range Surveillance Radar





Tiers:

1 2 **3** 4

System

Alternative Designation: Watchman
Type: Mobile Medium-Range Surveillance Radar
Crew: INA
Band: S-Band
Frequency: 2,750 … 3,050 MHz
Pulse Repetition Frequency (PRF): ≈ 1,100 Hz (9-fold staggered)
Pulse Width: 0.4 and 20 µs
Peak Power: 58 kW
Average Power: 1.3 kW
Instrumental Range: 80 NM
Range Resolution: 60 m (190 ft)
Accuracy: INA
Antenna Rotation: 4 Seconds (15 rpm)

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA
Antenna Mast: INA

Notes:

The Watchman family of S-Band medium-range radars is designed to provide terminal area/approach surveillance and ground controlled approach surveillance developed by Plessey Radar Ltd during the 1970s. The radar can be configured from a number of modules which enables users to match precisely equipments to operational needs. Options include transportable or static aluminium or carbon-fibre antennas; adaptive or eight-filter Moving Target Detector (MTD) signal processing and plot or track outputs. The Traveling-wave tube- based transmitter provides frequency diversity and frequency agility and enables a single radar to provide a variety of detection ranges out to a maximum of 222 km. The transmitter is available in a single tube format

or with multi-tubes which accommodates the “graceful degradation” often required by the operator. A dual pulse train is used; it has a very short pulse (0.4 microseconds) for high discrimination at short ranges and a much longer pulse (20 microseconds) for long-range detection of aircraft with small radar cross-sections. The long pulse is compressed in the receiver using a surface acoustic wave equalizer. The basic compressed pulse length is 0.4 μs, giving a 60 m range cell too. The signal separation is achieved by using different radio frequencies for the long and short pulses. Target detection is further enhanced by interchanging frequencies at nine pulse repetition intervals. A recent variant of Watchman (S) uses Solid-state transmitter. There are any upgrades to a new digital receiver design with intelligent tracking routines. CFAR circuit and high definition clutter map clutter map using a process of alpha smoothing (1/8 of current clutter amplitude plus 7/8 of previous sweep clutter amplitude) compensate the influence of noise and clutter by raising the detection thresholds. The Watchman surveillance radar system provides Air Traffic Services for the vast majority of the UK Ministry of Defence operational stations in the UK and worldwide. There are currently 40 systems in service worldwide. The Tactical variant (mobile equipment) of the Watchman system allows the rapid deployment and installation of Air Traffic Services in locations where British forces are on operational duty.

59N6E Protivnik-GE Russian Towed 3D Mobile Surveillance Radar





Tiers:



System

Alternative Designation: 59N6E Protivnik-GE
Type: 3D Mobile Surveillance Radar
Crew: INA
Frequency: D-Band (former L-Band)
Pulse Width: ca. 64 µs (Pulse compression)
Detection Range: The 59N6E Protivnik-GE is a 3D mobile surveillance radar developed by Almaz Antey Concern to detect a wide array of airborne targets at a distance between 10 kilometers and 400 kilometers flying at altitudes of up to 200 kilometers.
Digital Phased Array Antenna: Yes
Digital Signal Processing System: Yes
Detection Speed: The Protivnik-GE radar can detect targets flying at speeds between 60 and 8,000 kilometers per hour
Number of Targets: up to 150 airborne targets simultaneously.
Hits Per Scan: 1 to 3
Antenna Rotation: 5 and 10 seconds

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The 59N6E Protivnik-GE is a 3D mobile surveillance radar developed by Almaz Antey Concern to detect a wide array of airborne targets at a distance between 10 kilometers and 400 kilometers flying at altitudes of up to 200 kilometers. The radar system features a digital phased array antenna and digital signal processing system with the ability to perform target identification while providing the critical information to air defense systems as well as automated command and control (C2). The Protivnik-GE radar can detect targets flying at speeds between 60 and 8,000 kilometers per hour while tracking up to 150 airborne targets simultaneously. This radar system has been deployed within the Russian Armed Forces and was supplied to Egypt in 2017.

48Ya6-K1 Podlet K1 Russian Mobile Long-Range High-Altitude Surveillance Radar



Tiers:



System

Alternative Designation: 48Ya6-K1 Podlet K1
Type: Mobile Long-Range High-Altitude Surveillance Radar
Mission: The Podlet K1 was designed to detect hostile targets flying at low-altitude, provide early warning and support Russian advanced air-defense systems, such as the S-400.
Crew: INA
Chassis: INA
Frequency: S-Band
Maximum Range: 200-300 km depending on the operation mode
Passive Electronically Steered Array (PESA) Antenna: Yes

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The Radar 48Ya6-K1 “Podlet K1” (Cyrillic: 48Я6-К1 «Подлет-К1»; translated: “Approach”) is a mobile three-coordinate S-Band radar of low-altitude, a circular scan of a combat mode and inter-service application. It uses a phased-array antenna (the upper big array) for detecting and tracking of low-altitude aims. The lower two back-to-back arrays are secondary radar, the thinner array for international standard (SIF Mark XII), the larger for the national Russian IFF. The narrow antenna next to the big array is a compensation antenna for protection against jamming.

Credo-1E Russian Unified Moving Target Locating Radar





Tiers:



Variants:

- **Kredo-1S:** Ground recon vehicle with Kredo-1E radar/EO sensor pod on telescoping arm on amphibious BAZ-5921 chassis
- **TBD:** Same telescoping arm as the Kredo-1S, but on the BTR-based UNSh/K1Sh1 chassis
- **SNAR-10M:** Russian upgrade for the SNAR-10 artillery battlefield surveillance radar vehicle (replaces BIG FRED radar with the Kredo-1E)

System

Alternative designations: RP-200, IRL-133-3, Kredo-1, Credo-1, Credo-1E, & PSNR-8
Description: Ground Surveillance Radar (GSR) can be operated by a crew of 2 or 3; vehicle pintle or mast-mounted or tripodmounted
Crew: ea2/3 (operator; assistants); more for vehicle
Combat weight: kg48 (up to 97 with battery & display)
Radio: INA
Protection: N/A

Equipment

Name: Kredo-1E
Console: INA
Radar: Motor-driven for azimuth adjustment
Azimuth coverage (°): 360; 180 in scan sector; 18 in elevation
Antenna type: Slotted wave guide

Performance

Surveillance range: km40 (detection); 30 (tracking); 40 (tanks); 20-40 (light vehicles & trucks); 35 (helicopters); 30 (large aircraft); 12 (ships); 15 (personnel); 15 (shell burst-155-mm); 0.2 (minimum)
Tracking speed: 3-72 km/h4
Resolution: 50 m range; 1.8° in azimuth
Countermeasure resistance: INA

Transceiver specifications: Multi-mode master oscillator & klystron
Signal: Coherent pulse Doppler J-band (10.00 -19.00 GHz, US Ku band)
Power: w250 (Consumption)
Mode: Mono-pulse digital processing
Width of radiation pattern lobe: INA
Accuracy: 10 m in range); 0.12° in azimuth)
Emplacement time: 5 minutes
Polarization: INA
Compatibility: Can be used as the base for an integrated digital sensor suite or fused to process data from other sensors
Remote Operation: 25-200 m away from dish
Target acquisition: Automatically detects, tracks, & identifies targets & reads coordinates
TV Monitor: INA
Display: Displays acquisitions on digital map display with various display colors
Tone Signal: INA
Remote user transmission: Transmit data digitally over network via standard interface

Notes:

The Credo-1E unified moving ground target locating radar is designed to detect moving ground, surface and low-flying targets (man, group of people, vehicles) and to support artillery fire round-the-clock, in any season, and under zero visibility conditions (fog, smoke, and dust). It can be used as a standalone surveillance asset (with its transceiver and antenna control unit mounted on a tripod) or as part of a variety of artillery reconnaissance and mobile observation posts (on telescopic masts). The radar has standard interfaces allowing real-time transmission of target coordinates to the user, as well as remote radar control via communication links.

P-14 (Tall King A) Russian Mobile 2D VHF Early Warning Radar



Tiers:



Variants:

- **P-14MA/5H84AMA:** ground-based long-range VHF surveillance radar P-180U is offered as the modernized follow-on to its prototype, the analogue P-14. Produced in LiTak-Tak

System

Alternate Designation: P-14; NATO: Tall King
Type: Mobile 2D VHF Early Warning Radar
Chassis: Ural 375D
Crew: INA
Frequency: VHF
RPM: 2-6 rpm
Maximum Range: 400 km
Maximum Altitude: 30,000 meters ; 65,000 meters high beam (98,000 feet; 200,000 feet)
Azimuth: 360 degrees
Elevation: 12/17 degrees
Precision: 1.2 km range, 1.2 degrees azimuth
Power: 900 kW

↳*Dimensions (Chassis: Ural 375D)*

Height, Overall : m2.68
Length, Overall : m7.36
Width, Overall : m2.67
Weight, Gross Vehicle: mt13.2
Antenna Diameter: 33 meters
Antenna Mast: INA

Automotive (Chassis: Ural 375D)

Engine Name: ZiL-375 Diesel

Engine Type: V8, 180 hp, Gasoline

Engine Power: hp180

Cooling System: Liquid

Fuel Capacity , Aux : liters60.0

Fuel Capacity, Main Tank: liters300.0

Maximum Road Speed: km/h75

Maximum Range: km750

Towing Capability, Off-Highway: kg5000.0

Towing Capability, Off-Highway: kg10000.0

Gradient: %65

Side Slope: %40

Vertical Step: m0.8

Trench: m0.7

Fording: m1.2

Notes:

The P-14 (also referred to by the NATO reporting name "Tall King") is a 2D VHF radar that was developed and operated by the Soviet Union. The design of the P-14 2D early warning radar started in 1955 by decree of the CPSU Central Committee. The P-14 being the first high power VHF radar to be developed by the Soviet Union, the radar was accepted into service in 1959 following the successful completion of the radars test program.[2] The P-14 was developed under the direction of V.I. Ovsyannikov by the SKB Design Bureau, a division of State Plant No.197 named after V.I.Lenin, the predecessor of the current Nizhny Novgorod Research Institute of Radio Engineering (NNIIRT). The development team was awarded the Lenin prize by the Soviet Union in 1960 for the development of the P-14 radar. The P-14 was exported and is occasionally still found in service, several companies have offered upgrade options for the system, including replacement of outdated components with modern systems, such as digital MTI, modern PC based signal processing/display and solid state components. The P-14 was superseded by the 55G6 "Nebo" VHF surveillance radar in 1982. The P-14 was produced in three variants: the 1RL113 "Lena" (Tall King A) and 44Zh6 "Furgon" (Tall King B) static versions and the 5N84A "Oborona-14" (Tall King C). A total of 731 1RL113 "Lena" were manufactured between 1959 and 1976, 24 of which were for export. The 1RL113 static site was contained in two building (radar and generator) with the control cabin (operated by a crew of five) situated up to one kilometer away, the 44ZH6 operated in a similar fashion but could be relocated more easily. The 5H84A mobile version featured a folding antenna and transported on six trailers taking over 24 hours to assemble, the radar's control trailer had a crew of six and could be located up to one kilometer from the radar. A secondary radar for IFF is generally used in conjunction with the P-14, either the NRS-12 or the later 1L22 "Parol". All of the P-14 variants were developed for the long-range detection and tracking of aerial targets and had similar performance characteristics between them.[4] All used a single antenna accomplishing both transmission and reception; the antenna was a large open-frame truncated parabolic antenna, the antenna included a heated de-icing system for extreme conditions. The radars ware capable of modulating their frequency around four preset frequencies to counteract active interference and used automatic coherent-compensation for passive interference; both systems able to suppress interference by up to 20 dB. In addition to jammer suppression the P-14 can use five auxiliary antennae for direction finding to locate the jammer. The P-14 can operate in four different modes: high beam with increased upper detection limit, low beam with increased range at low to medium altitudes and scan which alternates between high and low beam modes.

P-12 NP (Spoon Rest B) Russian Mobile Early Warning Radar




Tiers:



Variants:

- **Spoon Rest A (P-12):** The P-12 "Yenisei" (also referred to by the NATO reporting name "Spoon Rest A" in the west) was an early VHF developed and operated by the former Soviet Union.
- **Spoon Rest B (P-12):** Mast-mounted variant that operates at a lower VHF frequency than Spoon Rest A.
- **Spoon Rest D (P-18):** Mast-mounted variant with eight dipoles; operates in the VHF frequency range (150-170 MHz). Based on the Spoon Rest B. Characteristics include:

System

Alternative Designation: P-12 NP; Spoon Rest B
Type: Mobile Early Warning Radar
Manufacturer: INA
Chassis: ZIL Trucks
Crew: INA
Band: 150 - 170 MHz (lower VHF-Band)
Maximum Range: 275 km
Vertical Beamwidth: 2.5 deg
Horizontal Beamwidth: 7-9 deg
Peak Power: 160 to 250 kW
Pulse Width: 4-6 microseconds
Pulse Repetition Frequency (PRF): 310-400 Hz
Antenna Rotation: 6 ... 30 seconds (0 ... 10 rpm.)
Dead Time: 377 µs
Receive Time: 2.4 milliseconds

Dimensions

Length: INA
Width: INA
Height: INA

Weight, Combat: INA

Notes:

The former Soviet Union had considerable successes in the development of VHF- radar units. The assortment of VHF- radar units in the army and the air force sufficed of the P 8 over the P 12 up to the P 18 radar sets. One of them is the mobile variant NP, a version of the P 12 installed into two caravans. The radar unit also has an E-scope next to the plan position indicator (PPI). The elevation angle measures the goniometer (the green luminescent scale between the maintenance panels) by a phase comparison between the two echo signals received by the both antenna planes. The Goniometer produced a standing wave of the received RF impulses on two slip rings fed by the two antenna groups. An electrical engine alternately moves a measuring contact on the slip rings and simultaneous a variable resistor delivers the vertical deflecting voltage to the RHI-scope. The voltage difference of the slip rings reaches the value zero in a certain position. The mechanical angle of this position corresponds to the elevation angle of the target. With a nomogram on the screen the shown elevation angle could be converted to a height. But the method reduces, however, the maximum range of the radar unit. Therefore the crew usually switched off the Goniometer. The radar unit P 12 can be synchronized with other radar units and then the PPI-scope shows both received echos. If two stations working by the same frequency are in a favorable distance to each other, her maximum obtainable range can be increased by interference. The Goniometer produced a standing wave of the received RF impulses on two slip rings fed by the two antenna groups. An electrical engine alternately moves a measuring contact on the slip rings and simultaneous a variable resistor delivers the vertical deflecting voltage to the RHI-scope. The voltage difference of the slip rings reaches the value zero in a certain position. The mechanical angle of this position corresponds to the elevation angle of the target. With a nomogram on the screen the shown elevation angle could be converted to a height. But the method reduces, however, the maximum range of the radar unit. Therefore the crew usually switched off the Goniometer. The radar unit P 12 can be synchronized with other radar units and then the PPI-scope shows both received echos. If two stations working by the same frequency are in a favorable distance to each other, her maximum obtainable range can be increased by interference. The trailer-mounted P-12 NP (1RL 14 PIR) “Spoon Rest B” is a derivative of the truck-mounted P-12 MA “Spoon Rest A”. The later version P-12 NA is a truck-mounted version again.

P-15 (Flat Face A) Russian Mobile 2D UHF Radar






Tiers:



Variants:

- **Flat Face A (Russian P-15):** INA
- **Flat Face B (Russian P-19):** INA

System

Alternative Designation: P-15; NATO: Flat Face
Type: 2D UHF Radar
Manufacturer: INA
Chassis: ZIL-157
Crew: INA

Dimensions (Chassis: ZIL-157)

Length: 6.93 m
Width: 2.32 m
Height: 2.74 m
Weight, Empty: 5,540 kg
Antenna Width: 6.00 m
Antenna Height: 2.15 m

Radar System

Band: C (810-850 or 880-905 MHz)
Maximum Range: 250 km
Peak Power: 900 kW
Beam WIdth Azimuth: 10 deg
Beam Width Elevation: 5 deg
Accuracy Angular: 5 deg
Accuracy Range: 90 m

Pulse Width: 2-3 microseconds

Pulse Repetition Frequency: 200-800 Hz; 600-880 Hz

Automotive (Chassis: ZIL-157)

Engine Name: ZIL-157

Engine Type: Diesel

Engine Power: hp1041

Transmission: 5 speed X 2 range transfer case

Cruising Range: INA

Speed, Maximum Road: km/h40

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The P-15 "Tropa" (Russian: "Тропа"; English: "trail") or 1RL13 (also referred to by the NATO reporting name "Flat Face A" in the west) is a 2D UHF radar developed and operated by the former Soviet Union. In 1952 SRI-244 started development of what become the P-15 early warning radar; by 1955, the radar had passed state trials and was accepted into service with the anti-aircraft troops of the Soviet armed forces. The P-15 was designed to detect aircraft flying at low altitude and came to be associated with the S-125 "Neva" anti-aircraft system (NATO reporting name SA-3 "Goa"), though it was later replaced by the P-15M2 "Squat Eye" radar which mounted a single radar antenna on a 20-30 meter mast to improve coverage. In 1959, the modernised P-15M "trail" radar passed through the state test program, the modernisation replacing outdated mercury-based electronics. In 1962, another modernisation of the P-15 passed through trials as the P-15N, the radar being developed and produced by the Ulyanovsk Mechanical Plant. The P-15N introduced a more sensitive receiver, which improved the detection range and a new amplifier for the transmitter. Further improvements were made in 1970 when the P-15MN passed trials. The P-15MN included a pulse coherent Doppler filter (moving target indicator) to remove passive clutter (by up to 50 dB), the first such radar in the Soviet Union. Finally by 1974, the modernisation of the P-15 was so extensive that it resulted in a new designation, the P-19 "Danube", also known as the 1RL134. The P-19 is known in the west as the Flat Face B. The P-15 is a high mobility radar. With the antenna mounted directly on the single truck (Zil-157) used for transport, the system could be deployed and taken down in no more than 10 minutes. The P-15 uses two open frame elliptical parabolic antenna accomplishing both transmission and reception, each antenna being fed by a single antenna feed. The radar can rapidly shift its frequency to one of four preset frequencies to avoid active interference, with passive interference being removed by a coherent doppler filter. Azimuth was determined by mechanical scanning with an associated accompanying PRV-11 (NATO reporting name "Side Net") used to determine elevation. A secondary radar for IFF is generally used in conjunction with the P-15,

generally the 1L22 "Parol".

30N6E2 (Tombstone) Russian 3-D Long-Range Surveillance Radar



Tiers:



30N6E2 Tombstone Radar

↳Radar

Name: 30N6E2 Tombstone Radar
Type: Illumination and Guidance Radar
Mission: primarily designed to be used as an engagement radar and to track targets and guide missiles to impact using a command link channel
NATO Reporting Name: FLAP LID B
NATO Frequency Band: I-J
Target Detection Range: km300
Azimuth Detection: deg360
Number of Tragets Detection: ea100
Simultaneously Engaged Targets: ea6
Maximum Target Speed: 30 - 2,800 m/s
Antenna: Antenna RPN 30N6E2 may rise to a special mobile tower 40V6M.
Chassis: The 30N6E2 Tomb stone radar is mounted on the high mobility truck chassis 8x8 MAZ-7910 vehicle derived from the MAZ-543
Missile Control: km72
Time Ready to Work: min5
Maximum Elevation: deg+60
Minimum Elevation: deg-3

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7
Width: m3.07
Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Configuration: 8x8

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Notes:

The 64N6 (NATO codename 'Tombstone') 3-D long-range surveillance radar comprises a hydraulically raised antenna assembly and radar shelter mounted on a common semi-trailer. The phased-array antenna set has a double-sided antenna aperture. Its 3-D performance is obtained by rotation of the antenna once every 12 seconds and electronically scanning the antenna beam, in both azimuth and elevation. Scan sector capability for detecting tactical ballistic missiles is also provided. This can detect aircraft and cruise missile type targets at a range of up to 300 km and ballistic missiles with launching ranges of up to 1,000 km using the sector scan facility. An IFF transponder subsystem is fitted. The radar is used for target detection and tracking in normal, clutter and severe ECM environments. The data obtained are relayed to the command post for processing and assessment. The radar can detect targets with speeds of up to 2,788 m/s (10,000 km/h). The export designation of the system is 83M6E. The S-300PMU-2 system designation is 83M6E2.

YLC-8B Chinese 3D Long-Range Anti-Stealth Surveillance Radar



Tiers:

1 **2** 3 4

System

Alternative Designation: YLC-8B
Type: 3D Long-Range Anti-Stealth Surveillance Radar
Crew: INA
Chassis: 6x6 or 8x8 Truck
Frequency: UHF-Band
Detect and Track Aircraft Range: over 500 km
Detect and Track Missiles: over 700 km
Maximum Altitude: INA
Displacement Time: INA
Emplacement Time: INA
Note: The antenna fold-able array is designed for automatic, rapid deployment and recovery.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

YLC-8B is operating in UHF-Band 3D long-range anti-stealth surveillance radar utilizing full coherent digital pulse compression and moving target detection technology. The radar can detect and track aircraft that are over 500 km away as well as missile threats out to ranges of over 700 km. The antenna fold-able array is designed for automatic, rapid deployment and recovery.

P-18 (Spoon Rest D) Russian Mobile 2D VHF Radar





Tiers:



Variants:

- **P-18ML:** ground-based long-range VHF surveillance radar P-18ML is offered as the modernized follow-on to its prototype, the analogue P-18. Produced in LiTak-Tak

System

Alternative Designation: P-18; Spoon Rest D; 1Rl131 Terek
Type: Mobile 2D VHF Radar
Chassis: ZIL-157
Crew: INA
Frequency: VHF
Maximum Range: 250 km
Maximum Altitude: 35 km
Azimuth: 360 degrees
Elevation: -5-15 degrees
Precision: 1 km range
Power: 260 kW

Dimensions (Chassis: ZIL-157)

Length: 6.93 m
Width: 2.32 m
Height: 2.74 m
Weight, Empty: 5,540 kg

Automotive (Chassis: ZIL-157)

Engine Name: ZIL-157
Engine Type: Diesel
Engine Power: hp1041

Transmission: 5 speed X 2 range transfer case

Cruising Range: INA

Speed, Maximum Road: km/h40

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The P-18 or 1RL131 Terek (also referred to by the NATO reporting name "Spoon Rest D" in the west) is a 2D VHF radar developed and operated by the former Soviet Union. The P-18 early warning radar is a development of the earlier P-12 radar, the P-18 radar being accepted into service in 1970 following the successful completion of the program. The P-18 was developed by the SKB Design Bureau, a division of State Plant No.197 named after V. I. Lenin who developed the previous P-12, the predecessor of the current Nizhny Novgorod Research Institute of Radio Engineering (NNIIRT). In 1979 a new secondary IFF radar the 1L22 "Parol" entered into service to complement the P-18, unlike the previous secondary radar NRS-12 (NATO "Score Board") the new interrogator was carried on a separate truck. The P-18 is still in service today and was widely exported, many companies offer upgrade options to improve the performance and reliability of the radar and to replace out-dated components. NNIIRT offers an upgrade package for the P-18 which includes the installation of a solid state transmitter and receiver, automatic jammer suppression equipment as well as PC based signal processing, test and interface equipment. These upgraded variants of the P-18 can be referred to as the P-18M, P-18-1 or P-18-2 depending on the manufacturer, modification and radar nationality. The P-18 was superseded by the 1L13 "Nebo" VHF surveillance radar in 1984. Currently, the Russian-Belarusian company Defense Systems provides upgrades for P-18 radars. Also Retia, a Czech civil and military electronics company, developed its own, fundamental modernisation of the P-18 under the name ReVEAL. It is now solid state, digitized and fitted with upgraded IFF system, while allowing to utilise also the legacy IFF. The whole equipment is repackaged into a standard container and already sold in several dozen units. The P-18 shares many similarities with the earlier P-12NA and like the P-12 it is mounted on two Ural-4320 truck chassis. The P-18 features many improvements over the P-12 including increased performance, precision and reliability. The radar was developed to work independently or as part of a C3 system directing SAM and aircraft to hostile targets, the truck mounted design provided the radar with high mobility. The P-18 uses a single antenna accomplishing both transmission and reception. The antenna is composed of sixteen Yagi antennas mounted in sets of eight with one set above the other. The radar antenna is mounted on the truck used to transport it improving mobility and the radar also features a mechanism which allows the antenna height and elevation to be altered during operation. Azimuth is scanned mechanically by the antenna with a rotation of 10 r.p.m, the original P-18 used three indicators, including two plan position indicators in addition to a back-up A-scope. Like the P-12 the radar features automatic frequency control with four pre-set operating frequencies, moving target indicator to eliminate passive clutter and active jamming, the radar could also display tracks from another radar it was paired with. The original P-18 used a coaxial cavity resonator transmitter, vacuum tube receiver with transistor based preamplifier and a vacuum tube/pin diode based duplexer. A secondary radar for IFF is generally used in conjunction with the P-18, either the NRS-12 or the later 1L22 "Parol".

AN/TPQ-49 American Multi-Mission Radar System



Tiers:



System

Alternative Designation: AN/TPQ

Type: Multi-Mission Radar

Mission: Performs multiple missions simultaneously including early warning, counterfire and air surveillance

Crew: ea1

Multi-Mission: The AN/TPQ-49 radar is multi-mission capable, allowing the operator to configure the radar to support a variety of missions simultaneously, including: early warning for indirect fire, CTA, air surveillance and counterUAS missions. In multi-mission mode, the radar can perform the tasks of two or more radars and can be configured to prioritize specific capabilities to fit mission needs.

Weapon Location: SRC's AN/TPQ-49 radar system is a trusted U.S. Marine Corps program of record. Combined with SRC's LCMR software, the system is designed to detect, track, classify and warn of incoming RAM threats while determining point of origin and point of impact locations. The system can track multiple weapons simultaneously and has a detection range of greater than 10 kilometers, and a point of origin accuracy of 75 meters at 5 kilometers.

Detection Range: The system can track multiple weapons simultaneously and has a detection range of greater than 10 kilometers, and a point of origin accuracy of 75 meters at 5 kilometers.

Air Surveillance: With SRC's LSTAR software, the radar can detect and track a wide range of traditional and non-traditional aircraft, with an instrumented range of 30 kilometers. The LSTAR software extends the radar coverage volume by employing air surveillance specific waveforms tailored to airspace monitoring. This capability makes the radar an ideal solution for general air surveillance for VSHORAD, wind farm gap filling, and small UAS detection and tracking.

Applications: Air surveillance • Counterfire target acquisition • Counter-UAS • Critical infrastructure protection • Force protection • Ground based sense and avoid • VSHORAD

Benefits: • Transports easily and installs rapidly (< 20 minutes) in challenging terrain • Low lifecycle cost • Unattended remote operation • Few false alarms in challenging clutter • Ideal for integrated solutions - EO/IR camera or counterfire response - ADS-B or secondary surveillance radar

Operating frequenc: L-Band

Azimuth coverage: 360°

Elevation coverage: 0 - 30°

Power: 1,200 W, 110/240 VAC 50/60 Hz, 24 VDC

Dimensions

Diameter: 102 cm

Height: 216 cm
Weight: 68 kg

Notes:

The AN/TPQ-49 multi-mission radar leverages SRC’s LCMR and LSTAR® software to provide the warfighter with a versatile, powerful, all-in one multi-mission radar capable of supporting early warning weapon location for indirect fire, counterfire target acquisition (CTA) and air surveillance missions. The radar provides continuous 360-degree surveillance and 3-D target location using a non-rotating, electronically steered antenna. It’s small footprint and lightweight design make the radar ideal for fixed site emplacement in hard to reach areas where typical radars are impractical. The system can simultaneously detect and track multiple targets from separate points of origin within a 315 square kilometer surveillance area. The radar is designed to support a variety of missions including: air surveillance, force protection, CTA, very short range air defense (VSHORAD), small UAS detection and tracking, and critical infrastructure protection.

PSNR-5 Russian Ground Surveillance Radar





Tiers:

1 2 **3** 4

Variants:

- **PSNR-5:** Tripod mounted
- **PSNR-5K:** Mount mast for vehicles (i.e. Russian BRM-1K)
- **PSNR-5M/Kredo-M:** Updated PSNR-5K on vehicles with a notebook computer to display, process, transmit; with GPS
- **Monitor-M:** Links up to 4 PSNR-5M radars to provide 360 deg view
- **Kredo-M1/PSNR-5M Modernized:** PSNR-5M with additional upgrades with range of 5 km 8.5 km (personnel); 20 km (tanks); 32 km (trucks); with 12 km (tracking)
- **Strazh-ST:** Vehicle sensor pod with Kredo-M1 & EO cameras (PRP-4M uses the PSNR-5M system; the PRP-4MU has an option for the Kredo-M1)

System

Alternative Designation : TALL MIKE (NATO); PSNR- 5/IRL133 (Ground); PSNR- 5K/1RL133-1 (Vehicle); IRL 133M (Kredo M-1 ground); 1RL 133M1 (PSNR-8 vehicle)
Description: Ground Surveillance Radar (GSR) can be operated by 1 or 2 soldiers; 3 soldiers required for dismounted carry
Ground Pressure : kg/cm2Varies by vehicle
Crew : ea1 (Vehicle); 2 (Dismounted)
Notes: Sources: 2014 WEG. With the pintle mount, this radar can be mounted on almost any vehicle to modify It into a reconnaissance vehicle. (photos from 2014 WEG)

↳*Dimensions*

Height, Overall : mVaries by vehicle
Length, Chassis Overall : mVaries by vehicle
Width, Overall : mVaries by vehicle
Weight, Combat: kg56.0; 50 (including 2 batteries for Kredo-M1)

Automotive

Engine Name: Varies by vehicle
Engine Type: Varies by vehicle
Fording Depth : mVaries by vehicle
Range, Cruising : kmVaries by vehicle

Speed : km/hVaries by vehicle

Communications

↳*Radio*

Radio: INA

Equipment

Name: PSNR-1 Kredo-M1 (both C & K used in translations);

Antenna Type: Parabolic dish with cable link

Azimuth coverage: deg360; 180 in surveillance sector; +/- 18 (Tripod can be adjusted for more vertical coverage)

Console: INA

Radar: Motor-driven for azimuth adjustment with remote control

Operation

↳*Remote*

Display: Monochrome digital readouts; color on Baget-14 notebook computer for Kredo- M1

Remote Operation: 25 m away for concealed operators

Remote user transmission: INA

Target Acquisition: INA

Tone Signal: INA

TV Monitor: INA

Performance

Countermeasure Resistance: INA

Range, Surveillance : kmPSNR-5/5M: 3-5 (personnel); 10-15 (vehicles); range reduced 50% at wind speeds more than 5 m/second; 0.2 (minimum)

Resolution: 100 m in range; 50 mils in azimuth; 25 m for range & 50 mils for azimuth for Kredo-M1

Tracking Speed: 2-60 km/hr (more for some targets)

Transceiver

Accuracy: INA

Compatibility: Operate using analog or digital processing match user interface.

Emplacement Time : min5 minutes (vehicle mast mounted)

Name: Transceiver Coherent pulse Doppler with magnetron (With klystron for Kredo-M1)

Polarization: INA

Power : W90 (Consumption); 12 (Output); 110 (consumption for Kredo-M1)

Signal: I-band (9.00 GHz); J-band (10.00-19.00 GHz or US Ku band for Kredo-M1)

Width of radiation pattern lobe : degINA

Notes:

Radar PSNR-5 Devices 1-RL-133 Russian designation: ПСНР-5 (Подвижная Станция Наземной Разведки) Určení: Radar PSNR-5 is used to search the fixed and moving ground targets and to monitor their movement in the event that the use of other technical means of the survey (from the toolbox of a vehicle) is not possible or is not appropriate. Allows you to identify the character and the polar coordinates of the goals/objectives, in the present case, the distance and the side angle (azimuth). the Basic TTD: The survey of tanks, OT, cars: - rate target in the range of 2-60 km/h..... sound indication - rate target in the range of 4-60 km/h..... from the screen Detecting moving people: - rate target of around 2 km/h..... sound indication - rate target of approximately 4 km/h..... from the screen Dosah⋆: - vehicles, tanks, individually or in the column..... 8 – 10 km - a person individually or in a group..... 3 – 4 km - the minimum distance of the detection target..... 0,2 km - the width of the propátrávaného sector..... 04-00 up to 20-00 dc - power supply..... 20-29V, direct current ⋆ at a wind speed ≥ 5 m/sec and the rains of greater than 4 mm/hr to reach reduced to ½ Zdroje: - rechargeable battery pack summer P-81 ..... 2 ks - battery winter P-81A..... 1 ks (myself basking) - nepřetržitýn operation..... 20 pm the detection Accuracy goals: - sound indication – length..... ± 25 m - sound indication – delivery..... 00 – 05 dc - from the screen – length..... ± 50 m - from the screen – length..... 00 – 10 dc the Composition and the determination of the sets in the BPzV(composition is different from the portable variants): - receiver-transmitter (Block P-01) is designed to emit high-frequency radiation into the space and the income from the goals/objectives of the reflected signal, to control the direction of the radiation in the azimuth and in the polohovém angle - the management and the indicating counter (Block P-02-1) is designed for remote control block P-01, and for processing the received signal, and searching for information on the identified/pursued objectives - voltage stabilizer (Block P-87) is designed for power supply of individual equipment sets of radar from the onboard network of the vehicle, at the same time changes the value of the voltage on the value of the operating - set with stand (Block P-03) in the composition: on the stand (Block P-03A) is designed for the operation of the block P-01 out of the vehicle on a tripod (the same for the observation device NNP-21) the sighting telescope is designed to control the identity of the electronic and the optical axis of the receiver-transmitter, to orientování antenna block P-01 off-road objects (for good visibility, if I know their azimuth) and, where appropriate, to the visual observation of the observed/objective pursued the indicative igo is designed to orientování antenna block P-01 in a magnetic azimuth when the establishment of the stand about the connecting cable is designed to interconnect the blocks of the P-01 and P-02 - battery pack summer (Block P-81) ...2 pc is designed to supply a radar in operation outside the vehicle without connection to its on-board network - accumulator winter (Block P-81A) ...1pc is designed to supply a radar in operation outside the vehicle without connection to its on-board network - device-172R - device Mu-351A - koutový reflector - insert between the rack and trojnožku - the bracket between the rack and trojnožku - the cable connecting 25 m (in the bag) is intended to link the blocks of the P-01 and P-02 in the operation of block P-01 on the rack outside the vehicle, and a block of P-02-1 inside the vehicle or outside of it (in secret) - cabinet with aftermarket parts (č.19) - box with accessories (č.20).

Giraffe 1X Swedish Lightweight Multi-Mission Surveillance Radar







Tiers:



System

Alternative Designation: Giraffe 1X
Type: Lightweight Multi-Mission Surveillance Radar
Manufacturer: SAAB
Family: Giraffe Radar
In Service: INA
Crew: ea1
Fixed, Mobile or Deployable: Giraffe 1X is a mobile, deployable or fixed asset for short-range surveillance and Ground Based Air Defence (GBAD) that provides forces with early warning and the ability to detect and classify more than 100 different targets – simultaneously. Even in high-clutter environments. The system can be delivered with surface surveillance as well as sense & warn add-ons and can be operated remotely or locally. Giraffe 1X is very lightweight with an exceptional small integration footprint. In fact, the complete radar can be transported on a pickup truck-sized vehicle, by helicopter or towed on a trailer. It can be permanently installed on a building or a mast, or integrated into a suitable vehicle. The system can be operated remotely or locally.
Multi-Role for Multipurpose: Giraffe 1X provides simultaneous air surveillance, GBAD target acquisition and RAM sense and warn capabilities without performance degradation. It can detect fixed and rotary wing targets, fast missiles and RAM targets as well as small UAVs in high-clutter environments. It also offers flexible integration of weapon systems and tactical data links, and can be configured fully self-contained with C3 capabilities.
Superior Detection: Giraffe 1X covers the entire search volume every second and will detect any air threat, including small, slow, high and low targets. The system provides exceptional air picture awareness with all-weather performance and accurate 3D data for all targets in the search volume. Automatic weapon location and impact location can be provided as an option. The system offers 360˚ detection and tracking of RAM threats even in severe clutter. This means it can provide your forces with automatic warning of incoming threats, giving them the time needed to prepare and respond.
Networking Possibilities: In the design of Giraffe 1X much emphasis has been put on networking performance. Giraffe 1X allows for standard or Customised data link integration.
Gifraffe 1X Key Advantages: *Highly capable radar with a small footprint *Covers the entire search volume every second

*Full mission flexibility through unparalleled support services *Full interoperability

Integrated Logistics Support (ILS): ILS is an important part of the system delivery and will form the basis for future maintenance. Saab ILS experts have solid experience in tailoring ILS deliveries together with customers worldwide

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: Giraffe 1X is a small and lightweight yet highperforming 3D radar that is easily integrated in almost any type of mobile platform, fixed structure or C2 system.

Radar System

Name: Giraffe 1X

Type: Stacked beam 3D radar

Antenna Type: AESA, digital beam forming

Frequency: X (I) band

Elevation Coverage: > 70 degrees

Rotation Rate: 60 RPM

Search Volume: 360° or in a sector

Instrumented Range: 75 km

Notes:

The Saab (formerly Ericsson Microwave Systems AB) Giraffe Radar is a family of land and naval two- or three-dimensional G/H-band (4 to 8 GHz) passive electronically scanned array radar-based surveillance and air defense command and control systems tailored for operations with medium- and Short Range Air Defense (SHORAD) missile or gun systems or for use as gap-fillers in a larger air defense system. The radar gets its name from the distinctive folding mast which when deployed allows the radar to see over nearby terrain features such as trees, extending its effective range against low-level air targets. The first systems were produced in 1977. By 2007, some 450 units of all types are reported as having been delivered. When agility and presence close to the combat area are essential, the Giraffe 1X short-range 3D radar surveillance system is there to protect mobile forces and assets against airborne threats. The Giraffe 1X is an ideal air surveillance component in the VSHORAD domain and can be used as a gap-filler that provides airspace commanders with the capabilities needed for maintaining continuous and accurate air situational awareness. Highly capable with small footprint Giraffe 1X is a small and lightweight yet high performing 3D radar that is easily integrated in almost any type of mobile platform, fixed structure or C2 system. The system is designed to deliver key capabilities as part of short-range surveillance and Ground Based Air Defence (GBAD). Accessing the bigger picture The compact concept makes Giraffe 1X the perfect choice when continuous air surveillance is desired. It provides swift understanding of the air situation, enabling immediate and effective response to changing threats, new tactics and shifting operational conditions. The system monitors the air volume 360 degrees for air targets and simultaneously locates and warns against incoming rocket, artillery and mortar rounds. Counter-UAV function Features include Saab’s unique function for enhanced low, slow and small (ELSS) target detection, which provides a dedicated counter-unmanned aerial vehicle (UAV) capability.

9S19 High Screen (9S19M Imbir) Russian Long-Range Sector Surveillance Radar System





Tiers:



System

↳*System*

Name: 9S19 HIGH SCREEN Sector Radar system
Type: Sector Surveillance Radar
Purpose: The HIGH SCREEN sector radar supporst the ATBM role, providing surveillance of anticipated azimuths of threat missiles
Crew: ea4
Mission: t is used to detect high speed targets, such as ballistic missile warheads
Detection Range: km175
Maximum Targets, Simultaneous: maximum being 16 simultaneous targets
Waveband: Centimetric
Maximum Elevation in Anti-Missile Mode: deg+73
Minumum Elevation in Anti-Missile Mode: deg+30
Maximum Elevation in Anti-Aircraft Mode: deg+50
Minimum Elevation in Anti-Aircraft Mode: deg0
Scan Cycle: 12.5-14 seconds
Number of Ballistic Targets tracked Simultaneously: up to 16
Rate of Target Updates fed into the CP: 1-2 seconds
Note: The radar is switches to a tracking mode when high speed targets are detected, automatically transmiting the trajectory parameters to the Command Post Vehicle

Notes:

The specialised 9S19 Imbir is a high power-aperture, coherent, X-band phased array designed for the rapid acquisition and initial tracking of inbound ballistic missiles within a 90 degree sector. To that effect it uses a large passive phase technology transmissive array, using a conceptually similar space feed technique to the MPQ-53 and 30N6 series radars, producing a narrow 0.5º pencil beam mainlobe. The primary search waveform is chirped to provide a very high pulse compression ratio intended to provide very high range resolution of small targets. The design uses a 16 kiloWatt ave Travelling Wave Tube (TWT) source, very low sidelobes and frequency hopping techniques to provide good resistance to jamming. Three primary operating

modes are used. In the first the 9S19 scans a 90º sector in azimuth, between 26º and 75º in elevation, to detect inbound Pershing class IRBMs within a 40 to 95 nautical mile range box, feeding position and kinematic data for up to 16 targets to the 9S457 command post. In this mode the transmissive array is tilted back to 35º. The second mode is intended to detect and track supersonic missiles such as the AGM-69 SRAM, and sweeps a narrower 60º sector in azimuth, between 9º and 50º in elevation, within a range box between 10 and 90 nautical miles, generating target position and velocity updates at 2 second intervals. The third mode is intended to acquire aircraft in severe jamming environments, with similar angular and range parameters to the second mode. In this mode the transmissive array is tilted back to 15º.

Kasta 2E1 Russian 6x6 Low-Altitude All-Around 3-D Surveillance Radar System





Tiers:

1 2 3 4

System

Alternative Designation: Kasta 2E1
Type: Low-Altitude All-Around 3-D Surveillance Radar System
Manufacturer: INA
Family: Kasta
In Service: INA
Vehicle Package: The Kasta 2E1 system uses two antennas and consists of two vehicles: one truck carries the antenna and its peripheral equipment and another truck operates as command post vehicle and on a trailer unit, the external power supply is installed

Dimensions (Chassis: KamAZ-5350)

Length: m7.85
Width: m2.5
Height: m3.29
Weight, Combat: tons9.2
Maximum Load: tons6

Automotive (Chassis: KamAZ-5350)

Engine Name: KamAZ-740.13-260 Diesel
Engine Type: Diesel
Engine Power: hp260

Cruising Range: km1,000

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.75

Maximum Load: tons6

Note #1: Engine is also equipped with cold weather starting device and can be started at temperatures down to -50°C

Note #2: Vehicle has a full-time all-wheel drive and is fitted with a central tyre inflation system

Radar System

Waveband: Decimetric

Target detection (height 100 m) with Antenna 5.4 / 14 m: km32

Target detection (height 100 m) with Antenna 50 m: km58

Effective Range: km5-150

Accuracy Distance: m540

Altitude: km6

Azimuth: deg360

Height: INA

Moving target indication (MTI): 53 DB

Mean time between failure (MTBF): 300 hours

Setup Time: min20

Power Up: min3.3

Teardown: min20

Operating crew: ea2

Power consumption: kw16

Transport units: ea2

Communications

Radio: R-168-5UN(1)E Russian VHF Manpack-Vehicular Radio Station

Protection

Armor: INA, It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Kasta 2E1 system uses two antennas and consists of two vehicles: one truck carries the antenna and its peripheral equipment another truck operates as command post vehicle and on a trailer unit, the external power supply is installed The Kasta 2E1 and 2E2 are the latest incarnations of the well established Flat Face and Squat Eye family of semimobile UHF band tactical acquisition radars. The initial P-15 Flat Face A introduced the now characteristic double stacked array of elliptical paraboloid section antennas. This radar was widely exported by the Soviets to Warsaw Pact nations and Soviet Third World allies and clients. The radar has been used to support interceptors, as well as SA-3, SA-4, SA-6 and SA-8 missile batteries as an acquisition radar. The P-15M Squat Eye is a derivative of the baseline design with a single antenna on a tethered latticework mast. It was employed to improve low altitude coverage, but also to permit use of the radar in heavily forested terrain where the height of the foliage canopy exceeded the height of the antenna phase centre in the P-15. The P-19 Flat Face B is the improved follow-on to the P-15 with a range of improvements. Since the 1990s a number of manufacturers are now offering comprehensive digital upgrades for the P-15 and P-19 inventory. Kasta 2E1 and 2E2 are heavily redesigned derivatives using a new KAMAZ 6 x 6 chassis and mostly digital hardware. The redesign of the Squat Eye antenna is the most visually prominent change with the increased aperture improving range performance. Due to their low power-aperture ratings this family of radars is generally not regarded to be particularly effective against LO and VLO aircraft.

PRV-16 (Thin Skin B) Russian Height-Finder Radar



Tiers:



System

Alternative Designation: PRV-16; Thin Skin B
Type: Height-Finder Radar
In Service: In service with nations that still operate the SA-4 Ganef**, SA-6 Gainful** and SA-8 Gecko**.
Crew: INA
Chassis: The vertical, orange-peel parabolic section antenna has been seen in both truck-and trailer-mounted versions.
Band: G-H (5-9 GHz)
Maximum Range: 200 km
Pulse Repetition Frequency (PRF): 400/800 Hz
Pulse Repetition Time (PRT): 1.6 and 2.5 milliseconds
Average Power: 470 W
Peak Power: 700 kW

Dimensions

Length (Truck-Mounted): INA
Width (Truck-Mounted): 6.9 m
Height (Truck-Mounted): 3.1 m
Length (Trailer-Mounted): INA
Width (Trailer-Mounted): 3.9 m
Height (Trailer-Mounted): 8.5 m
Weight: INA

Notes:

PRW-16 is a height-finder radar used in the former Warshaw Pact. It is the successor of PRV-9. It was developed in the mid 60s, and from about 1970th it was used in the Soviet army. Characteristic features of: tunable magnetron; depending on the interference environment and after automatic analysis of the disturbances, it seeks the best transmitting frequency for the next pulse; time required for the re-tuning over the entire frequency range: <1s; Interfering protection systems SBZ+UNS using 2 potentialoscopes of type LN 12; Swivel cycle of the antenna: 3.2 s (= nods 18 times per minute); time required for raising or folding down the antenna 4.5 min.

YLC-20 Chinese Emitter Locating System



Tiers:



System

Alternative Designation: YLC-20
Type: Emitter Locating System
Crew: INA
Chassis: 8x8 or 6x6 trucks
Mission: The only open source material at this time states the YLC-20 is intended to detect, locate and identify: 1. aerial emitting targets using active radar, including fighters, AEW&C aircraft and UAVs. 2. surface targets including early warning radars, acquisition radars and fire control radars. 3. emitting communications equipment.
Band Coverage: 380 MHz to 12 GHz
Maximum Range: INA
Maximum Altitude: INA
DIsplacement Time: Less than 1 hour
Emplacement Time: Less than 1 hour

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The Chinese YLC-20 is conceptually based on the KRTP-91 Tamara, but incorporates both precision DF and DTOA capabilities to locate airborne and surface based emitters. The only open source material at this time states the YLC-20 is intended to detect, locate and identify: 1. aerial emitting targets using active radar, including fighters, AEW&C aircraft and UAVs. 2. surface targets including early warning radars, acquisition radars and fire control radars. 3. emitting communications equipment. Stated band coverage is 380 MHz to 12 GHz. Deployment time is claimed to be 1 hr, with all system components on 8x8 or 6x6 trucks. At the time of writing no good quality imagery of production equipment was available through open sources. This limits current assessments of the system's capabilities. It is likely that DTOA techniques are used for target acquisition and coarse tracking, and DF techniques used for precision tracking, using DTOA derived coordinates to cue an interferometric DF antenna. Avaliable material does not state whether a heightfinding capability is provided, if so this would likely be performed using interferometric techniques with the DF subsystem. Once better quality imagery of the antenna arrangement becomes available, a more precise definition of capabilities and limitations will be possible. It is likely that much of the YLC-20 design is based on documentation

acquired during the abortive attempt to procure six Czech Vera E DTOA ELS systems. The YLC-20 was first disclosed in 2006.

HN-503 Chinese 2D Long-Range Radar



Tiers:



System

Alternative Designation: HN-503

Type: 2D Long-Range, Air Search Radar

Crew: eaINA

Maximum Range: 722.3 km

Minimum Range: 0.4 km

Maximum Altitude: 30480 m

Minimum ALtitude: 0 m

Properties: Moving Target Indicator (MTI), Pulse-only Radar

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

China HN-503 - Radar Role: Radar, Air Search, 2D Long-Range

SQUIRE French Man-Portable Medium-Range Ground Surveillance Radar







Tiers:



System

Alternative Designation: SQUIRE

Type: Man-Portable Medium-Range Ground Surveillance Radar

Crew: ea2

Band: X-Band

Mobility: The SQUIRE consists of compact components to be carried in two backpacks. Each weighs less than 23 kgs., including batteries, and can therefore be easily carried by two persons.

Low Level Air Surveillance: Low level air surveillance for detection of slow moving aircraft/UAV (< 300 km/h)

Average Power: 1 W max.

Instrumented Range: 48 km

Range Resolution: 5 m

Accuracy: ≤ 5 m ; ≤ 5 mils

Maximum Range, Pedestrain: km9

Maximum Range, Vehicles: km19

Maximum Range, Tanks: km23

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: The SQUIRE consists of compact components to be carried in two backpacks. Each weighs less than 23 kgs., including batteries, and can therefore be easily carried by two persons.

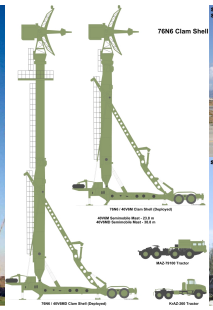
Notes:

SQUIRE is a man-portable medium-range ground surveillance radar that can detect and classify moving targets on, or close to, the ground at ranges up to 48 km. Deployed worldwide for force protection, reconnaissance and compound protection, it is equally suited for border, coastal and site surveillance, counter-drug, smuggling operations and drone detection. It consists of compact components to be carried in two backpacks. Each weighs less than 23 kgs., including batteries, and can therefore be easily carried by two persons. SQUIRE is light, compact, and has a very low output power thanks to the application of FMCW

technology. SQUIRE is ideally suitable for use by the Army and Marines, e.g. air mobile and amphibious units, but also by United Nations units or Border Guard units. Squire is an X-Band man-portable medium-range ground surveillance radar that can detect and classify moving targets on, or close to, the ground at ranges up to 48 km. Deployed worldwide for force protection, reconnaissance and compound protection, it is equally suited for border, coastal and site surveillance, counter-drug, smuggling operations and drone detection. Squire is light, compact, and has a very low output power thanks to the application of FMCW technology. Squire is ideally suitable for use by the Army and Marines, e.g. air mobile and amphibious units, but also by United Nations units or Border Guard units. It consists of compact components to be carried in two backpacks. Each weighs less than 23 kgs, including batteries, and can therefore be easily carried by two persons. Because of its low maximum power output (1W max) the Squire is a very safe radar concerning the effects of RF radiation energy. There is no radiation danger for persons, even in the direct vicinity of the system. KEY BENEFITS • SQUIRE is a man-portable ground surveillance radar for detection/tracking and classification of moving ground targets. It can assist artillery and mortar firing units by giving feedback on shell impacts. • Deployment of troops under all circumstances demands a system that is easily transportable, not only by vehicles, but also by man. SQUIRE is a lightweight radar being man-portable and easy to install on a vehicle. • The FMCW radar techniques applied in SQUIRE allow very low transmit power which makes the system virtually undetectable. Even sophisticated devices will not detect SQUIRE. This gives a clear tactical advantage. • Low level air surveillance for detection of slow moving aircraft/UAV (< 300 km/h) • Advanced doppler processing • The use of reliable components like the solid state transceiver, results in an extremely high Mean Time Between Failure [MTBF > 20.000 hr]. • This, combined with extensive use of "Commercial of the Shelf“ components, ensures that the Life Cycle Cost of SQUIRE are extremely low. FEATURES • Very Low Probability of Intercept (LPI) • Instrumented range selection: 3 km, 6 km,12 km, 24 km and 48 km • Track While Scan (option) • Automatic and manual target classification • Artillery fire deviation measurement • Threat warning via alarm zones • Day and night, all weather capability • Very safe due to low output power • Ease of operation (one man operation) with user friendly man-machine interface • Extremely low weight (man portable) • Fast deployment and march-order • Separation of radar unit and operator unit up to 100 m with cable TCP/IP network operation • High operational availability • Very low life cycle costs • Suitable for mounting on a vehicle or a mast • Sea mode (sea clutter filtering)

→→Air Defense Radars

76N6 Clam Shell Russian Low Altitude Acquisition Radar



Tiers:



Variants:

- **91N6E:** This is an upgraded derivative of the 64N6 Big Bird radar system developed for the S-400 surface-to-air missile system. It has a fully digital design with a higher peak power rating than its predecessor to accommodate longer-range 48N6E3 and 40N6E missiles. The 91N6E is mounted on the new MZKT-7930 tractor.

76N6 Clam Shell

↳*System*

Alternative Designations: 76N6 Clam Shell
Name: 76N6 Clam Shell
Type: Acquisition Radar
Band: I (8-10 GHz)
Power: 1.4 kW continuous wave
Turn-on Time: 3 min
Setup Time (40V6M mast): 1 hour
Detection Range, Target Flying at 500 meters: km90
Detection Range, Target Flying at 1,000 meters: km120
Target Tracking: up to 180
Target Resolution Azimuth: deg1
Target Resolution Range: 1.9 km
Target Resolution Velocity: 8.7 kmh
Minimum detectable Radar Cross-Section (RCS): 0.02 sq m
Maximum Target Speed: Mach 2.1
Average Power: 1.4 kW
Peak Power: 55.0 kW
Mean Time Between Failures: 100 hours

Mount: he 76N6 CLAM SHELL (5N66M etc.) is mounted on a large trailer with a mast which is between 24 and 39 m (79 and 128 ft) tall. Usually is used with a mast.

Automotive

Mount: Trailer

Primary Mover: MAZ-537 tractor

Communications

VHF Radio: R-168 Akveduk

HF Radio: R-161 Poisk

Notes:

The 76N6 Clam Shell** is a ground-based three-dimensional radar that uses frequency-modulated continuous-wave transmission for target acquisition in dense electronic countermeasures (ECM) environments. It is designed to detect and track approaching and receding low radar cross-section targets, such as cruise missiles, at very low altitudes.The fully automatic system provides target track data for the fire-control system of static SA-10a or mobile SA-10b air defense systems. Approaching and receding target velocity, range and bearing are provided, with selectable 1- or 6-degree vertical beamwidths and selectable beam polarization. The FA-51MU antenna head subsystem combines a transmit and receive antenna, separated by a shielding structure, which prevents spillover from the transmitter into the receiver. The design includes sidelobe suppression features. The doubly curved transmit and receive reflectors measure about 9 ft 6 in (2.9 m) in each dimension. The manufacturer claims world-class resolution, high rejection of clutter (100 dB) and very accurate pointing. The antenna head is mounted on a hydraulically elevated mast, which is available in two versions: the 40V6M, which is 77 ft 5 in (23.8 m) tall; or the 40V6M2/40V6MD, which is 127 ft 3 in (38.6 m) tall. The mast and antenna head are mated before elevation on a semi-trailer that is towed by a MAZ-537 tractor. A conventional rotational coupler allows the antenna head to rotate through 360 degrees. The Clam Shell transmitter, fitted in the FA-52MU transmit/receive module, produces a high-purity continuous wave signal for search operations, with imposed low frequency modulation for ranging to targets. Signal-processing enables the rejection of clutter, terrain, precipitation, high-density chaff and jamming.

96L6E (Cheese Board) Russian Early-Warning and Acquisition Radar





Tiers:



System

Name: 96L6E, NATO: Cheese Board

Type: 3D early-warning and acquisition radar

Target Detection Range: 300 km

Simultaneously Tracked Targets: 100 ea

Works in Conjunction with: the 83M6E2 control post and S-300MPU2 launchers

Chassis: MAZ-7930 (8x8) truck chassis and is intended for use with the S-300PMU and S-300PMU1 air defence systems as an upgrade to replace several existing radar's with a single more capable system

Band: C-Band

Crew: Three operators are needed to run the set. Up to five operator consoles are provided

Antenna: The phased-array antenna with 96 radiating rows employs mechanical beam steering in azimuth and electronic beam steering in elevation

Antenna Rotation: 5-10 rpm

Mean Time Betweeen Critical Failure: 10,000 hours

High Jam Resistance: Yes

Frequency Hopping: Yes

High Clutter Rejection: Yes

Operation Modes: There are two operation modes implemented: Low altitude targets can be acquired by constraining the mainlobe elevation angle between -3° and +1.5° using an antenna rotation of 5 rpm

Note: The 96L6E “Cheese Board” is designed to replace the 36D6 “Tin Shield B” and 76N6 “Clam Shell”.

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7

Width: m3.07

Height: m2.92

Maximum Load: tons15

Ground Pressure: INA

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel
Engine Type: Diesel
Engine Power: hp525
Cruising Range: km650
Speed, Maximum Road: km/h65
Speed, Average Cross: km/hINA
Speed Maximum Swim: km/hNot Amphibious
Configuration: 8x8
Gradient: deg60
Side Slope: deg40
Vertical Step: m0.6
Trench: m2
Fording Depth: m1.3

Protection

Hull Armor: INA
Turret Armor: INA
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: INA
Camouflage Nets: Yes, Standard
Note: Protection. Additional elements of protection are the placement of components of C-300 in the trenches (practiced as placing on the hills for a better view and more rapid care of the horizon, and in the trenches for stealth and protection against fragments of explosions).

Notes:

96L6E “Cheese Board” is a 3D early-warning and acquisition radar operating in C-Band designed to replace the 36D6 “Tin Shield B” and 76N6 “Clam Shell”. It is used in conjunction with the SA-10 “Grumble” (S-300) and SA-21 “Growler” (S-400) theatre defence missile systems. Three operators are needed to run the set. Up to five operator consoles are provided. The phased-array antenna with 96 radiating rows employs mechanical beam steering in azimuth and electronic beam steering in elevation. The radar is a frequency hopping design intended to provide high jam resistance and high clutter rejection. There are two operation modes implemented: Low altitude targets can be acquired by constraining the mainlobe elevation angle between -3° and +1.5° using an antenna rotation of 5 rpm. This slow rotation allows a better clutter rejection with a subclutter visibility up to 70 dB. All altitude targets can be acquired by constraining the mainlobe elevation angle between -1.5° and +20° using an antenna rotation of 10 rpm. As a third mode the radar can operate in a sector search. The 96L6E measures range, azimuth and elevation and performs up to 100 local tracks automatically. It classifies four different target types: aircrafts, helicopters, UAVs, and missiles. After relocation the 96L6E can be set up by three operators in less than 5 minutes.

YLC-2 (LLQ303) Chinese 3D Air Surveillance and Acquisition Radar





Tiers:



Variants:

- **YLC-2A:** Upgraded version
- **YLC-2V:** Self-Propelled Version

System

Alternative Designation: YLC-2
Type: 3D Air Surveillance and Acquisition Radar
Crew: INA
Chassis: INA
Band: L - band
Power Output: 5.5 KW
Peak Power: 85 KW
Detection Range: >500km
Accuracy Range: 200m
Azimuth: 3600
Resolution Range: <100m
Elevation: 0.50 - +200
MTI Improvement Factor: 44dB
Antenna Sidelobe Level: -35dB
Additional Features: *Phased array system and pencil beam scan technology *Wide band low sidelobe planar array antenna *Monopulse angle measurement *Frequency diversity *Distributed high power solid-state transmitter *Advanced programmable digital signal processing

Dimensions

Length: 9 m
Width: 7 M
Height: INA

Weight, Combat: INA

Notes:

The YLC-2 radar (domestic designation: LLQ303, formerly known as 385) is a three-dimensional main guidance and surveillance radar developed by the Nanjing Research Institute of Electronics Technology. In the mid-2000s, an improved version labeled YLC-2A was deployed to the PLA. Equipped with a new Giga-flops digital signal processor, it is capable of Digital Moving Target Indication (DMTI) and Constant false alarm rate (CFAR) processing. An S-band variation called YLC-2U with similar capabilities was also developed for SAM guidance. Both of these advanced YLC-2 radars have been specifically designed to counter stealth fighters such as F-22, with a claimed range of up to 200km even in heavy ECM environment.

Giraffe 8A Swedish AESA 3D Long-Range Radar





Tiers:



Variants:

- **Giraffe 40:** This is a short-range (40 kilometres (25 mi) instrumented) air defense radar with command and control capability. It employs a folding antenna mast that extends to a height of 13 metres (43 ft) when deployed and can be integrated with an Interrogation Friend or Foe (IFF) capability. Coverage is stated to be from ground level to 10,000 metres (33,000 ft) in altitude. In Swedish service the radar is designated PS-70 and PS-701 and provides target data to RBS-70 SHORADS missiles and 40mm Bofors guns. A more powerful version with a 60 kW transmitter is known commercially as Super Giraffe and in Swedish service as PS-707. These radars are no longer marketed.
- **Giraffe 50AT:** This is the model used in the Norwegian NALLADS air defense system which combines the radar and RBS-70 missiles with 20 mm anti-aircraft guns to provide low-level air defense for the combat brigades of the Norwegian army. Mounted on a BV-206 all-terrain tracked vehicle this version has an instrumented range of 50 km (31 mi). The antenna extends to a height of 7 metres (23 ft) and the system can control up to 20 firing units of guns or missiles or a combination of both. The Command and Control system features fully automatic track initiation, target tracking, target identification (IFF), target classification and designation, hovering helicopter detection threat evaluation and handling of "pop-up" targets. It can also exchange data with Giraffe 75 or AMB systems as part of a larger network
- **Giraffe 75:** This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90.[3] In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.
- **Giraffe S:** Optimized as a mobile radar for un-manned remote-controlled applications as a "gap-filler" in air defense early warning systems concentrating on small, low-flying targets over a long distance. It can also be employed as a coastal surveillance radar where targets are small surface vessels and sea-skimming missiles or aircraft. A new antenna extends range coverage to 180 km (110 mi) with altitude coverage from ground level to 6,000 metres (20,000 ft). The antenna mast extends to 8 metres (26 ft).
- **Giraffe AMB:** Giraffe Agile Multi Beam is a passive electronically scanned array radar, providing multi-beam 3-Dimensional air coverage at 5.4 to 5.9 GHz with instrumented ranges of 30 km (19 mi), 60 km (37 mi) and 100 km (62 mi), the altitude coverage is extended from ground-level to 20,000 metres (66,000 ft) with 70-degree elevation coverage. Data rate is 1-scan per-second. Its maintained pulse density suppresses high cluttering in adverse weather conditions. Ultra-low antenna side-lobes combined with pulse-to-pulse and burst-to-burst frequency agility provides some resistance to jamming. As in previous Giraffe radars automatic hovering helicopter detection is provided as is a rocket, artillery and mortar locating function, allowing the radar to detect incoming rounds and give 20 seconds or more of warning before impact. Giraffe AMB is the principal sensor of the Swedish RBS 23 BAMSE air defense missile system but is available for many other applications. The Giraffe AMB can be delivered with ground surveillance options fitted. A skilled crew can deploy the radar in around 10 minutes and recover it in around 6 minutes.
- **ARTE 740:** This is a coastal defense radar based on the Giraffe 75 antenna and Giraffe AMB processing system optimized for surface and low-altitude coverage for the Swedish Amphibious Forces (formerly the Coastal Artillery). It is mounted on a MOWAG Piranha 10x10 armored vehicle. 6 systems are in service.
- **Sea Giraffe AMB:** Saab's Sea Giraffe AMB is the naval variant of their Giraffe radar with 3D AMB technology. It can detect air and surface targets from the horizon up to a height of 20,000 metres (66,000 ft) at elevations up to 70°, and can simultaneously handle multiple threats approaching from different directions and altitudes, including diving anti-ship missiles. Also, it is specialized for rapidly detecting small, fast moving targets at all altitudes and small surface targets in severe clutter. Sea Giraffe AMB is installed on the Republic of Singapore Navy's upgraded Victory-class corvette and US Navy's Independence class of Littoral Combat Ships, and has the designation AN/SPS 77 V for LCS 2

and 4, and AN/SPS 77 V for LCS 6 and higher. It has also been chosen for the Royal Canadian Navy's new Protecteur-class Joint Support Ships. The radar has an instrumented range of 180 kilometres. Its roles include: *Air surveillance and tracking *Surface surveillance and tracking *Target identification for weapon systems *High-resolution splash spotting

- **AESA:** Saab Electronic Defence Systems (EDS) in May 2014 unveiled two new classes of active electronically scanned array (AESA) radar—three land-based systems (Giraffe 1X, Giraffe 4A and Giraffe 8A) and two naval variants (Sea Giraffe 1X and Sea Giraffe 4A).
- **Giraffe 8A:** At the top end of the range is the Giraffe 8A, a long-range IEEE S-band (NATO E/F) 3D sensor that can be produced in fixed, transportable and fully mobile configurations. Intended primarily for remote operation as part of an integrated air defence network, Giraffe 8A can also be operated locally. It has an instrumented range of 470 km and an altitude capability of more than 40,000m, bringing true long-range air defence capability to the Saab radar family for the first time. Giraffe 8A produces 15 stacked beams to provide elevation coverage from ground level to more than 65°. It can operate in a continuous 360° scan mode, rotating mechanically at 24rpm, or can be steered electronically across an operator-specified sector of 40° to 100°. More than 1,000 air defence tracks can be maintained, and the system also has anti-ballistic missile capability, in which case more than 100 tracks can be followed. Saab has paid special attention to Giraffe 8A's electronic counter-countermeasures properties. The radar generates very low sidelobes and incorporates sophisticated frequency agility in pulse-to-pulse, burst-to-burst and scan-to-scan regimes. It also switches and staggers pulse repetition frequency and transmits random jitter to further confuse countermeasures. It automatically selects the least jammed frequencies and can transmit intermittently or randomly. The radar offers a passive detection and tracking capability against jammers.
- **Giraffe 4A:** While the Giraffe 8A occupies the high end of the family, Saab has introduced new radars in the medium-range category in the form of Giraffe 4A and Sea Giraffe 4A for naval use. Employing similar S-band technology to the larger radar, Giraffe 4A offers true 3D multirole capability, combining the air defence and weapon locating tasks in a single unit. Able to be airlifted in a single C-130 load, Giraffe 4A can be deployed by two people in less than 10 minutes. It can operate as a standalone.
- **GIRAFFE 1X:** To complete its new line-up, Saab has introduced two short-range radars, Giraffe 1X and Sea Giraffe 1X. Working in the IEEE X-band (NATO I-band), Giraffe 1X is intended primarily as a highly mobile radar that can work with very short-range air defence systems in the battlefield or at sea. Weighing less than 300 kg, Giraffe 1X can be mounted on a small vehicle or vessel or in fixed installations such as on a building or a mast. The radar has a sense-and-warn function and can be optionally configured for weapon location.

System

Alternative Designation: Giraffe 8A Radar

Type: Multi-Mission Surveillance

Manufacturer: SAAB

Family: Giraffe Radar

In Service: INA

Crew: 2

Emplacement Time: 10 min

Displacement Time: 5 min

Multi-Role Capability: With Giraffe 8A the integrated Air Defence System will be enhanced with a sensor suite to allow constant 24/7 air surveillance over the assigned area of responsibility. The Giraffe 8A will simultaneously search for, detect, track and report short to medium range ballistic missiles.

Operational Flexibility: f the situation dictates, the commanding officer can choose between search in the entire 360° volume or an optimised search in a sector (40°-100°). Both with coverage up to 65° of elevation. *Extended range *Fast update *Low observable targets

Identification: Giraffe 8A can be offered with a set of integrated Electronic Identification capabilities: *IFF Mode 5 & S *Target Classification *Integrated Electronic Support Measures (ESM) *Passive tracking if in network

Survivability: Much emphasis has been put on ECCM performance in the design of Giraffe 8A. This includes: *Ultra-low side-lobes *Frequency agility; pulse to pulse, burst to burst, and scan to scan frequency agility *PRF switching and PRF stagger with random jitters *Intermittent (or random) transmission, to confuse hostile ESMs and Anti-Radiation Missiles *Automatic selection of least jammed frequency *Automatic jammer detection and tracking in both azimuth and elevation

Operated Locally or Remotely: Giraffe 8A is designed to be operated by remote control (primary method of operation). For local maintenance the system can be operated by a ruggedised PC in close connection to the system. The Remote

Control System is designed to give the operators full operational control of the sensor system. Although the radar system normally will operate unattended, all modes and functions can be remotely adjusted and controlled. The remote control functionality also includes system monitoring and system diagnostics.

Integrated Logistics Support (ILS): ILS is an important part of the system delivery and will form the basis for future maintenance. Saab ILS experts have solid experience in tailoring ILS deliveries together with customers worldwide.

Small Target Detection: New AESA technology allows new functionality to detect and track small targets also at longer ranges.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: INA

Radar System

Name: Giraffe 8A

Type: Stacked beam 3D radar

Antenna Type: AESA, digital beam forming

Frequency: S (E/F) band

Elevation Coverage: > 65 degrees

Rotation Rate: 24 RPM

Search Volume: 360° or in a sector

Air Surveillance: 470 km

Notes:

The Saab (formerly Ericsson Microwave Systems AB) Giraffe Radar is a family of land and naval two- or three-dimensional G/H-band (4 to 8 GHz) passive electronically scanned array radar-based surveillance and air defense command and control systems tailored for operations with medium- and Short Range Air Defense (SHORAD) missile or gun systems or for use as gap-fillers in a larger air defense system. The radar gets its name from the distinctive folding mast which when deployed allows the radar to see over nearby terrain features such as trees, extending its effective range against low-level air targets. The first systems were produced in 1977. By 2007, some 450 units of all types are reported as having been delivered. *Utilising identical antenna in fixed, transportable and mobile versions of the radar system *Unmatched operational performance against small targets and tactical ballistic missiles with its non-rotating mode *Offers enhanced real time identification and passive tracking functionality The Giraffe 8A is a 3D Long-Range AESA radar system on the S-band, designed for the highest level of situational awareness and ballistic missile defence. It is offered in versions for fixed, transportable and mobile applications, all providing exceptional range, search volume and multi-role capabilities, combined with outstanding operational flexibility. Today and in the future. Long-range air surveillance / early warning identification The capability to rapidly detect, track and report all air-breathing targets within the sensor coverage. Ballistic missile defence operations Detects, tracks and reports short/medium range ballistic missiles. Provides simultaneous weapons queuing and C2 reporting in order to significantly reduce time from warning to engagement. Operational in all climate zones Giraffe 8A is specified for operation in extreme climates, ranging from inland, coastal and hot desert to Arctic environments. Reliability Giraffe 8A is very reliable and easy to operate. Redundant design and the AESA concept makes the time between critical failure extremely long.

HT-233 Chinese 8x8 Self-Propelled Engagement Radar System



Tiers:



System

Alternative Designation: HT-233

Type: Engagement Radar

Manufacturer: INA

Family: INA

In Service: 2008-Present

Crew: INA

Chassis: Taian TAS-5380 series chassis

Dimensions (Chassis: TAS-5380)

Length: m11

Width: m3

Height: m3

Weight, Empty: tons18

Payload Capacity: tons20

Automotive (Chassis: TAS-5380)

Engine Name: Deutz Diesel

Engine Type: Diesel

Engine Power: hp517

Maximum Cruising Range: km800

Speed, Maximum Road: km/h80

Speed, Average Cross: km/h45

Speed Maximum Swim: Not Amphibious

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.5

Trench: m1.8

Fording Depth: m1.1

Radar

Name: HT-233

Type: Engagement Radar

Phase Shifter Elements: claimed to employ 4,000 phase shifter elements.

IFF Antenna: Yes

SSR Antenna: Yes

Bandwidth: 300 MHz instantaneous bandwidth in the lower X-Band or C-Band

Detection Maximum Range: km150

Tracking Maximum Range: km100

Azimuth: deg360

Elevation Beamsteering: 0° to 65°

Number of Targets it can Track: More than 50

Active Thermal Homing: Yes

Frequency Hopping: An interesting claim by Sengupta is that the HT-233 employs “randomness in frequency, space and time”; if this claim is correct then the HT-233 would be a frequency hopper, employing pseudo-random angular scan algorithms.

Note: The radar provides target acquisition and tracking within its coverage sector, post launch missile capture, midcourse missile tracking and command link guidance.

Communications

Tactical Radio: TBR-121

Protection (Chassis: TAS-5380)

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

Designated as HT-233, this radar is the most advanced FCRs HQ-9 could employ, and it has greater similarities to the MIM-104 Patriot's MPQ-53 than the S-300's 30N6 (Flap-Lid) series, working in the NATO G-band (4–6 GHz) also as a search and targeting radar. This could be due to an alleged transfer of a Patriot missile to China from Israel.[12][13] The radar can search a 120 degree arc in azimuth and 0-90 degrees in elevation out to 300 km, with a peak power output on 1MW (average 60 kW). The radar is credited as being able to track 100 targets and guides up to 6 missiles to 6 targets, or alternatively, to 3 targets with a pair of missile for each target. HT-233 is the FCR used by HQ-9 that is closest to AN/MPQ-53: In comparison to earlier H-200

radar used by early models of KS-1 SAM which uses a simple horn instead of lens arrangement, HT-233 radar adopts lens arrangement of AN/MPQ-53. In comparison to SJ-231 radar used by the latest model of KS-1, HT-233 has a thousand more phase shifter on its antenna array, totaling four thousand, as opposed to the three thousand of SJ-231. In contrast, both AN/MPQ-53 & 30N6E radars have ten thousand phase shifters on their antenna arrays respectively. HT-233 radar is mounted on Tai'an TAS5501 10 x 10 high mobility cross country truck, and operates in C-band at 300 MHz. When deployed as a search radar TH-233 is fielded at brigade level, while FCR radars deployed would be SJ-212, H-200 or SJ-231.[3] HT-233 is credited with a detection range of 120 km,[14] scanning 360 degrees in azimuth and 0-65 degrees in elevation. It can track 100 targets and designate 50 for engagements.

Giraffe 75 Swedish Mobile Air Surveillance Radar






Tiers:



Variants:

- **Giraffe 40:** This is a short-range (40 kilometres (25 mi) instrumented) air defense radar with command and control capability. It employs a folding antenna mast that extends to a height of 13 metres (43 ft) when deployed and can be integrated with an Interrogation Friend or Foe (IFF) capability. Coverage is stated to be from ground level to 10,000 metres (33,000 ft) in altitude. In Swedish service the radar is designated PS-70 and PS-701 and provides target data to RBS-70 SHORADS missiles and 40mm Bofors guns. A more powerful version with a 60 kW transmitter is known commercially as Super Giraffe and in Swedish service as PS-707. These radars are no longer marketed.
- **Giraffe 50AT:** This is the model used in the Norwegian NALLADS air defense system which combines the radar and RBS-70 missiles with 20 mm anti-aircraft guns to provide low-level air defense for the combat brigades of the Norwegian army. Mounted on a BV-206 all-terrain tracked vehicle this version has an instrumented range of 50 km (31 mi). The antenna extends to a height of 7 metres (23 ft) and the system can control up to 20 firing units of guns or missiles or a combination of both. The Command and Control system features fully automatic track initiation, target tracking, target identification (IFF), target classification and designation, hovering helicopter detection threat evaluation and handling of "pop-up" targets. It can also exchange data with Giraffe 75 or AMB systems as part of a larger network.
- **Giraffe 75:** This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90.[3] In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.
- **Giraffe S:** Optimized as a mobile radar for un-manned remote-controlled applications as a "gap-filler" in air defense early warning systems concentrating on small, low-flying targets over a long distance. It can also be employed as a coastal surveillance radar where targets are small surface vessels and sea-skimming missiles or aircraft. A new antenna extends range coverage to 180 km (110 mi) with altitude coverage from ground level to 6,000 metres (20,000 ft). The antenna mast extends to 8 metres (26 ft).
- **Giraffe AMB:** Giraffe Agile Multi Beam is a passive electronically scanned array radar, providing multi-beam 3-Dimensional air coverage at 5.4 to 5.9 GHz with instrumented ranges of 30 km (19 mi), 60 km (37 mi) and 100 km (62 mi), the altitude coverage is extended from ground-level to 20,000 metres (66,000 ft) with 70-degree elevation coverage. Data rate is 1-scan per-second. Its maintained pulse density suppresses high cluttering in adverse weather conditions. Ultra-low antenna side-lobes combined with pulse-to-pulse and burst-to-burst frequency agility provides some resistance to jamming. As in previous Giraffe radars automatic hovering helicopter detection is provided as is a rocket, artillery and mortar locating function, allowing the radar to detect incoming rounds and give 20 seconds or more of warning before impact. Giraffe AMB is the principal sensor of the Swedish RBS 23 BAMSE air defense missile system but is available for many other applications. The Giraffe AMB can be delivered with ground surveillance options fitted.
- **ARTE 740:** This is a coastal defense radar based on the Giraffe 75 antenna and Giraffe AMB processing system optimized for surface and low-altitude coverage for the Swedish Amphibious Forces (formerly the Coastal Artillery). It is mounted on a MOWAG Piranha 10x10 armored vehicle. 6 systems are in service.
- **Sea Giraffe AMB:** Saab's Sea Giraffe AMB is the naval variant of their Giraffe radar with 3D AMB technology. It can detect air and surface targets from the horizon up to a height of 20,000 metres (66,000 ft) at elevations up to 70°, and can simultaneously handle multiple threats approaching from different directions and altitudes, including diving anti-ship missiles. Also, it is specialized for rapidly detecting small, fast moving targets at all altitudes and small surface targets in severe clutter. Sea Giraffe AMB is installed on the Republic of Singapore Navy's upgraded Victory-class corvette and US Navy's Independence class of Littoral Combat Ships, and has the designation AN/SPS 77 V(1) for LCS 2 and 4, and AN/SPS 77 V(2) for LCS 6 and higher.

- **AESA:** Saab Electronic Defence Systems (EDS) in May 2014 unveiled two new classes of active electronically scanned array (AESA) radar—three land-based systems (Giraffe 1X, Giraffe 4A and Giraffe 8A) and two naval variants (Sea Giraffe 1X and Sea Giraffe 4A).
- **Giraffe 8A:** At the top end of the range is the Giraffe 8A, a long-range IEEE S-band (NATO E/F) 3D sensor that can be produced in fixed, transportable and fully mobile configurations. Intended primarily for remote operation as part of an integrated air defence network, Giraffe 8A can also be operated locally. It has an instrumented range of 470 km and an altitude capability of more than 40,000m, bringing true long-range air defence capability to the Saab radar family for the first time. Giraffe 8A produces 15 stacked beams to provide elevation coverage from ground level to more than 65°. It can operate in a continuous 360° scan mode, rotating mechanically at 24rpm, or can be steered electronically across an operator-specified sector of 40° to 100°. More than 1,000 air defence tracks can be maintained, and the system also has anti-ballistic missile capability, in which case more than 100 tracks can be followed. Saab has paid special attention to Giraffe 8A's electronic counter-countermeasures properties. The radar generates very low sidelobes and incorporates sophisticated frequency agility in pulse-to-pulse, burst-to-burst and scan-to-scan regimes. It also switches and staggers pulse repetition frequency and transmits random jitter to further confuse countermeasures. It automatically selects the least jammed frequencies and can transmit intermittently or randomly. The radar offers a passive detection and tracking capability against jammers.
- **Giraffe 4A:** While the Giraffe 8A occupies the high end of the family, Saab has introduced new radars in the medium-range category in the form of Giraffe 4A and Sea Giraffe 4A for naval use. Employing similar S-band technology to the larger radar, Giraffe 4A offers true 3D multirole capability, combining the air defence and weapon locating tasks in a single unit. Able to be airlifted in a single C-130 load, Giraffe 4A can be deployed by two people in less than 10 minutes. It can operate as a standalone.
- **Giraffe 1X:** To complete its new line-up, Saab has introduced two short-range radars, Giraffe 1X and Sea Giraffe 1X. Working in the IEEE X-band (NATO I-band), Giraffe 1X is intended primarily as a highly mobile radar that can work with very short-range air defence systems in the battlefield or at sea. Weighing less than 300 kg, Giraffe 1X can be mounted on a small vehicle or vessel or in fixed installations such as on a building or a mast. The radar has a sense-and-warn function and can be optionally configured for weapon location.

System

Alternative Designation: Giraffe 75; PS-90

Chassis: BV-206

Crew: ea2

Mission: The main tasks of the Giraffe 75 system can be summarised as keeping a threat adapted alert status, increasing reaction time by providing early target information and designation and making the combat of all air targets possible with air defence firing units, gun and missile. In addition, the system also co-ordinates the air defence firing units with own air movements.

Band: 5.4 GHz5.9 GHz (C-band)

Firing Posts: The truck-mounted Giraffe 75 mobile radar, also known as the PS-90 can be linked to nine RBS 70 firing posts.

Beamwidth: 8.2°vertical, 1.8°horizontal

Pulse Length: 4 µsec (25 km mode) 8 µsec (50 km mode)

PRF: 5,000 PPS (25 km mode) 2,500 PPS (50 km mode)

Instrument Range: 75 km

Coverage Range: 40 n miles (75 km; 47 miles) (instrumented range) 32 n miles (60 km; 37 miles) (fighter, RCS 3 m²) 27 n miles (50 km; 31 miles) (air target, RCS 1 m²) 13 n miles (25 km; 16 miles) (missile, RCS 0.1 m²)

Azimuth: 360°

Scan Rate, Rotational: 60 rpm

Track Capacity: 20 (targets) 10 (jam strobes)

MTI Improvement Factor: 40 dB

Deployment Altitude: 13 m

Power: 12 kW (peak, output) 300 W (average, output)

Processor: Ericsson APN 548 01 (16MHz)

↳***Dimensions (Chassis: BV-206)***

Height, Overall: m2.4
Length, Overall: m6.9
Width, Overall: m1.87
Cargo Space, Front: m32.5
Cargo Space, Rear: m35.5
Track Width: mm620
Ground Pressure: 11.6/13.6 kPa (1.68/1.97 PSI)
Gross Vehicle Weight: mt8,000 kg
Payload: 2.24mt (630 kg in front compartment and 1610 kg in rear compartment)
Trailer Load: mt2.5
Antenna Mast: 13 meters

Automotive (Chassis: BV-206)

Engine Name: Ford Cologne V6 gasoline, or Mercedes Benz turbodiesel
Engine Power: hp115
Range, Cruising: km300
Speed, Maximum Road: km/h55
Speed, Maximum Swim: km/h3
Fording Depth: Amphibious
Temperature Range: degreesCold starting to -52C
Grade, hard surface: %60
Grade, Deep Snow: %30
Turning Radius: m8

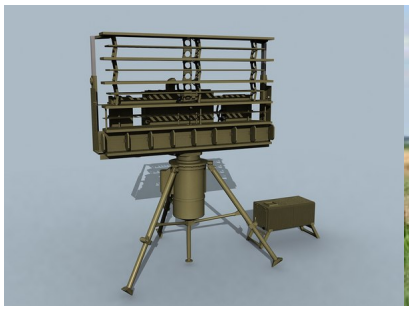
Protection

Armor: Depends on Variant. Armored variant of the Bv 206 is the Bv 206S. It has modified cabs and armor plating on all its bodywork. Recent member of the Bv 206 family is the BvS 10 improved armored version. It is new larger vehicle, with improved load capacity. The BvS 10 has the same superior mobility in difficult terrain, combined with the same speed on road.
Armor, Applique: Available
Armor, Explosive Reactive: No
Active Protection System: No
NBC Protection: Yes
Smoke Equipment: Yes

Notes:

This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90. In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.

1L122-1E Russian Man-Portable Air Defense Radar





Tiers:



Variants:

- **1L122–2E:** The larger one, 1L122–2E is a compact mobile solid-state 3D radar which is designed to perform necessary “information support function” for short- and medium-range air defense weapon systems, as well as for controlling and directing aerial traffic at make-shift airfields. These functions can be executed at short notice, in complacent to military’s force mobilization plans. The radar’s detection envelope (range) is between 1–80 km. The 1L122–2E is a vehicular variant that features a mast, which is extended when the vehicle is not moving and, when retracted, allows the radar to operate on the move. 1L122–2E is recommended to replace currently available target acquisition radars such as P-15, P-18, P-19, and others used to provide information support for the Pechora, Kvadrat, and Osa surface-to-air missile (SAM) systems.

System

Alternative Designation: 1L122–1E
Type: Man-Portable Air Defense Radar
Crew: ea2
Targets: v1L122–1E’s main task is to detect, position, and track aircraft, cruise missiles, and unmanned aerial vehicles, conduct friend-or-foe identification and automatically transmit tracking data to the automated control system.
Installation: Other provisions made in the design include installation on any mobile chassis and deployment of the radar head to a distance of up to 300 m from the carrier to be controlled remotely.
Radar Detection Range: 1-40 km
Target Tracking Speed: The 1L122-1E (1L122-2E) radar makes it possible to detect the indicated types of air targets flying at a speed of up to 700 m / s
Detection Zone Azimuth: 360 deg
Detection Zone Elevation: -5 (0) - +45 (60) degrees
Effective Dispersion Area (EPR): the mean square errors of determining the coordinates of a single target with an effective dispersion area (EPR) of 1 square m.
Displacement Time: INA
Emplacement Time: INA
Data Update Rate: 2 (4) or 4 (10) s

Dimensions

Antenna Length: 1200 mm

Antenna Width: 800 mm

Weight, Combat: kg30

Notes:

On July 3, 2018, Russia unveiled two air-defense radars of 1L122 series which able to detect a variety of targets including aircraft, helicopters, cruise missiles, and unmanned aerial vehicles (UAVs). Russia is developing these small radar hardware for a decade to supports its man-portable air defense systems and to create a robust command station with automation at field-level. The introduction of such hardware allows the troops to receive more precise target data. The radars are developed by Nizhny Novgorod Research Institute of Radio Engineering (NNIIRT). The series mainly consists of two variants — 1L122–1E (1Л122–1E) operating at L band frequency and 1L122–2E (1Л122–2E) operating at UHF frequency. 1L122–1E The smaller one, 1L122–1E's main task is to detect, position, and track aircraft, cruise missiles, and unmanned aerial vehicles, conduct friend-or-foe identification and automatically transmit tracking data to the automated control system. In its portable configuration (1L122–1E), the radar can be rapidly delivered to an assigned point, even in a hard-to-reach location. The set is broken down into several units, each weighing not more than 30 kg, which permits delivery by airdrop as well as any other mode of transportation. Other provisions made in the design include installation on any mobile chassis and deployment of the radar head to a distance of up to 300 m from the carrier to be controlled remotely. The radar's detection envelope (range) is between 1–40 km. In 2014, GAZ Tigr chassis-mounted anti-aircraft command module with 1L122E radar was unveiled at Oboronexpo 2014, a defense exhibition in Moscow.

1L119 Nebo-SVU Russian Early Warning / Target Acquisition Anti-Stealth Radar





Tiers:



System

Manufacturer: Nizhny Novgorod Research Institute of Radio Engineering (Russian acronym: NNIIRT)

Mission: Detecting and tracking Very Low Observable (VLO) and Low Observable (LO) aircraft designs

Crew: 4

Vehicles: 2

Detection Range: km500

Band: VHF

Deployment Time: min20

Tracking Range: km200

Tracking accuracy: 0.5 degrees in azimuth, and 1.5 in elevation, making it suitable as an acquisition radar for the S-300PMU1/2 and S-400 systems

Characteristics: Solid state phased array with electronic beam-steering in azimuth and elevation, it is considerably more accurate than its predecessor, it has much better mobility, and incorporates a wide range of improvements. It retains the VHF element design, but uses vertical polarization.

Detection range for aircraft and ballistic targets with RCS of 1 m2, km:: At 0.5 km altitude, km 65. At 10 km altitude, km 270. At 20 km altitude, km 380.

Measurement Accuracy:: Range, 200m. Azimuth, 30 arc minimum. Elevation angle, 1.5 (within 3 to 45 deg elevation angle range).

Maximum number of tracks: 100

Mean Time Between Failure: hours500

Mean Time to Repair Mean: hour.5

Power Consumption: kPH30

Dimensions

Height of Radar: m6

Length of Radar: m60

Notes:

The Nebo-SVU is part of the Nebo family of Very High Frequency (VHF) 2D and 3D mobile surveillance radars which also includes the 55G6-1 Nebo 3D radar and 1L13-3 Nebo-SV 2D radar both deployed in the 1990s. The Nebo-SVU phased array radar is designed to automatically detect, determine the coordinates and track airborne targets such as rotary- and fixed-wing aircraft, ballistic missiles, stealth aircraft, unmanned aerial vehicles and hypersonic cruise missiles. Besides, the radar system also provides Identification Friend or Foe (IFF) and detection of active electronic countermeasures (ECM) capabilities. Advanced digital signal techniques allow to suppress natural clutter and active jammers. The Nebo-SVU is capable of relying target information and air surveillance data to air defense systems and command centers. It entered service with the Russian Air Force in 2004 and has been exported at least to one undisclosed customer. The Nebo-SVU radar comprises antennas and electronic equipment, mounted on a semi-trailer; and the autonomous electric power plant, based on the ED-2x30-T400-1RA1M4 diesel-engine power plant, carried by the Kamaz truck. The radar system can operate in various climates with temperatures ranging from +50 Celsius to -50 Celsius, air humidity of 98%. It can detect a fighter aircraft with a radar cross section (RCS) of 2.5 square meters at 50 kilometers flying at 500 meters of altitude, at 250 kilometers flying at 10,000 meters or at 350 kilometers flying at 20,000 meters. It can detect ballistic targets at altitudes of up to 180 kilometers. Overall, the Nebo-SVU radar can track in excess of 100 airborne targets simultaneously.

64N6E (Big Bird) Russian Ballistic Missile Intercept Radar





Tiers:

1 **2** 3 4

System

Alternate Designations: NATO designation: Tombstone

Design: Radar is mounted on the cabin of the trailer and a turntable, allowing 360 degree rotation.

↳*Radar*

Radar Type: S-Band phased array search and acquisition

Target Detecting Capability: Can detect up to 200 targets simultaneously

Target Tracking Ability: Either 6 or 12 targets maximum depending on the number of antennas being used.

Band of Operation: 2 GHz

Azimuth of Operation: 360 with both antennas

Detection Range: 140-150 nautical miles

Time required to be ready to track from the march: 5 minutes

Notes:

Used for the detection of aerial targets and ballistic missiles and works in conjunction with the SA-10A Grumble or the SA-20 Gargoyle surface to air missile systems. 30% larger aperture than the U.S. Navy's SPY-1 Aegis radar. Unlike Western phased arrays in this class, the 64N6 uses a reflective phased array with a front face horn feed, the horn placed at the end of the long boom which protects the waveguides to the transmitters and receivers in the cabin. The beam steering electronics are embedded inside the antenna array, which has around 2700 phase elements on either face. This Janus faced arrangement permits the Big Bird to concurrently search two 90 degree sectors, in opposite directions, using mechanical rotation to position the antenna and electronic beam steering in azimuth and elevation. This design technique permits incremental growth in output power as the only components of the system which have to handle high microwave power levels are the waveguide and feed horn. The 64N6E is a frequency hopper, and incorporates additional auxiliary antenna/receiver channels for suppression of sidelobe jammers - NIIP claim the ability to measure accurate bearing to jamming sources. The back end processing is Moving Target Indicator (MTI), and like the Aegis the system software can partition the instantaneous sector being covered into smaller zones for specific searches. To enhance MTI performance the system can make use of stored clutter returns from multiple preceding sweeps. Detection ranges for small fighter targets are of the order of 140 to 150 nautical miles for early variants. Per 12 second sweep 200 targets can be detected, and either six or twelve can be individually tracked for engagements. While the Big Bird provides an excellent acquisition capability against aerial and ballistic missile targets, the 5V55 missile was inadequate. The S-300PM/PMU1 introduced the 48N6 which has much better kinematics - cited range against aerial targets is 81 nautical miles, ballistic missile targets 21.5 nautical miles, with a minimum engagement range of 1.6 to 2.7 nautical miles. Low altitude engagement capabilities were improved - down to 20 - 30 ft AGL. The missile speed peaks at 2,100 metres/sec or cca Mach 6. The missiles can be fired at 3 second intervals, and Russian sources claim a single shot kill probability of 80% to 93% for aerial targets, 40% to 85% for cruise missiles and 50% to 77% for TBMs.

64N6 (Big Bird) Russian Surveillance and Target Acquisition Radar





Tiers:



Variants:

- **91N6E:** This is an upgraded derivative of the 64N6 Big Bird radar system developed for the S-400 surface-to-air missile system. It has a fully digital design with a higher peak power rating than its predecessor to accommodate longer-range 48N6E3 and 40N6E missiles.

64N6 (Big Bird) Surveillance Radar

↳System

Alternative Designations: 64N6 (NATO designation Big Bird)
Name: 64N6 (Big Bird) Surveillance Radar
Type: Designation Radar
Crew: ea6
Weight: 60,000 kg
Band: 2 GHz
Coverage Azimuth: 360 deg or 180 deg
Elevation Detection Mode: deg13.4
Elevation Tracking Mode: deg28
Ballistic Target Detection Sector Azimuth: deg60
Ballistic Target Detection Sector Elevation: 0-55 deg; or 20-75 deg
64N6E2: 0-75 deg
Detection Range (Mig-21 Type Target): km260
Detection Range, Ballistic Target: km127

Accuracy Range: m150

Accuracy Azimuth: deg0.5

Accuracy Elevation: deg0.5

Tracking: 200 targets simultaneously

Scan Rate: sec12

Emplacement Time: 5 min

Displacement Time: INA

Mount: The 64N6 BIG BIRD is mounted on a large trailer along with a generator and typically towed with the now familiar 8-wheeled truck

Automotive

Mount: Trailer

Prime Mover: Both elements are mounted on a 60-ton truck consisting of the Type 74106 tractor and the Type 9988 semi-trailer

Communications

VHF Radio: R-168 Akveduk

HF Radio: R-161 Poisk

Notes:

The 64N6 (NATO codename 'Tombstone') 3-D long-range surveillance radar comprises a hydraulically raised antenna assembly and radar shelter mounted on a common semi-trailer. The phased-array antenna set has a double-sided antenna aperture. Its 3-D performance is obtained by rotation of the antenna once every 12 seconds and electronically scanning the antenna beam, in both azimuth and elevation. Scan sector capability for detecting tactical ballistic missiles is also provided. This can detect aircraft and cruise missile type targets at a range of up to 300 km and ballistic missiles with launching ranges of up to 1,000 km using the sector scan facility. An IFF transponder subsystem is fitted. The radar is used for target detection and tracking in normal, clutter and severe ECM environments. The data obtained are relayed to the command post for processing and assessment. The radar can detect targets with speeds of up to 2,788 m/s (10,000 km/h). The export designation of the system is 83M6E. The S-300PMU-2 system designation is 83M6E2. The Air Defense 64N6 (NATO code designation of Big Bird or Tombstone) is a mobile radar detection station with bilateral antenna, automatic control of modes and data, working in a centimetric range of frequencies. It is intended for maintenance with 54N6 radar-tracking information system and 83N6 control facilities for the S-300PM. The 64N6 provides detection of the air targets with resolution, accuracy of definition of coordinates and rate of updating of the data, allowing tracking of targets, follow the trajectory without difficulty, and overcome active and passive countermeasures, definition of the state accessory(belonging) of the found out purposes, and also directions of active countermeasures. Electronic scanning by a beam of illuminators in azimuthal and elevation planes in a combination to fast switching the sides of radiation of illuminators and uniform electromechanical rotation of illuminators on an azimuth allows redistribution of radiated energy in separate directions and sectors of a zone of the review due to temporary expenses for the review of various sites of space depending on radar-tracking conditions, to divide(undresse) visibility range into a zone of the regular review and a zone of support, to optimize time allocation for air defense due to use of procedures of detection in a combination with a mode of selection of the moving target. Borders of action are established for height and range by operators or automatically. Protection against active countermeasures is provided with automatic reorganization of carrying frequency by results of the analysis of tracking conditions. For protection against the active countermeasures operating on lateral petals of the diagram of an orientation of antennae, the three-channel self-balancing potentiometer connected to compensatory aerials is used. Protection against passive countermeasures is made due to use of equipment SDTS. Temporary automatic adjustment of amplification is applied to reduce the quantity of false tracks in a near zone (up to 65 km) in the channel of detection, in a distant zone - the scheme of stabilization of a level of false alarms. To reduce the quantity of false returns from subjects on district and the inactive purposes it is applied intersurvey the signals received from same sites of space during several periods of the review. Management of air defense work and devices entering into it, processing of the radar-tracking information and definition of coordinates of the purposes is carried out by a computer constructed on the basis of two specialized computers. The built in monitoring system checks functioning the equipment and defines malfunctions. The structure of the command post includes means of speech communication, and also the broadband communication line 5?312 for transfer of the information on a radio channel or on a cable. It is completed by means of independent electrosupply into which structure enters the unit

producing the electric power of a three-phase alternating current by frequency of 400 Hz by a voltage of 220 Volts given means of external power supplies can be used the converting device and diesel power station. Equipment is placed in two containers F6 (the illuminators, transmitting and reception devices and devices for processings of information and management), installed on the lorry convoy tractor MAZ-74106. The system is served by fighting calculation from 4 person. Its weight is 60 tons

Type 305A (LLQ305A) Chinese Self-Propelled 3D Acquisition Radar



Tiers:

1 **2** 3 4

System

Alternative Designation: Type 305A; LLQ305A
Type: Self-Propelled 3D Acquisition Radar
Crew: INA
Chassis: Mercedes-Benz NG 80
Mssion: Chinese sources have identified the radar as a long range 3D high altitude acquisition and search design, intended to support missile guidance applications.
Maximum Range: INA
Minimum Range: INA
Maximum Altitude: INA
Minimum Altitude: INA
Note: Very little info is released about this radar other than it can also act as Fire-control radar.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The new Type 305A 3D acquisition radar is unique and does not resemble any known Chinese radar designs. It is carried on the same Mercedes-Benz NG 80 derived chassis as the Type 120 and Type 305B radars. The antenna design physically resembles existing Western S-band AESAs such as the Thales Ground Master series, or the very much larger Israeli IAI/Elta EL/M-2080 Green Pine ABM radar series. The depth of the primary antenna and its structural frame is typical for AESA designs in this category, using a stacked modular feed network arrangement; this is well documented in a number of Russian AESA designs. The rear face of the antenna frame is largely occupied with voluminous equipment housings, of similar depth to the antenna frame itself, and of equal height. These would be consistent with the installation of low voltage AESA power supplies, cooling equipment, receiver, and exciter hardware. China's industry has previously designed and built large AESAs, specifically for the KJ-200 and KJ-2000 AWACS projects, operating either in the L-Band or S-Band, so the basic technology is available to construct a ground based radar in this category. Chinese sources have identified the radar as a long range 3D high altitude acquisition and search design, intended to support missile guidance applications. This type of functionality is consistent with a number of extant dual role acquisition radars, built to support long range acquisition of aerial targets at medium to high altitudes, and

acquisition of Tactical Ballistic Missile (TBM) category targets. In recent years claims have emerged of an intended ABM or ATBM role for the HQ-9, but no evidence of a suitable acquisition radar for this purpose was ever provided. If the Type 305A is what it appears to be, then it would be the kind of radar required for a ATBM acquisition capability. Until further disclosures are made, deeper analysis of the Type 305A would be largely speculative.

9S80 (Dog Ear) Russian Target Acquisition Radar System





Tiers:

1 2 **3** 4

System

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:
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↳*9S80 Dog Ear Radar System*

Name: 9S80 Dog Ear Radar System
Type: Acquisition Radar
Chassis: MT-LB
Function: The radar supplies target alerting information to the SA-13 Gopher (Russian 9K35 Strela-10) surface-to-air missile (SAM) system.
Antenna Type: open-mesh, rounded-rectangle parabolic antenna.
Vehicle Mount: The Dog Ear (with the Russian designation of 9S80) is a Russian ground-based, target-acquisition radar mounted on an MT-LB multi-purpose tracked vehicle or MT-LBu armored command and reconnaissance vehicle (ACRV).
Band: F-G (3-6 GHz)
Maximum Range, Acquisition: km80
Maximum Range, Tracking: km35
Note #1: Target acquisition requires a separate vehicle mounting a Dog Ear** forward alerting radar.
Note #2: Deployment usually involves one system for each air defense battery/battalion.

Dimensions (MT-LB)

Length: 6.45 m
Width: 2.85 m
Height: 1.87 m
Ground Clearance: 400 mm
Length of Track on Ground: 3.80 m

Track Width: 350 mm

Automotive (MT-LB)

Engine Name: 1 x YaMZ 238V

Engine Type: V-8 diesel engine

Engine Power: 240 hp at 2,100 rpm

Transmission: manual w/1 reverse gear and 6 forward gears

Fuel: 450 liters

Suspension: torsion bar, 6 road wheels, front drive, rear idler, 2 shock absorbers, no return rollers

Maximum Speed, Road: 62 km/h

Maximum Speed, Water: 6 km/h

Range: 500 km

Gradient: %60

Side Slope: %30

Vertical Obstacle: 0.70 m

Trench: 2.70 m

Fording: Amphibious

Protection

Armor: 7-14 mm maximum

Applique Armor: INA

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Dog Ear (with the Russian designation of 9S80) is a Russian ground-based, target-acquisition radar mounted on an MT-LB multi-purpose tracked vehicle or MT-LBu armored command and reconnaissance vehicle (ACRV). It uses an open-mesh, rounded-rectangle parabolic antenna. The radar supplies target alerting information to the SA-13 Gopher (Russian 9K35 Strela-10) surface-to-air missile (SAM) system. Deployment usually involves one system for each air defense battery/battalion.

PRV-11 (Side Net) Russian Height-Finder Radar System



Tiers:



System

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:
:

↳*PRV-11 (SIDE NET) Radar System*

Name: PRV-11 (SIDE NET) Radar
Function: Height Radar
Frequency: E band, 2.7 GHz
Length: m4
Width: m6
Crew: INA
Pulse Repetition Time (PRT): 3 and 1,3 ms
Pulsewidth: 3 and 1.5 µs
Pulse Repetition Frequency (PRF): 330 and 730 Hz
Peak Power: 1.2 MW
Average Power: 1.3 kW
Maximum Range: km28
Maximum Altitude: km32
Associated Weeapon System: SA-2/3/5
Displacement Time: INA
Emplacement Time: INA

Notes:

The PRV-11 radar (NATO name: SIDE NET) is a mobile, nodding height-finding radar operating in the E Band. The PRV-11 is a mobile, van-mounted mobile radar. It features clutter and asynchronous jamming protection. Weapons systems associated with the P-37 include the SA-2 GUIDELINE, SA-3 GOA and SA-5 GAMMON.

Giraffe AMB Swedish Air Surveillance and Ground Based Air Defence



Tiers:



Variants:

- **Giraffe 40:** This is a short-range (40 kilometres (25 mi) instrumented) air defense radar with command and control capability. It employs a folding antenna mast that extends to a height of 13 metres (43 ft) when deployed and can be integrated with an Interrogation Friend or Foe (IFF) capability. Coverage is stated to be from ground level to 10,000 metres (33,000 ft) in altitude. In Swedish service the radar is designated PS-70 and PS-701 and provides target data to RBS-70 SHORADS missiles and 40mm Bofors guns. A more powerful version with a 60 kW transmitter is known commercially as Super Giraffe and in Swedish service as PS-707. These radars are no longer marketed.
- **Giraffe 50AT:** This is the model used in the Norwegian NALLADS air defense system which combines the radar and RBS-70 missiles with 20 mm anti-aircraft guns to provide low-level air defense for the combat brigades of the Norwegian army. Mounted on a BV-206 all-terrain tracked vehicle this version has an instrumented range of 50 km (31 mi). The antenna extends to a height of 7 metres (23 ft) and the system can control up to 20 firing units of guns or missiles or a combination of both. The Command and Control system features fully automatic track initiation, target tracking, target identification (IFF), target classification and designation, hovering helicopter detection threat evaluation and handling of "pop-up" targets. It can also exchange data with Giraffe 75 or AMB systems as part of a larger network
- **Giraffe 75:** This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90.[3] In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.
- **Giraffe S:** Optimized as a mobile radar for un-manned remote-controlled applications as a "gap-filler" in air defense early warning systems concentrating on small, low-flying targets over a long distance. It can also be employed as a coastal surveillance radar where targets are small surface vessels and sea-skimming missiles or aircraft. A new antenna extends range coverage to 180 km (110 mi) with altitude coverage from ground level to 6,000 metres (20,000 ft). The antenna mast extends to 8 metres (26 ft).
- **Giraffe AMB:** Giraffe Agile Multi Beam is a passive electronically scanned array radar, providing multi-beam 3-Dimensional air coverage at 5.4 to 5.9 GHz with instrumented ranges of 30 km (19 mi), 60 km (37 mi) and 100 km (62 mi), the altitude coverage is extended from ground-level to 20,000 metres (66,000 ft) with 70-degree elevation coverage. Data rate is 1-scan per-second. Its maintained pulse density suppresses high cluttering in adverse weather conditions. Ultra-low antenna side-lobes combined with pulse-to-pulse and burst-to-burst frequency agility provides some resistance to jamming. As in previous Giraffe radars automatic hovering helicopter detection is provided as is a rocket, artillery and mortar locating function, allowing the radar to detect incoming rounds and give 20 seconds or more of warning before impact. Giraffe AMB is the principal sensor of the Swedish RBS 23 BAMSE air defense missile system but is available for many other applications. The Giraffe AMB can be delivered with ground surveillance options fitted. A

skilled crew can deploy the radar in around 10 minutes and recover it in around 6 minutes.

- **ARTE 740:** This is a coastal defense radar based on the Giraffe 75 antenna and Giraffe AMB processing system optimized for surface and low-altitude coverage for the Swedish Amphibious Forces (formerly the Coastal Artillery). It is mounted on a MOWAG Piranha 10x10 armored vehicle. 6 systems are in service.
- **Sea Giraffe AMB:** Saab's Sea Giraffe AMB is the naval variant of their Giraffe radar with 3D AMB technology. It can detect air and surface targets from the horizon up to a height of 20,000 metres (66,000 ft) at elevations up to 70°, and can simultaneously handle multiple threats approaching from different directions and altitudes, including diving anti-ship missiles. Also, it is specialized for rapidly detecting small, fast moving targets at all altitudes and small surface targets in severe clutter. Sea Giraffe AMB is installed on the Republic of Singapore Navy's upgraded Victory-class corvette and US Navy's Independence class of Littoral Combat Ships, and has the designation AN/SPS 77 V for LCS 2 and 4, and AN/SPS 77 V for LCS 6 and higher. It has also been chosen for the Royal Canadian Navy's new Protecteur-class Joint Support Ships. The radar has an instrumented range of 180 kilometres. Its roles include: *Air surveillance and tracking *Surface surveillance and tracking *Target identification for weapon systems *High-resolution splash spotting
- **AESA:** Saab Electronic Defence Systems (EDS) in May 2014 unveiled two new classes of active electronically scanned array (AESA) radar—three land-based systems (Giraffe 1X, Giraffe 4A and Giraffe 8A) and two naval variants (Sea Giraffe 1X and Sea Giraffe 4A).
- **Giraffe 8A:** At the top end of the range is the Giraffe 8A, a long-range IEEE S-band (NATO E/F) 3D sensor that can be produced in fixed, transportable and fully mobile configurations. Intended primarily for remote operation as part of an integrated air defence network, Giraffe 8A can also be operated locally. It has an instrumented range of 470 km and an altitude capability of more than 40,000m, bringing true long-range air defence capability to the Saab radar family for the first time. Giraffe 8A produces 15 stacked beams to provide elevation coverage from ground level to more than 65°. It can operate in a continuous 360° scan mode, rotating mechanically at 24rpm, or can be steered electronically across an operator-specified sector of 40° to 100°. More than 1,000 air defence tracks can be maintained, and the system also has anti-ballistic missile capability, in which case more than 100 tracks can be followed. Saab has paid special attention to Giraffe 8A's electronic counter-countermeasures properties. The radar generates very low sidelobes and incorporates sophisticated frequency agility in pulse-to-pulse, burst-to-burst and scan-to-scan regimes. It also switches and staggers pulse repetition frequency and transmits random jitter to further confuse countermeasures. It automatically selects the least jammed frequencies and can transmit intermittently or randomly. The radar offers a passive detection and tracking capability against jammers.
- **Giraffe 4A:** While the Giraffe 8A occupies the high end of the family, Saab has introduced new radars in the medium-range category in the form of Giraffe 4A and Sea Giraffe 4A for naval use. Employing similar S-band technology to the larger radar, Giraffe 4A offers true 3D multirole capability, combining the air defence and weapon locating tasks in a single unit. Able to be airlifted in a single C-130 load, Giraffe 4A can be deployed by two people in less than 10 minutes. It can operate as a standalone.
- **GIRAFFE 1X:** To complete its new line-up, Saab has introduced two short-range radars, Giraffe 1X and Sea Giraffe 1X. Working in the IEEE X-band (NATO I-band), Giraffe 1X is intended primarily as a highly mobile radar that can work with very short-range air defence systems in the battlefield or at sea. Weighing less than 300 kg, Giraffe 1X can be mounted on a small vehicle or vessel or in fixed installations such as on a building or a mast. The radar has a sense-and-warn function and can be optionally configured for weapon location.

System

Alternative Designation: Giraffe AMB
Date of Introduction: INA
Proliferation: INA
Type: Air Surveillance and Ground Based Air Defence
Manufacturer: SAAB
Family: Giraffe Radar
In Service: INA
Crew: INA
Emplacement Time: 10 min
Displacement Time: 5 min
Maintaining Air Situational Awareness: Maintaining air situational awareness Integrated medium- and short-range GBAD systems are supported in multiple simultaneous engagements. The Giraffe AMB can classify and track fixed wing, helicopter, surface, jammer and ballistic targets. The Giraffe AMB medium-range 3D radar surveillance system is an ideal gap filler that provides airspace commanders with the capabilities needed for maintaining continuous and accurate air situational

awareness. It is a mobile deployable or fixed asset for air surveillance that can be operated remotely or locally with the ability to provide a networked air picture. Giraffe AMB allows for standard or customised data link integration.

Assuring Ground-Based Air Defence Capabilities: By combining a true multi-mission radar system and powerful C3 system Giraffe AMB delivers an accurate air picture with high update rate and highly automated functions for planning, threat evaluation, weapon assignment and target distribution. Everything the commander responsible for GBAD needs for safeguarding people and assets. Giraffe AMB can detect fast missiles and small UAVs even in high-clutter environments and offers flexible integration of weapon systems and tactical data links. The system is fully self-contained with all support systems and C3, highly mobile and deploys in less than 10 minutes.

Proven Multi-Mission Capability: *Provides simultaneous air surveillance, GBAD target acquisition and sense & warn capabilities without performance degradation *Combat-proven over more than 150,000 h in full operation *Is a mobile deployable or fixed asset for air surveillance *Can be delivered with surface surveillance add-ons

Detection Capability: *Covers the entire search volume every second *Superior small, slow and low target detection capability *Accurate 3D data for all targets in the search volume *All-weather performance with maintained range coverage *Detection of very low- and high-altitude targets

Force and Asset Protection: *360˚ detection and tracking of small ballistic objects (shells and rockets) even in severe ground clutter *Prediction of impact location *Automatic warning generated before impact in protected area

C3: *Provides engagement-quality Recognized Air Picture (RAP) target data *Integrated air picture with Link 11B and Link 16 *Automatic threat evaluation and weapon assignment *Able to handle multiple defended assets and various types of firing units *Can be delivered with military Air Traffic Control

Flexibility and Mobility: *Deployment in less than 10 minutes and teardown in less than 5 minutes 12 m antenna height offers freedom of deployment. *Operated remotely or locally *Fully self-contained single vehicle configuration *20ft ISO container cabin, C-130 transportable *Offers full mission flexibility through unparalleled *Support services with low and predictable cost of ownership

Integrated Logistics Support (ILS): ILS is an important part of the system delivery and will form the basis for future maintenance. Saab ILS experts have solid experience in tailoring ILS deliveries together with customers worldwide.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: INA

Radar System

Name: Giraffe AMB

Type: Stacked beam 3D radar

Antenna Type: 3D phased array, digital beam forming

Frequency: C (G/H)-band

Elevation Coverage: > 70 degrees

Rotation Rate: 60 RPM

Search Volume: 360° or in a sector

Instrumented Range: 120 km

Notes:

The Saab (formerly Ericsson Microwave Systems AB) Giraffe Radar is a family of land and naval two- or three-dimensional G/H-band (4 to 8 GHz) passive electronically scanned array radar-based surveillance and air defense command and control systems tailored for operations with medium- and Short Range Air Defense (SHORAD) missile or gun systems or for use as gap-fillers in a larger air defense system. The radar gets its name from the distinctive folding mast which when deployed allows the radar to see over nearby terrain features such as trees, extending its effective range against low-level air targets. The first systems were produced in 1977. By 2007, some 450 units of all types are reported as having been delivered. In combat situations, event protection operations or other tense situations, real-time information is critical for protecting forces against threats from the air. When every second counts, the Giraffe AMB surface radar provides the information and time needed for protecting both people and assets. *Covers the entire search volume every second *Provides engagement-quality Recognized Air Picture (RAP) target data *Combat-proven 24/7 capability with more than 150,000 h in full operation *Full mission flexibility through unparalleled support services *High degree of interoperability and is designed for low and predictable cost of ownership Giraffe AMB delivers key capabilities as part of short- and medium-range surveillance and Ground Based Air Defence (GBAD). It integrates powerful 3D surveillance radar and C3 functionality in one and the same system and provides forces with swift understanding of the air situation, enabling immediate and effective response to changing threats, new tactics, and shifting operational conditions. The system monitors the air volume 360 degrees for air targets and simultaneously locates and warns against incoming rocket, artillery and mortar rounds, and at the same time able to provide coastal surveillance. Large volume C-UAS surveillance Features include Saab’s unique function for enhanced low, slow and small (ELSS) target detection, which provides a dedicated counter-unmanned aerial vehicle (UAV) capability.

Kabina 66/5n87 (Back Trap) 3D Long-Range Radar System







Tiers:



System

Alternative Designation: Kabina 66/5n87; NATO: Back Trap
Type: 3D Long-Range Radar System
Crew: INA
Chassis: The BACK TRAP is a van-mounted mobile radar.
Weapon System Associated with the Back Trap Radar: Weapons systems associated with the BACK TRAP include the SA-5 GAMMON.
Band: "E/F" Band
Frequency: 1.98-2.45 GHz
Power Output: 32 kW (average), 1.5 MW (peak) (some sources report up to 2.4 MW peak power)
PRF: 60-1460 Hz
Range Resolution: 1.7 km (range)/1 degree (azimuth)
On/Off time: INA
Detection Ranges, 1 m2 RCS target at 200 m Altitude: 50 km
Detection Ranges, 1 m2 RCS target at 400 m Altitude: 200 km
Detection Ranges, 1 m2 RCS target at 600 m Altitude: 310 km
Detection Ranges, 1 m2 RCS target at Maximum Range: 450 km (380 km for fighter sized target)

Dimensions

Length: INA

Width: INA

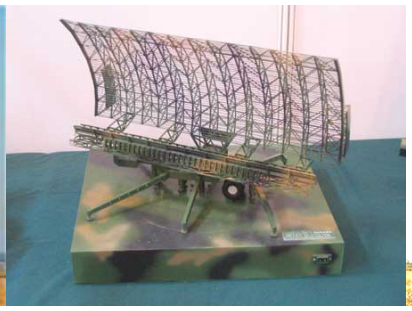
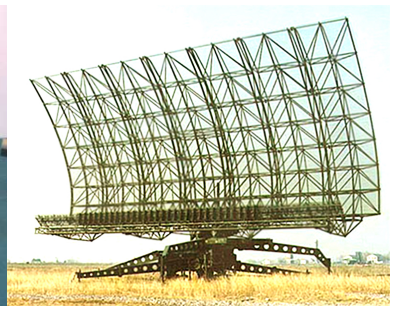
Height: INA

Weight, Combat: INA

Notes:

Air defense radar unit of the former Soviet Union Interesting at this radar unit is the diametral attachment of 2 antenna systems. Every antenna is meant for another elevation angle. Since two equal radar units always turned a location synchronously, four height ranges were felt therefore (like a Stacked- Beam- Antenna). The Kabina 66 was coupled with several height-finders (2 - 4 height-finders PRV-13 or PRV-17). The frequency is processed with four impulses but only two of these are transmitted. Two radar units work synchronously as a couple but also separate operation is possible. The rotary drive is hydraulically carried out. The power supply (300 kW / 400 Hz) is carried out of convertor or with diesel engines. A transfer needs 19 railroad plate freight cars.

YLC-4 Chinese 2D Long-Range Surveillance Radar

Tiers:



System

Alternative Designation: YLC-4
Type: 2D Long-Range Surveillance Radar
Crew: INA
Frequency Range: 216~220 MHz
RMAX: 380 km
Coverage Azimuth: 0° < 360°
Coverage Elevation: 0° < 25°
Reliability MTBFC: => 500 hours
Reliability MTTR: <= 0.5 hours
Aperture: 16.5 x 7.12 m Super cosecant square beam in elevation
Peak Power: ~50 kW
Pulse Width/Duty Cycle: 2 usec / 13%
Sweep Rate: ~10 sec
Sideslobes: < -30dB
Processing/MTI Improvement Factor: Digital AMTI / 41 dB
Clutter Rejection: ~45 dB
Power Requirements: 2 x 120 kW diesel generators

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

YLC-4 is a Chinese UHF solid-state, fully coherent 2D long range surveillance radar, which is mainly used for long range surveillance. The radar has the ability to synthesize data from up to four other radars with a large data capacity, and to communicate and display the data and state of the system through the net to realize remote control and detection. When equipped with height-finding radar, it can perform the function of guidance and providing target data for an air traffic control system. With long range detection range, high reliability and easy maintenance, YLC-4 radar is a main radar in air defense network. The manufacturer of the system is Nanjing Research Institute of Electronics Technology (NRIET)/Nanjing Institute No. 1.

Giraffe 4A Swedish Multi-Mission Surveillance Radar



Tiers:



Variants:

- **Giraffe 40:** This is a short-range (40 kilometres (25 mi) instrumented) air defense radar with command and control capability. It employs a folding antenna mast that extends to a height of 13 metres (43 ft) when deployed and can be integrated with an Interrogation Friend or Foe (IFF) capability. Coverage is stated to be from ground level to 10,000 metres (33,000 ft) in altitude. In Swedish service the radar is designated PS-70 and PS-701 and provides target data to RBS-70 SHORADS missiles and 40mm Bofors guns. A more powerful version with a 60 kW transmitter is known commercially as Super Giraffe and in Swedish service as PS-707. These radars are no longer marketed.
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- **Giraffe 75:** This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90.[3] In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.
- **Giraffe S:** Optimized as a mobile radar for un-manned remote-controlled applications as a "gap-filler" in air defense early warning systems concentrating on small, low-flying targets over a long distance. It can also be employed as a coastal surveillance radar where targets are small surface vessels and sea-skimming missiles or aircraft. A new antenna extends range coverage to 180 km (110 mi) with altitude coverage from ground level to 6,000 metres (20,000 ft). The antenna mast extends to 8 metres (26 ft).
- **Giraffe AMB:** Giraffe Agile Multi Beam is a passive electronically scanned array radar, providing multi-beam 3-Dimensional air coverage at 5.4 to 5.9 GHz with instrumented ranges of 30 km (19 mi), 60 km (37 mi) and 100 km (62 mi), the altitude coverage is extended from ground-level to 20,000 metres (66,000 ft) with 70-degree elevation coverage. Data rate is 1-scan per-second. Its maintained pulse density suppresses high cluttering in adverse weather conditions. Ultra-low antenna side-lobes combined with pulse-to-pulse and burst-to-burst frequency agility provides some resistance to jamming. As in previous Giraffe radars automatic hovering helicopter detection is provided as is a rocket, artillery and mortar locating function, allowing the radar to detect incoming rounds and give 20 seconds or more of warning before impact. Giraffe AMB is the principal sensor of the Swedish RBS 23 BAMSE air defense missile system but is available for many other applications. The Giraffe AMB can be delivered with ground surveillance options fitted. A

skilled crew can deploy the radar in around 10 minutes and recover it in around 6 minutes.

- **ARTE 740:** This is a coastal defense radar based on the Giraffe 75 antenna and Giraffe AMB processing system optimized for surface and low-altitude coverage for the Swedish Amphibious Forces (formerly the Coastal Artillery). It is mounted on a MOWAG Piranha 10x10 armored vehicle. 6 systems are in service.
- **Sea Giraffe AMB:** Saab's Sea Giraffe AMB is the naval variant of their Giraffe radar with 3D AMB technology. It can detect air and surface targets from the horizon up to a height of 20,000 metres (66,000 ft) at elevations up to 70°, and can simultaneously handle multiple threats approaching from different directions and altitudes, including diving anti-ship missiles. Also, it is specialized for rapidly detecting small, fast moving targets at all altitudes and small surface targets in severe clutter. Sea Giraffe AMB is installed on the Republic of Singapore Navy's upgraded Victory-class corvette and US Navy's Independence class of Littoral Combat Ships, and has the designation AN/SPS 77 V for LCS 2 and 4, and AN/SPS 77 V for LCS 6 and higher. It has also been chosen for the Royal Canadian Navy's new Protecteur-class Joint Support Ships. The radar has an instrumented range of 180 kilometres. Its roles include: *Air surveillance and tracking *Surface surveillance and tracking *Target identification for weapon systems *High-resolution splash spotting
- **AESA:** Saab Electronic Defence Systems (EDS) in May 2014 unveiled two new classes of active electronically scanned array (AESA) radar—three land-based systems (Giraffe 1X, Giraffe 4A and Giraffe 8A) and two naval variants (Sea Giraffe 1X and Sea Giraffe 4A).
- **Giraffe 8A:** At the top end of the range is the Giraffe 8A, a long-range IEEE S-band (NATO E/F) 3D sensor that can be produced in fixed, transportable and fully mobile configurations. Intended primarily for remote operation as part of an integrated air defence network, Giraffe 8A can also be operated locally. It has an instrumented range of 470 km and an altitude capability of more than 40,000m, bringing true long-range air defence capability to the Saab radar family for the first time. Giraffe 8A produces 15 stacked beams to provide elevation coverage from ground level to more than 65°. It can operate in a continuous 360° scan mode, rotating mechanically at 24rpm, or can be steered electronically across an operator-specified sector of 40° to 100°. More than 1,000 air defence tracks can be maintained, and the system also has anti-ballistic missile capability, in which case more than 100 tracks can be followed. Saab has paid special attention to Giraffe 8A's electronic counter-countermeasures properties. The radar generates very low sidelobes and incorporates sophisticated frequency agility in pulse-to-pulse, burst-to-burst and scan-to-scan regimes. It also switches and staggers pulse repetition frequency and transmits random jitter to further confuse countermeasures. It automatically selects the least jammed frequencies and can transmit intermittently or randomly. The radar offers a passive detection and tracking capability against jammers.
- **Giraffe 4A:** While the Giraffe 8A occupies the high end of the family, Saab has introduced new radars in the medium-range category in the form of Giraffe 4A and Sea Giraffe 4A for naval use. Employing similar S-band technology to the larger radar, Giraffe 4A offers true 3D multirole capability, combining the air defence and weapon locating tasks in a single unit. Able to be airlifted in a single C-130 load, Giraffe 4A can be deployed by two people in less than 10 minutes. It can operate as a standalone.
- **GIRAFFE 1X:** To complete its new line-up, Saab has introduced two short-range radars, Giraffe 1X and Sea Giraffe 1X. Working in the IEEE X-band (NATO I-band), Giraffe 1X is intended primarily as a highly mobile radar that can work with very short-range air defence systems in the battlefield or at sea. Weighing less than 300 kg, Giraffe 1X can be mounted on a small vehicle or vessel or in fixed installations such as on a building or a mast. The radar has a sense-and-warn function and can be optionally configured for weapon location.

System

Alternative Designation: Giraffe 4A Radar
Type: Multi-Mission Surveillance
Manufacturer: SAAB
Family: Giraffe Radar
In Service: INA
Crew: 2
Emplacement Time: 10 min
Displacement Time: 5 min
Multi-Mission Capability: With Giraffe 4A the commanding officer will access very high situation awareness through simultaneous air surveillance and GBAD target acquisition together with weapon locating capacity without performance degradation. If the situation dictates, the commanding officer can choose between search in the entire 360° volume or an optimised search in a sector (45°-120°).Both with coverage up to 70° of elevation.
Weapon Location Mode: Giraffe 4A also offers an optimised mode for weapon locating where the radar continuously searches the horizon and immediately tracks incoming projectiles.The point of origin and point of impact are calculated and

serve as input for counter-battery fire, adjustment of own fire or warning of incoming fire.

Surviability: Much emphasis has been put on ECCM performance in the design of Giraffe 4A. This includes: *Ultra-low side lobes *Frequency agility; pulse to pulse, burst to burst, and scan to scan frequency agility *PRF switching and PRF stagger with random jitters *Intermittent (or random) transmission, to confuse hostile ESMs and anti-radiation missiles *Sector transmission, which can be independently defined by the operator *Automatic selection of least jammed frequency *Automatic jammer detection and tracking in both azimuth and elevation

Operated Locally or Remotely: Giraffe 4A is designed to be operated locally or by remote control. Local operation is executed with a ruggedised PC in close connection to the system. The system also includes an operator module with two operator places in an NBC protected and armoured shelter.

Flexibility and Mobility: Giraffe 4A can be deployed by two persons in less than 10 min and teardown takes less than 5 min. It can also be airlifted by a single C-130 using standard equipment for container handling. With larger aircraft, such as the IL-76, C-17 or A400M the system can be transported as drive-on/drive-off cargo.

Integrated Logtistics Support (ILS): ILS is an important part of the system delivery and will form the basis for future maintenance. Saab ILS experts have solid experience in tailoring ILS deliveries together with customers worldwide.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: INA

Radar System

Name: Giraffe 4A

Type: Stacked beam 3D radar

Antenna Type: AESA, digital beam forming

Frequency: S (E/F) band

Elevation Coverage: > 70 degrees

Rotation Rate: 30 or 60 RPM

Search Volume: 360° or in a sector

Air Surveillance: 120 km

Weapon Locating: 100 km

Notes:

The Saab (formerly Ericsson Microwave Systems AB) Giraffe Radar is a family of land and naval two- or three-dimensional G/H-band (4 to 8 GHz) passive electronically scanned array radar-based surveillance and air defense command and control systems tailored for operations with medium- and Short Range Air Defense (SHORAD) missile or gun systems or for use as gap-fillers in a larger air defense system. The radar gets its name from the distinctive folding mast which when deployed allows the radar to see over nearby terrain features such as trees, extending its effective range against low-level air targets. The first systems were produced in 1977. By 2007, some 450 units of all types are reported as having been delivered. Multimission flexibility - Giraffe 4A combines the battle-proven designs from the Arthur and Giraffe AMB product families with an all-new radar sensor, based on AESA (Active Electronically Scanned Array) technology. This new radar offers exceptional range, performance and multi-function operational flexibility in a single solution. Air surveillance The ability to identify and track a high number of objects simultaneously makes the system suitable for air and sea surveillance as well as military ATC. Ground-based air defence Tracks air targets together with identification capability to to support multiple simultaneous engagements. Weapon

locating Tracks ballistic projectiles and calculates point of origin and point of impact for counter-battery fire or adjustment of own fire. Sense and warn The ability to detect and warn for small incoming ballistic objects offers valuable protection of own forces or civilian protection objects. Operational in all climate zones Giraffe 4A is specified for operation in extreme climates, ranging from inland, coastal and hot desert to Arctic environments. Giraffe 4A is reliable and easy to operate. Redundant design such as the AESA concept makes the time between critical failure extremely long; >2,500 h while typical repair time is less than 45 min. Large volume C-UAS surveillance Features include Saab’s unique function for enhanced low, slow and small (ELSS) target detection, which provides a dedicated counter-unmanned aerial vehicle (UAV) capability.

9S32 Grill Pan Russian Fire Control Radar System





Tiers:

1 2 **3** 4

System

↳*Radar*

Name: 9S32 GRILL PAN Guidance Radar system
Type: Parabolic dish target-illumination radar on telescoping mast on missile launch vehicle
Purpose: The GRILL PAN radar system controls the battery's launcher vehicles (TELARs and LLVs)
Sector Scan: 90-deg sector scan through 50 deg elevation on separate vehicle
Guidance System: inertial guidance with semi-active terminal homing
Band: X-Band
Multichannel: Yes
Peak Power: kW150
Maximum Range: km250
Beamwidth: deg0.5
Antenna: ransmission type of space fed phased-array antenna
Maximum Targets, Simultaneous: It can simultaneously track up to 12 targets and control up to six missiles against these targets
Radar Cross-Section: Radar cross-section of 2m2 at a range of 150 km in manual mode and 140 km in automatic mode
IFF Planara Array: Yes
Note: The GRILL PAN tracks targets assigned to it by the CP while simultaneously maintaining a horizon search for new targets

Protection

Hull Armor: INA
Applique Armor: No
Explosive Reactive Armor: No
Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Note: The S-300V is considered as a survivable system. Once all the missiles are launched the launcher vehicles can briefly redeploy. It uses shoot, scoot and hide tactics in order to avoid being destroyed.

Notes:

The 9S32 Grill Pan Fire Control Radar System is a multiple-target X-band tracking and guidance radar using a 10,000-element space fed transmission lens. Above the radar array is an IFF planara array, and below it are three sidelobe canceller antennas, which are mechanically steered to cover the main array sidelobe structure on up to three selected targets. There are two monopulse feeds on the top of the rotating radar turret. The upper feed is covered by a white, Teflon-like shell and is used when the array is set to 30° tilt for aircraft targets. The lower feed is further forward on the roof of the turret and is in line with the center axis of the array when it is tilted to approximately 45° for TBM intercepts. The emphasized features of the SA-12 system, including the Grill Pan array, are low RF loss and low cost. The phase shifters are Faraday rotators, having two sections in series, controlled by separate coils, with a total phase of 720°. In each phase shifter, the first coil is connected in series with coils of other phase shifters in that row and driven by the row command. The second coil is connected in series with coils of the other phase shifters in that column and drlven by the corresponding column command. Thus, a 10,000-element array, 100x 100 elements, requires only 100 row drivers and 100 column drivers. There are no electronic components on the phase shifter. The radar transmits right circular polarization and receives left circular (the predominant target echo polarization), and hence the Faraday rotator uses the same control field for reception as for transmission. The control field is changed only when the beam position is changed. During a dwell of several milliseconds, several hundred pulses are transmitted and received.

9S18M1 Snow Drift Russian Mobile 3D Coherent-Pulse Target Acquisition Radar




Tiers:



Variants:

- **9S18M1-1:** This variant offers increased detection range of 86 nm (99 mi, 160 km) and has a scan rate of 4.5 and 6 s.

System

Alternative Designation: 9S18M1 Snow Drift
Type: Mobile 3D Coherent-Pulse Target Acquisition Radar
Manufacturer: NIIP (Measuring Instruments Research Bureau), Novosibirsk, Russia Rosoboronexport, Moscow, Russia (export)
Chassis: The radar is vehicle-mounted and can become operational, once positioned, in less than 5 minutes.
Crew: INA
Detection Range High-Altitude Target: 85 km
Detection Range 100 meter Altitude Target: 35 km
Detection Range Nap-of-Earth (NOE) Target: 23 km
Tracking Range High-Altitude Target: 70 km
Tracking Range Nap-of-Earth (NOE) Target: 20 km
Emplacement Time: Less than 5 min
Displacement Time: Less than 5 min
Coverage Azimuth Ballistic Missile Targets: 120 deg
Coverage Azimuth Aircraft Targets: 360 deg
Coverage Elevation Aircraft Targets: 40 deg
Coverage Elevation Ballistic Missile Targets: 55 deg
Accuracy: 150 m
Scan Rate: 6-18 sec (deployment on operating mode)
Targets Located per Scan: 100

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The 9S18M1 radar (NATO name: SNOW DRIFT) is a 3-D acquisition radar operating in the centimetric Band. The 9S18M1 SNOW DRIFT is a mobile 3-D radar that uses an electronically steered pencil beam. The system incorporates frequency agility, giving it enhanced resistance to ECM. The SNOW DRIFT generally receives early warning from brigade-level surveillance radars such as the SPOON REST before acquiring the target. The radar can track up to 50 targets at a time, and provide target designation on six targets. Weapon systems associated with the 9S18M1 SNOW DRIFT include the SA-11 GADFLY and the SA-17 GRIZZLY.

VARIANT Danish 2D Surveillance and Target Indication Radar



Tiers:

1 2 3 4

System

Alternative Designation: VARIANT

Type: 2D Surveillance and Target Indication Radar

Manufacturer: Thales Group

Crew: INA

Military Features: VARIANT has typical military features including excellent surface gun fire support, hovering helicopter detection and protection against jamming. Its tracking is optimised for low false alarm rate and high track continuity. Rigorous testing to military standards ensures robust operation under the most demanding circumstances.

Dual Band Operation: Dual band (X-band and C-band) operation is jammer resistant. It always offers the best band to achieve robust performance under varying environmental conditions such as multipath, ducting and weather.

Low Probability of Intercept (LPI): Emissions from the integrated SCOUT antenna are difficult to detect. The applied Frequency Modulated Continuous Wave (FMCW) technique uses extremely low power. Unlike pulse radars with quasi LPI modes, detection performance is not sacrificed. This feature is called 'True LPI' (Low Probability of Intercept). It allows VARIANT to operate covertly in in a hostile environment while providing a very high resolution.

Features: • Fully automatic detection and tracking of air and surface targets • Surface Gun Fire support • Helicopter detection and classification, based on Spread Spectrum Indication (SSI) • Extensive ECCM facilities including dual band operation • Low Probability of Intercept (LPI) using the integrated FMCW radar SCOUT • Integral IFF antenna with monopulse capability (Mode 5/S) • Mechanical two axes stabilisation

Update Rate: 4.4 & 2.2 sec

Elevation Coverage: Up to 35°

Frequency Bands: G-band & I-band

Beamwidth Main Radar: 1.8° (G-band); 1.2° (I-band)

Beamwidth FMCW Radar: 1.5°

Peak Power: 2 kW (main radar); 3W (FMCW radar)

IFF Antenna: Integrated

MTBCF & MTBF: >1560 & >1270

Processing (Main Channel): Digital pulse compression and FFT based pulse Doppler processing

Air Targets Maximum Range: 120 km instrumented

Surface Targets Maximum Range: 70 km instrumented

Minimum Range: <25m

Tracking Capacity: 200 air tracks 200 surface tracks

Dimensions

Length: m1.16

Width: m2.35

Height: m2

Weight, Combat: kg450

Notes:

Variant is Thales Naval Nederland's latest 2D surveillance and target indication radar. Its principal role is as an automatic, fast reaction time radar sensor supplying targeting data to weapon systems. Targeting data is supplied for both air and surface targets simultaneously. Variant is a dual-band radar, utilising both the I- and G-Bands. Fully coherent, Variant provides pulse doppler operation for optimal clutter suppression and air target detection. Automatic “Hands off” target detection and tracking is provided by Thales Naval Nederland's modular digital processing. Outstanding ECM facilities are provided by the ability to operate over two frequency bands, an octave apart, and an integral Low Probability of Intercept (LPI) radar sensor. This LPI sensor can be used alone, thus providing Variant the unusual ability to operate in a mode that is almost undetectable to external ESM. Variant's low power consumption, lightweight construction and compact design, make the system well suited for use in fast patrol boats and other small ships. Variant is based on a double pill-box antenna, having a horizontal beamwidth of 1.8° and a vertical beamwidth of 14°. The transmitter is a Traveling Wave Tube with an average power of 200 W. Processing is based on digital pulse compression, Fast Fourier Transform processing, plot processing and automatic tracking. Detection range against a typical air target is given as about 30 km in G-Band and 28 km in I-Band. The Variant radar system supplies the following principal functions: *Surface target detection *Surface target tracking *Air target detection *Air target tracking *Gun-fire targeting support These functions are supported by the following features: *Automatic air target track initiation and maintenance *Manual surface track initiation *Automatic surface track maintenance *Splash-spotting gunfire support for pre-action calibration *Extensive ECM facilities including integral LPI radar *Integral IFF antenna

JY-27 Wide Mat Chinese Long-Range Early Warning Radar






Tiers:



System

Alternative Designation: Jy-27 Wide Mat

Type: Long-Range Early Warning Radar

Crew: INA

Chassis: INA

Frequency: 240 – 390 MHz (VHF-Band)

Pulsewidth: INA

Beamwidth: 7 deg

Peak Power: INA

Instrumented Range, 4x8 Array: 280 km

Instrumented Range, 6x16 Array: 390 km

Range Resolution: 600 km

Accuracy: ±150 m ; ±1º

Elevation: INA

Traverse: 360 deg

Dimensions

Length: INA

Width: INA

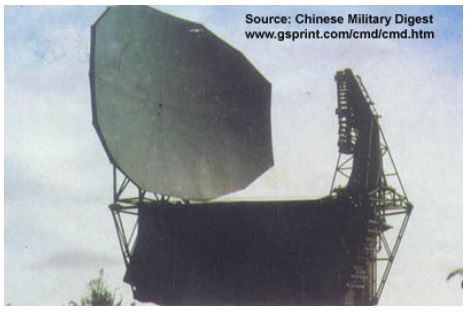
Height: INA

Weight, Combat: INA

Notes:

JY-27 radar of the Chinese manufacturer CETC is a fully solid-state and fully coherent long-range early warning system. It is designed and developed to provide early warning information and detect low-observable air targets in so-called “Stealth Technology”. Besides, it provides the early warning information for weapons system as well. The newer one antenna design is clearly influenced by the 1L13 Nebo SV “Box Spring” and 1L119 Nebo SVU. The radiating elements are horizontally polarized.

JY-8 Chinese Mobile 3D Air Surveillance, Target Acquisition and Interception Control Radar



Tiers:



Variants:

- **JY-8A:** This is a stripped-down variant of the baseline system. It uses only a single transmitter, eliminating the frequency diversity capability. Accordingly, maximum range is significantly reduced and height measurements are less accurate. Its stacked beam antenna forms 16 transmitting beams and 12 independent receiving beams to compensate for the loss in accuracy.

System

Alternative Designation: JY-8
Type: Mobile 3D Air Surveillance, Target Acquisition and Interception Control Radar
Crew: INA
Components: The system has four major components: the main antenna/transmitter/receiver shelter, operations shelter, maintenance shelter and tow truck. The complete system is air/sea transportable and can be assembled within one hour.
Band: G-H (4-6 GHz)
Antenna Scan Azimuth: 360 deg
Antenna Scan Elevation: 20 deg
Antenna Scan Altitude Range: 25 km
Antenna Scan Maximum Range: 350 km
Antenna Horizontal Beamwidth: 0.55 deg
Antenna Vertical Beamwidth: 0.90 deg
Antenna Rotation Rate: 3 rpm or 6 rpm
Pulse Width: 3-3.3 micro sec
Pulse Repetition Frequency: 365,500 Hz
Displacement: INA
Emplacement: Less than 1 Hour
Accuracy 100 nm Range Azimuth: 0.3 deg
Accuracy 100 nm Range: 500 m
Accuracy 100 nm Range RMS: 600 m

Target Resolution Range: 1 km

Target Resolution Azimuth: 0.6 deg

Target Capacity: 36 tracks

Peak Power: 800 kW per transmitter

Dimensions

Length: 12 m

Width: 12 m

Height: INA

Weight, Combat: INA

Notes:

The JY-8 is a mobile 3D air surveillance, target acquisition and interception control radar system operating in the C-band. It can be employed as the main radar sensor for an automated tactical defence system, or can be used as an independent radar. The system uses advanced signal/data processor techniques and is fully solid state with the exception of the magnetrons and thyratrons of the transmitters. The general designer of JY-9 is the head of 38th Research Institute, academician of Chinese Academy of Sciences Mr. Wu Manqing (□□□, Aug 1965 -), who is also the general designer of JY-9 and the general designer of the radar systems for KJ-2000 and KJ-200. The system has four major components: the main antenna/transmitter/receiver shelter, operations shelter, maintenance shelter and tow truck. The complete system is air/sea transportable and can be assembled within one hour. The system is designed to make use of amplitude comparison for height finding. With the aid of two computers, it is able to provide automatically accurate real-time 3D information on targets. Frequency diversity is used to increased detection probability. Other features include digital MTI, clutter map, automatic residue map and CFAR. A multibeam antenna assembly, mounted on the transmitter/receiver shelter and rotating at 3/6 rpm, is employed to form a group of stacked beams. RF power is generated by two transmitters and is fed to a power dividing network and then illuminated to the reflector via a waveguide assembly and feed array, creating a group of individual beams stacked vertically to form a wide cosecant squared pattern. In reception, both individual and combined beams are employed, 11 beams are formed by a receive network connected with an 11 channel diversity receiver. The received signals are sequentially mixed, amplified, detected and finally sent for data processing.

JY-9 Wall Eye Chinese Mobile Low-Altitude Search Radar



Tiers:



System

Alternative Designation: Jy-9 Wall Eye

Type: Mobile Low-Altitude Search Radar

Manufacturer: The system is manufactured by the East China Research Institute of Electronic Engineering(ECRIEE)/No.38 Research Institute.

Crew: ea4

Band: S (2-4 GHz)

Vertical Beamwidth: 40.0 deg

Horizontal Beamwidth: 1.3 deg

Dynamic Range: 120 dB

Maximum Range: 150 km

Altitude: 10,000 m

Scan Rate: 6 rpm or 12 rpm

Peak Power Output: 200.0 kW

Average Power OUtput: 3.4 kW

Emplacement: Less than 20 min

Displacement: Less than 20 min

Coverage, Azimuth: 360 deg

Coverage, Elevation: 0 deg to 40 deg

Maximum Resolution Range: 240 m

Minimum Resolution Range: 120 m

Azimuth: 1.3 deg

Antenna Gain: 34.4 dB

Detection Accuracy, Range: 80 m

Detection Accuracy, Azimuth: 0.4 deg

Detection Accuracy, Sensitivity: 55 dBm

Detection Accuracy, Noise Figure: 3.0 dB

Detection Accuracy, Clutter Rejection: 50.0 dB

Tracking: 1,000 plots; 72 tracks

Pulsewidth: 20 microsec

Pulse Repetition Frequency: 790 Hz

Mean Time Before Failure: >400 hours

Mean Time to Repair: <30 min

Dimensions

Length: m12

Width: m12

Antenna Height: m12

Weight, Combat: INA

Notes:

The JY-9 Radar is a mobile S-band low altitude search radar intended for use in air defense, gap filling, airport surveillance and coastal defense. It is designed for effective detection of targets at low altitude in both ECM and natural clutter environments. The general designer of JY-9 is the head of 38th Research Institute, academician of Chinese Academy of Sciences Mr. Wu Manqing (□□□, Aug 1965 -), who is also the general designer of JY-8 and the general designer of the radar systems for KJ-2000 and KJ-200. It consist of a radar/operations shelter, an antenna pallet and a power station shelter and is transportable by air, rail, and sea. It has a setup and dismantle time of 90 minutes by a team of 8 men. The JY-9 employs a dual-beam antenna assembly consisting of a deformed parabolic reflector, two horns and two feed channels. One channel is used for transmit, but both are used for receive. The antenna rotates at 6 or 12 rpm to provide all round coverage and can be mounted on a shelter or on the ground. The JY-9 has high anti-jamming and anti-clutter capability due to the use of advanced techniques, including pulse to pulse frequency agility, dual channel, JATS, wide operating band, low sidelobes, MTD automatic spectrum processing, automatic clutter map and automatic residue map. The mean time between failures is better than 900 hours with Built-in test equipment (BITE). The JY-9F three-dimensional low-altitude surveillance radar, is a new derivation of the JY-9 low-altitude radar. It is a fully coherent pulse-compression radar with a high reliability and mobility and can provide low-flying target information for national air defence information networks or for AAA or air traffic control systems. The JY-9F consists of an antenna assembly, an operations shelter, a trailer-installed shelter housing two diesel generators and an optional trailer-installed shelter. The antenna can be folded down or erected by a motor-driven mechanism and the assembling and disassembling of the system can be accomplished by a crew of eight men within one hour. This advanced radar incorporates the state-of-the-art techniques. The excellent low sidelobe antenna employed in the system has greatly enhanced the radar's anti-clutter capability and ECCM performance, giving improved low-altitude detection performance. Three AMTI processing channels are used, each equipped to handle a particular environmental condition, thereby providing maximum low-altitude target detection. The wideband and highly stable TWT+CFA transmitter guarantees a super-clutter visibility in excess of 40 dB in the presence of ground clutter. The quadriphase Taylor code ensures a desirable consistency, high reliability and high stability. Meanwhile, the waveform agility can be realised. The JY-9F radar is characterised by high reliability and maintainability with an MTBF of more than 400 hours and MTTR of less than 30 minutes. Due to extensive BITE adopted in the system, troubleshooting probability reaches 95 per cent while 85 per cent of faults can be isolated to PCB level and all faults can be isolated to the replaceable unit level. The system is manufactured by the East China Research Institute of Electronic Engineering(ECRIEE)/No.38 Research Institute.

67N6E Gamma-D Russian Towed Long-Range 3D Acquisition and Air Surveillance Radar







Tiers:



System

Alternative Designation: 67N6E Gamma-D
Type: Towed Long-Range 3D Acquisition and Air Surveillance Radar
Crew: INA
Frequency: D-Band
Average Power: 12.5 kW
Instrumental Range: 400 km
Range Resolution: 300 m
Accuracy: 100 m; 0.2°
Beamwidth: 1.35°
Antenna Rotation: 6 min-1
MTBCF: 1 000 hrs
Note: 67N6E «Gamma-D» is a mobile, operating in D-Band solid-state, long-range 3D acquisition and air surveillance radar, designed for use as part of automated and non-automated air defense and air force control systems. The radar can also be used for air traffic control and is with its export version probably an S-400 (Nato-Designator: S-21 “Growler”) battery component option.

Dimensions

Length: INA
Width: INA
Height: INA

Weight, Combat: INA

Notes:

67N6E «Gamma-D» (Cyrillic: 67Н6Е «Гамма-Д») is a mobile, operating in D-Band solid-state, long-range 3D acquisition and air surveillance radar, designed for use as part of automated and non-automated air defense and air force control systems. The radar can also be used for air traffic control and is with its export version probably an S-400 (Nato-Designator: S-21 “Growler”) battery component option. The radar comprises an active phased-array antenna with the turntable, an operator’s cabin housing electronic equipment and spare parts, tools and accessories set, a diesel power plant with two diesel-generators, and a self-contained power source for the operator’s cabin. The radar’s antenna and the turntable may be mounted on a semi-mobile tower (radar deployment platform 40V6M) with a height of 23.8 m. A remote control equipment kit can be provided for setting up at command posts to ensure radar operation at a distance of up to 15 km away with data link coupling. The kit also allows the crew to operate from the cabin moved 1 000 m away from the rotating antenna. The radar is fitted with a built-in automatic test and monitoring equipment, automatic fire-alarm and fire-extinguishing systems, air conditioning, and other technical support assets.

PRV-13 (Odd Pair) Russian Height Finding Radar



Tiers:



System

Alternative Designation: PRV-13; NATO: Odd Pair
Type: Height Finding Radar
Crew: INA
Chassis: Van-mounted
Associated with: Odd Pair** is a van-mounted, height-finding radar associated with the SA-5 Gammon** surface-to-air missile (SAM) system.
Frequency: 2500 to 2700 mhz
Peak Power: 1.6 mw
Average Power: 1 kW
Maximum Detection Range: 310 km
Pulse Repetition Frequency (PRF): 400 Hz
Hit Per Scan: > 15

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

RV-13 “Odd Pair” was a fully remote controlled height-finder in the former Warshaw Pact. It was used for heights up to 85 km. This height-finder was on duty as a transitional solution for the new states in the German Air Force up to 1998. A special feature is its compensation antenna (the so-called “baby-antenna”) used for sidelobe suppression. The transmitter stage of the PRV-13 uses a magnetron at a fixed frequency, with a second transmitter tuned on another frequency on standby. There where four reserve frequencies that could never be used before for reasons of confidentiality. Changing this frequency means, changing the magnetron. The PRV-13 was a patchwork of from proven electron tube assemblies used in its predecessors too, and solid-state assemblies and modules using integrated CMOS circuits. Very interesting was the kind of generation of the elevation angle marks: a cathode ray tube was deflected in scale to the elevation angle. In this tube was clamped a precise grid of wires. When the synchronously electron beam into this tube hit one of these wires, then it created an output pulse (standing for an electronic range mark).

Kolchuga-M Ukrainian Passive Early Warning Radar System





Tiers:



System

Alternative Designations: Kolchuga-M
Mission: he Kolchuga-M passive detection system is truck-mounted and detects aircraft electromagnetic emissions in the VHF, UHF, and SHF wavebands. It identifies and tracks incoming aircraft at long range for acquisition by separate air defense systems.
In Service: 2000-Present
Components for Complex: 2-3 vehicles plus control post
Crew: 2 at the receiving station, 3or 4 at control post
Platform: 6x6 van
Antenna Type: 4 in VHF, UHF, and SHF
Frequency Range: 0.13-18 GHz (to include X and Ku bands
Azimuth Coverage: deg360
Surveillance range: 450-620 km depending on target altitude and frequencies. The latter figure is for targets at 18.5 km altitude. Manufacturer claims 800 km (may be valid - some frequencies).
Effectiveness Against Stealth: Reported but not likely
Maximum Number of Targets Tracked: 32
Range for a Complex: 1,000 km frontage or 450-600 radius
Operation Duration Time: hours24
Operation Radius: 600 km (air targets at the 10 km altitude - up to 800 km), which makes an effective early warning air defense system
Range Aerials: The Kolchuga station is equipped with five meter-, decimeter-, and centimeter-range aerials, which provide for high radio sensitivity within a 110dB/W - 155 dB/W swath, depending on the frequency
Mode of Operation: Kolchuga is an electronic support measures system that employs two or more sites to locate emitters by triangulation. The system is vehicle mounted and comprises a large vertical meshed reflector, with two smaller circular parabolic dishes beneath and a pair of VHF-to-microwave log periodic antennas above. The dishes may exploit amplitude monopulse techniques for improved direction finding, whilst the angled spacing of the log-periodic antenna suggests that they may use phase interferometry to improve angle measurements. Various smaller antennas, presumably for inter-site communications are to the side and rear of the dish. The detection range is one of the best in its class, but it is highly dependent on the emitted power of the transmitter being tracked, and requires satisfaction of the line of sight condition to at least two receiving sites for triangulation (compared with three sites for a multilateration system such as the VERA passive sensor). A Kolchuga complex can detect and locate air and surface targets and trace their movement to a range generally

limited only by the common line-of-sight of the stations

System Parameters: According to the manufacturer's brochure (from AIDEX 1997), the upgraded Kolchuga-M is equipped: With four antennas in the VHF, UHF and SHF radio bands with narrow and wide beams. With parallel receivers allowing the instant discovery and analysis of signals of radio technical equipment (RTE) in the range 100 MHz -18 GHz and continual tracking across the entire band. [Other sources claim from 130MHz to 18GHz, and a 36 channel preset receiver]. With sensitivity of approximately -145 dBW With equipment for the analysis, processing and continual calculation and tracking of coordinates by triangulation and chronometrical-hyperbolic method. With equipment for the identification, operative displaying of information, long term memory and recording of the results of processing.

Target Identification: Kolchuga is able to detect and identify many types of radio devices mounted on ground, airborne, or marine objects. Target detection relies only on an emitter having sufficient power and being within Kolchuga's frequency range. Target identification, however, is more complex and is based on the measurement of different parameters of the transmitted signal—such as its frequency, bandwidth, pulse width, pulse repetition interval, etc. Kolchuga has been reported to use around forty different parameters when identifying a target. These parameters are compared to a database in order to identify both the type of emitter and, in some cases, even the specific piece of equipment (by identifying the unique signature or "fingerprint" that most transmitters have, due to the variations and tolerances in individual components). The database within Kolchuga is said to have the capacity to store around three hundred different types of emitter and up to five hundred specific signatures for each type.

Dimensions (Ural 375)

Length: 7,350 mm

Width: 2,960 mm

Height: 2,980 mm

Curb Weight: 8,400 kg

Automotive

Engine Name: 7.0L ZIL-375YA

Engine Type: V-8 Diesel

Engine Power: INA

Transmission: 5-speed manual + 2-speed transfer case

Range: INA

Maximum Speed: 76 km/h

Fuel Capacity: 79+16 gal. Fuel economy: 4.9 mpg (at 19-25 mph), 2.94 mpg (city cycle).

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Kolchuga-M passive detection system is truck-mounted and detects aircraft electromagnetic emissions in the VHF, UHF, and SHF wavebands. It identifies and tracks incoming aircraft at long range for acquisition by separate air defense systems. The team of designers with the Topaz state holding, who developed the sophisticated hi-tech [kol-CHOO-gah, Russian for "hauberk"] passive early warning radarequipment, was nominated for the State Science and Engineering Prize. A hauberk is a short tunic made of a mesh of interlinked metal rings. The new-generation strategic long-range passive radar complex "Kolchuga" meets the most stringent moral-ethical and environmental standards as absolutely harmless to people or the environment. It is unique

because, firstly, all research, development, pre-process, and serial production works were performed by the Topaz holding, and funded through Ukrspetsexport investment and Prominvestbank credits; secondly, the high technological level of the Ukrainian radar was asserted de facto by the most developed and powerful country, the trendsetter in the military sphere. A complex consisting of three Kolchuga radar stations makes it possible to spot ground and surface targets and trace their movement within a radius of 600 km (air targets at the 10 km altitude - up to 800 km), which makes an effective early warning air defense system. The Kolchuga station is equipped with five meter-, decimeter-, and centimeter-range aerials, which provide for high radio sensitivity within a 110dB/W - 155 dB/W swath, depending on the frequency. The 800-km detection range has been achieved only by the Ukrainian Kolchuga. The best the U.S. AWACS can do is 600 km, while the ground-based complexes Vera (Czech Republic) and Vega (Russia) can reach out up to 400 km - half what the Ukrainian complex can reach. The Kolchuga's lower limit of the working frequency range is 130MHz and is the lowest of all analogs. For the AWACS it is 2,000 MHz, for the Vera it is 850MHz, for the Vega it is 200MHz. This was developed by the Special Radio Device Design Bureau public holding, the Topaz holding, the Donetsk National Technical University, the Ukrspetsexport state company, and the Investment and Technologies Company. It took them eight years (1993 - 2000) to conduct research, develop algorithms, test solutions on experimental specimens, and launch serial production. The new product dramatically changed the balance in the constant competition between offensive and defensive means. The relatively cheap Ukrainian Kolchuga radar station, which is able to detect and identify practically all known active radio devices mounted on ground, airborne, or marine objects, actually cancels out all those billions of dollars spent on stealth-based armaments. On 15 September 2002 the US State Department made its first public accusations that President Leonid Kuchma personally approved the Kolchuga sale to Iraq via a Jordanian intermediary. The State Department said it had based its accusations on secret tape recordings made by Mykola Melnychenko, a former presidential bodyguard now in exile in the United States. The change in U.S.-Ukraine relations was triggered by authentication of a 90-second audio recording from July 10, 2000. The excerpt contained a conversation between Kuchma and Ukrspetsexport chief Valery Malev, in which Kuchma approves a sale of Kolchuga systems to Iraq. In a transcribed nine-minute conversation Kuchma discusses not only the Kolchuga sale to Iraq, but also a deal to repair Libya's MIG-25 fighter jets. In the conversation, Kuchma gives Malev permission to bypass the State Service for Export Control for the deal. The US concluded that the recording of the Ukrainian president is authentic. Sales of such radar systems would be a clear violation of United Nations Security Council Resolution 661, which prohibits any sale or supply of "weapons or any other military equipment" to Iraq. Equipment like the Kolchuga system could pose a threat to aircraft of the U.S.-led coalition patrolling the no-fly zones over northern and southern Iraq. The government of Ukraine denied selling Iraq the radar systems and invited international experts to Ukraine to investigate the charges. But as State Department spokesman Boucher said, the government of Ukraine has not been candid on this issue. And US Ambassador to Ukraine Carlos Pascual suggested Ukrainian officials may have destroyed or manipulated evidence of the radar sales. The U.S. Government and its NATO allies responded by downgrading Ukraine's participation in the NATO-Ukraine Commission meeting at the November NATO Summit in Prague from a summit to a ministerial. Nevertheless, concurrently, Ukraine developed with NATO a detailed and forward-leaning Action Plan to accelerate Ukraine's integration with NATO. The United States "initiated a temporary pause in new obligations of Freedom Support Act assistance that goes to the central government in Ukraine" and is reexamining its policy towards Ukrainian President Leonid Kuchma after determining that a tape recording of Kuchma approving the sale of an early warning system to Iraq is authentic, State Department Spokesman Richard Boucher told journalists in Washington 24 September 2002. "We've recently concluded an analysis of a July 2000 recording that was provided by the former Ukrainian presidential bodyguard, Mykola Melnychenko. On one of the tapes, Ukrainian President Leonid Kuchma is heard approving the clandestine sale of 'Kolchuga' early warning systems to Iraq, and we believe this recording to be authentic," Boucher said. "Our ongoing policy review reflects our serious concern that illicit transfers to Iraq were approved by President Kuchma, as well as our determination to discourage further transfers by Ukraine or by any other country that violates UN sanctions on Iraq," he continued. While the United States was not certain that the Kolchuga system has arrived in Iraq and been deployed, "there are some indications that suggest it may be there," Boucher said, adding, "It is a very serious matter to have a national leader approving a sale in violation of UN resolutions." Asked whether the United States will take action against Ukraine at the United Nations for its violations of UN resolutions, Boucher replied: "I don't know. We'll have to see." These programs had a budget of approximately $54 million in fiscal year 2002 and they represent about 35 percent of our total Freedom Support Act assistance to Ukraine. Programs that are funded under this budget included work with the Ukrainian Government on reforms in fiscal and commercial law, pensions and government regulations. It was impossible to track the matter down by a joint American-British commission sent to Ukraine in 2002 to investigate this purported sale. As of mid-2004 the US had not located Kolchuga systems in Iraq, and the transfer might not have taken place. Jane's Defense Weekly, dated September 27, 2006, carried a story, strangely datelined Bangkok, reporting that Ukraine had recently delivered or was imminently preparing to deliver an unknown number of Kolchuga systems to Iran for an estimated price of USD25 million per system. Information for the news story originated from Vietnamese arms traders working in Central Europe. Both the Ukrainian Security Service (SBU) and the State Service for Export Controls had responded September 25 to MFA's written inquiries to report that they had uncovered no evidence of such sales. The interagency Presidential Committee on Military Technical Cooperation and Export Controls had met September 27 and discussed the issue. They had decided that the Ukrainian government would not stoke the controversy by denying the claim; on an if-asked basis, however, Ukrainian government officials would deny that any such sale had taken place.

1L13-3 Nebo SV (Box Spring) Russian Mobile 2D Early Warning Radar





Tiers:



System

Alternative Designation: 1L13-3 Nebo SV; NATO: Box Spring
Type: Mobile 2D Early Warning Radar
Chassis: Ural 4320
Crew: INA
Truck-Mounted Antenna Rotating Device: Antenna lifting device from horizontal to vertical position Phased array tilting device
Cabin Equipment: Transmitter Device: Mounted in equipment cabin; Two power output amplifiers based on high power; output devices - endotrones (main and back-up); Broad band power pre-amplifier; Exciter Modulator
Receiver Device, Data Processors and Displays: Mounted in equipment cabin; Cabinets with receiver units, interference rejection system, radar environmental simulator; Displays Data processing equipment; IFF transceiver; Digital data processing units
Transmitter Characteristics: Metric (VHF) band of radiated frequencies, Adaptive programmable and manual frequency agility, Sector radiation mode in azimuth, Shaping of RF pulse by a complex signal, Shaping of RF pulse by complex signal,Crystal stabilisation of RF oscillator, Output device of power amplifier : endotron (high power output device)with liquid cooling.
Frequency: 30-300 MHz (approx)(NATO A/B Band)(IEEE: VHF Band)
Power output: 120-140 kW (peak)
PRF: 300 Hz
Accuracy: 400 m/ 0.67 degrees azimuth
Runup Time: INA
Setup/Stow Time: 45 minutes / 45 minutes
Detection Range (Aircraft) at 500 m Altitude: 60 km
Detection Range (Aircraft) at 10,000 m Altitude: 250 km
Detection Range (Aircraft) at 27,000 m Alititude: 350 km

Dimensions (Chassis: Ural 4320)

Length: m7.37
Width: m2.5

Height: m4.5

Weight, Empty: tons8

Antenna Length: m6

Antenna Width: m60

Antenna Weight: INA

Automotive (Chassis: Ural 4320)

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

The 1L13-3 Nebo radar (NATO name: BOX SPRING) is a mobile, 2-D early warning radar operating in the A/B Band. The 1L13-3 Nebo radar ECCM features include pulse to pulse frequency agility. It is designed to reject chaff automatically. The 1L13-3 Nebo radar ECCM features include pulse to pulse frequency agility. It is designed to reject chaff automatically. Capable of being used as part of a radar system to provide a valuable early warning capability against low observable aircraft. As part of an IADS system, the 1L13 Nebo would be used to cue the high power aperture X-band systems to a small acquisition box in which the VLO aircraft can be found.

JY-50 Chinese 2D Air Defense Radar



Tiers:

1 **2** 3 4

System

Alternative Designation: JY-50
Type: 2D Air Defense Radar
Crew: INA
Chassis: 6x6 or 8x8 Truck
Frequency: VHF-Band
Maximum Altitude: INA
Maximum Range: 250 km

Dimensions

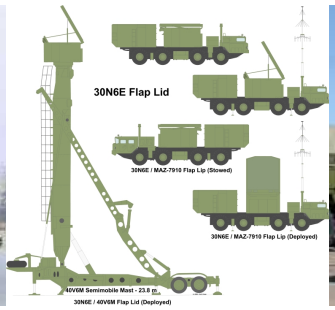
Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

JY-50 is a passive 2-D radar that uses the electromagnetic signals transmitted by distributed radio frequency stations around itself, including civilian mobile phone, radio, and television broadcasts, to perform the detection, location, and tracking of airborne targets including electromagnetic silence targets (so-called Stealth aircraft). JY-50 radar mainly accomplishes air defense warning mission to important direction and sensitive areas. The antenna is an array of two rows of 12 inverted Vee elements backed by a reflective grating.

30N6 Flap Lid Russian Ground-Based Target Acquisition and Tracking Radar







Tiers:



Variants:

- **30N6E:** Export variant for the S-300PMU1 , SA-20A Gargoyle and SA-10D systems.
- **30N6E-1 Flap Lid D/Tomb Stone:** Export variant for the S-300PMU2 system
- **30N6E2:** export variant for the S-300PMU2 /SA-20B Gargoyle /Favorit systems uses the Tomb Stone 30N6-E2 radar, but features new missiles and other radars as well as an Elbrus -90 microcomputer with greater capacity and speed.
- **30N6 Flap Lid B:** This is an upgraded variant. It features include the ability to engage simultaneously six targets, with two missiles against each target. Its phased-array beam-steering angular range is extended for instantaneous coverage of a 90-degree sector, comparable to the SPY-1 Aegis radar.

30N6 Flap Lid FLAP Lid

↳*System*

Name: 30N6 Flap Lid FLAP Lid
Type: Engagement Radar
Antenna: 2.75 sq m
Band: I-J (8-20 GHz)
Interception Range: km90
Minimum Interception Altitude: m25
Maximum Target Velocity: 4,200 kmh
Target Elevation Coverage: 0-50 degrees
Screening angle: 100 degrees
Mount: The 30N6 FLAP LID A is mounted on a small trailer
Note: The 36D6 TIN SHIELD radar can also be used to augment the S-300 system to provide earlier target detection than the FLAP LID radar allows. It can detect a missile-sized target flying at an altitude of 60 metres (200 ft) at least 20 km (12 mi) away, at an altitude of 100 m (330 ft) at least 30 km (19 mi) away, and at high altitude up to 175 km (109 mi) away. In addition a 64N6 BIG BIRD E/F band target acquisition radar can be used which has a maximum detection range of 300 km (190 mi).

Dimensions (Chassis: MAZ-7910 8 x 8 Truck)

Length: m9.40

Width: m3.10

Height: m3.70

Weight: kg20,000

Automotive (Chassis: MAZ-7910 8 x 8 Truck)

Engine Name: D12A-525

Engine Type: V-12 water-cooled diesel

Engine Power: 525 hp at 2,100 rpm

Power-to-Weight Ratio: 26.25 hp/metric ton

Maximum Speed, Road: km/h60

Maximum Speed, Off-Road: km/h30

Maximum Range: km800

Communications

VHF Radio: R-168 Akveduk

HF Radio: R-161 Poisk

Protection

Armor: INA

Notes:

The Flap Lid is a Russian ground-based target acquisition and tracking radar associated with the SA-10 Grumble ** surface-to-air missile (SAM) system. It uses a phased-array antenna and a track-via-missile (TVM) tracking and guidance system similar to that of the MIM-104 Patriot /MPQ-53 system. Flap Lid can reportedly track six targets and guide two missiles per target simultaneously. The launch rate is claimed to be three missiles per second. Target elevation coverage may have been increased from 50 degrees to a maximum of 75 degrees to provide a measure of ballistic missile defense capa bility. The SA-10B system takes approximately five minutes to deploy. The trailer-mounted Flap Lid A radar is associated with the SA-10A, while the truck-mounted (MAZ-7910) Flap Lid B is associated with the SA-10B (S-300P) system. Although the radar has few changes, its mounting on a truck allows for rapid deployment and disengagement. Both options provide 360-degree coverage in azimuth. The S-400 reportedly uses a new tracking and missile guidance radar that is based on the Flap Lid sensor, but with a larger antenna assembly along with a secondary array.

S-125 Newa (LOW BLOW) Russian Tracking and Missile Control Radar System





Tiers:



S-125 “Newa” (LOW BLOW) Radar System

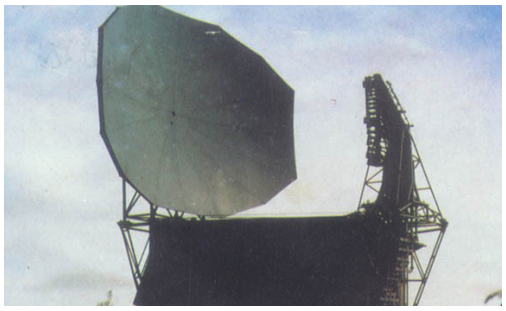
↳*System*

Name: S-125 “Newa” (LOW BLOW) Radar System
Function: A Fire Control, Trk/FC, and Missile Guidance Radar
Mount: Four-wheeled trailer-mounted
Crew: INA
Frequency, Fire Control: I band
Range, Fire Control: km40
Scan, Fire Control: Scan (trough) 16HZ
Frequency, Trk/FC: I band
Range, Trk/FC: km40-85
Scan, Trk/FC: Scan (Para) 25HZ
Frequency, Missile Guidance: D band
Range, Missile Guidance: km29
Parabolic Dishes: Two scanning parabolic dishes one above the other
Associated Weapon System: SA-3 GOA SAM, FLAT FACE, SQUAT EYE acquisition radar.

Notes:

Russian designator: S-125 “Newa” (Kabina UNW) Low Blow is the NATO reporting name given to a family of I-Band radars used with land-based SA-3 “Goa” surface-to-air missiles. The name Low Blow reflects the ability of the radar to guide the missile towards low-flying targets through heavy clutter. It use pairs of electromechanically scanning (so-called Lewis scanner) antennas mounted orthogonally, but to improve low-angle performance the antennas are mounted at 45 degrees from the horizontal. Both antennas are mounted at a 45 degrees angle in an upside down “V” shape. This change was introduced to reduce ground clutter. The antennas generate sawtooth fan beams like Fan Song. Between these two antennas is a Lobe-On-Receive-Only (LORO) mode antenna. When these antennas acquire a target the system can be switched to the LORO mode, receiving from this central parabolic dish antenna. The target in Low Blow tracking antennas scan in 6 degrees swathes, the beams are about 6 degrees wide in the fan and 1 degree in the scanning direction. Inserted into the top of the inverted “V” is the square parabolic guidance command antenna with a beam with of 12 degrees. The system is equipped with a high-resolution television camera by default with an 144 mm lens. Its infrared sensitivity allows working at night and at low-light conditions.

JY-8A Chinese Mobile 3D Air Surveillance, Target Acquisition and Interception Control Radar



Tiers:



Variants:

- **JY-8:** The JY-8 is a mobile 3D air surveillance, target acquisition and interception control radar system operating in the C-band. It can be employed as the main radar sensor for an automated tactical defence system, or can be used as an independent radar. The system uses advanced signal/data processor techniques and is fully solid state with the exception of the magnetrons and thyratrons of the transmitters. The general designer of JY-9 is the head of 38th Research Institute, academician of Chinese Academy of Sciences Mr. Wu Manqing (□□□, Aug 1965 -), who is also the general designer of JY-9 and the general designer of the radar systems for KJ-2000 and KJ-200.

System

Alternative Designation: JY-8A
Type: Mobile 3D Air Surveillance, Target Acquisition and Interception Control Radar
Crew: INA
Components: The system has four major components: the main antenna/transmitter/receiver shelter, operations shelter, maintenance shelter and tow truck. The complete system is air/sea transportable and can be assembled within one hour.
Band: G-H (4-6 GHz)
Antenna Scan Azimuth: 360 deg
Antenna Scan Elevation: 0.5 degrees to 30 degrees
Antenna Scan Altitude Range: 12,000 m
Antenna Scan Maximum Range: 150 km
Antenna Horizontal Beamwidth: 0.55 deg
Antenna Vertical Beamwidth: 0.90 deg
Antenna Rotation Rate: 3 rpm or 6 rpm
Pulse Width: 3-3.3 micro sec
Pulse Repetition Frequency: 365,500 Hz
Displacement: INA
Emplacement: Less than 1 Hour
Accuracy 100 nm Range Azimuth: 0.3 deg
Accuracy 100 nm Range: 500 m

Accuracy 100 nm Range RMS: 500 m

Accuracy Altitude: 700 m

Target Resolution Range: 1 km

Target Resolution Azimuth: 0.6 deg

Target Capacity: 36 tracks

Peak Power: 800 kW per transmitter

Time to Repair: Less than 30 Min

Note: The JY-8A has the same physical dimensions, and operates on similar principles, as the JY-8. It was marketed by China National Electronics Import and Export Corp., Beijing.

Dimensions

Length: 12 m

Width: 12 m

Height: INA

Weight, Combat: INA

Notes:

JY-8A This is a stripped-down variant of the baseline system. It uses only a single transmitter, eliminating the frequency diversity capability. Accordingly, maximum range is significantly reduced and height measurements are less accurate. Its stacked beam antenna forms 16 transmitting beams and 12 independent receiving beams to compensate for the loss in accuracy. The JY-8A has an elevation range of 0.5 degrees to 30 degrees and a lighter, more mobile antenna/transceiver shelter. Mean time before failure is more than 150 hours, while mean time to repair is less than 30 minutes. Otherwise, the JY-8A has the same physical dimensions, and operates on similar principles, as the JY-8. It was marketed by China National Electronics Import and Export Corp., Beijing. The JY-8A is used as the prime surveillance sensor for air defense battalions equipped with 57-mm guns. The radar is mounted on a trailer and towed by a truck. The radar has a maximum range of 95 mi (150 km) and a maximum altitude of 39,750 ft (12,000 m). Range accuracy is 550 yd (500 m), while altitude accuracy is 840 yd (700 m).

P-15M (Squat Eye) Russian Mobile Ground-Based Air Surveillance and Target Acquisition Radar





Tiers:



System

Alternative Designation: P-15M; Squat Eye
Type: Mobile Ground-Based Air Surveillance and Target Acquisition Radar
In Service: 1989-Present
Chassis: ZIL-131
Crew: INA
Band: C (500-1,000 MHz)
Peak Power: 500 kW
Maximum Range: 200 km

Dimensions (Chassis: ZIL-131)

Length: m7.04
Width: m2.49
Height, Cab: m2.49
Height, Transport Body: m2.97
Curb Weight: kg6,700
Wheelbase: 10 ft 10 in (3.30 m)+4 ft 7 in (1.40 m)
Antenna Length: 4 m
Antenna Width: 6 m
Antenna Mast Height: 30 m

Automotive (Chassis: ZIL-131)

Engine Name: INA
Engine Type: V8 gasoline (carburetor) ZIL-130
Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: km/h80

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: mINA

Suspension: solid axles with leaf springs.

Transmission: 5 m, 2-speed transfer case

Fuel Economy: 5.9 mpg-US (40 L/100 km; 7.1 mpg-imp) (city), 50 to 100 liters/100 km (cross-country).

Fuel Tanks: 2x45 gal.

Maneuverability: turning circle 33'5.6", approach angle 36°, departure angle 40°, max. ascent angle 31° (with 3,750 kg (8,267 lb) load), ground clearance 13 in (330 mm), overcome ford 4 ft 7 in (1.40 m)

Stopping Distance at 35 km/h: 12 m

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

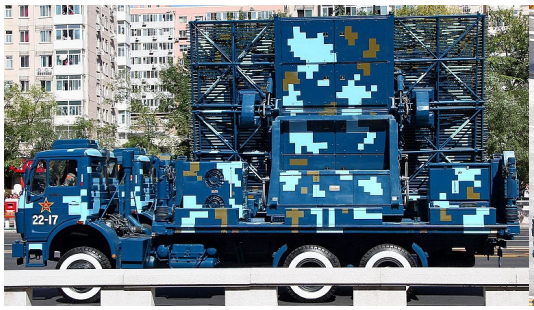
NBC Protection: INA

Smoke Equipment: No

Notes:

Squat Eye** is a ground-based air surveillance and target acquisition radar associated with the SA-3 Goa** surface-to-air missile (SAM) system. Squat Eye works in conjunction with the Low Blow ** missile fire control radar to supply an air-defense site's coverage of low-altitude targets. The radar is distinguished by its open-work elliptical parabolic antenna usually mounted on a 30-m (98-ft) mast. The reflector is fed by an underslung feed horn, which further emphasizes its low-altitude orientation.

Type 306B (LLQ305B) Chinese Self-Propelled 3D Acquisition Radar





Tiers:



System

Alternative Designation: Type 305B; LLQ305B
Type: Self-Propelled 3D Acquisition Radar
Crew: INA
Chassis: Mercedes-Benz NG 80
Mssion: Chinese sources have identified the radar as a long range 3D high altitude acquisition and search design, intended to support missile guidance applications.
Maximum Range: 333.4 km
Minimum Range: INA
Maximum Altitude: INA
Minimum Altitude: INA
Band: S-band at a wavelength of 11.67 cm
Waveguide Feeds: employs sixty 350 mm waveguide feeds
Note: Very little info is released about this radar other than it can also act as Fire-control radar.

Dimensions

Length: 12 m
Width: 12 m
Height: INA
Weight, Combat: INA
Antenna Height: 3.5 m

Notes:

The Type 305B 3D acquisition radar appears to be a variant of the existing NRIET / CEIEC / CETC YLC-2V, which has been photographed as part of a HQ-9 battery, and has been reported as employed to support up to four HT-233 engagement radars, each with four TELs. Chinese sources describe this radar as optimised for search and acquisition of aerial targets. The principal distinction between the established YLC-2V and the Type 305B would appear to be the absence of the IFF/SSR array mounted across the top of the antenna. A Chinese language PRC publication has described the Type 305B as a " three dimensional radar which has an antenna height of 3.5 metres, and employs sixty 350 mm waveguide feeds. It operates in the S-band at a

wavelength of 11.67 cm.”3 The YLC-2V employs a single 6 x 6 truck carrying the antenna head and turntable, which is hydraulically deployed, and three additional 6 x 6 trucks carrying cabins for electronics and operator stations. None of the latter were displayed with the Type 305B antenna systems. The hydraulically folded antenna used with the Type 305B has 58 element rows and will employ frequency scanning like other radars in this family of designs. Row spacing suggests S-band operation, like the YLC-2V.

JYL-1 Chinese Long-Range 3D Surveillance Radar






Tiers:



System

Alternative Designation: JYL-1

Type: Long-Range 3D Surveillance Radar

Crew: ea8

Chassis: INA

Band: It functions in the E/F-band region and might be used as either a military or commercial asset for air traffic control and management purposes.

Azimuth Coverage: 0º ~ 360º

Elevation Coverage: 0º ~ 25º

Search Range: 320km

Coverage Height: 25,000m

Measurement Accuracy Range: 100m

Measurement Accuracy Azimuth: 0.3º

Measurement Accuracy Height: 600m @ 200km

Resolution Range: 200m

Resolution Azimuth: 1.5º

Reliability MTBF: ≥ 800hrs

Reliability MTTR: ≤ 0.5 hrs

Displacement: Under 1 hour

Emplacement: Under 1 hour

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The JYL-1 radar is carried in the 2004 CRIA listing of Chinese indigenous products. The JYL-1 is a long-range 3D surveillance radar typical of those assets that might be found in a modern air defence network. It functions in the E/F-band region and might be used as either a military or commercial asset for air traffic control and management purposes.

JY-14 (LLQ302) Chinese Long-Range Air Defense Radar



Tiers:



System

Alternative Designation: JY-14; LLQ302

Type: Long-Range Air Defense Radar

Manufacturer: The system is manufactured by the East China Research Institute of Electronic Engineering(ECRIEE), No.38 Research Institute (□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□) in Chinese)).

Crew: ea

Band: E-F (2-4 GHz)

Maximum Range: 450 km

Standard Range: 320 km

Antenna Rotation: 6 rpm

Altitude: 22,860 m

Accuracy Range: 90 m

Accuracy Azimuth: 0.2 deg

Accuracy Height: 400 m

Resolution Range: 240 m

Resolution Azimuth: 0.9 deg

Resolution Elevation: 1.0 deg

Sidelobes: -35 dB

Mean Time Between Failutes: >4,150 hours

Mean Time to Repair: <30 min

Average Power Output: 10 kW

Transmit Power Output: 1 MW

Automatic Tracking: Yes, It can operate in high clutter and jamming environments without range reductions. It also has automatic tracking and reporting of up to 100 targets.

Moving Target Indicator (MIT): The system uses an adaptive Doppler moving target indicator (MTI) to produce an improvement factor of more than 40 dB for ground clutter and of over 30 dB for chaff clutter.

Pulse-to-Pulse Agility: Yes

Antenna Type: The JY-14 has a multibeam "Peacock" antenna designed in a near circular configuration with eight horn feeds: six in the E/F band and two in D band. The latter provide good height cover, while the lowest can also be used for identification-friend-or-foe (IFF).

Operating in Wind Conditions: The JY-14 can maintain operations in winds of up to 56 mph (90 kph); operate with degraded performance in winds from 56 mph to 78 mph (126 kph); and cease operations without damage at winds greater than 78 mph.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

The JY-14 (domestic designation: LLQ302, formerly known as:384) is a medium to long range air defense radar produced and used by the People's Republic of China. It is capable of detecting multiple targets within its range and determine their parameters, tracking them even through surface clutter and ECM jamming. It utilizes a frequency-agile mode with 31 different frequencies, has a large band of ECCM operating parameter frequencies, and uses linear FM compression. This system can simultaneously track up to 100 targets and can feed the data to missile-interceptor batteries. It can track targets flying as high as 75,000 feet (22,900 m) and 186 miles (299 km) in distance. The system is notable for having wideband frequency diversity and adaptive pulse-to-pulse agility, enabling it to track even the most morphic radar signatures. It is the most common ground radar in China, and is rapidly being exported to other countries. The radar features excellent anti clutter and anti jamming ability, as well as very good adaptability and automatization. Incorporated techniques include dual pulse frequency diversity, pulse-to-pulse frequency agility over a wide frequency band, adaptive MTI and CFAR techniques, and an advanced computerized BITE technique. The JY-14 can be upgraded to a more powerful power supply, giving it a wider range. This has been seen only in China so far, where multiple stations are tied together with the air defense system.

Giraffe 50AT Norwegian Mobile Air Defense Radar System



Tiers:



Variants:

- **Giraffe 40:** This is a short-range (40 kilometres (25 mi) instrumented) air defense radar with command and control capability. It employs a folding antenna mast that extends to a height of 13 metres (43 ft) when deployed and can be integrated with an Interrogation Friend or Foe (IFF) capability. Coverage is stated to be from ground level to 10,000 metres (33,000 ft) in altitude. In Swedish service the radar is designated PS-70 and PS-701 and provides target data to RBS-70 SHORADS missiles and 40mm Bofors guns. A more powerful version with a 60 kW transmitter is known commercially as Super Giraffe and in Swedish service as PS-707. These radars are no longer marketed.
- **Giraffe 50AT:** This is the model used in the Norwegian NALLADS air defense system which combines the radar and RBS-70 missiles with 20 mm anti-aircraft guns to provide low-level air defense for the combat brigades of the Norwegian army. Mounted on a BV-206 all-terrain tracked vehicle this version has an instrumented range of 50 km (31 mi). The antenna extends to a height of 7 metres (23 ft) and the system can control up to 20 firing units of guns or missiles or a combination of both. The Command and Control system features fully automatic track initiation, target tracking, target identification (IFF), target classification and designation, hovering helicopter detection threat evaluation and handling of "pop-up" targets. It can also exchange data with Giraffe 75 or AMB systems as part of a larger network.
- **Giraffe 75:** This features a 13 metres (43 ft) antenna mast and is normally carried on a 6x6 5-ton cross-country truck which carries the radar and command and control shelter. Instrumented range is 75 km (47 mi) and altitude coverage extends from ground-level to 10,000 metres (33,000 ft). An optional add-on unit extends the radars coastal defense capabilities. In Swedish service the radar is designated PS-90. In the Greek Air Force Giraffe 75 is used in combination with Contraves (now Rheinmetall defense) Skyguard/Sparrow fire control systems. 1 Giraffe typically controls 2 Skyguard systems each with 2 twin 35 mm GDF-005 guns and 2 Sparrow surface-to-air missile launchers.
- **Giraffe S:** Optimized as a mobile radar for un-manned remote-controlled applications as a "gap-filler" in air defense early warning systems concentrating on small, low-flying targets over a long distance. It can also be employed as a coastal surveillance radar where targets are small surface vessels and sea-skimming missiles or aircraft. A new antenna extends range coverage to 180 km (110 mi) with altitude coverage from ground level to 6,000 metres (20,000 ft). The antenna mast extends to 8 metres (26 ft).
- **Giraffe AMB:** Giraffe Agile Multi Beam is a passive electronically scanned array radar, providing multi-beam 3-Dimensional air coverage at 5.4 to 5.9 GHz with instrumented ranges of 30 km (19 mi), 60 km (37 mi) and 100 km (62 mi), the altitude coverage is extended from ground-level to 20,000 metres (66,000 ft) with 70-degree elevation coverage. Data rate is 1-scan per-second. Its maintained pulse density suppresses high cluttering in adverse weather conditions. Ultra-low antenna side-lobes combined with pulse-to-pulse and burst-to-burst frequency agility provides some resistance to jamming. As in previous Giraffe radars automatic hovering helicopter detection is provided as is a rocket, artillery and mortar locating function, allowing the radar to detect incoming rounds and give 20 seconds or more of warning before impact. Giraffe AMB is the principal sensor of the Swedish RBS 23 BAMSE air defense missile system but is available for many other applications. The Giraffe AMB can be delivered with ground surveillance options fitted.
- **ARTE 740:** This is a coastal defense radar based on the Giraffe 75 antenna and Giraffe AMB processing system optimized for surface and low-altitude coverage for the Swedish Amphibious Forces (formerly the Coastal Artillery). It is mounted on a MOWAG Piranha 10x10 armored vehicle. 6 systems are in service.
- **Sea Giraffe AMB:** Saab's Sea Giraffe AMB is the naval variant of their Giraffe radar with 3D AMB technology. It can detect air and surface targets from the horizon up to a height of 20,000 metres (66,000 ft) at elevations up to 70°, and can simultaneously handle multiple threats approaching from different directions and altitudes, including diving anti-ship missiles. Also, it is specialized for rapidly detecting small, fast moving targets at all altitudes and small surface targets in severe clutter. Sea Giraffe AMB is installed on the Republic of Singapore Navy's upgraded Victory-class corvette and US Navy's Independence class of Littoral Combat Ships, and has the designation AN/SPS 77 V(1) for LCS 2 and 4, and AN/SPS 77 V(2) for LCS 6 and higher.

- **AESA:** Saab Electronic Defence Systems (EDS) in May 2014 unveiled two new classes of active electronically scanned array (AESA) radar—three land-based systems (Giraffe 1X, Giraffe 4A and Giraffe 8A) and two naval variants (Sea Giraffe 1X and Sea Giraffe 4A).
- **Giraffe 8A:** At the top end of the range is the Giraffe 8A, a long-range IEEE S-band (NATO E/F) 3D sensor that can be produced in fixed, transportable and fully mobile configurations. Intended primarily for remote operation as part of an integrated air defence network, Giraffe 8A can also be operated locally. It has an instrumented range of 470 km and an altitude capability of more than 40,000m, bringing true long-range air defence capability to the Saab radar family for the first time. Giraffe 8A produces 15 stacked beams to provide elevation coverage from ground level to more than 65°. It can operate in a continuous 360° scan mode, rotating mechanically at 24rpm, or can be steered electronically across an operator-specified sector of 40° to 100°. More than 1,000 air defence tracks can be maintained, and the system also has anti-ballistic missile capability, in which case more than 100 tracks can be followed. Saab has paid special attention to Giraffe 8A's electronic counter-countermeasures properties. The radar generates very low sidelobes and incorporates sophisticated frequency agility in pulse-to-pulse, burst-to-burst and scan-to-scan regimes. It also switches and staggers pulse repetition frequency and transmits random jitter to further confuse countermeasures. It automatically selects the least jammed frequencies and can transmit intermittently or randomly. The radar offers a passive detection and tracking capability against jammers.
- **Giraffe 4A:** While the Giraffe 8A occupies the high end of the family, Saab has introduced new radars in the medium-range category in the form of Giraffe 4A and Sea Giraffe 4A for naval use. Employing similar S-band technology to the larger radar, Giraffe 4A offers true 3D multirole capability, combining the air defence and weapon locating tasks in a single unit. Able to be airlifted in a single C-130 load, Giraffe 4A can be deployed by two people in less than 10 minutes. It can operate as a standalone.
- **Giraffe 1X:** To complete its new line-up, Saab has introduced two short-range radars, Giraffe 1X and Sea Giraffe 1X. Working in the IEEE X-band (NATO I-band), Giraffe 1X is intended primarily as a highly mobile radar that can work with very short-range air defence systems in the battlefield or at sea. Weighing less than 300 kg, Giraffe 1X can be mounted on a small vehicle or vessel or in fixed installations such as on a building or a mast. The radar has a sense-and-warn function and can be optionally configured for weapon location.

System

Alternative Designation: Giraffe 50AT

Chassis: BV-206

Crew: ea2

Type: Air Defense Radar

Total Built: 11,000

Band: C-Band

IFF: Yes

Number of Targets: The frequency-agile radar provides automatic location, pop-up handling, identification and evaluation of threats and can handle up to 20 targets simultaneously, with automatic track initiation on its two operator stations, each of which is equipped with a 19 inch full-colour raster scan display.

Advanced Moving Target Indicator (MTI): Yes

Wind Compensation: The system also has advanced Moving Target Indicator (MTI) filter with automatic wind compensation and automatic detection of hovering helicopters.

Data Communications: Data communications consist of narrow band data channels for plot and track transmission.

Graphics Generators: The graphics generators are based on three Motorola 68020 32-bit microprocessors, and the complete Giraffe 50AT system has a total of seven CPUs – implemented as gate-array single-chip processors – with a combined power of some 10 MIPS (million instructions per second).

Software: Software is written in a real-time variant of the Pascal high-order language, and comprises 50,000 to 200,000 lines of source code, depending on the application.

Note #1: Up to three NALLADS can be linked together to defend an extremely large area. The then Ericsson Microwave Systems in conjunction with Ericsson Radar Norge developed the software for the system while the weapon-control terminals came from Siemens (Norway).

Note #2: The Giraffe 50AT has the ability to exchange data with GIRAFFE 75 and AMB systems to facilitate radar co-operation and the compilation of a local air picture. The system can also be integrated with an IFF subsystem (including Mk

XII).

↳*Dimensions (Chassis: BV-206)*

Height, Overall: m2.4
Length, Overall: m6.9
Width, Overall: m1.87
Cargo Space, Front: m32.5
Cargo Space, Rear: m35.5
Track Width: mm620
Ground Pressure: 11.6/13.6 kPa (1.68/1.97 PSI)
Curb Weight: mt4.5
Gross Vehicle Weight: mt6.58
Payload: 2.24mt (630 kg in front compartment and 1610 kg in rear compartment)
Trailer Load: mt2.5
Mast Height: m4-7

Automotive (Chassis: BV-206)

Engine Name: Ford Cologne V6 gasoline, or Mercedes Benz turbodiesel
Engine Power: hp115
Range, Cruising: km300
Speed, Maximum Road: km/h55
Speed, Maximum Swim: km/h3
Fording Depth: Amphibious
Temperature Range: degreesCold starting to -52C
Grade, hard surface: %60
Grade, Deep Snow: %30
Turning Radius: m8

Protection

Armor: Depends on Variant. Armored variant of the Bv 206 is the Bv 206S. It has modified cabs and armor plating on all its bodywork. Recent member of the Bv 206 family is the BvS 10 improved armored version. It is new larger vehicle, with improved load capacity. The BvS 10 has the same superior mobility in difficult terrain, combined with the same speed on road.
Armor, Applique: Available
Armor, Explosive Reactive: No
Active Protection System: No
NBC Protection: Yes
Smoke Equipment: Yes

Notes:

This is the model used in the Norwegian NALLADS air defense system which combines the radar and RBS-70 missiles with 20 mm anti-aircraft guns to provide low-level air defense for the combat brigades of the Norwegian army. Mounted on a BV-206 all-terrain tracked vehicle this version has an instrumented range of 50 km (31 mi). The antenna extends to a height of 7 metres (23 ft) and the system can control up to 20 firing units of guns or missiles or a combination of both. The Command and Control system features fully automatic track initiation, target tracking, target identification (IFF), target classification and designation, hovering helicopter detection threat evaluation and handling of "pop-up" targets. It can also exchange data with Giraffe 75 or AMB systems as part of a larger network. OVERVIEW: The Giraffe is a mobile, medium range air identification and surveillance radar. Giraffe is a powerful 3D surveillance radar system and Command and Control system intended for short and medium-range surveillance and ground based air defence. In addition it can also warn of incoming rocket, artillery and mortar rounds, as well as provide coastal surveillance. DETAILS: The Giraffe is a frequency agile, low to medium altitude pulse doppler air search radar and combat control center which can be used in mobile or static short to medium range air defense applications. Giraffe is designed to detect low-altitude, low cross-section aircraft targets in conditions of severe clutter and electronic countermeasures. When equipped as an air-defense command center Giraffe provides an air picture to each firing battery using manpack radio communication. It is normally housed in a single 6m long shelter mounted on an all-terrain vehicle for high mobility. NOTES: Several variants available. The first systems were produced in 1977. By 2007, some 450 units of all types are reported as having been delivered. User countries include: Brazil, Croatia, Estonia, Finland, France, Indonesian Army, Ireland Irish Army, Latvia, Lithuania, Greece, Norway, Pakistan, Serbia, Singapore, Sweden, Thailand Navy and United States.

→→Counter-Battery Radars

ARK-1M RYS Russian Artillery Locating Radar



Tiers:

1 2 **3** 4

System

Alternative Designation: 1RL-239, Lynx
Crew: ea4
Chassis: MT-LBu
Emplacement Time: min5
Displacement Time: min5

Dimensions

Height, Overall: m2.72
Length, Chassis Overall: m7.61
Width, Overall: m2.85
Weight: mT15.7

Automotive

Engine Name: YaMZ-238N
Engine Power: hp300
Engine Type: V-8 diesel
Range, Cruising: km500
Speed, Maximum Road: km/h61
Speed, Cross Country: km/h30
Speed, Maximum Swim: km/h6
Fording Depth: Amphibious

Radar

Antenna Type: Paraboloid Deflector

Detection Range (Mortar): km13

Detection Range (Artillery): km8

Detection Range (Rocket): km25

Detection Range (Missile): km30

Frequency Band: H

Receiver (Noise Figure): dB8.0

Max Number of Targets: tracks / minute3

Protection

Armor, Hull: mm15

Armor, Turret Front: mm20

NBC Protection: Yes

Smoke Equipment: No

Notes:

MT-LBu based ARK-1M (artilleriskiy radiolokatsionnyi kompleks) – mobile H-band artillery locating radar 1RL-239 with a detection range of 15 km (howitzers) to 40 km (tactical missiles). Usually found in the division's reconnaissance battery.

SLC-2 Chinese Mobile Counter-Battery Radar







Tiers:



System

Alternative Designation: SLC-2
Type: Mobile Counter-Battery Radar
Manufacturer: Norinco
In Service: 1994-Present
Mission: SLC-2 radar can also be applied in adjusting firing of friendly weapons or rockets. With slight modification to software parameters the radar can also be used to detect and track low flying targets such as light aircraft, helicopters and RPVs.
Chassis: Dongfang EQ2102
Crew: ea1
Configuration: 6x6
Load: 5,000 kg (road); 3,500 kg (cross-country)
Towed Load: 4,800 kg

Radar System

Bande: S - band
Detection Range for Artillery: 35 km
Detection Range for Rockets: 50 km
Accuracy: 0.35% of range (for range more than 10 km); 35 m (for range less than 10 km)
Peak Power: 45 kW
Noise: 3 dB

Clutter Improvement Factor: 55 dB

Additional Features: *Active phased array antenna with electronic scanning both in azimuth and elevation *Sophisticated computer-controlled digital signal processing *Comprehensive online or offline BITE *Automatic/manual height correction with digital/video map *Various effective ECCM *Tracking while scanning

Dimensions

Length: 7,495mm

Width: 2.470mm

Height: 3.240m (with canvas and bow kit)

Weight, Without Winch: 6,920 kg

Weight, With Winch: 7,120 kg

Wheelbase: 3,475mm / 1,250mm

Ground Clearance: 305mm

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: km/h90

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: Protection from small arms and shell splinters

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The SLC-2 Radar is a Chinese active electronically scanned array counter-battery radar designed to locate hostile artillery, rocket and ground-to-ground missile launchers immediately after firing, and to support friendly artillery by guiding counter-battery fire. SLC-2 radar can also be applied in adjusting firing of friendly weapons or rockets. With slight modification to software parameters the radar can also be used to detect and track low flying targets such as light aircraft, helicopters and RPVs. SLC-2 systems have sometimes been mounted on a Dongfang EQ2102 3.5 ton truck. Four AN/TPQ-37 Firefinder radar were sold to China, and these became the foundation of SLC-2 radar development. Aside from political reasons, the US$10 million plus unit price tag of TPQ-37 (including after sale logistic support) was simply too costly for Chinese. The decision was made to develop a domestic equivalent after mastering the technologies of TPQ-37. After the initial test of TPQ-37 in Tangshan (□□) Range near Nanjing in 1988, and in Xuanhua District in October of the same year, several shortcomings of TPQ-37 were discovered and further intensive tests were conducted and completed in 1994. The requirement of the Chinese domestic equivalent was subsequently modified to address these issues revealed in trials. Due to the limitation of the Chinese industrial capability at the time, decision was made to develop the Chinese domestic equivalent in several steps. The first step was to

develop a smaller one, which would result in the Chinese equivalent of AN/TPQ-36 Firefinder radar, and based on the experience gained from this program, a more capable larger version in the same class of AN/TPQ-37 Firefinder radar would be developed, which eventually resulted in SLC-2 series. As Chinese capability in microelectronics matured, an updated version of passive phased array Type 373 radar is developed, designated as SLC-2. This is a fully solid-state, highly digitized version that adopts planar active phased array antenna. One of the shortcomings of TPQ-37 revealed in tests was in its multi-targeting capability. When enemy artillery batteries located more than two hundred meters apart fires simultaneously, TPQ-37 could provide accurate coordinate for distance, but coordinates for positions were less accurate. This would not be a problem for most users because TPQ-37 can be used in pairs in conjunction, provide accurate coordinates for locations. However, these costly radars could not be purchased in large numbers and China thus developed the capability for SLC-2 to provide accurate coordinates for both distance and position. Bangladesh Bought two in 2012. Pakistan also operates significant number of SLC-2 Radar.

1L219 Zoopark-1 Russian Mobile Counter-Battery Radar





Tiers:



Variants:

- **Zoopark-1M:** The variant entered service in January 2017, according to Russia's Sputnik (March 28, 2017). No details have been revealed. It does include a 1L216 missile and artillery ground reconnaissance system, a 1I38 maintenance vehicle and a ED60 mobile power plant. The system is service with artillery unit s in Russia's Eastern Military District.

System

Alternative Designation: Zoopark-1 1L219
Type: Mobile Counter-Battery Radar
Crew: INA
Chassis: MTLB
Designed: It has been designed to automatically determine the coordinates of enemy artillery positions such as mortars, howitzers, rocket launchers and tactical missile systems.
Band: G-H (4-8 GHz)
Scan Sector: 90 degrees
Range, Tactical Missile: 35 km
Range, Multiple Rocket Systems: 12-20 km
Range, Mortars: 12-15 km
Range, Artillery Rounds: 8-10 km
Displacement Time: Less than 5 Minutes
Emplacement Time: Less than 5 Minutes
Service Life: 8 years guaranteed by manufacturer

Dimensions (Chassis: MTLB)

Length: m6.45
Width: m2.86
Height: m1.86
Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Antenna Length: INA

Antenna Height: INA

Mast Height: INA

Automotive (Chassis: MTLB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: PP-61AM, 2.6x

Computerized FCS: N/A

Thermal Sight Vehicle Commander: N/A

Thermal Sight Gunner: N/A

Main Gun Stabilization: N/A

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The Zoopark-1 missile and artillery round reconnaissance radar system, referred in the West as a counter battery radar, was developed by the former Soviet Union in the 1980s as the replacement for the APK-1 Ris radar system. The Zoopark-1 is mounted on a MTLB tracked chassis. It has been designed to automatically determine the coordinates of enemy artillery positions such as mortars, howitzers, rocket launchers and tactical missile systems. The Zoopark-1 radar system can also serve to monitor firing results of its own artillery systems. The Zoopark-1 radar system was deployed to Syria in early 2016. The Zoopark-1 intelligence radar system is completely autonomous and needs five minutes to get set up. The radar can track artillery shells of 82 to 120mm (typically mortar ammunition) at distances of up to 17 kilometers. It can detect 105 to 155mm projectiles at distances of 12 kilometers, multiple launch rocket systems at distances of 22 kilometers and tactical missiles at ranges of up to 45 kilometers. The radar can track up 12 targets simultaneously detecting up to 70 firing positions in a minute.

1L220-U (Zoopark-2) Ukrainian Artillery Locating Radar



Tiers:



System

Alternative Designation: Zoopark 2

Crew: 5

Chassis: Multiple Options (See Images)

Time Between Failures: hours>400

Dimensions

Height, Overall: m3.8

Length, Chassis Overall: m11.5

Width, Overall: m3.2

Weight, Combat: mt23.5 (varies with chassis)

Radar

Detection Range, Mortar: km>/=30

Detection Range, Artillery: km>/=30

Detection Range, Rocket: km30-55

Detection Range, Tactical Missile: km80

Emplacement Time: mins5

Displacement Time: mins3

↳*Transmitter*

Transmitter Type: Traveling Way Tube (TWT)

Peak Power: kw40

Frequency Band: GHz3-4

Modulation Type: Pulsed

Receiver

Noise Figure: dB5
Single Pulse Processing: Coherent
Multiple Pulse Processing: MTI and Doppler Filters

↳*Antenna*

Type: Phased Array
Polarization: Vertical
Mode: Track
Scan Method: Electronic
Scan Type: Monopulse
Scan Width: Deg60
Notes: Scan Width is 10% of the full azimuth sector is assumed for a crossing trajectory

Notes:

A Ukrainian export company reported the Ukrainian army would begin receiving the 1L220-U (NATO: Zoopark 2) in 1999. The Artillery Locating Radar (ALR) has the capability of detecting mortars, cannon artillery, rocket, and tactical missile batteries. It can estimate the impact points of hostile fires as well as register friendly artillery. The ALR has an internal navigation and orientation system to enable autonomous operations and is equipped with a communications suite for command and control. It is capable of friendly fire adjustment ranges as follows: 20-25 km for 152-mm artillery guns, 25-30 km for 82-mm/120-mm mortars; 21-40 km for BM-21-type MLRS; 80 km for rockets.

↳

BL-904 Chinese Artillery Locating Radar





Tiers:



System

Alternative Designation: BL-904
Crew: INA
Chassis: 6x6 truck
Emplacement Time: INA

Dimensions for Truck

Height, Overall: INA
Length, Chassis Overall: INA
Width, Overall: INA
Weight, Combat: INA

Dimensions for Radar

Height, Overall: INA
Length, Chassis Overall: INA
Width, Overall: INA
Weight, Combat: INA

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Range, Cruising: INA
Speed, Maximum Road: INA
Speed, Maximum Swim: INA
Speed, Cross: INA

Speed, Maximum Off: INA

Fording Depth: INA

Radar

Type: Phased Array

Frequency Band: C

Detection Range, Mortars: km15

Detection Range, Artillery: km18

Detection Range, Rockets: km18

Number of Targets Radar Can Track Simultaneously: 8

Response Time: sec5

Vertical Range of Detection: degrees–5 to +12

Horizontal Range of Detection: degrees180

Protection

Armor: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The BL-904 is the artillery locating radar developed by China North Industries Group Corporation (NORINCO). The radar system is based on the phased-array radar technology and was developed as a part of the Plz-45 155mm self-propelled howitzer system. Operating in the C-band, the radar can detect the trajectory of enemy mortar rounds, howitzer projectiles, and rockets and can also be used to adjust friendly artillery. The radar has a response time of 5 seconds, and its performance is said to be comparable to the U.S. TPQ-36. A complete BL-904 radar system consists of two 6X6 trucks, one carrying the phased-array radar antenna and the other carrying the operation center. The system takes 10 minutes to be ready for operation. The radar's vertical range of detection is –5 to +12 degrees and the azimuth range of detection is 180 degrees. The system has a maximum detection range of 15km (for mortars) and 18km (for 122/152/155mm howitzer projectiles and 122mm rockets), and can track eight targets simultaneously. It is also equipped with the GPS and can transmit the target information to the battery command post in real-time.

Soras 6 Swedish Sound Ranging System



Tiers:



System

Alternative Designation: SORAS-6
Crew: ea2
Weight, Combat: mt2.8
Height: mm52
Sound Frequency: hz2-150
Microphone Cable Length: km1-8
Meteorological Unit, Mast Height: m15
Meteorological Unit, Mast Weight: kg40
Maximum Detection Range: km30
Precision Under 10km: 0.5% of the measured distance
Precision Under 30km: 2% of the measured distance
Maximum Number of Targets: targets200
Response Time: seconds2 to 45
Emplacement Time: Varies
Displacement Time: Varies
Number of Microphones: 9

Automotive: Mercedes Benz Unimog U1350L 4x4 (if used)

Engine Name: OM-352
Engine Type: 6 Cylinder Diesel
Speed, Maximum Road: km/h80
Speed, Maximum Swim: NA
Speed, Cross: INA
Speed, Maximum Off: INA
Fording Depth: m1.2

Vehicle Length: m5.5
Vehicle Height: m2.5
Vehicle Width: m2.3
Combat Weight: mt7.5

Notes:

This system is not a radar but is a sound ranging system with the same purpose as counter-battery radar. Sound ranging system (Soras) 6 is a fully automated, EMP-protected, completely passive sound ranging system capable of accurately locating enemy gun positions. The system is not susceptible to jamming. The system is comprised of a computer terminal, nine microphones, and a meteorological unit. Each microphone is surveyed into position and acoustically designates an azimuth to each firer. The computer terminal then calculates intersection points with the azimuths for target locations. The system operates in temperatures ranging from -40° to +55° c. Normally, it takes between 2 and 45 seconds for the computer terminal to calculate target coordinates. But, the target coordinate calculation time depends on the number of sound sources within the same interval of time. Nine microphones are deployed in an area 8 km wide and 1-2 km deep. The microphone positions are determined by conventional surveying methods or by special equipment. An alarm on the calculator is automatically triggered if contact is broken with any of the microphones. The meteorological unit provides air temperature, wind speed, and wind direction. Two people can connect the meteorological unit and raise the mast in 15 to 20 minutes. The system possess the ability to detect firing systems by itself and/or act as a passive cueing system when used in conjunction with an artillery location radar. There are no associated vehicles for the Soras 6 however, the Mercedes Benz Unimog U1350L truck (described within the table) provides a representative worldwide transportation capability for the system.

SNAR-2 (Pork Trough) Russian Mobile Counter-Battery Radar



Tiers:



Variants:

- **Pork Trough-2 (SNAR-6):** Operates in the J band.
- **Cheetah:** This is a mobile Chinese version of the SNAR-2. It operates in the Ku-band. See separate database entry.

System

Alternative Designation: SNAR-2; NATO: Pork Trough
Type: Mobile Counter-Battery Radar
Crew: INA
Chassis: AT-LM
Band: I (8-10 GHz)
Range, Surveillance: 40 km
Range, Arillery Detection: 9 km
Note: There is very little unclassified information available about the SNAR-2

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA
Antenna Length: INA
Antenna Width: INA
Mast Height: INA

Notes:

Pork Trough** (SNAR-2) is a Russian counter-battery radar used to locate enemy artillery and provide position information. It employs a rotating horizontal parabolic cylinder antenna mounted on a fully tracked AT-LM artillery tractor.

AN/TPQ-36(V) American Towed Firefinder Radar





Tiers:



Variants:

- **AN/TPQ-46:** Alongside the baseline AN/TPQ-36(V), the US Marine Corps (USMC) operates a service specific variant that is designated as the AN/TPQ-46. Here, the US Army's two element configuration is replaced by a four HMMWV/trailer application. Subsequent to its initial fielding, the service has commissioned the AN/TPQ-46A and -46B upgrades. Here, AN/TPQ-46A is understood to have been based on the AN/TPQ-36(V)8 configuration and is believed to have updated the architecture's operating shelter and electronics, enhanced its target detection, survivability and interoperability capabilities and reduced its maintenance and logistics requirements. For its part, AN/TPQ-46B mirrors the AN/TPQ-36(V)10 radar and feature that sensor's upgraded processor. Here, the update reduced the circuit board count from nine to three and is claimed to have provided 'unlimited future growth potential'.

System

Alternative Designation: AN/TPQ-36; AN/TPQ-36(V)
Type: Towed Firefinder Radar
Manufacturers: Northrop Grumman manufactures the AN/TPQ-36(V)8 Firefinder radar. Before acquisition by Raytheon, the Hughes Aircraft Co. developed the AN/TPQ-36 Firefinder radar at its Fullerton, California facility, and manufactured it at its Forest, Mississippi plant.
Crew: INA
Upgarde: Firefinder (V)7 adds a modular azimuth position system (MAPS). MAPS has a north seeking laser gyrocompass and a microprocessor controlled Honeywell H-726 inertial navigation system. Prior Firefinders used a survey team to find site latitude, longitude, and direction to North. With MAPS, reaction time was limited only by site set-up, since system geo-position was pre-loaded before sortie deployment. Crew was reduced from 8 to 6. Firefinder (V)8 extends system performance, improves operator survivability and lowers life cycle cost. Greater processing power and the addition of a low noise amplifier to the radar antenna improves detection range (by up to 50%) and performance accuracy against certain threats.
Frequency: 8 GHz to 12.5 GHz (32 sub-frequencies)
Coverage, Range: 8 n miles (14.5 km; 9 miles) (artillery, effective range); 10 n miles (18 km; 11 miles) (mortar, effective range); 13 n miles (24 km; 15 miles) (rockets, effective range)
Coverage, Azimuth: 90° (sector) 360°
Coverage, Target Capacity: 10
Coverage, Track Capacity: 99
Displacement Time: 5 min
Power, Volt: 115 V (400 Hz, AC, three phase, supply);120 V (400 Hz, AC, three phase, supply)
Emplacement Time: 15 min

Power, Watt: 23 kW (transmit, peak); 10 kW (AN/MJQ-25 generator, nominal, supply)

Antenna Type: Phased Array

Transmitter: TWT

Note: The AN/TPQ-36(V) consists of the following: *a trailer-mounted antenna-transceiver assembly; *a power generator, and ; *an operator shelter that houses the necessary processing equipment.

System Dimensions

Length: 4,600 mm

Width: 2,100 mm

Height, in Operation: 3,700 mm

Height, in Transit: 2,100 mm

Weight, Combat: 1,451 kg

Operations Shelter

Length: 2,692 mm

Width: 2,100 mm

Height: 1,800 mm

Weight: 1,089 kg

AN/MJQ-25 Generator with Trailer

Length: 4,350 mm

Width: 2,080 mm

Height: 2,490 mm

Weight: INA

Notes:

Hughes AN/TPQ-36 Firefinder weapon locating system is a mobile radar system developed in the mid-late 1970s by Hughes Aircraft Company and manufactured by Northrop Grumman and ThalesRaytheonSystems, achieving initial operational capability in May, 1982. The system is a "weapon-locating radar", designed to detect and track incoming mortar, artillery and rocket fire to determine the point of origin for counter battery fire. It is currently in service at battalion and higher levels in the United States Army, United States Marine Corps and Australian Army. Also Turkish Army , Portugal and Ukrainian Army are among the users. The radar is typically trailer-mounted and towed by a Humvee. The AN/TPQ-36 Firefinder Radar is a lightweight, small, highly mobile radar set capable of detecting weapon projectiles launched at any angle within selected 90-degree azimuth sectors over 360 degrees of coverage. The AN/TPQ-36 can locate simultaneous and volley-fire weapons. It can also be used to register and adjust friendly fire. Upon projectile detection, the weapon location is computed and is used to direct counter-battery fires. The system consists of an operational control group, OK-398/TPQ-36, and an antenna transceiver group, OY-71/TPQ-36. It is used by the artillery battalions to provide an effective capability to locate hostile weapons, both mortars and short- to medium-range weapons. The Marine Corps will be receiving a Version 8 configuration, currently involving Toby Hanna Army Depot & Grumman Electronics Programs. This new configuration consists of a new Operations Control Group (OCG) using the Army Lightweight Multipurpose Shelter (LMS) mounted on a M1097 HMMWV. This HMMWV tows the Antenna Transceiver Group (ATG) with the integrated Modular Azimuth Positioning System (MAPS) mounted on the M116A2E1 trailer. The OCG is controlled by an operator either located within the shelter or remotely located. The second M1097 HMMWV will carry the MEP112A generator mounted on an M116A2E1 trailer. An additional reconnaissance vehicle/crew carrier, a fourth HMMWV, will be added to the Marine Corps Table of Equipment.

1L219 Zoopark Russian Artillery Locating Radar





Tiers:

1 **2** 3 4

System

Alternative Designation: Zoopark 1

Crew: 3 (1 driver; 2 radar operators)

Chassis: MT-LBu

Dimensions

Height, Overall: INA

Length, Overall: m7.62

Width, Overall: m2.85

Weight, Combat: mt10

Automotive

Engine Power: hp240

Speed, Maximum Road: km/h60

Speed, Maximum Swim: km/h4.5

Fording Depth: Amphibious

Engine Name: YaMZ 238

Engine Type: Diesel

Speed, Cross: INA

Speed, Maximum Off: 26

Radar

Detection Range (mortars): km20

Detection Range (artillery): km15

Detection Range (rockets): km30

Detection Range (missiles): km40

Max Number of Targets: tracks / min12

Emplacement Time: min5

Displacement Time: min5

↳*Antenna*

Type: Active Phased Array

Antenna Gain: dBi40

Scan Method: Electronic

Scan Type: Sector

Scan Width - Hostile Fire: deg90

↳*Transmitter*

Transmitter Type: INA

Peak Power: INA

Frequency Band: 6.0 - 8.0 Ghz

Modulation Type: All

↳*Receiver*

Noise Figure: 5.0

Single Pulse Processing: INA

Multiple Pulse Processing: INA

Communications

↳*Radio*

Name: R-123M

Notes:

The Zoopark-1 automated multifunctional reconnaissance and control complex consists of the 1L259 radar mounted on a MT-LBU chassis, 1IZ0 maintenance van on an Ural-43203 truck, and the trailer-mounted ED30-T230P-1RPM power station. The MT-LBU engine-driven generator allows for autonomous operation. The ED30-T230P-1RPM power station provides power during vehicle and radar maintenance. The system is capable of transmitting information of a detected enemy firing unit position to an artillery unit within 20 seconds of detection. The Zoopark-1 is capable of tracking friendly artillery fire. The system calculates the impact error of friendly artillery rounds and provides automatic correction parameters for increased accuracy. Additionally, the system is also capable of controlling (simultaneously) several remote piloted vehicles (RPVS) using an automatic screen indication with a topographic mapping of calculated and real RPV flight routes. The radar is capable of conducting air traffic control around an airfield or operating area. The radar tracks and establishes the current position of aircraft in the operating area of responsibility and provides real-time data transmission of data received to the air control center. The antenna beam is electronically phase-steered in azimuth and elevation. The reflect-array is composed of 3328 phase shifters, space-fed by a mono-pulse horn located on the front side of the array and electronics enclosure. After coming into position, and after the array is raised from the travel position, it is rotated so that its bore sight is centered in the assigned coverage sector. The search scan elevation angle is probably fixed, nominally at a low angle in the range of 30 to 50 mils. The search mode will be interrupted by verification and track mode scans during periods when targets are detected. Verification is most likely a non-scanning mode, with the beam pointed at the same elevation angle as the search scan. Also, verification may be repeated for some targets. During the track mode, the radar tracks the target by scanning in both azimuth and elevation.

Type 704 Chinese Counter-Battery Radar System



Tiers:



Variants:

- **Type 704 radar:** Type 704 is the first of the Type 704 series of counter-battery radars. Developmental work of Type 704 begun in parallel with the introduction of AN/TPQ-37 radar into Chinese service, and the reported experience gained on the Chinese reverse engineering of TPQ-37 has influenced Type 704 radar. One problem revealed in the tests was that the reliability of TPQ-37 is much lower than what was claimed. The reason was that when TPQ-37 was deployed in environments with high humidity and high level of rainfall (southern China), high salinity (coastal regions), high altitude (southwestern China), and subjected to daily high temperature differences (northwestern China), malfunctions occurs more frequently. Type 704 radar was designed specifically to improve the reliability against these harsh environmental factors.
- **Type 704A radar:** Type 704 is followed by its successor, Type 704A, which is fully solid state, fully digitized version, which further improved reliability and simplified logistics, and thus reduced the operational cost. One of the limitations of TPQ-37 revealed in tests was that the it was less effective against projectiles with flat trajectory, so it is much more effective against howitzer and mortar rounds than rounds from 130 mm towed field gun M1954 (M-46) and its Chinese derivative Type 59-1. Type 704A radar is designed to overcome this shortcoming by improving the capability against rounds with flat trajectory.
- **BL904 radar:** A further improved variant based on Type 704A designated as BL904 has also been introduced. This latest version of Type 704 radar family reportedly utilizes the more advanced lens arrangement for its planar passive phased array antenna, instead of earlier simple horn arranged used in earlier versions. Unconfirmed Chinese claims also concludes that the BL904 radar also incorporate former-USSR counter-battery radar Zoopark-1 radar, two of which was purchased by China from Ukraine, but such claim has yet to be verified by official sources and sources outside China.
- **CS/RB1 radar:** At the 9th Zhuhai Airshow held in November 2012, a new, lightweight, counter battery radar designated as CS/RB1 made its public debut.[1] Like Type 704 and BL904 radars, CS/RB1 is also designed primarily for detecting incoming projectiles down to the size of mortar round, though larger objects can be tracked as well. CS/RB1 is designed to be a lightweight version of Type 704/BL904 to be carried by individual soldiers (when systems are breaking down into portions). CS/RB1 radar operates is a passive phased radar operates in L-band, and it is fully solid state, highly digitized, conformal array in cylindrical shape., and it can be airdropped.

System

Alternative Designation: Type 704
Type: Counter-Battery Radar System
Crew: ea3 (driver, radar operator, power supply operator)
Chassis: INA
Package: The system consists of an antenna-transceiver vehicle and a command-operations vehicle.
Band: I-J (8-20 GHz)
Range, 81mm Mortar: 12.00 km
Range, 120mm Mortar: 15.00 km

Range, 155mm Howitzer: 16.00 km

Accuracy, Flat Trajectory Gun: 40 m

Accuracy, Mortar: 30 m

Accuracy, Registration Fire: 40 m

Accuracy, Rocket Launcher: 60 m

Power Supply: 60 kW est (AN/TPQ-37)

Scan Sector, Beam Width: 6 deg (107 mils)

Scan Sector, Rotation: -0.5 to +90 deg (-9 to +1,600 mils)

Scan Sector, Tilt Angle: -0.5 to +27 deg (-9 to +480 mils)

Stored Targets: 99 est (AN/TPQ-37)

Simultaneous Tracks: 8

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Antenna-Transceiver Vehicle: 3,820 kg

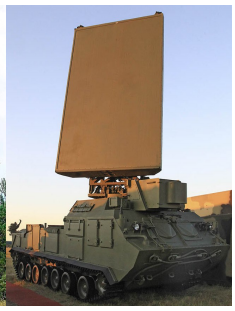
Weight, Command-Operations Vehicle: 3,920 kg

Notes:

The Type 704 is a counter-battery radar designed to accurately locate the hostile artillery, rocket and ground-to-ground missile launcher immediately after the firing of enemy, and support friendly artillery by providing guidance of counter fire. Built by NORINCO, it was first displayed publicly in 1988's ASIADEX defence show. Type 704 radar shares the same root as its larger cousin, the SLC-2 Radar: four AN/TPQ-37 Firefinder radar have been sold to China and this had become the foundation of SLC-2 radar development. Aside from political reasons, the US$10 million plus unit price tag of TPQ-37 (including after sale logistic support) was simply too costly for Chinese. Decision was made to develop a domestic equivalent after mastering the technologies of TPQ-37. After the initial test of TPQ-37 in Tangshan (□□) Range near Nanjing in 1988, and in Xuanhua District in October of the same year, several shortcomings of TPQ-37 were discovered and further intensive tests were conducted and completed in 1994. The requirement of the Chinese domestic equivalent was subsequently modified to address these issues revealed in trials. Due to the limitation of the Chinese industrial capability at the time, decision was made to develop the Chinese domestic equivalent in several steps. The first step was to develop a smaller one, which would result in the Chinese equivalent of AN/TPQ-36 Firefinder radar, Type 704 series radar, and based on the experience gained from this program, a more capable larger version in the same class of AN/TPQ-37 Firefinder radar would be developed, which eventually resulted in SLC-2 series. Type 704 is the first of the Type 704 series of counter-battery radars. Developmental work of Type 704 begun in parallel with the introduction of AN/TPQ-37 radar into Chinese service, and the reported experience gained on the Chinese reverse engineering of TPQ-37 has influenced Type 704 radar. One problem revealed in the tests was that the reliability of TPQ-37 is much lower than what was claimed. The reason was that when TPQ-37 was deployed in environments with high humidity and high level of rainfall (southern China), high salinity (coastal regions), high altitude (southwestern China), and subjected to daily high temperature differences (northwestern China), malfunctions occurs more frequently. Type 704 radar was designed specifically to improve the reliability against these harsh environmental factors.

1L260 Zoopark-1M Russian Mobile Counter-Battery Radar





Tiers:



Variants:

- **1L259 Zoopark-1:** Zoopark-1 is a three-dimensional (3-D) multifunction phased-array artillery location radar for use on the battlefield. The system tracks projectiles, calculates their trajectory, pinpoints the position of enemy artillery and transfers the information to associated fire-control systems for counter-b attery fire.

System

Alternative Designation: 1L260 Zoopark-1M
Type: Mobile Counter-Battery Radar
Crew: INA
Chassis: MTLB
Designed: The 1L260 Zoopark-1M is a mobile artillery locating radar system designed to detect artillery rocket positions even in heavy electronic countermeasures (ECM) environments. Besides, the 1L260 can detect mortar and howitzer gunfire source as well as tactical ballistic missiles launch pads.
Band: G-H (4-8 GHz)
Range, 155mm Artillery Shell: 23 kilometers
Range, 203mm Artillery Shell: 27 kilometers
Range, Artillery Rockets: between 32 and 45 kilometers
Range, Ballistic Missiles: 65 kilometers
Operating Time: 8 hours
Number of Targets: up to 12 targets simultaneously
Azimuth: In azimuth it covers a sector of 2.5 to 90-degree
Displacement Time: Less than 5 Minutes
Emplacement Time: Less than 5 Minutes

Dimensions (Chassis: MTLB)

Length: m6.45
Width: m2.86
Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Antenna Length: INA

Antenna Height: INA

Mast Height: INA

Automotive (Chassis: MTLB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: General Purpose Machine Gun

Caliber: 7.62mm

Length: 1,098 mm

Barrel Length: 772 mm

Weight: 9 kg

Action: Gas-operated, open bolt

Rate of Fire: 700–800 rounds/min

Muzzle Velocity: 825 m/s

Maximum Firing Range: 4,000 m

Effective Firing Range: 1,500 m

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Basic Load: rounds1,500

Fire Control

Name: PP-61AM, 2.6x

Computerized FCS: N/A

Thermal Sight Vehicle Commander: N/A

Thermal Sight Gunner: N/A

Main Gun Stabilization: N/A

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The 1L260 Zoopark-1M is a mobile artillery locating radar system designed to detect artillery rocket positions even in heavy electronic countermeasures (ECM) environments. Besides, the 1L260 can detect mortar and howitzer gunfire source as well as tactical ballistic missiles launch pads. The radar system is mounted on a tracked armored chassis and includes a maintenance vehicle. Besides, the system can provide assistance for friendly artillery systems helping them to adjust their gunfire to effective hit their designated target. The 1L260 radar system can detect a 155mm artillery shell at a range of 23 kilometers or 27 kilometers for 203mm shells. It can detect artillery rockets at ranges between 32 and 45 kilometers. An ATACMS-sized tactical ballistic missile can be detected at a range of 65 kilometers. The 1L260 can be ready for deployment or evacuation in five minutes while operating for over eight hours tracking up to 12 targets simultaneously. In azimuth it covers a sector of 2.5 to 90-degree.

ARTHUR Norwegian Counter-Battery Radar





Tiers:

1 2 3 4

System

Alternative Designation: MAMBA
Crew: 4
Chassis: Hägglunds Bandvagn 206 (Can be carried on most 6x6 vehicles as well)

Dimensions of the Hägglunds Bandvagn 206

Height: m2.4
Length: m6.9
Width: m1.87
Weight: kg4,500

Automotive

Engine: 2.8L 99 kW Ford Cologne V6, Gasoline
Engine Power: hp136
Range, Cruising: km300
Speed, Maximum Road: km/h55
Speed, Maximum Swim: km/h3
Fording Depth: Amphibious
Speed, Cross: INA
Cargo load: 2240 kg (630 kg in front unit and 1610 kg in trailer unit)
Gearbox: MB W 4A-018 automatic transmission
Ground Pressure: PSI1.97
Crew Capacity: Driver and 6 Passengers
Maximum Slope (Dry Land): %60
Maximum Slope (Snow): %30
Side Slope: %40

Vertical Step: m1

Trench: m2

Minimum Operating Temperature: deg-60

Radar System

Frequency Band: C

↳*Modification A*

Range for Locating Artillery: 15 - 20km

Range for Locating 120mm mortars: 30 - 35km

CEP: 45% of range

↳*Modification B*

Range for Locating Artillery: 20 - 25km

Range for Locating 120mm mortars: 35 - 40km

CEP: 35% of range

↳*Modification C*

Range for Locating Artillery: 31km

Range for Locating 120mm mortars: 55km

Range for Locating Rockets: 50 - 60km

CEP: 2% of range for guns and rockets; 1% of range for mortars

Number of Simultaneous Tracks: 100

Protection

Hull Armor: Protection from small arms and shell splinters

Window Armor: INA

Applique Armor: INA

Active Protection System: No

NBC: INA

Note: The ARTHUR radar is unprotected. The prime mover will have the protection characteristics inherent to the system

Notes:

ARTHUR is an acronym for "ARTillery HUnting Radar", and is a counter-battery radar system originally developed jointly for and in close co-operation with the Norwegian and Swedish armed forces by Ericsson Microwave Systems in both Sweden and Norway. The system is partly based on the same technology as Saab’s Giraffe radar, and simultaneously scans 100 targets per minute, while tracking own shells and calculating impact points during registration. It is also used by the British Army, under the name Mobile Artillery Monitoring Battlefield Radar, or Mobile Artillery Monitoring Battlefield Asset (MAMBA). The ARTHUR detects hostile artillery by tracking projectiles in flight. The original ARTHUR Mod A can locate guns at 15 - 20km and 120mm mortars at 30 - 35km with a circular error probable of 0.45% of range. This is accurate enough for effective counter-battery fire by friendly artillery batteries. ARTHUR can operate as a stand-alone, medium-range weapons locating radar or a long-range weapon locating system, consisting of two to four radars working in coordination. This flexibility enables the system to maintain a constant surveillance of an area of interest. The upgraded ARTHUR Mod B meets the British Army's MAMBA requirement for

locating guns, mortars, and rockets. It can locate guns at 20 - 25km and 120mm mortars at 35 - 40km with a circular error probable of 0.35% of range. MAMBA was successfully used by the British Army in Iraq and Afghanistan. ARTHUR Mod C has a larger antenna and can detect guns at 31km, mortars at 55km and rockets at 50 - 60km depending on their size, and locate targets at a rate of 100 per minute with CEP 0.2% of range for guns and rockets and 0.1% for mortars. ARTHUR can be operated in two main modes: Weapon locating and Fire direction. Weapon locating is used to determine the location of the guns, mortars or rocket launchers that fired and their target area. Fire direction is used to adjust the fire of own artillery onto target coordinates. It can be carried by a C-130 or slung under a heavy lift helicopter such as a Chinook. Its air mobility allows it for use by light and rapid reaction forces such as airborne and marine units. It is a mobile, passive electronically scanned array C-Band radar for the purpose of enemy field artillery acquisition and was developed for the primary role as the core element of a brigade or division level counter battery sensor system. The vehicle carrying the radar was originally a Bandvagn 206 developed and produced by Hägglunds, but is now more often delivered on trucks with ISO fasteners. The radar is now developed by SAAB Electronic Defense Systems (after EMW was sold to SAAB in June 2006) and Saab Technologies Norway AS.

AN/TPQ-50 American Counterfire Radar System



Tiers:



System

Alternative Designation: AN/TPQ-50
Type: Multi-Mission Radar
Mission: Early warning, counterfire target acquisition and air surveillance
Crew: ea1
Performance: The AN/TPQ-50 counterfire radar is an official U.S. Army Program of Record, a distinction of its effectiveness at filling a critical need for America's warfighters. The radar has been designed and tested against strict U.S. military standards, including: • MIL-STD-461E, Requirements for the Control of Electromagnetic Interference, Characteristics of Subsystems and Equipment • MIL-STD-464A, Electromagnetic Environmental Effects Requirements for Systems • MIL-STD-810G, Test Method Standard for Environmental Engineering Considerations & Laboratory Tests The predecessor of AN/TPQ-50 received the Top 10 Army Greatest Invention award in 2004. This award recognizes the best technological solutions for soldiers, and how these new technologies increase competence for the U.S. Army.
Benefits: Saves lives by providing early warning of incoming fire • Quickly locates enemy RAM launchers • Cues a counterfire response from any integrated system • Transports easily in challenging terrain • Low lifecycle cost • Unattended remote operation
Operating Frequency: L-Band
Detection Range: 15 km, depending on weapon type and trajectory
Point of Origin Accuracy: 50 m at 10 km
Azimuth Coverage: 360°
Elevation Coverage: 0 - 30°
Power Requirements: 1,200 W, 110/240 VAC 50/60 Hz, 24 VDC

Dimensions

Diameter: 102 cm
Height: 216 cm
Weight: < 227 kg

Notes:

The AN/TPQ-50 Lightweight Counter Mortar Radar (LCMR) is a highly mobile counterfire target acquisition radar organic to Brigade Combat Teams, field artillery brigades and division artilleries. The system provides 360 azimuth coverage between the ranges of .5 to 10 km while automatically detecting, classifying, tracking and locating points of origin of projectiles fired from

mortar, artillery and rocket systems. The system is fielded in the vehicle-mounted configuration but can be operated in the tripod-mounted configuration. The Q-50 can quickly detect, track, classify and accurately determine the point of origin of enemy indirect fires and provide projectile impact locations with sufficient accuracy to warn Soldiers and provide point of origin information for engagement. The Q-50 is networked with existing counterfire systems to provide the maneuver commander increased counterfire radar flexibility. It can be assembled and disassembled quickly by two Soldiers.

SNAR-10M1 (Big Fred) Russian Mobile Counter-Battery Radar




Tiers:



Variants:

- **Small Fred:** This variant operates in J band (10-20 GHz). It has a detection range of 24 mi (39 km) and a tracking range of 4 mi (7 km). The radar is fitted to a BMP MICV.

System

Alternative Designation: SNAR-10M1; 1RL232-2M; NATO: Big Fred
Crew: INA
Chassis: MTLB
Band: K (34.55-35.25 GHz)
Radar Beam: 0.36 deg x 1.3 deg
Range, Battlefield Surveillance: 12-15 km
Range, Maximum Against Moving Vehicles: 16 km
Range, Maximum Against Moving Ships: 30 km
Range, Maximum Against Moving Shell Impacts: 10 km
Output Power: 14-70 KW
Pulse Repetition Frequency: 4,410 Hz up to 16 miles (26 km)
Target Discrimination Traverse: 6 deg
Target Discrimination Range: 50 m
Grid Radial Error: 30 m
Search Sector: 26 deg
Time for Traget Location: 20 seconds
Precision Locating Coordinates Polar Traverse: <2 mils
Precision Locating Coordinates Polar Range: <66 ft (20 m)
Circular Error Probable for Mortar: 45 m

Dimensions (Chassis: MTLB)

Length: m6.45

Width: m2.86

Height: m1.86

Weight, Combat: kg12,700 kg

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Antenna Width: 1.5 m

Antenna Height: 0.8 m

Automotive (Chassis: MTLB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: PP-61AM, 2.6x

Computerized FCS: N/A

Thermal Sight Vehicle Commander: N/A

Thermal Sight Gunner: N/A

Main Gun Stabilization: N/A

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The SNAR-10 M1 self-propelled radar, capable of detecting tanks at a distance of up to 40 km, arrived at the Central Military District under a state defense order. The new station strengthens the combat capabilities of the artillery units of the tank formation stationed in the South Urals. The SNAR-10 M1 radar is designed for reconnaissance of moving ground, air and surface targets. The modern radar can detect vehicles, manpower, exploding shells at a range of 200m - 40km. The station is equipped with an internal and external communication system with automated data transmission, and satellite navigation. Autonomous operation of the complex is at least three days. The crew is four people strong. The radar can be deployed into combat position in max 5 minutes.

SLC-2E Chinese Artillery Locating Radar





Tiers:



System

Alternative Designation: NA

Crew: INA

Chassis: 6×6 Beiben truck chassis / Dongfeng EQ2102 3.5 ton truck

Dimensions

Height: m3.2 in travel mode

Length: m7.5

Width: m2.5

Weight: INA

Automotive (Dongfeng EQ2102 3.5 ton truck)

Engine Name: Dongfeng Diesel

Engine Type: Diesel

Engine Power: hp160

Range, Cruising: km550

Speed, Maximum Road: km/h90

Speed, Cross Country: INA

Speed, Maximum Swim: NA

Fording Depth: m1

Radar

Detection Range, Artillery: km35

Detection Range, Rockets: km50

Detection Range, Mortars: Range not available however, a source reports that the SLC-2E is successful at detecting mortar rounds at a rate of 80%

Peak Power: kW45

Band: S

CEP for Targets Beyond 10km: 35% of range

CEP for Targets Within 10km: 35m

Clutter Improvement Factor: 55 dB

Noise: 3 dB

Other Features: Active phased array antenna with electronic scanning both in azimuth and elevation. Sophisticated computer-controlled digital signal processing. Comprehensive online or offline BITE. Automatic/manual height correction with digital/video map. Various effective ECCM. Tracking while scanning.

Communications

↳*Radio*

Name: INA

Protection

Note: The SLC-2E offers no protection to the crew or system

Notes:

The SLC-2 Radar is a Chinese active electronically scanned array counter-battery radar designed to locate hostile artillery, rocket and ground-to-ground missile launchers immediately after firing, and to support friendly artillery by guiding counter-battery fire. As Chinese capability in microelectronics matured, an updated version of passive phased array Type 373 radar is developed, designated as SLC-2. This is a fully solid-state, highly digitized version that adopts planar active phased array antenna. In addition it is equipped with optical infrared system and sound measuring systems that enable to discover enemy’s stealth attack. In contrast to the original model, the 2E variant is not only designed to support counter-battery missions against hostile artillery, rockets, and surface-to-surface missile systems, but also detect airborne threats with a dedicated air defense mode. A complete SLC-2E system comprises a control cabin with associated processing equipment, on-board power supply, and the radar transmitter. Bangladesh Bought two in 2012. Pakistan also operates significant number of SLC-2 Radar.

→Airborne Radars

→Naval Radars

MR-104 Rys (Drum Tilt) Russian Naval Fire-Control Radar



Tiers:



System

Alternative Designation: MR-104 Rys (Drum Tilt)
Type: Naval Fire-Control Radar
Band: I (8-10 GHz)
Maximum Range: 22.2 km
Minimum Range: 0.2 km
Maximum Altitude: 9.144 km
Minimum Altitude: 0 m

Dimensions

Length: 1.50 m
Width: 1.35 m
Height: INA
Weight, Combat: INA

Notes:

The Drum Tilt** is a naval fire-control radar associated with the AK-230 30-mm anti-aircraft (AA) twin guns. The drum-shaped plastic radome is tilted about 25 degrees above the horizontal and houses a circular parabolic dish.

P-10 (Knife Rest B) Russian Early Warning Radar





Tiers:

1 2 3 4

System

Alternative Designation: P-10; Knife Rest B
Type: Early Warning Radar
Crew: INA
Frequency: VHF-Band
Pulse Repetition Frequency (PRF): 100 Hz
Peak Power: 55 ... 75 kW
Instrumental Range: 110 NM
Beam Width: 21 degrees
Antena Rotation: 0 ... 6 rpm
Resolution: 2.5 km
Accuracy: 3.7 km

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The Knife Rest (Russian: P-8) series of radars were used for early warning in conjunction with the SA-2 Guideline surface-to-air missile (SAM) system. The antenna consists of a twin Yagi array. Knife Rest-A is ground-mounted; the Knife Rest-B/C (Russian: P-10) models are truck-mounted. A navy variant was fitted in some SVERDLOV-class cruisers and T-43-class minesweepers.

Engineer Systems

→Mobility

→→Bridging Systems

PMM-2 Russian Self-Propelled Amphibious Floating Bridging and Ferry System






Tiers:



Variants:

- **PMM-2M:** The PMM-2M is floating bridging and ferry system designed and manufactured by the Russian defense industry. The vehicle is based on the suspension of the T-64 main battle tank. PMM-2 units can be connected together to form floating bridges. The PMM-2M can also be used to create bridge of 20m wide for water crossing of combat vehicles.

System

Alternative Designation: None
Chassis: Based on amphibious version of the Kharkov T-64 (same as MT-T transporter, PTS-2 tracked amphibian)
Crew : ea3.0
Ground Pressure : kg/cm2INA
Troop Capacity : eaINA
Weight, Combat : mt36.0

↳***Dimensions***

Height, Overall : m3.85
Length, Overall : m13.5

Width, Overall : m3.5 / 10.5

Automotive

Engine Name: V-64-4 V-12

Engine Power : hp710.0

Engine Type: Diesel

Fording Depth : m1.2

Range, Cruising : km500.0

Speed, Maximum Off-Road: km/hINA

Speed, Maximum Road : km/h55.0

Speed, Maximum Swim : km/hINA

Vertical Step : m2.8

Bridge

Capacity : mt42.5

Deck Length Opened One: m10.0

Deck Width Opened : m4.2

Emplacement Time : min5 (est)

Loading Ramps (2) width ea : m5.0

Obstacle Gap : m20.0

Type: SP Ferry

Variants: Amphibious Bridging System- Wheeled (ABS-W)

Communications

↳*Radio*

Name: R-173 and R-134

Notes:

The PMM-2 replaces the GSP and has one main advantage as a ferry over the GSP: whereas two GSP half-ferries must be joined together to produce one ferry with a capacity of 50 metric tons, one PMM-2 can handle approximately the same capacity eight PMM-2 vehicles can form eight separate ferries or four large ferries (85- ton capacity). The PMM-2 bears great similarity to the PTS-2 tracked amphibian, with its cab and boat-like bow. The chassis is similar to that of the MT-T artillery prime mover, with seven road wheels and four return rollers. When unfolded the PMM-2 creates a raft that can carry a main battle tank without further assistance or construction. While two systems can be combined to form an 85-ton capable ferry, the PMM-2 does not form float bridges. On top of the hull, the system has two large box pontoons carried one atop the other. They are hinged to hydraulically unfold to either side of the hull for water operations. Small tread way ramps are folded on the pontoons. The unfolded pontoons have wave deflectors, as well as ramps to expedite the loading and unloading of vehicles. Airdrop/air transportable: No. Minimum operating depth (m): 1.3. Ground clearance (m): .4. Approach angle: 25. Departure angle: 25

M1074 American 10x10 Joint Assault Bridge System (JABS)







Tiers:

1 2 3 4

System

Alternative Designation: M1074 Joint Assault Bridge System (JABS)
Type: Joint Assault Bridge System (JABS)
Manufacturer: Leonardo DRS Technologies West Plains, Missouri Anniston Army Depot (final assembly)
Crew: ea2
Payload Capacity: 1× scissors-type folding bridge MLC95
Bridge Type: MLC95

Dimensions

Vehicle Length with Bridge: 9.83 m
MLC95 Folding Scissors Bridge Length: 11.7 meters
Width: 3.66 m
Height, Hull: 1.71 m
Height, with Bridge: 3.08 m
Weight: 68.7 tons
Bridge Weight: 15 tons

Automotive

Engine Name: Honeywell AGT1500C
Engine Type: Multi-fuel turbine engine

Engine Power: 1,500 shp

Transmission: Allison DDA X-1100-3B (4 forward 2 reverse gears)

Maximum Speed, Road: 72 km/h

Maximum Speed, Off-Road: 48 km/h

Operational Range: 418.2 km

Fuel Capacity: 1,900 liters

Suspension: High-hardness-steel torsion bars with rotary shock absorbers

Ground Clearance: 0.48 m

Protection

Hull Armor: Burlington composite armor

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1074 Joint Assault Bridge System (JABS) is an armored military engineering vehicle based on the Abrams M1A1 main battle tank. The M1074 was designed by Leonardo DRS Technologies to provide deployable bridge capability for units engaged in military operations. The M1074 Truck, Palletized Loading, 10x10 is one of the US Military family of Palletized Load System (PLS) vehicles. General information about the PLS series is found on the linked page. The M1074 is equipped with a hydraulic Load Handling System (LHS) capable of self-loading and unloading. It is also equipped with a variable reach Grove PLS Material Handling Crane (MHC) to support forward-deployed artillery units or similar missions. It is equipped with a 20K capacity self-recovery side-mounted winch kit that can be deployed for forward or rearward towing. The bridge is an Armored vehicle-launched bridge (AVLB) Military Load Class 95 Scissor Bridge (MLC95). After the M1074 has deployed the bridge, assault force vehicles can cross over the bridge. The M1074 can cross over, pick up the bridge on the far bank and continue along in support of assault forces. The JABS was conceived as a compromise between the M104 Wolverine that was deemed too expensive to operate and the aging M60 AVLB which could not adequately support the Abrams and Bradley vehicles. The vehicle provides the Army Mobility Augmentation Companies supporting Armored Brigade Combat Teams with a survivable, deployable and sustainable heavy-assault-bridging capability. Prototype development began in May 2012 when the U.S. Army Contracting Command awarded General Dynamics Land Systems and Leonardo DRS a $26 million contract to build two Joint Assault Bridge System (JABS) prototypes. The contract supported the engineering and manufacturing development phase, with the GDLS prototype being built in Sterling Heights, Michigan and the Leonardo prototype built in West Plains, Missouri. The Army wanted the winner of the contract to include Anniston Army Depot's organic industrial base experience in the JAB's production. The XM1074 JABS prototypes were ready in 2014. They were delivered to Anniston Army Depot (ANAD) where they underwent testing and evaluation through 2016 with the Leonardo prototype being accepted as the M1074 in August. Leonardo DRS has a public-private partnership with Anniston Army Depot in Alabama to manage the M1 chassis assembly and worked with Israeli Military Industries (IMI) on the design and engineering of the bridge system, according to a DRS statement. On August 23, 2016, DRS Technologies, Inc., announced that the U.S. Army had awarded it an indefinite quantity contract worth up to $400 million to build the new Joint Assault Bridge System (JABS). The Army has placed an initial order for 168 vehicles and the Marines for 29. The JABS completed its low-rate production phase from 2016 to 2018 with a total of 51 vehicles. ANAD produced 10 in fiscal year 2016, 14 in 2017 and an additional 27 in 2018. These first JABSs underwent exploitation and fire survivability testing at the Aberdeen Test Center. These tests finalized the current configuration for full-rate production and evaluated some configuration changes in the design for crew protection. United States Army Operational Test Command, Fort Hood began conducting operational testing in April 2019, with the 40th Brigade Engineer Battalion, 2nd Armored Brigade Combat team, 1st Armored Division. Full-rate production is scheduled to start in 2019 and expected to be completed by May 2024. The M1074 JABS will replace the M60 AVLB and M104 Wolverine on a one-for-one basis in the US Army, Army National Guard and the US Marines Corps. The M1074 Joint Assault Bridge System (JABS) is based on the hull of the M1A1 version of the M1 Abrams main battle tank using the suspension system from the M1A2 and upgraded with the Total InterGrated Engine Revitalization (TIGER). This is projected to lower maintenance costs as well as increased availability and unit readiness with commonality of parts with the Abrams chassis. The unit has a new hydraulic bridge launcher system as well as Embedded Diagnostics (ED). Survivability is enhanced with components of the Tank Urban Survivability Kit (TUSK) including Abrams Reactive Armor Tile (ARAT1), Rear

Viewer Sensor System (RVSS) and Tank-Infantry Phone (TIP). Additionally it can employ the AUTOFLUG Driver's Seat and Abrams Lightweight Underbody Kit for situational use. The Bridge Launcher Mechanism (BLM) was designed by Israel Military Industries in conjunction with Leonardo DRS. The bridging controls are a basic push-button system, similar to the M104 Wolverine, while the computer assembles the bridge and deploys it. The bridge extends its span vertically instead of horizontally as the M104 Wolverine. It can deploy an MLC95 bridge with a gap crossing of 11 meters in approximately 3 minutes.

MTU-72 Russian Armored Bridgelayer





Tiers:

1 2 **3** 4

System

Alternative Designations: None
Chassis: T-72S
Crew: ea2

↳*Dimensions*

Combat Weight (Mt): 40
Length Overall (M): 11.64
Height Overall (M): 3.38
Width Overall (M): 3.46
Ground Pressure (kg/Cm2): INA

↳*Automotive*

Engine Name: V-46-6
Engine Type: Diesel
Engine Power: 780
Maximum Road Speed: km/h60
Maximum Range: km500
Gradient: %60
Side Slope: %40
Vertical Step: m0.85
Trench: m2.8
Fording: m1.2
Fording with Preparation: m4.5

↳*Communications*

Radios, Frequency, and Range: R-173 and R-134

Bridge System

Type: Cantilever

Capacity: mt50

Width of Obstacle: m18

Width: m3.55

Length Opened: m20

Weight: kg6,400

Emplacement Time: min3

Displacement Time: min8

Notes:

The MTU-72 armored bridgelayer is a combat engineering vehicle, designed to launch an assault bridge for tanks and other military vehicles across trenches and water obstacles. It entered service with the Soviet Army in 1974. It replaced or supplemented the previous MTU-20 and MT-55 bridgelayers, based on the T-55 medium tank. Production of the MTU-72 ceased in 1990. Its replacement - the MTU-90 was ready for production in the late 1990s. However due to funding problems it received no production orders. It appears that the Russian Army was never keen on investing in armored bridgelayers. The MTU-72 bridgelayer is based on a modified T-72 main battle tank chassis. A number of the Soviet T-72B or T-72M1 tanks were converted to armored bridge layer by removing the turret and replacing it with a bridge-launching system. Some sources mention, that some bridgelayers were produced utilizing newly-built T-72 chassis.

TMM Russian Truck-Mounted Scissors Bridge





Tiers:

1 2 3 4

Variants:

- **TMM-1:** 50 ton scissor bridge on ZIL-157 chassis. Also known as TMM without suffix.
- **TMM-2:** 50 ton scissor bridge on KrAZ-214 chassis. Also known as TMM without suffix.
- **TMM-3:** 50 ton scissor bridge on KrAZ-255B chassis. Can be identified by steel frame with spare wheel above cab.
- **TMM-4:** 60 ton scissor bridge with stronger jacks on KrAZ-255B or KrAZ-260 chassis. In KrAZ-260 version spare wheel is located behind cab.
- **TMM-6:** The TMM-6 is a vehicle launched bridge system of Russian origin. It was developed in the 1990's to replace older bridge launching systems with a more capable bridge system. The name TMM-6 stands for Tyazhelo Mekhniznrovanny Most 6, which is Russian for heavy mechanized bridge 6. It is also known as the Gusenitsa-2 with the Gusenitsa-1 being the MTU-90 bridgelayer based on the T-90 chassis.

System

Alternative Designation: Mechanized Bridge, Scissors Bridge

Type: Vehicle launched bridge

Chassis: Modified KrAZ-214 (6 × 6), 7,000 kg, or KrAZ-255B (6 × 6), 7,500 kg, and KrAZ-260 trucks.

Ground Pressure : kg/cm2INA

Crew : ea1 + 2 (driver, 2 passengers)

Troop Capacity : eaINA

Bridge Operation: Normally four TMM vehicles form a unit and together are able span a 40 meter gap.

↳*Dimensions*

Height, Overall : m3.15

Length, Overall : m9.3

Width, Overall : m3.2

Weight, Combat: mt19

Automotive

Engine Name: YaMZ M206B

Engine Type: V6 Diesel

Engine Power : hp205 hp at 2.000 rpm

Range, Cruising : kmINA

Maximum Range: km530

Speed, Maximum Road : km/h55

Speed, Maximum Off-Road: INA

Speed, Maximum Swim : INA

Vertical Step : mINA

Fording Depth : m1.0

Fuel Capacity: 450 liters

Bridge System

Type: Single scissor bridge

Length: m10.5

Weight Capacity: tons50

Depth of Water: 1.7 and 3.2 meters deep.

Operation: Normally four TMM vehicles form a unit and together are able span a 40 meter gap.

Note #1: An infinite number of bridges can be connected

Note #2: The bridge has a 50 t weight capacity and the roadway allows for vehicles ranging from small cars to tanks.

Protection

Armor: No

NBC: No

Night Visition: No

Smoke Equipment: No

Notes:

The TMM is a Cold War era vehicle launched bridge of Soviet origin. It was developed to allow Soviet forces to traverse small gaps and water and gaps that are wider than a single bridge but do not require a pontoon. The name TMM stands for Tyazhelo Mekhniznrovanny Most , which is Russian for heavy mechanized bridge. The TMM remains in use, but has been replaced in production by the larger and more capable TMM-6. The TMM is a bridge system that is based on the KrAZ-214 6x6 7t truck. The improved TMM-3 uses the later KrAZ-255B 7.5t truck chassis and launches the same bridge. A 10.5 m folded scissor bridge is carried at the rear of a vehicle. The bridge is launched rearwards using a pivoting metal frame and a series of steel wire and winches connected to the engine. The bridge rests on the river floor by means of two variable length struts. A single bridge section has a length of 10.5 meters and an infinite number can be connected. Normally four TMM vehicles form a unit and together are able span a 40 meter gap. The bridge sections can be laid in gaps and water between 1.7 and 3.2 meters deep. The bridge has a 50 t weight capacity and the roadway allows for vehicles ranging from small cars to tanks. The TMM-4 variant uses a 60 t weight capacity bridge. The TMM was produced in large quantities and was acquired by the USSR, most Warsaw Pact nations and many nations receiving Soviet aid. Despite its age the TMM remains in service although it is no longer produced.

PMP Russian Heavy Folding Pontoon Bridge





Tiers:

1 2 **3** 4

System

Alternative Designation: Ribbon bridge
Chassis: KraZ-255B, Kr AZ-255
Crew : ea3
Ground Pressure : INA
Troop Capacity : INA
Weight, Combat : mT36.0

↳***Dimensions (See notes)***

Automotive

Engine Name: V-64-4 V-12
Engine Power : hp710.0
Engine Type: Diesel
Fording Depth : m1.2
Range, Cruising : km500
Speed, Maximum Off-Road: km/hINA
Speed, Maximum Road : km/h55
Speed, Maximum Swim : km/hINA
Vertical Step : m2.8

Bridge

Bridge/center: 32

Capacity/Load Class : mT60

Material: SKhL-4 steel

Ramp/shore: 4.0

Roadway Width : m6.5

Type: Pontoon

Working Party: See notes

↳*Dimensions*

Length : m227.0

Communications

↳*Radio*

Name: R-173 and R-134

Notes:

The complete PMP ribbon bridge set consists of 32 center pontoons and 4 ramp pontoons, the normal bridge unit consists of a half-set (one complete bridge) made up of 16 center and 2 ramp pontoons. Each 4-section is launched from the KRAZ-255B. It automatically unfolds upon entering the water. The sections then lock in place to form a bridge unit 6.75 meters long and 8 meters wide. Normally, all the units are launched simultaneously. They join together parallel to the near shore to form a continuous roadway. The roadway then swings across the water obstacle; powerboats (6 per half-set) hold it in place on the designated center-line. Engineers can use the full 36- pontoon set to construct 227 meters of bridge. They may also configure it as 40- to 170-ton rafts. A half-set gives the capability to construct 119 meters of 60-ton bridge, 191 meters of 20-ton bridge, or rafts. Under ideal conditions assembly speeds of 7 meters of bridge per minute can result. This bridge can be built in streams with a velocity of up to 2 meters a second (approx. 7 km/h). Bridge pontoons: Weight (kg): 6,790. Length (m): unfolded: 6.75. Folded: 6.75. Width (m): unfolded: 8. Folded: 5. Depth unfolded (m): bow section: 9. Center section: 7. Folded: 2. Ramp pontoons. Weight (kg): 7,252. Length (m): unfolded: 5.6. Folded: 5.6. Width unfolded (m): river end: 7.3. Shore end: 7. Folded: 3.1. Raft assembly data. 40-ton raft-bridge pontoons: 2 Overall deck length (m): 13.5. Assembly time (min): 8* Working party (est.): 6. *Real world evidence indicates that the bridge can be assembled as fast as 30m/minute. 60-ton raft-bridge pontoons: 3 Overall deck length (m): 20.3. Assembly time (min): 10*. Working party (est.): 9. *Real world evidence indicates that the bridge can be assembled as fast as 30m/minute. 80-ton raft-bridge pontoons: 4. Overall deck length (m): 27. Assembly time (min): 12*. Working party (est): 12. *Real world evidence indicates that the bridge can be assembled as fast as 30m/minute. 110-ton raft-bridge ramp pontoon: 1 Bridge pontoons: 5 Overall deck length (m): 39.3. Assembly time (min): 15*. Working party (est.): 18. *Real world evidence indicates that the bridge can be assembled as fast as 30m/minute. 170-ton raft-bridge ramp pontoon: 1. Bridge pontoons: 8. Overall deck length (m): 59.6. Assembly time (min): 15*. Working party (est.): INA. *Real world evidence indicates that the bridge can be assembled as fast as 30m/minute. Auxiliary equipment powerboats or tracked amphibians: 12. Launch sequence. 1. The travel locks are disengaged, the pontoon carrier backs to the edge of the water, brakes sharply, and then the pontoon slides over the carrier roller system into the water where it unfolds almost immediately. 2. The pontoon is then stiffened by activating six locking devices. 3. Once the pontoons have been launched and stiffened they are interconnected parallel to the near shore to form a continuous strip of roadway. 4. This roadway is then swung across the water obstacle and held in place by powerboats. Whenever possible the launching operations are done along a continuous shoreline permitting all pontoons to be launched at the same time. If necessary, the bridge can be built on a small frontage using the successive raft system. This slows construction time. Retrieval. For retrieval the launch operation is reversed. The pontoon carrier backs to the water’s edge, an integral jib is unfolded from the truck bed, and two cables are strung from the winch (located behind the driver’s cab) through the jib pulleys, around the pontoon retrieving guides, and secured to the pontoon retrieval studs. The winch simultaneously folds and lifts the pontoon to the truck bed. The jib is then folded back into the truck bed, and the pontoon is winched over the roller system and secured. The whole procedure takes a few minutes.

BLG-60 German Armored Vehicle-Launched Bridge (AVLB)



Tiers:

1 2 3 4

System

Alternative Designation: BLG 60

Manufacturer: KhPZ, UVZ (Soviet Union) Bumar-Łabędy (Poland) ZTS Martin (Czechoslovakia)

Type: Armored Vehicle-Launched Bridge (AVLB)

Chassis: T-55

Crew: ea2

MT-55A: The MT-55A span is 18 meters long and can hold up loads up to 50 tons. Later the MT-55A was modified with gap measuring mechanism and infrared equipment for bridge laying at darkness. Of the MT-55A, a total of 1,762 were produced between 1969 and 1983, including 183 export versions MT-55KS (from 1971) and 301 hulls for East Germany's BLG-60 programme.

Dimensions

Chassis Length: 9.8 m

Chassis Width: 3.37 m

Chassis Height: 2.40 m

Chassis Weight, Combat: 36 tons

MT-55A Bridge Length: 18 m

MT-55A Bridge Width: INA

MT-55A Bridge Weight: INA

MT-55A Bridge Cargo Capacity: up to 50 Tons

Automotive

Engine Name: Model V-55

Engine Type: V-12 water-cooled. 38.88-l diesel

Engine Power: hp500

Power-to-Weight Ratio: 14.6 hp (10.4 kW) / tonne

Transmision: Mechanical [synchromesh], 5 forward, 1 reverse gears

Fuel Capacity: 580 l internal, 320 l external (less on early T54), 400 l jettisonable rear drums

Cruising Range: INA

Speed, Maximum Road: km/h48

Speed, Average Cross: km/h25

Speed Maximum Swim: Not Amphibious

Fording Depth: m1.4 unprep; 5.5 snorkel

Gradient: %60

Side Slope: %30

Vertical Step: m0.8

Trench: m2.85

Tank Commander's Weapon System

↳*System*

Name: QJZ-89

Type: 12.7mm Heavy Machine Gun

Manufacturer: NORINCO

Cartridge: mm12.7x108

Weight, Gun Only: kg17.5

Weight,Tripod: kg8.5

Length, Total: mm2,119

Length, Barrel: mm1,003

Barrels: ea1

Action: Gas/Recoil

Rate of Fire: rds/min450-600

Muzzle Velocity: m/s850

Feed System: Belt

Sights: Iron/Optical

↳*Ammunition*

Type: Heavy Machine Gun

Caliber: mm12.7

Muzzle Velocity: m/s850

Basic Load: INA

Max Range: m1,600

Min Range: kmINA

Armor Penetration: Yes

Fire Control

Name: INA

Computerized FCS: INA

Laser Rangefinder: KTD-1 or KTD-2

Night Sight: TPN-1-22-11 night sight

Protection

Hull Armor: 120 mm hull front at 60° (100 mm after 1949) 79 mm hull upper sides 20 mm hull lower sides 60 mm at 0° hull rear 20 mm hull bottom 33-16 mm hull roof

Turret Armor: 205 mm turret front 130 mm turret sides 60 mm turret rear 30 mm turret roof

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: Roller-plow available, In 1959, some tanks received mountings for the PT-55 mine clearing system or the BTU/BTU-55 plough.

Self-Entrenching Blade: No

NBC Protection: Yes, PAZ (Protivoatomnaya Zashchita) NBC protection system

Smoke Equipment: grenlaunch/eng smk sys

Notes:

This system is mounted ont he adapted chassis of a T55, where a launching unit replaces a combat turret. The BLG- 60 armored bridge-layer was a joint development between the former East Germany and Poland. The bridge is launched in a similar fashion to the Csechoslovakia MT-55. The BLG 60 and BLG 67 armored bridge-layers were used by the East German Army and other countries. The bridge initiating equipment is controlled by a system of hydraulic cylinders; the allocation of hydraulic oil can be controlled both manually by mechanical levers and automatically. The pressure of the liquid is provided by high-pressure piston pumps motorized by the tank engine. All mechanisms of the MT-55A used for laying and recovering of the bridge can be controlled by the crew from the inside of the tank, with hatch covers closed. To begin the launching process, the vehicle stops short of the gap; then, the bridge swings ahead and down while its two sections open like scissors. The MT-55A span is 18 meters long and can hold up loads up to 50 tons. Later the MT-55A was modified with gap measuring mechanism and infrared equipment for bridge laying at darkness. The MT-55A was designed and produced by TS Martin from 1962 (the former Czechoslovakia was one of the countries that build the T-54/55 series under licence). The development phase ended in 1967 after which 5 pre-series vehicles were built. Series production started in 1969. The transformed T-55A chassis differs only by the arrangement of the compartments in the hull. The bridge tank is proposed for an easy and swift crossing of antitank barriers (trenches) and other obstacles with the purpose of facilitating the passage of mechanized and tank units. The bridge initiating equipment is controlled by a system of hydraulic cylinders; the allocation of hydraulic oil can be controlled both manually by mechanical levers and automatically. The pressure of the liquid is provided by high-pressure piston pumps motorized by the tank engine. All mechanisms of the MT-55A used for laying and recovering of the bridge can be controlled by the crew from the inside of the tank, with hatch covers closed. To begin the launching process, the vehicle stops short of the gap; then, the bridge swings ahead and down while its two sections open like scissors. The MT-55A span is 18 meters long and can hold up loads up to 50 tons. Later the MT-55A was modified with gap measuring mechanism and infrared equipment for bridge laying at darkness. Of the MT-55A, a total of 1,762 were produced between 1969 and 1983, including 183 export versions MT-55KS (from 1971) and 301 hulls for East Germany's BLG-60 programme.

MTU-90 Russian Armored Bridge Layer





Tiers:



Variants:

- **MTU-90M:** This is an improved variant with a shorter bridge rather than the MTU-90. The bridge can span 19 m; payload capacity is 60 tons. Initial operational capability (IOC) was attained in Russia in 2013. This version was ordered by Azerbaijan, with deliveries scheduled for August 2014, according to an Azerbaijan Press Agency (APA) report dated June 26, 2014. Ref: Military Periscope, May 2016

System

Alternative Designation: Gusenitsa-1, TMM-6 Heavy Bridge Building System
Crew: ea2
Chassis: T-90S
Maximum Bridging Gap: m24
Maximum Launch Time: min2.5
Load Capacity: kg50,000
Load Class: MLC-50

Dimensions

Vehicle Length: m9.6
Vehicle Width: m3.52
Vehicle Height: m3.92
Vehicle Combat Weight: kg45,500
Bridge Weight: kg8,600
Ground Pressure: kgf/cm20.91
Bridge Length: m25.01
Bridge Width: m8.6

Automotive

Engine Name: V-84 MS
Engine Type: 4-stroke, liquid-cooled multifuel diesel (T-90S)

Engine Power: hp840

Cruising Range on Paved Road: km750

Speed, Maximum Road: km/h60

Cruising Range on Unpaved Roads: kmUp to 515

Gradient: %60

Side Slope: %40

Vertical Step: m.85

Trench: m2.8

Fording Depth: m1.2

Protection

Hull Armor: INA

Applique Armor: INA

NBC Protection: PAZ nuclear, biological and chemical (NBC warfare warning and collective protection (T-90S)

Smoke Equipment: Yes

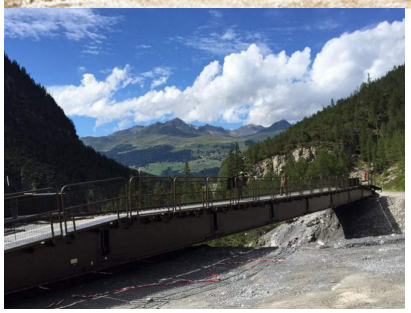
Notes:

The MTU-90 armored bridge layer is designed to carry and lay a one-span bridge over narrow gaps (ditches, canals and rivers) on the battlefield. The vehicle is mounted on a T-90S chassis supporting the single span and supports the TMM-6 Heavy Bridge Building System. The MTU-90 is capable of basic water-crossing operations as well as self-entrenchment. It is equipped with NBC protection systems, fire extinguishers and a smoke-screen system. The vehicle also has a night-vision device, as well as protection against armor-piercing, incendiary and hollow-charge projectiles. The bridge has a length of 25m, a width of 3.52 m and is capable of supporting 50,000 kg. The vehicle is capable of deploying its single span within 2.5 minutes. The crew can deploy the bridge without leaving the cabin. This vehicle can also work in support of the TMM-6 Heavy Bridge Building System. It is capable of laying multi-span bridges for passage of tanks and wheeled vehicles. The vehicle’s capabilities are similar to those of the U.S. Wolverine, indicating the MTU-90 may be a derivative design.

Dry Support Bridge (DSB) British Tactical Military Bridging System







Tiers:



System

Alternative Designation: Dry Support Bridge (DSB)
Type: Tactical Military Bridging System
Manufacturer: WFEL
Crew: 8
Military Load Classification (MLC): Normal 100 (T) / 96 (W) at 46m Maximum 120 (W) / (T) at 46m
Launch Time: Less than 90 minutes
Operating conditions (air temperature): Minus 46 to plus 49 °C
Normal launcher environment operating conditions (air temperature): Minus 29 to plus 49 °C

Dimensions

Maximum clear span: 46m
Span Range and Increments: 22m to 46m in 6m increments
Road Width: 4.3m
Bank Heights: Up to +/- 3m
Longitudinal Bank Slope: 1 in 20 (reduced capability at 1 in 10)
Lateral Bank Slope: 1 in 20
Parallel Module: Stowed LWH 5.95 x 2.44 x 1.1m Deployed LWH 5.95 x 4.3 x 1.19m Weight 4,417kg
Ramp Module: Stowed LWH 5.95 x 2.44 x 1.1m Deployed LWH 5.96 x 4.3 x 1.19m Weight 4,080kg
End Beam: LWH 2.5 x 0.375 x 0.56m Weight 357kg

Approach Ramp: LWH 4.09 x 0.42 x 0.19m Weight 86kg

Decking & Kerbs: Integral — does not require dressing after bridge setdown

Automotive

Launch Vehicle Chassis: The launching system is designed to be adaptable to a range of vehicle chassis. This has been achieved through the adoption of a chassis interface sub-frame, which allows the crane and launching equipment to be easily adapted to a range of chassis with little modification. This design approach ensures that a very high level of commonality exists across all vehicle configurations and ensures greater spares availability and - most importantly - specification compliance against original test data. In general, chassis have been 5-axle vehicles which have included Oshkosh, IVECO and Rheinmetall MAN.

Notes:

The DSB Bridging System consists of four primary elements: (1) the bridge, (2) the launching system, (3) the launch vehicle chassis and (4) the vehicles used to transport the bridge elements. BRIDGE The DSB bridge is modular in design and consists of only 5 key elements:- the approach ramps which lead onto the bridge, an end beam which supports the approach ramps, two bridging modules, a 6m ramp module and a 6m parallel module and a walkway. Once constructed, the bridge is 4.3m wide and is capable of carrying loads of up to MLC 120W across gaps up to 46m wide. Once built, a 46m bridge weighs approximately 37.5 tonnes, excluding walkways. The bridge modules have been designed to be compact while being transported, yet easily deployable to their full width during bridge construction. This is achieved through a patented folding design, which allows the bridge to unfold to its full width simply by lifting it. The result is a folding bridge module which has integral deck units from which the two main bridge girders pivot. The girders are folded underneath when in transport mode and swing outwards once deployed, to form a fully-decked 4.3m wide bridge surface. The folded dimensions of a bridge module are such that, when two modules are stacked, they are equivalent in size to a 1C ISO container. The folded module is deployed by simply lifting the module via its opening slings, the action of which rotates the girders gently outwards under the control of hydraulic dampers. The modules are similarly folded by lifting the module by its closing slings. The bridge may also be supplied with additional ramp modules, to allow two shorter bridges to be built, if required. Once constructed, the bridge can be fitted with an appliqué walkway, which is carried on an additional flatrack and which, when built, cantilevers off the side of the bridge. Health Usage Monitoring Systems All the parallel bridge modules in the DSB system are fitted with a 'crack first' fatigue monitor. This type of gauge allows the individual life of a bridge panel to be ascertained. Walkways The walkway is deployed in sections, attaches to the existing kerbs and forms a continuous walkway adjacent to the bridge. The design of the walkway is such that its top surface is above the roadway surface, helping to protect foot traffic. It is also possible to fit a walkway to each side of the bridge. LAUNCHING SYSTEM As with the bridge, the launcher has been designed to be compact for transportation purposes, yet quickly deployable to its operational size within minutes. This has been achieved via a ‘fold and rotate’ system which is unique to the Dry Support Bridge system. The launcher vehicle weighs approximately 40–45 tonnes, depending on the chosen chassis and level of armour. THE LAUNCH VEHICLE CHASSIS The launching system is designed to be adaptable to a range of vehicle chassis. This has been achieved through the adoption of a chassis interface sub-frame, which allows the crane and launching equipment to be easily adapted to a range of chassis with little modification. This design approach ensures that a very high level of commonality exists across all vehicle configurations and ensures greater spares availability and - most importantly - specification compliance against original test data. In general, chassis have been 5-axle vehicles which have included Oshkosh, IVECO and Rheinmetall MAN. BRIDGE TRANSPORTATION VEHICLES The size and shape of two DSB bridge modules, when stacked, approximates to the same size as an ISO container. The common method of transportation for the bridge sections is therefore on an ISO Flatrack, which is included in the system. This allows bridging to be treated as a commodity and shipped by a multitude of vehicles, including Oshkosh, IVECO and MAN.

Caterpillar CS563E American Vibratory Smooth Drum Roller





Tiers:

1 2 3 4

System

Alternative Designation: Caterpillar CS563E

Type: Vibratory Smooth Drum Roller

Manufacturer: Caterpillar

Crew: ea1

Dimensions

Length, Overall: 5760mm

Height To Top Of Cab: 3070mm

Wheelbase: 2900mm

Ground Clearance: 448mm

Operating Weight: 12130kg

Automotive

Engine Name: 3056E ATAAC

Engine Type: Diesel

Aspiration: turbocharged

Gross Power: 112kw

Net Power: 107kw

Fuel Capacity: 330L

Hydraulic System Fluid Capacity: 64L

Maximum Speed: 11.4km/h

Operating Voltage: 24V

Alternator Supplied Amperage: 55 amps

Drum

Drum Width: 2134mm

Drum Diameter: 1524mm

Static Linear Load: 32.2kg/cm

Vibration Frequency 1: 31.9Hz

Nominal Amplitude - High: 1.7mm

Nominal Amplitude - Low: 0.9mm

Centrifugal Force - High: 266kN

Centrifugal Force - Low: 133kN

Protection

Hull Armor: INA

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Caterpillar CS563E Vibratory Smooth Drum Roller

Type 84A Chinese Heavy Mechanized Bridge



Tiers:

1 2 3 4

Variants:

- **Modified Heavy Mechanized Bridge:** This is an upgraded version of the Type 84A developed by NORINCO. It can support armored vehicles weighing up to 60 metric tons and wheeled vehicles with an axle rating of 13 metric tons. Each span has a length of 15m when opened and a roadway width of 3.5m. Five of these spans can be used to cross a 75m gap. The bridge is transported and launched from a domestically manufactured Mercedes-Benz 8 x 8 cross-country truck. The chassis features power-steering on the front four wheels and a central-tire inflation system. In a standard laying operations, the truck backs up to the gap and the bridge is opened out. Once fully open, hydraulically operated outriggers are opened out and extend vertically until they reach the ground. The outriggers are reportedly fully automatic with double-acting cylinders. Each is fitted with a large shoe. A single span takes about 12 min to position, according to NORINCO. The bridge can be deployed in rivers with a maximum flow speed of 7 ft/sec (2 m/sec) and a maximum depth of 5.5m. A typical Modified HMB package includes five trucks, each transporting and launching a single bridge unit, and a crew of 12. Seven personnel are needed to position each span. Ref: Military Periscope October 2016

System

Alternative Designation: NA

Crew: ea2

Maximum Bridging Gap: m50

Maximum Launch Time: INA

Load Capacity: Tracked vehicles: 50 metric tons; Wheeled Vehicles: Axle load of 13 metric tons

Span Length: m10.5 (Up to 5 spans can be used)

Water Depth Limitation: m3.5

Builders: China Shipbuilding Trading Co., Shanghai, China; China North Industries Corp. (NORINCO), Beijing China (Modified HMB)

Dimensions

Vehicle Length: INA

Vehicle Width: INA

Vehicle Height: INA

Vehicle Combat Weight: INA

Automotive

Engine Name: INA

Engine Type: INA

Cruising Range on Paved Road: INA

Speed, Maximum Road: INA

Protection

Hull Armor: INA

Applique Armor: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Type 84A heavy mechanized bridge (HMB) is a Chinese wheeled bridge-laying vehicle. The bridge can hold tracked armored vehicles weighing up to 50 metric tons on five modular spans. It can handle wheeled vehicles with a maximum axle load of 13 metric tons. The bridge can span a gap up to 50m. When the bridge is being deployed, the truck backs up to the gap, drops hydraulic stabilizers on either side of the rear and opens the bridge over the obstacle to be crossed. Outriggers are then opened and extended below the bridge. The bridge sections are carried and placed into position by an 8 x 8 or 6 x 6 wheeled vehicle. Each span is 10.5m long. Up to five can be coupled together. The system can be used in water as deep as 3.5 m. The bridge can also be connected with various types of pontoon bridges. Ref: Military Periscope October 2016

TMM-6 Russian 8x8 Truck-Mounted Scissors Bridge






Tiers:

1 **2** 3 4

System

Alternative Designation: NA
Type: Vehicle launched bridge
Chassis: MZKT-7930 "astrologer", a heavy 8 × 8 truck of the Belarusian manufacturer MZKT
Crew : ea2 (driver, operator)
Troop Capacity : eaINA
Emplacement: 60-80 minutes
Displacement: 90 minutes

↳*Dimensions (Chassis: MZKT-7930)*

Length, Overall : m12.7
Width, Overall : m3
Height, Overall : m3.29
Weight, Empty: tons20.5
Maximum Payload: tons24

Automotive (Chassis: MZKT-7930)

Engine Name: YaMZ-846
Engine Type: Diesel
Engine Power : hp500

Range, Cruising : kmINA

Maximum Range: km1,100

Speed, Maximum Road : km/h70

Gradient: %45

Side Slope: %30

Vertical Step: m0.6

Trench: m2

Fording: m1.4

Bridge System

Type: Single scissor bridge

Length: m17

Weight Capacity: kg60,000

Height: 1.5 to 5.0 m

Width: m3.8

Gauge: m1.5

Depth of Water: 1.7 and 3.2 meters deep.

Controls: The hydraulically driven laying mechanism can either be located at an operator station at the rear of the vehicle or by remote controlbeing controlled.

Vehicle Cross Speed: 400 vehicles should be able to cross the fast bridge per hour at a speed of up to 30 km / h.

Note #1: One set of TMM-6 consists of two Unlike the older Soviet bridge laying system TMM-3 , in which four identical vehicles belonged to a complete bridge, one set of TMM-6 consists of two bridge laying vehicles and four transport vehicles with a total of six bridges.

Protection

Armor: No

NBC: Yes

Night Visition: No

Smoke Equipment: No

Notes:

The TMM-6 is a vehicle launched bridge system of Russian origin. It was developed in the 1990's to replace older bridge launching systems with a more capable bridge system. The name TMM-6 stands for Tyazhelo Mekhniznrovanny Most 6, which is Russian for heavy mechanized bridge 6. It is also known as the Gusenitsa-2 with the Gusenitsa-1 being the MTU-90 bridgelayer based on the T-90 chassis. The TMM-6 functions in a similar way as the older TMM system but is a much larger and heavier system. A MZKT-7930 8x8 truck chassis is used as the launch vehicle. A 17 m folded scissor bridge is carried at the rear of a vehicle. The bridge is launched rearwards using a hydraulic arm and rests on the river floor by means of two variable length struts. Normally six TMM-6 would form a unit and together are able to create a 102 meter bridge. The TMM-6 is an unarmed vehicle and has no armor but does feature an NBC system. A single bridge section has a length of 17 meters and an infinite number can be connected and a single MTU-90 section can be fitted on one end. Six vehicles would make up a single unit and result in a 102 meter bridge. The bridge sections can be laid in gaps and water between 2 and 5 meters deep. Creating a 102 meter bridge requires 50 minutes. The bridge has a 60 t weight capacity and may carry up to 400 vehicles per hour that may move at speeds up to 30 km/h. The TMM-6 is used in small quantities with the Russian army and is available for export.

MT-55A Czechoslovakian Self-Propelled Armoured Bridgelayer







Tiers:



Variants:

- **MT-55:** Pre-series model, equipped with the bridge of the MT-34 bridge-layer. In Western sources, this model is
- **MT-55KS:** Export model for "capitalist" non-Warsaw Pact countries. Based on the T-55A without radiation protection layer both otherwise similar.
- **PM-55:** Wheeled version, based on a Tatra 813 "Kolos" 8x8 truck.

System

Alternative Designation: None
Chassis: T-55A Tank (modified)
Crew: ea2
Troop Capacity: eaINA

↳*Dimensions*

Combat Weight: mt36
Length Overall: m9.90
Height Overall: m3.35
Width Overall: m3.30

↳*Automotive Performance*

Engine Name: V-55
Engine Type: 12-cyl. 38.88 liter water-cooled diesel
Engine Power: 580 hp
Power/weight: 14 hp/tonne

Cruising Range: km690

Maximum Speed: km/h50

Suspension: Torsion bar

Fording Depth: m1.4

Vertical Step: m0.7

Communications

Tactical Radio: R-123

Bridge System

Type: Scissors

Capacity: mt50

Width of Obstacle: m17

Width: m3.3

Length Opened: m18

Weight: kg6.5

Emplacement Time: min2

Displacement Time: min5-6

Notes:

The MT-55A (Slovak: Mostný tank) is an armoured vehicle-launched bridge (AVLB) tank, manufactured by ZTS Martin in Slovakia. The AVLB is based on a T-55A medium tank chassis, with the turret detached and replaced by a special bridge launching equipment. The MT-55A was produced for the armies of the Warsaw Pact (including the Soviet Army), as well as for export clients. The MT-55, Base T-55, was designed and produced by ZTS Martin from 1962 (the former Czechoslovakia was one of the countries that build the T-54/55 series under licence). The development phase ended in 1967 after which five pre-series vehicles were built. The MT-55A, Base T-55A, series production started in 1969. The transformed T-55A chassis differs by the arrangement of the compartments in the hull. The bridge tank is proposed for an easy and swift crossing of antitank barriers (trenches) and other obstacles with the purpose of facilitating the passage of mechanised and tank units. The bridge initiating equipment is controlled by a system of hydraulic cylinders; the allocation of hydraulic oil can be controlled both manually by mechanical levers and automatically. The pressure of the liquid is provided by high-pressure piston pumps motorized by the tank engine. All mechanisms of the MT-55A used for laying and recovering the bridge can be controlled by the crew from inside the tank with the hatch covers closed. To begin the launching process, the vehicle stops short of the gap; then, the bridge swings ahead and down while its two sections open like scissors.[1] The MT-55A span is 20 meters long and can support loads of up to 50 tons. Later, the MT-55A was modified with a gap measuring mechanism and infrared equipment for bridge laying in darkness. Total production of the MT-55A between 1969 and 1983 amounted to 1,762 vehicles, including 183 export versions MT-55KS (from 1971) and 301 hulls for East Germany's BLG-60 programme.

M104 Wolverine American Armored Bridgelayer







Tiers:



System

Alternative Designation: M104 Wolverine
Type: Armored Bridgelayer
Manufacturer: General Dynamics Land Systems
In Status: 2003-Present
Crew: ea2
Chassis: Based on the M1A2 Abrams tank chassis
Bridge Launch Time: < 5 minutes
Bridge Recovery Time: <10 minutes

Dimensions

Vehicle Length, Overall: 13.40 m
Vehicle Length, Hull: 7.64 m
Width, Overall: 4.00 m
Width, Hull: 3.48 m

Height, Overall: 3.95 m

Height, Hull: 2.91 m

Length of Track on the Ground: 4.65 m

Track Width: 635 mm

Ground Clearance,Center: 483 mm

Ground Clearance, Sides: 432 mm

Bridge Length: 26.00 m

Bridge Width: 4.00 m

Weight, Empty: 7,010 kg

Weight, Combat: 62,325 kg

Maximum Bridging Gap: 24.0 m

Automotive

Engine Name: 1 x Avco-Lycoming AGT-1500

Engine Type: multi fuel turbine

Engine Power: 1,500 hp at 3,000 rpm

Power-to-Weight Ratio: 24.1 hp/metric ton

Speed, Road: 72 kph

Speed, Cross-Country: 48 kph

Speed, up 10 deg slope: 32 kph

Speed, up 60 deg slope: 7 kph

Acceleration, 0-32 kph: 6.8 sec

Range: 418 km

Gradient: 60

Vertical Obstacle: 0.94 m

Trench: 2.69 m

Fording, without Preparation: 1.22 m

Fording, with Preparation: 1.98 m

Fuel Capacity: 1,885 liters

Suspension: torsion bar

Road Wheels: 7 w/15-in (381-mm) travel, rear drive, front idler, 3 internal shock absorbers, 2 return rollers

Protection

Hull Armor: Chobham-type

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: Engine exhaust smoke generation

BattleManagement System: The M104 is fitted with a digital battlefield management system, which is designed to increase awareness on the battlefield and keeps the vehicle in contact with local field commanders.

Notes:

The M104 Wolverine Heavy Assault Bridge is an armored military engineering vehicle created by General Dynamics Land Systems, designed to provide deployable bridge capability for units engaged in military operations. Since the 1960s the United States Army has made use of armored bridge-laying vehicles based on the M48 Patton/M60 series of tanks. In recent years, however, the Army discovered that the aging M60 AVLB (Armored Vehicle Launched Bridge) was too slow to keep up with the M1 Abrams' top speed of roughly 70 km/h during field maneuvers. Additionally, the Abrams was so heavy that it could safely cross the AVLB's bridge only at a very slow speed. Program development for a new armored bridge-laying vehicle began in 1983, and by 1994 General Dynamics Land Systems and the German MAN Mobile Bridges GmbH (since 2005 Krauss-Maffei Wegmann) had been awarded a contract. The first prototype vehicles were being tested by 1996, and the first production models were delivered by 2003. It is unclear why the vehicle was subject to such a long development time. Because the Wolverine is essentially an M1A2 SEP tank with Leguan bridge-laying gear instead of a turret, it shares virtually all of the parent vehicle's speed, mobility, survivability, and automotive components. This commonality was a key design factor in the Wolverine's development. The Wolverine also features an advanced communications package designed to keep it in contact with local field commanders. However, the vehicle itself is unarmed. The Wolverine is operated by two crewmen who sit within the hull. Both crewmen have access to the bridging controls, while the bridge is carried in two sections, stacked above the hull. Once a bridging site is chosen the vehicle securely anchors itself in place with a spade. The two sections of the bridge are joined together, and then the entire bridge is extended across the obstacle and dropped into place. The crewmen have the ability to make minor corrections during launch, if needed. Once operations are complete, the Wolverine drives across the bridge and retrieves it from the other side simply by reversing the process. The bridge can be launched in under five minutes or retrieved in less than ten minutes, all without the crewmen ever leaving the safety of their vehicle. Once launched, the 26-meter Leguan bridge can support a 70-ton vehicle moving at 16 km/h, or 10 miles per hour. The Wolverine thus allows the heaviest of vehicles to cross craters, ditches, and damaged bridges at combat speed. This mobility is a decisive advantage for armored units. To date the United States Army has received 44 Wolverines, which have been distributed to a few select engineer units. The Army had originally intended to purchase 465 vehicles; however, budget cuts and a shift in philosophy toward a lighter fighting force meant that the Army no longer needed hundreds of bridgelaying vehicles. While the Army did not plan to purchase any more Wolverines, it had, at the time, reserved the right to restart production if necessary. However, as of 2016 the Wolverine is being replaced by the Leonardo DRS Joint Assault Bridge (JAB), thus effectively ending the Wolverine program. The M1074 Joint Assault Bridge also has an Abrams tank chassis, but is combined with an 18.3-metre (60 ft) scissor bridge. While the M104 was intended to replace the AVLB, it was found to be too expensive and complicated to maintain and operate. While the JAB's bridge is shorter, it has a faster deployment time of three minutes, compared to the Wolverine's 3-5 minute set-up time. On August 23, 2016, DRS Technologies, Inc., announced that the U.S. Army had awarded it an indefinite quantity contract worth up to $400 million to build the new Joint Assault Bridge (JAB) system to carry, deploy and recover a heavy “scissor” bridge. First deliveries are planned in mid-2017, with low-rate initial production expected to be reached in 2019.

M1977 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Common Bridge Transporter (CMT)





Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo

bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.

- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M1977 HEMTT

Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Common Bridge Transporter (CBT)

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Mission: The M1977 Common Bridge Transporter (CBT) is a modified M977 HEMTT Cargo truck equipped with a Load Handling System (LHS). The M1977 CBT was designed to support the Engineer Corps in transporting all bridging assets. The M1977 CBT loads, launches and retrieves the Ribbon Bridge, Improved Ribbon Bridge and Heavy Dry Support Bridge utilizing the Bridge Adapter Pallet, (BAP) and associated bridge erection boats utilizing the Improved Boat Cradle (IBC).

Payload Capacity: 9,979 kg

Winch: The CBT is equipped with a winch to assist in retrieving the deployed equipment.

XM15 Bridge Adapter Pallet (BAP): The XM15 Bridge Adapter Pallet (BAP) is used to adapt the CBT for transport of Combat Engineer bridge equipment as mentioned above. When loaded, the BAP provides the necessary locks, rollers and guides to launch, retrieve and transport the bridge equipment. The BAP consists of the main frame and winch frame assemblies. The BAP is PLS compatible and is transloadable to/from the PLS trailer. The winch frame detaches from the BAP main frame and attaches to the CBT LHS. The winch frame utilizes the truck hydraulic power to winch the bridges during retrieval operations.

XM14 Improved Boat Cradle (IBC): The XM14 Improved Boat Cradle (IBC) is used to adapt the CBT for transport of the Combat Engineer Bridge Erection Boat (BEB). When loaded, the IBC provides the necessary locks, rollers and guides to launch, retrieve and transport the BEB. The IBC is PLS compatible, similar to the flatrack in design and is transloadable to/from the PLS Trailer.

XM1977 Common Bridge Transporter (CBT) Details: Cab and Remote Control of LHS 2 Speed LHS 20,000 lb. Payload 8x8 Configuration 48 in. Fording Capability 60% Grade 445 hp DDC Engine

XM15 Bridge Adapter Pallet (BAP) Details: Remote Control (30" range) 2 Speed Winch Control 10-25" Minimum Winch Line Speed 4 Automatic Bay Locks Dual Front Lock Release From Cab Transloadable Onto PLS Trailer

XM14 Improved Boat Cradle (IBC) Details: Controlled From Cab With Joystick Steel Construction Minimal Moving Parts Minimal Maintenance

Dimensions

Length: 10.17 m
Width: 2.44 m
Height: 2.57 m
Distance Between Equalizer Pivots: 5.33 m
Distance Between Axles, 1st to 2nd: 1.52 m
Distance Between Axles, 2nd to 3rd: 3.81 m
Distance Between Axles, 3rd to 4th: 1.52 m
Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA
Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel
Engine Power: 445 hp at 2,100 rpm
Power-to-Weight Ratio: 16.18 hp/metric ton
Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears
Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)
Maximum Speed: 88 km/h
Range: 483 km; w/full load at 54 km/h
Fuel Capacity: 589 liters
Tire Size: 16.00R20
Gradient: 60 percent
Side Slope: 30 percent
Fording Depth: 1.23 m
Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant
Applique Armor: Available
Active Protection System: INA
NBC Protection: Yes
Smoke Equipment: No

Notes:

The M1977 Common Bridge Transporter (CBT) is a modified M977 HEMTT Cargo truck equipped with a Load Handling System (LHS). The M1977 CBT was designed to support the Engineer Corps in transporting all bridging assets. The M1977 CBT loads, launches and retrieves the Ribbon Bridge, Improved Ribbon Bridge and Heavy Dry Support Bridge utilizing the Bridge Adapter Pallet, (BAP) and associated bridge erection boats utilizing the Improved Boat Cradle (IBC). The CBT is equipped with a winch to assist in retrieving the deployed equipment. The XM15 Bridge Adapter Pallet (BAP) is used to adapt the CBT for transport of

Combat Engineer bridge equipment as mentioned above. When loaded, the BAP provides the necessary locks, rollers and guides to launch, retrieve and transport the bridge equipment. The BAP consists of the main frame and winch frame assemblies. The BAP is PLS compatible and is transloadable to/from the PLS trailer. The winch frame detaches from the BAP main frame and attaches to the CBT LHS. The winch frame utilizes the truck hydraulic power to winch the bridges during retrieval operations. The XM14 Improved Boat Cradle (IBC) is used to adapt the CBT for transport of the Combat Engineer Bridge Erection Boat (BEB). When loaded, the IBC provides the necessary locks, rollers and guides to launch, retrieve and transport the BEB. The IBC is PLS compatible, similar to the flat rack in design and is transloadable to/from the PLS Trailer.

→→Mine Clearing Vehicles

BMR-3M Russian Mine Clearing Vehicle





Tiers:



System

Alternative Designation: BMR-3M
Type: Mine Clearing Vehicle
Manufacturer: INA
Family: BMR-3M
In Service: 2000-Present
Crew: ea2 (Driver and Commander)
Passenger Capacity: ea3

Mine Roller System

Mine Roller: KTM-7 Mine Rollers
Chains: Chains are fitted between the rollers to detonate tilt-mast fuzes
Single Roller Path: A single roller clears 0.8 m wide track
Electromagnetic Countermine System: Yes, which detonates magnetically fuzed mines
Pressure Activated Fuse Mines Capable: Yes, Clears Pressure Activated Fuse Mines
Bottom Mines fitted with Rod-type Fuses Capable: Yes, Clears Bottom Mines fitted with Rod-type Fuses
Magnetic Proximity Fuses Capable: Yes, Clears Magnetic Proximity Fuses
Soil Planted Mines Capable: yes, Clears Soil Planted Mines
Mine Clearing Speed: up to 12 km/h

Mine Detection Set (Hand-held): ea2

:

Dimensions

Length: m6.93

Width: m3.78

Height: m2.93

Weight, Combat: tons48

Automotive

Engine Name: V-84MS

Engine Type: Diesel

Engine Power: hp840

Cruising Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: INA

Speed Maximum Swim: km/hNot Amphibious

Gradient: 60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.8

Fording Depth (Without Preparation): m1.2

Fording Depth (With Preparation): m5

Mine Clearing Speed: up to 12 km/h

Communications

Primary Radio: INA

Radio Jammer: Yes, which prevents detonation of radio-controlled explosives

Main Gun

Note: The 12.7mm NSV is remotely-operated and can be used to destruct visible mines laying on the surface or in soil

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: Anti-Aircraft Machine Gun

Caliber: mm12.7

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Max Rate of Fire: rds/min700-800

Length (Total): mm1,560

Weight (Gun Only): kg25

Weight (On Tripod): kg41

Weight (50-Round Belt): kg11

Action: Gas Operated

Feed System: 50-Round Belt

Sights: Iron Sights

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Fire Control

Laser Target Desinator: INA

Protection

Armor, Hull: New all-welded superstructure as well as ERA Blocks. The superstructure provides protection against small arms fire, artillery shell splinters and mine fragment debris

Armor, Belly: Composite construction, the belly of the BMR-3M can withstand anti-tank mine blast anywhere under the hull

Applique Armor: Avaialble

Active Protection System: Yes

Mine Clearing: Yes

Explosive Reactive Armor (ERA): Yes

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Blast-Suppressing Seats: Yes, for the Commander and Driver

Life Support System: Yes. It is reported that the crew along with 3 passengers can stay inside the BMR-3M for 2 days

Note: The BMR-3M is based on the T-90 main battle tank chassis. The turret has been removed and new all-welded superstructure has been fitted. This mine clearing vehicle is fitted with Explosive Reactive Armor (ERA) blocks.

Notes:

The Russian BMR-3M is a T-90 hull with the turret replaced with a superstructure housing the crew and other mine clearing equipment. Attached to the front of the vehicle are two arms each with solid steel wheels that whilst driving over mines, their weight detonates them and thanks to their thickness are not damaged, allowing the vehicle to continue along its path with

other tanks such as the T-90 following it. The new mine clearing vehicle is mainly intended for road mine clearing, while escorting convoys.

M1150 American Assault Breacher Vehicle





Tiers:

1 **2** 3 4

System

Alternative Designation: M1150
Type: Assault Breacher Vehicle
Manufacturer: US Army Anniston Depot
Crew: ea2
Chassis: The ABV is builded on the same chassis as the General Dynamics-built M1A1 Abrams main battle tank.
Accessories: Major components of the ABV include a Full-Width Mine Plow (FWMP), two linear demolition charges (LDC), a lane-marking system, a remote control system, and weapon station integration on a modified M1A1 tank chassis. ABV will fill the requirement to clear a lane of sufficient width and depth for the assault forces and will be operated by a two-man crew with an option for remote control. The ABV is equipped with a variety of specialised equipment supplied by Pearson Engineering of the UK can be fitted. The HLA (High Life Adaptors), whilst providing an increased approach angle to the ABV, allows the rapid fitting and removal of the full suite of ABV front end equipment and sub-systems. For clearing minefields, the FWMP (Full Width Mine Ploughs) can be swiftly installed at the front of the vehicle which can be rapidly replaced by the CDBB (Combat Dozer Blades) that, in addition to clearing battlefield obstacles, can also be used to prepare firing positions. Another alternative installation at the front of the vehicle is the Pearson Engineering ROBS (Rapid Ordnance Removal Systems) or an SMP (Lane Marking Systems). The plow mounted on the front of the ABV lets it construct hasty earthworks for cover and to barrel through enemy obstacles. Mounted on the rear of the ABV turret structure is the Linear Demolition Charge System containing two launchers with an updated firing system. Each of these launchers is fitted with a MK 2 solid propellant rocket attached to a M58 linear charge. The ABV included the same communications system and a deep fording capability as the M1A1 Abrams MBT.

Dimensions

Length: 7.9 m
Width: 3.6 m
Height: 2.4 m
Weight: 50,000 kg

Automotive

Engine Name: Honeywell AGT 1500

Engine Type: Gas Turbine

Engine Power: 1,500 hp

Transmission: Allison X-1100-3B Hydro-Kinetic automatic transmission

Maximum Speed, Road: 72 km/h

Maximum Speed, Cross-Country: 48 km/h

Range: INA

Suspension: The suspension of the ABV is composed on each side with 7 road wheels and 2 track-return rollers, on each side of the chassis.

Main Weapon System

Name: M58 MICLIC

Type: Mine Clearing Line Charge (MICLIC)

Note: The M58 Mine Clearing Line Charge (MICLIC) is a rocket-projected explosive line charge which provides a "close-in" demining capability for maneuver forces of the United States Army and Marine Corps. It is effective against conventionally fuzed land mines and, when detonated, it provides a lane 8 meters by 100 meters. The MICLIC system consists of an M353 3½ ton[3] or M200A1 2½ ton trailer (or M200 tracked trailer) chassis, a launcher assembly, an M147 firing kit, an M58A3 line charge and a 5-inch MK22 Mod 4 rocket. The line charge is 350 feet long and contains 5 pounds per linear foot of C-4 explosive. In the event a MICLIC fails to detonate normally, it can be manually activated by time-delay fuses every few feet along the length of it. The M147 Firing Kit can also be employed from other combat engineer vehicles, namely the M60AVLB and the M1150 Assault Breacher Vehicle.

Auxiliary Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7 mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: 12.7 mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,200 Rounds

Protection

Hull Armor: The ABV is builded on the same chassis as the General Dynamics-built M1A1 Abrams main battle tank. The ABV will provide crew protection and vehicle survivability while having the speed and mobility to keep pace with the manoeuvre force. For the ABV role, the turret of the M1A1 Abrams MBT has been removed and replaced by a new all-welded steel structure to which has been added the latest explosive reactive armour (ERA) package. This provides a higher level of protection against anti-tank weapons fitted with a High Explosive Anti-Tank (HEAT) warhead fitted to weapons such as the RPG-7 (Rocket Propelled Grenade).

Applique Armor: INA

Mine Clearing: Yes

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1150 Assault Breacher Vehicle (ABV) is a U.S. military mine- and explosives-clearing vehicle, based on the M1 Abrams-chassis, equipped with a mine-plough and line charges. Its first large scale use by the US Marines was in the joint ISAF-Afghan Operation Moshtarak in Southern Afghanistan during the War in Afghanistan in 2010 against the Taliban insurgency. These tracked combat vehicles were especially designed to clear pathways for troops and other vehicles through minefields and along roadside bombs and improvised explosive devices. The 72-ton, 40 foot (15 m) long vehicles are based on the M1 Abrams with a 1,500 horsepower engine, but fitted with a .50 cal machine gun and a front-mounted 15-foot (4.5 m) wide plow, supported by metallic skis that glide on the dirt and armed with nearly 7,000 lb (3,175 kg) of explosives. The Breachers are equipped with Linear Demolition Charge System (LDCS): rockets carrying C-4 explosives up to 100–150 yards forward, detonating hidden bombs at a safe distance, so that troops and vehicles can pass through safely. In the 1990s, the U.S. Army decided it could not afford to continue developing complicated, maintenance-heavy vehicles for this purpose. The Grizzly program was canceled in 2001, and the prototype developed never made it to the production lines. The Marine Corps however persisted and funded its own development and testing. The main body of the final model of the ABV is built on the General Dynamics chassis that is used for the M1A1 Abrams main battle tank. Pearson Engineering of the UK provided the specially designed plow and the other mine-clearing accessories. In the morning of December 3, 2009, for the first time breachers were used in combat, when Marines pushed into the Taliban stronghold Now Zad during Operation Cobra's Anger in Helmand province, on their way to another Taliban stronghold Marjah, 380 miles (610 kilometers) southwest of Kabul, that was to be assaulted in February 2010. On February 11, 2010, two breachers fired explosive line charges in the desert outside Sistani, to test Taliban defenses on the eve of Operation Moshtarak when closing off the enemy's escape route. On February 13, 2010, on the first day of the operation, breachers of the US Marines 2nd Combat Engineer Battalion succeeded in digging and blasting "safety lanes" through the numerous minefields laid by the Taliban around Marjah. According to a report in December 2009, there were then five ABVs in Afghanistan, and the U.S. Marines were said to have plans to field a total of 52 by 2012, of which about 34 have already had been produced. The U.S. Army was said to have ordered 187. By August 2013, six Assault Breacher Vehicles were brought to the Korean Peninsula. They are used by the 2nd Infantry Division to provide the capability for deliberate and in-stride breaching of mine fields and complex obstacles. The ABVs would allow the 2ID to clear the heavily mined Korean Demilitarized Zone, believed to contain tens of thousands to millions of mines. A previous deployment of MRAP mine-resistant vehicles to Korea caused North Korea to accuse their presence as vehicles that would cross the DMZ for an attack of the country; the MRAPs were later withdrawn due to their unsuitability for the terrain. North Korea has not publicly responded to the ABVs’ arrival on the peninsula.

Listva Russian 6x6 Remote Controlled Mine Clearance Vehicle







Tiers:



System

Alternative Designation: SBA-60K2 Bulat
Type: Remote-Controlled Mine Clearance Vehicle
Chassis: SBA-60K2 Bulat
Crew: ea2
Passenger Capacity: ea8
Compartments: The vehicle has three combat compartments: the first houses the commander and driver; the second conceals the radio operator, who searches for mines and scans the surrounding terrain; the third is for a team of sappers, in case a mine needs to be finished off manually.
Mine Detection: The Listva vehicle’s electronics can detect mines and IEDs at a distance of 100 meters within a 30° sector.
Sensors: This includes 16 externally mounted sensors for locating objects at a range of one hundred meters and transmitting the information in real time to the operator at the control panel.

Dimensions

Length: 8 m
Width: 2.5 m
Height: 2.6 m
Weight, Combat: 15.9–19.5 t
Ground Pressure: INA

Automotive

Engine Name: KamAZ-740.31-240

Engine Type: Diesel

Engine Power: hp240

Range: km800

Speed, Maximum Road: km/h90

Speed, Mine Detection: 15 kph

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: INA

Main Weapon System

Note: The Listva can be equipped with either 1 × 7.62-mm or 12.7-mm Machine Guns.

Fire Control

Name: INA

Computerized FCS: No

Protection

Hull Armor: The armour on the Listva can withstand direct hits from 7.62 mm calibre weapons. The vehicle features prominent, high-angled plated armour meant to deflect small-arms' rounds and artillery shell shrapnel, and features a V-shaped hull to increase protection against mine and IED blasts, with the bottom of the hull being resistant to explosions equivalent to 1 kg of TNT. The Bulat is also fitted with mine-resistant seats.

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Russia’s Strategic Missile Force unveiled the Listva remote-controlled mine-clearance vehicle to the public at the Army 2018 international military and technical forum. "The remote-controlled mine-clearance vehicle was developed to increase the survivability and protection level of ground-mobile missile systems on combat patrol routes and in the field, breach minefields and remove remote-controlled explosive devices," the press office said. The combat effectiveness of the Listva system was checked. During the check, systems of the type deactivated explosive devices and then they were delivered to missile large units. The vehicle was developed specifically for the Strategic Missile Force and proved its effectiveness during a command post exercise involving the Novosibirsk-based missile large unit. The Listva vehicle’s electronics can detect mines and IEDs at a distance of 100 meters within a 30° sector. Strategic Missile Force engineering units are planning to receive more than 300 items of engineering equipment before 2020, including obstacle-clearing vehicles, heavy mechanized bridges, excavators, truck cranes and some other vehicles. Wheeled road-building vehicles developed specifically for the Strategic Missile Force will make up more than 50 percent of the engineering materiel to be delivered.

Trojan British Combat Engineering Vehicle







Tiers:

1 **2** 3 4

System

Alternative Designation: Trojan
Type: Combat Engineering Vehicle
Manufacturer: BAE Systems Land Systems
Chassis: The Trojan is based on a modified Challenger 2 main battle tank chassis. The turret has been removed and replaced by a new superstructure with special equipment.
Crew: 3 (commander, operator, driver)
Mine Plough: Yes, The Trojan is fitted with a full-length mine plough, that pushes mines out of the way to clear a safe path for following vehicles
Dozer Blade: Yes
Large Excavator Arm: Yes, The excavator arm is used for earth works, grabbing and moving obstacles, placing fascines. The standard bucket has a 1 m^3 capacity. Bucket can be replaced with other attachments. The arm lift capacity is 6.5 tonnes.
Minefield Breaching System: This vehicle can carry fascines and drop into ditches. Also it can tow a trailer carrying Python rocket-propelled minefield breaching system.
:

Dimensions

Length: 8.3 m
Width: 3.5 m, 4.2 m with Applique Armor
Height: 2.5 m
Weight, Combat: 62.5 tons

Automotive

Engine Name: Perkins CV12-8A

Engine Type: Diesel

Engine Power: hp1,200

Power to Weight Ration: 19.2 hp/t

Transmission: David Brown TN54 epicyclic transmission (6 fwd, 2 rev.)

Suspension: Hydropneumatic

Range: 450 km

Speed: 59 km/h (37 mph) 40 km/h (25 mph) off road

Gradient: %60

Side Slope: %30

Vertical Step: m0.9

Trench: m2.3

Fording: m1

Main Weapon System

Note: The Main Weapon System is controlled via remote control.

↳*System*

Name: L94A1 Chain Gun

Type: Chain Gun

Caliber: mm7.62

Length: 1.25 m

Barrel Length: 703 mm

Weight: 17.86 kg

Action: Electrically driven

Rate of Fire: 520 to 550 rounds per minute

Muzzle Velocity: 862 m/s

Feed System: disintegrating link belt

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (linked)

Basic Load: INA

Protection

Hull Armor: The Trojan combat engineering vehicle has the same level of armor protection as the Challenger 2 MBT. It

provides a very high level of protection against direct fire weapons.

Applique Armor: If required additional armor can be added. Vehicle also has enhanced protection against landmines.

Mine Clearing: This vehicle can carry fascines and drop into ditches. Also it can tow a trailer carrying Python rocket-propelled minefield breaching system.

NBC Protection: There is an NBC protection system for the crew, so this engineering vehicle can operate in hazardous environments.

Smoke Equipment: INA

Notes:

The Trojan Armoured Vehicle Royal Engineers (AVRE) is a combat engineering vehicle of the British Army. It is used to breach minefields and for many other tasks. It is currently in use with the Royal Engineers. The Trojan Armoured Vehicle Royal Engineers is based on a Challenger 2 tank chassis, but lacks the main armament. In place of the turret, it has a large hydraulic excavator arm, which can be used to excavate areas, move obstacles, and deposit the fascine that the Trojan carries at its rear. The Trojan is usually also fitted with a plough on the front, which enables it to clear mines, either detonating them on contact, or pushing them out of the way to clear a safe channel for following vehicles. For self-defence only, it carries a 7.62mm machine gun. For rapid mine-clearing purposes, the Trojan can also tow a trailer carrying the Python, a rocket-propelled hose similar to the Giant Viper. This allows for a much quicker way of clearing a path for ground forces. The hose, packed with explosive, is launched across a minefield, and detonates after it hits the ground, clearing a 7-metre wide path for 230 metres. The vehicles were built at BAE Systems Land Systems plant in Newcastle upon Tyne. The contract was awarded in 2001 to Vickers Defence Systems, who were bought by BAE Systems in 2004. The project was known as the Future Engineer Tank. 33 have been built. It was first used on exercise in May 2007 with the 1st Battalion (Mechanised) of the Duke of Lancaster's Regiment. A number of Trojans are permanently based in Canada at British Army Training Unit Suffield in order to allow the Royal Engineers to support Armoured Battle Groups on major exercises. Trojans were first deployed operationally by the British Army to Afghanistan in 2009 engaging in their first advance under contact in 2010. During Operation Moshtarak 28 Engineer Regiment operated the Trojan attempting to use its traditional mine clearance equipment in the Counter-IED role in support of a major British Army advance. Its companion vehicle, developed at the same time, is another variant of the Challenger 2, the Titan armoured bridge layer, of which 33 have also been built.

PNMIRL Danish Armored Mine Clearing Vehicle







Tiers:



System

Alternative Designation: Wisent 1; Bergepanzer Wisent

Type: Armored Recovery Vehicle

Manufacturer: German FFG company as a private venture

Crew: ea3

Bucket Capacity: 1.3 m³

Dig Depth: 4.4 m

Lifting Capacity: 30 t

Winch Capacity: 35 t

Towed Load: 50 t

Earth Working Capacity (Dozer): 300 m³/h

Earth Working Capacity (Excavator Arm): 300 m³/h

Front Mounted Dozer Blade: It can be used to clear obstacles and for earthmowing operations. It is also used as an earth anchor to stabilize the vehicle during craning, winching and excavating operations.

ARV: In the ARV role the Wisent 1 can recover damaged, stuck, swamped or overturned combat vehicles on the battlefield. It also tows them to the nearest shelter, or maintenance unit. Vehicle can also provide maintenance service in the field. Crew of the Wisent 1 operate from under armor protection.

The Full Width Mine Plough (FWMP)

Description: This produces a safe and mine free cleared lane for following vehicles. This product is battle proven and is in service with, amongst others, the British Army, the U.S. Army, the U.S. Marine Corps and the Finnish, Danish, Dutch and Swedish Armed Forces. The blast resistant system comprises three main parts; two 9-tine track width blades to protect vehicle tracks and a central 5-tine vee blade to provide full width clearance. Fold out blade extensions to each side of the

system ensure that mines are pushed well beyond the width of the cleared lane. Ploughing depth is controlled by plough skids which remain in contact with the ground at all times. The system works well in a wide range of soil conditions and ground undulations. The FWMP can be fitted using a common interface kit which allows the task equipment to be quickly and easily interchanged and jettisoned increasing the operational capability of the host vehicle.

Key Features: *Rapidly clears mines and IEDs from the full width of the host vehicle *Blast resistant and can remain fully operational after a mine detonation *Designed to minimize the tractive effort required *Capable of operating in a wide range of soil conditions *Low maintenance *Can be fitted with a MSD to counter magnetic influence fused mines

Operation and Control: *The FWMP(H) has two operating positions; stowed for cross-country travel and deployed for breaching operations. Two hydraulic lift cylinders stow and deploy the plough blades. *Hydraulic power is provided by an in-built electrohydraulic power system if the FWMP is directly fitted to the vehicle. If the FWMP(H) is fitted using a Pearson Engineering common interface kit (HLA), an on-board hydraulic system is supplied. *The FWMP(H) is controlled from a Multipurpose Control Unit (MCU) mounted within easy reach of the vehicle driver.

Modular: *The FWMP(H) can be rapidly attached to, or detached from, the vehicle and interchanged with other Special to Role equipment using a (HLA) *An optional Hard Surface Device (HSD) can be fitted to the FWMP(H) to clear mines and munitions laid on the surface of roads and hard flat terrain. *An optional Magnetic System Duplicator (MSD) can be fitted to help protect the equipment from the effect of magnetically fused mines. *A purpose built Transportation Pallet facilitates both storage and transport and is capable of fitting into either an ISO container or onto a DROPS pallet.

Dimensions

Length: 8.2 m

Width: 3.5 m

Height: 3 m

Weight: 47 t

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: Diesel

Engine Power: 960

Transmission: INA

Maximum Speed: 65 km/h

Range: 600 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.7 m

Trench: 2.5 m

Fording: 1.2 m

Main Weapon System

Note: 1 x 12.7 mm (optional)

Protection

Hull Armor: This multi-purpose combat vehicle has a level of protection, similar to that of the Leopard 1 main battle tank. Vehicle withstands blasts equivalent to 8 kg of TNT anywhere under the hull or under any track location. Interior is lined with a spall liner.

Applique Armor: Available

Mine Clearing: Yes, The Wisent 1 can be also reconfigured for mine clearing role. It can clear pathways through minefields, allowing assault units to pass, before enemy establishes defenses. For this role it can be fitted with a full-width mine plough and a safe lane marking system.

NBC Protection: Yes

Smoke Equipment: No

Notes:

PNMIRK is the Danish abbreviation for Pansret Minerydningskøretøj, Armoured Mine clearing Vehicle – a unique Danish combInation of the Wisent ARV and the Full Width Pearson Mine Clearing Plough. It is used to clear a path of mines or IEDs for all kind of vehicles and personnel. Besides the full width plough the PNMIRK also has MSD Signature Duplicator (this creates a magnetic field in front of the vehicle to set off magnetic mines), and at the back a Lane Marking System (LMS) that by air pressure shoots markers along the cleared path.

Grizzley American Minefield Breaching Vehicle





Tiers:



System

Alternative Designation: Grizzly

Type: Minefield Breaching Vehicle

Manufacturer: INA

Crew: ea2

Dozer Blade: The Grizzly is equipped with a huge dozer blade, which is 4.5 m wide. It is able to dig one meter into the ground at a swipe and excavate 300 m³ per hour. The dozer blade is heavily armored and can withstand mine damage.

Telescopic Arm: Its telescopic arm with bucket for obstacle removal and digging. It is able to reach 10 meters and can excavate 80 m³ per hour. The bucket can lift about 6.3 tonnes.

Breaching: The Grizzly could breach an 600 meter obstacle with mines, berms, wire, rubble within 21 minutes, creating a lane for vehicles to follow. It could also breach an anti-tank trench in 5 minutes. This Combat engineer vehicle could breach natural obstacles as well.

Dimensions

Length: 10.62 m

Width: 3.66 m

Width, With Dozer Blade: 5.55 m

Height: 3.6 m

Weight: 50 Tons

Automotive

Engine Name: Honeywell AGT1500

Engine Type: Gas Turbine

Engine Power: 1,500 hp

Transmission: INA

Maximum Speed: 66 km/h

Range: 420 km

Gradient: %60

Side Slope: %30

Vertical Step: 1 m

Trench: 2.7 m

Fording: 1.2 m

Fording with deep Fording Kit: 2.28 m

Main Weapon System

Note: The Grizzly was fitted with a remotely controlled weapon station, armed with 12.7 mm machine gun or 40 mm automatic grenade launcher.

Protection

Hull Armor: Protection of the Grizzly is comparable to that of the main battle tanks. It can withstand mine damage.

Applique Armor: Available

Mine Clearing: Yes

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Fiscal Year 2001 Army budget request included decisions to restructure or "divest" a number of programs in order to provide some of the resources to support its transformation to achieve the ambitious deployment goals outlined in the October 1999 Army Vision. The restructured programs are the Crusader and the Future Scout and Cavalry System. The "divestitures" include Heliborne Prophet (Air), MLRS Smart Tactical Rocket (MSTAR), Stinger Block II, Command and Control Vehicle (C2V), Grizzly, Wolverine, and the Army Tactical Missile System Block IIA. Funding for these programs was reallocated to fund the Army Vision transformation strategy. The GRIZZLY [initially designated the Breacher] is an armored vehicle designed to breach complex obstacles including mines, berms, wire, rubble, and tank-ditches. The GRIZZLY will breach obstacles with minimal preparation creating safe lanes for other vehicles in the dominant maneuver force with little or no loss in momentum. The GRIZZLY's obstacle clearing features include a full-width mine-clearing blade and a powered, extensible excavating arm. GRIZZLY is a Military Load Class 70 complex obstacle breaching vehicle which will integrate advanced countermine and counter-obstacle capabilities into a single survivable system. GRIZZLY will incorporate a full width Mine Clearing Blade (MCB), Power Driven Arm (PDA) for obstacle reduction and digging and a commander's control station (CCS) (crew compartment). It will have a remote fired 50-caliber machine gun and grenade launched screening smoke for self-defense. GRIZZLY will breach an 600 meter complex obstacle in 21 minutes and breach an antitank ditch in 5 minutes. GRIZZLY will be capable of breaching other types of natural and man made, simple and complex obstacles, creating a lane for vehicles to follow. It will integrate the technologies incorporated in the M1 & M2A3 chassis with the GRIZZLY mission modules. GRIZZLY is designed to provide the Digital Division with mobility support (i.e. counter-obstacle breaching) for Decisive Operations. Based on a modified and refurbished M1 Abrams tank chassis, the GRIZZLY will employ armors and many components derived from various members of the Abrams family of tanks. The system employs a two man crew. Its mobility will be comparable to the Abrams Main Battle Tank and the Bradley Fighting Vehicle. The dominant maneuver force will support the GRIZZLY with ongoing direct and indirect fire and air support. The GRIZZLY will be deployed with selected engineer companies in mechanized battalions, armored cavalry regiments, and heavy brigades. GRIZZLY is employed as an integral part of the M1A2 SEP/M2A3 equipped digital maneuver battalion task force. GRIZZLY as part of the Breach Force and supported by friendly direct and indirect fires, will reduce threat obstacles and create a safe one way passage lane for an M1/M2 equipped force to follow. A GRIZZLY equipped task force can execute breaching operations with minimal preparation and with little or no loss of task force momentum or need for lane proofing. GRIZZLY must provide an integrated, survivable breach system. GRIZZLY must provide breach lanes through simple and complex obstacles that allow the supported maneuver force to pass through and accomplish the force's mission. The required probabilities of two GRIZZLYs to successfully breach a lane is 0.95 (threshold) and 0.99 (objective), inclusive of blade and system losses due to mines, but exclusive of losses due to direct and indirect fires. GRIZZLY must breach lanes through simple and complex obstacles to allow the heavy maneuver force to conduct Decisive Operations. The probabilities of the GRIZZLY in providing breached lanes are a function of the GRIZZLY’s breach capabilities and GRIZZLY survivability to direct and indirect fires, but also the success of the maneuver force at suppressing the enemy (threat) force, obscuring the breach site, and securing the breach site. Nearly all obstacles include mines, so survivability of the system and the blade to mines must be considered. Doctrine calls for two lanes per task force with a recommended allocation of two assets to achieve one lane. The GRIZZLY equipped force must provide the task force a near certainty (a 99% probability) of achieving

one lane and a high probability (approximately 90%) of achieving two lanes. Assuming that two GRIZZLYs are allocated to each of two lanes, the threshold value of 0.95 results in a 0.90 probability of successfully breaching both lanes and a 0.9975% probability of successfully breaching at least one of the lanes. GRIZZLY will provide a lane allowing 95% of the maneuver task force (threshold) and 99% of the task force (objective) to safely pass, excluding losses due to direct and indirect fires. GRIZZLY will operate as part of a combined arms task force. The maneuver commander sets the conditions for breaching success through the execution of the Suppress, Obscure, and Secure fundamentals of breaching. Ideally, direct and observed indirect fires on the breach site are eliminated before the GRIZZLY is committed to execute the Reduce fundamental of breaching operations. Force on force combat simulation and threat assessments predict that the most likely direct fire threat faced by the GRIZZLY will come from dismounted teams providing fires on the obstacle and employing handheld anti-tank weapons (RPG type weapons). GRIZZLY is also exposed to indirect fires while conducting the breach. The specified conditions are representative of the type of fire mission expected against the GRIZZLY in the breach. These conditions equate to 60 rounds aimed/targeted at a box approximately 250 meters by 50 meters deep. These parameters will provide the inputs to existing models for development of the specific test parameters to measure compliance with this requirement. It is not intended that testing include the firing of 60 shells. GRIZZLY will provide resistance to perforation of the CCS against a 6-gun artillery battery, firing a variable time fuze, 10 round artillery salvo of 155 mm M107 high explosive with proximity fuze comparable to the M728 from 7,000 meters (threshold). The objective requirement is to provide resistance to top attack munitions. Grizzly [Breacher] The Fiscal Year 2001 Army budget request included decisions to restructure or "divest" a number of programs in order to provide some of the resources to support its transformation to achieve the ambitious deployment goals outlined in the October 1999 Army Vision. The restructured programs are the Crusader and the Future Scout and Cavalry System. The "divestitures" include Heliborne Prophet (Air), MLRS Smart Tactical Rocket (MSTAR), Stinger Block II, Command and Control Vehicle (C2V), Grizzly, Wolverine, and the Army Tactical Missile System Block IIA. Funding for these programs was reallocated to fund the Army Vision transformation strategy. 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testing include the firing of 60 shells. GRIZZLY will provide resistance to perforation of the CCS against a 6-gun artillery battery, firing a variable time fuze, 10 round artillery salvo of 155 mm M107 high explosive with proximity fuze comparable to the M728 from 7,000 meters (threshold). The objective requirement is to provide resistance to top attack munitions. The Breacher program was initiated in FY92 as a result of lessons reinforced during Operation Desert Storm and as a consequence of the deferral of the Combat Mobility Vehicle (CMV) during the Armored Systems Modernization (ASM) restructure. The Army has leveraged the work conducted under the ASM-CMV Advanced Technology Transition Demonstrator (ATTD) program to accelerate the development cycle. A sole-source contract was awarded to United Defense, LP (formerly BMY) in September 1992 for Demonstration and Validation prototypes to be delivered in 4QFY95. Following a significant increase in the GRIZZLY program's procurement objective to the currently planned 366 units, the Army's Acquisition Executive notified OSD that the Army designated the GRIZZLY program an ACAT II program and a covered system for LFT&E in June 1996. The GRIZZLY was added to the FY97 Annual T&E Oversight List for LFT&E only. This program is not an operational test and evaluation oversight program. The Army briefed a draft LFT&E strategy to DOT&E in April 1996 and received DOT&E approval of a revised strategy in December 1996. Dedicated LFT&E events begin in FY98 and extend through FY01. There was one GRIZZLY test event supporting the LFT&E program during FY97. Testing conducted prior to this most recent effort consisted of developmental and demonstration/validation testing only. That testing, although generating valuable information for the product manager, did not provide relevant data for the LFT&E. A full-up, system-level test employing a prototype chassis was subjected to a mine detonation during FY97. This test challenged a mine clearing blade system that had been redesigned based on FY96 developmental test results. The redesigned mine clearing blade system survived the mine detonation and did perform in accordance with engineering expectations. The program is in Engineering and Manufacturing Development (EMD) Phase and funded for First Unit Equipped (FUE) in 3QFY04 to 1 CD. Initial Operational Capability (IOC) is 4QFY04. United Defense (UD) finalized their EMD vehicle design 30 Jul 98 and will fabricate two prototypes for delivery to the government in 2QFY00.

Husky 2G South African 4x4 Vehicle-Mounted Mine Detection (VMMD)





Tiers:



Variants:

- **Husky Mk I:** The Husky Mk I was developed in the 1970s, for land mine detection.
- **Husky Mk II:** DCD introduced Husky Mk II and Husky Mk III as upgraded versions of the basic variant.
- **Husky Mk III:** The current Program of Record (M1231) for the U.S. Army. The Mk III is the modern single-occupant Husky model. The platform is integrated with pulse induction metal detector panels and overpass tires that enable operators to regulate tire air pressure in order to reduce the risk of initiating victim-operated, pressure-fused, anti-vehicle landmines without causing detonation. As with all Husky platforms, the Mk III has been engineered in a unique modular, frangible configuration. In the event of a mine or improvised explosive device detonation, vehicle components break apart in a predictable fashion, reducing damage to the platform and occupants, as well as facilitating fast in-field repairs using the system's RedPack, a towable asset comprising front and rear modules as well as a battle damage repair tool kit.
- **Husky 2G:** A two-occupant version of the Husky MK III vehicle. Development of the Husky 2G was prompted by the need to effectively conduct longer missions and employ multiple advanced detection systems. The Husky 2G was designed with the same protection, survivability, and mobility characteristics as the original Husky MK III, but integration of more sophisticated high sensitivity detectors, ground-penetrating radar, and video optics suites, and remote weapon stations created the need for a second operator to manage the additional workload.

System

Alternative Designation: Husky 2G

Type: Vehicle-Mounted Mine Detection (VMMD)

Family: Husky

Manufacturer: VMMD vehicle is marketed in the US by Critical Solutions International (CSI), who are also responsible for the international marketing and field support of the vehicle.

Crew: 2

Hull: The Husky VMMD incorporates a V-shaped hull offering optimum protection against blasts.

Cabin: The cabin is fitted with a bullet-proof glass window and a single hatch is provided on the top.

Mission: The vehicle is designed to detect landmines and improvised explosive devices (IEDs) with high probability of detection (Pd) and low false alarm rate (FAR). The height of the sensor installed on the Husky can be controlled automatically to adjust in various terrains. The Husky is also attached with the Mine Detonation Trailer (MDT) set to detonate any left out mines.

Backup Camera: Yes

Dimensions

Length: m7.34

Width: m2.53

Height: m3.54

Wheel Base: 5.23 m

Curb Weight: 8,350 kg

Operating Weight: 8,700 kg

Gross Overpass Mode Weight: 8,700 kg

Gross Non-Overpass Weight: 12,000 kg

Ground Clearances, Hull: 590 mm

Ground Clearances, Overpass Mode: 360 mm

Ground Clearances, Non-Overpass Mode: 415 mm

Automotive

Engine Name: 1 x MTU 6R106TD20 6-liter (366 cu in), 6-cylinder,water-cooled, direct-injection diesel

Engine Type: Diesel

Engine Power: 201 hp (150 kW)

Transmission: Allison 2500 SP 5-speed automatic (4 x 4)

Fuel Capacity: 40 gallons (150 liters)

Tire Size: 450/80 R20

Maximum Speed, Detection: 50 kph

Maximum Sustaned Road Speed: 72 kph

Maximum Speed, on 20% Grade: 17 kph

Maximum Speed, on 60% Grade: 7 kph

Maximum Speed, on 70% Grade: 5 kph

Angle of Approach: 50 deg

Angle of Departure: 43 deg

Range, Daily Operating: 200 km

Range, Max Fuel: 800 km

Endurance: 6 hours

Radar

Radar Name: The Husky vehicle is equipped with NIITEK's VISOR™ 2500 Ground Penetrating Radar (GPR), with four panelled 3.2m array at the front.

Detection: The Husky is most commonly configured with payloads that enable operators to identify threats through visual scans and the focused application of optics and sensors.

Pulse Induction Metal Detectors: Yes

Non-Linear Junction Detectors: Yes

Gunshot Detection: Yes

Interrogation

Attachments: Husky vehicles are frequently integrated with attachments that enhance clearance units' ability to confirm and classify a detected threat using remote, mechanical, or explosive means.

Interrogation Arm: Yes

Blowers: Yes

Water Diggers: Yes

Thermal Cameras: Yes

Optics Suite: Yes

Disruption: The Husky can be equipped with payloads to deliberately initiate or interrupt a suspected threat systems' ability to function as intended by mechanical, electrical, or explosive means. Launched line charges Mine-clearing line charge

Mitgation: The Husky are often equipped with payloads designed to limit the severity of damage caused by undetected threats on friendly follow on elements through standoff subsystems and disruptive proofing *Mine Roller Mine rollers *Passive Infrared Disruption Rhino *Passive Infrared Defeat System *Rake *Proofing Roller *Electrostatic Discharge

Interrogation Arm: The Husky 2G features the FASCAN interrogation arm, which is used to investigate suspected mines and roadside bombs.

Situational Camera: TORC Robotics 360 situational awareness camera system and the QinetiQ North America QNET system, which provides lightweight protection against rocket-propelled grenades.

Protection

Hull Armor: The v-shaped hull of Husky VMMD can protect the vehicle and crew from blasts.It can withstand up to STANAG 4569 level 4a & 4b blasts on field and is also capable of withstanding STANAG 4569 level 3 (standard) ballistic explosion. The vehicle is designed to withstand high detonation and can be brought to operating conditions within two hours after an explosion.

Cabin Armor: The cabin is fitted with a bullet-proof glass window and a single hatch is provided on the top.

Applique Armor: INA

EFP Armor: Yes, Explosively Formed Penetrator

RPG Netting: Rocket-propelled grenade

RPG Bare Armor: Yes

Smoke Launchers: Yes

NBC Protection: Yes

Electronic Countermeasures: Yes

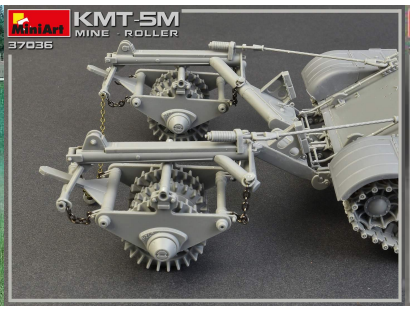
Notes:

This variant has an enlarged driver's cab that can accommodate two people. The driver focuses on maneuvering the vehicle and spotting IEDs visually, while the commander handles the sensors. The driver's workload is reduced two ways. First, several functions are transferred to the commander, who oversees both the ground-penetrating radar as well as the sensor systems. In addition to vision system upgrades, the driver can use a back-up camera. The Husky 2G features the FASCAN interrogation arm, which is used to investigate suspected mines and roadside bombs. The upgraded system has additional power to operate additional sensors and enhancements, such as the NIITEK ground-penetrating radar. It is also equipped with the TORC Robotics 360 situational awareness camera system and the QinetiQ North America QNET system, which provides lightweight protection against rocket-propelled grenades. Active self-defense is available from the Common Remotely Operated Weapon Station (CROWS), which is handled by the commander from within the cab. In addition to the machine gun, the CROWS includes a large 15-inch (381-mm) color monitor that shows live video from the turret's cameras in the daytime and a second-generation forward-looking infrared (FLIR) camera at night. The commander can operate the cameras and a built-in laser rangefinder without having to use the gun. The Husky VMMD (vehicle-mounted mine detection) family of vehicles are blast-survivable, mission-configurable wheeled platforms employed around the world by specialized route clearance teams operating in high-explosive threat areas. Defined by their unique design characteristics of survivability, frangibility, and reparability, Husky

vehicles enable personnel and payloads to safely operate in close proximity to sub-surface explosive hazards. The Husky is manufactured in South Africa by DCD Protected Mobility and then integrated with clearance payloads, provided, and supported by U.S.-based C-IED solutions company, Critical Solutions International. The current iteration of the Husky is part of a class of MRAP vehicles developed from a South African blast protection design. The basic v-hull concept of modern MRAP vehicles, and the Husky, was an architectural innovation that fundamentally recast the nature of the vehicle's resistance to explosive threats. As clearance techniques matured along with emerging technologies in order to respond to evolving threats, the unique tenants of the Husky design have endured. Survivability: The sharp V-hull of the Husky dramatically reduces blast effect by increasing ground clearance and standoff from the blast, increasing structural hull rigidity, and diverting blast energy and fragmentation away from the platform and its occupants. Frangibility: With three main components (a center cab with front and rear wheel modules) connected by sheering pins, the Husky is designed to break apart in a blast event, allowing energy to transfer to the detachable front and rear modules rather than transferring stress to the critical components of the vehicle or the occupants located in the cab. Repairability: Critical components have been engineered to break apart in a predictable fashion, preventing catastrophic damage and enabling users to quickly replace modules on site. This approach increases the lifespan of the vehicle, maintains mission readiness, and limits the need for recovery teams to evacuate the vehicle to intermediate- or depot-level maintenance facilities. The Husky VMMD Mk III and 2G are powered by a Mercedes Benz OM 906 LA 6.4L six-cylinder turbo diesel engine coupled with an Allison 2500 SP 5-speed automatic transmission. The operating weight of vehicle is 8,350kg, and the Husky can reach a maximum speed of 72km/h and has a range of 400km or 200km when equipped with mine-detonation trailer (MDT). The cabin of the Husky is fitted with bullet-proof glass windows and an entry hatch on the roof. The Husky's versatility for application in dynamic clearance missions comes from both the vehicle design and the modularity provided by easy integration of tailored payloads.

KMT-5M Russian Tank Mounted Mechanical Mine Clearing Device







Tiers:



System

Alternative Designation: None
Type: Roller and Plow
Chassis: Can be mounted on the T-54, T-55, T-62, and other medium tanks.
Crew: ea2
Installation Time: min30-45
Lane Clearing Rate: km8-12
Number of Rollers per set: 2
Total Number of Rollers: 2 sets of three roller disks per system
Weight, Combat: mt7.5
Cleared lane width, each: mm2 x 810mm lanes behind each roller / plow

↳*Dimensions*

Height, Overall: mINA
Length, Overall: m3.2
Width, Overall: m4

Notes:

The KMT-5M mine roller-plow is very flexible, since it allows for either the plows or the rollers to be used. The rollers function satisfactorily against mines equipped with simple pressure fuses, but other mines will defeat this equipment. However, the roller-plow combination also allows the tank to counter more sophisticated fuses with plows designed to uncover or push mines aside. The plows and rollers cannot work simultaneously. The KMT-5M also includes a luminous lane-marking device for night operations. Because plows and rollers do not clear the area between them a “dog bone” or light chain with rollers is stretched between the roller sections to defeat tilt-rod mines. Quick disconnects allow the operator to drop either plows or rollers or both; otherwise, the crew can remove the system in 8 to 13 minutes. All current medium tanks have fittings for attaching mine clearing equipment. There is one plow per tank platoon and one roller per company. For tanks newer than the T-55/62 the plows are no longer carried in the engineer company, but are permanently mounted on the tank. Therefore the engineers need only to transport the rollers. One Kraz-255B truck (with KM-61 crane) or two ZIL-131 trucks can carry one KMT-5M.

Uran-6 Russian Multi-functional Robotic Mine-Clearing System





Tiers:



System

Alternative Designation: URAN-6

Type: Uran-6 is a multi-functional, mine-clearing robotic system manufactured by JSC 766 UPTK for the Armed Forces of the Russian Federation.

Crew: eaRobotic, unmanned

Note: Four video cameras, fitted atop the robot, provide operator with 360° field-of-view of the operating area in the front and rear. The real-time imagery is transmitted to its remote control system.

Dimensions

Height, Overall: m1.47

Length, Boom: INA

Length, Overall: m4.45

Height: m1.49

Width, Overall: m2.01

Weight: t5.31

Clearing Track Width: m1.72

Automotive

Engine Name: 6 Cylinder

Engine Type: Diesel

Engine Power: hp174

Fording Depth: m0.45

Gradient: 35

Endurance: h3.5

Mine Clearing Speed: km/h2

Maximum Speed: km/h5

Vertical Step: m.3

Cround Clearance: mm260

Communications

↳*Radio*

Name: INA

Command and Control Range: m2000

Attachments

↳*Flail Tool*

Blade Rate: m2/hr2200

Position: Front

Clearance: mm2015

Cleared Lane Width: mm1725

Weight: kg1200

↳*Tiller Tool*

Usage: Tool attachment for clearance of landmines, booby trap clearance, scatterable munitions clearance, soil preparation in areas with little or no vegetation.

Clearance Width: mm1800

Depth: mm320

Length: mm2352

Width: mm1545

Height: mm1197

Weight: kg1585

↳*Roller Tool*

Usage: Tool attachment for route clearance and area proofing.

Number of Wheels: 10 to 12

Individual Wheel Weight: kg160

Length: mm2050

Width: mm1274

Height: mm851

Weight: kg1880

↳*Dozer Blade*

Usage: Tool attachment, for soil containing explosives, IEDs, clearing hazardous roadblocks.

Max load movement: t4

Length: mm693

Width: mm1935

Height: mm1103

Weight: kg585

Protection

Active Protection System: No

Armor, Applique: mmNo

Armor, Explosive Reactive: mmNo

Armor, Turret Front: INA

NBC Protection: Yes

Shrapnel Protection: Yes

Smoke Equipment: No

Survivability Equipment: INA

Notes:

The Uran-6 is a multi-functional, mine-clearing robot that can be deployed in mine reconnaissance and area clearance operations to detect and remove explosive ordnance as well as anti-personnel and anti-tank mines.The Uran-6 (MRTK-R) is a an unmanned multifunctional demining system designed and manufactured by the Russian Defense Industry. The Uran-6 is a Russian version of the Croatian MV-4 Dok-Ing mine-clearing robot. The Uran-6 can do the work of 20 engineer troops. The demining robot can be deployed in mine reconnaissance and area clearance operations to detect and remove explosive ordnance and anti-personnel / anti-tank mines. It also minimises risks caused by unexploded ordnance and other dangerous objects. The robot recently took part in the International Military Technical Forum (Army-2016) held in Russia in September 2016.

Heidar-5 Russian 8x8 Armored Minelayer Vehicle



Tiers:



Variants:

- **BTR-60P:** Initial model with open top, pintle-mounted 7.62-mm machine gun
- **BTR-60PA/BTR-60PK (12 passengers only):** Covered top, NBC protection, pintle-mounted 7.62-mm MG, still exit over top
- **BTR-60PB (space for 8 soldiers for dismounted operations).:** Most common variant with BRDM-2 MG turret with a 14.5-mm MG & coaxial 7.62-mm; troops exit over top
- **Modernized BTR-60PB:** BM2 Turret with 30-mm 2A42 Cannon & 7.62-mm PKTM MG; 30-mm AGS-17 AGL on left side
- **BTR-60U:** Command vehicle with additional radios
- **BTR-60 PU-12/12M:** Anti-Aircraft units' command vehicle
- **BTR-60 MS:** Radio vehicle with High Ball antenna
- **BTR-60 VVS:** Sans turret with additional radios
- **BTR-60 PBK:** BTR-60PB with 3 radios
- **BTR-60 1V18:** Artillery observation vehicle
- **BTR-60 1V19:** BTR-60 1V18 for FDC operations
- **BTR-60 R-145BM:** Communications vehicle with 5 radios
- **BTR-60 R-975:** Forward air-control vehicle with turret
- **BTR-60-Z-351BR:** Power production vehicle with generator
- **BTR-60-P-238BT:** Switchboard vehicle for communications
- **BTR-60-P-240BT:** Integrates radio & wire communications- R-123M radio & R-241 switchboard
- **BTR-60-P241BT:** Equipped with P-241 telephone system
- **BTR-60-R-137B:** Communications vehicle with turret
- **BTR-60 ACRV:** Artillery Battery C2 & recon vehicle
- **BTR-60-R-145:** Additional radio, but no turret
- **BTR-60-R-156BTR:** C2 vehicle with additional radios
- **BTR-60-R-409BM:** Relay vehicle-R-409 & R-123M radios
- **BTR-60PAU (Bulgaria):** Artillery command vehicle
- **BTR-60PB-MD (Bulgaria):** Upgraded engine, radios, & NBC equipment
- **BTR-60P Maintenance Assistance (MTR-2):** Maintenance vehicle with tarp over troop compartment
- **BTR-60 SPAAG (Cuba):** Twin 30-mm anti-aircraft cannons
- **BTR-60 Djibouti (Djibouti):** AML-90 turret on BTR-60
- **BTR-60BD:** Speed increased to 100 km/h & range to 800 km
- **MTP-2:** Armored Recovery Vehicle
- **BTR-60PZ:** Final production model with 1PZ-2 roof-mounted periscope
- **BTR-60-R-140BM:** C2 vehicle with turret
- **MEP:** Infantry command post
- **BTR-60PB FAC:** Turreted FAC vehicle without the gun

System

Alternative Designations: Heidar-5

Manufacturer: INA

In Service: 2018-Present

Description: 8x8 Armored Minelayer Vehicle

Crew: ea3

Passengers: ea14

Mine Launching Unit: 18 mine launcher units mounted on each side of the hull.

Types of Mines: According to our first analysis, each mine launcher unit has two preloaded magazines, each of which holds two anti-tank or anti-personnel mines. The vehicle seems to equipped with an automatic firing system that can be used to preselect the resultant mine barrier data and can be placed into several laying modes that can be changed while the vehicle is moving.

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Dimensions

Length: m7.56

Width: m2.83

Height: m2.31

Weight, Combat: tons10.3

Automotive

Engine Name: 2 x GAZ-49B

Engine Type: Petrol

Engine Power: 90 hp each, 180 hp combined

Range, Crusing: km500

Speed, Maximum Road: km/h80

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m2

Fording Depth: mAmphibious

Fuel Capacity: INA

Note: The new engine provides a 20 percent decrease in fuel consumption;

Communications

Primary: R-123

Secondary: R-113

Main Weapon System

↳***System***

Name: KPVT 14.5mm Heavy Machine Gun (KPV)
Type: Heavy Machine Gun (KPV)
Caliber: mm14.5
Manufacturer: V.A. Degtyarev Plant
In Service: 1949-Present
Proliferation: Widely Proliferated
Weight: kg49
Total Length: mm1,980
Barrel Length: mm1,346
Width: mm162
Height: mm225
Rate of Fire: rds/min600
Maximum Firing Range: m4,000
Effective Firing Range: m3,000
Feed System: 40-round belt
Sights: iron or optical

↳***Ammunition***

Name: INA
Type: API-T
Cailber: mm14.5mm
Cartridge: 14.5×114 mm
Muzzle Velocity: m/s1,005
Basic Load: ea500
Effective Range (Day): m2,000
Effective Range (Night): INA
Tactical Range: m1,500-2,000
Armor Penetration: 20 at 1,000 m/ 30 at 500 m
Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Type: General Purpose Machine Gun
Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: + 1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Vehicle Commander: TKN-1

Thermal Gunner: PP-61A optical sight

Main Gun Stabilization: INA

Turret Type: BPU-1 turret

Infrared Light: OU-3 infrared light

Protection

Armor Material: Welded steel

Armor Hull: 7 mm at 86° hull upper front 9 mm at 47° hull lower front 7 mm hull sides 5 mm hull upper rear 7 mm hull lower rear 5 mm hull floor 7 mm hull roof

Armor (turret front): 10 mm turret front 7 mm turret sides 7 mm turret sear 7 mm turret roof

Applique Armor: Yes, In road position, the mine laying system is covered by armour plates.

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Collective (closed vehicles)

Smoke Equipment: No

Survivability Equipment: No

Notes:

During the Iranian Army Day, local defense industry has presented the Heidar-5, a new minelayer wheeled vehicle able to launch anti-tank mines to create mine barrier based on Soviet-made BTR-60 8x8 APC (Armoured Personnel Carrier). The vehicle is equipped with an automatic firing unit located inside the vehicle. The Heidar-5 minelayer is based on a modified Soviet-made BTR-60PB 8x8 armoured personnel carrier. The original turret is removed and the troops compartment is used to put a mine launching assembly mounted at the rear vehicle, with 18 mine launcher units mounted on each side of the hull. According to our first analysis, each mine launcher unit has two preloaded magazines, each of which holds two anti-tank or anti-personnel mines. The vehicle seems to equipped with an automatic firing system that can be used to preselect the resultant mine barrier data and can be placed into several laying modes that can be changed while the vehicle is moving. The Heidar-5 could also create mine barrier on the move. Mines are ejected on each side of the vehicle. In road position, the mine laying system is covered by armour plates. The front of the Heidar-5 is fitted a remotely-operated weapon station armed with a Soviet-made DShK 12.7mm heavy machine gun. The hull of the BTR-60PB is of all-welded steel armour with the driver and commander seated at the front of the hull. Both have a windscreen in front of them which, when in action, is covered by a flap hinged at the top. The BTR-60PB enters in service with the Russian army in 1966. The vehicle is an eight-wheel-drive vehicle motorized with a 2 GAZ-49B 6-cylinder in-line water-cooled petrol engines developing 90 hp at 3,400 rpm each coupled to manual transmission with 4 forward and 1 reverse gears. It can run at a maximum road speed of 80 km/h with a maximum cruising range of 500 km.

Husky MkIII (M1231) South African 4x4 Vehicle-Mounted Mine Detection (VMMD)





Tiers:



Variants:

- **Husky Mk I:** The Husky Mk I was developed in the 1970s, for land mine detection.
- **Husky Mk II:** DCD introduced Husky Mk II and Husky Mk III as upgraded versions of the basic variant.
- **Husky Mk III:** The current Program of Record (M1231) for the U.S. Army. The Mk III is the modern single-occupant Husky model. The platform is integrated with pulse induction metal detector panels and overpass tires that enable operators to regulate tire air pressure in order to reduce the risk of initiating victim-operated, pressure-fused, anti-vehicle landmines without causing detonation. As with all Husky platforms, the Mk III has been engineered in a unique modular, frangible configuration. In the event of a mine or improvised explosive device detonation, vehicle components break apart in a predictable fashion, reducing damage to the platform and occupants, as well as facilitating fast in-field repairs using the system's RedPack, a towable asset comprising front and rear modules as well as a battle damage repair tool kit.
- **Husky 2G:** A two-occupant version of the Husky MK III vehicle. Development of the Husky 2G was prompted by the need to effectively conduct longer missions and employ multiple advanced detection systems. The Husky 2G was designed with the same protection, survivability, and mobility characteristics as the original Husky MK III, but integration of more sophisticated high sensitivity detectors, ground-penetrating radar, and video optics suites, and remote weapon stations created the need for a second operator to manage the additional workload.

System

Alternative Designation: Husky Mk III; The current Program of Record (M1231) for the U.S. Army.

Type: Vehicle-Mounted Mine Detection (VMMD)

Family: Husky

Manufacturer: VMMD vehicle is marketed in the US by Critical Solutions International (CSI), who are also responsible for the international marketing and field support of the vehicle.

Crew: 1

Hull: The Husky VMMD incorporates a V-shaped hull offering optimum protection against blasts.

Cabin: The cabin is fitted with a bullet-proof glass window and a single hatch is provided on the top.

Mission: The vehicle is designed to detect landmines and improvised explosive devices (IEDs) with high probability of detection (Pd) and low false alarm rate (FAR). The height of the sensor installed on the Husky can be controlled automatically to adjust in various terrains. The Husky is also attached with the Mine Detonation Trailer (MDT) set to detonate any left out mines.

Dimensions

Length: m7.34

Width: m2.53

Height: m3.54

Wheel Base: 5.23 m

Curb Weight: 8,350 kg

Operating Weight: 8,700 kg

Gross Overpass Mode Weight: 8,700 kg

Gross Non-Overpass Weight: 12,000 kg

Ground Clearances, Hull: 590 mm

Ground Clearances, Overpass Mode: 360 mm

Ground Clearances, Non-Overpass Mode: 415 mm

Automotive

Engine Name: 1 x MTU 6R106TD20 6-liter (366 cu in), 6-cylinder,water-cooled, direct-injection diesel

Engine Type: Diesel

Engine Power: 201 hp (150 kW)

Transmission: Allison 2500 SP 5-speed automatic (4 x 4)

Fuel Capacity: 40 gallons (150 liters)

Tire Size: 450/80 R20

Maximum Speed, Detection: 50 kph

Maximum Sustaned Road Speed: 72 kph

Maximum Speed, on 20% Grade: 17 kph

Maximum Speed, on 60% Grade: 7 kph

Maximum Speed, on 70% Grade: 5 kph

Angle of Approach: 50 deg

Angle of Departure: 43 deg

Range, Daily Operating: 200 km

Range, Max Fuel: 800 km

Endurance: 6 hours

Radar

Radar Name: The Husky vehicle is equipped with NIITEK's VISOR™ 2500 Ground Penetrating Radar (GPR), with four panelled 3.2m array at the front.

Detection: The Husky is most commonly configured with payloads that enable operators to identify threats through visual scans and the focused application of optics and sensors.

Pulse Induction Metal Detectors: Yes

Non-Linear Junction Detectors: Yes

Gunshot Detection: Yes

Interrogation

Attachments: Husky vehicles are frequently integrated with attachments that enhance clearance units' ability to confirm

and classify a detected threat using remote, mechanical, or explosive means.

Interrogation Arm: Yes

Blowers: Yes

Water Diggers: Yes

Thermal Cameras: Yes

Optics Suite: Yes

Disruption: The Husky can be equipped with payloads to deliberately initiate or interrupt a suspected threat systems' ability to function as intended by mechanical, electrical, or explosive means. Launched line charges Mine-clearing line charge

Mitgation: The Husky are often equipped with payloads designed to limit the severity of damage caused by undetected threats on friendly follow on elements through standoff subsystems and disruptive proofing *Mine Roller Mine rollers *Passive Infrared Disruption Rhino *Passive Infrared Defeat System *Rake *Proofing Roller *Electrostatic Discharge

Protection

Hull Armor: The v-shaped hull of Husky VMMD can protect the vehicle and crew from blasts.It can withstand up to STANAG 4569 level 4a & 4b blasts on field and is also capable of withstanding STANAG 4569 level 3 (standard) ballistic explosion. The vehicle is designed to withstand high detonation and can be brought to operating conditions within two hours after an explosion.

Cabin Armor: The cabin is fitted with a bullet-proof glass window and a single hatch is provided on the top.

Applique Armor: INA

EFP Armor: Yes, Explosively Formed Penetrator

RPG Netting: Rocket-propelled grenade

RPG Bare Armor: Yes

Smoke Launchers: Yes

NBC Protection: Yes

Electronic Countermeasures: Yes

Notes:

The Husky VMMD (vehicle-mounted mine detection) family of vehicles are blast-survivable, mission-configurable wheeled platforms employed around the world by specialized route clearance teams operating in high-explosive threat areas. Defined by their unique design characteristics of survivability, frangibility, and reparability, Husky vehicles enable personnel and payloads to safely operate in close proximity to sub-surface explosive hazards. The Husky is manufactured in South Africa by DCD Protected Mobility and then integrated with clearance payloads, provided, and supported by U.S.-based C-IED solutions company, Critical Solutions International. The current iteration of the Husky is part of a class of MRAP vehicles developed from a South African blast protection design. The basic v-hull concept of modern MRAP vehicles, and the Husky, was an architectural innovation that fundamentally recast the nature of the vehicle's resistance to explosive threats. As clearance techniques matured along with emerging technologies in order to respond to evolving threats, the unique tenants of the Husky design have endured. Survivability: The sharp V-hull of the Husky dramatically reduces blast effect by increasing ground clearance and standoff from the blast, increasing structural hull rigidity, and diverting blast energy and fragmentation away from the platform and its occupants. Frangibility: With three main components (a center cab with front and rear wheel modules) connected by sheering pins, the Husky is designed to break apart in a blast event, allowing energy to transfer to the detachable front and rear modules rather than transferring stress to the critical components of the vehicle or the occupants located in the cab. Repairability: Critical components have been engineered to break apart in a predictable fashion, preventing catastrophic damage and enabling users to quickly replace modules on site. This approach increases the lifespan of the vehicle, maintains mission readiness, and limits the need for recovery teams to evacuate the vehicle to intermediate- or depot-level maintenance facilities. The Husky VMMD Mk III and 2G are powered by a Mercedes Benz OM 906 LA 6.4L six-cylinder turbo diesel engine coupled with an Allison 2500 SP 5-speed automatic transmission. The operating weight of vehicle is 8,350kg, and the Husky can reach a maximum speed of 72km/h and has a range of 400km or 200km when equipped with mine-detonation trailer (MDT). The cabin of the Husky is fitted with bullet-proof glass windows and an entry hatch on the roof. The Husky's versatility for application in dynamic clearance missions comes from both the vehicle design and the modularity provided by easy integration of tailored payloads.

UR-77 Meteorit Russian Mine Clearing Vehicle





Tiers:

1 2 **3** 4

System

Alternative Designation : UR-77 mine clearing vehicle, M1979
Chassis: Based on the 2S1
Crew : ea2.0
Ground Pressure : kg/cm2INA
Troop Capacity : eaINA

↳*Dimensions*

Height, Overall : m3.1
Length, Overall : m8.4
Width, Overall : m2.8
Weight, Combat: mt15.5

↳

Automotive

Engine Name: YaMZ-238N
Engine Type: Diesel
Engine Power : hp300
Fording Depth : mINA
Range, Cruising : km500

Speed, Maximum Road : km/h60.0

Speed, Maximum Off-Road: km/h30

Speed, Maximum Swim : km/h4.5

Vertical Step : mINA

Communications

↳*Radio*

Name: INA

Mines

↳*Mine Clearning Equipment*

Breaching Time : min3 to 5

Charges: UZP-77, UZ-67

Length, Charge : m93.0

Type: Explosive line

Notes:

The UR-77 Meteorit (Russian: УР-77 Метеорит, lit. 'Meteorite') is a Soviet mine clearing vehicle, based on a variant of the 2S1 Gvozdika chassis. The vehicle is armed with a launcher and two mine-clearing line charges. When launched, a charge causes a shock wave that destroys or disables all the shells or mines along the area of the line charge. (with a width of 6 metres and length up to 90 metres). The vehicle has also been used offensively, where its line charge has been used to destroy entire streets in urban combat.

GSL-130 Chinese Tracked Comprehensive Mine Clearing Vehicle (TCMCV)






Tiers:

1 **2** 3 4

System

Alternative Designation: GSL-130

Type: Tracked Comprehensive Mine-Clearing Vehicle (TCMCV),

Chassis: Type 59

Crew: ea3

Passenger Capacity: INA

Add on Parts: Yes

Depth Sensing Device: Yes

Rocket Propelled Mine Clearing System: three GBP127 unguided rockets

Dimensions

Length (Hull): m6.04

Length (Gun Foward): m9.0

Height: m2.49

Width: m3.52

Weight, Combat: kg62,500

Ground Pressure: kg/m0.8

Ground Clearance: m0.5

Automotive

Engine Name: Perkins Condor V-12

Engine Type: Diesel V-12

Engine Power: hp1,200

Transmission: David Brown TN54 epicyclical (6 forward/ 2 reverse gears)

Cruising Range: km450

Speed, Maximum Road: km/h56

Speed, Average Cross: 4-7

Speed Maximum Swim: km/hINA

Fording Depth: m1.7

Gradient: 60

Side Slope: %30

Vertical Step: m0.9

Trench: m2.34

Fording: m1.3

Fuel Capacity: liters1592

Communications

↳*TBR-121*

VHF Transceiver: Yes

VHF Range: km1 to 50

Proliferated: Widely

Digital Data: Yes, Full

Control: Self-Adaptive Control (Including Automatic Antenna Tuner)

Frequency Agile: Yes

Wireless Network Capabilities: Yes

Note:: Very similar in capabilities to the US SINCGARS ASIP

Protection

Applique Armor: Yes, Track Shirts

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: Yes

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, Grenlaunch 8x; VESS

IR Signature: No

Armor, Front Upper: mm97

Armor, Front Lower: mm99

Armor, Sides Upper: mm79

Armor, Sides Lower: mm20

Armor, Hull Rear: mm46

Armor, Hull Floor: mm20

Armor, Top: mm33

Smoke Equipment: 8 x 81-mm smoke grenade launchers. Vehicle engine exhaust smoke system.

Notes:

The PLA also operates the GSL130 Tracked Comprehensive Mine-Clearing Vehicle (TCMCV), which is based on the older Type 59/Type 69 MBT hull. This system is also referred to as the WZ763. The turret has been removed and replaced by an armoured superstructure for the crew of three and mounted at the front is a hydraulically operated full-width mine plough clearing system, which includes a depth-sensing device that is lifted while travelling.

→→Route Clearing Vehicles

IRM Russian Engineer Reconnaissance Vehicle





Tiers:



Variants:

- **IPR:** Very similar to the IRM except it has a folding snorkel on the rear deck.

System

Alternative Designation: Zhuk (Beetle)
Description: Based on the BMP-1 chassis however, with 7 road wheels instead of the BMP-1's 6.
Crew: ea6 (commander, driver, and 4 dismount able engineers)

↳Dimensions

Height, Overall: m2.4
Length, Chassis Overall: m8.2 with detector arms in travel mode
Width, Overall: m3.1
Weight, Combat: mt17
Ground Pressure: 0.69 kg/cm2

Automotive

Engine Name: UTD20
Engine Power: hp500
Range, Cruising: km300

Speed, Average Cross: INA

Speed, Maximum Off: INA

Speed, Maximum Road: km/h52

Speed, Maximum Swim: km/h12

Communications

↳*Radio*

Name: Onboard and 2 dismountable R-147

Armament

↳*Weapon 1 (PKT)*

Type: Machine Gun

Armor Penetration: mmINA

Cailber/Length: mm7.62 (7.62x54R)

Combat Load: rds2,000 (Light Ball, Ball-T, AP-I, API-T)

Muzzle Velocity: m/sINA

Range, Maximum Effective, Day: m1,000

Range, Maximum Effective, Night: m800

Range, Maximum Effective, On the Move: m400-500

Protection

Active Protection System: INA

Armor, Applique: mmINA

Armor, Explosive Reactive: mmINA

Armor, Turret Front: mmINA

NBC Protection: Collective protection system

Self entrenching blade: No

Smoke Equipment: Vehicle engine exhaust smoke system (VEESS)

Notes:

The IRM engineer reconnaissance vehicle conducts reconnaissance of routes, fords, water barriers (velocity, depth, underwater obstacles, and bottom profile and density), ice, mapping, and overall terrain trafficability. Its chassis employs components of the BMP-1 IFV. It has two propellers on the rear of the hull for propulsion in the water. A wave deflector covers the front of the hull. The IRM has an emergency extraction/self-recovery system available which allows the vehicle to quickly extract itself when stuck in mud, etc. without having the crew exit the vehicle. The system consists of two racks of 12 rockets each mounted on the rear deck between the propellers. This rocket propulsion system is especially valuable if the vehicle is stuck when under enemy fire. Gradient: 36 Side Slope: 17 Mine detecting capability: two extendable arms for mine detecting. The mine detector arms are hydraulically articulated to their operating position in three minutes. The detector will bring the vehicle to a halt upon encountering an obstacle or detecting a metallic object. Handheld mine detectors AT mine detection zone (m) width: 3.6 depth: .3. River-type wide-span mine detector: RSHM-2 (detects mines planted depth of .3m with current velocity of 3-5 km/h). Mechanical Penetrometer (to analyze soil for trafficability). Sonar (echo sounder with an auto recorder and three hydro-acoustic

transducers) .5 to 20 m (for water bottom profiles, mine and obstacle detection). Gyrocompass and Gyro Stabilized Artificial Horizon: AGI-1S Surveillance and Night Observation Equipment: TNPO-160, TNP-370, TVN-2BM. Navigation: inertial with constant coordinate and direction readout: TNA-3. IR searchlight is mounted to the right of the PKT MG. Equipment for Dismounted Engineer: Digital Camera Portable Periscope: PIR-T. The 15x periscope is used primarily for detailed studies of enemy structures and obstacle soil. Penetrometer. Portable ice drill. Laser Rangefinder. Thermal Viewer. Handheld GPS Receiver. Handheld Mine Detectors. Portable: RVM-2M and IMP-2. Radios, Handheld: R-147, 2 each.

IMR-2M Russian Heavy Combat Engineering Vehicle



Tiers:



Variants:

- **IMR:** First version of combat engineering vehicle built on T-54/55 medium battle tank chassis, powered by a V-55 diesel engine developing 520 hp.
- **IMR-2M1:** Simplified model without the mine-clearing system. Entered service in 1982. Based on T-72A tank hull.
- **IMR-2M2:** Improved version that is better suited for operations in dangerous situations, for example in contaminated areas. It entered service in 1990 and has a modified crane arm with bucket instead off the pincers.
- **IMR-2MA:** Latest version with bigger operator's cabin armed with a 12.7 mm machine gun NSV.
- **Klin-1:** Remote controlled IMR-2.
- **IMR-3M:** Combat engineering vehicle built on the T-90 main battle tank chassis. The vehicle is 9,320 mm long, 3,500 mm wide and 3,430 mm high and weighs 49.5 t with the KMT-RZ minesweeping device. The IMR-3M is powered by an 840-hp V-84MS multifuel diesel engine, producing a maximum speed of 60 km/h and a range of 500 km. The baseline AEV is fitted with a U-type dozer blade, jib-type crane with an excavator bucket, and minesweeping plow. A chemical, biological, radiological and nuclear [CBRN] reconnaissance device, smokescreen generator, advanced signal suite and automatic fire extinguisher are fitted. The IMR-3M is armed with an NSVT 12.7 mm heavy machine gun [HMG] in a remotely controlled station. Production started in 2016 and is currently ongoing.

System

Alternative Designation: IMR-2M
Description: Heavy Combat engineering vehicle
Blade Rate: m3/hr350
Boom Capacity: mt2
Bulldozer Position: Front
Bulldozer Position Grading: Yes
Bulldozer Position Road Clearning/Building: Yes
Chassis: T-90
Crew: ea2
Dozer Blade (front mounted): Yes
Earth displacement: m3/hr300
Excavation Rate: km/hr0.35
Hourly Capacity ditch digging: m3/hr9
Hourly Capacity filling ditches: m3/hrINA

Lane Clearing Rate AT Mines: km/hr6

NBC Protection: Yes

Number of Rollers per set: 2

Operating Depth, solid: m1.3

Operating Depth frozen: m1.1

Operating Speed, Bulldozer: km/h10

Operating Speed, snow: km/h9

Operating Speed, road building: km/h8

Operating Speed, with trees: km/h8

Proliferation: Limited Proliferation

Reach: m8.4

Ripper: Yes

Rotary Crane Capacity: mt2

Time from Travel to Operating Position: min6

Total Number of Rollers: 2

Trench Crossing: m1.57

Trenching Machine: Yes

Weight, Combat: mt44.3

Width: m3.73

Scrapper: Yes

Pit Depth: m2.5

↳*Boom Specifications*

Height, Overall: INA

Length, Boom (m): 8.4

Length, Overall: INA

Width, Blade: INA

Width, Overall: INA

Boom Capacity: MT2

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: hp840

Fording Depth: m1.2

Range, Cruising: km500

Speed: km/h60

Speed , Average Cross: 8

Speed, Maximum Road: km/h60

Speed, Maximum Swim: km/h10

Vertical Step: mINA

Communications

↳*Radio*

Name: R-173

↳*Intercom*

Name: R-174

Armament

↳*PKT MG*

Type: Machine Gun

Cailber/Length: mm7.62

Combat Load: INA

Muzzle Velocity: INA

Range, Maximum Effective, Day: m1000

Range, Maximum Effective, Night: m800

Range, Maximum Effective, On the Move: m450

Protection

Active Protection System: INA

Armor, Applique: Available

Armor, Explosive Reactive: No

Armor, Turret Front: INA

NBC Protection: Yes

Protection: Protection from small arms fire and projectile splinters

Smoke Equipment: Yes

Survivability Equipment: INA

Notes:

IMR-2MA: Latest version with bigger operator's cabin armed with a 12.7 mm machine gun NSV. The IMR-2 is a combat engineering vehicle built on T-72 main battle tank basis. Development of the IMR-2 begun in 1970s and completed in 1980, while commercial production commenced in 1982. IMR-2 developed to replace aging IMR which built on the basis of T-54/55 tank. The IMR-2 combat engineering vehicle is in service with Russian Army and some foreign militaries. It took part in Soviet–Afghan War, First Chechen War, Second Chechen War and in addition used in relief operations after Chernobyl disaster. IMR-2 was derived from the T-72 tank. The turret of the T-72 was replaced with a new rotating multipurpose telescopic crane.

The IMR-2 has a bulldozer blade fitted on the front of the hull, which has a V shape and a straight shape and a 200 – 250 m3/h capacity. When not required, the blade is folded upwards. Stone barriers can be cleared at the rate of 280 to 350 meter an hour while trenches and tree barriers can be filled in at the rate of 350 to 400 m3/h. A 12.7 mm NSVT machine gun is mounted on the crew operator/commander cabin, for the self-protection of the vehicle. The IMR-2 is powered by a multi-fuel water-cooled diesel engine V-84Ms developing 840 hp, the same engine used in the T-72. The IMR-2 can run at a maximum road speed of 50 km/h with a maximum range of 500 km. The IMR-2 uses the same torsion bar suspension as the main battle tank T-72, which consists of six road wheels on each side. This combat engineering vehicle is operated by a 2-man crew.[

BAT-M Russian Tracked Route-Clearing Vehicle





Tiers:



Variants:

- **BAT, BAT-2:** Based on MT-T artillery tractor

System

Alternative Designations: Dozer

↳*Description*

Crew: 2

Troop Capacity: INA

Chassis: AT-T heavy tracked artillery tractor

Combat Weight: mt26

Length Overall: m10

Height Overall: m3.5

Width Overall: m4.7

Clearance: mm425

↳*Automotive Performance*

Engine Type: V-12 diesel

HP:

Cruising Range: km500

↳*Speed (km/h)*

Max Road: km/h35
Max Off-Road: INA
Max Swim: INA
Fording Depths: m0.7

↳*Features*

Radios, Frequency, and Range: INA
Vertical Step: m1
Trench Crossing: m1.57
Time from Travel to Operating Position: min5 to 7

Notes:

In the late 40’s the Soviet troops required a heavy artillery tractor to tow their super heavy guns and the upcoming nuclear missiles. One of them was the legendary AT-T based on the very early chassis and lower hull of the T-44 and later T-54 tank with 500mm wide tracks and a 13 teeth sprocket wheel. On the basis of this very strong artillery tractor several other heavy engineer vehicles were also derived. One of them, the BAT-M (also known as a “Way Builder”), featured a huge blade that was pivoted back when marching or being transported and a 2-ton crane installed at the rear part of the vehicle. My model represents an NVA version used by the former Eastern German Army until its end in 1990, at which time they still had 158 BAT / BAT-M in service. This vehicle had a V12 Diesel Engine with a cylinder capacity of 38.800 cm3, was water cooled, with a 415 hp rating.

IMR-2 Russian Combat Engineering Vehicle





Tiers:



Variants:

- **IMR:** First version of combat engineering vehicle built on T-54/55 medium battle tank chassis, powered by a V-55 diesel engine developing 520 hp. IMR-2M1: Simplified model without the mine-clearing system. Entered service in 1982. Based on T-72A tank hull.
- **IMR-2M2:** Improved version that is better suited for operations in dangerous situations, for example in contaminated areas. It entered service in 1990 and has a modified crane arm with bucket instead off the pincers.
- **IMR-2MA:** Latest version with bigger operator's cabin armed with a 12.7 mm machine gun NSV.
- **Klin-1:** Remote controlled IMR-2.
- **IMR-3M:** Combat engineering vehicle built on the T-90 main battle tank chassis. The vehicle is 9,320 mm long, 3,500 mm wide and 3,430 mm high and weighs 49.5 t with the KMT-RZ minesweeping device. The IMR-3M is powered by an 840-hp V-84MS multifuel diesel engine, producing a maximum speed of 60 km/h and a range of 500 km. The baseline AEV is fitted with a U-type dozer blade, jib-type crane with an excavator bucket, and minesweeping plow. A chemical, biological, radiological and nuclear [CBRN] reconnaissance device, smokescreen generator, advanced signal suite and automatic fire extinguisher are fitted. The IMR-3M is armed with an NSVT 12.7 mm heavy machinegun [HMG] in a remotely controlled station. Production started in 2016 and is currently ongoing

System

Alternative Designation: IMR-2; IMR
Type: Combat Engineering Vehicle
Family: IMR Series
Crew: ea2
Chassis: based on the T-72 main battle tank chassis
Telescopic Arm (Crane): Mounted on the superstructure where you would normally see a turret
Telescopic Arm Traverse Range: deg360
Telescopic Arm Maximum Lifting Capability: tons2
Mine Clearing: Yes, with Mine Clearing attachments
Earth Working Capacity: 200-250 m³/h
Dozer Blade: Available Attachment
Dozer Blade Capacity: 200 - 250 m³/h
Manipulator: Available Attachment
Bucket Loader: Available Attachment

Mine Clearing Ploughs: Available Attachment

Mine Clearing Charges: YEs

Dimensions

Length: m9.55

Width: m4.35

Height: m3.68

Weight, Combat: tons44.3

Ground Pressure: kg/mINA

Automotive

Engine Name: V-84-1

Engine Type: Diesel

Engine Power: hp840

Maximum Cruising Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: km/h35

Speed Maximum Swim: km/hNot Amphibious

Gradient: 50

Side Slope: deg30

Vertical Step: m0.8

Fording (Without Preparation): m2.7

Fording (With Preparation): m5

Communications

Primary Radio: R-173

Secondary Radio: R-168-100U

Main Weapon System

↳***System***

Name: Type 54 (DShKM) Heavy Machine Gun

Type: Heavy Machine Gu

Caliber: mm12.7

Proliferation: +1 Million

Total Length: mm1,625

Barrel Length: mm1,070

Weight (Gun Only): kg34

Weight (On Wheeled Mounting): kg157

Max Rate of Fire: rds/min600

Action: Gas-Operated, Flapper Locking

Feed System: 50 Round Belt

Sights: Iron/Optical

Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: heavy machine gun and anti-materiel rifle cartridge

Caliber: mm12.7

Cartridge: 12.7x108 mm

Muzzle Velocity: m/s850

Basic Load: ea1,200

Maximum Effective Range: m2,500

Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Protection

Hull Armor: protection from small arms fire and shell splinters

Applique Armor: Available

Mine Clearing: Available Attachment

Self-Entrenching Blade: Available Attachment

NBC Protection: Yes

Smoke Equipment: INA

Automatic Fire Suppression System: Yes

Notes:

The IMR-2 is a combat engineering vehicle built on T-72 main battle tank basis. Development of the IMR-2 begun in 1970s and completed in 1980, while commercial production commenced in 1982. IMR-2 developed to replace aging IMR which built on the basis of T-54/55 tank. The IMR-2 combat engineering vehicle is in service with Russian Army and some foreign militaries. It took part in Soviet–Afghan War, First Chechen War, Second Chechen War and in addition used in relief operations after Chernobyl disaster. IMR-2 was derived from the T-72 tank. The turret of the T-72 was replaced with a new rotating multipurpose telescopic crane. The IMR-2 has a bulldozer blade fitted on the front of the hull, which has a V shape and a straight shape and a 200 – 250 m3/h capacity. When not required, the blade is folded upwards. Stone barriers can be cleared at the rate of 280 to 350 meter an hour while trenches and tree barriers can be filled in at the rate of 350 to 400 m3/h. A 12.7 mm NSVT machine gun is mounted on the crew operator/commander cabin, for the self-protection of the vehicle. The IMR-2 is powered by a multi-fuel water-cooled diesel engine V-84Ms developing 840 hp, the same engine used in the T-72. The IMR-2 can run at a maximum road speed of 50 km/h with a maximum range of 500 km. The IMR-2 uses the same torsion bar suspension as the main battle tank T-72, which consists of six road wheels on each side. This combat engineering vehicle is operated by a 2-man crew.

IMR-3M Russian Combat Engineering Vehicle






Tiers:

1 2 3 4

Variants:

- **IMR:** First version of combat engineering vehicle built on T-54/55 medium battle tank chassis, powered by a V-55 diesel engine developing 520 hp. IMR-2M1: Simplified model without the mine-clearing system. Entered service in 1982. Based on T-72A tank hull.
- **IMR-2M2:** Improved version that is better suited for operations in dangerous situations, for example in contaminated areas. It entered service in 1990 and has a modified crane arm with bucket instead off the pincers.
- **IMR-2MA:** Latest version with bigger operator's cabin armed with a 12.7 mm machine gun NSV.
- **Klin-1:** Remote controlled IMR-2.
- **IMR-3M:** Combat engineering vehicle built on the T-90 main battle tank chassis. The vehicle is 9,320 mm long, 3,500 mm wide and 3,430 mm high and weighs 49.5 t with the KMT-RZ minesweeping device. The IMR-3M is powered by an 840-hp V-84MS multifuel diesel engine, producing a maximum speed of 60 km/h and a range of 500 km. The baseline AEV is fitted with a U-type dozer blade, jib-type crane with an excavator bucket, and minesweeping plow. A chemical, biological, radiological and nuclear [CBRN] reconnaissance device, smokescreen generator, advanced signal suite and automatic fire extinguisher are fitted. The IMR-3M is armed with an NSVT 12.7 mm heavy machinegun [HMG] in a remotely controlled station. Production started in 2016 and is currently ongoing

System

Alternative Designation: IMR-3M
In Service: 2018-Present
Type: Combat Engineering Vehicle
Family: IMR Series
Crew: ea2
Chassis: based on the T-72 main battle tank chassis
Telescopic Arm (Crane): Mounted on the superstructure where you would normally see a turret
Telescopic Arm Traverse Range: deg360
Telescopic Arm Maximum Lifting Capability: tons2

Mine Clearing: Yes, with Mine Clearing attachments

Earth Working Capacity: 200-250 m³/h

Dozer Blade: Available Attachment

Dozer Blade Capacity: 200 - 250 m³/h

Manipulator: Available Attachment

Bucket Loader: Available Attachment

Mine Clearing Ploughs: Available Attachment

Mine Clearing Charges: Yes

Fording Depth: 1.2 m

Note: A feature of the BMR-3M is the ability to remote control from a portable console, or work autonomously after programming an action algorithm for a given route.

Dimensions

Length: m9.32

Width: m3.5

Height: m3.42

Weight, Combat: tons50,800 kg

Ground Pressure: kg/mINA

Ground Clearance: 460 mm

Automotive

Engine Name: V-84MS

Engine Type: Diesel

Engine Power: hp840

Maximum Range: km500

Speed, Maximum Road: km/h50

Speed, Average Cross: km/h35

Speed Maximum Swim: km/hNot Amphibious

Gradient: 50

Side Slope: deg30

Vertical Step: m0.8

Fording (Without Preparation): m2.7

Fording (With Preparation): m5

Communications

Primary Radio: R-173

Secondary Radio: R-168-100U

Main Weapon System

↳*System*

Name: Type 54 (DShKM) Heavy Machine Gun
Type: Heavy Machine Gu
Caliber: mm12.7
Proliferation: +1 Million
Total Length: mm1,625
Barrel Length: mm1,070
Weight (Gun Only): kg34
Weight (On Wheeled Mounting): kg157
Max Rate of Fire: rds/min600
Action: Gas-Operated, Flapper Locking
Feed System: 50 Round Belt
Sights: Iron/Optical
Variants: DK, DShKM, DSHKS, Type 54 HMG

↳*Ammunition*

Type: heavy machine gun and anti-materiel rifle cartridge
Caliber: mm12.7
Cartridge: 12.7x108 mm
Muzzle Velocity: m/s850
Basic Load: ea1,200
Maximum Effective Range: m2,500
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Fire Control

Protection

Hull Armor: protection from small arms fire and shell splinters
Applique Armor: Available
Mine Clearing: Available Attachment
Self-Entrenching Blade: Available Attachment
NBC Protection: Yes
Smoke Equipment: INA
Automatic Fire Suppression System: Yes

Notes:

Engineer Troops of the Armed Forces of the Russian Federation have received modern IMR-3M mine-obstacle vehicles. In the framework of the contract signed in 2016, the manufacturer handed over 13 vehicles to the Russian Defence Ministry. The IMR-3M was created on the basis of the T-90A tank and is equipped with a KMT-R3 track width mine plough with an EMT electromagnetic detachable device for trawling mines with rod-type and non-contact magnetic fuses. The vehicle is capable of lifting loads up to 2 tons. The IMR-3M is armed with the 12.7mm remote-controlled machine-gun mount. It can fire at ground, low-speed air targets, as well as explosive objects openly lying on the ground. The IMR-3M is also designed to make passes in moderately rugged terrain, in stone and forest rubble and in snow. It can remove minefields or perform work in contaminated area. The vehicle is equipped with radiation, chemical reconnaissance and contamination control and has a high level of protection against radiation and toxic substances. IMR-3M is capable of forcing water barriers up to 5 m deep along the bottom.

DIM Russian Vehicle Mounted Mine Detector



Tiers:

1 2 **3** 4

System

Alternative Designation: None
Chassis: Used on a UAZ-469 or other light 4x4 vehicle
Crew: ea2
Depth: m25cm; 70cm while fording
Detection Ability: Can detect metallic mines in roadways, airfields, and other flat terrain.
Mounting/dismounting Time: minUp to 7
Operating Speed: km/h10

Notes:

Components: detection system, pneumatic system, electronic system. The DIM is a large pulse-induction mine-detection device mounted to a light 4x4 truck. The detection element fastens to a frame on the front of the vehicle. When a mine is detected, the vehicle breaking system is engaged and the clutch is disengaged. The full-width detection head, located 2.6 meters from the vehicle's front wheels to provide stopping distance, is divided into six components to pinpoint mine location. The electronic system also displays which component of the mine-detector head the mine is under. It also has attached rollers so that the head does not come in contact with ground objects. Cross-country capability is very limited; therefore the DIM is generally used for clearing prepared surfaces. The detection equipment swings upward to ride on the top of the vehicle cab for traveling. When needed it is swung forward to rest on two wheels.

→→Graders and Tracklayers

Caterpiller 120M American 6x6 Motor Grader





Tiers:

1 **2** 3 4

System

Alternative Designation: Caterpillar 120M Grader

Type: Motor Grader

Crew: ea1

In-Dash Instrument Cluster: The instrument panel, with easy-to-read, high-visibility gauges and warning lamps, keeps the operator aware of critical system information.

Dimensions

Blade Base: 8.3 ft (2.53 m)

Front Ground Clearance: 1.9 ft (0.58 m)

Ground Clearance - Rear Axle: 13.6 in (34.54 cm)

Height - Exhaust Stack: 112.4 in (285.5 cm)

Height - Front Axle Center: 22.5 in (57.15 cm)

Height - Top of Cab: 10.8 ft (3.29 m)

Height - Top of Cylinders: 113.7 in (288.8 cm)

Height to Top of Isomount Cab: 10.8 ft (3.29 m)

Length - Between Tandem Axles: 59.5 in (151.13 cm)

Length - Counterweight to Ripper: 389.3 in (988.82 cm)

Length - Front Axle to Mid Tandem: 232.8 in (591.31 cm)

Length - Front Axle to Moldboard: 98.9 in (251.21 cm)

Length - Front Tire to Rear of Machine: 334.1 in (848.61 cm)

Overall Length: 27.9 ft (8.5 m)

Rear Ground Clearance: 1.2 ft (0.37 m)

Wheelbase: 19.4 ft (5.91 m)

Width Over Tires: 8.2 ft (2.5 m)

Automotive

Engine Name: Caterpillar C6.6 diesel
Engine Power: 138 - 173 hp
Max Road Speed: 45 km/h
Range: INA
All Wheel Drive (AWD) System.: The optional AWD system utilizes dedicated left and right pumps for precise hydraulic control. The infinitely variable pumps and motors maximize torque in each gear delivering the most power to the ground in the industry and increasing productivity in the most demanding applications.
:
:

Controls

Advanced Joystick Controls: Two electro-hydraulic joysticks reduce hand and wrist movement as much as 78% compared to conventional lever controls for greatly enhanced operator efficiency. The intuitive pattern is easy to learn and provides the precise implement control you expect from Caterpillar.
Auxiliary Pod and Ripper Control: The optional ripper control and auxiliary control pod are ergonomically positioned to allow simple, comfortable operation for the multiple hydraulic options.
Controls and Switches: Reliable, longlife rocker switches are located on the right side cab post and front instrument cluster, within easy reach for the operator.
Intuitive Steering Control: The 120M introduces a breakthrough in joystick steering control. This technology creates a direct relationship between the lean angle of the joystick and the turning angle of the steer tires.
Electronic Throttle Control: Electronic Throttle Control (ETC) provides the operator with easy, precise, and consistent throttle operation. An automatic and manual mode on a single switch offers flexibility for different applications and operator preferences.
Left Joystick Functions: The left joystick primarily controls the machine direction and speed. 1 – Steering: Lean joystick left and right 2 – Articulation: Twist joystick left and right 3 – Articulation Return to Center: Yellow thumb button 4 – Wheel Lean: Two black thumb buttons 5 – Direction: Index trigger shifts transmission to forward, neutral or reverse 6 – Gear Selection: Two yellow thumb buttons upshift and downshift 7 – Left moldboard lift cylinder: Push joystick to lower, pull joystick to raise 7 – Left moldboard lift cylinder float: Pushing joystick through detent engages float
Right Joystick Functions: The right joystick primarily controls the Drawbar, Circle and Moldboard functions. 1 – Right moldboard lift cylinder: Push joystick to lower, pull joystick to raise 7 – Right moldboard lift cylinder float: Pushing joystick through detent engages float 2 – Moldboard slide: Lean joystick left and right 3 – Circle turn: Twist joystick left and right 4 – Moldboard tip: Thumb switch fore and aft 5 – Drawbar center shift: Thumb switch left and right 6 – Electronic Throttle Control: Trigger switch is resume and decrement 7 – Differential Lock/Unlock: Yellow button
Ripper Control Pod: Infinitely variable roller switches control the rear ripper and/or front lift group (when equipped), for easy and comfortable control.
Programmable Auxiliary Hydraulic Pod.: Four fingertip controls and a mini joystick maximize hydraulic control flexibility, accommodating up to six hydraulic circuits. Individual functions are easily programmable through Cat ET to meet the configuration you need. The optional auxiliary hydraulic pod is provided in addition to the ripper control pod when the machine is configured with three or more auxiliary functions.
Smooth Shifting Transmission: The 120M combines several key innovations to ensure smooth, powerful shifts throughout the gear range.
Electronically Controlled Shifting: The full Electronic Clutch Pressure Control (ECPC) system optimizes inching modulation and smooths shifting between all gears and directional changes. This provides outstanding control and also extends the life of the transmission by reducing stress on gears.
Controlled Throttle Shifting: This standard feature helps to smooth directional and gear changes without use of the inching pedal.

Structure

Front Frame Structure: The 120M front frame is a formed structural carbon steel tube. Advanced fabrication technology significantly reduces the number of weld joints, which more evenly distributes stress loads. The result is a robust machine that delivers the durability you expect from Caterpillar.

Rear Frame Structure.: The box-sectioned hitch design helps resist torsion loads and ensure structural durability. The integrated bumper ties the rear frame together as a single, solid unit, so the frame can withstand heavy-duty applications such as ripping and winging snow.

Articulation Hitch: A large tapered roller bearing at the lower pivot carries loads evenly and smoothly. This joint is sealed to prevent contamination in this critical area. A mechanical locking pin prevents frame articulation to help ensure safety when servicing or transporting the machine.

Circle Construction: Our one-piece forged steel circle is built to stand up to high stress loads and provide structural durability. The front 240° of circle teeth are hardened to reduce wear and ensure component reliability.

Drawbar Construction: The A-frame drawbar features a tubular design for high strength and optimum durability.

Aggressive Blade Angle: With a long wheelbase the operator can obtain aggressive moldboard angles, so material rolls more freely along the length of the blade. This is particularly helpful when handling very dry materials or cohesive soils. Better material control gets the job done faster, requires less power and saves fuel.

Hydraulics

Advanced Electro-Hydraulic System.: The 120M incorporates a state-of-the-art electro-hydraulic system. This technology is the foundation for revolutionary changes of the machine and implement controls. Advanced joystick controls provide unmatched controllability with precise, predictable hydraulic movements and the reliability you expect from Caterpillar.

Blade Float: Blade float is built into the blade lift control valves and is optional for some auxiliary hydraulic functions. The blade float feature allows the blade to move freely under its own weight. By floating both cylinders, the blade can follow the contours of the road when removing snow. Floating only one cylinder permits the toe of the blade to follow a hard surface while the operator controls the slope with the other lift cylinder.

Independent Oil Supply: Large, separate hydraulic oil supply prevents crosscontamination and provides proper oil cooling, which reduces heat build-up and extends component life.

Load Sensing Hydraulics (PPPC: The time proven load-sensing system and the advanced Proportional Priority Pressure-Compensating (PPPC, or “triple-PC”) electro-hydraulic valves on the 120M are designed to provide superior implement control and enhanced machine performance in all applications. Continuous matching of hydraulic flow and pressure to power demands creates less heat and reduces power consumption.

Cat® XT™ Hose: Caterpillar hose technology allows high pressures for maximum power and reduced downtime. Intelligent routing minimizes exposure to damage. Hose clips prevent hose rubbing and excessive vibration for lower owning and operating costs.

Balanced Flow: Hydraulic flow is proportioned to ensure all implements operate simultaneously with little effect on the engine or implement speeds. If demand exceeds pump capacity, all cylinder velocities are reduced by the same ratio. The result is improved productivity in all applications.

Consistent and Predictable Movement: PPPC valves have different flow rates for the head (red) and rod ends (blue) of the cylinder. This ensures consistent extension and retraction speeds for each cylinder, and gives the operator a consistent and predictable response every time an implement control is moved.

Notes:

The Caterpillar 120M is a motor grader, used by the US military. The Caterpillar company does not manufacture any special military version of the 120M grader. However after some modifications, such as flat military paint, blackout lights, transport provisions, keyless ignition, and other, this road grading machine can be used for military roles. Though it is claimed that the militarized 120M grader has more reliable performance in extreme weather, mainly due to optional equipment. In 2011 it was announced that more than 1 000 of these motor graders will be delivered to the US Army, Navy and Marine Corps. Deliveries commenced in 2012. It replaced in service the old Caterpillar 130G grader, which has been in service for more than 30 years. The Caterpillar 120M grader has 3 axles. Graders delivered to the US military have an all-wheel drive system for improved mobility. Engine and cab are situated above the rear axles. There is a wide blade in between the 1st and 2nd axles. Actually the Caterpillar 120M grader has rather humble performance comparing with many other commercial graders. Still though it

significantly outperforms the old Caterpillar 130G military grader. There is a 30 years difference in technology between these two machines. The 120M is fitted with modern grade control technologies for precise grading. It is also fitted with diagnostics equipment and is easier to maintain. The Caterpillar 120M is used to create a flat surface during the grading process. Graders create fine "finish grade", while the "rough grading" is performed by bulldozers, scrappers, or other engineering vehicles. The Caterpillar 120M is used for construction and maintenance of dirt and gravel roads. This machine is also used to prepare the base course to create a wide flat surface for paved roads. It can also produce inclined surface to give cant to roads, or produce drainage ditches. Additional front blade and rear ripper can be attached. This militarized grader can be used for construction of airfields, landing zones, defensive berms, anti-tank ditches and for other military earthmoving tasks. The operator has good visibility. Overall working environment of the operator is significantly better than on the previous 130G model. The new grader has joystick controls, air conditioned cab. Furthermore vibration levels inside the cab are much lower. An armored cab can be installed for operation in various hotspots. It provides protection for the operator against small arms fire, artillery shell splinters and various blasts. This grader carries no defensive armament, as it typically operates in rear areas. This construction machine is powered by a Caterpillar C6.6 diesel engine, developing 138-, 153- and 173 hp depending on optional equipment and grading mode. Number in the designation actually denotes a 6.6-liter displacement of the engine. There are 8 forward and 6 reverse gears. This machine has a 6x6 configuration with an all-wheel drive. The older Caterpillar 130G had 6x4 configuration. Unusual feature of this new machine is that it can make a faster turn by adjusting the outside front tire speed up to twice faster than the inside tire. This significantly reduces turning radius. Another unusual feature of the Caterpillar 120M is that this machine can disengage transmission form the rear axles. This feature was originally designed for precise grading. However this feature also allows the machine to return to base on its front wheels with various transmission problems. A number of options are available for these militarized graders. These include a cold starting kit (which allows to start the machine at -40°C), deep fording kit and some other. Optional equipment installed on these graders differs depending on the US military branch. For example US Navy machines have some optional equipment, that is not present on US Army machines. The Caterpillar C120M grader can be airlifted by a C-130 Hercules tactical transport aircraft with minimum of preparation.

Caterpillar 130G American 6x6 Motor Grader





Tiers:



System

Alternative Designation: Caterpillar 130G

Type: Motor Grader

Manufacturer: Caterpillar

Crew: ea1

Note: The Caterpillar 130G was designed to create a flat surface during the grading process. Graders create fine "finish grade", while the "rough grading" is performed by bulldozers, scrappers, or other military engineer vehicles. The Caterpillar 130G was designed for construction and maintenance of dirt and gravel roads. This machine can prepare the base course to create a wide flat surface for paved roads. It can also produce inclined surface to give cant to roads, or produce drainage ditches. Additional front blade and rear ripper can be attached.

Dimensions

Length: 7.93 m

Width: 2.41 m

Height: 3.33 m

Blade Width: 3.66 m

Weight: 15 t

Automotive

Engine Name: Caterpillar 3304

Engine Type: 7-liter Caterpillar 3304 turbocharged diesel engine

Engine Power: hp135

Transmission: Transmission of this grader has 6 forward and 6 reverse speeds.

Maximum Speed: 39 km/h

Range: INA

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording with deep Fording Kit: up to 0.76 m

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Caterpillar 130G grader has been in service with the US military for more than 30 years. It was adopted by the US military in the late 1970s. Basically it was a standard commercial construction machine, with some minor modifications in order to suit military requirements. The Caterpillar company had no special military version of the 130G grader.

→→Mobile Cranes

Kobelco CKE800 American 80 Ton Hydraulic Crawler Crane



Tiers:



System

Alternative Designation: CKE800
Type: Hydraulic Crawler Crane
Manufacturer: Kobelco
Crew: ea1
Main Boom, Maximum Lifting Capacity: 80 t/3.0 m
Main Boom, Maximum Length: 54.9 m
Fixed Jib Maximum Lifting Capacity: 6.6 t
Fixed Jib, Maximum Combination: 42.7 m + 18.3 m, 45.7m + 12.2m

Dimensions

Length, Base Machine + Boom Base + Crawler: 11,640 mm
Width, Base Machine + Boom Base + Crawler: 3,390 mm widtd
Height, Base Machine + Boom Base + Crawler: 3,300 mm height
Weight, Base Machine + Boom Base + Crawler: 40,770 kg
Length, Upper Boom: 1,510 mm
Width, Upper Boom: 4,545 mm
Length, Lower Boom: 5,350 mm
Width, Lower Boom: 1,510 mm
Basic Bloom Length: 9.1 m
Operating Weight: Approx. 73.8 t
Counter Weight: 25.8 t (upper) + 6.8 t (lower)
Transport Weight: 39.9 t (Main machine with crawler and lower boom)
Ground Pressure: 88 kPa (0.9 kgf/cm2)

Automotive

Engine Name: Mitsubishi 6D16-TLU2K
Engine Type: Diesel
Engine Power: 159 kW/2,000 min-1 (rpm)
Fuel Tank Capacity: 400 liters
Swing Speed: 4.0 min-1 (rpm)
Travel Speed: 1.2 km/h

Hydraulic System

Main Pumps: 3 variable displacement
Maximum Pressure: 32 MPa (325 kgf/cm2)
Hydraulic Tank Capacity: 450 liters
Self-Erection Device: Standard counterweight removal

Main and Auxiliary Winch

Maximum Line Speed: 120 m/min (1st layer)
Rated Line Pull: 78.5 kN (8 tf
Maximum Line Pull: 150 kN (15.3 tf)
Wire Rope: 22 mm
Length, Wire Rope: 215 m (Main) 125 m (Aux.)
Brake Type: Wet-type multiple disc brake

Protection

Hull Armor: INA
Applique Armor: No
Mine Clearing: No
NBC Protection: INA
Smoke Equipment: INA

Notes:

The CKE800 crawler crane from KOBELCO takes advantage of new technologies to raise performance to new heights. Winches with extremely powerful line-pull handle the toughest jobs, while the innovative “wettype” multi-disc braking system provides safe and sure control with minimal maintenance. A large winch capacity promotes ultra-smooth operation and enhanced component service life. An optional full-sized third winch enables the use of an impressive selection of attachments. Add these new features to the renowned power and reliability of KOBELCO cranes, and you have the ideal combination of lifting performance, economical operation and durability. For more information go the the following website: http://www.kobelco-cranes.com/en/wp-content/themes/kobelco/pdf/hydraulic/CKE800_SPEC.pdf

FAUN BKF 35-4 German 35 Ton Mobile Recovery Crane





Tiers:



System

Alternative Designation: FAUN BKF 35-4
Type: 35 ton Mobile Recovery Crane
Manufacturer: Faun
Crew: ea2
Lift Capacity: 35 Tons
Boom Capacity: 22.5 m
Towed Load: 42 Tons
Winch Capacity: 20 Tons

Dimensions

Length: 11.85 m
Width: 2.75 m
Height: 3.8 m
Weight: 32 Tons

Automotive

Engine Name: Mercedes-Benz Model: INA
Engine Type: Diesel
Engine Power: 389 hp
Transmission: INA
Maximum Speed: 85 km/h
Range: 800 ~ 1 000 km
Gradient: %60
Side Slope: %20
Vertical Step: 0.6 m

Trench: 1.8 ~ 2 m

Fording with deep Fording Kit: 0.75 m

Protection

Hull Armor: INA

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The FAUN BKF 35-4 is an unusual German military machine. It is referred in German as Bergekranfahrzeug or recovery crane. It is fitted with specialized equipment for craning, winching, towing and recovery operations. This concept of a highly mobile recovery crane is specific to the German army, as other countries do not use such vehicles and rely either on mobile cranes or recovery vehicles. The FAUN BKF 35-4 was produced in the early 2000s. Deliveries commenced between 2002-2004, depending on the source. Some sources report that only 2 of these recovery cranes were ordered. At the time these were the biggest recovery vehicles in German army service.

Liebherr FKL German All-Terrain Crane





Tiers:



Variants:

- **Liebherr FKM:** Liebherr FKM (Fahrzeugkran Mittel or Medium Mobile Crane), is a larger and more capable machine with 6x6 configuration. It has a lifting capacity of 20 t. Its rear cargo platform has a 16 t capacity. This mobile crane was also adopted by the German military. A total of 208 units were delivered. This crane has been exported to the Netherlands (27 units). Some of these cranes are fitted with armored cabs.

System

Alternative Designation: Liebherr FKL
Type: All-Terrain Crane
Crew: ea2
Bulldozer Blade: No
Crane: Yes
Ground Penetrating Radar: No
Bucket Loader: No
Back-hoe Excavator: No
Ditch Trencher: Noi
Recovery Winch: 85 m of cable.
Winch Capacity: 20 tons
Maximum Lifting Capacity: 10 tons
Towed Load: 6.5 tons
Note: At its maximum reach the crane can lift loads with a maximum weight of 2.4 t. This crane does not requires any counterweight.

Dimensions

Length: m9.22
Width: m2.5
Height: m3.2
Weight: 16.1 tons

Weight with add-on Equipment: 17.6 tons

Crane Length: m13

Automotive

Engine Name: KHD F8L513

Engine Type: Diesel

Engine Power: hp256

Cruising Range: km800

Speed, Maximum Road: km/h75

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 60

Side Slope: %20

Vertical Step: m0.5

Trench: m0.6

Fording Depth: m1.2

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Liebherr Fahrzeugkran Leicht (FKL), or Light Mobile Crane was specially designed to meet requirements of the Bundeswehr (German military). Sometimes it is referred as the FKL 10 due to its lifting capacity of 10 t. Production order was awarded to Liebherr in 1990 after severe competition. A total of 251 units were delivered to the German military alongside 208 larger and more powerful Liebherr FKM cranes with lifting capacity of 20 t. Deliveries of the FKL began in 1991 and were completed in 1994. This crane is used by all branches of the German military, including army, navy and air force.

Liebherr G-BKF German 20 Ton Armored Recovery Crane





Tiers:

1 2 3 4

System

Alternative Designation: Liebherr G-BKF
Type: Armored Mobile Crane
Manufacturer: Liebherr
Crew: ea2
Lift Capacity: 22.8 t
Boom Length: 20.9 m
Winch Capacity: at least 20 t
Towed Load: 40 t

Dimensions

Length: 11.79 m
Width: 2.75 m
Height: 3.73 m
Weight: 44 t

Automotive

Engine Name: Liebherr D946TI
Engine Type: Diesel
Engine Power: hp544
Transmission: INA
Maximum Speed: 80 km/h
Range: 800 ~ 1 000 km
Gradient: %60
Side Slope: %20
Vertical Step: m0.6

Trench: m1.8-2

Fording: m0.75

Fording with Preperation: m1

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Liebherr G-BKF is a high mobility, protected recovery crane developed by Liebherr-Werk Ehingen GmbH for the Bundeswehr. The G-BKF is integrated onto a 8×8 MAN truck system supplied by Rheinmetall. Both armored/protected compartments for the driver and cab operator were supplied by Rheinmetall as well. The G-BKF can rescue and tow the new generation of armoured control and command vehicles, armoured transport vehicles, MULTI FSA (swap body vehicles) and wheeled vehicles. It is also capable of providing tactical infantry cover over long distances, providing repair and handling support as well as deployment for rescue, recovery and emergency aid tasks. A key focus of the crane is to protect its occupants. Liebherr worked with leading European military technology company Rheinmetall Defence to produce the armoured driver's and crane cabs. The special driver's cab was extended by 250mm to provide storage space for the extensive personal protective equipment for the crew and integrate the military communication equipment. The cab features a double-thickness steel bulkhead and special glass offering ballistic protection yet meets all road traffic requirements. The protection has been verified to STANAG 4569/ AEP 55. The crane cab is also armoured with composite panels bolted to a steel bearing structure to reduce weight. The four axle carrier is based on a standard All Terrain crane chassis, with all wheel steer and drive . Despite its weight and size it is said to have excellent off-road properties and manoeuvrability. In towing mode, vehicles weighing up to 16 tonnes can be mounted on the lift cradle at the rear. An extensive range of accessories allows it to tow almost all German Army wheeled vehicles. Two Rotzler Treibmatik winches are mounted on the rear of the vehicle, and the smaller winch can be moved to the front for self-rescue purposes. The chassis is also equipped with rescue jacks for recovering a damaged vehicle from difficult terrain. Synchronised winching allows a damaged vehicle to be raised slightly whilst being pulled by the other. The G-BKF is fitted with a 20.9 metre main boom which can handle loads of up to 20 tonnes. All the crane's control functions, the towing device, the two rescue winches and the jacks can be operated either from a protected position in the crane's cab using the standard controls or from the ground using a standard Liebherr remote controller. Liebherr uses all its vast experience for designing special cranes for military purposes. Liebherr military cranes are in demand with the army, air force and navy; they have proven themselves all over the world with repair, resupply and engineering units. Liebherr has manufactured more then 800 military cranes with lifting capacities from 10 to 500 tonnes since 1977. The product range extends from standard cranes with additional options to specially developed vehicles for military purposes. Mobile cranes from Liebherr are suitable for both on-road and off-road use. They feature great economy and are very flexible in use. To satisfy special technical requirements and special solutions, Liebherr uses time-tested components which have been used many times on standard cranes.

Terex-Demag MAC-50 American 50 Ton All-Terrain Mobile Crane





Tiers:

1 2 3 4

System

Alternative Designation: Terex-Demag MAC-50

Type: All-Terrain Mobile Crane

Manufacturer: Terex-Demag

Crew: ea2

Dimensions

Length: INA

Width: INA

Height: INA

Weight: 31.7 t

Automotive

Engine Name: Cummins QSC

Engine Type: Diesel

Engine Power: 305 hp

Transmission: INA

Maximum Speed: 68 km/h

Range: 700 km

Gradient: %60

Side Slope: %30

Vertical Step: 0.5 m

Trench: 1.2 m

Fording with deep Fording Kit: 1.5 m

Protection

Hull Armor: INA

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

50 Ton Capacity, 82' Maximum Boom Length, 32'9" Minimum Boom Length, Carrier A/C, Upper A/C, Carrier Heater, Upper Heater, Load Moment Indicator, Cummins Turbo Diesel Engine, Load Block, Anti-Two-Block, 8x6x8 Steering, 445/95R25 Tires

Liebherr G-LTM 1090-4.2 German 35 Ton All-Terrain Crane





Tiers:

1 2 3 4

System

Alternative Designation: Liebherr G-LTM 1090-4.2

Type: 35 Tons All-Terrain Crane

Manufacturer: Liebherr

Crew: ea2

Lifting Capacity: 36.6 tons

Boom: This crane has a powerful telescopic boom which extends to 35.7 m. It can lift loads with a maximum weight of 36.6 t. It can be used for medium and heavy crane work. All functions of crane can be controlled from the crane cab or using a remote control unit.

Recovery Winch: This mobile crane is fitted with a single recovery winch with 49 m of cable. The winch is mounted at the rear and can be used for recovery of stuck, swamped or damaged vehicles, as well as for self-recovery. If required the winch can be moved to the front.

Dimensions

Length: 13.29 m

Width: 2.58 m

Height: 4 m

Weight: 48 tons

Automotive

Engine Name: Liebherr, Model: INA

Engine Type: Diesel

Engine Power: 449 hp

Transmission: ZF 12-speed automated transmission

Maximum Speed: 85 km/h

Range: 1,000 km

Gradient: %60

Side Slope: %20

Vertical Step: m0.6

Trench: m2

Fording: m0.5

Protection

Hull Armor: This crane has an armored driver's cab as well as the crane cab. Liebherr teamed with Rheinmetall Defence in order to develop and produce these cabs. The forward control cab is made of steel armor. The crane cab has a steel frame and ceramic armor in order for reduced overall weight. These cabs provide protection against small arms fire, artillery shell splinters and blasts. There is also an NBC protection system. The forward control cab has a roof hatch and can mount a machine gun for self-defense.

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

LTM 1090-4.2 Mobile crane The mobile crane LTM 1090-4.2 combines mobility, performance and economy at the highest level. It is worldwide economically mobile, because it can be driven with 10 tons, 12 tons and 16 tons axle load. With its ECOdrive and ECOmode the LTM 1090-4.2 is operated extremely environmental friendly, low on consumption and with low noise. The Liebherr innovations VarioBallast and VarioBase® cater for more performance, flexibility and safety.

→→Forklifts

Atlas II American All-Terrain Forklift





Tiers:



System

Alternative Designation: Atlas II

Type: All-Terrian Forklift

Mission: This material handling machine is used to loading and unloading vehicles and containers. It can transport palletized loads or boxes. It can also stack them on on top of another and unstack. It can handle supplies such as ammunition and missiles. It can also handle MLRS and HIMARS pods with rockets. It can be also used in constructions and rebuild operations.

Crew: ea1

Automatic Fork Leveling System: Yes

Telescopic Boom: 3-stage telescopic boom, that can reach into trucks and shipping containers.

Maximum Lift Capacity: Maximum lift capacity is 2.7 t, or 4.5 t, depending on the carriage.

Airlift Capacity: This military machine can be airlifted by the C-130 Hercules tactical cargo aircraft. It is prepared for flight within 15 minutes.

Dimensions

Length: 9 m

Width: 2.4 m

Height: 2.6 m

Weight, Combat: INA

Automotive

Engine Name: John Deere PE4045 HF 485
Engine Type: Diesel
Engine Power: hp173
Maximum Speed: 37 km/h
Range: 400 km
Gradient: %45
Side Slope: INA
Vertical Step: 0.5 m
Trench: 0.5 m
Fording: 0.9 m

Protection

Hull Armor: This machine has an enclosed cab. It provides protection for the operator against rollover and falling objects.
Applique Armor: Yes, Add-on armor kit is available for the cab for operation in hotspot areas, such as Afghanistan and Iraq.
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: INA
Smoke Equipment: No

Notes:

The new ATLAS II is a rough terrain forklift with a load capacity of 10,000 lb with a 48" load center with the primary mission to lift and load/unload pallets from ISO 20' containers. The target price for the production contract is not to exceed $135,000 per vehicle (in FY03 dollars). The intent is to improve the vehicles capabilities as much as possible while maintaining the current program's vehicle cost. The All-Terrain Lifter, Army System (ATLAS II) is to receive and issue supplies, move stock to and from storage; load and unload ammunition, supplies, and equipment on unit vehicles for deployment; stuffing and unstuffing pallets from containers; transloading landing craft cargo between vehicles and aircraft; moving items into stock; and off-loading breakbulk cargo from vehicles and aircraft. The forklift truck (hereinafter called "truck" or "forklift") shall be a four-wheel drive, diesel-engine-driven, variable reach boom type truck (see ASME B56.6). The truck shall not be equipped with stabilizers or outriggers. The truck shall be rated at 6,000 pounds at 24-inch load center with the 6,000-pound capacity carriage mounted and shall be rated at 10,000 pounds at 48-inch load center with the 10,000-pound capacity carriage mounted. The production contract will be a five-year, firm fixed price requirements type contract. The current program estimate includes $135M for approximately 1,000 vehicles. The production contract will require the contractor to deliver up to six vehicles in production configuration about seven months after the production contract award for the Production Verification Testing. The Government reserves the right to purchase the successful offeror's Demonstration Test vehicle to perform additional testing after the award of the production contract and prior to delivery of the production configuration vehicles. This program is based on the belief that industry has existing commercial vehicles, or vehicles capable of being modified, that can meet the requirements of this program. The Demonstration Test (in conjunction with the written proposal and evaluation) is a means of mitigating the risk to the Government in order to select the ATLAS II that has the highest probability of meeting all requirements as well as distinguishing differences between offerors providing vehicles that range in performance due to achieving required and desired objectives outlined in the ORD. The Demonstration Test vehicle, commercial component manuals, and the Demonstration Test vehicle support will be at no cost to the Government. The production contract will also include contract provisions providing for the transfer of the data package and rights to the government in the event that the original manufacturer goes out of business or drops the parts or vehicles from production.

→→Container Handlers

Kalmar RT240 Finish Rough Terrain Container Handler





Tiers:



System

Alternative Designation: Kalmar RT240

Type: Rough Terrain Container Handler

Mission: The container handlers are used to handle standard shipping containers, that are the backbone of military logistics. The Kalmar RTCH lifts, moves, stacks and unstacks standard 20 ft and 40 ft ISO containers.

Crew: ea1

Maximum Lift Capability: This machine can move containers with a maximum weight of 24 t. It can stack containers three high and is capable of picking up a container in the second row. Container handler of the RT240 is capable of side shifting, rotation, tilting forward/rear or left/right

Note: The RT240 is capable of operating in up to 1.5 m of sea water.

Dimensions

Length: 14.55 m

Width: 3.66 m

Height: 3 m

Weight, Combat: 53.75 t

Automotive

Engine Name: Cummins QSM 11

Engine Type: Diesel

Engine Power: hp400

Maximum Speed: 37 km/h

Range: INA

Gradient: %27

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording: 1.5 m

Note: This machine uses two wheel steering for traveling on highway and four wheel steering for loading duties and operation in confined sites.

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Kalmar RT240 Rough Terrain Container Handler (RTCH) is a militarized model of commercial design. It was adopted by the US military. It is a successor to the Caterpillar RTCH, which entered service with the US military back in 1981. This machine operates on rough terrain, beaches and other unimproved surfaces. The US Army awarded production contract for new rough terrain container handler in 2000. This machine was first fielded in 2001. By 2004 the US Army operated 346 Kalmar RT240 container handlers. At that time the US Marine Corps ordered 25 RTCH systems with a possible order for another 80 systems. It is also in service with Australia and United Kingdom. The container handlers are used to handle standard shipping containers, that are the backbone of military logistics. The Kalmar RTCH lifts, moves, stacks and unstacks standard 20 ft and 40 ft ISO containers. This machine can move containers with a maximum weight of 24 t. It can stack containers three high and is capable of picking up a container in the second row. Container handler of the RT240 is capable of side shifting, rotation, tilting forward/rear or left/right. This machine can move containers on sites where there is minimal or often destroyed infrastructure. It can operate on various terrain, including sand, mud and even water. This military machine is powered by Cummins QSM 11 turbocharged multi-fuel diesel engine, developing 400 hp. Vehicle has all-wheel drive. This machine uses two wheel steering for traveling on highway and four wheel steering for loading duties and operation in confined sites. Also it has a crab steer for parallel drive when operating close to walls or other obstacles. The RT240 is capable of operating in up to 1.5 m of sea water. This container handler can be airlifted after short preparation by the C-17 or C-5 military cargo aircraft. During preparation transport height of this machine is reduced. However no disassembly is required. The Kalmar RTCH can operate in temperatures from -40°C to +50°C.

→→Smooth Drum Rollers and Vibratory Compactors

Caterpillar CB10 American Split Drum Vibratory Smooth Drum Roller





Tiers:



System

Alternative Designation: Caterpillar CB10
Type: Split Drum Vibratory Smooth Drum Roller
Manufacturer: Caterpillar
Crew: ea1

Dimensions

Length, Overall: 4495.8mm
Width, Overall: 1854.2mm
Wheel Base: 0.28m
Height - With Rops/Fops: 2971.8mm
Drum Diameter: 47in
Standard Compaction Width: 1701.8mm
Static Linear Load: 79.84kg
Travel Speed - Maximum: 12.08km/h
Maximum Compaction Width: 1854.2mm
Maximum Operating Weight With Cab: 12070.1kg
Standard Operating Weight With Rops: 10410kg
Maximum Operating Weight With Rops: 11791.2kg
Standard Operating Weight With Cab: 10670.8kg

Automotive

Engine Name: Cat C4.4 with ACERT Technology
Engine Type: Diesel
Gross Power: 97.7kw

Fuel Tank Capacity: 208.2L

Water Spray Tank Capacity: 836.6L

Drum

Drum Width: 1701.8mm

Nominal Amplitude - High: 0.7mm

Nominal Amplitude - Low: 0.4mm

Centrifugal Force Per Drum - Maximum: 8841kg

Centrifugal Force Per Drum - Minimum: 7698.9kg

Vibration Selection: Independent per drum, front only, rear only, both

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Caterpillar CB10 - Split Drum Vibratory Smooth Drum Roller.

→Counter-Mobility

→→Mine Laying Equipment

UMZ Russian 6x6 Scatterable Minelaying System



Tiers:

1 2 **3** 4

System

Alternative Designation: Multipurpose Minelayer
Chassis: ZIL-131B, KamAZ-63501, MT-Lou
Crew : ea2.0
Troop Capacity : N/A

↳Dimensions

Height, Overall : m2.5
Length, Overall : m7.1
Width, Overall : m3.0
Weight: mt10

Automotive

Engine Power : hp150.0
Engine Type: Gasoline
Fording Depth : m1.4
Range, Cruising : km525.0
Speed, Maximum Off-Road: km/h30.0
Speed, Maximum Road : km/h80.0
Speed, Maximum Swim : INA
Speed, Operating Minimum: km/h10.0
Speed, Operating Maximum: km/h40.0
Minefield Spacing Depth (m): m15.0

Speed, Operating Surface Laying : km/h40.0

Communications

↳*Radio*

Name: R-168

Mines

Combat Load : rdsAP, PFM-1S: 3,200. AP, POM-2: 5,000. AT, PTM-3: 600

Minelaying Pattern: Scattered

Time Required to Load Minelayer with One Basic Mine Load : min60-90

Time Required to Load Minelayer with Crew only : mINA

Type: AP, PFM-1S; AP, POM-2; AT, PTM-3

Payload Weight : kg15000.0

Protection

NBC Protection: INA

Smoke Screening System: No

Notes:

The UMZ has been disclosed as the likely replacement for the GMZ-series. The UMZ consists of three launchers mounted on each side of the vehicle for a total of six mine launchers per vehicle. each full turn launcher is hexagonally shaped and contains 30 launch tubes totaling 180. It can fire the mines to one or both sides, or to the rear. Both AP and AT mines are launched from the 140-mm launch tubes. The UMZ uses the same mine canisters as the PKM system. Depending on the position of the launch tubes, one-, two-, or three-lane mine fields can be laid. Minefield (m): length: 1,000 to 1,200. Depth (m): 30 to 120. Max length of minefield with one basic load (m): AP, PFM-1s: 3,200. AP, POM-2: 5,000. AT, PTM-3: 600. Mine capacity: from 180 to 11,520 depending on the type of mine number of mines in one basic load: AP PFM-1s: 11,520. AP POM-2: 720. AT PTM-3: 180. Variants: although primarily mounted on the ZIL-131B, the UMZ minelaying system has been observed mounted on several different carriers such as a modified MT-Blue chassis or on a PT-S tracked amphibious personnel carrier and most recently on the KamAZ-63501 in the UMZ-K Variant.

GMZ-3 Russian Tracked Minelaying Vehicle



Tiers:

1 2 3 4

System

Alternative Designation: GMZ-3; Gusenichniy Minniy Zagraditel

Type: Minelaying Vehicle

Family: GMZ-3

Manufacturer: Ural Transport Engineering Plant, Yekaterinburg, Russia

In Service: 1968-Present

Chassis: based on the chassis of the SA-4 Ganef

Crew: ea3 (commander, driver/mechanic, laying operator)

Passenger Capacity: INA

Note #1: here are three GMZ-3s in the engineering battalion of a typical tank division or motorized rifle division. It can be fully loaded by a squad of seven engineers in 15 to 20 minutes.

Note #2: The driver is also the mechanic.

Minelayer System

Minelayer Type: Plough-type dual-chute automatic

Mine Capacity: ea208

Mine Spacing Interval: m5-10

Minelaying per Minute (Underground): ea4

Minelaying per Minute (Aboveground): ea8

Depth Mine is Burried in Dirt: mm120

Depth Mine is Burried in Snow: mm500

Modes of Operation: Automatic or Manual

Maximum Weight Capacity (Single Mine): kg12

Land Navigation System: Yes

Dimensions

Length: m8.62

Width: m3.25

Height: m2.70

Weight, Combat: tons28.5

Ground Clearance: m0.43

Automotive

Engine Name: KaMAZ-7482

Engine Type: Water-cooled Diesel

Engine Power: hp525

Power to Weight Ration: 18.42 hp/metric ton

Maximum Range, Road: km500

Maximum Range, Carrying Mines: km300

Speed, Maximum Road: km/h60

Speed, Cruising: km/h40

Speed, Off-Road: km/h25

Speed, Laying Mines: km/h16

Speed, Burying Mines: km/h6

Speed Maximum Swim: km/hNot Amphibious

Gradient: 57.7

Side Slope: deg46.7

Vertical Step: m0.70

Trench: m2.5

Fording Depth: m1.0

Suspension: torsion bar; seven road wheels, front mounted drive sprocket, rear idler, four return rollers

Communications

Primary Radio: R-173

Secondary Radio: INA

Main Gun (Commanders)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: General Purpose Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-Present

Manufacturer: Degtyaryov plant

Proliferation: +1 Million

Max Rate of Fire: rds/min650

Effective Rate of Fire: 250-300 rds/min

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: 57-N-323S

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 meters: mm90

Fire Control

Laser Target Desinator: INA

Infrared System: TVNE-4B for driver

Commander Night Vision Device: K-3A Night Vision Device

Protection

Armor: INA

Applique Armor: Available

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes

Smoke Equipment: Yes, grenade launchers and additional system as part of engine design

IR Signature: INA

Notes:

The tracked mine-laying vehicle is designed to lay antitank mines in the progress of action in the soil (snow) with their concealment and on the surface of the soil (snow) without concealment. Mines are laid by being automatically delivered from the cluster to the dispersing mechanism and then through ports in the rear plate of the vehicle hull to the conveyer, which is

provided with a mechanism that arms the moving mines. When mines are laid on the ground (snow) surface, they are dispersed directly from the conveyer. When mines are laid with concealment, they are dispersed through the plow assembly and laid in a furrow made by the plow; after a delay they are finally armed. Mines laid in loose soils (snow) are concealed by back dumps

PMZ-4 (PMR-3) Russian Towed Mechanical Minelayer






Tiers:

1 2 **3** 4

System

Alternative Designation: INA
Chassis: Not applicable
Crew : ea6.0
Troop Capacity : ea0.0
Weight, Combat : mt1.8
Alternative Designation : INA
Chassis: Not applicable
Crew : ea6.0
Date of Introduction: INA
Proliferation: 17.0
Troop Capacity : eaNone
Weight, Combat : mt1.3

↳Dimensions

Height, Overall : m2.7
Length, Overall : m5.6
Width : m3.25
Height, Overall : m2.7
Length, Overall : m5.6
Width : m3.25

Automotive

Speed, Operating Burying: km/h2.5

Mine Spacing AP: m3.0

Mine Spacing AT: m4.0

Speed, Operating Surface Laying: km/h7.0

Operating Speed, Bulldozer : km/h2 to 3

Operating Speed, mine spacing : km/h3 to 4

Operating Speed, surface laying : km/h4 to 10

Mines

Combat Load : rdsSee notes

Fire on Move: No

Minelaying Pattern: Straight line

Minelaying Rate Burying AT: min10.0

Minelaying Rate Burying AP: min12.0

Type: TM-44, TM-46, TM-57, TM-62 SERIES, TM-72, TMD-B

Weight : kg1300.0

Fire on Move: No

Mine Combat Load: See notes

Mine Weight : kgINA

Minelaying Pattern: Straight line

Minelaying Rate : min10 to 12

Protection

NBC Protection: No

Smoke Screening System: No

NBC Protection: No

Smoke Screening System: No

Notes:

Originally designated the PMR-3 “Pricepnoi Minnyi Raskladchik” meaning “towed mine layer (surface)”, this apparatus was the first Soviet minelayer capable of burying mines as well as laying them on top of the ground. It consists of a single chute and a plow attachment. The attachment provides the option of burying the mines or depositing them on the surface of the ground. The PMR-3 equipment designation was later changed to PMZ-4 “Pricepnoi Minnyi Zagraditel” meaning “towed mine layer (buried)” as this designation was more accurate in describing the task carried out by this piece of equipment. The type of mines laid by this apparatus were the Soviet TM-44, TM-46, TM-57 or TM-62 series anti-tank mines. The mines could be spaced 4 to 5,5m apart depending on the control setting. If buried, the mines are placed at a depth between 6-12 cm while the vehicle traveled along at a speed of 5km/h. The trailer on its own weighed 1.8 metric tons. The towing vehicle could carry 120 to 300 mines depending on the capacity and type of vehicle. The SADF captured one of these trailers in Southern Angola during Ops Protea in 1981. The captured PMZ-4 minelayer trailer is seen pictured here while on display to the public at Oshakati. Prime equipment mover: 6x6 ZIL-131 truck (200 mines) or 4x4 Ural-375D (350 mines) or BTR-152 (120 mines). Max burial depth (cm): 20. PMR-3, (and the similar PMZ-4) consists of a single chute and a plow attachment. Differences: PMZ-4 (pic left) has a cable layer used for laying controlled minefields and does not have a conveyer-belt chain drive on the wheels. PMZ-4 hand loaded

only. Towed-minelayers are used in sections of three or four and operate 20 to 40 meters apart with each minelayer laying a straight-line row. Mines in different rows are staggered with the distance between mines depending on whether the mines are pressure-initiated or full-width attack (influenced or tilt-rod fuzed).

UMZ-K Russian 8x8 Multipurpose Minelaying Vehicle




Tiers:

1 2 3 4

Variants:

- **KamAZ-4350:**
- **KamAZ-5350:**

System

Alternative Designation: UMZ-K
Type: Multipurpose Minelaying Vehicle
Manufacturer: INA
Family: UMZ Series
In Service: 2015-Present
Crew: 1 + 2 men
Payload Capacity: 15,000 kg.
Towing Capacity: kg12,000
Launcher: The platform of the truck sits six multiple payload rotary launchers with fixed elevation mechanisms.
Tilt Angle: The tilt angle is 50 degrees, while its horizontal coverage is 90 degrees.
Basic Mine Load: 180 clusters
Types of Mines: antipersonnel (PFM, POM), anti-paratrooper (PDM) or antitank mines (PTM).
Maximum Length of Minefield: antipersonnel mines (PFM) – 3,200 meters; antipersonnel mines (POM) – 5,000 meters; antitank mines (PTM) – 600 meters.
Minefield Dimensions: The minefields it creates are 15 meters deep and 240 meters wide. Its mine-laying speed is up to 40 km per hour.

Dimensions

Length: m9.3
Width: m2.5
Height: m3.25
Weight, Combat: tons11.4

Automotive

Engine Name: KamAZ-740.50.360

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km1,000

Speed, Maximum Road: km/h95

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6 - 1.4

Fording Depth: m1.75

Communications

Primary: INA

Protection

Armor: It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

IR Signature: No

Notes:

Named the UMZ-K, it differs from its predecessor, the UMZ layer, first of all in its wheeled chassis. Unlike the UMZ, which is mounted atop a ZIL-131B cargo truck chassis, the new system is based on that of a KamAZ-63501.

→→Earthmovers and Bulldozers

John Deere 850J American Bulldozer





Tiers:

1 **2** 3 4

System

Alternative Designation: John Deere 850J
Type: Bulldozer
Manufacturer: John Deere
Crew: ea1
Note: This bulldozer is equipped with a detachable blade. A variety of blades are available. The most common is a universal blade with side wings, that allows to carry more material. Also this dozer can be fitted with a rear-mounted winch, or rake attachment.

Dimensions

Length: 4.99 m
Width: 3.8 m
Height: 3.3 m
Weight: 20 tons

Automotive

Engine Name: INA
Engine Type: Diesel
Engine Power: 200 hp
Transmission: INA
Maximum Speed: 11 km/h
Range: INA
Gradient: INA
Side Slope: INA
Vertical Step: INA
Trench: INA

Fording: INA

Protection

Hull Armor: For operation in hostile or combat areas these machines can be fitted with armored cabs. The add-on cab requires no modifications to the vehicle structure. It provides protection for the operator from small arms fire, artillery shell splinters and mine blasts. Bulldozers used by Australian armed forces are additionally fitted with anti-roll-over bars.

Applique Armor: INA

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The John Deere 850J is a commercial design. It follows the lines of the John Deere J-series dozers.

Caterpillar 277C American Multi Terrain Loader







Tiers:

1 2 3 4

System

Alternative Designation: Caterpillar 277C
Type: Multi Terrain Loader
Manufacturer: Caterpillar
Crew: ea1

Dimensions

Length - Track On Ground: 1808.48mm
Length - With Bucket On Ground: 3693.16mm
Length - Without Bucket: 2976.88mm
Length With Out Bucket: 2974mm
Width Over Tracks: 1981mm
Height To Top Of Cab: 2115mm
Ground Clearance: 223.52mm
Clearance At Max Lift And Dump: 2425mm
Reach At Max Lift And Dump: 618mm
Bucket Pin Height - Maximum Lift: 0.27m
Clearance At Maximum Lift And Dump: 2425.7mm
Height - Top Of Cab: 0.18m
Vehicle Width: 1981.2mm

Maximum Overall Height: 3997.96mm

Operating Weight: 4306.9kg

Breakout Force: 3314.9kg

Operating Load: 3200kg

Tipping Angle: 14715.855degrees

Automotive

Engine Name: C3.4 DIT

Engine Type: Diesel

Engine Power: 62.7kw

Transmission: INA

Maximum Speed: INA

Fuel Capacity: 98 liters

Range: INA

Departure Angle: 42 degrees

Turning Radius From Center - Inc Bucket: 2330mm

Turning Radius From Center - Machine Rear: 1627mm

Maximum Dump Angle: 40 degrees

Turn Radius From Center - Bucket: 2329.18mm

Turn Radius From Center - Coupler: 1485.9mm

Turn Radius From Center - Rear: 1625.6mm

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: No

NBC Protection: No

Smoke Equipment: No

Notes:

Caterpillar 277C Multi Terrain Loader

BTM-3 Russian Trenching Machine






Tiers:



System

Alternative Designation: BTM-3

Type: Trenching machine

Family: BTM

Crew: ea2

Troop Compartment Capacity: INA

Chassis: Russian T-54 medium tank, however their ends were swapped in order to make an engine compartment at the front. So the AT-T and BTM-3 are essentially driving backwards comparing with the T-54 tank.

Bulldozer Blade: Available

Crane: No

Ground Penetrating Radar: No

Mine Clearing: No

Minelaying Plow: Types, work rate?

Proofing Roller: No

Bucket Loader: No

Back-hoe Excavator: No

Scatterable Mine Dispenser: No

Ditch Trencher: Yes

Note: The BTM-3 could dig straight, zigzag, or curved trenches. The rotor unloads the soil next to the trench, creating front and rear parapet of the trench which is around 0.5 m tall and provides additional protection.

Dimensions

Length: m7

Width: m3.17

Height: m4.32

Weight, Combat: tons27.5 - 27.7 t

Automotive

Engine Name: A-401

Engine Type: Diesel

Engine Power: hp305

Maximum Range: km450-500

Speed, Maximum Road: km/h36

Speed, Average Cross: INA

Speed Maximum Swim: km/hNot Amphibious

Fording Depth: m1.1

Trench: up to 1.8 m

Communications

Tactical Radio: R-113 standard tank radio.

Trenching System

↳***System***

Type: "High-Speed Trenching Machine"

Dig Depth: up to 1.5 m

Earth working capacity (trench depth 0.4 - 0.5 m): 1 200 - 1 400 m/h

Earth working capacity (trench depth 1.1 m): 270 - 810 m/h

Earth working capacity (trench depth 1.5 m): 270 - 560 m/h

Emplacement: min5-7

Displacement: INA

Basic Trench: 1.1 m deep and 0.9 m wide

Full-Size Trench: 0.5 m deep and 1.1 m wide

Note #1: This machine was used by motorized and mechanized infantry units. Each Soviet motorized or mechanized division (10 000~13 000 soldiers) had 3 of these trenching machines.

Note #2: This trench-digging machine has a large rotor with buckets at the rear. There are a total of 8 buckets, with 160 l capacity each. The rotor is lowered behind the vehicle and digs trenches.

Protection

Hull Armor: Protection from small arms fire and projectile Splinters

Applique Armor: Available

Mine Clearing: Yes

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The fast trench-digging vehicle BTM-3 is designed to dig defensive and communication trenches in soils of up to IV type. The BTM consists of the basis vehicle and digging equipment. A heavy artillery prime-mover was used as the vehicle basis. When the vehicle is moving in transport mode, the gear box provides five gears for forward movement and one for backward. As soon as the vehicle starts digging trenches speed is decreased. The BTM can dig trenches in curves with a minimum radius of 25 m. The vehicle can switch from transport mode to operating (digging) mode in 10 minutes. When digging at 3rd gear, the BTM can approximately dig an 800 meter long man-sized trench in one hour.

Caterpillar D5 American Tracked Bulldozer





Tiers:

1 2 3 4

System

Alternative Designation: D5; D5K

Type: Track Bulldozer

Manufacturer: Caterpillar

Crew: ea1

Dimensions

Length with Blade: 4555mm

Length without Blade: 3544mm

Width Over Tracks: 2330mm

Height to Top of the Cab: 3002mm

Length of Track on Ground: 2388mm

Ground Clearance: 385mm

Track Gauge: 1770mm

Standard She Size: 560mm

Number of SHoes per Side: 41

Ground Contact Area: 2.68m2

Number of Track Rollers per Side: 7

Ground Pressure: 42.89kPa

Operating Weight: 11,700kg

Standard Blade Width: 3077mm

Standard Blade Height: 1109mm

Standard Blade Capacity: 2.6m3

Standard Blade Cutting Depth: 441mm

Automotive

Engine Name: 3116T
Engine Type: Diesel
Gross Power: 90.3kw
Net Power: 82.1kw
Power Measured: 2100 rpm
Aspiration: Turbocharged
Fuel Capacity: 218L
Transmission:
Max Speed, Forward: 10km/h
Max Speed, Reverse: 12.1km/h

Protection

Hull Armor: INA
Applique Armor: No
Mine Clearing: INA
Self-Entrenching Blade: Yes
NBC Protection: INA
Smoke Equipment: No

Notes:

Caterpillar is an American international company that specializes in industrial and farming equipment, including tractors, bulldozers and wheel loaders. The company started in 1925, and it is headquartered in Peoria, Illinois. One of its products is the Caterpillar D5 Crawler Tractor, which is a type of bulldozer. A bulldozer comes with a wide metal plate that you can use to push material around. Buy Caterpillar equipment from authorized dealers, or rent one for a period time.

→→Front-End and Backhoe Loaders

HMEE British 4x4 Backhoe Loader





Tiers:



System

Alternative Designation: HMEE

Type: Backhoe Loader

Manufacturer: JCB

Mission: The HMEE is used for a wide range of mobility, counter-mobility, survivability and general engineering missions. It can perform excavation tasks and then quickly self-deploy to the next mission site.

Crew: ea2

Attachments: The HMEE has a wide array of attachments. These include a range of shovels, wide range of excavator buckets, excavator mounted hydraulic hammer, fork frame, sand bagger, snow plough and other attachments. It is capable of lifting more than 2 t and can dig to a depth of nearly 4 m.

Note: The JCB HMEE is a unique high-mobility excavation system. It can self-deploy and support fast moving forces on long range operations without the need of a trailer.

Dimensions

Length: 8.54 m

Width: 2.49 m

Height: 3.48 m

Weight: 11.99 tons

Automotive

Engine Name: Cummins ISB 02

Engine Type: Diesel

Engine Power: 185 hp

Transmission: INA

Maximum Speed: 100 km/h

Range: 600 km

Gradient: %60

Side Slope: %30

Vertical Step: 0.62 m

Trench: 0.6 m

Fording with deep Fording Kit: 0.76 m

Protection

Hull Armor: INA

Applique Armor: This military construction vehicle can be fitted with an armored cab, which provides protection against small arms fire, artillery shell splinters, landmines and IEDs.

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The JCB HMEE (High Mobility Engineer Excavator) is a military vehicle made by JCB. The HMEE is an armoured backhoe loader designed for high speeds in order to self-deploy with military convoys. Most backhoes are limited to much lower speeds.[2] It is also capable of towing heavy loads and has good off-road mobility. It is based on technology from the JCB Fastrac tractors.

Bobcat B300 American Loader Backhoe







Tiers:

1 2 3 4

System

Alternative Designation: Bobcat B300
Type: Loader Backhoe
Manufacturer: Bobcat
Crew: ea1

Dimensions

Transport Length: 5880 mm
Transport Width: 1873 mm
Wheelbase: 1819 mm
Height To Top Of Suspended Cab: 2326 mm
Operating Weight 4wd: 4200.3kg

↳*Backhoe*

Load Height - Std: 2796 mm
Reach From Swivel - Std: 4236 mm
Dig Depth - Std: 3368 mm
Bucket Dig Force - Std: 3094 kg

↳*Loader*

Clearance At Max Dump Height: 2043mm

Reach At Max Dump Height: 416mm
Dig Depth: 70mm
Lift Capacity At Full Height: 1431kg
Bucket Breakout Force: 37.5kN
Bucket Width: 1873mm
Bucket Capacity: 0.5m3

Automotive

Engine Name: V2203
Engine Type: Diesel
Net Power: 34.4kw
Transmission Type: hydrostatic
Fuel Capacity: 95.1L
Turning Radius: 4495.8mm
Max Speed - Forward: 17.6km/h
Tire Size Front - 2wd / 4wd: 12x16.5
Rear Tires Size 2wd/4wd: 12x16.5

Protection

Hull Armor: INA
Applique Armor: No
Mine Clearing: No
NBC Protection: INA
Smoke Equipment: No

Notes:

Bobcat B300 Loader Backhoe

HMEV Australia 4x4 Backhoe Loader



Tiers:



System

Alternative Designation: HMEV

Type: Backhoe Loader

Manufacturer: Thales Australia

Crew: ea1

Note: The HMEV is designed to dig combat emplacements, trenches, firing positions, fill ditches and clear obstacles. In the basic role this machine is fitted with a backhoe and a front-end loader. The HMEV can dig to a depth of over 4 m. The front-end loader can be adapted to carry a fork-lift attachment. Other accessories, such as a snow plough, compactor, rock breaker and earth auger are optional.

Dimensions

Length: 8.54 m

Width: 2.49 m

Height: 3.49 m

Weight: 11.5 t

Automotive

Engine Name: Cummins 6BTA5.9-C185

Engine Type: Diesel

Engine Power: 185 hp

Transmission: INA

Maximum Speed: 100 km/h

Range: 600 km

Gradient: 60

Side Slope: 30

Vertical Step: 0.62 m

Trench: 0.6 m

Fording: 0.76 m

Protection

Hull Armor: INA

Applique Armor: Armor protection can be added to the cab for protection against small arms fire, artillery shell splinters and IED blasts.

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The HMEV (High Mobility Engineering Vehicle) is a wheeled engineering vehicle capable of traveling at high speed on/off road. The HMEV was selected by the Australian Army and 27 HMEVs were delivered. In December 2001 the US Army selected the HMEV vehicle for its IHMEE (Interim High Mobility Engineering Excavator) program ordering up to 62 HMEV vehicles. Canada, the United Arab Emirates and some NATO countries are evaluating the HMEV vehicle. The HMEV features self-deployment, cross-country, capability, highway speed of 100 km/h, diesel engine rated at 185-hp, earth moving functions, trailer towing of up to 8,000 kg, air-conditioning, lightweight armor, air transportable capability (C-130 and CH-47) and stores for an optional operator. The vehicle was selected by the US Army under the designation Interim High Mobility Engineering Excavators or IHMEE. Up to 40 IHMEEs will be procured by the US Army with final deliveries scheduled in 2004. ADI hopes that this purchase boosts international orders.

Hitachi LX120 Japanese Super Wheel Loader




Tiers:



System

Alternative Designation: Hitachi LX120

Type: Super Wheel Loader

Manufacturer: Hitachi

Crew: ea1

Dimensions

Length With Bucket On Ground: 7,610mm

Width Over Tires: 2,520mm

Height To Top Of Cab: 3,300mm

Wheelbase: 3,030mm

Hinge Pin - Max Height: 3,890mm

Reach At Max Lift And Dump: 1,080mm

Ground Clearance: 435mm

Operating Weight: 12,712kg

Static Tipping Weight: 9,595.8kg

Automotive

Engine Name: 6068T

Engine Type: Diesel

Net Power: 108.2kw

Power Measured: 2,200rpm

Max Torque: 570Nm

Displacement: 6.8L 6.8L

Aspiration: Turbocharged

Fuel Capacity: 249L

Turning Radius: 6,060mm

Operating Voltage: 12V

Rear Axle Oscillation: 26 degrees

Tire Size: 20.5x25

Transmission Type: Power Shift

Number Of Forward Gears: 4

Number Of Reverse Gears: 3

Max Speed - Forward: 37.1km/h

Max Speed - Reverse: 24.5km/h

Bucket

Dump Clearance At Max Raise: 2730mm

Bucket Capacity - Heaped: 2.3m3

Bucket Capacity - Struck: 2.01m3

Breakout Force: 130.81kN

Hydraulic System

Relief Valve Setting: 19305.4kPa

Pump Flow Capacity: 231L/min

Raise Time: 5.8sec

Dump Time: 1.7sec

Lower Time: 3.5sec

Pump Type: Gear

Protection

Hull Armor: None

Applique Armor: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

Widely Proliferated Super Wheel Loader

Bobcat S650 American Skid-Steer Loader







Tiers:



System

Alternative Designation: Bobcat S650 Skid Steer Loader	
Type: Skid Steer Loader	
Manufactuer: Bobcat	
Crew: ea1	
Rated Operating Capacity (SAE): 2690 lbs	
Tipping Load: 5380 lbs	
Turning Radius: 82.9 in	

Dimensions

Length without Attachment: 108.4 in	
Length with Standard Bucket: 136.8 in	
Width: 72.1 in	
Width (with bucket): 74 in	
Height: 81.3 in	
Height with Operator Cab: 81.3 in	
Height to Bucket Hinge Pin: 124 in	
Operating Weight: 8327 lbs	
Reach @ Maximum Height: 31.5 in	
Wheelbase: 45.3 in	

Automotive

Engine Name: S650	
Engine Type: Diesel	
Engine Cooling: Liquid	
Engine Power: 74.3 HP	

Turbocharged Engine: Yes

Travel Speed: 7.1 mph

Travel Speed (2-speed option): 12.3 mph

Fuel Tank: 27.2 gal

System Relief @ Quick Couplers: 3500 psi

Auxiliary Std Flow: 23 GPM

Auxiliary High Flow: 30.5 GPM

Protection

Hull Armor: INA

Applique Armor: No

Mine Clearing: Yes

NBC Protection: No

Smoke Equipment: No

Notes:

The Bobcat® S650 skid-steer loader is a vertical lift path model in the 600 frame size. It offers increased lifting capacity and provides greater forward reach at full lift height for loading trucks. The Tier 4 diesel engine delivers power and performance. The new Bobcat® S650 skid steer loader is part of the M-Series. With its vertical lift path, the S650 gives you increase lifting capacity and provides greater forward reach at full lift height for loading over dump trucks. Like all M-Series models, the S650 has an industry-leading cab design that offers improved visibility and operator-friendly features such as cab forward design with the optional pressurized cab, air ride seats and seat-mounted joysticks. The S650 has powerful hydraulics, top digging and pushing power, and increased fuel capacity. Stay productive with simple maintenance checks and simple design. To help you become even more productive, Bobcat offers more attachments for more carriers than anyone in the industry. Bobcat is the only major compact equipment company that manufactures a majority of its attachments. 12-Volt Power Accessory: Your cab is your office. That’s why Bobcat installed a 12-volt power accessory for charging your mobile phone, MP3 player or other accessories. Air-Ride Seats: Achieve optimum suspension comfort with the optional air-ride seat. Air suspension adjusts to your weight, helping you smooth out the bumps on your jobsite and increasing your comfort. Better Visibility: Visibility has been significantly increased in all directions. The rear window is 14% larger and the size of the top window is now 43% larger, providing a big advantage when loading a truck or using attachments with raised lift arms. Cab-Forward Design: The new design moves the operator area closer to the attachment and gives you a better vantage point for your work area. Convenient Engine Speed Controls: The engine speed control has been moved out in front of the operator, on the right-hand corner post of the cab. Convenient Storage: New storage bins are located throughout the machine. Store items wherever it’s convenient! Cup Holders: The cup holders hold 20oz. soda bottles all the way up to super-sized cups and coffee mugs. Deluxe Instrumentation Panel: This intelligent Bobcat option helps you prevent theft with keyless start and enables better operation by closely monitoring and interacting with your machine. A new 4.5-inch LED screen with full-color capability offers increased readability and interaction. Easy-to-read virtual sweep gauges allow you to quickly read and understand operation levels. Easy-Pull, Easy-Secure Side Window: Simply pull the new window knob to slide the side window to five lockable positions. The window stays exactly where you want it to get consistent air flow. Extra Elbow Room, Easier Cleaning: Windows are mounted on the outside of the Roll-Over Protection System (ROPS) – which provides extra elbow room in the cab, and makes window cleaning much faster. Fingertip Controls: Attachments are more comfortable to operate, controlled easily and adjusted simply from the fingertip controls. Flexible Joystick Positioning / Seat-Mounted Joystick Control: Joystick mounts on our SJC- equipped (Selectable Joystick Controls) machines slide forward and backward independent of the seat, adjusting to the individual comfort positions of different-sized operators. The seat-mounted joystick control provides flexible control through seat-mounted joysticks on models with optional SJC; as the suspension seat shifts up and down, the joysticks move with the seat. Foot Well Cleaning Access: Two cleanout holes in the foot well allow for easier removal of mud and debris that enter the cab. Heat and Air Conditioning: Because our optional AC units are integrated into the machine, there is no bulky add-on unit to obstruct your visibility. Automotive-style vents allow you to point the air where you need it for greater comfort in all weather conditions. Large Entry/Exit: On machines with enclosed cabs, Bobcat provides a large swing open door to make it easier to enter and exit the cab. A lowered door threshold gives you increased visibility to your attachment and the surrounding work area – making it easier to see and do your work. More Room: Our stronger, narrower loader arms make a wider cab possible, with up to 20% more interior space than competitors, keeping you comfortable. Operator Switches:Puts important controls in front of you on the cab corner posts. Pressurized Cab: Bobcat loaders with enclosed cabs have a best-in-class, pressurized interior space that

helps keep dust to a minimum. A new, one-piece pressure seat engages the entire door on the front and sides, compressing the door seal into a specialized curved door pocket keeping dust and debris out of the cab. Radio Capable: Order your loader with a stereo to increase your comfort. The radio features an auxiliary audio input jack that is ready for an MP3 player or other audio device. Rear Defrost:Defrosts the new, larger rear window with new rear air ducts. Suspension Seat: Other comfort items include an optional fully adjustable suspension seat, adjusting easily to the operator’s weight. Features S650: Joystick Control Air Conditioning Adjustable Seat Backup Alarm BICS System (Interlock) Cab Enclosure Sound Option Cab Heater Operating Lights Parking Brake Radio Rear Window Top Window Lift-Arm Support Seat Belt Suspension Seat Two Speed Travel Deluxe Instrumentation Engine Shutdown Hydraulic Bucket Positioning High Flow Option Auxiliary Hydraulics Spark Arrestor Muffler Bob-Tach Attachment System Power Bob-Tach ACS (Switchable Controls) Ride Control Rear Hydraulics

WA600-8 Japanese Large Size Front-End Loader





Tiers:



System

Alternative Designation: WA600-8

Type: Large Size Front-End Loader

Crew: ea1

Dimensions

Length: 471.86in

Width Over Tires: 11.62ft in

Wheelbase: 14.77ft in

Height To Top Of Cab: 14.64ft in

Turning Circle: 56.47ft in

Operating Weight: 119049.7lb

Automotive

Engine Name: SAA6D170E-5

Engine Type: Water-cooled, 4-cycle

Horsepower, Gross-Sae J1995: 531.1hp

Horsepower, Net-Iso 9249: 527.1hp

Steering System Type: Articulated

Minimum Turning Radius At The Centre Of Outside Tire: 23.3ft in

Lubrication Method: Gear pump, force-lubricatio

Filter: Full-flow type

Governor: All-speed, electronic

Aspiration: Turbocharged, after cooledEGR

Fuel System: Direct injection

Brake: Hydraulic, Wet disc

Ride Control System: Standard

Maximum Speeds/Fwd Mph (Km/H): 37

Maximum Speeds/Rev Mph (Km/H): 37

Transmission: Automatic Powershift

Number Of Speeds - Forward: 4

Number Of Speeds - Reverse: 4

Fuel Tank - Diesel: 189.7gal

Engine Oil: 22.8gal

Max Speed - Forward: 21.1mph

Max Speed - Reverse: 23mph

Parking Brake: Wet

Service Brake: Hydraulically actuated

Emergency Brake: Parking brake is commonly used

Drive System: Four-wheel drive

Operational

Bucket Capacity Range – Sae: 6.4 - 7.0 m3

Standard Bucket Capacity – Sae: 8.4yd3

Bucket Description: GP Bucket, Bolt Edge

Static Tipping Load,Full Turn: 50510.2lb

Breakout Force: 25000 kgf

Dump Clearance, @45 Degrees Dump Angle: 10.9ft in

Dump Reach, @45 Degrees Dump Angle: 5ft in

Bucket Width: 9ft in

Bucket Link Type: Z-bar

Hydraulic System

Steering Pump Type: Piston Pump

Loader Control Type: Piston Pump

Number Of Cylinders: 2

Bore: 4.6in

No.Of.Bucket Cylinders: 1

Loader Control Capacity: 126.3gal/min

Control Valve: 2-spool type

Control Positions Boom: Raise, hold, lower, and float

Control Positions Bucket: Tilt-back, hold, and dump

Hydraulic Cylinders Type: Double-acting, piston type

Lift Cylinder Stroke: 42.1in
Lift Cylinder Bore: 7.9in
Bucket Cylinde Bore: 8.9in
Bucket Cylinde Stroke: 30.6in
Pump Flow Capacity: 43.1gal/min
Raise Time: 9.3sec
Dump Time: 2.3sec
Lower Time: 4.1sec

Notes:

Machine Performance Redesigned Komatsu bucket with liner and bolt- on ground engagement tooling (GET) fills more easily and retains material better for up to 7% increased productivity. Powerful Komatsu SAA6D170E-7 Tier4 Final engine with advanced engine timing optimizes performance and reduces emissions. Variable traction control and modulated clutch systems provide optimal tractive effort for all ground conditions. Large Capacity Lock-up Torque Converter provides quick acceleration and automatically engages in 2nd, 3rd, and 4th gear, requiring no action from the operator. Ultimate Efficiency Automatic Digging System performs bucket curl and boom lift during digging to reduce operator fatigue and help optimize bucket fill factors. Komatsu SmartLoader Logic helps reduce fuel consumption without decreasing production. Fuel Consumption Decreased up to 13% in E mode. Dual work modes allow the operator to select between Power and Economy modes to optimize the machine efficiency and performance to match the application. Komatsu Quality All major hydraulic and power train components (engine, transmission, pumps, cylinders, etc) are designed and manufactured by Komatsu which helps increase efficiency and performance by working together in harmony. Castings are used in high stress areas such as the bell-crank to increase durability and visibility. Standard RH full fender with steps and handrail provides improved access to engine compartment for daily checks. Operator Environment The pillar-less operator's cabin provides the operator with a large, quiet and pressurized work environment while providing excellent visibility during operation. New high capacity air suspension operator's seat with heat and dampener is now standard. New 7'' LCD high resolution monitor with key pad allows the operator fast, accurate viewing of operational information. New rear view monitor system with separate monitor is standard. Standard Advanced Joystick Steering System (AJSS) helps optimize steering control while reducing operator fatigue. Maintenance KOMTRAX Komatsu CARE complimentary factory scheduled engine maintenance for 3 years or 2,000 hrs, and up to 2 complimentary KDPF exchange assemblies within the first 5 years. Battery disconnect switch is located at ground level and can be locked with a standard padlock. Reversible cooling fan swings out for ease of cleaning. Convenient Diesel Exhaust Fluid (DEF) fill access with sight gauge. Standard onboard diagnostics with KOMTRAX, monitor machine utilization, maintenance reminders, fuel consumption, working modes, KDPF regeneration, DEF level, payload data, and receive e-mail notifications of important events.

→→Excavators

PC35MR-3 Japanese Small Size Hydraulic Excavator





Tiers:



Variants:

- **Note:** There is numerous variants of the PCM35M. You can view these different variants at the following website: https://www.komatsuamerica.com/

System

Alternative Designation: PC35MR-3
Type: Small Size Excavator
Crew: ea1

Dimensions

Tail Swing Radius: 950mm
Track Gauge: 1440mm
Track Shoe Width: 300mm
Crawler Length: 2105mm
Boom Swing Angle Lh: 75degrees
Boom Swing Angle Rh: 55degrees
Bucket Offset Lh: 580mm
Bucket Offset Rh: 770mm
Overall Length: 4825mm
Overall Height: 2520mm
Overall Width: 1740mm
Operating Weight: 3580kg
Digging Depth – Maximum: 3110mm
Digging Reach – Maximum: 5300mm
Arm Crowd Force – Iso: 2100 kgf

Maximum Reach @ Ground Level: 5170mm

Swing Radius: 950mm

Bucket Size – Kga Standard Gp: 0.1m3

Automotive

Engine Name: Komatsu 3D88E–6

Engine Type: Direct injection

Power Measured: 2400rpm

Flywheel Horsepower: 21.4kw

Number Of Cylinders: 3

Fan Drive Type: Mechanical

Starter: 2.3 kW

Operation Voltage: 12V

Battery: 58 Ah

Alternator: 40 A

Fuel Tank: 44L

Hydraulic Tank: 14L

Engine Oil: 6.7L

Coolant: 3.3L

Performance

Travel Speed (Maximum): 4.8km/h

Travel Speed (Minimum): 2.8km/h

Swing Speed: 9rpm

Ground Pressure: 35.2kPa

Max. Traction Force: 3400kg

Gradeability: 30degrees

Bucket Digging Force (Iso): 3050kg

Arm Crowd Force (Iso): 2100kg

Undercarriage

Number Of Shoes Per Side: 44 (steel)

Max Drawbar Pull: 3400kg

Number Of Carrier Rollers Per Side: 1

Adjustment Of The Track Tension: Grease

Number Of Track Rollers Per Side: 4

Hydraulic System

Type Of Hydraulic Pump: Variable capacity x 2 gear x 1
Max. Oil Flow: 36.1x2+19.8 9.5x+5.2
Hydraulic Motor (Travel): Variable capacity x 2
Hydraulic Motor (Swing): fixed capacity x 1
Max. Pressure Setting: 25993.3kPa
Auxiliary Hydraulic Flow: 70L/min

Blade

Blade Width: 1740mm
Blade Height: 355mm

Notes:

The Komatsu PC 35 MR 3 is a 3.29t machine with Komatsu engine which powers this model with up to 21.6kW or 28 horse power. The PC 35 MR 3 is categorised in the medium sized machine segment in the mini excavators category. The PC 35 MR 3's size is 2.52m x 4.8m x 1.7m. The bucket of PC 35 MR 3 has a capacity of 0.12m³ which is average for this type of machine. The PC 35 MR 3 is manufactured and distributed with Blade and Rubber track. It does not include Track adaption, Quick hitch hydr. And Quick hitch mech.. There are more detailed specifications and machine descriptions available in the original Komatsu PC 35 MR 3 specs data sheet. Available in Romanian, Portuguese, German, Russian, Dutch, Czech, English, Italian, Finnish, Spanish and French, LECTURA Specs offers a free download of highly detailed specifications and machine descriptions of this model. The production is still going in 2017, where this PC 35 MR 3 is available at a new list price between €56000 and €72000. For more detailed information about pricing and current residual values, check out the LECTURA Valuation system. At present, 15 other mini excavators, which range from 0.9t up to 5.3t are produced by Komatsu. Of these, PC 26 MR 3, PC 30 MR 3 and also PC 16 R 3 HS are the most frequently visited on LECTURA Specs. Ranked in the LECTURA index at #5, this PC 35 MR 3 mini excavator has models that date from 2008 to 2017. Currently, 15 models of the PC 35 MR 3 mini excavator exist, at an average sale value of €16500 at 8 years of age.

PC130-8 Japanese Medium Size Hydraulic Excavator







Tiers:

1 2 3 4

Variants:

- **Note:** There are numerous variants of the PC130. You can view all Komatsu equipment at the following website: https://www.komatsuamerica.com/

System

Alternative Designation: Komatsu PC130-8

Type: Exavators

Crew: ea1

Dimensions

Shipping Length Of Unit: 7590mm

Shipping Height Of Unit: 2875mm

Max Cutting Height: 8650mm

Max Loading Height: 6210mm

Max Reach Along Ground: 8170mm

Max Vertical Wall Digging Depth: 4980mm

Max Digging Depth: 5520mm

Boom/Stick Option (Hex) 1: One-piece boom 4600mm 15\'1\"/ Arm 2500mm 8\'2\"

Ground Clearance: 400mm

Height To Top Of Cab: 2855mm

Width To Outside Of Tracks: 2590mm

Length Of Track On Ground: 2880mm

Tail Swing Radius: 2190mm

Removal Counterweight Clearance: 895mm

Track Gauge: 1990mm

Shoe Size: 600mm

Operating Weight: 12560kg

Automotive

Engine Name: SAA4D95LE-5
Engine Make: 2238
Number Of Cylinders: 4
Net Power: 68kw
Gross Power: 72kw
Power Measured: 2200rpm
Displacement: 3.3L
Aspiration: Turbocharged, air-to-air aftercooled
Drawbar Pull: 123kN
Number Of Carrier Rollers Per Side: 1
Number Of Shoes Per Side: 43
Number Of Track Rollers Per Side: 7
Ground Pressure: 32.62kPa
Fuel Capacity: 247L
Operating Voltage: 24V
Hydraulic System Relief Valve Pressure: 34818.5kPa
Hydraulic Pump Flow Capacity: 242L/min

Swing Mechanism

Swing Speed: 11rpm

Buckets

Reference Bucket Capacity: 0.5m3
Minimum Bucket Capacity: 0.2m3
Maximum Bucket Capacity: 0.6m3

Notes:

The PC130-8 excavator is equipped with five working modes (P, E, L, B and ATT mode). Each mode is designed to match engine speed and pump speed with the current application. This provides the flexibility to match equipment performance to the job at hand.

PC360LC-11 Japanese Large Size Hydraulic Excavator







Tiers:



System

Alternative Designation: PC360LC-11
Type: Hydraulic Excavator
Crew: ea1

Overall Dimensions

Overall Length: 5880mm
Ground Clearance: 498mm
Height To Top Of Cab: 3160mm
Length Of Track On Ground: 4350mm
Tail Swing Radius: 3445mm
Track Gauge: 2590mm
Overall Height (To Top Of Boom): 3400mm
Track Length: 4955mm
Removal Counterweight Clearance: 1185mm
Shoe Width: 850mm
Operating Weight: 35900kg

Dimensions, Option 1 (Boom/Stick Option Hex 1)

Max Vertical Wall Digging Depth: 5120mm
Max Digging Depth: 6355mm
Max Digging Height: 9580mm
Boom/Stick Option (Hex) 1: Arm - 2.25 m
Max.Dumping Height: 6595mm
Bucket Digging Force - Sae: 242.23kN
Minimum Swing Radius: 4390mm

Max Digging Reach On Ground: 9950mm

Max Digging Reach: 10155mm

Arm Crowd Force - Sae: 219.67kN

Dimensions Option 2 (Boom/Stick Option Hex 2)

Max Reach Along Ground: 10355mm

Max Vertical Wall Digging Depth: 5880mm

Max Digging Depth: 6705mm

Minimum Swing Radius: 4400mm

Max. Digging Height: 9965mm

Max.Dumping Height: 6895mm

Arm Crowd Force-Sae: 187.31kN

Boom/Stick Option (Hex) 2: Arm - 2.6 m

Bucket Digging Force - Sae: 242.23kN

Max Digging Reach: 10550mm

Dimensions Option 3 (Boom/Stick Option Hex 3)

Max Reach Along Ground: 10920mm

Max Vertical Wall Digging Depth: 6480mm

Max Digging Depth: 7380mm

Max. Digging Height: 10210mm

Boom/Stick Option (Hex) 3: Arm - 3.2 m

Max Digging Reach: 11100mm

Minimum Swing Radius: 4310mm

Bucket Digging Force - Sae: 211.83kN

Arm Crowd Force-Sae: 159.85kN

Max.Dumping Height: 7110mm

Dimensions Option 4 (Boom/Stick Option Hex 4)

Max Reach Along Ground: 11730mm

Max Digging Depth: 8180mm

Arm Crowd Force-Sae: 134.36kN

Boom/Stick Option (Hex) 4: Arm - 4.0 m

Bucket Digging Force - Sae: 211.83kN

Max Digging Reach: 11900mm

Max Vertical Wall Dig Depth: 7280mm

Max. Digging Height: 10550mm

Max.Dumping Height: 7490mm

Minimum Swing Radius: 4320mm

Automotive

Engine Name: SAA6D114E-6

Number Of Cylinders: 6

Net Power: 191.7kw

Gross Power: 202.1kw

Power Measured @: 1950rpm

Displacement: 8.9L

Aspiration: Turbocharged

Bore: 114mm

Stroke: 144.5mm

Swing Drive: 14L

Fuel Tank: 605L

Engine Oil: 38.5L

Max Speed: 5.5km/h

:

Swing Mechansim

Swing Speed: 9.5rpm

Swing Torque: 103000.1Nm

Notes:

PC360LC -11 Power and Performance Powered by a Komatsu SAA6D114E-6 Tier 4 Final certified engine, featuring an integrated diesel particulate filter, hydraulically actuated Komatsu Variable Geometry Turbocharger, and Selective Catalytic Reduction system. Large counterweight and robust undercarriage provide solid over the side stability while lifting. Reduced cooled exhaust gas recirculation rate and advanced engine timing improve combustion efficiency and engine response. High performance final drive assemblies provide high drawbar pull for improved steering performance and maneuverability. Advanced Hydraulic System New hydraulic pump control logic provides up to 4% increased performance compared to the PC360LC-10. High displacement hydraulic pumps provide high flow rates at reduced engine RPM for improved fuel efficiency. A Closed Center Load Sensing hydraulic system ensures smooth operation, quick cycle times, and great multi-function while lowering fuel consumption. Efficiency is further improved with a quick arm return valve and by reducing hydraulic loss within the control valve and hydraulic circuit. Enhanced Cab and Monitor Panel The large quiet reinforced cab has an integrated ROPS design. A high capacity operator seat comes standard with an air suspension and is heated for improved comfort. The LCD color monitor panel has an updated screen that combines a rear view camera display together with key gauges and information. Attachment control stores up to 10 work tools and the machine can run attachments while operating in Economy mode to save fuel. A rear view monitoring system with one camera is standard and allows the operator to view directly behind the machine. Simple and Convenient Maintenance Serviceability is enhanced for simplicity and convenience to make sure it gets done. Left and right guardrails on the upper structure to provide a convenient work area in front of the engine. A battery disconnect switch cuts power to the machine during service or electrical work. Service points are grouped for convenience and filters are accessible from ground level. Maintenance intervals are monitored and stored in the large monitor panel. Reliable Machine Design All major components are designed and manufactured by Komatsu which allows the engine and hydraulic systems to be optimized to maximize efficiency. A high efficiency dual element fuel filter and pre-filter with water separator provides engine protection from fuel contaminants. Triple labyrinth final drive seal shields provide improved durability and floating seal protection. The work equipment features large and durable one piece steel castings in the boom foot, boom tip, and arm tip.

→Survivability

→→Recovery Vehicles

Type 85 Chinese Armored Recovery Vehicle



Tiers:



Variants:

- **W653A or Type W653-I:** Features a crane with a telescopic jib with a maximum lifting capacity of 20 metric tons.

System

Alternative Designation: Type 653
Manufacturer: China North Industries Corp. (NORINCO), Beijing, China Heavy Defense Industries (HDI), Taxila, Pakistan
Crew: ea5
Passenger Capacity: NA
Chassis: Type 69 II
Blade Characteristics: Hydraulic
Crane Characteristics: Hydraulic (On right side of the hull)
Crane Capacity: m/t70
Addition Equipment: Auxiliary winch, tools, tow bars, and cables

Dimensions

Length: m6.24
Width: m3.29
Height: mINA
Weight, Combat: kg38,000

Automotive

Engine Name: Model 12150L-7BW
Engine Type: Liquid-cooled, V12 diesel
Engine Power: hp580 hp at 2,000 rpm

Cruising Range: km440

Speed, Maximum Road: km/h50

Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording Depth: m1.4

Protection

Armor, Hull Rear: mm46

Armor, Hull Top: 33

Armor, Glacis: mm97

Mine Clearing: Limited with blade

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes, engine exhaust (Not on Thai version)

Notes:

The Type 85 is a tracked armored fighting vehicle produced by Chinese company Norinco. Designed after the chassis of a Type 69 II to recover Type 69s and other similar or lighter vehicles. Thanks to its hydraulic crane, the Type 85 can also be used to assist with maintenance or repair while conducting tasks such as removing engines and / or transmissions. The main winch can be used for multiple tasks but, is primarily used for recovery of vehicles or self recovery. The winch has a 70 metric ton capacity. Using its front mounted hydraulic dozer blade, the Type 85 can also be used in a mobility role as it can remove obstacles and a defensive role as it assists in building fighting positions. The improved version of the Type 85, also known at the W653A or Type W653-I, has a crane with a telescoping jib and a max capacity of 20 metric tons. The Type 85 has also be produced under license by Pakistan.

Type 84 Chinese Armored Recovery Vehicle





Tiers:



Variants:

- **W653A or Type W653-I:** Features a crane with a telescopic jib with a maximum lifting capacity of 20 metric tons.

System

Alternative Designation: Type 653
Manufacturer: China North Industries Corp. (NORINCO), Beijing, China Heavy Defense Industries (HDI), Taxila, Pakistan
Crew: ea5
Passenger Capacity: NA
Chassis: Type 69 II
Blade Characteristics: Hydraulic
Crane Characteristics: Hydraulic (On right side of the hull)
Crane Capacity: m/t70
Addition Equipment: Auxiliary winch, tools, tow bars, and cables

Dimensions

Length: m6.24
Width: m3.29
Height: mINA
Weight, Combat: kg38,000

Automotive

Engine Name: Model 12150L-7BW
Engine Type: Liquid-cooled, V12 diesel
Engine Power: hp580 hp at 2,000 rpm
Cruising Range: km440
Speed, Maximum Road: km/h50
Gradient: %60

Side Slope: %40

Vertical Step: m0.8

Trench: m2.7

Fording Depth: m1.4

Protection

Armor, Hull Rear: mm46

Armor, Hull Top: 33

Armor, Glacis: mm97

Mine Clearing: Limited with blade

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes, engine exhaust (Not on Thai version)

Notes:

The Type 84 is an armored recovery vehicle based on the Type 69 tank and used by the PLA Army. The Type 84 was designed to change power packs, clear obstacles and prepare firing positions. The Type 84 features a powered structure controlling a dozer blade at the front of the hull and a hydraulically powered crane. The crane is capable of lifting up to 70 tons. Originally designated as Type 653, later versions by Norinco were re-classified as Type 84.

GCZ-112 Chinese Tracked Multi-Purpose Engineer Vehicle (TMPEV)



Tiers:



System

Alternative Designation: GCZ112Tracked Multi-Purpose Engineer Vehicle (TMPEV)

Type: Road repair, construction, construction of field defenses, non-explosive obstacle clearance, towing, and recovery

Crew: ea3

Chassis: T-79 tank chassis with T-96 suspension

Bulldozer Blade: Yes

Crane: Yes

Ground Penetrating Radar: No

Mine Clearing: No

Proofing Roller: No

Bucket Loader: No

Back-hoe Excavator: No

Wench: Yes

Dimensions

Length: m9.86

Width: m3.34

Height: m2.95

Weight, Combat: kg37,500

Ground Pressure: INA

Automotive

Engine Name: 12150L-7BW (same at T-79 tank)

Engine Type: Diesel

Engine Power: hp730

Cruising Range: km400

Speed, Maximum Road: km/h45

Speed, Average Cross Country: INA

Speed, Maximum Swim: km/hINA

Fording Depth: mINA

Communications

Radio: INA

Protection

Hull Armor: mm203

Applique Armor: Capable

NBC Protection: INA

Smoke Equipment: INA

Rubber Skirts: Yes, to protect against RPGs

Crane

Power Source: Hydraulic

Telescopic: Yes

Telescopic Range: m3.5

Capacity: tonnes16

Capacity While Moving: tonnes3

Maximum Height of Crane: m8.4

Dozer Blade

Power Source: Hydraulic

Shape: Adjustable to straight or V-shaped

Maximum Cutting Depth: m.40

Notes:

The main roles of the GCZ-112 tracked multi-purpose engineer vehicle (TMPEV) are to provide combat engineer support while accompanying armored / mechanized troops, which includes road repair, emergency military road construction, non-explosive obstacle clearing, and towing and recovery operations. The GCZ112 can also be used to construct technical weapons emplacements and flat-bottomed pits. The vehicle is mainly composed of a modified Type 79 tank chassis, and combined dozer blade, crane and winch.

BREM-D Russian Armored Maintenance-Recovery Vehicle



Tiers:



Variants:

- **BTR-DG (Ob'yekt 925G):** Cargo variant without bow machine guns, firing ports and periscopes. The troop compartment was modified to serve as a cargo compartment.
- **BTR-DG:** converted into an airborne SPAAG fitted with a specially built three-legged ZU-23-2 twin anti-aircraft autocannon mount over the roof of the cargo compartment.
- **BTR-D San:** BTR-D converted into an airborne armoured ambulance.
- **BREM-D:** (BREM-D stands for bronirovannaya remonto-evakuatsionnaya mashina desanta – armoured maintenance-recovery vehicle of the airborne) (Ob'yekt 932) – BTR-D converted into an airborne ARV. It carries specialized equipment for the repair and recovery of BMD-1 type vehicles. This equipment includes a light collapsible crane stored on the roof of the personnel compartment, which can be traversed through 180°, a recovery winch, a combination spade and dozer blade, a generator, towing equipment, electric welding system, tools and ready use spares. One of the 7.62 mm bow PKT tank machine guns was eliminated. This entered service in 1989 in very small numbers
- **BTR-RD "Robot":** BTR-D converted into an airborne ATGM team carrier with two 9P135M-1 ATGM launchers capable of firing 9M113 "Konkurs" (AT-5 Spandrel), 9M113M "Konkurs-M" (AT-5B Spandrel B), 9M111 "Fagot" (AT-4 Spigot) and 9M111-2 "Fagot" (AT-4B Spigot B) ATGMs. They can be used by the dismounted ATGM squad or fitted on a pintle mount on the right side of the hull. This is basically a BTR-D with a pintle mount added and with missile racks inside the troop compartment
- **BTR-ZD "Skrezhet":** (ZD stands for zenitnaya ustanovka) – BTR-D converted into an airborne air defense vehicle for carrying two MANPAD teams. The vehicle is fitted with racks for spare MANPAD missiles. It also is fitted with external stowage rails for a MANPAD on the right hand side of the roof of the troop compartment. It can also carry a complete ZU-23-2 twin anti-aircraft autocannon mount on the roof of the troop compartment.
- **NPDU "Sterkh":** (NPDU stands for nazemnyj punkt distantsionnogo upravleniya) – BTR-D converted into an airborne unmanned aerial vehicle carrier and launch vehicle of the "Stroy-P" set. It is used to launch Yak-061 "Pchela-1T" UAV for reconnaissance or jamming at ranges up to 60 km. The single-rail launcher is mounted on left hand side of the roof of the hull. It has large three-piece tube on forward right hand side of the roof of the hull. It entered service in 1990
- **BMD-1KSh "Soroka" (Ob'yekt 926):** (KSh stands for komandno-shtabnaya – command and staff) – airborne command post equipped with the R-123M, R-111 and R-130M or R-134 radio sets, as well as an AB1 portable 1 kW generator, the TNA-3 navigation system, folding CLOTHES HORSE type antennae around the superstructure and two slim antenna masts. Bow mounted machine guns and firing ports were removed. The commander's hatch is offset to the left and does not project forward. It's sometimes called BMD-KSh or KShM-D
- **BMD-1R "Sinitsa":** (R stands for radiostantsiya – signals vehicle) – Division-level command and signals vehicle equipped with R-161A2M radio set, one heavy telescopic antenna mast stowed along the left hand side of the roof of the hull and one slim elevatable antenna mast on the rear right hand side of the roof of the personnel compartment. Only a small number was delivered.
- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **R-440-ODB "Kristall-BDS":** BTR-D converted into an airborne satellite communications vehicle with R-440 system with a range of 15,000 km. The vehicle has a roof-mounted satellite dish AK-12 that is covered with a cage-like structure during transport.
- **1V119 "Reostat":** BTR-D converted into an airborne artillery battalion fire direction vehicle. The vehicle is fitted with a turret equipped with NNP-21 and V-7 observation devices, three R-173 and R-159 radiosets, PAB-2AM aiming circle, three antennae mounts, DSP-30 and DAK-2 rangefinders. The turret was also equipped with PSNR-5K (1RL-133-1) "Tall Mike" ground surveillance radar mounted on the roof of the turret. Located over the turret front sights were the visors

hinged in the center
- **2S9 Nona-S (Ob'yekt 925S) –:** Airborne self-propelled mortar, armed with a 120 mm 2A60 mortar. Entered service 1981.

System

Alternative Designation: BREM-D

Type: Armored Maintenance-Recovery Vehicle

Family: BTR

Manufacturer: Volgograd Tractor Factory

In Service: 1989-Present

Crew: ea1

Passenger Capacity: ea12

Note: This equipment includes a light collapsible crane stored on the roof of the personnel compartment, which can be traversed through 180°, a recovery winch, a combination spade and dozer blade, a generator, towing equipment, electric welding system, tools and ready use spares.

Dimensions

Length: m5.88

Width: m2.63

Height: m2

Weight, Combat: tons8

Ground Pressure: INA

Automotive

Engine Name: 5D20 V6 Diesel

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h62

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: 60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2

Fording Depth: mAmphibious

Note: The BTR-D is amphibious and is propelled on water by two waterjets

Communications

Primary: INA

Main Gun

Note: One of the 7.62 mm bow PKT tank machine guns was eliminated, leaving only 1 x 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

In Service: 1961-Present

Proliferation: +1 Million

Length: mm1,203

Barrel Length: mm605

Weight, Gun Only: kg9

Weight, Tripod Only: kg7.7

Max Rate of Fire: 650 rds/min

Effective Rate of Fire: 250-300 rds/min

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: Yes

Thermal Sight Gunner: Yes

Main Gun Stabilization: INA

Protection

Hull Armor: Protection of this vehicle is very light. Hull of the BTR-D is welded from aluminum armor in attempt to save

weight, however it protects the occupants only from small arms fire and artillery shell splinter

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Firing Ports: all-round firing ports

Notes:

The BREM-D is a variant of the BTR-D. BREM-D (BREM-D stands for bronirovannaya remonto-evakuatsionnaya mashina desanta – armoured maintenance-recovery vehicle of the airborne) (Ob'yekt 932) – BTR-D converted into an airborne ARV. It carries specialized equipment for the repair and recovery of BMD-1 type vehicles. This equipment includes a light collapsible crane stored on the roof of the personnel compartment, which can be traversed through 180°, a recovery winch, a combination spade and dozer blade, a generator, towing equipment, electric welding system, tools and ready use spares. One of the 7.62 mm bow PKT tank machine guns was eliminated. This entered service in 1989 in very small numbers. The BTR-D is a amphibious and airborne APC. The BTR-D is a Soviet airborne multi-purpose tracked armoured personnel carrier which was introduced in 1974 and first seen by the West in 1979 during the Soviet–Afghan War. BTR-D stands for Bronetransportyor Desanta (БТР, Бронетранспортер Десанта, literally "armoured transporter of the Airborne"). It is based on the BMD-1 airborne IFV. NATO gave it the designation BMD M1979. While the BTR-D is based on the BMD-1, it is 60 mm longer and lacks a turret; instead, it has a small flat superstructure with a hatch on top. Crew The crew consists of the driver, the commander and the left bow mounted machine gun gunner, all of whom are in the same positions and have the same equipment as in the BMD-1. Armament Although the turret with all of the main armament was removed, the two bow mounted machine guns have been retained. However, the original PKT tank machine guns have been replaced by PKB general purpose machine guns. The vehicle can also be fitted with pintle-mounted automatic grenade launchers (AGS-17, AGS-30 or AGS-57) and/or machine guns (PKM, 6P41, "Utyos" or "Kord"). Maneuverability The BTR-D is powered by the same engine as the BMD-1, however, its suspension is longer because the entire vehicle has been lengthened by 60 mm. Because of this, the vehicle has six road wheels on each side instead of five. It also has five return rollers on each side unlike the BMD-1, which has four. Armour protection The armour protection is slightly better on the BTR-D than on the BMD-1. That's because the upper front armour has a dual slanted angle. Troop compartment Because the turret has been removed, the troop compartment has been enlarged and can carry up to ten fully equipped soldiers. It's also linked with the crew compartment in the front. Also, there are two firing ports in the sides and one in the rear, two of which are for RPK-74 light machine guns. Equipment The BTR-D has all the same equipment as the BMD-1, but also has towing equipment for ZU-23-2 twin AA autocannon.

BREM-1 Russian Armored Recovery Vehicle





Tiers:



System

Alternative Designation: None

Chassis: T-72

Crew: 3: TC, Driver, Mechanic

Weight: mt41

↳*Dimensions*

Height Travel (m): 2.45

Length, Overall: m7.98

Width, Overall: m3.46

Armament

↳*NSV-T Cupola Mounted Machine Gun*

Cailber/Length: mm12.7mm

Fire on Move: Yes

Automotive

Engine Name: V12, 840hp, Multi-fuel Diesel

Cruising Ranges (with external tanks)::

Dirt road without towed vehicle: km650

Dirt road while towing: km220-430

Highway without towed vehicle: km700

Speed::

Dirt Road: km/h45

Highway without Towed Vehicle: km/h12

Maximum Highway: km/h60

Communications

↳*Radio*

Name: R-123

Protection

NBC Protection: Yes

Smoke Equipment: VEESS and four smoke grenade launchers

Recovery

Winch Capacity::

Line Pull: mt25

With Blocks: mt100

Auxiliary Winch::

Auxiliary Winch, Cable Length: m400

Auxiliary Winch, Capacity (line pull): kg530

Crane Capacity::

2.4m Extension: mt19

4.4m Extension: mt3

Towing Capacity: mt50

Towing Rods: mTwo - 1.68 and Two - 5.5

Hydraulic Jack Capacity: mt30

Blade

Width, Blade: m3.1

Notes:

he BREM-1 armored repair and recovery vehicle was developed to support a fleet of T-72 main battle tanks and its derivatives. Officially it entered service with the Soviet Army in 1975. Other sources report that production commenced in 1984. Until 1990 a total of 342 BREM-1 armored recovery vehicle have been delivered. The Russian Army had no dedicated recovery vehicle for its T-64 and T-80 series tanks. So the BREM-1 was used to support these tanks as well. So 342 units was not much considering that Soviets were churning out their tanks in tens of thousands. A lack of recovery vehicles was always felt in the Soviet, and later Russian army. Russian Army is still using the ageing BTS-4 armored recovery vehicles. The BREM-1 has been exported to a number of countries alongside the T-72 MBT. In some cases it is used to supports other tanks when the operator has no dedicated recovery vehicle.

Type 73 Chinese Armored Recovery Vehicle





Tiers:

1 2 **3** 4

System

Crew: ea4
Chassis: Type 59
Main Recovery Winch Capacity: 32-35 tons (without pulley); or 64~70 tons (with pulley)
Winch Cable Length: 130 m (main winch); or 260 m (auxiliary winch)
Boom Capacity: 1,000kg
Boom Max Lift Height: 3.2m
Boom Elevation Range: 0-60 degrees
Boom Azimuth Range: 200 degrees

Dimensions

Length: 7.16m
Width: 3.27m
Height: 2.125m
Weight, Combat: tons31

Automotive

Engine Name: 12150L
Engine Power: 580hp
Cruising Range: km435
Speed, Maximum Road: km/h50
Speed, Average Cross: km/h25
Speed, Average Road: km/h30
Gradient: %58
Trench: m2.7
Fording Depth: m1.4

Max Fuel Capacity: liters790

Protection

NBC Protection: No

Notes:

The Chinese Type 73 ARV (Armored Recovery Vehicle) is built on a Type 59 hull and was the first ARV the Chinese ever built for their Type 59 in the 1970’s. The recovery equipment includes a recovery winch, which can provide a pulling capacity of 25 tons, or 50 tons when used in conjunction with two pulleys, and a manually operated hoist boom with a max lifting capacity of 1,000 kg. A spade can provide a maximum of 54 tones of support. This means that the vehicle can winch to safety, tow, and replace the engine of a damaged or stuck tank in the field. Armament on the Type 73 includes a roof-mounted Type 59 12.7mm antiaircraft machine gun (AAMG) with 500 rounds.

M1089 American 6x6 Medium Tactical Vehicle (MTV) Wrecker





Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1089

Type: Medium Tactical Vehicle (MTV) Wrecker

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Main Recovery Winch: 2 x 30,000 lb (13,608 kg) line pull capacity

Wrecker Components: Provides front or rear recovery from the vehicles operator station or remote control. 11,000 lb (4,990 kg) loads of most all wheeled military vehicles

Dimensions

Length: 9.14 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 5.30 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 15,682 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1089 Wrecker is designed to recover vehicles in the 5 ton or less weight class. The M1089 Wrecker features front or rear disabled vehicle lift and tow capability. The M1089 is equipped with two, 30,000 pound main winch assemblies, with 300 feet of cable each. The M1089 also equipped with a MHE rated at 11,000 pounds with the boom extended at 14 feet. Both MHE and main winches feature remote control capabilities.

M984A1 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Wrecker





Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.
- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.

- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M984A1 HEMTT Wrecker

Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Wrecker

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: 9,979 kg

Dimensions

Length: 9.98 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 4.85 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 3.30 m

Weight: 23,088 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

M984A1 Wrecker The M94A1 is a recovery vehicle version. The automatic, two-speed, 60,000-lb (27,216-kg) capacity recovery winch has 185 ft (56.4 m) of cable. The winch can recover vehicles 32 degrees to the left or right of the wrecker or 23 degrees below the wrecker. It is also fitted with 20,000-lb (9,072-kg) bare-drum capacity self-recovery winch. The towing system is a crossbar floating on a four-inch (102-mm) ball. The ball is supported by three hydraulic cylinders. The wrecker is equipped with a 141,600-ft lb (19,577-kg m) capacity crane that can lift the power packs of a range of vehicles including both the M1A1 Abrams and the M60 main battle tanks. The M984A1 can also be equipped with oxy-acetylene welding equipment as well as a variety of other recovery equipment. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89 × 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-speed transfer case. The front axles on all HEMTTs are single-reduction Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration.

The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production models have the suffix A4.

LVSR MKR15 American 10x10 Logistics Vehicle System Replacement (LVSR) Heavy Wrecker





Tiers:



Variants:

- **LSVR MKR15 Wrecker:** This version is equipped with a crane, winches and hydraulic spade. It can flat tow 110,000 lb (49,900 kg) on the highway. The truck has a lift and tow capacity of 97,000 lb (44,000 kg) gross vehicle weight with 24,000 lb (10,890 kg) lift capacity. The articulated crane has a lift capacity of 18,00 0 lb (8,170 kg) at 11 ft (3.35 m); and 10,000 lb (4,540 kg) at a maximum reach of 20 ft (6.1 m).
- **LSVR MKR16 Tractor:** This is the tractor variant of the LVSR. It is equipped with a recovery winch with a 60,000-lb (27,220-kg) capacity and 10,000-lb (4,540-kg) side-pull capacity.
- **MKR18 Cargo:** This is the cargo version of the LVSR. It is equipped with the Multilift Mk 18A1 load handling system. Towed trailers add 16.5 tons of payload.

System

Alternative Designation: LVSR MKR15

Type: Logistics Vehicle System Replacement (LVSR) Heavy Wrecker

Configuration: 10x10

Manufacturer: Oshkosh Defense, Oshkosh, Wis.

Crew: ea1

Cab Seating: 1x1

Airlift Capability: Vehicle can be airlifted by C-17 Globemaster III or C-5A Galaxy aircraft. Height of the vehicle can be reduced by 50 cm for easier transportation. With additional preparation it can be airlifted by the C-141 Starlifter.

Crane: Yes, The articulated crane has a lift capacity of 8,170 kg at 3.35 m; and 14,540 kg at a maximum reach of 6.1 m

Winches: Yes, There are two rear-mounted 17,690 kg dual-drum-style, constant-pull-design winches with 98 m of 19-mm cable. The self-recovery winch is front-mounted with 9,070 kg capacity and 61 m of 16-mm cable.

Hydraulic Spade: Yes, The hydraulic spade has 35,380 kg of pull in 60 RCI soil. The 2.44-m cargo deck has Sixcon ISO lock provisions and tie-down provisions for bulk cargo weighing up to 4,540 kg.

Flat Toe: 49,900 kg on the highway.

Lift and Tow Capacity: The truck has a lift and tow capacity of 44,000 kg gross vehicle weight with 10,890 kg lift capacity

Dimensions

Length: 11.46 m

Width: 2.49 m

Height: 3.11 m

Wheelbase: 5.42 m

Gross Weight: 48,080 kg

Curb Weight: 30,750 kg

Automotive

Engine Name: 1 x CAT C15

Engine Type: Diesel

Engine Power: hp600

Fuel Capacity: m628 liter

Maximum Speed: 105 km/h

Range: 480 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.6 m

Trench: 2.5 m

Fording: 1.52 m

Note: The front two and the back two axles are steered.

Protection

Armor: It is fitted with an integrated armored cab and energy-absorbing seats.

Applique Armor: Yes, The add-on armor kit for LVSR was developed and supplied by Plasan of Israel. Plasan was awarded a contract in mid-2006 for 12 LVSR armor kits for testing. The November 2011-stated AAO for LVSR add-on armor B-kits quotes 651. The armor system for LVSR follows the A-kit/B-kit principle, with vehicles designed 'fitted for, but not with', protection. In the case of LVSR, 'fitted for' includes an armored cab floor as standard. Cargo and wrecker variants require an upgrade of the front springs. Protection kits can be installed and uninstalled from vehicles in the field using only basic tools. The A-kit is fitted on the production line and is the combination of a limited amount of armoring (in difficult-to-access areas of the vehicle), together with a significant amount of armour installation attachments and required support structures. The bulk of the armor, the B-kit, is installed in the field on an 'as required' basis. The benefits of the A-kit/B-kit principle are that armor is only fitted when required, this reducing vehicle wear and tear, and by default whole life cycle costs. Improvements and/or upgrades to armor are also far easier to integrate into an appliqué solution. The A-kit/B-kit principle is currently applied to all current production US tactical 'soft skin' vehicles.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Oshkosh LVSR MKR15 is a wrecker variant of the LVSR heavy high mobility truck. In 2011 US Marine Corps ordered nearly 70 of these heavy wreckers. First production vehicles were delivered in 2012. It replaces the Oshkosh Mk.48/15. The Logistic Vehicle System Replacement (LVSR) is a family of vehicles, based on a common 5-axle ten-wheel drive (10x10) chassis, that vary in individual configuration by mission requirements. The LVSR was designed and is manufactured by Oshkosh Defense. LVSR is a purpose-designed military vehicle and there are currently three variants in service, a cargo, a wrecker and a tractor truck. The first LVSRs were ordered in 2006. The LVSR is the U.S. Marines' equivalent of the U.S. Army's Oshkosh Heavy Expanded Mobility Tactical Truck (HEMTT) and Oshkosh Palletized Load System (PLS). The Marines do not use the HEMTT or PLS and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The predecessor of the LVSR, the MK48 Logistics Vehicle System (LVS), had entered service with the US Marine Corps (USMC) from

1985 and in the late 1990s a project to replace the LVS was started. As a precursor to a formal LVS replacement programme a number of manufacturers co-operated with the USMC to build and evaluate an Advanced Technology Demonstrator (ATD). The ATD was built during 1998 at the Nevada Automotive Test Centre (NATC). LVS Modification Demonstrators (LVS-MDs) were also built, these integrating commercially proven automotive components and technologies. In April 2001, Logistics Management Institute (LMI) completed their final report for the 'Analysis of Alternatives (AoA) for the USMC Logistics Vehicle System Replacement (LVSR), concluding the best option was to rebuy a vehicle similar to the technology demonstrator. Five alternative options had been considered, these were: Inspect and Replace Only As Necessary (IROAN) for the LVS; rebuild the LVS; re-manufacture the LVS to a higher standard; rebuy a vehicle similar to the technology demonstrator; research and develop an entirely new vehicle. Around this time it was suggested that 2,000-3,000 vehicles might be required, although throughout the program numbers would fluctuate. An LVSR industry day was held in late 2001, and a formal solicitation to industry was released in early 2003. This had been delayed from an expected April 2002. The LVSR Request for Information (RfI) had originally been expected in May 2000. In March 2004 Oshkosh Truck Corporation (now Oshkosh Defense) announced that the US Marine Corps had awarded the company a Phase I System Development and Demonstration Contract to supply three LVSR trucks. These were to be delivered to the Marines for extensive endurance and performance testing within 12 months. This award was the first phase of a two-phase acquisition competition valued in March 2004 at $783 million for up to 1,581 vehicles. Competition for the Phase II production award (scheduled for March 2006) was limited to those companies that successfully completed Phase I evaluation. The other company selected for the Phase I evaluation was the American Truck Company (ATC) with a TATRA-based design. Phase 1 testing was completed in 2005 and in late-May 2006, the USMC awarded the LVSR Phase II contract to Oshkosh Truck Corporation. An initial LVSR order issued on 31 May 2006 was valued at $28 million and ordered 22 cargo, two wrecker (recovery), and tractor truck LVSR variants, plus vehicle kits, training (operator/maintainer-cargo), test support-production verification testing cargo, meetings, and contract data requirements. The first LVSR cargo variant began testing at the Aberdeen Proving Ground in June 2007. Tractor and wrecker prototype vehicles began testing in November 2007 and April 2008 respectively. An additional 123 cargo variants, which completed low rate initial production (LRIP) quantities, were subsequently ordered under option year two of the production contract. In January 2009, Oshkosh announced an LVSR delivery order valued at $176 million. This called for more than 425 LVSRs and transitioned LVSR from LRIP into full-rate production (FRP). LVSR fielding began in April 2009 for user trials and testing and the first vehicle was fielded to Afghanistan in September 2009. LVSR deliveries were completed in September 2013. Orders totalled 2,022, with the total order value around $965.78 million. Deliveries included 1,505 MKR18 cargo variants, 355 MKR16 tractor trucks, and 162 MKR15 wreckers. The requirement for an LVSR companion trailer for the USMC has also been provided by Oshkosh. The M1076, which is already in service with the US Army, is the selected trailer. In May 2009, it was announced that the Marine Corps would receive an initial 30 M1076 PLST for use with the LVSR. By early 2016 the USMC had purchased a total of 687 PLST through a separate contract with the US Army.

Type 654 Chinese Armored Recovery Vehicle



Tiers:

1 2 3 4

System

Alternative Designation: Type 90-II ARRV

Manufacturer: China North Industries Corp. (NORINCO), Beijing, China Heavy Defense Industries (HDI), Taxila, Pakistan

Crew: ea5

Passenger Capacity: NA

Chassis: Type 90

Blade Characteristics: Hydraulic

Crane Characteristics: Hydraulic (On right side of the hull and forward)

Crane Capacity: kg25,000

Addition Equipment: Auxiliary winch, tools, tow bars, and cables

Winch Capabilities: Maximum pulling force of 82 tons with pulley. 41 tons without the pulley.

Dimensions

Length: m8.83

Width: m3.4

Height: m2.4

Weight, Combat: kg47,500

Automotive

Engine Name: 6TD-2

Engine Type: Water-cooled, turbocharged, after cooled, 4-stroke, 8-cyl diesel

Engine Power: hp1,200

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Off Road: km/h50

Gradient: %60

Side Slope: INA

Vertical Step: .85m

Trench: 3m

Fording Depth: 5m with snorkel

Protection

Armor, Hull Rear: INA

Armor, Hull Top: INA

Armor, Glacis: INA

Mine Clearing: Limited with blade

Self-Entrenching Blade: Yes, It can clear a maximum of 120 cu m of soil per hour

NBC Protection: Over-pressure system, anti-neutron inner liner

Smoke Equipment: 8, 76mm, electronically operated smoke grenade launchers IVO the driver's position

Add on Armor: Panel of composite armor can be fitted to the glacis and turret front

Notes:

Based on the Type 90 MBT, the Type 654 Armored Recovery Vehicle was developed as a support vehicle to the Type 90s sold to Pakistan. The Type 654 is similar to the Type 90 tank, but has a new all-welded superstructure designed for the repair and recovery role. The stabilizer blade is hydraulically operated and is mounted at the front of the vehicle and operated by the driver from his position in the vehicle. The dozer blade can be used to remove battlefield obstacles and prepare firing positions though it is most often used to stabilize the vehicle while the crane or winch are being used. The blade can clear a maximum of 4,240 cu ft (120 cu m) of soil per hour. Also hydraulic, the crane is mounted on the right side of the chassis with a maximum lifting capacity of 25,000 kg. The crane is pivoted at the front of the chassis and is traversed to the rear when not in use. The crane is very helpful in conducting battlefield damage repair but, can be used for routine maintenance as well.. The primary hydraulic winch is at the front of the vehicle and has a maximum pulling force of 82 tons. This allows it to recover all current Chinese-produced armored vehicles.

M88A1 American Armored Recovery Vehicle





Tiers:



Variants:

- **M88:** Original production model with Continental AVSI-1790-6A 980-hp V-12 gasoline engine. No NBC protection system. There were 1,075 M88s built from 1961 to 1964 by Bowen-McLaughlin-York (BMY) of York, Pa. All U.S. Army vehicles converted to diesel power.
- **M88A1:** BMY began development of the diesel-powered M88A1 in 1972, eventually converting 875 M88s and building more than 2,100 new M88A1s
- **M88A2 Hercules Improved Recovery Vehicle (IRV):** This is an improved version capable of hoisting and towing twice weight of an M88A1, including M1 tanks. Production on the M88A2 began in 1994. Key upgrades include improved power-assisted braking, steering, winching, hoisting and increased horsepower, according to BAE Systems.

System

Alternative Designation: M88A1
Type: Armored Recovery Vehicle
Crew: ea4
Left Capability: 22.7 tons
Winch Capability: 40.8 tons, It is used for recovery of damaged, stuck, sunken and overturned vehicles. There is also an auxiliary winch. It is used for delivery of the main winch rope and other cargo handling operations.
Towed Load: 55 tons
Dozer Blade: The front-mounted dozer blade is used to stabilize the vehicle during craning and winching operations. It can be also used for clearing obstacles and light earth-mowing works, such as covering up of ditches and so on.
Welding Equipment: Vehicle has a welding outfit for welding and cutting works in the field. These are carried by one of the crew member. The M88 also has a set of tools for field repairs.

Dimensions

Length: 8.27 m
Width: 3.43 m
Height: 3.13 m
Weight: 50.8 tons

Automotive

Engine Name: Continental AVSI-1790-6A

Engine Type: turbocharged diesel engine

Engine Power: 750 hp

Transmission: Allison XT-1400-2 transmission

Maximum Speed: 40 km/h

Range: 300 km

Gradient: %60

Side Slope: %30

Vertical Step: m1.1

Trench: m2.6

Fording without Preparation: m1.4

Fording with Preparation: m2.6

Note: This recovery vehicle was also fitted with auxiliary power unit which powers all systems and add-on equipment when the main engine is turned off.

Main Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,300 rounds

Protection

Hull Armor: The superstructure of this armored recovery vehicle is composed of a single large armor casting. It provides protection against machine gun fire and artillery shell splinters. Hull bottom armor is similar to that of medium tanks and

withstands anti-tank mine blast. The original M88 lacks NBC protection system, which later models are equipped with.

Applique Armor: Available

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

M88A1 improved version, developed in 1973. The petrol engine was replaced by a diesel unit. It is powered by Continental AVSI-1790-6A turbocharged diesel engine, developing 750 hp. Engine is coupled with Allison XT-1400-2 transmission. This recovery vehicle was also fitted with auxiliary power unit which powers all systems and add-on equipment when the main engine is turned off. Unlike it's predecessor it is equipped with NBC protection system. Production of the M88A1 commenced in 1977 and ceased in 1985 with a total of 1427 vehicles produced. Additionally 876 original M88 ARVs were upgraded to the A1 standard. The M88 armored recovery vehicle was designed for medium and heavy recovery operations. Typical tasks of this support vehicle include recovery of damaged, stuck, swamped or overturned armored vehicles on the battlefield. It also provides maintenance service or tows them to maintenance units. The M88 was accepted to service with the US Army in 1959. Deliveries commenced in 1961 and over 1 000 of these armored recovery vehicles were produced until 1964. This ARV saw action during a number of wars, noticeably in Vietnam and both Iraq wars. The upgraded M88 armored recovery vehicles are still in service with the US military. This vehicle was also exported to a number of countries. The M88 armored recovery vehicle is based on the suspension and running gear of the M48A2 and M60 tanks. Vehicle is fitted with "A" frame-type hoisting boom, winch and a front-mounted dozer. It was designed to support the Patton series tanks. The crane has a 22.3 t capacity. It is used to lift disabled vehicles, turrets, powerpacks, or other loads. If repairs are required to a vehicle's suspension, the crane raises the front of back of the vehicle to allow access to the damaged system. When not required the crane lays on top of the roof. The main winch has a 40.8 t capacity. It is used for recovery of damaged, stuck, sunken and overturned vehicles. There is also an auxiliary winch. It is used for delivery of the main winch rope and other cargo handling operations. The front-mounted dozer blade is used to stabilize the vehicle during craning and winching operations. It can be also used for clearing obstacles and light earth-mowing works, such as covering up of ditches and so on. Vehicle has a welding outfit for welding and cutting works in the field. These are carried by one of the crew member. The M88 also has a set of tools for field repairs. The M88 ARV tows damaged, faulty or uncontrolled tanks or armored vehicles using rigid or non-rigid hitches. Damaged vehicles are towed to the nearest shelters, assembly points of repair depots. The superstructure of this armored recovery vehicle is composed of a single large armor casting. It provides protection against machine gun fire and artillery shell splinters. Hull bottom armor is similar to that of medium tanks and withstands anti-tank mine blast. The original M88 lacks NBC protection system, which later models are equipped with. The M88 is armed with a single roof-mounted 12.7 mm machine gun for self-defense. This weapon is operated by the vehicle commander. A total of 1 300 rounds are carried. This support vehicle has as crew of four, including commander, driver, mechanic and rigger. All crew members have their separate hatches in the roof of the superstructure. There is also a door in each side. The original M88 was powered by a petrol engine. With the introduction of the M1 Abrams two M88 recovery vehicles were required to tow this MBT, due to it's weight. To address this shortcoming a more powerful version of the M88 was introduced in the early 1990s. In case of emergency this recovery vehicle can refuel main battle tanks from it's own fuel tank. The M88 can be fitted with a deep wading kit. After preparation it can ford water obstacles up to 2.6 m deep.

M816 American 6x6 5-Ton Medium Wrecker







Tiers:



System

Alternative Designation: M816

Type: Medium Wrecker

Manufacturer: AM General

In Service: INA

Crew: ea1

Revolving Hydraulic Crane: Yes

Boom Extension: 10-18 feet

Maximum Lift Capacity: maximum lift capacity of 20,000 lb with outriggers and boom jacks to the ground. The boom capacity depends on boom extension and placements of truck outriggers and boom jacks. With boom full out and no outriggers, the capacity is only 3000 lb. The boom elevates to 45 degrees, swings 270.

Dimensions

Length: 9.04 m

Width: 2.49 m

Height: 2.84 m

Weight, Combat: 15,900 kg

Automotive

Engine Name: Cummins NHC-250

Engine Type: Diesel

Engine Power: hp240

Range: km585

Speed, Maximum Road: km/h84

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: None

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The M816 Medium Wrecker is part of the M809 series of 5-ton 6x6 military trucks. It was made by AM General starting in 1970. It has a revolving hydraulic crane with an extending boom that can extend from 10–18 ft with a maximum lift capacity of 20,000 lb with outriggers and boom jacks to the ground. The boom capacity depends on boom extension and placements of truck outriggers and boom jacks. With boom full out and no outriggers, the capacity is only 3000 lb. The boom elevates to 45 degrees, swings 270. The fuel consumption rate is 5 mpg. The towing capacity is 14 tons on road or 10 tons cross country (or off-road). The front winch has a 20Klb capacity and the rear winch is 45klb capacity. These trucks were specially built for the United States Army to pull medium duty equipment through non-incorporated terrain.

M88 American Armored Recovery Vehicle





Tiers:



Variants:

- **M88:** Original production model with Continental AVSI-1790-6A 980-hp V-12 gasoline engine. No NBC protection system. There were 1,075 M88s built from 1961 to 1964 by Bowen-McLaughlin-York (BMY) of York, Pa. All U.S. Army vehicles converted to diesel power.
- **M88A1:** BMY began development of the diesel-powered M88A1 in 1972, eventually converting 875 M88s and building more than 2,100 new M88A1s
- **M88A2 Hercules Improved Recovery Vehicle (IRV):** This is an improved version capable of hoisting and towing twice weight of an M88A1, including M1 tanks. Production on the M88A2 began in 1994. Key upgrades include improved power-assisted braking, steering, winching, hoisting and increased horsepower, according to BAE Systems.

System

Alternative Designation: M88
Type: Armored Recovery Vehicle
Manufacturer: BMY (1961–1994) United Defense and Anniston Army Depot (1994–2005) BAE Systems Land and Armaments (since 2005)
Crew: ea4
Left Capability: 22.7 tons
Winch Capability: 40.8 tons, It is used for recovery of damaged, stuck, sunken and overturned vehicles. There is also an auxiliary winch. It is used for delivery of the main winch rope and other cargo handling operations.
Towed Load: 55 tons
Dozer Blade: The front-mounted dozer blade is used to stabilize the vehicle during craning and winching operations. It can be also used for clearing obstacles and light earth-mowing works, such as covering up of ditches and so on.
Welding Equipment: Vehicle has a welding outfit for welding and cutting works in the field. These are carried by one of the crew member. The M88 also has a set of tools for field repairs.

Dimensions

Length: 8.27 m
Width: 3.43 m
Height: 3.13 m
Weight: 50.8 tons

Automotive

Engine Name: INA
Engine Type: Petrol
Engine Power: INA
Transmission: INA
Maximum Speed: 40 km/h
Range: 300 km
Gradient: %60
Side Slope: %30
Vertical Step: m1.1
Trench: m2.6
Fording without Preparation: m1.4
Fording with Preparation: m2.6

Main Weapon System

↳*System*

Name: M2 Browning
Type: Heavy Machine Gun
Caliber: 12.7mm
Length: 1,654 mm
Barrel Length: 1,143 mm
Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)
Action: Short recoil-operated
Rate of Fire: 450–600 rounds/min
Muzzle Velocity: 890 m/s
Maximum Firing Range: 7,400 m
Effective Firing Range: 1,800 m
Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,300 rounds

Protection

Hull Armor: The superstructure of this armored recovery vehicle is composed of a single large armor casting. It provides protection against machine gun fire and artillery shell splinters. Hull bottom armor is similar to that of medium tanks and withstands anti-tank mine blast. The original M88 lacks NBC protection system, which later models are equipped with.

Applique Armor: Available

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M88 armored recovery vehicle was designed for medium and heavy recovery operations. Typical tasks of this support vehicle include recovery of damaged, stuck, swamped or overturned armored vehicles on the battlefield. It also provides maintenance service or tows them to maintenance units. The M88 was accepted to service with the US Army in 1959. Deliveries commenced in 1961 and over 1 000 of these armored recovery vehicles were produced until 1964. This ARV saw action during a number of wars, noticeably in Vietnam and both Iraq wars. The upgraded M88 armored recovery vehicles are still in service with the US military. This vehicle was also exported to a number of countries. The M88 armored recovery vehicle is based on the suspension and running gear of the M48A2 and M60 tanks. Vehicle is fitted with "A" frame-type hoisting boom, winch and a front-mounted dozer. It was designed to support the Patton series tanks. The crane has a 22.3 t capacity. It is used to lift disabled vehicles, turrets, powerpacks, or other loads. If repairs are required to a vehicle's suspension, the crane raises the front of back of the vehicle to allow access to the damaged system. When not required the crane lays on top of the roof. The main winch has a 40.8 t capacity. It is used for recovery of damaged, stuck, sunken and overturned vehicles. There is also an auxiliary winch. It is used for delivery of the main winch rope and other cargo handling operations. The front-mounted dozer blade is used to stabilize the vehicle during craning and winching operations. It can be also used for clearing obstacles and light earth-mowing works, such as covering up of ditches and so on. Vehicle has a welding outfit for welding and cutting works in the field. These are carried by one of the crew member. The M88 also has a set of tools for field repairs. The M88 ARV tows damaged, faulty or uncontrolled tanks or armored vehicles using rigid or non-rigid hitches. Damaged vehicles are towed to the nearest shelters, assembly points of repair depots. The superstructure of this armored recovery vehicle is composed of a single large armor casting. It provides protection against machine gun fire and artillery shell splinters. Hull bottom armor is similar to that of medium tanks and withstands anti-tank mine blast. The original M88 lacks NBC protection system, which later models are equipped with. The M88 is armed with a single roof-mounted 12.7 mm machine gun for self-defense. This weapon is operated by the vehicle commander. A total of 1 300 rounds are carried. This support vehicle has as crew of four, including commander, driver, mechanic and rigger. All crew members have their separate hatches in the roof of the superstructure. There is also a door in each side. The original M88 was powered by a petrol engine. With the introduction of the M1 Abrams two M88 recovery vehicles were required to tow this MBT, due to it's weight. To address this shortcoming a more powerful version of the M88 was introduced in the early 1990s. In case of emergency this recovery vehicle can refuel main battle tanks from it's own fuel tank. The M88 can be fitted with a deep wading kit. After preparation it can ford water obstacles up to 2.6 m deep.

M88A2 Hercules American Armored Recovery Vehicle





Tiers:

1 2 3 4

Variants:

- **M88:** Original production model with Continental AVSI-1790-6A 980-hp V-12 gasoline engine. No NBC protection system. There were 1,075 M88s built from 1961 to 1964 by Bowen-McLaughlin-York (BMY) of York, Pa. All U.S. Army vehicles converted to diesel power.
- **M88A1:** BMY began development of the diesel-powered M88A1 in 1972, eventually converting 875 M88s and building more than 2,100 new M88A1s
- **M88A2 Hercules Improved Recovery Vehicle (IRV):** This is an improved version capable of hoisting and towing twice weight of an M88A1, including M1 tanks. Production on the M88A2 began in 1994. Key upgrades include improved power-assisted braking, steering, winching, hoisting and increased horsepower, according to BAE Systems.

System

Alternative Designation: M88A2
Type: Armored Recovery Vehicle
Manufacturer: BMY (1961–1994) United Defense and Anniston Army Depot (1994–2005) BAE Systems Land and Armaments (since 2005)
Crew: ea3
Left Capability: 31.8 tons
Winch Capability: 63.5 tons
Towed Load: 63 tons
Dozer Blade: The front-mounted dozer blade is used to stabilize the vehicle during craning and winching operations. It can be also used for clearing obstacles and light earth-mowing works, such as covering up of ditches and so on.
Welding Equipment: Vehicle has a welding outfit for welding and cutting works in the field. These are carried by one of the crew member. The M88 also has a set of tools for field repairs.
Note: With the lowest acquisition, operational and maintenance cost of any 70-ton capable recovery system, HERCULES answers the need for cost-effective, self-supporting heavy recovery performance. The HERCULES was the primary 70-ton recovery system during Operation Iraqi Freedom. And, U.S. troops found a few other creative uses for its capabilities when

they used it to pull down the Saddam Hussein statue in Baghdad on April 9, 2003. HERCULES utilizes a hull designed for the recovery mission and thoroughly proven by U.S. Army testing. Stability and performance are unmatched by any alternate tank-based design. HERCULES offers operational and logistics commonality with the existing M88A1 fleet, simplifying training and parts availability. Key upgrades include improved power-assisted braking, improved steering, improved electrical system and increased engine horsepower. HERCULES features overlay armor protection, ballistic skirts, a longer 35-ton boom, a 140,000-pound (63,504 kg) constant pull main winch with 280 feet of cable, and an auxiliary three-ton winch to aid main winch cable deployment. The M88A2 HERCULES is built and equipped to be the world's recovery champion.

Dimensions

Length: 8.6 m

Width: 3.7 m

Height: 3.2 m

Weight: 63 tons

Automotive

Engine Name: Continental AVDS-1790-8DR

Engine Type: turbocharged diesel engine

Engine Power: 1 050 hp

Transmission: Allison XT-1400-2 transmission

Maximum Speed: 48 km/h

Range: 500 km

Gradient: %60

Side Slope: %30

Vertical Step: m1.1

Trench: m2.6

Fording without Preparation: m1.4

Fording with Preparation: m2.6

Note: This recovery vehicle was also fitted with auxiliary power unit which powers all systems and add-on equipment when the main engine is turned off.

Main Weapon System

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,300 rounds

Protection

Hull Armor: This armored recovery vehicle has improved armored protection over it's predecessor. Armor of the M88A2 and withstands hits from 30 mm projectiles. It also withstands and anti-tank mine blast under the hull. Vehicle is additionally fitted with side skirts.

Applique Armor: Available

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The M88A2 HERCULES Hercules [Heavy Equipment Recovery Combat Utility Lift and Evacuation System], formerly the M88A1E1 Improved Recovery Vehicle, addresses a long-standing US Army need to upgrade its recovery vehicles to safely tow and recover battle-damaged, mired or inoperative Abrams tanks. The HERCULES, using M88A1 hulls, modified to specification by Anniston Army Depot, upgrades the basic M88 chassis to meet the increased demands of towing, winching, and lifting the M1, M1A1, and M1A2 tank. Among the most significant upgrades is its on-board recovery systems. The winch and hoist capacities are greatly increased to enable the vehicle to lift 40% heavier loads and winch 55% higher capacities. HERCULES features a longer 35-ton hoist capability boom, a 140,000 pound (63,504 kg) constant pull main winch with 280 feet (85.3 m) of cable and an auxiliary 3-ton winch to aid main winch cable deployment. The Hercules also incorporates improved hydraulics, enhanced propulsion system, and heavier suspension, along with overlay armor protection and ballistic skirts. The vehicle's enhanced survivability with added armor which brings its weight to more of a match for the Abrams tanks it predominantly supports. The HERCULES upgraded power train which enables it to tow a 25% larger load, with better braking capacity and higher speeds to better enable it to accompany maneuver forces. The crew has been reduced from four to three soldiers. This action results from some of the on-board innovations such as an auxiliary winch to deploy the main winch, chain/davit hoists for heavy equipment/machinery and a grease operated track adjuster. The HERCULES manufacturer is United Defense, Ground Systems Division located in York, PA. The Low Rate Initial Production (LRIP) awarded 9 Sep 94 with a follow-on award 2 Dec 94. The Hercules M88A1 to M88A2 conversion is a PM Hercules directed program where work is divided between UD and Anniston Army Depot (ANAD) to accomplish the conversion to the M88A2 Hercules Improved Recovery Vehicle. The M88A2 Hercules Heavy Recovery Vehicle (HRV) is a full-tracked armored vehicle used to perform battlefield recovery missions including towing, hoisting, and winching. It is fully capable of recovery support for Abrams series tanks and future heavy combat vehicles. The M88A2 provides the Force XXI maintainer a recovery platform capable of performing a single vehicle tow for M1 series tanks. HERCULES allows maintenance teams to get to the fight and gives them needed capability to perform their mission. The HERCULES is the answer to the current recovery deficiency for M1 series tanks and future heavy combat vehicles. HERCULES is a key enabler for the success of the Force XXI concept of operations and has a separate chapter in the Forward Force Modernization Plan. The Force XXI structure, where manpower and armor quantities are reduced, intensifies the need in an extended battlespace for a single system recovery capability that precludes the use of two vehicle and/or like-combat systems recovery. HERCULES provides this recovery capability, preserving resources and combat power/maneuverability. Within Force XXI, HERCULES will operate as part of the Forward Support Company (FSC) Combat Repair Team (CRT) that provides combined organizational and direct support maintenance to each maneuver company. The CRT is the maneuver battalion’s first level of maintenance support. Deployment of the HERCULES is the CRT’s first step towards restoring combat power to maneuver units. HERCULES is the enabling technology which allows the CRT to reach and retrieve disabled combat vehicles, deliver it to a

location, based on METT-T, where repair can be performed, either by the Forward Repair System or in the Task Force Support Area (TFSA) Unit Maintenance Collection Point. HERCULES in concert with the FRS optimizes CRT maintenance capability. The US Army received its first M88A2 on 11 Jul 97 as the first eight vehicles were handed off to units in the 1st Cavalry Division at Ft. Hood, TX. A total of 46 vehicles were fielded to 1CD by 4QFY99. The first units receiving the 70-ton armored recovery vehicles included the 3rd Squadron, 8th Cavalry and the 215th Forward Support Battalion (FSB) receiving seven and one each respectively. Successfully achieving First Unit Equipped (FUE) represents a critical milestone for any materiel development. For the HERCULES, FUE was accomplished on 31 Jul 97 after the units completed a two and a half week operator and maintenance New Equipment Training (NET) course conducted by the Ordnance Center and School (OC&S) from 14-30 Jul 97. Starting in early April 1999, PM HERCULES initiated total package fielding of 27 vehicles to 4 ID(M), which is receiving HERCULES vehicles over 7 years prior to original fielding plans. HERCULES will be fielded in Armor Bns (7ea), Regimental Cav Sqdn (7ea), Div Cav Sqdn (5ea), Engineer Bns with Grizzly/Wolverine (2ea), and FSB/MSB (1ea). This requires a total of 629 systems. The Force XXI basis of issue is 6 per Forward Support Company (FSC)/Armor Battalion; 4 per Base Support Company (BSC); 1 per Division Support Battalion, 1 per Division Aviation Support Battalion, 7 per Regimental Cavalry Squadron, and 5 per Division Cavalry Squadron. The total Force XXI requirement is 605. The M88A2 is being fielded after years of research, development and testing to ensure the system is safe, operable, maintainable and meets user requirements. Admittedly, not all technical concerns had been fully addressed at the time of initial fielding. However, those that had only been partially met placed no high risk to the user. Of particular concern was the loss of traction when towing an Abrams vehicle on slopes under wet and muddy conditions. Towing was restricted to the use of a braking vehicle, while the PMO assessed various tracks to enhance system performance, with improvements to be addressed as a vehicle retrofit. The M88A2 Traction Enhancement Test teamed engineers from the HERCULES Program Managers office, ATC, and United Defense-Limited Partnership (UDLP). The team was tasked to evaluate proposed changes to the vehicle hardware/suspension that could possibly improve traction of the M88A2 HERCULES and to provide data for input into the modeling effort spearheaded by UDLP. The proposed changes included suspension lockout blocks, re-indexing torsion bars and repositioning of the tow pintle. These changes were designed to enhance the track-to-ground contact and also minimize the squatting effect of the rear of the vehicle during uphill towing. Also, selected track and cleat configurations were evaluated to measure their performance while towing on slopes. The traction enhancement demonstration was conducted at ATC’s Churchville Test Area (CTA), which is located approximately 12 miles north of Aberdeen Proving Ground near the town of Churchville, MD. This facility is APG’s hilly cross-country endurance test area and is used to evaluate the durability of power trains, suspensions, and braking systems of test vehicles as they negotiate (ascending and descending) the various steep hills, with grades up to 29 percent. Testing at CTA consisted of operating on various dirt-surfaced longitudinal grades ranging from 20 to 25 percent. The majority of the demonstrations were conducted on the 24 and 25 percent grades. Effective 10 August 1998, the HERCULES was officially approved for single vehicle tow of the Abrams tank and other 70 ton combat vehicles. As with any new system, there are unforeseen problems, because the M88A2 Heavy Recovery Vehicle System is not the M88A1 Medium Recovery Vehicle System. The HERCULES new main winch has the capabilities of recovering a stuck M1A2, in most cases, using a single line pull. The operating procedures for the main winch are not the same as the M88A1 main winch. Built into the HERCULES main winch are five micro-switches that are designed to protect the main winch from damage. These micro-switches protect the main winch by shutting down the hydraulic system and stopping the winch operations. The PMO was alarmed by a rash of expensive winch failures shortly after fielding at both Ft. Hood and Kuwait. A team of government and contractor experts was assembled to investigate the situation and make recommendations to correct the problem. The root cause of the damage was continued operation of the main winch after the cable mis-wrapped on the drum. The most frequent cause of cable mis-wrap was over-speeding the drum during cable pay out. The variable speed main winch can unwrap the cable faster than the auxiliary winch can pull it out of the vehicle. The team selected four design paths to address the problem. The most promising concept would be to reduce the winch power while in the over-ride mode. It would be better to stall the winch when the cable gets jammed than allow the winch to break itself. The M88A2 road wheel arm hub, bearing and idler arm spindles are built to a closer tolerance than that of the M88A1; therefore, requiring different procedures. As of late 1999 reports from the field indicated that soldiers were ignoring repeated warnings and continue to burn up hub bearings by not following proper procedures.

T-54T Russian Armored Recovery Vehicle





Tiers:



Variants:

- **T-54 (A):** Former East German manufacture. Push/pull bar at front, 1 mt crane, NBC equipment, no winches or spades
- **T-54 (B):** Former East German manufacture. Similar to T-54 (A). Tow cable brackets at hull rear, hull front protective plate, snorkel. No winch or spade.
- **T-54 (C):** Former East German manufacture. Heavy-duty crane, snorkel

System

Alternative Designations: BTS-2 (Medium Tank Towing Vehicle-2)
Crew: ea3 to 5
Chassis: T-54 tank
Weight: mt36
Length Overall: m7.5
Height Travel: m1.9
Width Overall: m3.27
Ground Clearance: mm264
Gradient: deg31
Fording Depth Unprepared: m1.4
Fording Depth With Snorkel: m5.5
Trench Crossing: m2.7
Vertical Step: m.8

Armament

Smoke Equipment: VEESS

NBC protection: No (See Variants)

Automotive Performance

Engine: V12, 520 hp, Diesel

Cruising Range: km400

Max Highway Speed: km/h48

Dirt Road Speed: INA

Highway w/o Towed Vehicle Speed: INA

Radio: INA

Recovery

Towing Capacity: mt40

Crane Capacity: mt1

Notes:

The T-54-T armored recovery vehicles are based on modified chassis of the T-54 medium tank. The recovery vehicle variants have a crane able to lift up to 3 MT, a loading platform, and a spade on the rear of the vehicle. They can mount a snorkel for deep fording. Performance figures are the same for the T-54 (and T-55) tanks. They replaced older tank recovery vehicles based on the T-34 chassis.

Wisent 2 German Armored Recovery Vehicle



Tiers:



Variants:

- **Wisent 1:** The Wisent 1 or Bergepanzer Wisent was developed by a German FFG company as a private venture. It is intended mainly for export. It is worth noting that FFG company has considerable experience in the upgrade and overhaul of various armored vehicles. The Wisent 1 evolved from a vehicle, known as the Armored Recovery Vehicle 2000 or ARV 2000.

System

Alternative Designation: Wisent 2
Type: Armored Recovery Vehicle
Manufacturer: German FFG company as a private venture
Crew: ea3
Bucket Capacity: 1.3 m³
Dig Depth: 4.4 m
Lifting Capacity: 32 t
Winch Capacity: 40 t
Towed Load: 62 t
Earth Working Capacity (Dozer): 400 m³/h
Earth Working Capacity (Excavator Arm): 260-300 m³/h
Note: The Wisent 2 is an unusual multi-purpose vehicle. It can be reconfigured from Armored Engineer Vehicle (AEV) to Armored Recovery Vehicle (ARV) in less than 5 hours. The whole concept behind this vehicle is a modular platform, that can be fitted with various add-on and interchangeable equipment.

Dimensions

Length: 10.5 m

Width: 3.54 m

Height: 3.1 m

Weight: 57 t

Automotive

Engine Name: MTU MB 873 Ka501

Engine Type: Diesel

Engine Power: 1 500

Transmission: INA

Maximum Speed: 65 km/h

Range: 650 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 1.15 m

Trench: 3 m

Fording: 1 m

Main Weapon System

Note: This multi-purpose vehicle can be fitted with remotely-controlled weapon station, armed with a 12.7 mm machine gun for self-defense. This weapon station is optional.

Protection

Hull Armor: The Wisent 2 is based on the Leopard 2 main battle tank. This combat vehicle also has a high level of protection against landmines and improvised explosive devices. It withstands blasts equivalent to 10 kg of TNT under any track location or anywhere under the hull. Interior is lined with a spall liner.

Applique Armor: Available

Mine Clearing: Yes, Add-on passive, or reactive explosive armor can be fitted for even higher level of protection.

NBC Protection: Yes

Smoke Equipment: No

Notes:

WISENT 2 is one of the world’s most advanced multi-functional armored support vehicle, which can be used as an armoured recovery vehicle (ARV) or an armored engineer vehicle (AEV). Developed by Flensburger Fahrzeugbau Gesellschaft (FFG), the vehicle is based on the combat-proven Leopard 2 main battle tank (MBT).

MCRS HEMTT American 8x8 Modular Catastrophic Recovery System (MCRS)









Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from

other cargo models by its rear-mounted Hiab 8108/2 materials handling crane

- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.
- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: MCRS

Type: Modular Catastrophic Recovery System

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: This is a multi-component recovery system in U.S. Army service that consists of a M983A4 light equipment tractor; fifth-wheel towing and recovery device; and tilt deck recovery trailer. It can recover and tow a variety of wheeled vehicles in a number of situations. It is a complement to the Army's M984 and M1089 wreckers. The vehicle was initially developed as a Stryker recovery vehicle. The trailer can hold 35 tons, permitting it to handle many of the Army's mine-resistant ambush protected (MRAP) vehicles as well.

Dimensions

Length: 8.90 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 4.60 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.07 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 14,605 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

Modular Catastrophic Recovery System (MCRS) The US Army, with Tru-Hitch Inc., has fielded the Modular Catastrophic Recovery System (MCRS). This system incorporates the Fifth Wheel Towing and Recovery Device (FWTRD), which engages into the Tilt Deck Recovery Trailer (TDRT). This system provides a full range of recovery capability. The Fifth Wheel Towing and Recovery Device (FWTRD) is equipped with a dedicated 35K winch and boom spade caps to provide a stable platform for recovery winching. The prime mover’s heavy duty 45K winch can also be utilized with the FWTRD for winch recovery . The Fifth Wheel Towing and Recovery Device (FWTRD) can lift 32,000 lbs and tow up to 150,000 lb. GCW with optimal weight distribution. The Tilt Deck Recovery Trailer (TDRT) is capable of transporting up to 35 tons and offers high ground clearance and yet low center of gravity. What makes the Tru-Hitch FWTRD unique is that it imposes a downward load on the prime mover at the fifth wheel rather than from behind the prime mover. Thus, towed weight is evenly distributed on all axles of the prime mover. The operator maintains safe steering and braking of the prime mover and the vehicle in tow. Because the load pivots at the fifth wheel, turning ability and off-road mobility are significantly better than that of other recovery systems. The FWTRD can be utilized independently of the Tilt Deck Recovery Trailer (TDRT) to lift tow a full compliment of wheeled vehicles, including MRAP and STRYKER. For recovery, the FWTRD booms with boom caps, are set as spades. The winch cable is fed through a sheave mounted at the top of the FWTRD mast. This high vantage point and extremely stable platform maximize the winches capability. The prime mover’s heavy duty 45K winch, the FWTRD 35K, or a combination of both winches can be utilized for straight pulls. The FWTRD engages into the Tilt Deck Recovery Trailer (TDRT). The axles of the TDRT slide forward allowing the bed to tilt to the rear for loading. Deck width is expandable from 102” to 114” to accommodate wider vehicles. Disabled vehicles are winched onto the TDRT deck. The TDRT deck is specifically designed for severe service. With the TDRT axles slid to transport position, the load is safely moved. Recover, Lift-Tow, Transport. The Modular Catastrophic Recovery System (MCRS)

performs the full range of recovery functions.

Wisent 1 (Bergpanzer Wisent) German Armored Recovery Vehicle





Tiers:



Variants:

- **Wisent 2:** The Wisent 2 armored engineer vehicle was developed by FFG of Germany. This vehicle was aimed to meet requirements of current operations and deployment scenarios in hotspot areas such as Afghanistan and Iraq. The FFG company has considerable experience in the upgrade and overhaul of various armored vehicles. The Wisent 2 is based on the Leopard 2 main battle tank. Development was completed somewhere in 2009.

System

Alternative Designation: Wisent 1; Bergepanzer Wisent
Type: Armored Recovery Vehicle
Manufacturer: German FFG company as a private venture
Crew: ea3
Bucket Capacity: 1.3 m³
Dig Depth: 4.4 m
Lifting Capacity: 30 t
Winch Capacity: 35 t
Towed Load: 50 t
Earth Working Capacity (Dozer): 300 m³/h
Earth Working Capacity (Excavator Arm): 300 m³/h
Front Mounted Dozer Blade: It can be used to clear obstacles and for earthmowing operations. It is also used as an earth anchor to stabilize the vehicle during craning, winching and excavating operations.
ARV: In the ARV role the Wisent 1 can recover damaged, stuck, swamped or overturned combat vehicles on the battlefield. It also tows them to the nearest shelter, or maintenance unit. Vehicle can also provide maintenance service in the field. Crew of the Wisent 1 operate from under armor protection.

Dimensions

Length: 8.2 m
Width: 3.5 m
Height: 3 m
Weight: 47 t

Automotive

Engine Name: MTU MB 838 Ca M500

Engine Type: Diesel

Engine Power: 960

Transmission: INA

Maximum Speed: 65 km/h

Range: 600 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.7 m

Trench: 2.5 m

Fording: 1.2 m

Main Weapon System

Note: 1 x 12.7 mm (optional)

Protection

Hull Armor: This multi-purpose combat vehicle has a level of protection, similar to that of the Leopard 1 main battle tank. Vehicle withstands blasts equivalent to 8 kg of TNT anywhere under the hull or under any track location. Interior is lined with a spall liner.

Applique Armor: Available

Mine Clearing: Yes, The Wisent 1 can be also reconfigured for mine clearing role. It can clear pathways through minefields, allowing assault units to pass, before enemy establishes defenses. For this role it can be fitted with a full-width mine plough and a safe lane marking system.

NBC Protection: Yes

Smoke Equipment: No

Notes:

The Wisent is an 8x8 armored logistics vehicle built by Rheinmetall. It is designed to be airlift able by the Airbus A400M. It can be fitted with various modules, for cargo carrying, medical use, troop transport, and so on. The Wisent can also be fitted with various weapons, including an RCWS.

FV106 Samson British Armored Recovery Vehicle







Tiers:



Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV106 Samson
Type: Armored Recovery vehicle
Manufacturer: Alvis Vehicles, Coventry, England
Family: e Combat Vehicle Reconnaissance (Tracked), CVR(T), family

In Service: 1979-? (Great Britain) 1979-Present (see proliferation)

Crew: ea3

Note: The Samson armored recovery vehicle was designed to recover damaged or overturned vehicles on the battlefield. It also provides maintenance service or tows damaged vehicles to maintenance units.

Dimensions

Length: m4.79

Width: m2.36

Height: m2.25

Weight: tons8.7

Ground Pressure: 0.36 kg/cm sq

Track: m1.71

Track Width: m0.43

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: hp195 hp

Cruising Range: 640

Speed, Maximum Road: km/h87

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg35

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: 423 liters

Winch: Yes, the winch which is operated at the rear of the vehicle. A hinged spade anchor was designed in two halves to preserve access to the rear door. To winch any heavy vehicles or lighter ones from difficult slopes, it is necessary to lay out several pulleys to get the maximum effect from a fairly low-capacity winch.

Main Weapon System

↳*System*

Name: L43A1 FN MAG, 7.62 mm General-Purpose Machine Gun

Type: 7.62mm General Purpose Machine Gun

Manufacturer: Fabrique Nationale (FNH / FNH UK) and U.S. Ordnance

Proliferation: + 1 Million

Max Rate of Fire: rds/min650-1,000

Length, Total: mm1,263

Length, Barrel: mm630

Width: mm118.7

Height: mm263

Weight: 11.8 kg

Action: Gas-operated long-stroke piston, open bolt

Effective Firing Range (Bipod): 800 m

Effective Firing Range (Tripod): 1,800 m

Maximum firing range: 3,500 m

Feed System: Non-disintegrating DM1 or disintegrating M13 linked belt

Sights: Folding leaf sight with aperture and notch, front blade

↳***Ammunition***

Name: INA

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s840

Basic Load: ea3,000

Fire Control

Name: INA

Computerized FCS: INA

Commander Periscopes: ea7

Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.

Gunner Periscopes: ea2

Navigation System: Yes

Night Vision: Rank Precision Industries passive night sight

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: mmINA

Explosive reactive armor: mmINA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Notes:

Based on the Spartan hull, the FV106 is the heaviest Scorpion variant. FV106 Samson is a British Army armoured recovery vehicle, one of the CVR(T) family. The main role of this vehicle is to recover the CVR(T) family of vehicles, but can recover other light tracked vehicles such as the FV430 series. The Samson was conceived in the early 1970s with the final design entering production in 1978. The hull is an all-welded aluminium construction. It usually carries a crew of three operating a 3.5T capstan winch that can also be utilised in a lifting configuration. It carries suitable equipment to enable a 4:1 mechanical advantage with 228m of winch rope. This winch is capable of recovering up to 12 Tonnes of vehicle. A manually operated earth anchor is situated at the rear to anchor the vehicle while operations are carried out. The Samson can be fitted with a flotation screen so it can be operated amphibiously using its own tracks at 6.5 km/h or at 9.6 km/h if also fitted with a propeller kit. The Samson can also be fitted with a full NBC protection unit.

→→Maintenance Support Vehicles

ASLAV-F Australian 8x8 Amphibious Armored Maintenance Support Vehicle



Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armoured Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilised M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
- **ASLAV Type II:** The ASLAV Type II has no turret and greater internal capacity and is derived from the Canadian Bison Armoured Personnel Carrier. The ASLAV Type II has a crew of two (commander and driver) and is armed with a pintle mounted M2 12.7 mm machine gun. In a number of vehicles, the standard machine gun pintle mount was replaced by a Kongsberg Protector remote weapon station (RWS), which can accommodate either a 12.7 mm machine gun or a Mk 19 40mm automatic grenade launcher. Using a common hull design installed with interchangeable Mission Role Installation Kits (MRIKs), it can be converted into any one of four variants.
- **ASLAV-PC (Personnel Carrier):** is an Armoured Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance
- **ASLAV-C (Command):** is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialised seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.
- **ASLAV-S (Surveillance):** is a specialised surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilising two specialist MRIKs.
- **ASLAV-F (Fitter):** is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** is an Armoured Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-F
Type: Armored Reconnaissance Vehicle
Family: ASLAV

In Service: In the Australian Army, the ASLAV equips the Cavalry Squadrons of the Royal Australian Armoured Corps. A Cavalry Squadron comprises a headquarters element, an echelon and three sabre troops of six ASLAVs, each troop is further broken down into two patrols each comprising two ASLAV-25s and one ASLAV-PC. The ASLAV equips two squadrons from each of the Australian Army's Armoured Cavalry Regiments, the 1st Armoured Regiment in Adelaide, the 2nd Cavalry Regiment in Townsville, and the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane, as well as the School of Armour at Puckapunyal.

Crew: ea3

Passenger Capacity: ea6

Crane Name: HIAB 650 Special hydraulic crane

Crane Capacity: The Fitters MRIK provides a HIAB 650 Special hydraulic crane with a lift capacity of some 4000kg and which slews approximately 260º.

Maintenance Support Equipment: The Fitters vehicle carries an oxy-acetylene kit, toolboxes, a multi-purpose lifting device for the crane as well as spare parts, enabling power pack and other major assemblies to be changed or repaired in the field.

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: 60

Side Slope: %30

Vertical Step: m0.5

Trench: m2

Fording Depth: mAmphibious

Note: The ASLAV-F is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Main Gun

↳*System*

Name: M242 25mm Bushranger Chain Gun

Type: 25mm Chain Gun

Caliber: 25mm

Manufacturer: Hughes Helicopters (1981–1985) McDonnell Douglas Helicopters (1985–2002) Alliant Techsystems (2002–2015) Orbital ATK (2015–2018) Northrop Grumman Innovation Systems (2018–present)

In Service: 1981-Present

Proliferation: >11,000

Length: 2,672mm

Barrel Length: 2,175mm

Width: 318mm

Height: 373mm

Weight: 119 kg

Barrels: Single barrel (progressive RH parabolic twist)

Action: Open bolt

Rate of Fire: • Cyclic: 200rpm with 1hp or 500rpm with 8hp

Muzzle Velocity: 1,100 metres per second (3,600 ft/s)

Maximum Firing Range: 6,800 m

Effective Firing Range: 3,000 m

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm25

Shell: 25×137 mm

Basic Load: 720

Notes: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. The ammunition used in the M242 may also be used in a variety of weapons such as the GAU-12 Equalizer, the French Giat M811, or the Swiss Oerlikon KBA weapon system. It has the capability to fire U.S. manufactured ammunition as well as the NATO equivalents thereof. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun

Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (STANAG 2310)

Basic Load: 1,200

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-F provides protection against small-arms fire, mine-blasts and artillery fragments.

Turret Armor: INA. The ASLAV-F is fitted with a two-man turret, similar to that of the LAV-25.

Applique Armor: Protection of this reconnaissance vehicle can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Fitters MRIK provides a HIAB 650 Special hydraulic crane with a lift capacity of some 4000kg and which slews approximately 260º. Two hydraulically operated outriggers are located between the second and third roadwheel stations, and

these provide support during lifting operations. On the right of the hull top, adjacent the crane, is located a stowage box carrying additional stabilisers and stabiliser plates, which can be attached to the rear towing lugs to provide further support during heavy lifting. The Fitters vehicle carries an oxy-acetylene kit, toolboxes, a multi-purpose lifting device for the crane as well as spare parts, enabling power pack and other major assemblies to be changed or repaired in the field. The Australian Light Armoured Vehicle (ASLAV) is an eight-wheeled amphibious armoured reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armoured fighting vehicles. The ASLAV is a highly mobile, eight-wheel drive, amphibious armoured fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tyres through the use of solid-core run-flat tyres. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

M113AS4 AF Australian Armored Personnel Carrier (APC) with Hiab Crane



Tiers:



Variants:

- **M113AS4 AF:** armored fitted, fitted with a Hiab crane. A total of 38 of these vehicles will be delivered.
- **M113AS4 ARVL:** armored recovery vehicle, fitted with a 13 t capacity winch. A total of 12 of these vehicles will be delivered.
- **M113AS4 AA:** armored ambulance. A total of 15 of these vehicles will be delivered.
- **M113AS4 ACV:** armored command vehicle. A total of 43 of these vehicles will be delivered.
- **M113AS4 ALV:** armored logistics vehicle. It can take all types of combat supplies and carry them under armor. A total of 50 of these vehicles will be delivered.

System

Alternative Designation: M113AS4 AF
Type: Armored Personnel Carrier (APC)
Manufacturer: Australia. Company: INA
Crew: ea2
Passenger Capacity: ea10

Dimensions

Length: 6 m
Width: 2.62 m
Height: 2.6 m
Weight, Combat: 18 tons

Automotive

Engine Name: MTU 6V199TE
Engine Type: Diesel
Engine Power: hp350
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.8 ~ 1.9

Fording Depth: m1.6

Main Gun

Turret: The M113AS4 is fitted with a new one-man turret

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: mm12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Vehicle's hull provides protection against up to 14.5 mm rounds.

Turret Armor: INA

Applique Armor: Protection of the upgraded APC was enhanced by add-on ceramic armor tiles. Hull was reinforced for additional protection against landmines and IED blasts. Interior was fitted with spall liner.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

M113AS4 AF armored fitted, fitted with a Hiab crane. A total of 38 of these vehicles will be delivered. The M113AS4 is an Australian-made upgrade of the old M113AS1 and M113AS3 which are based on the American M113A1 tracked armoured personnel carrier (APC), one of the most popular light tracked APC in the world. The project of Australian M113 upgrade was leaded by BAE Systems. The decade long project to upgrade 433 M113 vehicles began in 2002, with the first completed vehicle delivered to the customer in January 2007. While the upgraded Australian M113s look similar to how they would have in the 1970’s, they are ‘a generational leap ahead’ with improved firepower, protection and habitability from the original M113 A1 vehicle. The finished vehicles are also more reliable and faster following the upgrade. The Australian Army operates a fleet of some 800 members of the M113 series of full-tracked armoured personnel carriers in different variants including ambulance, fire support, command post, mortar carrier, recovery and load carrier vehicles. The M113AS4 is currently the standard tracked APC of Australian armed forces. The M113 Armoured Personnel Carrier (APC) is an all-terrain vehicle designed to protect and transport its crew and up to ten Infantry personnel. In September 1996, the Australian Department of Defence selected the now Tenix Defence Systems Pty Ltd, Australia to upgrade 364 of the Australian Army's fleet of M113A1 series of full-tracked Armoured Personnel Carriers (APCs) to extend their operational life through to the year 2010.

GCZ-110 Chinese Tracked Multi-Purpose Engineer Vehicle (TMPEV)







Tiers:



System

Alternative Designation: GCZ-110Tracked Multi-Purpose Engineer Vehicle (TMPEV)

Type: Road repair, construction, construction of field defenses, non-explosive obstacle clearance, towing, and recovery

Crew: ea3

Chassis: T-79 tank chassis with T-96 suspension

Bulldozer Blade: Yes

Crane: Yes

Ground Penetrating Radar: No

Mine Clearing: No

Proofing Roller: No

Bucket Loader: No

Back-hoe Excavator: No

Wench: Yes

Dimensions

Length: m9.96

Width: m4.10

Height: m4.10

Weight, Combat: kg42,000

Ground Pressure: INA

Automotive

Engine Name: 12150L-7BW (same at T-79 tank)

Engine Type: Diesel

Engine Power: hp730

Cruising Range: km400

Speed, Maximum Road: km/h45

Speed, Average Cross Country: INA

Speed, Maximum Swim: km/hINA

Fording Depth: mINA

Communications

Radio: INA

Crane

Power Source: Hydraulic

Telescopic: Yes

Telescopic Range: m3.5

Capacity: tonnes16

Capacity While Moving: tonnes3

Maximum Height of Crane: m8.4

Dozer Blade

Power Source: Hydraulic

Shape: Adjustable to straight or V-shaped

Maximum Cutting Depth: m.40

Protection

Hull Armor: mm203

Applique Armor: Capable

NBC Protection: INA

Smoke Equipment: INA

Rubber Skirts: Yes, to protect against RPGs

Notes:

The main roles of the GCZ-110 tracked multi-purpose engineer vehicle (TMPEV) are to provide combat engineer support while accompanying armored / mechanized troops, which includes road repair, emergency military road construction, non-explosive obstacle clearing, and towing and recovery operations. The GCZ110 can also be used to construct technical weapons emplacements and flat-bottomed pits. The vehicle is mainly composed of a modified Type 79 tank chassis, and combined dozer blade, crane and winch.

M1079 American 4x4 Light Medium Tactical Vehicle (LMTV) Van






Tiers:



Variants:

- **Note:** *M1078 A0/A1/A1R/A1P2 - LMTV Cargo NSN 2320-01-549-8577 *M1078 A0/A1/A1R/A1P2 - LMTV Cargo with winch[6] NSN 2320-01-549-8611 *M1079 A0/A1/A1R/A1P2 - LMTV Van NSN 2320-01-552-7745 *M1079 A0/A1/A1R/A1P2 - LMTV Van with winch NSN 2320-01-552-7749 *M1080 A0/A1/A1R/A1P2 - LMTV Chassis 3.9 m NSN 2320-01-552-7791 *M1081 A0 - LMTV Cargo-airdrop LVAD *M1082 A1/A1R/A1P2 - Trailer, LMTV cargo[6] NSN 2320-01-449-1775 *M1083 A0/A1/A1R/A1P2 - MTV Cargo NSN 2320-01-549-8610 *M1083 A0/A1/A1R/A1P2 - MTV Cargo with winch NSN 2320-01-549-8565 *M1084 A0/A1/A1R/A1P2 - MTV Cargo with material handling equipment (MHE)[6] NSN 2320-01-552-7739 *M1084 A0/A1/A1R/A1P2/RSV - MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767 *M1085 A0/A1/A1R/A1P2 - MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo with winch NSN 2320-01-552-7770 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE NSN 2320-01-552-7780 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE & winch[6] NSN 2320-01-552-7776 *M1087 A1R/A1P2 - MTV Expansible Van NSN 2320-01-552-7781 *M1088 A0/A1/A1R/A1P2 - MTV Tractor NSN 2320-01-552-7759 *M1088 A0/A1/A1R/A1P2 - MTV Tractor with winch NSN 2320-01-552-7759 *M1089 A0/A1/A1R/A1P2 - MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994 *M1090 A0/A1 - MTV Dump *M1091 - MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production *M1092 A0/A1/A1R/A1P2 - MTV Chassis 4.1 m NSN 2320-01-552-7793 *M1093 A0 - MTV Cargo-airdrop LVAD *M1094 A0 - MTV Dump-airdrop LVAD *M1095 A1/A1R/A1P2 - Trailer, MTV Cargo NSN 2320-01-449-1776 *M1096 A0/A1/A1R/A1P2 - MTV LWB Chassis 4.5 m NSN 2320-01-552-7796 *M1140 A1/A1R HIMARS High Mobility Artillery Rocket System, launcher chassis *M1147 LHS (palletized) Load Handling System Trailer[6] NSN 2320-01-508-7887 *M1148 A1R/A1P2 LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546 *M1157 A1R/A1P2 10-ton Dump[6] NSN 2320-01-552-7787 *M1157 A1R/A1P2 10-ton Dump with winch NSN 2320-01-552-7782 *XM1160 10-ton MEADS air defence chassis (5.5 m wheelbase) Mongoose Mobile Launcher Chassis (MLC) (cancelled) M1273 A1P2 MTV 10-ton chassis[6] NSN 2320-01-621-6239

System

Alternative Designation: M1079

Type: Light Medium Tactical Vehicle (LMTV) Van

Family: FMTV Series

Configuration: 4x4

Crew: ea3

Winch: The M1079 can be equipped with a self-recovery winch kit capable of fore and aft vehicle recovery operations. The winch has 308 feet of line capacity and 10,000 pounds bare drum line pull at 110% overload.

Dimensions

Length: 6.70 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Weheeelbase: 3.90 m

Ground Clearance: 559 mm

Payload Capacity: 2,268 kg

Curb Weight: 8,156 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 225 hp (168 kW) at 2,600 rpm

Transmission: Allison MD-D7 automatic transmission; 7 forward/1 reverse gears

Power-to-Weight Ration: 18.9-32.62 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 40 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1079 Van is designed to be used as a mobile shop by Direct Support Unit Maintenance contact teams. The M1079 van body is constructed of aluminum and is equipped with 3 double paned windows, blackout shields, double rear doors, removable steps, and an AC/DC electrical junction box and multiple outlets. The van body can be equipped with heater and/or air conditioner. The M1079 can be equipped with a self-recovery winch kit capable of fore and aft vehicle recovery operations. The winch has 308 feet of line capacity and 10,000 pounds bare drum line pull at 110% overload.

Combat Support Vehicles

→Medical Vehicles

ASLAV-A Australian 8x8 Amphibious Armored Ambulance





Tiers:



Variants:

- **ASLAV Type I:** The ASLAV Type I is the most numerous type; it is a turreted vehicle derived from the LAV-25 and comes in only one variant.[
- **ASLAV-25 (Reconnaissance):** ASLAV-25 (Reconnaissance) – is an Armoured Car with a crew of three (commander, gunner & driver). The two man turret has day, thermal and infrared imaging weapon systems, a stabilised M242 25mm dual-feed chain gun and two FN MAG 58 7.62 mm machine guns. The ASLAV-25 conducts troop-level tactical reconnaissance and can carry up to six dismounts in the rear.
- **ASLAV Type II:** The ASLAV Type II has no turret and greater internal capacity and is derived from the Canadian Bison Armoured Personnel Carrier. The ASLAV Type II has a crew of two (commander and driver) and is armed with a pintle mounted M2 12.7 mm machine gun. In a number of vehicles, the standard machine gun pintle mount was replaced by a Kongsberg Protector remote weapon station (RWS), which can accommodate either a 12.7 mm machine gun or a Mk 19 40mm automatic grenade launcher. Using a common hull design installed with interchangeable Mission Role Installation Kits (MRIKs), it can be converted into any one of four variants.
- **ASLAV-PC (Personnel Carrier):** is an Armoured Personnel Carrier capable of carrying seven fully equipped troops in support of troop level tactical reconnaissance
- **ASLAV-C (Command):** is an Armoured Command Vehicle, it is equipped with an enhanced radio installation and radio masts, map boards, stowage compartments, specialised seating and an stowable annex. In addition to the crew, the ASLAV-C can accommodate three staff officers and provides command and control at the Squadron and Regimental Headquarter level.
- **ASLAV-S (Surveillance):** is a specialised surveillance vehicle equipped with a hydraulically raised mast mounted thermal imager, laser range finder, day television camera and battlefield surveillance radar RASIT or AMSTAR. The ASLAV-S supports tactical reconnaissance with ground surveillance and observation and can carry four crew and two occasional troops.
- **ASLAV-A (Ambulance):** is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.
- **ASLAV Type III:** The ASLAV Type III has no turret and is used by members of the Royal Australian Electrical and Mechanical Engineers for repair and recovery. The ASLAV Type III has a crew of two (commander and driver) and usually carries a third mechanic, it is armed with a pintle mounted FN MAG 58 7.62 mm machine gun, although some have been fitted with the Kongsberg Protector RWS. The ASLAV Type III comes in two variants utilising two specialist MRIKs.
- **ASLAV-F (Fitter):** is a maintenance support vehicle that provides a protected mobile workshop for field repair personnel, including vehicle parts and tools, and is fitted with a HIAB 650 crane.
- **ASLAV-R (Recovery):** is an Armoured Recovery Vehicle that is equipped with a heavy winch to recover disabled vehicles to a more accessible location or tow them to a repair facility

System

Alternative Designation: ASLAV-S

Type: Armored Ambulance

Family: ASLAV

In Service: In the Australian Army, the ASLAV equips the Cavalry Squadrons of the Royal Australian Armoured Corps. A Cavalry Squadron comprises a headquarters element, an echelon and three sabre troops of six ASLAVs, each troop is further broken down into two patrols each comprising two ASLAV-25s and one ASLAV-PC. The ASLAV equips two squadrons from each of the Australian Army's Armoured Cavalry Regiments, the 1st Armoured Regiment in Adelaide, the 2nd Cavalry Regiment in Townsville, and the 2nd/14th Light Horse Regiment (Queensland Mounted Infantry) in Brisbane, as well as the School of Armour at Puckapunyal.

Crew: ea3

Passenger Capacity: ASLAV-A (Ambulance) – is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients.

Dimensions

Length: m6.53.

Width: m2.62

Height: m2.69

Weight, Combat: 13.2 t

Automotive

Engine Name: 6V53T

Engine Type: Detriot Diesel

Engine Power: hp275

Range: km660

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h10

Gradient: %60

Side Slope: %30

Vertical Step: 0.5

Trench: m2

Fording Depth: Amphibious

Note: The ASLAV-A is fully amphibious with 3 minute preparation. It is propelled on water by two water jets mounted at the rear of the hull.

Main Gun

Note: The turret can be traversed and the main gun fired while vehicle is afloat.

↳*System*

Name: M242 25mm Bushranger Chain Gun

Type: 25mm Chain Gun

Caliber: 25mm

Manufacturer: Hughes Helicopters (1981–1985) McDonnell Douglas Helicopters (1985–2002) Alliant Techsystems (2002–2015) Orbital ATK (2015–2018) Northrop Grumman Innovation Systems (2018–present)

In Service: 1981-Present

Proliferation: >11,000

Length: 2,672mm

Barrel Length: 2,175mm

Width: 318mm

Height: 373mm

Weight: 119 kg

Barrels: Single barrel (progressive RH parabolic twist)

Action: Open bolt

Rate of Fire: • Cyclic: 200rpm with 1hp or 500rpm with 8hp

Muzzle Velocity: 1,100 metres per second (3,600 ft/s)

Maximum Firing Range: 6,800 m

Effective Firing Range: 3,000 m

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm25

Shell: 25×137 mm

Basic Load: 720

Notes: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. The ammunition used in the M242 may also be used in a variety of weapons such as the GAU-12 Equalizer, the French Giat M811, or the Swiss Oerlikon KBA weapon system. It has the capability to fire U.S. manufactured ammunition as well as the NATO equivalents thereof. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

Auxiliary Weapon System

↳*System*

Name: Mk 48 Machine Gun

Alternative Designation: Mark 48, or Mk 48, or Maximi

Type: Light Machine Gun

Caliber: 7.62mm

Proliferation: Widely Proliferated

Manufacturer: FN Herstal

In Service: 2003-Present

Length: 1,000 mm

Barrel Length: 502 mm

Weight: 8.2 kg (22.006 lb) empty 11.2 kg (24.7 lb) w/ 100 rounds

Action: Gas-operated, open bolt

Rate of Fire: 710 (± 50) rounds/min

Maximum FIring Range: 3,600 m

Effective Firing Range: 800 m

Feed System: Disintegrating belt (M13 link)

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO (STANAG 2310)

Basic Load: 1,200

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Automatic Fire Suppression: Yes

Protection

Hull Armor: Armor of the ASLAV-A provides protection against small-arms fire, mine-blasts and artillery fragments.

Turret Armor: INA. The ASLAV-A is fitted with a two-man turret, similar to that of the LAV-25.

Applique Armor: Protection of this reconnaissance vehicle can be increased by fitting add-on ceramic armor tiles. Vehicle can be also fitted with slat armor, which improves protection against RPG rounds.

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

ASLAV-A (Ambulance) – is an Armoured Ambulance and is fitted with specialist medical equipment and in addition to the crew can accommodate a medic and three lying patients or six sitting patients. The Australian Light Armoured Vehicle (ASLAV) is an eight-wheeled amphibious armoured reconnaissance vehicle used by the Australian Army. It was built by General Dynamics Land Systems Canada, and developed from the Canadian Army's LAV-25 and Bison armoured fighting vehicles. The ASLAV is a

highly mobile, eight-wheel drive, amphibious armoured fighting vehicle that can be deployed by land, sea or air (in Royal Australian Air Force C-130s or C-17s). It is fitted with GPS, an intra-vehicular navigation system and a radio harness capable of supporting HF, VHF, UHF and digital radios. The ASLAV is capable of speeds of 100 km/h (62 mph) and has a maximum range in excess of 660 km (410 mi). The eight-wheel drive provides excellent cross-country mobility and redundancy, the vehicle is capable of operation with only four working wheels, and can continue to operate with eight punctured tyres through the use of solid-core run-flat tyres. It is fully amphibious and is driven in the water by permanent shrouded propellers located at the rear of the hull at speeds of up to 10 km/h (6.2 mph)

FV104 Samaritan British Armored Ambulance




Tiers:



Variants:

- **Scorpion (FV101):** Original variant with 3-man crew
- **Spartan (FV103):** Artillery & engineer vehicle with 3-man crew & 4 dismountable troops; 80 k/hr; 483 km range; 1 7.62-mm MG
- **Striker (FV102):** AT vehicle with 5 Swingfire CLOS ATGMS (5 reloads) & 1 7.62-mm L37A1 MG
- **Scorpion 90:** 3-man crew; 73 k/hr; Cockerill Mk IIIK 90-mm gun & 1 7.62-mm MG
- **Samaritan (FV104):** Ambulance for 4 litter patients, 5 seated patients, or 2 litter/3 seated patients; 2-man crew; 483 km range
- **Sultan (FV105):** Command vehicle with at least 2 radios; total 5-6 personnel; 483 km range
- **Samson (FV106):** 483 km range, ARV with internal main winch, tow bars, & tow cables
- **Scimitar (FV107):** Scorpion with 1 30-mm Rarden L21 rifled gun (165 rounds) & 1 7.62-mm coax MG; 80 k/hr; 644 km range;
- **Scorpion 2:** Description of late production Scorpions with Perkins engine & other upgrades with 2-man turret with 30-mm, 76-mm, or 90-mm main armament options
- **Saber:** Reconditioned recon vehicle with 30-mm Rarden cannon & Hughes 7.62-mm coaxial chain gun
- **Scorpion (Jordan):** Upgraded original Scorpion with Perkins engine & other upgrades
- **Spartan with MILAN ATGM:** 2-round turret must be reloaded from outside the vehicle (11 reloads)
- **Scorpion 90 (Venzeula):** Scorpion 90 with Belgain CMI Defence 90-mm Mk II gun & Perkins engine
- **Sturgeon:** OPFOR vehicle used in Suffield, Canada based on the Spartan
- **Salamander:** OPFOR vehicle used in Suffield, Canada based on the 76-mm Scorpion
- **Scorpion (Malaysia):** Scorpion 90 with 76-mm AGL & Perkins engine
- **Omani Scorpion:** Increased protection package & some received a Cummins diesel engine
- **Scorpion vehicle-mounted automatic mortar FCS:** Fires Denel's 60-mm or BAE Systems' 81-mm L16 mortars
- **CVR(T) Life-Extension Program (LEP):** LEP with diesel engine, better optics & communication

System

Alternative Designations: FV104 Samaritan
Type: Armored Ambulance
Manufacturer: Alvis Vehicles, Coventry, England
Family: e Combat Vehicle Reconnaissance (Tracked), CVR(T), family
In Service: 1977-Present
Crew: ea2
Troops: up to 6 men
Note # 1: This variant carries four litters, two litters and three sitting cases or five sitting evacuees.
Note # 2: Medical supplies can be carried on top of the hull and at the rear of the vehicle.

Dimensions

Length: m5.07

Width: m2.24

Height: m2.42

Weight: tons8.66

Ground Pressure: 0.36 kg/cm sq

Ground Clearance: m0.36

Automotive

Engine Name: Cummins BTA 5.9-litre (Diesel)

Type: Diesel

Engine Power: hp195 hp

Cruising Range: 483

Speed, Maximum Road: km/h72

Speed, Average Cross: INA

Speed Maximum Swim: km/h6.4

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.5

Trench: m2

Fording Depth: m1

Fording with Preperation Depth: mAmphibious

Transmission: Self Change Gears TN15X

Suspension: torsion bar, 5 road wheels, front drive, rear idler, 2 hydraulic shock absorbers

Fuel Capacity: liters423 liters

Fire Control

Name: INA

Computerized FCS: INA

Commander Periscopes: ea7

Roof Mounted Day Sight: Yes, with magnifications of 1x and 10x.

Gunner Periscopes: ea2

Navigation System: Yes

Night Vision: Rank Precision Industries passive night sight

Protection

Armor (turret front): mmAgainst 14.5-mm rounds (remainder of the vehicle against 7.62-mm rounds)

Applique armor: mmINA

Explosive reactive armor: mmINA

Active Protection System: INA

Self-entrenching blade: No

NBC Protection System: Yes

Smoke Equipment: 8 Smoke dischargers

Note: Not Directly armed, the Samaritan is defended by a bank of four smoke grenade dischargers along the front right of the vehicle glacis plate. The Vehicle has not weapons, outside of the Soldier's individual weapons.

Notes:

The FV104 Samaritan is the British Army armoured ambulance variant of the CVR(T) family. It has a capacity for up to 6 casualties.The Samaritan is one of the variants of the Combat Vehicle Reconnaissance (Tracked) family of armoured fighting vehicles developed by Alvis plc for the British military. The FV104 is equipped to fulfil the fire support role with a 76 mm gun, but also capable of fulfilling to a large degree the anti-tank and reconnaissance roles.

M997A3 HMMWV American 4x4 Ambulance





Tiers:



Variants:

- **Note:** *A1 versions *A2 versions *M997A3 ambulance *Expanded Capacity HMMWV *M1114 Up-Armored HMMWV *M1151 /M1152 HMMWV *M1167 Expanded Capacity TOW/Armament Carrier *LOSAT carrier *MOWAG Eagle *M1028 *Ground Based Common Sensor-Light (GBCS-L) *XM1097 "Heavy Hummer" *HMMWV -mounted AMRAAM launcher *Special Operations Force Vehicle Intelligence Vehicle (SOF IV) *Cab-Over Cargo Truck (COCT) *Right-Hand Drive *Desert Mobility Vehicle Systems (DMVS) *Multiple-Launch Rocket System vehicle *Avenger *MSE Shelter and Command Post *Survivable Combat Tactical Vehicle (SCTV)

System

Alternative Designation: M997A3 HMMWV
Type: 4x4 Ambulance
Manufacturer: AM General
Family: HMMWV
In Service: 1987-Present
Crew: ea1
Passenger Capacity: 8 maximum (can also carry casualties)

Dimensions

Length, Soft Top: 4.84 m
Length, Armored: 5.16 m
Width: 2.16 m
Height, Soft Top: 1.83 m
Height, Armored: 2.59 m
Wheelbase: 3.30 m
Ground Clearance: 0.41 m
Vehicle Weight, Soft Top: 2,767 kg
Payload Weight, Soft Top: 1,906 kg
Gross Weight, Soft Top: 4,672 kg

Vehicle Weight, Armored: 3,474 kg

Payload Weight, Armored: 871 kg

Gross Weight, Armored: 4,345 kg

Automotive

Engine Name: 1 x General Motors V8

Engine Type: 6.5L turbo-charged, diesel fuel injection

Engine Power: 160 hp at 3,400 rpm

Transmission: automatic w/4 forward gears, 1 reverse gear

Fuel Capacity: 94 liters

Range: 483 km

Speed, Maximum Road: km/h105

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.56

Fording Depth: m1.52

Suspension: independent double A-arm with coil spring on all wheels, with front stabilizer bar

Main Weapon System

Note: Basic vehicle does not have weapons fitted; armament carrier can be fitted with a 7.62-mm or 12.7-mm machine guns or a 40-mm grenade launcher; TOW carrier has launcher

Protection

Armor: INA

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Rugged and resilient, the M997A3 is an ambulance configuration of the Humvee family. Equipped with advanced armor protection, these combat ambulances were built to reliably transport causalities from the battlefield to medical aid stations. Capable of transporting up to four litter patients, eight ambulatory patients—or a combination of both—as well as medical personnel, equipment and a driver, the M997A3 is dependable in the face of danger. The ambulance can be heated, ventilated or air conditioned, depending on environmental conditions. For operation in a nuclear, biological or chemical (NBC) environment, the M977A3 can be equipped with a Gas-Particulate Filter Unit (GPFU) with heaters capable of supporting up to seven personnel equipped with either M25 series protective masks or M13 series patient-protective masks. The GPFU sends temperature-controlled, filtered air to individual face masks, increasing protection, making breathing easier and reducing stress and heat fatigue during extended periods of NBC operation.

Bv206A Swedish Amphibious Tracked Armored Ambulance





Tiers:



Variants:

- **Bv 206A:** Ambulance version, which is capable of carrying stretchers in the rear compartment.
- **Bv 206F:** Firefighting vehicle
- **RaBv 2061:** Swedish Army communications/command version, fitted with radio equipment and workplaces for staff members.
- **PvBv 2062:** Swedish Army anti-tank vehicle, an open top version of the Bv 206 armed with a 90 mm Pvpj 1110 recoilless anti-tank gun.
- **PvBv 2063:** Swedish Army anti-tank vehicle, similar to PvBv 2062, but fitted with the launch system for an ATGM, either the TOW (Rbs 55) or the Bofors BILL (Rbs 56).
- **Bv 206S:** The Bv206S is an armored personnel carrier variant of the Bv 206, which provides protection from small arms fire for the occupants. It is in service with the armed forces of France, Germany (379 Bv 206D/S ordered), Spain, Netherlands, Italy (189 units), Sweden (50 units), Greece (Bv 208) and Singapore (300 units), which has replaced it with the Bronco All Terrain Tracked Carrier. Using a Steyr M1-"Monoblock" engine (6-cylinder, 130 kW), the vehicle can carry the driver and 12 combat-equipped troops — four in the front compartment and eight in the rear. The Bv 206S can be slingloaded by Boeing CH-47 Chinook and Sikorsky CH-53E Super Stallion helicopters or carried in the C130 Hercules.

System

Alternative Designation: Small Unit Support Vehicle (SUSV)

Description: Amphibious Armored Ambulance

Bodies: Fiberglass reinforced with PVC foam insulation

Crew: ea1

Passengers: ea11

Forward Car: The forward car accommodates the driver and three combat troops.

Rear Car: The rear car carries eight fully equipped troops or up to 6 stretchers

Airlift Capable: Yes, The unladen Bv206S can be underslung and air lifted by a Boeing Chinook CH-47 and a Sikorsky Super Stallion CH-53 helicopters. The vehicle is air transportable in the C-5A Galaxy (ten vehicles), C-17A Globemaster (six vehicles), C-130 Hercules (one or two vehicles), C-160 Transall (one vehicle), A400M (two vehicles), CH-47 helicopter (one vehicle) and CH-53 helicopter (one vehicle).

Note: The vehicle provides high mobility and ballistic protection and is available as an armoured personnel carrier, cargo carrier, battlefield ambulance, mortar carrier, command post vehicle and recovery vehicle.

↳*Dimensions*

Height, Overall: m2.4

Length, Overall: m6.9

Width, Overall: m1.87

Cargo Space, Front: m32.5

Cargo Space, Rear: m35.5

Track Width: mm620

Ground Pressure: 11.6/13.6 kPa (1.68/1.97 PSI)

Curb Weight: mt4.5

Gross Vehicle Weight: mt6.58

Payload: 2.24mt (630 kg in front compartment and 1610 kg in rear compartment)

Trailer Load: mt2.5

Automotive

Engine Name: Steyr M16

Engine Type: Steyr M16 six-cylinder in-line, 3,200cc, direct injection diesel engine provides 130kW power at 4,000rpm and 350Nm torque at 2,300rpm. The power to weight ratio is 19.42hp/t.

Engine Power: hp115

Transmission: Mercedes Benz W5A-580 automatic transmission has five forward and one reverse gear.

Range, Cruising: km300

Speed, Maximum Road: km/h52

Speed, Maximum Swim: km/h4.7

Fording Depth: mAmphibious

Temperature Range: degreesThe vehicle operates in temperatures from -32°C to +46°C, from Arctic to desert and jungle conditions.

Grade, hard surface: %60

Grade, Deep Snow: %30

Turning Radius: m8

Main Weapon System

Note: The Bv206S can be equipped with a ring mount for a 7.62mm or a 12.7mm machine gun. Missiles and other weapon systems can be carried in the vehicle. A mortar carrier variant of the vehicle is available.

Protection

Armor: The vehicle is fitted with all-welded steel armour and the windows of the vehicle provide the same level of protection against direct fire 7.62mm ball ammunition and artillery shrapnel.

Armor, Applique: mmAvailable

Armor, Explosive Reactive: mmNo

Active Protection System: No

NBC Protection: Yes

Smoke Equipment: Yes

Automated Fire Detection and Extinguishing System.: Yes

Notes:

he Bv206A is an ambulance version of the Bv 206 and is capable of carrying stretchers in the rear compartment. Bandvagn 206 (Bv 206) is a tracked articulated, all-terrain carrier developed by Hägglunds (now part of BAE Systems Global Combat Systems) for the Swedish Army. It consists of two units, with all four tracks powered. It can carry up to 17 people (6 in the front compartment, 11 in the rear), and the trailer unit can be adapted for different uses (see Variants section).

YPR-765 PRGWT Danish Armored Medical Evacuation Vehicle (AMEV)





Tiers:



Variants:

- **EIFV:** Holds only 6 soldiers that can dismount; M242 Bushmaster 25-mm gun with 900 rounds of ammo; BGM-71 TOW AT weapon with 6 rounds; M240 Machine Gun with 4400 rounds
- **Mortar Prime Move (Netherlands: YPR 765 PRMR):** Tows the 120-mm Thomson-Brandt mortar with crew of 7
- **Cargo Carrier (Netherlands: YPR 765 PRVR-A/B):** Crew of 2 can carry cargo into the combat zone
- **TOW Missile Carrier (Netherlands: YPR 765 PRAT):** Similar to the US M901 ITOW variant of the M113 with an Emerson TOW AT system
- **Ambulance (Netherlands: YPR 765 PRGWT):** Unarmed variant with a crew of 4
- **Bn Command (Netherlands: YPR 765 PRCO-C1):** Specialized for infantry battalion commanders
- **Bn Gunnery Center (Netherlands PRCO-C2):** Specialized for use by artillery battalions
- **Mortar Fire-Control Vehicle (Netherlands PRCO-C3):** Specialty vehicle to control indirect mortar fire
- **Anti-Aircraft Control Vehicle (Netherlands PRCO-C4):** Specially designed for air defense command & control
- **YPR 765 PRCO-C5 (Netherlands):** Observation vehicle with only a 4-man crew
- **YPR 765 PRRDR (Netherlands):** Operated the British ZB 298 battlefield surveillance radar
- **YPR PRRDR-C (Netherlands):** Radar/Command Vehicle
- **YPR 765 PRI/I (Netherlands):** Squad vehicle with M113 cupola, M2 HB MG, 9 soldiers, & driver
- **YPR 806 PRBRG (Netherlands):** Recovery vehicle with HIAB crane, crew of 4, & 8 smoke grenade launchers
- **YPR-2000 (Netherlands):** Upgrade included more storage containers
- **Command Vehicle:** Room for 9-man crew with additional communication equipment
- **AIFV-B (Belgium):** 40-caliber MG, NBC protection, & Halon fire-extinguishing system
- **AIFV-B-CP (Belgium):** Pintle-mounted 12.7-mm MG, crew of 7, NBC protection, & Halon fire-extinguishing system
- **Philippine Variant:** Converted to accept 50-caliber MG ILO 25-mm cannon
- **YPR-765 KMAR Military Police Vehicle:** YPR-765 PRI/I modified for use by military police
- **Turkish ACV:** See separate vehicle for the FNSS IFV

System

Alternative Designations: Egyptian Infantry Fighting Vehicle (EIFV); See Variants

Description: IFV modified from the M113 with exit ramp in the rear with space for 7 soldiers; 2 firing ports on each side & 1 firing port in the left of the ramp

Specifications

Crew: 3 (driver, commander, gunner)

Combat Weight: mt13.7

Chassis Length Overall: m5.26

Height Overall: m2.79 (2.01 hull top)

Width Overall: m2.82

Ground Pressure: kg/cm20.67

Automotive Performance: 6V-53T

Engine Type: Water-cooled, turbocharged, 2-stroke, V-6 diesel Allison

Cruising Range: km490 (483-EIFV)

Speed (Max Road): km/h61 (66-EIFV)

Speed (Max Off-Road): km/hINA

Speed (Average Cross-Country): INA

Speed (Max Swim): km/h7

Fording Depths: mAmphibious

Radio: INA

Armament

Note: Unarmed

Protection

Armor (turret front): mmINA (sides on EIFV protected against 14.5-mm AP rounds)

Applique Armor: mmAluminum hull with spaced laminate steel on front & sides

Explosive Reactive Armor: mmINA

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: Yes (Details INA)

Smoke Equipment: 6 Smoke grenade launchers

Survivability Equipment: INA

Notes:

YPR-765 prgwt (pantser-rups-gewondentransport) — armored medical evacuation vehicle (AMEV); unarmed; crew of three plus five passengers; rear compartment has two forward-facing seats on the left, bins for the personal equipment of the wounded on either side, and can hold two stretchers on either side, suspended from chains. The vehicle is equipped with a diesel-heater. The AIFV (Armored Infantry Fighting Vehicle) is a tracked light armored vehicle that serves as an infantry fighting vehicle (IFV) in the armies of several countries. It is a development of the M113A1 armored personnel carrier. The hull of the vehicle is made of welded aluminum, with spaced steel laminate armor bolted onto the side and front. The voids of the armor are filled with polyurethane foam, which gives the vehicle extra buoyancy when travelling in the water. Original production AIFV's can swim without deploying flotation curtains, using only a large front-mounted trim vane; they are propelled in the water by their tracks. The engine sits on the front right of the hull, behind a hatch that can be used to remove the complete powerpack. The powerpack is similar to the M113A1, except for a larger radiator capacity and turbocharger. The transmission is also fitted with heavy duty components from the M548 tracked cargo carrier. Immediately to the left of the engine is the driver, above whom is a hatch that opens to the right. The driver has four M27 day periscopes. The driver's center periscope can be replaced by a passive infra-red periscope for night driving. The commander sits immediately behind the driver, and has a cupola that can be completely traversed. The cupola has five periscopes, four of which are M17 day periscopes, the fifth has 1x to 6x variable magnification. The turret is fitted on the right side of the hull behind the engine. The turret, which has electro-hydraulic traverse, can elevate from -10 to +50° and can traverse and elevate at a speed of 60°/sec. The turret mounts an Oerlikon Contraves 25 mm KBA-B02 cannon with a dual ammunition feed and 180 rounds of ready use ammo, with another 144 rounds stored in the hull. Mounted to the left of this gun is a 7.62 mm FN MAG machine gun, which has 230 rounds of ready ammo, with a further 1,610 in the hull. There is a six-barrel smoke discharger mounted at the front, just above the large trim vane. The troop compartment is at the rear of the hull; a large power operated ramp allows access through the rear of the vehicle, a door is also provided in the ramp. Additionally a single piece hatch covers the top of the troop compartment. The compartment contains seven troops in the Dutch variant, with six sitting back to back facing outwards and a single passenger sitting between

the command and the turret facing backwards. There are two firing ports in each side of the hull and a single firing port in the rear. The side firing ports are provided with M17 periscopes, the rear one is fitted with an M27 periscope.

Type 85 (Type WZ751) Chinese Amphibious Armoured Ambulance



Tiers:

1 2 **3** 4

Variants:

- **Type 85/YW 531H:** Domestic/export base model
- **YW703H:** Command variant
- **Type 85 Armored Command Vehicle:** 2-man crew, 6 staff, additional communications equipment, & fewer ammunition rounds; used at regimental or division level
- **Type 85 Recovery Vehicle:** 1000 KG crane with 5-man crew
- **Type 85 Maintenance Engineering Vehicle:** Similar to the WZ 751 (ambulance), but for support
- **Type 85 Mortar Carriers:** 82-mm & 120-mm variants similar to the YW 531
- **WZ 751 Armored Ambulance:** 2-man crew with space for 4 litter or 8 seat patients; 12.7-mm MG
- **Type 85 SP Howitzer (Type 70-1/YW 302):** Type 54-1 122-mm howitzer on Type 85 chassis
- **Type 85 ATGM Launcher Vehicle:** Railed hull with 4-rail Red Arrow-8 SACLOS wire-guided ATGM
- **YW 307 IFV:** Type 89 with a 25-mm cannon similar to the Bushmaster & the 7.62-mm coaxial MG
- **YW 309 Infantry Combat Vehicle (ICV):** 3-man crew, 73-mm low pressure main gun, 7.62-mm coaxial MG & Red Arrow 3 ATGM
- **HJ-8 Anti-Tank Vehicle:** AT traversable launcher with 4 HJ-8 ATGMs & 4 loads in storage in the hull
- **NVH-1:** Joint Chinese/British variant with 25-mm gun
- **Type 90:** Updated design with reduced height, improved hull shape, & better transmission
- **Thai versions:** Similar to the Chinese variants, but armed with a M-2HB MG
- **Artillery Command Post Vehicle:** YW 531H modified with a raised rear superstructure
- **YW 306:** 130-mm MRL platform
- **Type 89 (YW 534/WZ 534):** Improved power pack & night vision equipment for domestic use & export with longer & wider chassis, improved engine, & mobility

System

Alternative Designations: Type 85; Type WZ751
Type: Amphibious Armoured Ambulance
Crew: ea2 (driver, commander)
Medics: ea2
Medical Equipment: four stretcher patients, eight seated patients or two stretcher patients and four seated patients. In addition to the stretchers, a medical kit, a splint box and an oxygen supply are carried and standard equipment includes an air conditioning system.
Maximum Effective Range: km500
Driver Day Periscope: ea2
Driver Night Periscope: ea1

Dimesions

Length: m6.13
Width: m3.06
Height: m2.59
Weight, Combat: kg13,800
Ground Pressure: kg0.546

Automotive

Engine Name: BF8L 413F
Engine Type: Turbocharged, air-cooled, V-8 diesel
Engine Power: hp320
Cruising Range: km600
Speed, Maximum Road: km/h65
Speed, Average Cross: km/h35
Speed, Maximum Swim: km/h6
Fording Depth: mAmphibious
Transmission: Manual
Gears: ea5 Forward, 1 Reverse

Communications

Primary Radio: Type 889
Secondary Radio: VRC 83
Intercom System: Type 803

Armament and Ammunition

↳*Main Gun*

Name: Type 54 (DShKM copy)
Type: Anti-Aircraft Machine Gun
Caliber/length: mm12.7
Number of Rounds: ea1,200
Muzzle Velocity: m/s850
Max Range: m2,000
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)
Ammo: 1120 Rounds: APDS (Tungsten Core); API, API-T,
Armored Sheilds: Yes
Traverse: deg360
Elevation: deg90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Tank Commander: INA

Thermal Gunner: INA

Main Gun Stablization: Yes

Range, Day Sight: kmINA

Range, Thermal Sight: kmINA

IFF: INA

Protection

Armor Type: Welded Steel Hull

Hull Armor: mm12.7

Armor (turret front): mm14 (front glacis)

Applique Armor: mmNo

Explosive Reactive Armor: mmNo

Active Protection System: No

Mine Clearing: No

Self-entrenching Blade: No

NBC Protection System: Yes

Survivability Equipment: INA

Smoke Equipment: 8 Smoke Grenade Launchers (4 on each side)

Waveguide Blade: Yes

Notes:

Type 85 Tracked Armoured Ambulance or Type WZ751 - Unarmed ambulance with a higher roofline. This is also based on the YW 531 H but has a new and raised hull rear and a new larger commander's cupola to the rear of the driver which is fitted with an externally mounted 12.7 mm anti-aircraft machine gun. This has a crew of two and also carries two medical personnel plus four stretcher patients, eight seated patients or two stretcher patients and four seated patients. In addition to the stretchers, a medical kit, a splint box and an oxygen supply are carried and standard equipment includes an air conditioning system. Loaded weight is 13,800 kg. This is now called the Tracked Armoured Ambulance Type 85. The YW531H Type 85 Chinese Armored Personnel Carrier s a tracked armoured fighting vehicle produced by Chinese company Norinco (industrial index: Type YW531H). It is an improved version of the Type 63 armoured personnel carrier. The vehicle is bigger, has additional firing ports and periscopes, a longer chassis with an additional road wheel on each side, and is equipped with an NBC protection system. The Type 85 series was developed in 1985, exclusively for the export market; for the PLA, the very similar Type 89 AFV was designed. The main user of the Type 85 series are the Royal Thai Armed Forces who received their first vehicles in 1987. The hull is made of welded steel, and provides protection against small arms fire. The vehicle carries a maximum of 15 including crew. The driver sits in the front left of the hull, and has a single piece hatch, which opens to the left. The driver is provided with two day periscopes which cover the front and right of the vehicle. One of the drivers periscopes can be replaced by a night vision device. The commander sits behind the driver and has a single piece hatch. The air-cooled, turbocharged diesel engine sits to the right rear of the driver. It has a large intake located in the top of the hull, with an exhaust on the right hand side. The engine feeds a manual transmission with five forward gears and one reverse gear. Track is driven at the front by a drive sprocket, and passes over five dual rubber-typed road wheels and track-return rollers, then loops over an idler at the rear, before returning to the front again. A 12.7 millimetre calibre machine gun with armoured shields is located in an open mount at the front of a small hatch in the center of the hull which opens into the troop compartment. The gun can traverse through 360 degrees and can be elevated to an angle of 90 degrees. A total of 1,120 rounds is carried on board. Two oblong roof hatches

and a large rear door provide access to the troop compartment. On either side of the forward hull, a cluster of four 76 mm smoke grenade dischargers is mounted. The vehicle is amphibious, a folding trim board stowed at the front of the hull needs to be raised, and the vehicle can then propel itself in the water using its tracks. Standard equipment includes an NBC system, a Type 889 or VRC-83 radio, and a Type 803 intercom system.

BMM-3 Russian 8x8 Amphibious Armored Mobile Dressing Station




Tiers:



Variants:

- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)

System

Alternative Designation: BMM-3

Description: 8 X 8 wheeled Mobile Dressing Station

Chassis: BTR-80

Crew: ea3

Note: The equipment and medicine set ensures the delivery of first aid at stationary position and on the move. The vehicle has a folding tent to be attached to the vehicle at any side door. Up to 12 casualties can be accommodated in the tent.

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA
Type: API-T
Caliber: mm14.5
Cartridge: 14.5×114 mm
Muzzle Velocity: m/s1,005
Basic Load: ea500
Effective Range (Day): m2,000
Effective Range (Night): INA
Tactical Range: m1,500-2,000
Armor Penetration: 20 at 1,000 m/ 30 at 500 m
Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)
Caliber: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Effective Rate of Fire: rds.min250-300
Weight (Gun Only): kg9
Weight (Tripod Only): kg7.7
Length, Total: mm1,203
Length, Barrel: mm605
Action: Gas-operated, open bolt
Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes
Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights
Effective Firing Range (With Sight Adjustments): m100-1,500

↳***Ammunition***

Name: 57-N-323S
Type: Rifle
Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BMM-3 protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

The BMM-3 operates as the mobile dressing station with the team of doctors and a bandaging set. The basic design of all modifications comprises a basic sanitary set. Up to four heavy casualties can be carried on stretchers inside the hull, and additional two outside on the stretchers placed under engine compartment roof. The equipment and medicine set ensures the delivery of first aid at stationary position and on the move. The vehicle has a folding tent to be attached to the vehicle at any side door. Up to 12 casualties can be accommodated in the tent.

Linza Russian 4x4 Armored Ambulance






Tiers:



Variants:

- **Linza Armored Ambulance:** Armored Ambulance
- **Logistic Support Vessel:** INA
- **Command Post Vehicle:** INA
- **Kamaz-53949 Typhoon-K Russian 4x4 Armored Vehicle:** Armored Vehicle

System

Alternative Designation: Linza
Type: 4x4 Armoured Ambulance
Manufacturer: Remdiesel
Crew: ea2
Passenger Capacity: Linza can transport up to 10 wounded soldiers
Payload Capacity: 2,000kg

Dimensions

Length: 6.7m
Width: 2.5m
Height: 2.8m
Curb Weight: 13,700kg
Ground Clearance: The ground clearance of the vehicle can be automatically adjusted in line with the speed, surface and person-specific driving style.

Automotive

Engine Name: Cummins 6ISBe 350 P-6
Engine Type: Diesel
Engine Power: The engine generates a maximum power of 350hp at a maximum torque of 1,090Nm.
Power-to-Weight Ratio: The power-to-weight ratio of the vehicle is 20.2hp/t.
Transmission: six-speed automatic transmission system.

Range: km1,000

Speed, Maximum Road: 100km/h

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Suspension: The Typhoon-K is equipped with a hydro-pneumatic independent suspension system with ride height adjustment according to the requirements of the users.

Central Tire Inflation System: Yes

Vertical Step: 0.6m

Trench: 0.5m

Fording: 1.5m without preparation

Main Weapon System

Note: The Kamaz-53949 is fitted with a stabilised remotely controlled weapon station (RCWS). The RCWS can be armed with medium-to-heavy machine guns, including a 7.62mm medium machine gun (MMG) or a 12.7mm / 14.5mm heavy machine gun (HMG).

↳*System*

Name: NSV

Type: Heavy Machine Gun

Caliber: 12.7

Length: 1,560 mm

Barrel Length: INA

Weight: 25 kg (55.12 lb) (gun only) 41 kg (90.39 lb) on tripod 11 kg (24.25 lb) (50-round belt)

Action: Gas-operated

Rate of Fire: 700–800 rounds/min

Muzzle Velocity: 845 m/s

Effective Firing Range: 1500 m vs. air (maximum) 2000 m vs. ground targets

Feed System: 50-round belt

Sights: Iron sights

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7×108mm

Basic Load: 2,000 Rounds

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: No

Protection

Hull Armor: The vehicle protects the occupants from 14.5mm-calibre ammunition, armour-piercing rounds and incendiary rounds. It can withstand the impact of 8kg TNT explosion under the floor and 10kg TNT explosion under the wheels. The vehicle offers STANAG 4569 level III protection against anti-personnel and anti-tank mines, as well as improvised explosive devices (IEDs). The V-shaped hull reduces the blast impact by deflecting the kinetic objects away from the hull in the event of TNT device explosion anywhere under the bottom of the vehicle. The hull is hinged with sandwich armour, comprising conventional internal steel armour and new-generation external ceramic armour.

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Med-Evac version using the K-53949 chassis is named Linza. Linza can transport up to 10 wounded soldiers. Kamaz-53949 Typhoon-K is a 4×4 mine-protected armored vehicle manufactured by Remdiesel, a subsidiary of KAMAZ, to meet the requirements of armed forces and special units worldwide. The vehicle was recently displayed at the International Military-Technical Forum ARMY-2017 held in Moscow, Russia, in August. Russian state-owned arms exporter Rosoboronexport and Remdiesel signed an agreement to promote the vehicle in export markets across the North Africa, Middle East, Central and South East Asia, Latin America and Commonwealth of Independent States (CIS) regions. The Typhoon-K is primarily used to safely transport troops and military cargoes in mine-inflated zones. It can also be configured as a command post vehicle, ambulance and logistics support vehicle. Kamaz-53949 design The Typhoon-K is based on the common chassis utilized by the Kamaz family of all-wheel drive medium and heavy-duty vehicles. The vehicle also shares most of the components and assemblies with the other platforms in the family. The vehicle accommodates two crew members and eight fully equipped troops. The hull features four side doors and a rear door. The roof is fitted with two hatches for observation, firing and emergency exit purposes. The Kamaz-53949 vehicle measures 6.7m-long, 2.5m-wide and 2.8m-high. It has a curb weight of 13,700kg and can carry a payload of 2,000kg. The vehicle also features a signature reduction package, an all-around video surveillance system and an automatic fire-extinguishing unit. Armament of Kamaz-53949 Typhoon-K The Kamaz-53949 is fitted with a stabilized remotely controlled weapon station (RCWS). The RCWS can be armed with medium-to-heavy machine guns, including a 7.62mm medium machine gun (MMG) or a 12.7mm / 14.5mm heavy machine gun (HMG).

Piranha III Swiss 6x6 Amphibious Ambulance







Tiers:



Variants:

- **Piranha (6 x 6):** INA
- **Piranha III (8 x 8):** INA
- **Piranha IV:** This variant ioncludes an upgraded MTU 544-hp powerplant with an increased power-to-weight ratio and maximum speed of 62 mph (100 km/hr) and 465.7-mi (750-km) road range.

System

Alternative Designation: Piranha III
Type: 6x6 Amphibious Ambulance
Manufacturer: MOWAG
Family: Piranha
Crew: ea1
Passenger Capacity: INA

Dimensions

Length: 5.97 m
Width: 2.50 m
Height: 1.85 m
Distance Between Axles, 1st to 2nd: 2.04 m
Distance Between Axles, 2nd to 3rd: 1.04 m
Ground Clearance: 500 mm
Combat Weight: 10,500 kg

Unloaded Weight: 8,000 kg

Automotive

Engine Name: 1 x Detroit 6V-53T

Engine Type: 318-cu in (5.21-liter) liquid-cooled, 2-stroke, V6 diesel

Engine Power: 300 hp at 2,800 rpm

Fuel Capacity: 250 liters

Suspension: 6 x 6 (6-wheel drive, 2-wheel steering) coil spring on front axle and torsion bars on 2 rear axles, hydraulic shock absorbers at all wheel stations (12.5 in/0.32 m travel)

Range: 600 km

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: km/h11

Vertical Obstacle: 0.50 m

Fording: Amphibious

Gradient: 70 %

Protection

Hull Armor: Quick-mount selection, including defense against RPG, IED, NBC

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

Ambulance This is an unarmed variant with roof-mounted air conditioning. The Piranha 6 x 6 armored personnel carrier (APC) is one of four models in the Piranha family (the others being the 4 x 4 and 8 x 8 versions), all of which share similar components such as hull sections and wheels, as well as door and hatch configurations.

M113AS4 AA Australian Armored Ambulance



Tiers:



Variants:

- **M113AS4 AF:** armored fitted, fitted with a Hiab crane. A total of 38 of these vehicles will be delivered.
- **M113AS4 ARVL:** armored recovery vehicle, fitted with a 13 t capacity winch. A total of 12 of these vehicles will be delivered.
- **M113AS4 AA:** armored ambulance. A total of 15 of these vehicles will be delivered.
- **M113AS4 ACV:** armored command vehicle. A total of 43 of these vehicles will be delivered.
- **M113AS4 ALV:** armored logistics vehicle. It can take all types of combat supplies and carry them under armor. A total of 50 of these vehicles will be delivered.

System

Alternative Designation: M113AS4 AA
Type: Armored Personnel Carrier (APC)
Manufacturer: Australia. Company: INA
Crew: ea2
Passenger Capacity: ea10
Litter Capacity: INA

Dimensions

Length: 6 m
Width: 2.62 m
Height: 2.6 m
Weight, Combat: 18 tons

Automotive

Engine Name: MTU 6V199TE
Engine Type: Diesel
Engine Power: hp350
Cruising Range: km500
Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.8 ~ 1.9

Fording Depth: m1.6

Main Gun

Note: The M113AS4 is fitted with a new one-man turret, armed with a heavy machine gun.

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: mm12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Vehicle's hull provides protection against up to 14.5 mm rounds.

Turret Armor: INA

Applique Armor: Protection of the upgraded APC was enhanced by add-on ceramic armor tiles. Hull was reinforced for additional protection against landmines and IED blasts. Interior was fitted with spall liner.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

M113AS4 AA armored ambulance. The M113AS4 is an Australian-made upgrade of the old M113AS1 and M113AS3 which are based on the American M113A1 tracked armoured personnel carrier (APC), one of the most popular light tracked APC in the world. The project of Australian M113 upgrade was leaded by BAE Systems. The decade long project to upgrade 433 M113 vehicles began in 2002, with the first completed vehicle delivered to the customer in January 2007. While the upgraded Australian M113s look similar to how they would have in the 1970’s, they are ‘a generational leap ahead’ with improved firepower, protection and habitability from the original M113 A1 vehicle. The finished vehicles are also more reliable and faster following the upgrade. The Australian Army operates a fleet of some 800 members of the M113 series of full-tracked armoured personnel carriers in different variants including ambulance, fire support, command post, mortar carrier, recovery and load carrier vehicles. The M113AS4 is currently the standard tracked APC of Australian armed forces. The M113 Armoured Personnel Carrier (APC) is an all-terrain vehicle designed to protect and transport its crew and up to ten Infantry personnel. In September 1996, the Australian Department of Defence selected the now Tenix Defence Systems Pty Ltd, Australia to upgrade 364 of the Australian Army's fleet of M113A1 series of full-tracked Armoured Personnel Carriers (APCs) to extend their operational life through to the year 2010.

Bushmaster Australian 4x4 Armored Ambulance






Tiers:



Variants:

- **Planned Variants:** ADI (now Thales Australia) planned at least six variants. These included an armored ambulance; command vehicle; mortar carrier with internally mounted 81-mm or 120-mm weapon; fire support vehicle with 12.7-mm machine gun and 40-mm automatic grenade launcher; engineering vehicle; and firefighting vehicle.
- **Bushmaster ambulance:** This variant can transport two stretchered patients, or one stretchered and four seated patients at one time. They are equipped with the latest medical equipment and provide protection against blasts and ballistic threats.
- **Bushmaster EOD:** The Bushmaster explosive ordinance disposal (EOD) variant is fitted with a 27 ft 11 in (8.5 m) interrogator arm with a 225-degree arc of operation around the front of the vehicle. The arm can be installed onto any existing Bushmaster vehicle to modify it into an EOD variant. The two-piece articulated arm can include the following attachments: interrogation tool with clasp claw; work light; camera; detection equipment; and proximity detector. The vehicle can also be fitted with a roller clearance system that is hydraulically operated, steerable and easily attached and released. An EOD robot can also be stored internally .
- **Bushmaster combat support vehicle:** Thales Australia privately developed a prototype Bushmaster combat support vehicle in 2005. It was previously known as the Copperhead . This 4 x 4 vehicle features the Bushmaster cab at the front, with a flat-bed cargo area at the rear, which can carry up to 11,000 lb (5,000 kg) of cargo. The cargo area measures 101 sq ft (9.4 sq m). Upgradeable ballistic protection options are available for the crew cabin. The vehicle has a top speed of 60 mph (100 km/h) and a maximum range of 500 mi (800 km). It also offers high clearance for obstacles, tight turning circle and the ability to travel off-road in all conditions, according to the manufacturer. A dual-cab variant, offered for the British operational utility vehicle system (OUVS) program, featured a larger interior cabin with room for two crew and up to six passengers with four side-opening passenger doors and a flatbed area of 54 sq ft (5 sq m) and a 6,600-lb (3,000-kg) payload.
- **Bushmaster 6 x 6:** Thales Australia has conducted studies of a 6 x 6 version of the Bushmaster, which would have a gross vehicle weight of up to 25.6 tons.

System

Alternative Designation: Bushmaster Armored Ambulance

Type: Protected Mobility Vehicle

Crew: ea2 (commander, driver)

Passenger Capacity: This variant can transport two stretchered patients, or one stretchered and four seated patients at one time.

Dimensions

Length, Overall: 6.60 m

Length, Hull: 7.09 m

Height: 2.65 m

Width: 2.50 m

Cabin Volume: 11.2 cubic m

Ground Clearance, Hull: 0.43 m

Ground Clearance, Axle Housings: 0.40 m

Wheel Track: 2.10 m

Wheel Base: 3.90 m

Weight, Unloaded: 12,500 kg

Weight, Combat: 15,000 kg

Weight, Payload: 2,500 kg

Automotive

Engine Name: 1 x Caterpillar 3126 ATAAC

Engine Type: 6-cylinder turbocharged air-to-air after-cooled diesel

Engine Power: 300 hp at 2,400 rpm with 25 percent torque rise

Transmission: ZF 7HP502 full automatic with front-end retarder for controlled slope descent

Tires: 395/85 R20 with bead locks or optional run-flat inserts

Inflation System: optional dual-channel with dash-mounted push button control, providing 4 settings highway, sand, mud/snow and emergency

Brakes: dual circuit Meritor air-operated disc brakes assisted by a hydraulic retarder

Suspension: AxleTech 4000 series coil spring with short-long-arm wishbone and double-acting hydraulic shock-absorbers, bump-stop rubbers

Axles: Arvin Meritor/Timoney 4000 series independent suspension axle system, 7,700-kg capacity with diff locks front, center and rear

Speed, Road: 100 km/h

Range: 800 km

Vertical Obstacle: 0.50 m

Fording: 1.20 m w/out preparation

Gradient: %60

Side Slope: %40

Approach Angle: deg40

Departure Angle: deg38

Turning Circle: 18.6 m

Fuel Capacity: 319 Liters

Main Gun

Note: Remote weapon station up to 12.7mm HMG or 40mm AGM launcher, or manned open turret up to 12.7mm HMG or 40mm AGM launcher

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7 mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳***Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 1,200

Auxiliary Weapon System

Note: Manned swing mounts up to 7.62mm (one front and two rear)

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Protection

Hull Armor: all-welded steel to withstand 5.56-mm and 7.62-mm ball ammunition

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: 8 x grenade launchers (bank of 4 on each side of vehicle hull)

Notes:

Bushmaster ambulance This variant can transport two stretchered patients, or one stretchered and four seated patients at one time. They are equipped with the latest medical equipment and provide protection against blasts and ballistic threats. The Bushmaster Protected Mobility Vehicle or Infantry Mobility Vehicle is an Australian-built four-wheel drive armoured vehicle. The Bushmaster was primarily designed by the then government-owned Australian Defence Industries (ADI), and is currently produced by Thales Australia with a support contract provided by Oshkosh Truck following the acquisition of ADI. The Bushmaster is currently in service with the Australian Army, Royal Australian Air Force, Royal Netherlands Army, British Army, Japan Ground Self Defense Force, Fiji Infantry Regiment, Jamaica Defence Force and the New Zealand Army. The role of the Bushmaster is to provide protected mobility transport (or protected troop lift capability), with infantry dismounting from the vehicle before going into action. As the Bushmaster is only lightly armoured, the term Infantry Mobility Vehicle (IMV) was initially adopted to distinguish it from a heavier wheeled or tracked armoured personnel carrier, such as the ASLAV and M113 also in Australian service. Later the Bushmaster's designation was changed to Protected Mobility Vehicle (PMV). The Bushmaster is optimised for operations in northern Australia, and is capable of carrying up to 9 soldiers and their equipment, fuel and supplies for 3 days, depending on the type of variant. The vehicle is fitted with air conditioning and was once planned to have a cool water drinking system, but was omitted upon production due to cost constraints. After operational complaints the drinking water cooling system is being reconsidered for installation. It has a road cruise speed of 100 km/h and an operational range of 800 km. The Bushmaster is a mine protected vehicle and provides a high degree of protection against land mines, using its v-hull monocoque to deflect the blast away from the vehicle and its occupants. The vehicle's armour provides protection against small arms of up to 7.62 mm ball ammunition, 81mm mortar fragments, Claymore mines, and with additional applique armour, protection for armour-piercing ammunition of up to 7.62mm. The fuel and hydraulic tanks of the vehicle are located outside the crew compartment, while it also has an automatic fire suppression system. The troop carrier variant of the Bushmaster is fitted with one gun ring. The forward gun ring can be fitted with a 5.56 mm or 7.62 mm machine gun. The two rear hatches each have a mounting boss to allow the attachment of a swing mount capable of holding a 7.62 mm machine gun. The Bushmaster is air transportable by C-130 Hercules, C-17 Globemaster III and Mil Mi-26 aircraft. It is the first armoured vehicle to be designed and completely manufactured in Australia since the Sentinel tank during World War II.

Nimr Hafeet Emirati 6x6 Armored Ambulance





Tiers:

1 2 3 4

Variants:

- **HAFEET 620:**
- **HAFEET 620A:** Logistics and Utility Vehicle
- **HAFEET 640A:** Artillery Support Vehicle (Observation and Command & Control configurations)
- **HAFEET APC:**
- **HAFEET Ambulance:**

System

Alternative Designation: Nimr Hafeet
Description: 6x6 Armored Ambulance
Cab Seating: ea1 + 1/3 men
Airlift Capable: INA
Number of Stetchers: INA
Note: There are 2-, 3- or 4-door versions of the Hafeet. All versions can be armored.

↳*Dimensions*

Length: m6.9
Width: m2.3
Height: m2.1
Weight, Empty: tons8 - 11.5
Payload Capacity: tons2.4-5

Automotive

Engine Name: Cummins ISBe 300

Engine Type: Diesel

Engine Power: hp296

Maximum Road Speed: km/h110

Maximum Range: km650

Gradient: %43

Side Slope: %30

Vertical Step: m0.4

Trench: m0.5

Fording: m1

Note #1: This military vehicle can also tow trailers and light artillery pieces.

Note #2: Vehicle is fitted with a central tyre inflation system and run-flat tyres as standard. Also there is a recovery winch, which also comes as standard.

Main Weapon System

Note: This armored vehicle has a roof hatch and can be fitted with a roof-mounted 7.62 mm or 12.7 mm machine gun machine gun, or 40-mm grenade launcher. Sometimes the Nimr II is even fitted with a heavy machine gun. Depending on customer requirements this vehicle can be fitted with remotely controlled weapon station. Some vehicles are fitted with smoke grenade dischargers.

↳*System*

Name: Caracal Assault Rifle 817

Alternative Designation: CAR 817

Date of Introduction: 2016

Country: United Arab Emirates

Manufactuer: Caracal International company

Caliber: mm7.62

Length, Stock Extended: mm884

Length, Stock Retracted: mm802

Barrel Length: mm406

Weight, Without Magazine: kg3.3

Muzzle Velocity: m/s750

Cyclic Rate of Fire: rds/min650-750

Practical Rate of Fire: rds/min30-90

Magazine Capacity: 10, 20, 25 rounds

Range of Effective Fire: m600

Sight: Iron

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62x51 mm

Protection

Armor: The Hafeet Class features variants with a high degree of protection to enhance survivability of the crew to attack from roadside IEDs, under-vehicle mines and ballistic threats. The Hafeet Class vehicles can be armored with different level of ballistic and blast protection depending on the variant and customer needs. The vehicles can receive standard ballistic protection up to STANAG level IV and standard blast protection up to STANAG level III (a,b).
Applique Armor: Available, There are numerous versions of the Nimr Hafeet. Due to its modular nature the vehicle can be configured to suit various battlefield roles.
Explosive Reactive Armor: No
Active Protection System: INA
NBC Protection: Optional
Smoke Equipment: Available, smoke grenade dischargers
Fire Suppression System: Yes
Protective Net: Protective net against anti-tank rocket launchers
Battle Field Management System: Available

Notes:

The Nimr Hafeet 6x6 Armored Ambulance is the medical version of the Nimr Hafeet 620. The HAFEET Class of 6x6 vehicles provides a multipurpose platform for all military requirements at 13,000 kg capacity from utility vehicles to fully protected patrol vehicles. A universal 6x6 chassis is utilised for a common logistic basis. All vehicles in the HAFEET Class can be protected, and specific protected models are included for crew survivability with fully tested and certified cabins. The main role of the Hafeet is to provide troops with logistical and utility support. Also there are some specialized versions of this vehicle. It is a purpose-designed military vehicle, which can operate in demanding conditions. It has good cross-country mobility and can travel over difficult terrain. The Hafeet has a payload capacity and size of a light truck. However due to its military nature the Hafeet can withstand heavy use or even abuse, far exceeding that of militarized commercial vehicles, or those based on commercial drivelines. Most versions of the Hafeet can carry loads with a maximum weight of 2 400-5 000 kg. This military vehicle can also tow trailers and light artillery pieces. There are 2-, 3- or 4-door versions of the Hafeet. All versions can be armored. The armored cab provides protection for the passengers against small arms fire and artillery shell splinters, mines and improvised explosive devices.

UAZ-452A Russian 4x4 Ambulance





Tiers:



System

Alternative Designation: UAZ-452A

Type: Ambulance

Manufacturer: Ulyanovsk Automobile Plant

Family: UAZ

Crew: ea1

Passenger Capacity: The van could seat up to 4 stretchers or 6 on the benches and one accompanying both. The vehicle was not comfortable for people on the move, as suspension in the submodel remained that of the standard model, but this van was, and in many places is still the only ambulance vehicle that can reach some of the most remote places.

Note #1: Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular.

Dimensions

Length: 4360 mm

Width: 1940 mm

Height: 2090 mm

Wheelbase: 2300 mm

Curb Weight: 1,760 kg

Ground Clearance: 220 mm

Automotive

Engine Name: UMZ 452MI

Engine Type: Gasoline

Engine Power: hp75

Range: kmINA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: None

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

UAZ-452A – ambulance, aka "санитарка" (Sanitarka - the medic lady), popularly nicknamed the "таблетка" (tabletka - "tablet" or "pill"). The van could seat up to 4 stretchers or 6 on the benches and one accompanying both. The vehicle was not comfortable for people on the move, as suspension in the submodel remained that of the standard model, but this van was, and in many places is still the only ambulance vehicle that can reach some of the most remote places. The UAZ-452 is a family of off-road vans produced at the Ulyanovsk Automobile Plant (UAZ) since 1965. Its predecessor model UAZ-450 (produced between 1958-1966) was based on the chassis and engine of the four-wheel drive light truck GAZ-69, and was the first "forward control" vehicle of this type to be built in the Soviet Union and Russia. Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular. In 1985 the van was upgraded and spun off into separate submodels: 39625, 3962, 3303, 3909 and 2206. The upgrade consisted of lighting fixtures that met modern international requirements, alarms, a new instrument panel, and a new speedometer. The brakes were redesigned. The engine was also upgraded, and its power output increased to 99 hp against the previous 78 hp. In the early 2000s, the model was given new plastic side mirrors taken from the GAZ GAZelle van, headrests on front seats; and new passenger seats for a minibus version (2206) were also given headrests. The pickup truck (version 3303) was fitted with a metal body instead of a wooden one.

XA-185 Finish 6x6 Amphibious Armored Ambulance






Tiers:



Variants:

- **XA-180:** Original six wheeler, carries crew of 2 and 16 troops. Empty weight ca 12 tonnes.
- **XA-185:** Upgraded version, carries crew of 2 and 18 troops. Has a more powerful engine and improved power transmission. Used as an ambulance in the Norwegian Army.
- **XA-186:** Upgraded armour. Armoured and equipped with machine-assisted gun turret (.50 BMG). Cannot swim because of the heavy armour. Empty weight ca 19 tonnes. Engine and transmission same as XA-185.
- **XA-188:** Used by the Netherlands Army.
- **XA-200:** The 200 series looks a little different from older variants due to increased armour. It lacks amphibious capabilities but can wade through water that is up to 1.5 m deep. The improved armour protects the passengers against up to 14.5 mm small arms fire. It is also equipped with modern optical aids like periscopes and night vision. The armor upgrade was initiated after the realisation that the previous armor was inadequate, even modern armor-piercing 7.62 mm ammunition could pierce the older XA-180 and XA-185 models in certain areas. The XA-202 was originally developed for Communications and Command. The XA-203 was made as a temporary replacement for XA-185, and is intended to be replaced by Patria AMVs in Finnish service. The Patria AMV (Armored Modular Vehicle) is an 8×8 multi-role military vehicle produced by the Finnish defence company Patria.

System

Alternative Designation: XA-185 Ambulance
Type: 6x6 Amphibious Armored Ambulance
Manufacturer: Patria Vehicles Oy, Hameenlinna, Finland
Family: XA Series
Crew: 2 (commander, driver)
Passenger Capacity: 10 Troops

Dimensions

Length: 7.35 m
Width: 2.90 m
Height: 2.30 m
Distance between a Axles, 1st to 2nd: 1.90 m
Distance between a Axles, 2nd to 3rd: 1.90 m
Tire Size: 356 x 508 mm
Ground Clearance: 0.40 m

Combat Weight: 15,000 kg

Unloaded Weight: 12,000 kg

Payload Weight, Road: 6,500 kg

Payload Weight, Cross-Country or Swimming: 3,000 kg

Automotive

Engine Name: 1 x Valmet 612 DWI

Engine Type: 451-cu in (7.4-l) liquid-cooled, turbocharged, 4-stroke, 6-cyl inline diesel

Engine Power: 271 hp (202 kW) at 2,500 rpm

Power-to-Weight Ratio: 16.0 hp/metric ton

Transmission: Allison automatic MD 3560P

Suspension: 6 x 6 (6 wheels driving, 4 wheels steering); beam axles, leaf springs and shock absorbers on each wheel station

Maximum Road Speed: 100 kph

Maximum Swim Speed: 10 kph w/2 shrouded propellers

Range: 800 km

Fording: Amphibious

Main Gun

Note: Basic vehicle is unarmed except for 3 firing ports and vision blocks in each hull side

Protection

Hull Armor: All-welded steel hull provides splinter protection

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes

Smoke Equipment: INA

Fire Suppression System: Yes

Notes:

XA-185 Amphibious Armored Ambulance. This is an improved version of the XA-180 fitted with a more powerful diesel engine and stronger axles. The Patria Pasi (earlier known as the Sisu Pasi) is a Finnish-made six-wheeled armoured personnel carrier (APC) originally designed for Finnish Defence Forces. The first version was produced in 1983 and serial production began in 1984. It was designed to operate with ease of use, simple structure and low-cost maintenance. The basic appearance and configuration of Patria Pasi is similar to most wheeled APCs. The XA-180 and XA-185 versions are fully amphibious while the XA-203 is not. In 1980, Sisu produced an XA-180 prototype for Finnish Army tests. It competed against two other prototypes, but was declared the winner of the trials in 1983. On 22 December 1983 the Finnish Army ordered a first batch of fifty XA-180s, of which nine were reserved for UN duties. The vehicle proved quite successful and more orders were soon to follow. The XA-180 was originally manufactured and marketed by the Finnish company Sisu Auto but later variants were marketed by the Finnish defence company Patria and are known as Patria XA series.[1] The Vehicle's widely known nickname "Pasi" (also a common given name of Finnish men) stems from the Finnish name "panssari-Sisu" (English: armoured Sisu). The main

superstructure is mainly manufactured from 6 to 12 mm of armour steel and the bottom is mine-strengthened, and the front windows are bullet-resistant and equipped with protective hatches. The vehicle has continuous six wheel drive and good capabilities for off-road driving. It can take inclines up to a maximum of 60°. The XA series has no standard armament, but is equipped with a rotating turret structure for installation of light/heavy machine guns or autocannons. It also has 8 BMP style firing ports on the sides and rear. Therefore, passengers, usually a squad of infantry, can fire their weapons from the cover of the armor. The XA series is popular in peacekeeping missions due to its mobility, non-aggressive appearance, and good protection against mines and improvised explosive devices (IED). The vehicle also offers a good combination of armament, comfort, mine protection, protection against shrapnel and small calibre fire, road speed, short time of learning how to drive, and an acceptable terrain mobility. It also offers more internal space compared to other similar vehicles like the Fuchs or BTR-80.

→Firefighting Vehicles

M1142 HEMTT American 8x8 Tactical Fire Fighting Truck (TFFT)







Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially

introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.
- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M1142

Type: Tactical Fire Fighting Truck (TFFT)

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Water Tank: The M1142 is served by the XM1158 HEMTT-based Water Tender (HEWATT) to support Army requirement for a water tender capability for Army Engineer Firefighting detachments and Ordnance Ammunition Companies. HEWATT carries a 2,500 gallon polypropylene water tank

Water Pump: a Darley 500 gpm pump (hydraulic drive), a booster reel with capacity for 200 feet of 1.0 inch booster hose (electric rewind), 400 feet of 3.0 inch inlet and fill valving identical to the TFFT.

Dimensions

Length: 10.17 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 5.33 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

M1142 Tactical Fire Fighting Truck (TFFT) The M1142 Tactical Fire Fighting Truck (TFFT) is an integration of an Oshkosh HEMTT chassis mated with a commercial Pierce fire fighting package. M1142 was delivered for testing in 2005 and first fielded in 2007. Pierce Manufacturing division of Oshkosh is the integration contractor. The M1142 Tactical Fire Fighting Truck (TFFT) is a multifunctional vehicle, ready to deploy in almost any terrain to combat five types of fires/hazards: wildland; structural (limited to two stories or less); petroleum, oils, and lubricants (POL) and hazardous materials (HAZMAT); tactical vehicle; and aircraft crashes. The M1142 Tactical Firefighting Truck (TFFT) is a standard M977A2 HEMTT chassis carrying an add-on commercial firefighting package. The M1142 is served by the XM1158 HEMTT-based Water Tender (HEWATT) to support Army requirement for a water tender capability for Army Engineer Firefighting detachments and Ordnance Ammunition Companies. HEWATT carries a 2,500 gallon polypropylene water tank, a Darley 500 gpm pump (hydraulic drive), a booster reel with capacity for 200 feet of 1.0 inch booster hose (electric rewind), 400 feet of 3.0 inch inlet and fill valving identical to the TFFT. HEWATT procurement is planned for FY 2008-2009, replacing the M916 LET tractor combined with a water tank semitrailer.

Striker 3000 American 6x6 Aircraft Rescue and Firefighting (ARFF) Vehicle







Tiers:



Variants:

- **Striker 1500 (4x4):** The Striker 1500, a.k.a. Striker 4x4, is the 2 axle model. It features 1,500-US-gallon (5,700 l) water tank 210-US-gallon (790 l) foam tank 450 pounds (200 kg) of dry chemical 460 pounds (210 kg) of Halotron 1 Oshkosh unveiled a new modernized Striker at FDIC-Indianapolis, April 2010. It is 2,000 pounds lighter so it is faster and more maneuverable. The new Striker was designed with extensive feedback from firefighters and fire chiefs. It has a 700 HP Deutz TCD 16.0L V8 Diesel engine with over 2,000 pound-feet of torque. This new edition has 84 sq. ft. of glass in the front windscreen, and for the first time has crosslays. Engine maintenance is facilitated by a walk-in, step-up platform incorporated into the rear of the unit, making major systems easily serviced.
- **Striker 3000 (6x6):** The Striker 3000, a.k.a. Striker 6x6, is the 3 axle model. It features: 3,000-US-gallon (11,000 l) water tank 420-US-gallon (1,600 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1
- **Striker 4500 (8x8):** The Striker 4500, a.k.a. Striker 8x8, is the 4 axle model. It features: 4,500-US-gallon (17,000 l) water tank 630-US-gallon (2,400 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1

System

Alternative Designation: Striker 3000

Type: Aircraft Rescue and Firefighting (AAFF) Vehicle

Manufacturer: Oshkosh

Configuration: 6x6

In Service: 2015-Present

Crew: INA

Cab: 5-person seating max; aluminum frame construction with center steering position; wrap-around, cockpit style instrument panel; easy-read backlit gauges and controls

Dimensions

Length: 475 in. (12 m)

Width: 120 in. (305 cm)

Height without HRET: Less than or equal to 140 in. (356 cm) (with full water tank)

Wheelbase: 267 in. (678 cm) from Axle 1 to Axle 3

Automotive

Engine Name: Scania DC16, Deutz TCD16.0, Emission Rating Available; US Tier 4f/EU Stage IV, US Tier 4i/EU Stage IIIB/Euro 5 Compliant; US Tier 3/EU Stage IIIA/ Euro 3

Engine Type: INA

Transmission: Allison 4800 EVS transmission; electronic/7-speed/automatic

Anti-Lock Braking System (ABS): Yes

Transfer Case: Oshkosh; independently mounted; torque proportioning differential and driver selected locking mechanism

Front Axle: 31,000 lb. (14061 kg); Oshkosh double reduction with bevel gear differential; driver operated differential lock (transverse and separate front to back)

Front Brakes: Drum brakes standard (Rockwell Dual Actuator Air); optional disc brakes available (17” Rotor Bendix SN7 sliding caliper)

Rear Axle: 31,000 lb. (14,061 kg); Oshkosh double reduction with bevel gear differential; driver operated differential lock

Rear Brakes:: S-cam type; air/drum brake standard; disc brake available

Suspension: Oshkosh TAK-4 independent system with dual control arms and single coil spring; up to 16 in. (40.6 cm) of wheel end travel with superior all-terrain mobility, ride quality and handling

Tires: 24R21 all-terrain radial

Fire Fighting System

Roof Turret: Non-aspirating and aspirating options available, electric joystick control; 625/1,250 gpm (2366/4732 lpm), options available up to 1,585 gpm (6000 lpm)

Bumper Turret: 3000 gallon (11356.2 l) capacity; corrosion and UV resistant polypropylene

Water Tank: 3000 gallon (11356.2 l) capacity; corrosion and UV resistant polypropylene

Foam Tank: 420 gallon (1590 l) capacity; corrosion and UV resistant polypropylene

Fire Pump: Power divider driven Waterous CRQB; single stage centrifugal; cast iron body; brass impeller; stainless steel shaft; pump and-roll capable; 2,000 gpm (7570 lpm)

Ultra High Pressure Water: Yes

Quad Agen: Yes, Water, Foam, Dry Chemical, Clean Agent

Compressed Air Foam System: Yes

Fixed Hose Reels: 100 ft. (30 m) hose length bundled with water/foam or 150 ft. (46 m) hose with dry chemical

Foam Proportioning System: Around the-pump

Protection

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Oshkosh Striker is a specialized aircraft rescue and firefighting (ARFF) vehicle built by Oshkosh Corporation at the Pierce Mfg. facilities Appleton, Wisconsin. There are three models of the Striker: 1500, 3000, 4500. All models are available with a snozzle capable of piercing an aircraft fuselage to dispense fire retardant material within a cabin or cargo area. On April 17, 2015 Oshkosh announced they will debut a new twin engine Striker 8 X 8 at Interschutz 2015. The Striker 3000, a.k.a. Striker 6x6, is the 3 axle model. It features: *3,000-US-gallon (11,000 l) water tank *420-US-gallon (1,600 l) foam tank *500 pounds (230 kg) of dry chemical *460 pounds (210 kg) of Halotron 1 Innovative Fire Suppression CROSSLAYS –With the optional twin crosslays on the Striker, you can have up to 600 feet (183 m) of 1¾" (45mm) hose at your disposal– accessible from either side of the vehicle. LARGE PUMP OPTION – Larger planes mean greater challenges. Oshkosh offers an optional 2650 gpm (10,000 lpm) pump to provide all of the water and/or foam you will need to meet these challenges. BRONZE PUMP – Long ago, you asked for a corrosion resistant pump body. In response, Oshkosh made it available on the Striker. That tradition of excellence carries forward on the Striker. ELECTRONIC FOAM PROPORTIONING –With this all new pressure governed system, the water pump knows what is required to meet your fire suppression needs and runs the engine just enough to meet those needs. This allows your vehicle to use less fuel – reducing overall wear and tear – yet still perform as only a Striker can. ADVANCED FIRE SUPPRESSION TECHNOLOGIES – Firefighters face new challenges every day. The Striker is designed to be ready for the latest technologies still under development, including ultra high-pressure water, compressed air foam systems (CAFS), and clean agent delivery systems. Unmatched Chassis Performance The Striker provides fast acceleration – a full second faster to 50 miles per hour – and delivers increased fuel economy from the 697 hp Tier 4i/Euro 5 emission compliant engine. It also delivers a lower center of gravity, tighter turning radius and, with the help of TAK-4® all-wheel independent suspension, the Striker delivers a confident and controlled ride. LIGHTER WEIGHT – The Striker is designed to be lighter by 5%. What does that mean to you? Faster acceleration, for one thing. Also, better stopping distance. Best of all, it still possesses that quality and toughness that Oshkosh is known for. Advanced Safety Systems Safety is built into all aspects of the Striker – from the cab design to the certified testing for static side slope stability and structural integrity. IMPROVED BRAKE TORQUE – With our new disc brake option we have improved brake torque by 11%. So, when you need to stop, you stop. NITROGEN BOTTLE STORAGE – The Striker provides excellent access to the vertically stored nitrogen bottles for easy and safe removal and reloading. Unsurpassed Reliability And Durability Oshkosh vehicles are renowned for their reliability and durability–and the Striker continues the tradition. ACCESS – Service technicians told us that easy access to the engine compartment is critical. Open up the rear door on the Striker and you will find an exclusive walk-in service port with easy access. And, if necessary, the entire powertrain can be removed for maintenance – without involving the water tank. FILTER AND FLUID CHECK –The Striker has a single, easy to access area with all filters AND fluid checks including: engine oil, transmission fluid, and power divider fluid. One location means you can know, with confidence and in no time at all, that your Striker is ready for action. SERVICEABILITY – Well thought out and well designed electrical, hydraulic, and pneumatic line routing means unsurpassed access to wires, oil, and air lines for faster diagnostic time. 24/7/365 SERVICE – Our worldwide service dealer network is ready when you need us. Smart Design VISIBILITY – With 84 square feet of glass and a 238-degree horizontal viewing radius at eye level, the Striker offers unparalleled visibility. Utilizing the Oshkosh center steer driving position, you will feel like you are in the cockpit of a fighter jet. FORWARD VISIBILITY - We have improved your ability see the ground below you. NFPA requires you to see 20 feet out from the front bumper. The Striker allows you to see 12.3 feet. You will have to sit in this cab to believe it. ERGONOMICS – Completely redesigned cab instrumentation is logical and purpose built. Through extensive ergonomic research with users around the world, we observed how you used the vehicle and designed each control, switch, and instrument to be intuitive and ready when you are. LOGICAL CONTROLS – Color-coded controls to clearly identify what function and/or what agent you are utilizing, allows you, quickly and with confidence, focus on the task at hand. IMPROVED STORAGE – You said you needed more dedicated storage. We listened. With over 63 cubic feet (1.8 m3), the Striker has plenty of room for everything you could possibly need.

Striker 1500 American 4x4 Aircraft Rescue and Firefighting (ARFF) Vehicle







Tiers:



Variants:

- **Striker 1500 (4x4):** The Striker 1500, a.k.a. Striker 4x4, is the 2 axle model. It features 1,500-US-gallon (5,700 l) water tank 210-US-gallon (790 l) foam tank 450 pounds (200 kg) of dry chemical 460 pounds (210 kg) of Halotron 1 Oshkosh unveiled a new modernized Striker at FDIC-Indianapolis, April 2010. It is 2,000 pounds lighter so it is faster and more maneuverable. The new Striker was designed with extensive feedback from firefighters and fire chiefs. It has a 700 HP Deutz TCD 16.0L V8 Diesel engine with over 2,000 pound-feet of torque. This new edition has 84 sq. ft. of glass in the front windscreen, and for the first time has crosslays. Engine maintenance is facilitated by a walk-in, step-up platform incorporated into the rear of the unit, making major systems easily serviced.
- **Striker 3000 (6x6):** The Striker 3000, a.k.a. Striker 6x6, is the 3 axle model. It features: 3,000-US-gallon (11,000 l) water tank 420-US-gallon (1,600 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1
- **Striker 4500 (8x8):** The Striker 4500, a.k.a. Striker 8x8, is the 4 axle model. It features: 4,500-US-gallon (17,000 l) water tank 630-US-gallon (2,400 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1

System

Alternative Designation: Striker 1500

Type: Aircraft Rescue and Firefighting (AAFF) Vehicle

Manufacturer: Oshkosh

Configuration: 4x4

In Service: 2015-Present

Crew: INA

Cab: 5-person seating; aluminum frame construction with center steering position; wrap-around, cockpit style instrument panel; easy-read backlit gauges and controls

Dimensions

Length: 426 in. (1082 cm)

Width: 120 in. (305 cm)

Height without HRET: ≤ 140 in. (356 cm) (with full water tank)

Wheelbase: 219 in. (556 cm)

Automotive

Engine Name: Scania DC16, Deutz TCD16.0, Emission Rating Available; US Tier 4f/EU Stage IV, US Tier 4i/EU Stage IIIB/Euro 5 Compliant; US Tier 3/EU Stage IIIA/ Euro 3

Engine Type: INA

Transmission: Allison 4800 EVS transmission; electronic/7-speed/automatic

Anti-Lock Braking System (ABS): Yes

Transfer Case: Oshkosh; independently mounted; torque proportioning differential and driver selected locking mechanism

Front Axle: 31,000 lb. (14061 kg); Oshkosh double reduction with bevel gear differential; driver operated differential lock (transverse and separate front to back)

Front Brakes: Drum brakes standard (Rockwell Dual Actuator Air); optional disc brakes available (17” Rotor Bendix SN7 sliding caliper)

Rear Axle: 31,000 lb. (14,061 kg); Oshkosh double reduction with bevel gear differential; driver operated differential lock

Rear Brakes:: S-cam type; air/drum brake standard; disc brake available

Suspension: Oshkosh TAK-4 independent system with dual control arms and single coil spring; up to 16 in. (40.6 cm) of wheel end travel with superior all-terrain mobility, ride quality and handling

Tires: 24R21 all-terrain radial

Fire Fighting System

Roof Turret: Non-aspirating and aspirating options available, electric joystick control; 375/750 gpm, (1420/2839 lpm), options available up to 1,585 gpm (6000 lpm)

Bumper Turret: Non-aspirating and aspirating; electric joystick control; 300 gpm (1136 lpm), higher flow turret options available Handlines (Foam/Water): Two preconnect type (one each side) with up to 300 ft. (46 m) of 1.75 in. (44 mm) ID hose and a 125 gpm (473 lpm) pistol-grip nozzle

Water Tank: 1,500 gallon (5678 l) capacity; constructed of corrosion and UV resistant polypropylene

Foam Tank: 210 gallon (795 l) capacity; constructed of corrosion and UV resistant polypropylene

Fire Pump: Power divider driven Waterous CRQB; single stage centrifugal; cast iron body; brass impeller; stainless steel shaft; pump and-roll capable; 2000 gpm (7511 lpm) Optional Waterous CRUQB high flow pump – 2650 gpm (10031 lpm) Optional Brass/Bronze pump

Ultra High Pressure Water: Yes

Quad Agen: Yes, Water, Foam, Dry Chemical, Clean Agent

Compressed Air Foam System: Yes

Protection

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Oshkosh Striker is a specialized aircraft rescue and firefighting (ARFF) vehicle built by Oshkosh Corporation at the Pierce Mfg. facilities Appleton, Wisconsin. There are three models of the Striker: 1500, 3000, 4500. All models are available with a snozzle capable of piercing an aircraft fuselage to dispense fire retardant material within a cabin or cargo area. On April 17, 2015 Oshkosh announced they will debut a new twin engine Striker 8 X 8 at Interschutz 2015. The Striker 1500, a.k.a. Striker

4x4, is the 2 axle model. It features: *1,500-US-gallon (5,700 l) water tank *210-US-gallon (790 l) foam tank *450 pounds (200 kg) of dry chemical *460 pounds (210 kg) of Halotron 1 Oshkosh unveiled a new modernized Striker at FDIC-Indianapolis, April 2010. It is 2,000 pounds lighter so it is faster and more maneuverable. The new Striker was designed with extensive feedback from firefighters and fire chiefs. It has a 700 HP Deutz TCD 16.0L V8 Diesel engine with over 2,000 pound-feet of torque. This new edition has 84 sq. ft. of glass in the front windscreen, and for the first time has crosslays. Engine maintenance is facilitated by a walk-in, step-up platform incorporated into the rear of the unit, making major systems easily serviced. KEY FEATURES Innovative Fire Suppression CROSSLAYS –With the optional twin crosslays on the new Striker, you can have up to 600 feet (183 m) of 1¾" (45mm) hose at your disposal– accessible from either side of the vehicle. LARGE PUMP OPTION – Larger planes mean greater challenges. Oshkosh offers an optional 2650 gpm (10,031 lpm) pump to provide all of the water and/or foam you will need to meet these challenges. BRONZE PUMP – Long ago, you asked for a corrosion resistant pump body. In response, Oshkosh made it available on the Striker. That tradition of excellence carries forward on the new Striker. ELECTRONIC FOAM PROPORTIONING –With this all new pressure governed system, the water pump knows what is required to meet your fire suppression needs and runs the engine just enough to meet those needs. This allows your vehicle to use less fuel – reducing overall wear and tear – yet still perform as only a Striker can. ADVANCED FIRE SUPRESSION TECHNOLOGIES – Firefighters face new challenges every day. The new Striker is designed to be ready for the latest technologies still under development, including ultra high-pressure water, compressed air foam systems (CAFS), and clean agent delivery systems. Unmatched Chassis Performance The Striker provides fast acceleration – a full second faster to 50 miles per hour – and delivers increased fuel economy from the 697 hp Tier 4i/Euro 5 emissions compliant engine. It also delivers a lower center of gravity, tighter turning radius and, with the help of TAK-4® all-wheel independent suspension, the Striker delivers a confident and controlled ride. LIGHTER WEIGHT – The Striker is designed to be lighter by 5%. What does that mean to you? Faster acceleration, for one thing. Also, better stopping distance. Best of all, it still possesses that quality and toughness that Oshkosh is known for. Advanced Safety Systems Safety is built into all aspects of the Striker – from the cab design to the certified testing for static side slope stability and structural integrity. IMPROVED BRAKE TORQUE – With our new disc brake option we have improved brake torque by 11%. So, when you need to stop, you stop. NITROGEN BOTTLE STORAGE – The Striker provides excellent access to the vertically stored nitrogen bottles for easy and safe removal and reloading. Unsurpassed Reliability And Durability Oshkosh vehicles are renowned for their reliability and durability–and the new Striker continues the tradition. ACCESS – Service technicians told us that easy access to the engine compartment is critical. Open up the rear door on the Striker and you will find an exclusive walk-in service port with easy access. And, if necessary, the entire powertrain can be removed for maintenance – without involving the water tank. FILTER AND FLUID CHECK –The Striker has a single, easy to access area with all filters AND fluid checks including: engine oil, transmission fluid, and power divider fluid. One location means you can know, with confidence and in no time at all, that your Striker is ready for action. SERVICEABILITY – Well thought out and well designed electrical, hydraulic, and pneumatic line routing means unsurpassed access to wires, oil, and air lines for faster diagnostic time. 24/7/365 SERVICE – Our worldwide service dealer network is ready when you need us. Smart Design VISIBILITY – With 84 square feet of glass and a 238-degree horizontal viewing radius at eye level, the Striker offers unparalleled visibility. Utilizing the Oshkosh center steer driving position, you will feel like you are in the cockpit of a fighter jet. FORWARD VISIBILITY - We have improved your ability see the ground below you. NFPA requires you to see 20 feet out from the front bumper. The Striker allows you to see 12.3 feet. You will have to sit in this cab to believe it. ERGONOMICS – Completely redesigned cab instrumentation is logical and purpose built. Through extensive ergonomic research with users around the world, we observed how you used the vehicle and designed each control, switch, and instrument to be intuitive and ready when you are. LOGICAL CONTROLS – Color-coded controls to clearly identify what function and/or what agent you are utilizing, allows you, quickly and with confidence, focus on the task at hand. IMPROVED STORAGE – You said you needed more dedicated storage. We listened. With over 63 cubic feet (1.8 m3), the Striker has plenty of room for everything you could possibly need.

Striker 4500 American 8x8 Aircraft Rescue and Firefighting (ARFF) Vehicle





Tiers:



Variants:

- **Striker 1500 (4x4):** The Striker 1500, a.k.a. Striker 4x4, is the 2 axle model. It features 1,500-US-gallon (5,700 l) water tank 210-US-gallon (790 l) foam tank 450 pounds (200 kg) of dry chemical 460 pounds (210 kg) of Halotron 1 Oshkosh unveiled a new modernized Striker at FDIC-Indianapolis, April 2010. It is 2,000 pounds lighter so it is faster and more maneuverable. The new Striker was designed with extensive feedback from firefighters and fire chiefs. It has a 700 HP Deutz TCD 16.0L V8 Diesel engine with over 2,000 pound-feet of torque. This new edition has 84 sq. ft. of glass in the front windscreen, and for the first time has crosslays. Engine maintenance is facilitated by a walk-in, step-up platform incorporated into the rear of the unit, making major systems easily serviced.
- **Striker 3000 (6x6):** The Striker 3000, a.k.a. Striker 6x6, is the 3 axle model. It features: 3,000-US-gallon (11,000 l) water tank 420-US-gallon (1,600 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1
- **Striker 4500 (8x8):** The Striker 4500, a.k.a. Striker 8x8, is the 4 axle model. It features: 4,500-US-gallon (17,000 l) water tank 630-US-gallon (2,400 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1

System

Alternative Designation: Striker 4500

Type: Aircraft Rescue and Firefighting (AAFF) Vehicle

Manufacturer: Oshkosh

Configuration: 8x8

In Service: 2015-Present

Crew: INA

Cab: 5-person seating; aluminum frame construction with center steering position; wrap-around, cockpit style instrument panel; easy-read backlit gauges and controls

Dimensions

Length: 426 in. (1082 cm)

Width: 120 in. (305 cm)

Height without HRET: ≤ 140 in. (356 cm) (with full water tank)

Wheelbase: 219 in. (556 cm)

Automotive

Engine Name: Dual Scania DC16 engines; 550-770 hp each

Engine Type: INA

Transmission: Dual Allison 4800 EVS transmissions; electronic / 7-speed / automatic

Anti-Lock Braking System (ABS): Yes

Transfer Case: Oshkosh; independently mounted; torque proportioning differential and driver selected locking mechanism

Front Axle: 2 x 31,000 lb. (14061 kg) for 62,000 lb. (28123 kg); Oshkosh double reduction with bevel gear differential; driver operated differential lock

Front Brakes: Dual wedge type

Rear Axle: 2 x 31,000 lb. (14061 kg) 62,000 lb. (28123 kg);Oshkosh double reduction with bevel gear differential; driver operated differential lock

Rear Brakes:: S-cam type; air/mechanical spring actuation

Suspension: Oshkosh TAK-4 independent system with dual control arms and single coil spring; up to 16 in. (40.6 cm) of wheel end travel with superior all-terrain mobility, ride quality and handling

Tires: Emergancy Off Road 24R21

Acceleration: 0 to 50 mph (80 km/h) in 20 seconds

Top Speed: 77.6 mph (125 km/h)

Side Slope Stability (Static): >30°

Gradeability: Ascend/descend a 60% grade

Power Uniter: Proprietary Oshkosh design directs engine power to drive components and firefighting systems smoothly and efficiently

Fire Fighting System

Roof Turret: Non-aspirating and aspirating options available, electric joystick control; 625/1250 gpm (2366/4732 lpm), options available up to 1,585 gpm (6000 lpm)

Bumper Turret: Non-aspirating; electric joystick control; 300 gpm (1136 lpm), higher flow options available

Water Tank: 4,500 gallon (17029 l) capacity; constructed of corrosion and UV resistant polypropylene

Foam Tank: 540 gallon (2384 l) capacity; constructed of corrosion and UV resistant polypropylene

Fire Pump: Power divider driven Waterous CRQA; single stage centrifugal; cast iron body; brass impeller; stainless steel shaft; pump-and-roll capable; 1,950 gpm (7,381 lpm) at 240 psi (1657 kPa)

Foam Proportioning System: Around-the-pump

Protection

Armor: No

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Oshkosh Striker is a specialized aircraft rescue and firefighting (ARFF) vehicle built by Oshkosh Corporation at the Pierce Mfg. facilities Appleton, Wisconsin. There are three models of the Striker: 1500, 3000, 4500. All models are available with a snozzle capable of piercing an aircraft fuselage to dispense fire retardant material within a cabin or cargo area. On April 17, 2015 Oshkosh announced they will debut a new twin engine Striker 8 X 8 at Interschutz 2015. The Striker 4500, a.k.a. Striker 8x8, is the 4 axle model. It features: 4,500-US-gallon (17,000 l) water tank 630-US-gallon (2,400 l) foam tank 500 pounds (230 kg) of dry chemical 460 pounds (210 kg) of Halotron 1 Innovative Fire Suppression Snozzle HRET in multiple lengths with below-grade discharge Optional crosslays to access hand lines from either side of the truck. Extreme Mobility & Maneuverability Oshkosh patented TAK-4 all-wheel independent suspension Decreased weight for faster acceleration Dual engines for faster response time Wide track and low center of gravity for side slope stability of at least 30° Available central tire inflation increases stability Center steer for advanced visibility and control Firefighter-Inspired Design Panoramic forward view for unmatched visibility Best-in-class space seats up to five - 275 cubic ft. (7.8 cubic m) Exceptional comfort and ride quality New cab and firefighter options Indicator lighting clearly identifies water, foam, and clean agent controls, which are grouped by function Advanced electronics for easier troubleshooting and better user interface Exceeds NFPA, ICAO, and EU standards Easy Maintenance Single point access for lubrication fills, air tank drains, and electrical connections including circuit breaker box

→Fuel Tankers

M978 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Fuel Tanker






Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.
- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty

M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.

- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M978 HEMTT Fuel Tanker

Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Fuel Tanker

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: 9,979 kg

Dimensions

Length: 10.17 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 5.33 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89 × 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-speed transfer case. The front axles on all HEMTTs are single-reduction Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration. The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production

models have the suffix A4.

M1091 American 6x6 Medium Tactical Vehicle (MTV) Fuel/Water Tanker



Tiers:

1 2 3 4

Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782

- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1091
Type: Medium Tactical Vehicle (MTV) Fuel/Water Tanker
Family: FMTV Series
Configuration: 6x6
Crew: ea1
Cab Seating: 3-Man
Tank Assembly: Constructed with 304 stainless steel with internal baffles according to DOT. Top/bottom loading
Fuel Servicing: All U.S. Army aircraft and helicopters, and tracked and wheeled vehicles
System Capability: Reloading from all U.S. Army fuel-dispensing systems including bottom loading @ 600 GPM. Self-loading capability @ 200 GPM
Pumping: FMTV standard is automatic, operator preset flow rate in 10-GPM increments (20-100 GPM) per hose with deadman controller Fuel flow is metered, filtered or unfiltered with a flow control valve from a PTO-driven 200-GPM pump Alternate (backup) pumping is from a 24 VDC, motor-driven, 25 GPM pump
Hoses and Reels: 2 each, 1 1/2" dia., 50-foot long fuel-dispensing hoses on air-powered self-rewinding reels Hose ends are 2", self-sealing, quick disconnect Static ground reels with 40-foot grounding cables and a 10-foot "Y" branch at the end with alligator end connections electrically bonded to the vehicle chassis frame
Metering: A meter is provided for each fuel-servicing hose to indicate fuel dispensed, with one indicating through each hose. A total fuel dispensing meter is also included. Meters provide 1-gallon increment fuel measurement
Pump and Control Module: Rear-mounted pump controls are readily accessible/visible under all operating conditions. Includes both an automatic control shut-off valve when control door is closed and an emergency control cable, which melts and automatically closes in case of fire. An emergency fuel shut-off control is positioned near the cab on both the driver's and second passenger's side
Filter Separator: Per MIL-F-8901, readily accessible and includes automatic/manual drain, water sight glass, and color-coded differential pressure gauge
Fuel Nozzles: New, improved 1-inch automotive-type (OPW) with female quick disconnects
Fuel Level Indicator: Easy reading (float-type), liquid-filled gauge

Dimensions

Length: 8.05 m
Width: 2.44 m
Height, Top of Cab: 2.76 m
Height, Air Transport: 2.59 m
Height, Air Drop: 2.18 m
Wheelbase: 4.50 m
Ground Clearance: 559 mm
Payload Capacity: 4,536 kg
Curb Weight: 10,974 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1091 Fuel/Water Tanker is designed to transport fuel or water to support the soldiers on the battlefield. The M1091 is constructed of stainless steel with internal baffles and can transport 1500 gallons. It is a self contained unit, housing the pump and control module, hoses, reels and dispensing nozzles, metering instruments, fuel level indicator, filters, and a sampling

probe used with the aqua-glow water sampling kit. The pump can dispense 20 -100 gallons per minute with deadman controller that halts dispensing to prevent accidental spillage. The vehicle is still in the developmental phase.

CBRN

→CBRN Delivery Systems

→→Decontamination and Smoke Vehicles

RKhM-6 Povozka Russian CBRN Reconnaissance Vehicle



Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle

- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control
- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: RKhM-6 CBRN Reconnaissance Vehicle

Manufacturer: Arzamas Machinery Plant of Military Industrial Company (VPK)

Description: The vehicle is based on the hull of BTR-80 armoured personnel carrier (APC). The conventional layout accommodates the driver’s compartment at forward hull, NBC laboratory in the middle and engine at the rear.

Crew: ea3

Personnel: eaThe vehicle lacks special suits for dismounting troops in a radiation environment, but carries three sets of MOPP suits and filters.

CBRN Detection Equipment and Systems: The RKhM-6 is equipped with more advanced NBC laboratory. The fully automated system is controlled by single personnel and enables the automatic detection of chemical and radioactive substances, with alarms ringing inside the vehicle if any such contamination is found. The sensors aboard the vehicle can detect any type of radioactive contamination from inside the vehicle, and the crew can test the samples from within the vehicle. The vehicle lacks special suits for dismounting troops in a radiation environment, but carries three sets of MOPP suits and filters. The biological sensors on the vehicle can detect biological molecules such as viruses, while the chemical detection optical devices use the onboard computer for analysis. The vehicle can detect vapours and aerosols of toxic and hazardous substances in a contaminated environment of 10m² a minute. The vehicle runs at a speed of 20km/h-50km/h in accordance with the level and complexity of contamination. The RKhM-6 is equipped with the battlefield management systems (BMS), and Perunit-V satellite navigation system based on GLONASS. The advanced meteorological suite provides coverage across 4km² of area or accurate direction up to 6km. It measures wind speed and direction, air samples, weather

conditions, rain and snow.

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ Series, Model: INA

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp300

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Note: The vehicle is equipped with a central tyre inflation system and run-flat tyres for high mobility over different terrains

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made

KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳*Ammunition*

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Forward-Looking Infrared (FLIR) Capable: Yes

Battlefield Management Systems (BMS): Yes

Navigation System: Perunit-V satellite navigation system based on GLONASS

Meteorological Suite: Yes, Provides coverage across 4km² of area or accurate direction up to 6km. It measures wind speed and direction, air samples, weather conditions, rain and snow.

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters. It features spaced and heavier armour at the forward hull, while the sides and turret are

hinged with aluminium and steel plates.
Turret Armor: Protection against 12.7mm and shrapnel
Applique Armor: Available
Explosive Reactive Armor: INA
Active Protection System: INA
Mine Clearing: INA
Mine Protection: The vehicle also integrates a reinforced roof and blast-resistant floor for protection against mine explosions.
Self-Entrenching Blade: INA
NBC Protection: Yes, Collective & a advanced NBC laboratory
Smoke Equipment: 6 x 81-mm smoke grenade launchers
Note: The vehicle also integrates a reinforced roof and blast-resistant floor for protection against mine explosions.

Notes:

RKhM-6 "Povozka" – latest version with state-of-the-art detection systems, including the PRKhDD-2B with a detection range of about 3 km. Furthermore, the RKhM-6 is equipped with an SN-RKhM inertial navigation system and a 14Ts834 satellite navigation system. In service since 2011. Deployed to Syria in November 2018. It is an advanced variant of the RKhM-4-01 CBRN vehicle.The 8×8 CBRN vehicle is designed to conduct chemical, radiological, biological and nuclear reconnaissance missions for CBRN reconnaissance elements of the Russian Armed Forces. It can transmit reconnaissance data to reconnaissance devices and command control centres. The Russian Army RKhM-6 is an advanced Nuclear, Bacteriological and Chemical (NBC) reconnaissance vehicle derived from the BTR-80 armored vehicle. The vehicle is provided with satellite navigation system and can cover an area of four square miles. The crew can transmit the result of their analysis to remote command and control centers without leaving the vehicle. The RKhM-6 vehicle is expected to enter service with the Russian Army in early 2016.

TMS-65m Russian Decontamination/smoke Generator Vehicle





Tiers:

1 2 **3** 4

System

Alternative Designations: None
Crew: 2
Troop Capacity: INA
Chassis: Ural 4320, 6x6
Combat Weight (Mt): INA
Length Overall (M): 7.3
Height Overall (M): 2.5
Width Overall (M): 2.8
Ground Pressure (Kg/Cm2): INA
Automotive Performance: INA
Engine Type: YaMZ-238M2; V-8 liquid cooled diesel
HP: 240
Cruising Range (Km): 1040
Speed (Km/H):
Max Road: 71
Max Off-Road: INA
Max Swim: INA
Fording Depths (M): 1.5
Radios, Frequency, And Range: INA

Nozzle Movement: Yes

Traverse: 90

Elevation: 12

Depression: 23

Operating RPM’s of Turbine Engine: INA

Idle Speed (rpm): INA

Max Effective Speed (rpm): INA

Ability to Generate on the Move: Yes

Performance Characteristics:

Engine Name: VK-1A modified gas turbine

Fuel Type: INA

Fuel Capacity (l): INA

Operating Time (min): 60

Time to Initiate Smokescreen (min): 10

Generator Efficiency (%): 96

Smoke Screening System: Yes

Emplacement Time: 10-12 minutes

Displacement Time: 10-12 minutes

Notes:

The TMS-65m is primarily used for the decontamination of vehicles and equipment whether stationary or on the move. Additionally, the system can be used to decontaminate ground and hard surface roads as well as produce protective smokescreens. The vk-1 turbine engine (a modified MIG-17 engine) along with a sealed control cab is mounted on an Ural 4320, 6x6 truck chassis. The turbine engine can be moved vertically or horizontally by controls located in the operator’s control cab. The operator’s control cab is fixed to the left side of the turbine engine and is equipped with floodlights for limited visibility operations. Two 1500-liter tanks are mounted across the front of the truck bed between the driver’s cab and the turbine engine. One tank is used for obscurant, decontaminates, or water and the other tank is used for the fuel to power the turbine engine. The obscurant, decontamination, or water is fed through pipes into the turbine engine exhaust stream. Depending upon the size and level of contamination the TMS-65m is capable decontaminating equipment at a rate of 30 seconds to 3 minutes per item.

Slovakian Decontamination/Smoke Generator Vehicle TZ-74



System

Alternative Designations: None

Date Of Introduction: INA

Crew: 2

Troop Capacity: INA

Chassis: Tatra 148 PPR 15, 6x6

Combat Weight (Mt): 21.9

Length Overall (M): 8.49

Height Overall (M): 2.5

Width Overall (M): 3.2

Ground Pressure (Kg/Cm2): INA

Automotive Performance: Tatra 2-298-1

Engine Type: V-8 air cooled diesel

HP: 1200

Cruising Range (Km): 400

Speed (Km/H): INA

Max Road: 71

Max Off-Road: INA

Traverse: 120

Elevation: 30

Depression: 20

Operating RPM's of Turbine Engine: 13,000 rpm (equals 84%)

Idle Speed (rpm): 5400

Ability to Generate on the Move:: 1400

Ability to Generate on the Move: No

Performance Characteristics:

Engine Name: Type M701 C-500

Fuel Type: Diesel

Fuel Capacity (l): 2,000

Operating Time (min): 22

Time to Initiate Smokescreen (min): 1

Generator Efficiency (%): 98

Smoke Screening System: INA

Emplacement Time: approximately 10-12 minutes

Displacement Time: approximately 10-12 minutes

Notes:

THE TZ-74 IS PRIMARILY USED FOR THE DECONTAMINATION OF VEHICLES AND EQUIPMENT WHETHER STATIONARY OR ON THE MOVE. ADDITIONALLY, THE SYSTEM CAN BE USED TO DECONTAMINATE GROUND AND HARD SURFACE ROADS AS WELL AS PRODUCE PROTECTIVE SMOKESCREENS. THE TZ-74 IS BASED ON THE CHASSIS OF THE TATRA 148 PPR 15, 6X6 TRUCKS. THE SYSTEM USES A GAS TURBINE ENGINE TO GENERATE A SMOKE SCREEN OVER A LARGE AREA. THE GAS TURBINE IS MOUNTED ON THE REAR OF THE VEHICLE WITH THE OPERATOR'S CABIN ON THE LEFT-HAND SIDE, AND AN OBSCURANT TANK ON THE RIGHT-HAND SIDE. THE REMAINDER OF THE REAR OF THE VEHICLE CONSISTS OF STORAGE TANKS FOR LIQUIDS AND FUEL FOR THE TURBINE ENGINE. A SMOKESCREEN IS CREATED AS A RESULT OF THE INTRODUCTION OF OIL, DIESEL FUEL, OR A COMBINATION OF BOTH INTO THE EXHAUST NOZZLE OF THE TURBINE ENGINE. THE INTRODUCTION OF THE MIXTURE INTO THE TURBINE ENGINES EXHAUST CAUSES AN IMMEDIATE DISPERSION AND EVAPORATION OF THE MIXTURE THAT CONDENSES IN THE COOLER PART OF THE STREAM AFTER EXPULSION FROM THE MOTOR. THE TZ-74 CAN PRODUCE SMOKE IN ABOUT A MINUTE AFTER THE TURBINE ENGINE IS TURNED ON. ALTHOUGH THE JET ENGINE HAS ENOUGH FUEL TO OPERATE FOR 3 HOURS, ITS MISSION TIME IS SEVERELY LIMITED BY THE CAPACITY OF THE INTERNAL LIQUID SOURCES AVAILABLE. HOWEVER, IF EXTERNAL SOURCES ARE USED, THE MISSION TIMES ARE DRAMATICALLY INCREASED. THE MAIN DECONTAMINANT TANK HAS A 5,000-LITER CAPACITY. THE FOG OIL TANK HAS A 200-LITER CAPACITY. THE FUEL TANK FOR THE GAS TURBINE HAS A 2,000-LITER CAPACITY.

ARS-14KM Russian 6x6 Decontamination Truck





Tiers:



System

Alternative Designation: ARS-14KM

Type: Decontamination Truck

Chassis: Kamaz 43114

Crew: ea1

Cab Seating: 2

Cargo Capacity: 6,000 kg

Towed Load: 12,000 kg

Note: The ARS-14KM decontamination vehicle is designed for decontaminating military hardware and terrain, setting smokescreens and heating process solutions.

Dimensions

Length: 5.20 m

Width: 2.32 m

Wheelbase: 3.34 m

Height: INA

Cargo Capacity: 6,000 kg

Max Gross Train Weight: 27,350 kg

Max Weight: 15,350 kg

Towed Load: 12,000 kg

Automotive

Engine Name: Kamaz 740.31 Euro 2

Engine Type: Turbocharged Diesel

Engine Power: hp225

Max Torque: 912 Nm (6,599 ft-lb)

Ditch Crossing Ability: 0.60 m

Fording Depth: 1.75 m

Step Climbing Ability: 0.55 m

Protection

Armor: The trucks have the option of an armored cab including hidden armoring of the cab.

Applique Armor: Available

Active Protection System: No

NBC Protection: INA

Notes:

The Eastern Military District’s NBC protection regiment based in the Amur Region in Russia’s Far East has received a batch of advanced ARS-14KM versatile decontamination trucks based on the KAMAZ-43114 cross-country vehicle, the district’s press office said. "The truck is designed to disinfect and decontaminate military hardware and separate terrain and road sections. The truck is versatile and can be also used to extinguish fire, generate aerosol screens, make special solutions, heat water, wash servicemen, etc.," the press office said. The ARS-14KM decontamination vehicle is designed for decontaminating military hardware and terrain, setting smokescreens and heating process solutions. According to the press office, the regiment will start learning to operate the advanced military hardware at the beginning of the new training period that will start on December 1. Now, the crews are undergoing preliminary training.

RKhM-2 Russian CBRN Reconnaissance Vehicle



Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RKhM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: RKhM-2

Description: 8 X 8 wheeled APC as an upgrade to the BTR-70; 7 soldiers exit through 2 side doors; 4 firing ports on the right & 3 firing ports on the left

Crew: ea3

Personnel: ea7

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳***Ammunition***

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳***System***

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳***Ammunition***

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the BTR-80 APC protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

The RKhM-2 is a mobile CBRN Reconnaissance Vehicle, which is a variant of the BTR-80 APC. Little is known about this vehicle.

RKhM-4 Russian CBRN Reconnaissance Vehicle



Tiers:



Variants:

- **BTR-80 (GAZ-5903):** Original w/ 3 firing ports on each side & smoke grenade launchers
- **BTR-80A (GAZ-59034:** Stabilized turret w/ 2A72 gun, 7.62-mm coax MG, & new right side firing port
- **BTR-80AK:** BTR-80A CP variant with 1 firing port on right side and 2 whip antennas at rear corners
- **BTR-80K (GAZ-59031):** Command Post for 6; different turret w/ MGs & 3 radios (R-173, R-173P & R-159)
- **BTR-80 Kushetka-B (M1989/1):** Command vehicle with additional communications gear & gun removed
- **BTR-80 PBKM (KM-80):** Command vehicle with increased radio communications equipment
- **BTR-805:** Modular turret armaments system (14.5-mm KPVT MG) & better fire control/sights
- **BTR-80 with Cummins Diesel:** Western Cummins 6CTA 8.3-C250 diesel engine test model; road speed to 100 km/h and range to 600 km
- **BTR-82/BTR-82A (Russia & Kazakhstan):** Latest version; see separate WEG sheet
- **BTR-80UP (Ukraine):** BTR-80 with 300hp engine improved armor protection & air conditioning
- **BTR-80UP-KB (Ukraine):** Battalion level command vehicle
- **BTR-80UP-KR (Ukraine):** Company level command vehicle
- **BTR-80UP-S (Ukraine):** Staff Vehicle
- **BTR-80UP-M (Ukraine):** Battlefield Ambulance
- **BTR-80UP-BREM (Ukraine):** ARV
- **BTR-80UP-R (Ukraine):** Dedicated reconnaissance vehicle
- **BTR-80UP-T (Ukraine):** Dedicated cargo transport variant
- **KShM Kushetka-B (Ukraine):** Command vehicle based upon the K1Sh1
- **BTR-94 (Ukraine):** Amphibious armored car with twin 23-mm 2A7M guns (same guns as the ZSU-23-4)
- **BTR-3U/Okhotnik (Guardian) (Ukraine):** 2001 BTR-94 upgrade w/ Shkval 1man turret w/ 30-mm gun, twin AT-5 ATGM launchers, 30-mm AGL, & a 7.62-mm MG. Jordanian version uses twin 23-mm gun & donated to the new Iraqi armed forces
- **BTR-3E1 (Ukraine):** Export BTR-3U with the Shturm turret; 30-mm ZTM cannon, a 40mm AGL, & a 7.62-mm MG & a twin Barrier ATGM system.
- **BTR-4 (Ukraine):** Soldiers enter & leave the vehicle through rear doors; Grom overhead weapons station with 30-mm automatic cannon, 7.62mm coax MG, & up to 4 9P135M Konkurs or Baryer ATGM missiles, & 1 30-mm AGL
- **BTR-80 GKKO (Hungary):** Proposed vehicle with additional observation equipment, but no turret
- **BTR-80M (Hungary):** 1993 Improvement with 240-hp DMZ-238M2 series engine
- **BTR-80 MPAEJ (Hungary):** Battlefield engineer variant without turret
- **BTR-80 MPFJ (Hungary):** Obstacle clearance vehicle without armament
- **BTR-80 MVJ (Hungary):** ARV
- **BTR-80 SKJ (Hungary):** Battlefield ambulance variant with enlarged passenger compartment
- **BTR-80 VSV (Hungary):** NBC reconnaissance vehicle
- **TAB Zimbru (B33)(Romania):** BTR-80 w/268hp Model 1240 V8-DTS engine, Romanian radios, & more 12.7-mm ammo storage space
- **Zimbru 2000 (Romania):** Proposed improved TAB Zimbru with enlarged hull & 285-hp engine
- **Saur 1 (Romania):** 2006 prototype with 275hp Cummins engine, rear entry/exit doors & new turret
- **Saur 2 (Romania):** Improved Saur 1 prototype
- **BTR-80 "Caribe" (Columbia):** Colombian designation for BTR-80 with 12.7mm machine gun
- **Kliver Turret System:** Prototype with the Kliver turret (see separate entry)
- **ZS-96:** PSYOP variant w/ loudspeakers
- **ZS-88:** Loudspeakers for PSYOP operations and riot control

- **“Tajfun”:** Prototype proposed for base security forces with a 7.62mm MG & the Kredo-1 radar
- **UNSh:** Standardized name for expanded chassis, but called Kusheta-B, ACRV, & BM
- **SPR-2 Wide Band Jamming System:** Turretless w/ large telescopic antenna to neutralize artillery shells with proximity fuses
- **RKhM-4-02:** Upgraded RKhM-4 NBC reconnaissance vehicle
- **RKhM-4-01:** Improved/modernized RKhM4 NBC vehicle
- **RKhM-4 NBC Reconnaissance Vehicle:** Outfitted with NBC equipment
- **RPM-2 (NKR):** Radiological Reconnaissance Vehicle that first appeared in 2000
- **R-439-MD2:** Satellite communications vehicle
- **R-439-BK1:** Improved R-439-BK satellite communications vehicle
- **R-439-BK (Legenda 2BK):** Satellite communications vehicle
- **R-165B:** Short-wave signal/ communications vehicle
- **R-149BM4A:** Command and Signal Vehicle
- **R-149BMR:** Signal/Communications vehicle
- **PU-12M7 (9S482MU):** Improved PU-12M6 FA battery command vehicle
- **PU-12M6 (9S482M6):** Field Artillery (FA) battery command vehicle
- **P-240BTZ:** Switchboard platform
- **K1Sh1 (GAZ-59032) (UNSH):** Command Post with enlarged hull w/o turret armament
- **E-351BrM:** Mobile power station with diesel/electric generator
- **BREM-K (GAZ-59033) ARV:** Armored recovery vehicle with A-frame, tow bars, & stabilizers
- **BMM-80 (GAZ-59039 or Simfoniya):** Battlefield ambulance for 9 sitting or 2 litter patients
- **BMM-3:** Battlefield ambulance used as a mobile field hospital
- **BMM-2:** Battlefield ambulance for use at the battalion level for field treatment
- **BMM-1:** Battlefield ambulance for first aid & MEDVAC operations
- **BMM:** Medical series; BMM-1 (ambulance), BMM-2 (Bn Aid Stn), & BMM-3 (Bde Aid Stn)
- **2S23 (Nona-SVK) SP GunMortar System (Fire Support Vehicle):** Breach-loaded 2A60 120-mm rifled mortar/gun system similar to the 2S9
- **BTR-80 R-975:** Forward air control vehicle
- **BTR-80 1V152:** Artillery C2 & forward observation vehicle w/ range finding, navigation & new optics

System

Alternative Designation: RKhM-4

Description: The RKhM-4-01 is designed for radiation and chemical agent reconnaissance day and night, under adverse meteorological conditions, in rough terrain when negotiating natural and artificial ground or water obstacles.

Proliferation: INA

Crew: ea3

Personnel: ea7

CBRN Equipment

Dose Rate Meter: IMD-21B (IMD-1r) & DP-5V dose rate meter

Gas Detector: GSA-13 automatic gas detector

Chemical Alert System: SKhT chemical alert flare launcher with control panel

Gas Identifier: PGO-11 semiautomatic gas identifier

Sampling Equipment Kit: KPO-1 sampling equipment kit

Chemical Agent Detector: VPKhR chemical agent detector kit

Meteorology Kit: MK-3M meteorology kit

Warning Sign Kit: KZO-2 warning sign kit

Dimensions

Length: m7.7

Width: m2.9

Height: m2.41

Weight, Combat: tons13.6

Automotive

Engine Name: KamAZ-7403

Engine Type: Water-cooled, V8 Diesel

Automotive Performance: hp260

Range, Cruising: km600

Speed, Maximum Road: km/h80

Speed, Maximum Off-Road: km/h60

Speed, Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.5

Trench: m2.0

Fording Depth: mAmphibious

Communications

Primary: R-173

Secondary: R-163

Intercome: R-174

Main Weapons System

↳*System*

Name: KPVT 14.5mm Heavy Machine Gun (KPV)

Type: Heavy Machine Gun (KPV)

Caliber: mm14.5mm

Manufacturer: V.A. Degtyarev Plant

In Service: 1949-Present

Proliferated: Widely Proliferated Afghanistan Albania Algeria Angola Armenia Bangladesh Benin Bulgaria: locally produced Cambodia Cameroon Congo China: Type 56 machine gun, produced by Norinco Cuba Czechoslovakia (ex) Egypt Eritrea Estonia Ethiopia Finland (KPVT) Georgia Guinea-Bissau Hungary India - Manufactured at Ordnance Factory Tiruchirappalli Iraq- Iraqi Armed Forces Popular Mobilization Forces Iraqi Kurdistan Iran Islamic State Ivory Coast Izz ad-Din al-Qassam Brigades Laos Lebanon Libya Malawi Mali - Armed and Security Forces of Mali Malta - North Korea-made KPVs Mongolia Mozambique Myanmar North Korea Nicaragua Pakistan: Used by the Pakistan Army. Panama Poland Romania: KPV and KPVT built under license Russia Sahrawi Arab Democratic Republic São Tomé and Príncipe Serbia (KPVT) Sierra Leone: Chinese QJG56 and Polish KPVT Slovenia (KPVT) Somalia South Africa Sudan Syria Togo Ukraine Yemen Vietnam Tanzania Zimbabwe

Weight: kg49

Length, Total: mm1.980

Barrel Length: mm1,346

Width: mm162

Height: mm225

Rate of Fire: rds/min600

Maximum Firing Range: m4,000

Effective Firing Range: m3,000

Feed System: 40-round belt

Sights: iron or optical

Maximum Elevation: deg+60

Minimum Elevation: deg-4

Fire on the Move: Yes

↳*Ammunition*

Name: INA

Type: API-T

Caliber: mm14.5

Cartridge: 14.5×114 mm

Muzzle Velocity: m/s1,005

Basic Load: ea500

Effective Range (Day): m2,000

Effective Range (Night): INA

Tactical Range: m1,500-2,000

Armor Penetration: 20 at 1,000 m/ 30 at 500 m

Note: Additional Ammo includes: API, I-T

Auxiliary Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds.min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length, Total: mm1,203

Length, Barrel: mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Gunner Day Sights: 1P3-6, 1.2x/4x

Main Gun Stabilization: No

Infrared Searchlight: OU-3GA2M

Protection

Hull Armor: Front armor of the RkhM-4 protects against 12.7 mm rounds. All-round protection is against 7.62 mm rounds and artillery shell splinters.

Turret Armor: Protection against 12.7mm and shrapnel

Applique Armor: Available

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: Yes, Collective

Smoke Equipment: 6 x 81-mm smoke grenade launchers

Notes:

The RKhM-4 is designed for radiation and chemical agent reconnaissance day and night, under adverse meteorological conditions, in rough terrain when negotiating natural and artificial ground or water obstacles. The vehicle design is based on the BTR-80 APC. The RKhM-4-01 vehicle: carries out field radiation level metering conducts radioactivity testing of objects and samples; detects radiation (outside vehicle); carries out automatic atmosphere testing for contaminants; conducts periodic tests for air contamination and contamination of objects and samples; conducts sampling for radioactivity tests and contaminating substance tests; flags contaminated areas; advises of contamination in the area of patrolling; conducts terrain orientation in adverse terrain and weather conditions, day and night; conducts weather observations.

→→Surface to Surface Missiles (SSM)

→→Artillery Munitions

→→Aircraft Systems/Cruise Missiles

→→Special Purpose Forces (SPF)

→CBRN Weapons

Chlorine: Choking (Lung Damaging) Agent



Agent Characteristics

Alternative Designations: Molecular chlorine
Military designation:
Chemical abstracts service number: 7782-50-5
UN Number: 1017
Chemical Formula: Cl2
Appearance: Gas
Color: Greenish Yellow
Description type agent: Choking
Description: Toxic gas with corrosive properties.
Lethality: Yes
Nonpersistent: Yes
Flammability*: 0
Health*: 4
Instability/reactivity*: 0
Flashpoint° (F): INA
Boiling Point ° (F): -30.3

Routes of Exposure

Inhalation: Yes
Ingestion: Yes
Skin/eye: Yes

Methods of Dissemination

Indoor air: Yes
Water: Yes
Food: Unlikely
Outdoor air: Yes
Agricultural: Unlikely
Historic usage*: Yes

Notes:

CHLORINE IS USED AS AN INDUSTRIAL/HOUSEHOLD CLEANER/DISINFECTANT. IT IS USES RANGE FROM WATER TREATMENT TO CHEMICAL WARFARE (DATING BACK TO WORLD WAR I). PERSISTENCE: MINUTES TO HOURS. UN NUMBER: 1017. SYMPTOMS: BLURRED VISION. BURNING SENSATION IN THE NOSE, THROAT, AND EYES, COUGHING CHEST TIGHTNESS, DIFFICULTY BREATHING OR SHORTNESS OF BREATH, NAUSEA AND VOMITING, WATERY EYES, WHEEZING, LUNG PROBLEMS AND DEATH. BBC REPORTS POSSIBLE CHLORINE ATTACKS IN SYRIA IN APRIL/MAY 2014 AND MARCH 2015. UN SUPPORTED THE ABOVE STATEMENT WITH THE FOLLOWING: “HIGH DEGREE OF CONFIDENCE, THAT CHLORINE HAD BEEN USED AS A WEAPON IN THREE VILLAGES IN NORTHERN SYRIA FROM APRIL TO AUGUST 2014.”

Sulfur Mustard: Blister Agent



System

Alternative Designations: HD (distilled sulfur mustard), Mustard, Mustard gas

Military designation: HD

Chemical abstracts service number: 505-60-2

UN Number: 2810

Chemical Formula: C4H8Cl2S

Appearance: Liquid

Color: Yellow or brown

Description type agent: Blister

Description: Blister agent (vesicant) that causes severe, delayed burns to the eyes, skin, and respiratory tract.

Lethality: Yes

Nonpersistent: No

Flammability*: 1

Health*: 4

Instability/reactivity*: 0

Flashpoint° (F): 219.2

Boiling Point ° (F): 422.6

Routes of Exposure

Inhalation: Yes

Ingestion: Yes

Skin/eye: Yes

Methods of Dissemination

Indoor air: Yes

Water: Yes

Food: Yes

Outdoor air: Yes

Agricultural: Yes

Historic usage*: Yes

Notes:

DESCRIPTION: MUSTARD GAS IS A VESICANT THAT WAS FIRST USED IN CHEMICAL WARFARE IN WORLD WAR I (EVEN THOUGH DISCOVERED PREVIOUSLY). IT CONSISTS OF AN OILY LIQUID OR CLEAR VAPOR. THE UN REPORTS ‘AFTER WWI’ THE FOLLOWING USAGES OF HD : RUSSIA (1919), MOROCCO (1923-1926), ABYSSINIA (1935-1940), MANCHURIA (1937-1945), YEMEN (1963-1967), IRAQ/IRAN (1982-1988), POSSIBLE SYRIA (2014). UN #: 2810 (GUIDE 153). CDC REPORTS HD DAMAGES CELLS WITHIN MINUTES OF CONTACT; HOWEVER, PAIN AND OTHER HEALTH EFFECTS ARE DELAYED UNTIL HOURS AFTER EXPOSURE. HD IN LARGE DOSES CAN BE FATAL. HD IS 2 TO 5 TIMES MORE PERSISTENT IN WINTER THAN IN SUMMER. UN #: 2810 (GUIDE 153). THE CDC STATES THAT HD AFFECTS THE NERVOUS SYSTEM CAUSING "CHOLINERGIC TOXICITY" WITH THE FOLLOWING SYMPTOMS: EXCESSIVE SALIVA, TEARS AND URINE; GASTROINTESTINAL (GI) CRAMPING AND DIARRHEA; VOMITING (EMESIS); AND CONSTRICTED OR PINPOINT PUPILS (MIOSIS). HD HAS AN ODOR OF GARLIC, ONION, HORSERADISH, OR MUSTARD.

RICIN: Biotoxin



System

Alternative Designations: Ricine, Ricins

Military designation:

Chemical abstracts service number: 9009-86-3

UN Number: 3462

Chemical Formula: INA

Appearance: Powder, Liquid, Crystalline

Color: White

Description type agent: Biotoxin

Description: Toxic protein from Castor Bean plant

Lethality: Yes

Nonpersistent:

Flammability*: 1

Health*: 4

Instability/reactivity*: 0

Flashpoint° (F): INA

Boiling Point ° (F): INA

Routes of Exposure

Inhalation: Yes

Ingestion: Yes

Skin/eye: Possible

Methods of Dissemination

Indoor air: Yes

Water: Yes

Food: Yes

Outdoor air: Yes

Agricultural: Yes

Historic usage*: Yes

Notes:

Ricin (/ˈraɪsɪn/ RY-sin), a lectin (a carbohydrate-binding protein) produced in the seeds of the castor oil plant, Ricinus communis, is a highly potent toxin. A dose of purified ricin powder the size of a few grains of table salt can kill an adult human. The median lethal dose (LD50) of ricin for mice is around 22 micrograms per kilogram of body weight via intraperitoneal injection. Oral exposure to ricin is far less toxic. An estimated lethal oral dose in humans is approximately 1 milligram per kilogram. Ricin is very toxic if inhaled, injected, or ingested. It can also be toxic if dust contacts the eyes or if it is absorbed through damaged skin. It acts as a toxin by inhibiting protein synthesis. It prevents cells from assembling various amino acids into proteins according to the messages it receives from messenger RNA in a process conducted by the cell's ribosome (the protein-making machinery) – that is, the most basic level of cell metabolism, essential to all living cells and thus to life itself. Ricin is resistant, but not impervious, to digestion by peptidases. By ingestion, the pathology of ricin is largely restricted to the gastrointestinal tract, where it may cause mucosal injuries. With appropriate treatment, most patients will make a decent recovery. Because the symptoms are caused by failure to make protein, they may take anywhere from hours to days to appear, depending on the route of exposure and the dose. When ingested, gastrointestinal symptoms can manifest within six hours; these symptoms do not always become apparent. Within two to five days of exposure to ricin, effects of ricin on the central nervous system, adrenal glands, kidneys, and liver appear. Ingestion of ricin causes pain, inflammation, and hemorrhage in the mucosal membranes of the gastrointestinal system. Gastrointestinal symptoms quickly progress to severe nausea, vomiting, diarrhea, and difficulty swallowing (dysphagia). Haemorrhage causes bloody feces (melena) and vomiting blood (hematemesis). The low blood volume (hypovolemia) caused by gastrointestinal fluid loss can lead to organ failure in the pancreas, kidney, liver, and GI tract and progress to shock. Shock and organ failure are indicated by disorientation, stupor, weakness, drowsiness, excessive thirst (polydipsia), low urine production (oliguria), and bloody urine (hematuria). Symptoms of ricin inhalation are different from those caused by ingestion. Early symptoms include a cough and fever. When skin or inhalation exposure occur, ricin can cause an allergy to develop. This is indicated by edema of the eyes and lips; asthma; bronchial irritation; dry, sore throat; congestion; skin redness (erythema); skin blisters (vesication); wheezing; itchy, watery eyes; chest tightness; and skin irritation. An antidote has been developed by the UK military, although it has not yet been tested on humans. Another antidote developed by the US military has been shown to be safe and effective in lab mice injected with antibody-rich blood mixed with ricin, and has had some human testing. Symptomatic and supportive treatments are available for ricin poisoning. Existing treatments emphasize minimizing the effects of the poison. Possible treatments include intravenous fluids or electrolytes, airway management, assisted ventilation, or giving medications to remedy seizures and low blood pressure. If the ricin has been ingested recently, the stomach can be flushed by ingesting activated charcoal or by performing gastric lavage. Survivors often develop long-term organ damage. Ricin causes severe diarrhea and vomiting, and victims can die of circulatory shock or organ failure; inhaled ricin can cause fatal pulmonary edema or respiratory failure. Death typically occurs within 3–5 days of exposure. Vaccination is possible by injecting an inactive form of protein chain A. This vaccination is effective for several months due to the body's production of antibodies to the foreign protein. In 1978 Bulgarian defector Vladimir Kostov survived a ricin attack similar to the one on Georgi Markov, probably due to his body's production of antibodies. When a ricin-laced pellet was removed from the small of his back it was found that some of the original wax coating was still attached. For this reason only small amounts of ricin had leaked out of the pellet, producing some symptoms but allowing his body to develop immunity to further poisoning. The seeds of Ricinus communis are commonly crushed to extract castor oil. As ricin is not oil-soluble, little is found in the extracted castor oil.The extracted oil is also heated to more than 80 °C to denature any ricin that may be present.The remaining spent crushed seeds, called variously the “cake”, “oil cake”, and “press cake”, can contain up to 5% ricin. While the oil cake from coconut, peanuts, and sometimes cotton seeds can be used as either cattle feed and/or fertilizer, the toxic nature of castor beans precludes their oil cake from being used as feed unless the ricin is first deactivated by autoclaving. Accidental ingestion of Ricinus communis cake intended for fertilizer has been reported to be responsible for fatal ricin poisoning in animals. Deaths from ingesting castor plant seeds are rare, partly because of their indigestible seed coat, and because some of the ricin is deactivated in the stomach. The pulp from eight beans is considered dangerous to an adult. Rauber and Heard have written that close examination of early 20th century case reports indicates that public and professional perceptions of ricin toxicity "do not accurately reflect the capabilities of modern medical management". Most acute poisoning episodes in humans are the result of oral ingestion of castor beans, 5–20 of which could prove fatal to an adult. Swallowing castor beans rarely proves to be fatal unless the bean is thoroughly chewed. The survival rate of castor bean ingestion is 98%. In 2013 a 37-year-old woman in the United States survived after ingesting 30 beans. Victims often manifest nausea, diarrhea, fast heart rate, low blood pressure, and seizures persisting for up to a week. Blood, plasma, or urine ricin or ricinine concentrations may be measured to confirm diagnosis. The laboratory testing usually involves immunoassay or liquid chromatography-mass spectrometry.

VX: Nerve Agent



System

Alternative Designations: Methylphosphonothioic acid, O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate

Military designation:

Chemical abstracts service number: 50782-69-9

UN Number: 2810

Chemical Formula: C11H26NO2PS

Appearance:

Color: Clear, Amber

Description type agent: Nerve

Description: One of the most toxic tasteless and odorless human-made chemical warfare agents

Lethality: Yes

Nonpersistent: No

Flammability*: 1

Health*: 4

Instability/reactivity*: 0

Flashpoint° (F): 318.2

Boiling Point ° (F): 568.4

Routes of Exposure

Inhalation: Yes

Ingestion: Yes

Skin/eye: Yes

Methods of Dissemination

Indoor air: Yes

Water: Yes

Outdoor air: Yes

Agricultural: Possible

Historic usage*:

Notes:

VX is an extremely toxic synthetic chemical compound in the organophosphorus class, specifically, a thiophosphonate. In the class of nerve agents, it was developed for military use in chemical warfare after translation of earlier discoveries of

organophosphate toxicity in pesticide research. In its pure form, VX is an oily, relatively non-volatile, liquid that is amber-like in color] Because of its low volatility, VX persists in environments where it is dispersed. VX, short for "venomous agent X".]is one of the best known of the V nerve agents and was first discovered at Porton Down in England during the early 1950s based on research first done by Gerhard Schrader, a chemist working for IG Farben in Germany during the 1930s. Now one of a broader V-series of agents, they are classified as nerve agents and have been used as a chemical weapon in various recorded deadly attacks. VX fatalities occur with exposure to tens of milligram quantities via inhalation or absorption through skin; VX is thus more potent than sarin, another nerve agent with a similar mechanism of action. On such exposure, these agents severely disrupt the body's signaling between the nervous and muscular systems, leading to a prolonged neuromuscular blockade, flaccid paralysis of all the muscles in the body including the diaphragm, and death by asphyxiation. The danger of VX, in particular, lies in direct exposure to the chemical agent persisting where it was dispersed, and not through its evaporating and being distributed as a vapor (i.e. it is not a "vapor hazard"). VX is considered an area denial weapon due to these physical and biochemical characteristics. As a chemical weapon, it is categorized as a weapon of mass destruction and is banned by the Chemical Weapons Convention of 1993, where production and stockpiling of VX exceeding 100 grams (3.53 oz) per year is outlawed. The only exception is for "research, medical or pharmaceutical purposes outside a single small-scale facility in aggregate quantities not exceeding 10 kg (22 lb) per year per facility".

Sarin: Chemical Nerve Agent



System

Alternative Designations: Trilone, Zarin

Military designation: GB

Chemical abstracts service number: 107-44-8

UN Number: 2810

Chemical Formula: C4H10FO2P

Appearance: Liquid

Color: Clear

Description type agent: Nerve

Description: Chemically similar to Organophospate

Lethality: Yes

Nonpersistent: Yes

Flammability*: 1

Health*: 4

Instability/reactivity*: 0

Flashpoint° (F): >536

Boiling Point ° (F): 297

Routes of Exposure

Inhalation: Yes

Ingestion: Possible

Skin/eye: Yes

Methods of Dissemination

Indoor air: Yes

Water: Yes

Food: Yes

Outdoor air: Yes

Agricultural: Yes

Historic usage*: Yes

Notes:

Sarin (NATO designation GB [short for G-series, "B"]) is an extremely toxic synthetic organophosphorus compound. A colourless, odorless liquid, it is used as a chemical weapon due to its extreme potency as a nerve agent. Exposure is lethal even at very low concentrations, where death can occur within one-to-ten minutes after direct inhalation of a lethal dose,[5][6] due to suffocation from lung muscle paralysis, unless antidotes are quickly administered. People who absorb a non-lethal dose, but do not receive immediate medical treatment, may suffer permanent neurological damage. Sarin is generally considered a weapon of mass destruction. Production and stockpiling of sarin was outlawed as of April 1997 by the Chemical Weapons Convention of 1993, and it is classified as a Schedule 1 substance. Like some other nerve agents that affect the neurotransmitter acetylcholine, sarin attacks the nervous system by interfering with the degradation of the neurotransmitter acetylcholine at neuromuscular junctions. Death will usually occur as a result of asphyxia due to the inability to control the muscles involved in breathing. Initial symptoms following exposure to sarin are a runny nose, tightness in the chest, and constriction of the pupils. Soon after, the person will have difficulty breathing and they will experience nausea and drooling. As they continue to lose control of bodily functions, they may vomit, defecate, and urinate. This phase is followed by twitching and jerking. Ultimately, the person becomes comatose and suffocates in a series of convulsive spasms. Moreover, common mnemonics for the symptomatology of organophosphate poisoning, including sarin gas, are the "killer Bs" of bronchorrhea and bronchospasm because they are the leading cause of death, and SLUDGE – salivation, lacrimation, urination, defecation, gastrointestinal distress, and emesis (vomiting). Death may follow in one to ten minutes after direct inhalation. Sarin has a high volatility (ease with which a liquid can turn into vapour) relative to similar nerve agents, therefore inhalation is very easy and even vapor may immediately penetrate the skin. A person's clothing can release sarin for about 30 minutes after it has come in contact with sarin gas, which can lead to exposure of other people. Treatment measures have been described. Treatment is typically with the antidotes atropine and pralidoxime. Atropine, an antagonist to muscarinic acetylcholine receptors, is given to treat the physiological symptoms of poisoning. Since muscular response to acetylcholine is mediated through nicotinic acetylcholine receptors, atropine does not counteract the muscular symptoms. Pralidoxime can regenerate cholinesterases if administered within approximately five hours. Biperiden, a synthetic acetylcholine antagonist, has been suggested as an alternative to atropine due to its better blood–brain barrier penetration and higher efficacy.

Hydrogen Cyanide: Systemic Agent



System

Alternative Designations: Formonitrile, Hydrocyanic acid, Prussic acid

Military designation: AC

Chemical abstracts service number: 74-90-8

UN Number: 1051

Chemical Formula: HCN

Appearance:

Color: Colorless or pale blue

Description type agent: systemic chemical asphyxiant

Description: interferes with the normal use of oxygen by nearly every organ of the body

Lethality: Yes

Nonpersistent: No

Flammability*: 4

Health*: 4

Instability/reactivity*: 2

Flashpoint° (F): 0

Boiling Point ° (F): 78

Routes of Exposure

Inhalation: Yes

Ingestion: Yes

Skin/eye: Yes

Historic usage*: Yes

Methods of Dissemination

Indoor air: Yes

Water: Yes

Food: Yes

Outdoor air: Yes

Agricultural: Possible

Historic usage*: Yes

Notes:

Hydrogen cyanide (HCN), sometimes called prussic acid, is a chemical compound[11] with the chemical formula HCN. It is a colorless, extremely poisonous and flammable liquid that boils slightly above room temperature, at 25.6 °C (78.1 °F).[12] HCN is produced on an industrial scale and is a highly valuable precursor to many chemical compounds ranging from polymers to pharmaceuticals.

Chloroacetophenone: Riot Control / Tear Agent



System

Alternative Designations: 2-Chloro-1-phenylethanone, 2-Chloroacetophenone, alpha-Chloroacetophenone, Chemical mace, Chloromethyl phenyl ketone, Phenyl chloromethylketone, Tear gas

Military designation: CN

Chemical abstracts service number: 532-27-4

UN Number: 1697

Chemical Formula: C8H7ClO

Appearance: Gas

Color: Gray, white, or colorless

Description type agent: Riot Control/Tear Agent

Description: Military and law enforcement use CN for riot control.

Lethality: Yes

Nonpersistent: Yes

Flammability*: 1

Health*: 2

Instability/reactivity*: 0

Flashpoint° (F): 244

Boiling Point ° (F): 472-473

Routes of Exposure

Inhalation: Yes

Ingestion: Yes

Skin/eye: Yes

Methods of Dissemination

Indoor air: Yes

Water: Yes

Outdoor air: Yes

Agricultural: Possible

Historic usage*: Yes

Notes:

Phenacyl chloride, also commonly known as chloroacetophenone, is a substituted acetophenone. It is a useful building block in

organic chemistry. Apart from that, it has been historically used as a riot control agent, where it is designated CN. It should not be confused with cyanide, another agent used in chemical warfare. Because of its significantly greater toxicity, it has largely been supplanted by CS gas. Even though CN is still supplied to paramilitary and police forces in a small pressurized aerosol known as “Mace” or tear gas, its use is falling as pepper spray both works and disperses more quickly than CN and is less toxic than CN. The term "Mace" came into being because it was the brand-name invented by one of the first American manufacturers of CN aerosol sprays. Subsequently, in the United States, Mace became synonymous with tear-gas sprays in the same way that Kleenex has become strongly associated with facial tissues (a phenomenon known as a genericized trademark). Like CS gas, this compound irritates the mucous membranes (oral, nasal, conjunctival and tracheobronchial). Sometimes it can give rise to more generalized reactions such as syncope, temporary loss of balance and orientation.[6] More rarely, cutaneous irritating outbreaks have been observed and allergic contact permanent dermatitis. At high concentrations, CN may cause corneal epithelial damage and chemosis. It has also accounted for at least five deaths, which have resulted from pulmonary injury and/or asphyxia.

Logistics

→Transportation

Berkut-2 Russian Tactical Heated-Cab Snowmobile





Tiers:

1 2 3 4

System

Alternative Designation: Berkut-2; TTM-1901-40
Type: Tactical Heated-Cab Snowmobile
Manufacturer: Russian firm NPO Transport
In Service: 2016-Present
Crew: ea1
Passenger Capacity: ea2
Operating Temperature: The snowmobiles have a car-type heated cab and are designed for use in the Arctic, given their ability to operate at ambient temperature of -50°C.
Cab Heating System: The cab's effective heating system maintains a temperature of +18°C even if it is -50°C outside.
Aircraft Transport Capable: Many of Russia's military transport aircraft, such as the Il-76, could easily carry them internally and An-32 or An-76 tactical airlifters may be able to as well. Helicopters such as the Mi-8/17 could carry them sling-loaded or even possibly inside their cabin. This could also make the Berkuts an attractive way to provide additional mobility for airborne or special operations forces inserted in remote Arctic areas for short-duration missions.

Dimensions

Length: INA
Width: INA
Height: INA

Weight, Combat: 900kg

Automotive

Engine Name: VAZ-21213

Engine Type: Gas Engine

Engine Power: hp80

Range: 200 km on one tank of gas

Speed, Maximum Snow: km/h64

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Fuel Capacity: INA

Tow Weight: 295 kg

Main Weapon System

Weapon Mount: The militarized Berkut-2 also has an external mount for a single machine gun above the driver's compartment, which would provide some limited local defense.

↳*System*

Name: PKP Pecheneg Machine Gun

Type: General-Purpose Machine Gun

Caliber: 7.62mm

Length: 1,200 mm

Barrel Length: 658 mm

Weight: 8.2 kg (18 lb) without a bipod 8.7 kg (19 lb) with a bipod 12.7 kg (28 lb) with an infantry tripod mount

Action: Gas-operated

Rate of Fire: 600–800 RPM

Muzzle Velocity: 900 m/s

Effective Firing Range: 1,500 m

Feed System: Belt feed: 100-, 200-, 250-round

↳*Ammunition*

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×54mmR

Basic Load: 1,000 Rounds

Protection

Armor: INA
Applique Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: INA
Smoke Equipment: No

Notes:

The Berkut-2, or TTM-1901-40, is an extremely simple vehicle consisting of a small heated 2-man cab built atop a set of forward articulated sleds and tracks in the rear. A PKP GPMG can be mounted just behind the cab but there is no armour to protect the gunner or cab. The Berkut's small size and light weight, just 900kg or just under 2,000 lbs, make it ideal for rapid transport aboard trucks or transport aircraft. Highly versatile, the snowmobiles can tow up to 650 lb or 295 kg – either equipment or troops on skis/sleds pulled by tether. The cabs are heated and can support operations in temperatures as low as -55F or -50C. The vehicles are ideal for patrolling or transporting troops to difficult, heavily wooded areas, when insertion on foot or by air are impractical. The snowmobiles are a part of Russia's renewed interest in the Arctic region with the refurbishment and reactivation of former bases in the Russian Arctic Circle. The importance of this small, simple vehicle is marked by its first appearance at this year's Victory Parade.

PTS-M (Ob'yekt 65) (Export) North Korean Tracked Amphibious Transport Vehicle



Tiers:



Variants:

- **PTS-2:** INA
- **PTS-3:** INA
- **PTS-4:** In 2014, the Russian Defense Ministry intends to purchase an undetermined number of PTS-4s, which underwent acceptance trials in 2011. The vehicle will be fitted with a remotely operated 12.7 mm (0.50 in) machine gun and a multi-fuel engine. The PTS-4 weighs 33 tons, with a payload of 12 tons on land (18 tons on water). Projected maximum road speed is 60 km/h (37 mph), with an expected maximum speed in water of 15 km/h (9.3 mph). Unlike its predecessors, it uses T-80 suspension components. The fully enclosed cab offers protection against small arms fire and splinter. Production began in 2014.

System

Alternative Designation: PTS-M (Ob'yekt 65)
Type: Tracked Amphibious Transport Vehicle
Manufacturer: Soviet State Factories
Family: PTS
In Service: 1965-Present in some countries
Cab Seating: 1 + 2 men
Passenger Capacity: 70 troops,
Maximum Payload Capacity on Land: tons10
Maximum Payload Capacity on Water: tons5

Dimensions

Length: m12
Width: m3.17
Height: m3.3
Weight, Empty: tons17
Maximum Payload Capacity on Water: tons5
Maximum Payload Capacity on Land: tons10

Automotive

Engine Name: A-712P

Engine Type: Diesel

Engine Power: hp340

Maximum Cruising Range: km380

Speed, Maximum Road: km/h42

Speed, Average Cross: INA

Speed Maximum Swim: km/h12

Gradient: %60

Side Slope: %30

Vertical Step: m0.65

Trench: m2.5

Fording Depth: mAmphibious

Sea State: 4

Winch: Yes

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The PTS is a Soviet tracked amphibious transport. PTS stands for Plavayushchij Transportyer - Sryednyj or medium amphibious transport vehicle. Its industrial index was Ob'yekt 65. Introduced in 1965, it is large, with a substantial payload of 10 tons, two to four times the capacity of the BAV 485, and better cross-country performance, at the cost of greater somewhat higher purchase costs because it is tracked. The most common model is the improved PTS-M that is powered by a 350 hp diesel engine. The PTS has a boxy, open watertight hull, with six road wheels per side, front drive sprocket, rear idler sprocket, and no return rollers. Like the BAV 485, and unlike the DUKW, it has a rear loading ramp. The crew is seated at the front, leaving the rear of the vehicle open for a vehicle, which can be driven (or backed) in, rather than lifted over the side. To aid in facilitating this, the engine is under the floor. Propulsion in water is by means of twin propellers, in tunnels to protect them from damage during land operations. The PTS-M also has a companion vehicle, the PKP, a boat-like amphibious two-wheeled trailer, with fold-out sponsons providing stability on water; the combination allows the PTS-M to accommodate an artillery tractor, field gun (up to medium caliber), its crew, and a quantity of ammunition, all in one load.

MZKT-74295 Belarusian Tank Transporter





Tiers:



Variants:

- **MZKT-7401:** MZKT-7401 is essentially a similar vehicle. It is powered by a Russian YaMZ engine, developing 400 hp. It has a payload capacity of 50 000 kg. The prime mover is fitted with a MAZ 2-seat cab. It was first publicly revealed in 2007. This tank transporter is used in Belarus and, reportedly, Russia.
- **MZKT-742952:** has a payload capacity of 50 000 kg. The prime mover is powered by a Deutz diesel engine, developing 544 hp. First prototype was completed in 1998.
- **MZKT-742953:** Payload of 70,000kg. Mercedes-Benz (DaimlerChrysler) engine, 680hp. Introduced in 2000. The prime mover has a new metal-frame crew cab, which accommodates driver and 6 passengers.
- **MZKT-74296:** Payload of 59,000kg. Deutz diesel engine, 544hp. 1 driver + 6 passengers. Introduced in 2001
- **MZKT-742960:** 1 driver + 6 passengers; can carry two BMP-2 infantry fighting vehicles simultaneously. Introduced in 2015. It has a new metal-frame crew cab, which accommodates driver and 6 passengers. This prime mover is used in conjunction with a 2-axle semi-trailer and can transport loads with a maximum weight of 56 000 kg. It is powered by a Deutz diesel engine, developing 544 hp.
- **MZKT-74291:** Payload of 90,000kg; 600hp engine

System

Curb Weight (: mt21.5 (prime mover)
Number of Axles: ea4
Number of Tires: ea8
Payload: mt50
Trailer Type: 93783
Troop Capacity: ea2 in cab
Weight, Gross Vehicle: mt95
Wheels Central Tire Pressure Regulation System: Yes

↳*Dimensions*

Height, Overall: m3.64
Length, Overall: m9.7
Width, Overall: m3.07
Wheelbase: m4.605

Automotive

Engine Type: Mercedes-Benz OM502LA diesel, 500hp
Fording Depth: m1 w/out prep; 1.6 w/prep
Ground Clearance: mm450
Range, Cruising: km700
Speed: km/h62
Side slope: 30%
Gradient (loaded): 10%
Vertical step: m0.4
Gradient (unloaded): 25%
Trench: m1.8

Notes:

This tank transporter is fitted with a MAZ forward control cab, which is produced by a Belarusian truck maker. The cab provides seating for the driver and co-driver. There are two sleeping berths for the crew. However, the cab has no space to accommodate crew of the vehicle that it transports. Vehicle has an 8x8 configuration. Both front axles are steerable. It has two winches that assist loading of immobile or disabled vehicles. The Turkish MZKT-74295 is used in conjunction with a two-axle semi-trailer. It can carry loads with a maximum weight of 50,000 kg, including main battle tanks, heavy armored vehicles, self-propelled artillery systems, construction equipment and other military loads. This vehicle is also marketed under the Volat brand.

Navistar ATX6 Czechoslovakian 6x6 Truck





Tiers:



System

Cooling: Water
Curb Weight (: mt12.1
Number of Axles: ea3
Number of Tires: ea6
Payload: mt16.9
Troop Capacity: ea2 in cab
Weight, Gross Vehicle: mt29
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in1600R 20
Layout: 6X6
Brakes (main): Dual circuit, air, drums, all-round, ABS fitted. Supplementary engine exhaust brake.

↳*Dimensions*

Height, Overall: m2.735
Length, Overall: m9.485
Width, Overall: m2.5
Wheelbase: m4.09

Armament

Armament: None

Automotive

Engine Type: Navistar 12.4L, in-line 6, turbodiesel, 450hp
Fording Depth: m1.5
Ground Clearance: mm410

Range, Cruising: km1000

Speed: km/h117

Turning Radius: m10.75

Angle of approach: degrees42

Angle of departure: degrees25

Gradient: 80%

Side slope: 45%

↳***Fuel***

Fuel Capacity: liters420

Utility

Transport: air transportable by C-130 Hercules

Notes:

The ATX6 is a high mobility heavy duty tactical truck designed to be a universal container carrier of supplies, equipment, and food. This vehicle operating range is -32C to +49C with no additional preparation. The standard series cab kit is designed to accept applique armor up to STANAG Level 2. The ATX6 is air transportable by C130 Hercules aircraft.

Kraz-255B Russian 7.5 Metric Ton, 6x6 Cargo Truck






Tiers:

1 2 3 4

Variants:

- **KrAZ-258:** Tractor Truck
- **Several other variants.:** INA

System

Curb Weight: kg12
Number of Axles: ea3
Payload: mt7,500
Towing Capability, Off: kg10,000
Trailer Payload, On: kg10,000
Troop Capacity: 3 in cab, 16 in rear
Weight, Gross Vehicle: mt19.7
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in20x21
Turning Radius: m14

↳*Dimensions*

Height, Overall: m2.94
Length, Overall: m8.64
Width, Overall: m2.75
Ground Clearance: mm360

Automotive

Engine Type: V8, 265hp, Diesel
Fording Depth: m1
Range, Cruising: km850
Speed: km/h70
Cooling: Water

↳*Fuel*

Fuel Capacity::
Fuel capacity, Left Tank: liters165
Fuel capacity, Right Tank: liters165
Type: Diesel

Payload

Cargo Curb Weight: kg12
Cargo Space, Height: m.92
Cargo Space, Length: m4.56
Cargo Space, Width: m2.5
Gradient, Loaded: deg30

Notes:

Primarily designed as a cargo truck, the KRAZ-255B is also used as a prime mover for various equipment including a tank transporter trailer and PMP pontoon bridge.

URAL-375D Russian 6X6 General Utility Truck





Tiers:

1 2 3 **4**

Variants:

- **Ural-375A:** a fully enclosed all-steel cab, was a chassis for wagon-style body, payload 12,787 lb (5,800 kg), framework shortened to 13.2'
- **Ural-375D:** Most produced 375.
- **Ural-375E KET-L:** a recovery vehicle equipped a front-mounted and a rear-mounted winch along with a jib crane.
- **Ural-375S:** a tractor-trailer truck with framework shortened to 5.3'.
- **Ural-377:** civilian 6×4 truck
- **Ural-377S:** was a civilian 6×4 tractor-trailer.

System

Alternate Designation: Ural 375
Payload on/off Highway : kg4500
Quantity, Axles : ea3.0
Troop Capacity : 3 in cab, 24 in rear
Wheels Central Tire Pressure Regulation System: Yes

↳*Dimensions*

Height, Overall : m2.68
Length, Overall : m7.36
Width, Overall : m2.67
Weight, Gross Vehicle: mt13.2

Cargo Space

↳*Dimensions*

Cargo Bed Area : m29.5
Height : m0.872
Length : m3.9
Width : m2.43

Automotive

Engine Name: ZiL-375 Diesel
Engine Type: V8, 180 hp, Gasoline
Engine Power: hp180
Cooling System: Liquid
Fuel Capacity , Aux : liters60.0
Fuel Capacity, Main Tank: liters300.0
Maximum Road Speed: km/h75
Maximum Range: km750
Towing Capability, Off-Highway: kg5000.0
Towing Capability, Off-Highway: kg10000.0
Gradient: %65
Side Slope: %40
Vertical Step: m0.8
Trench: m0.7
Fording: m1.2

Notes:

The Ural-375 is a general purpose 4.5 ton 6×6 truck, produced at the Ural Automotive Plant in the Russian SFSR since 1961. The Ural 375 replaced the ZIL-157 as the standard Soviet Army truck in 1979. It was itself replaced by the Ural-4320. The Soviets found the trucks an ideal platform for the BM-21 Grad rocket launcher. Other modes for the Ural-375D included troop carrier, supply carrier, etc. Since 1973 the main production model was powered by a ZiL-375 V8 diesel engine, developing 180 hp. The diesel-powered unit was introduced in order to increase the range on fuel, as well as to reduce risks of catching fire. Vehicle has an engine pre-heater and is well suited for operation in winter. Despite that the petrol-engined version was produced in small number until 1991. There are numerous variants of this military truck. They vary from multiple rocket launcher carriers to missile resupply vehicles and fuel servicing trucks. The specialized TMS-65 is a special NBC decontamination vehicle carrying a jet engine to remove NBC agents from other vehicles. Other variants include recovery vehicle and fuel tanker.

Renault Kerax French 8x8 Truck





Tiers:

1 **2** 3 4

Variants:

- **Armored version:** Protection from small arms fire (7.62), artillery shell fragmentation, landmines and IEDs. Engine: 520hp turbodiesel Length: 10.2m Width: 2.5m
- **8X8 recovery vehicle:** Equipped with a specific recovery system.
- **8X8 "Heavy Duty" (tractor):** Heavy equipment / tank transporter with a gross combined vehicle weight of 120 tons

System

Alternative Designation: INA
Brake system: Drum brakes, Electronic Braking System (EBS 5)
Cooling: Intercooled
Curb Weight: kg12.315
Number of Axles: ea4
Number of Tires: ea8
Payload: mt26
Troop Capacity: 2 in cab
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: 395/85 R20
Run Flat Tires: Yes

↳*Dimensions*

Height, Overall: m3.5
Length, Overall: m10.2
Width, Overall: m2.6

Armament

Armament: 5.56, 7.62, or 12.7 mm

Automotive

Engine Type: Renault DXi 11 turbodiesel, 11L, 450hp

Fording Depth: m0.8 without preparation; 1.2 with preparation

Ground Clearance: mm430

Range, Cruising: km900

Speed: km/h110

Trench: m0.9

Vertical Step: m0.4

↳*Fuel*

Fuel Capacity: liters315

Payload

Curb Weight: mt12.315

Gradient, Loaded: deg50

Payload on/off road: mt26

Utility

Transport: Air-transportable by A400m, C-130, and C-160

Notes:

The Renault Kerax is designed for heavy transport missions, and has eight driven wheels on multiple axles (two steering axles in the front and two drive axles in the rear). It is used to carry cargo, troops, weapons, containers and other equipment. They can be configured also as dump trucks, water/fuel tankers, load handling systems (LHS), shelters, recovery truck, or weapon systems carriers. This vehicle will cold-start down to -32C. The Kerax trucks are available with standard or armored cabs. The cab is air-transportable by A400m, C-130, and C-160.

MAZ-7910 Russian 8x8 Air Defense Missile System Carrier







Tiers:



Variants:

- **MAZ-543P:** The MAZ-543P (carrying capacity - 19600 kg) was used for 9K76 Temp-S system.
- **MAZ-543M:** The MAZ-543M version was designed to carry the BM-30 Smerch Multiple rocket launcher.
- **MAZ-543:** Designed in the 1960s, the MAZ-543 was presented on 7 November 1965 during the Moscow Red Square military parade as part of SS-1c Scud B (9K72 Elbrus) system. The vehicle is powered by a 38.9 litre D12A-525 tank diesel engine producing around 525 horsepower, and gives a maximum road speed of 37 mph (60 km/h). There have been a number of variants
- **MAZ-543A:** he 1967 MAZ-543A, arrived (with extra carrying capacity up to 22000 kg). It served as the basis for several civilian vehicles, including the AA-60(543)-160 aerodrome fire-fighting vehicle (1973), the AA-70(543)-172 experimental emergency vehicle, and the KS-5571 crane. In 1974 at the Exhibition of Achievements of the National Economy, a new prototype modification (MAZ-7310) was presented. It has been in production since 1976.
- **MAZ-547:** The MAZ-547 version is a six-axle version, used as Transporter erector launcher for the SS-20 Saber.
- **MAZ-7910:** This variant is used to carry the air defense missile complex S-300PMU-2.
- **MAZ-74106:** This variant is used mainly to transport the air search radar 64N6 BIG BIRD for the S-300PM.
- **WS2400:** In 1986, People's Republic of China fielded its version of MAZ-543. Initially designated WS580 but later renamed WS2400, this Chinese version is one of the Wanshan series trucks manufactured by Wanshan Special Vehicle, a wholly owned subsidiary of China Aerospace Sanjiang Space Co. Ltd., which is in turn a subsidiary of China Aerospace Science and Industry Corporation (CASIC).

System

Alternative Designations: MAZ 7910

Manufacturer: MAZ

Crew: ea2

Automotive

Engine Name: D12A-525

Engine Type: V-12 water-cooled diesel

Engine Power: 525 hp at 2,100 rpm

Power-to-Weight Ratio: 26.25 hp/metric ton

Maximum Speed, Road: km/h60

Maximum Speed, Off-Road: km/h30

Maximum Range: km800

Cargo Capacity Example: take three 800 mm pipes with a total weight of 18 tonnes

Dimensions (Chassis: MAZ-7910 8 x 8 Truck)

Length: m9.40

Width: m3.10

Height: m3.70

Curb Weight: kg23,300

Payload: tons18

Communications

VHF Radio: R-168 Akveduk

HF Radio: R-161 Poisk

Protection

Note: There is not information on the protection available to the MAZ 7910

Notes:

In 1974, MAZ made the prototype of a pipe hauler MAZ 7910. According to the information the only prototype was made, the other information says that mass production in small quantities started in 1976. This version has a single cabin. It could take three 800 mm pipes with a total weight of 18 tonnes. Overall dimensions — 11,450x3050x3550 mm. Curb weight — 23,300 kg. Payload — 18 tonnes. Top speed — 60 kph.

M983 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Tractor Truck







Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS,

as fitted to the Oshkosh PLS truck.

- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M983 HEMTT
Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Tractor Truck
Manufacturer: Oshkosh Corporation
Configuration: 8x8
Family: Heavy Expanded Mobility Tactical Truck (HEMTT)
Crew: ea2
Payload Capacity: 9,979 kg
Material Handling Crane Maximum Capacity: 6,631 kg at 3 m boom length

Dimensions

Length: 8.90 m
Width: 2.44 m
Height: 2.57 m
Distance Between Equalizer Pivots: 4.60 m
Distance Between Axles, 1st to 2nd: 1.52 m
Distance Between Axles, 2nd to 3rd: 3.07 m
Distance Between Axles, 3rd to 4th: 1.52 m
Weight: 14,605 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA
Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel
Engine Power: 445 hp at 2,100 rpm
Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89 × 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-

speed transfer case. The front axles on all HEMTTs are single-reduction Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration. The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production models have the suffix A4.

Ural-63708 Russian Heavy Equipment Transport Truck





Tiers:

1 2 3 4

System

Alternative Designation: NA

Manufacturer: Ural

Family: Heavy Transport

Crew: 1 driver

Passenger Capacity: 5

Dimensions

Length: m10.37

Width: m2.55

Height: m3.15

Weight, Tractor: tons15

Weight, Tractor and Trailer: tons~30

Payload Capacity: tonsUp to 70

Gross Combination Weight: tonsUp to 100

Automotive

Engine Name: YaMZ

Engine Type: Diesel

Engine Power: hp600

Cruising Range: km800

Speed, Maximum Road: km/h90

Speed, Average Cross: INA

Gradient, Unloaded: %~25

Gradient, Loaded: %10-15

Side Slope, Tractor: %~30

Vertical Step: m~0.6

Trench: INA

Fording Depth, Loaded: m~0.7

Fording Depth, Tractor: mUp to 1.8

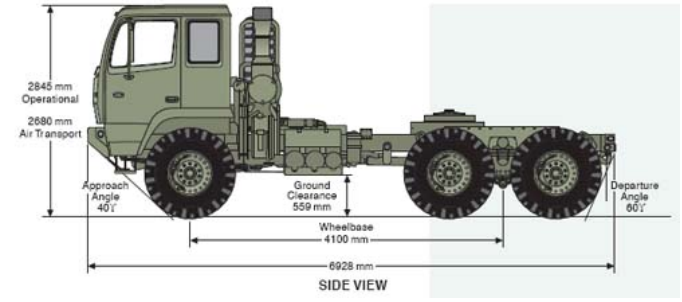
Notes:

The Ural-63708 is a new Russian tractor truck with 8x8 configuration. It is a version of the Ural-63704-0010 military truck with an added axle at the rear and fitted with a more powerful engine. It was first publicly revealed in 2016. This tractor truck is a member of Tornado-U family of military vehicles. In this case letter "U" in the designation stands for "Ural", as there is also a similar KamAZ-U family, developed by another Russian truck manufacturer KamAZ.

M1092 American 6x6 Medium Tactical Vehicle (MTV) Truck Chassis







Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782

- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1092

Type: Medium Tactical Vehicle (MTV) Truck Chassis

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Dimensions

Length: 6.91 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 7,515 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1092 or M1092A1 Truck, Chassis 5 ton is a member of the Family of Medium Tactical Vehicles (FMTV), providing tactical unit mobility and logistics for the U.S. Army and the other military services.

M1084 American 6x6 Medium Tactical Vehicle (MTV) Cargo Truck with Material Handling Equipment (MHE)







Tiers:

1 2 **3** 4

Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787

- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1084

Type: Medium Tactical Vehicle (MTV) Cargo Truck with Material Handling Equipment (MHE)

Family: FMTV Series

Configuration: 6x6

Crew: ea3

Winch: The M1084 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

Material Handling Equipment (MHE): Loads/unloads cargo bed and trailer, hydraulic operation, 2,500 lb (1,134 kg) lift at 14 ft (4.3 m), 5,000 lb (2,268 kg) at 7 ft (2.1 m), includes stabilizers and local and remote controls

Dimensions

Length: 7.78 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 10,740 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 330 hp (246 kW) at 2,400 rpmm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Suspension: front longitudinal leaf w/rear shock absorbers, bogie with leaf spring over walking beam.

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1084 Standard Cargo Truck with MHE is designed to transport cargo and soldiers. The M1084 has a payload capacity of 10,000 pounds and lift capacity of 2,500 to 5,000 pounds using the on board MHE. The cargo bed side rails are hinged for the ease of loading and unloading cargo. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1084 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

LVSR MKR18 American 10x10 Logistics Vehicle System Replacement (LVSR) Heavy Mobility Cargo Truck





Tiers:



Variants:

- **LSVR MKR15 Wrecker:** This version is equipped with a crane, winches and hydraulic spade. It can flat tow 110,000 lb (49,900 kg) on the highway. The truck has a lift and tow capacity of 97,000 lb (44,000 kg) gross vehicle weight with 24,000 lb (10,890 kg) lift capacity. The articulated crane has a lift capacity of 18,00 0 lb (8,170 kg) at 11 ft (3.35 m); and 10,000 lb (4,540 kg) at a maximum reach of 20 ft (6.1 m).
- **LSVR MKR16 Tractor:** This is the tractor variant of the LVSR. It is equipped with a recovery winch with a 60,000-lb (27,220-kg) capacity and 10,000-lb (4,540-kg) side-pull capacity.
- **MKR18 Cargo:** This is the cargo version of the LVSR. It is equipped with the Multilift Mk 18A1 load handling system. Towed trailers add 16.5 tons of payload.

System

Alternative Designation: LVSR MKR18
Type: Logistics Vehicle System Replacement (LVSR) Heavy Mobility Cargo Truck
Configuration: 10x10
Manufacturer: Oshkosh Defense, Oshkosh, Wis.
Crew: ea1
Cab Seating: 1x1
Airlift Capability: This heavy truck can be airlifted by the C-5A Galaxy and C-17 Globemaster III military transport aircraft. Height of the vehicle can be reduced by 50 cm for easier transportation.
Note #1: The MKR18 cargo carrier version of the LVSR is equipped with a Multilift load handling system and can load and unload flatracks or containers both on the prime mover and trailer without external material handling equipment. All adapters and lift hardware are carried on the vehicle. It uses standard NATO flatracks.

Dimensions

Length: 10.83 m
Width: 2.49 m
Height: 3.52 m
Wheelbase: 5.67 m
Gross Weight: 48,080 kg
Curb Weight: 24,360 kg

Road Payload Capacity: 22,500 kg

Off-Road Payload Capacity: 16,500 kg

Automotive

Engine Name: 1 x CAT C15

Engine Type: Diesel

Engine Power: hp600

Fuel Capacity: m628 liter

Maximum Speed: 105 km/h

Range: 480 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.6 m

Trench: 2.5 m

Fording: 1.52 m

Note: The front two and the back two axles are steered.

Protection

Armor: It is fitted with an integrated armored cab and energy-absorbing seats.

Applique Armor: Yes, The add-on armor kit for LVSR was developed and supplied by Plasan of Israel. Plasan was awarded a contract in mid-2006 for 12 LVSR armor kits for testing. The November 2011-stated AAO for LVSR add-on armor B-kits quotes 651. The armor system for LVSR follows the A-kit/B-kit principle, with vehicles designed 'fitted for, but not with', protection. In the case of LVSR, 'fitted for' includes an armored cab floor as standard. Cargo and wrecker variants require an upgrade of the front springs. Protection kits can be installed and uninstalled from vehicles in the field using only basic tools. The A-kit is fitted on the production line and is the combination of a limited amount of armoring (in difficult-to-access areas of the vehicle), together with a significant amount of armour installation attachments and required support structures. The bulk of the armor, the B-kit, is installed in the field on an 'as required' basis. The benefits of the A-kit/B-kit principle are that armor is only fitted when required, this reducing vehicle wear and tear, and by default whole life cycle costs. Improvements and/or upgrades to armor are also far easier to integrate into an appliqué solution. The A-kit/B-kit principle is currently applied to all current production US tactical 'soft skin' vehicles.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

MKR18 Cargo This is the cargo version of the LVSR. It is equipped with the Multilift Mk 18A1 load handling system. Towed trailers add 16.5 tons of payload. The Logistic Vehicle System Replacement (LVSR) is a family of vehicles, based on a common 5-axle ten-wheel drive (10x10) chassis, that vary in individual configuration by mission requirements. The LVSR was designed and is manufactured by Oshkosh Defense. LVSR is a purpose-designed military vehicle and there are currently three variants in service, a cargo, a wrecker and a tractor truck. The first LVSRs were ordered in 2006. The LVSR is the U.S. Marines' equivalent of the U.S. Army's Oshkosh Heavy Expanded Mobility Tactical Truck (HEMTT) and Oshkosh Palletized Load System (PLS). The Marines do not use the HEMTT or PLS and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The predecessor of the LVSR, the MK48 Logistics Vehicle System (LVS), had entered service with the US Marine Corps (USMC) from 1985 and in the late 1990s a project to replace the LVS was started. As a precursor to a formal LVS replacement programme a number of manufacturers co-operated with the USMC to build and evaluate an Advanced Technology Demonstrator (ATD). The ATD was built during 1998 at the Nevada Automotive Test Centre (NATC). LVS Modification Demonstrators (LVS-MDs) were also built, these integrating commercially proven automotive components and

technologies. In April 2001, Logistics Management Institute (LMI) completed their final report for the 'Analysis of Alternatives (AoA) for the USMC Logistics Vehicle System Replacement (LVSR), concluding the best option was to rebuy a vehicle similar to the technology demonstrator. Five alternative options had been considered, these were: Inspect and Replace Only As Necessary (IROAN) for the LVS; rebuild the LVS; re-manufacture the LVS to a higher standard; rebuy a vehicle similar to the technology demonstrator; research and develop an entirely new vehicle. Around this time it was suggested that 2,000-3,000 vehicles might be required, although throughout the program numbers would fluctuate. An LVSR industry day was held in late 2001, and a formal solicitation to industry was released in early 2003. This had been delayed from an expected April 2002. The LVSR Request for Information (RfI) had originally been expected in May 2000. In March 2004 Oshkosh Truck Corporation (now Oshkosh Defense) announced that the US Marine Corps had awarded the company a Phase I System Development and Demonstration Contract to supply three LVSR trucks. These were to be delivered to the Marines for extensive endurance and performance testing within 12 months. This award was the first phase of a two-phase acquisition competition valued in March 2004 at $783 million for up to 1,581 vehicles. Competition for the Phase II production award (scheduled for March 2006) was limited to those companies that successfully completed Phase I evaluation. The other company selected for the Phase I evaluation was the American Truck Company (ATC) with a TATRA-based design. Phase 1 testing was completed in 2005 and in late-May 2006, the USMC awarded the LVSR Phase II contract to Oshkosh Truck Corporation. An initial LVSR order issued on 31 May 2006 was valued at $28 million and ordered 22 cargo, two wrecker (recovery), and tractor truck LVSR variants, plus vehicle kits, training (operator/maintainer-cargo), test support-production verification testing cargo, meetings, and contract data requirements. The first LVSR cargo variant began testing at the Aberdeen Proving Ground in June 2007. Tractor and wrecker prototype vehicles began testing in November 2007 and April 2008 respectively. An additional 123 cargo variants, which completed low rate initial production (LRIP) quantities, were subsequently ordered under option year two of the production contract. In January 2009, Oshkosh announced an LVSR delivery order valued at $176 million. This called for more than 425 LVSRs and transitioned LVSR from LRIP into full-rate production (FRP). LVSR fielding began in April 2009 for user trials and testing and the first vehicle was fielded to Afghanistan in September 2009. LVSR deliveries were completed in September 2013. Orders totalled 2,022, with the total order value around $965.78 million. Deliveries included 1,505 MKR18 cargo variants, 355 MKR16 tractor trucks, and 162 MKR15 wreckers. The requirement for an LVSR companion trailer for the USMC has also been provided by Oshkosh. The M1076, which is already in service with the US Army, is the selected trailer. In May 2009, it was announced that the Marine Corps would receive an initial 30 M1076 PLST for use with the LVSR. By early 2016 the USMC had purchased a total of 687 PLST through a separate contract with the US Army.

Wanshan WS21050 Chinese 14x2 Heavy Equipment Transport



Tiers:

1 **2** 3 4

System

Alternative Designation: INA

Brake system: Drums all around, air-over-hydraulic or full dual-circuit air options, supplementary engine exhaust brake and hydraulic retarder

Cooling: Air

Curb Weight: mt40

Number of Axles: ea7

Number of Tires: ea14

Payload (on/off road): mt65

Troop Capacity: ea2 in cab

Weight, Gross Vehicle: mt105

Wheels Central Tire Pressure Regulation System: Yes

Wheels Size: 1600x600-685

Steering: Power assisted on axles 1,2,3,6, and 7. Emergency steering back-up.

Layout: 14X12

Run Flat Tires: No

↳*Dimensions*

Height, Overall: m3.12

Length, Overall: m10.342

Width, Overall: m2.5

Automotive

Engine Type: Deutz BF12L513C 19.144L, turbodiesel, 517hp

Fording Depth: m1.2

Ground Clearance: mm400

Range, Cruising: km500

Speed: km/h50

Turning Radius: m38

Track (front): m2.072

Track (rear): m2.072

Trench: m2.5

Angle of Approach: degrees14

Angle of Departure: degrees24

↳***Fuel***

Fuel Capacity: liters

Armament

Armament: None

Notes:

14X12 heavy duty off-road vehicle. On a MAZ chassis, the radiators are between the cabs. This vehicle can operate on road, off road, and as a transporter erector launcher (TEL).

MAZ-543 Russian 8x8 Special Wheeled Chassis





Tiers:



Variants:

- **MAZ-543P:** MAZ-543P a baseline chassis with a payload capacity of 19 600 kg. It was used to carry the SS-12 Scaleboard medium range ballistic missile.
- **MAZ-543A:** MAZ-543A appeared in 1967. It is a more capable version, with a payload capacity of 22 000 kg. Layout of the engine compartment was revised. Though it retained two forward control cabs on each side of the engine. This vehicle was used as a chassis to carry Elbrus (Western reporting name Scud) and Temp-S (SS-12 Scaleboard) short-range ballistic missiles. Also here a number of other vehicles, based on this chassis. There were experimental emergency vehicle and crane, based on the MAZ-543A, that did not reached production.
- **MAZ-543M:** MAZ-543M improved version, which appeared in the early 70s. It had some improvements over its predecessor. Passenger cabin on the right was removed and the engine compartment was revised. It allowed to free some space at the rear for weapons and special equipment. The MAZ-543M was used as a base for the Smerch MLRS, Rubezh coastal defense missile system, Bereg self-propelled artillery system and a whole host of other specialized military vehicles.
- **MAZ-7310:** MAZ-7310 cargo truck intended for civilian application. It is a variant of the basic series. This vehicle was revealed in 1974 and entered production in 1976. Other variants of this vehicle are the MAZ-7510 dump truck, and the MAZ-7910 pipeline carrier. An aircraft crash tender, the AA-60 (7310)-160.1, has also been produced. At least one experimental variant powered by a 1 100 hp gas turbine has been developed for trials.
- **MAZ-7410:** MAZ-7410 is a prime mover with a shorter wheelbase, which entered production in the mid-70s
- **Wanshan WS580:** Wanshan WS580 is a Chinese heavy high mobility chassis with 8x8 configuration, which was based on the MAZ-543. Technology was transferred to China from Belarus. This Chinese vehicle evolved into a whole host of indigenous special wheeled chassis, such as Wanshan WS2400, that were carrying ballistic missiles and other military equipment. Later production models were based on Belarusian MZKT designs, but benefit from German technology transfer. These are fitted with German engines and transmissions.

System

Alternative Designation: MAZ-543
Manufacturer: MAZ
Type: Special wheeled chassis
Family: MAZ 543Family
Crew: 1 + 3 men
Chassis: MAZ-543 Special Wheeled Chassis

Dimensions (MAZ-543 Special Wheeled Chassis)

Length: m11.7
Width: m3.07

Height: m2.92

Weight, Empty: tons17.3

Ground Pressure: INA

Maximum Load: tons15

Automotive (MAZ-543 Special Wheeled Chassis)

Engine Name: D12A-525 38.9-liter Diesel

Engine Type: Diesel

Engine Power: hp525

Cruising Range: km650

Speed, Maximum Road: km/h65

Speed, Average Cross: km/hINA

Speed Maximum Swim: Not Amphibious

Configuration: 8x8

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.3

Communications

Note: Depends on the country that Russia exported this vehicle to.

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Camouflage Nets: Yes, Standard

Notes:

In the early 1960s, MAZ started development of an all-wheel drive chassis MAZ 543. These are the 4th generation of this family of vehicles. Its design was similar to MAZ 537G, but was fitted with new units, cabins and longer frame. The new chassis was equipped with a 525 hp D12A-525A V12 diesel, automatic transmission with an updated torque converter and a 3-speed gearbox. MAZ 543 range included chassis MAZ 543, MAZ 543A and MAZ 543M with fiberglass side cabins. There was a place for

radiator and the front part of a missile rocket between cabins. All variant had wheelbase of 7.7 meters, top speed - 60 kph and fuel consumption - 80 liters per 100 km. The first version of the new range was a light chassis MAZ 543 with a payload of 19.1 tonnes. The first 6 prototypes were made in the spring of 1962. Mass production started in 1965. They got 2 twin-door cabins (the left and right). 1631 copies were made. They become the base chassis for a missile complex 9K71 'Temp' and missile launcher 9P117. In 1963, MAZ 543A with a payload of 19.4 tonnes was presented. It was developed for a missile complex 9P120 'Temp-S'. Mass production started in 1966. The main difference from MAZ 543 is slightly shifted to the front both cabins. Till the middle of 2000s, more than 2600 chassis were made.

Shaanxi SX250 Chinese 6x6 General Utility Truck





Tiers:



Variants:

- **SX2150:** Shaanxi SX2150K is a an improved second-generation version. It entered service with the mid 1990s and was produced in large numbers. This truck is fitted with an Austrian Steyr WD615.71 turbocharged diesel engine as well as 9-speed transmission. The engine develops 256 hp. This truck is significantly faster and has a top speed of 87 km/h, opposed to 70 km/h of the original SX250 and SX2150. It is 60 kg lighter than the baseline SX2150, but otherwise has similar dimensions and payload capacity. This truck can be recognized by headlights relocated to the front bumper.
- **SX2190:** The SX2190 is a 7.5 ton 6x6 special heavy duty truck developed and built by Shaanxi Automobile Group and used by the People's Liberation Army of the People's Republic of China. It is the licensed production version of the Steyr-Daimler-Puch (now part of General Dynamics European Land Combat Systems) Steyr 91 and replacing the older JN252, CQ261 and SX250 heavy duty trucks in the 1990s. It is one of the most popular military trucks in China.
- **SX161:** The Shaanxi SX161 was a 6x4 version of the SX250.

System

Alternative Designation: Shaanxi 6x6 Military Truck
Type: Truck
Chassis: Shaanxi 6x6 Military Truck
Crew: ea1+3 men
Emplacement Time: 1.5 - 2.5 minutes
Displacement Time: 1.5 - 2.5 minutes
Note #1: This truck is a modified version of the Hanyang CQ260.

Dimensions

Length: m7.12
Width: m2.52
Height: 3.05
Weight, empty: t9.49
Payload Capacity (on road): t10
Payload Capacity (off road): t5
Wheel base: m3.125
Track (front/rear): m2.080

Ground clearance: mm355

Automotive

Engine Name: Wei Chai WD615.77

Engine Type: Diesel with 5-speed gear shift

Engine Power: hp280

Cruising Range: km70

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %58

Side Slope: %30

Vertical Step: m0.58

Fording Depth, without Preparation: m1.2

Fording Depth, with Preparation: m1.2

Trench: m0.7

Turning Radius: m9

Fuel tank capacity: 280 litres

Note #1:: This military truck can tow artillery pieces or semi trailers with a maximum weight of 6 500 kg.

Protection

Hull Armor: It seems that this artillery system carries no defensive armament

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

Mine Clearing: INA

Self-Entrenching Blade: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

The SX-250 was developed and built by Shaanxi Automobile Works as a cross country vehicle in the 1960s and loosely based on the Soviet Ural-375 and the cab/cargo-bed designs of the French Berliet GBU 15. It was renamed by the Shaanxi Automobile Corporation Limited and used by the People's Liberation Army of the People's Republic of China for various uses (crane truck, transport cab, transport, etc.)

Dongfeng EQ2061E Chinese 4x4 Truck







Tiers:

1 2 3 4

System

Alternative Designation: Aeolus (export name)
Brake system: Air, split-circuit, drums front and rear
Cooling: Water
Curb Weight (: mt4.39
Number of Axles: ea2
Number of Tires: ea4
Payload: mt8.1 on road; 1.5 off road
Towing Capability, Off: 1.5
Troop Capacity: ea3 in cab
Weight, Gross Vehicle: mt6.10
Wheels Central Tire Pressure Regulation System: No
Wheels Size: in11.00X18
Towing Capability On Road: mt2

↳*Dimensions*

Height, Overall: m2.86
Length, Overall: m5.472
Width, Overall: m2.4
Wheelbase: m3.4

Automotive

Engine Type: EQ6100-1B, gasoline, 135hp or B140-20, diesel, 138hp

Fording Depth: m0.85

Ground Clearance: mm286

Range, Cruising: km550

Speed: km/h88

Turning Radius: m7.5

Gradient (Loaded): 60%

Angle of Approach: degrees45 without winch, 31.5 with winch

Angle of Departure: degrees38

Trench: m0.7

↳*Fuel*

Fuel Capacity: liters145

Armament

Armament: None

Payload

Cargo Payload On Road: mt8.1

Cargo Space Cargo Bed Area: m25.668

Cargo Space Height: m1.338

Cargo Space Length: m2.6

Cargo Space Width: m2.18

Curb Weight: kg4.39

Gradient, Loaded: deg60%

Cargo Payload Off Road: mt1.5

↳*Payload Weight*

Payload on/off Highway: kg8.1 / 1.5

Trailer Payload On: 2

Trailer Payload off: mt1.5

Utility

Transport: PTO and a 4,500kg winch on front bumper

Notes:

Right hand drive 4X4 vehicle intended for mountainous areas, rough roads, and tracks. Conventional layout with the engine forward, a steel cab for one driver and two passengers, and a load area in the rear. The diesel version of this truck uses 18

liters of fuel per 100 kilometers. This vehicle is mainly used for command and control, reconnaissance, troop carrier, aircraft towing, and other general purposes.

MAZ-537 Russian 8x8 Special Wheeled Chassis





Tiers:



Variants:

- **MAZ-543P:** Baseline chassis with a payload capacity of 19 600 kg. It was used to carry the SS-12 Scaleboard medium range ballistic missile.
- **MAZ-537D:** With external electrical (AC) generator.
- **MAZ-537E:** Increased load handling to total semitrailer weight of up to 65 tons.
- **MAZ-537A:** Additional flatbed compartment providing an on-board carrying capacity of 15 tons with a concurrent maximum total semitrailer load of 65 tons (only on hardened roads); total maximum length increased to 30m.
- **MAZ-537K:** Specifically adapted for the installation of crane equipment

System

Alternative Designation: MAZ- 537, KZKT-537
Manufacturer: MAZ (1959-1965) KZKT (1963-1990)
Type: Special wheeled chassis
Family: MAZ-543
In Service: 1962 -Present
Crew: ea1
Cab Seating: ea3
Chassis: MAZ-543 Special Wheeled Chassis

Dimensions

Length: m11.7
Width: m3.07
Height: m2.92
Curb Weight: metric tons21.6
Maximum Load: tons15
Ground Pressure: INA
Ground Clearance: mm500
Wheel Size: 18.00 X 24 in

Automotive

Engine Name: D12A-525 38.9-liter Diesel
Engine Type: Diesel
Engine Power: hp525
Cruising Range: km650
Speed, Maximum Road: km/h65
Speed, Average Cross: INA
Speed Maximum Swim: km/hNot Amphibious
Configuration: 8x8
Gradient: deg60
Side Slope: deg40
Vertical Step: m0.6
Trench: m2
Fording Depth: m1.3
Fuel Capacity: liters840
Number of Axles: ea4
Number of Tires: ea8
Towing Capability: metric tons25
Trailer Payload: metric tons65
Trailer Size: Semi-trailer. CHMZAP-9990 or CHMZAP-5247G

Communications

Primary: INA

Protection

Hull Armor: INA
Turret Armor: INA
Applique Armor: INA
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: INA
Camouflage Nets: Yes, Standard

Notes:

The MAZ- 537 is a 12-cylinder diesel engine-powered military truck artillery tractor, originally designed for loads up to 50 tons

(using semitrailers such as the ChMZAP-9990 or ChMZAP-5247G, for example) with later versions providing a maximum load of 65 tons. It was manufactured by the Minsk Automobile Plant (from 1959 to 1965) and the Kurgan Wheel Tractor Plant from 1963 until halt of production in 1990. The metal cab of the MAZ-537 provides space for the driver and 3 passengers for a total of four occupants, has two access doors on the side and a roof hatch, and is equipped with additional engine-independent heating. The 537G modification version is characterized by the addition of a winch to facilitate loading and unloading, as well as enabling self-extraction when stalled in adverse terrain (like mud). The working cable length of the winch is 100 meters, and the winch is able to provide 15 tons of traction. The vehicle is powered by a 12-cylinder D-12A-525A diesel engine located directly behind the cab. This engine provides preheating as well. The drivetrain of the MAZ-537 consists of a hydrodynamic transmission transferring power to the two front axles over a torque converter and a planetary three-stage gearbox with assisted steering (power steering) gear. The MAZ-537 has been widely used in both military roles (as, for example, artillery tractor trailer (pulling rocket or (ballistic) missile launchers), tank transporter, and airfield tractor) and in the civilian sphere as heavy tractor trailers, tractor ballast (or secondary unit) for carrying extra heavy loads, and in oil and gas fields.

Kraz-6322 Ukrainian 6x6 Truck






Tiers:



Variants:

- **KrAZ-63221:** Longer wheelbase Length: 10m Curb weight: 11.6mt Payload: 11.4mt Intended for carrying of production equipment and emergency-maintenance teams (attending personnel); can be used on all kinds of roads.
- **KrAZ-63221REB-01 “Sentry”:** Kolchuga passive sensor on KrAZ-63221 chassis
- **KrAZ-63221 RW-02 “Radist:** Outfitted with communications systems, such as radio relay, troposphere, outer space and radio communications serving for arrangement of various communications in the field.
- **C-12-63221 tanker truck:** Used for carrying fuel over roads Temp range: - 40°C to + 45°C Capacity: 12 m3 Two independent tanks to carry gasoline and diesel simultaneously. Introduced: 2016
- **KrAZ-6322-056:** Intended for recovery work and is equipped with a variety of equipment, including 8kW generator, air compressor, cutting torches, tool set, and a behind-the-cab materials handling crane. Supplied to Iraq.

System

Alternative Designation: "Soldier"
Brake system (main): Dual circuit, air, drums on all axles, supplementary engine exhaust brake
Brake system (parking): Mechanically operated drum-type transmission brake on transfer box output shaft
Cooling: Water
Curb Weight (: mt12.7
Number of Axles: ea3
Number of Tires: ea6
Payload: mt11.6
Towing Capability, Off: 10
Trailer Payload On: 30
Troop Capacity: ea3 in cab, 24 in rear
Weight, Gross Vehicle: mt23
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: 525/70R 21; or 530/70-21; or 445/65R 22.5; or 1600R 20

↳*Dimensions*

Height, Overall: m3.1
Length, Overall: m9.1

Width, Overall: m2.72
Wheelbase: 4.6m + 1.4m

Automotive

Engine Type: YaMZ 238DE2, 14.86 liter, 330hp, 8 cylinder turbodiesel
Fording Depth: m1.2
Ground Clearance: mm370
Range, Cruising: km1,200
Speed: km/h80
Turning Radius: m14
Side slope: %40
Angle of Approach: degrees38
Angle of Departure: degrees30

↳*Fuel*

Fuel Capacity: liters500
Fuel capacity, Left Tank: liters250
Fuel capacity, Right Tank: liters250

Payload

Cargo Payload On: mt11.6
Cargo Space Length: m4.9
Cargo Space Width: m2.52
Gradient, Loaded: %58

Notes:

The KrAZ-6322 heavy utility truck was developed by the Ukrainian AVTOKRAZ. This heavy-duty military truck is intended for different loads and troop transportation. The standard body is fitted with drop sides and a removable tarpaulin with bows. Wooden bench seats may be fitted for troop transportation. This truck is also offered with improved YAMZ-238DE2 (Euro 2) diesel engine. Other engine options include Cummins, Deutz, or Volvo. This military truck has considerable cross-country mobility. The centralized tire inflation system and 12 ton capacity self-recovery winch are optional. Fuel consumption is approximately 33.4 liters per 100 kilometers.

EQ2102 Chinese Transportation Vehicle for the UAV ASN-207







Tiers:

1 2 **3** 4

System

Alternative Designation: NA

Manufacturer: Dongfeng

Cab Passenger Capacity: 1 + 4

Bed Passenger Capacity: NA when used as UAV transporter

Dimensions

Length: m7.49

Width: m2.47

Height: m3.24

Weight, Combat: mT6.92 - 7.12

Payload Capacity: 5,000 kg on hard surface roads and 3,500 kg off-road

Ground clearance: mm305

Automotive

Engine Name: Dongfeng Diesel

Engine Type: Diesel

Engine Power: hp160

Cruising Range: km550

Speed, Maximum Road: km/h90

Gradient: %60

Side Slope: %30

Vertical Step: m.4

Trench: m.4

Fording Depth: m1

Protection

Armor: None

Notes:

The Dongfeng EQ2102 is a Chinese military truck with 6x6 configuration. It is a Chinese militarized version of Nissan Diesel Condor commercial vehicle.

LARC-V American 4x4 Amphibious Cargo Vehicle







Tiers:



System

Alternative Designation: LARC-V

Type: Amphibious Cargo Vehicle

Manufacturer: Condec, LeTourneau-Westinghouse

Crew: ea3

Passenger Capacity: INA

Dimensions

Length: 11 m

Width: 3 m

Height: 2 m

Weight, Combat: 8,618 kg

Automotive

Engine Name: Cummins V8-300 785 cu in (12.9 L)

Engine Type: Diesel V8

Engine Power: hp300

Range: 402.3 km

Speed, Maximum Road: km/h48

Speed, Average Cross: INA

Speed Maximum Swim: km/h15.3

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Main Weapon System

Note: There is no fixed weapon system onboard the LARC-V. Force Protection is provided by individual weapons.

Protection

Armor: None

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

LARC-V (Lighter, Amphibious Resupply, Cargo, 5 ton), is an aluminium-hulled amphibious cargo vehicle capable of transporting 5 tons. It was developed in the United States during the 1950s, and is used in a variety of auxiliary roles to this day. In addition to the United States, LARC-Vs have been used by military forces in Australia, Argentina, Portugal, Philippines, Singapore and Iceland. Approximately 968 were made. About 500 were destroyed, most by scuttling during the American withdrawal from South Vietnam. About 200 have been retained in U.S. military service. Roughly 100 are privately owned and mostly used for tourism. The LARC-V was fielded in 1963 and were used extensively by the U.S. Army for over the beach supply during the Vietnam War. They supported the logistical and manpower build up at the start of and during the Vietnam war. Two units arrived from Ft. Story, VA. in June 1965. The 344th Transportation Company (Light Amphibious) setup harbor operations in Qui Nhon and the 347th Transportation Company in Camh Ranh Bay. The companies had two platoons of 17 LARCVs each and a separate 3rd echelon maintenance detachment. About December 1965, one of the 344th's platoons moved to Da Nang and was attached to the Air Force wing. There it ran 24-hour/day operations hauling bombs from ships in the harbor to the flight line. Their operation was so crucial to the USAF that if at least 15 LARCS were not operational, any needed parts were flown in by Nonoperational Ready Supply Grounded (NORSG) aircraft from St Louis. 458th Transportation, LARC-V Company, arrived in Cam Ranh Bay Oct 1967. For 458th Sea Tigers details see our on line site "458th Sea Tigers", or book Serving with the 458th by Ted Faurbo. 101st Airborne Division in 1967 and later the 1st Cavalry Division in 1968. LARC-Vs were used by the Argentine Marines during the 1982 invasion of the Falkland Islands. In January 2011, during the 2010–11 Queensland floods in Australia, it was reported that C-17 aircraft of the Royal Australian Air Force were to carry two LARC-V vehicles for use in Operation Flood Assist. The vehicles were deployed from Townsville to RAAF Base Amberley. The United States Naval Facilities Engineering Command (NAVFAC) has directed the Sealift Support Program Office (SSPO) to supervise a Service Life Extension Program (SLEP) on the LARC Vs used by the Navy. This SLEP involved changing from a mechanical to a hydraulic transmission, updating the electrical system, and improving other on-board systems. These reworked LARCs began delivery in June 2006 for use by U.S. Navy Beach Master Units, Underwater Construction Teams and the Maritime Prepositioned Force ships. A total of 42 LARCs are currently funded to transition through the SLEP process. Towing capacity on land was improved to approximately 29,000 lb and bollard pull in water was doubled to 7,600 lb. The vehicle operates in all-wheel drive while in land or tow modes. The craft is powered by a 375-horsepower John Deere turbo-charged Diesel engine that is Tier 2 certified. Engine speed is constant, with a hydraulic transmission modifying speed. Design and manufacture of the SLEP LARC-Vs was carried out by Power Dynamics, LLC of Stennis Space Center, Mississippi.

Kamaz-6560 Russian 8x8 Truck



Tiers:

1 2 3 4

Variants:

- **Air defense carrier:** Carries Pantsyr SM missiles and acquisition radar.

System

Alternative Designation: KAMAZ-53958 Tornado
Cooling: Water
Curb Weight: kg12
Number of Axles: ea4
Number of Tires: ea8
Payload: mt24
Trailer Payload On: 15
Troop Capacity: 1+2 in cab
Weight, Gross Vehicle: mt36
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in425/85.R21
Run flat tires: Yes

↳*Dimensions*

Height, Overall: m3
Length, Overall: m10
Width, Overall: m2.5

Wheelbase: m3.6

Automotive

Engine Type: YaMZ-5367 diesel, 450hp

Fording Depth: m1.8

Ground Clearance: mm400

Range, Cruising: km1000

Speed: km/h90

Side slope: 40%

Vertical step: mm600

Angel of approach: 31 degrees

Armament

Armament: None

Notes:

The main role of this high mobility vehicle is to carry troops and cargo. It can also carry various bodies and specialized equipment. The KamAZ-6560M can be customized as fuel tanker, recovery vehicle, prime mover, palletized load carrying system, mobile crane, multiple launch rocket system, mobile howitzer, mobile crane and can suit many other roles. Vehicle can also tow trailers or artillery pieces with a maximum weight of 15 t. Armored cab is armored at the Russian GOST 6a level (STANAG 4569 Level 3). The cabin protects from B-32 7.62x54mm armor-piercing bullet fired from Dragunov SVD sniper rifle at 25 m distance. It is likely that the cab can be fitted with add-on composite armor. The cab was also designed to withstand mine blasts. Cab of the vehicle withstands mine blasts equivalent to 6 kg of TNT. An NBC filtration system for the cab is proposed as an option.

M1088 American 6x6 Medium Tactical Vehicle (MTV) Tractor Truck





Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1088

Type: Medium Tactical Vehicle (MTV) Tractor Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Winch: The M1088 can be equipped with a self-recovery winch capable of fore vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

Dimensions

Length: 7.15 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 8,455 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution

for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1088 Tractor Truck is designed for line haul operations. The M1088 is the prime mover for the M871 Semi-Trailer and can tow the M871 fully loaded on and off road. In addition, the M1088 can tow the existing medium trailer fleet. The M1088 can be equipped with a self-recovery winch capable of fore vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

MAN 35.460 Danish 8x4 Heavy Equipment Transporter (HET)







Tiers:

1 2 3 4

System

Alternative Designation: MAN 35.460

Type: Heavy Equipment Transporter (HET)

Manufacturer: INA

Crew: ea1

Dimensions

Length: mm8295

Width: mm2492

Height: mm3224

Weight, Empty: kg10,390

Weight, Net Load: kg21,610

Weight, Total: kg32,000

Automotive

Engine Name: Type D 2876 LF04

Engine Type: Diesel Turbo charged, inter-cooler.

Engine Power: 460 at 1,900 RPM

Transmission: 16-speed ZF type 16 S-221 OD servo-shift gearbox.

Transfer Case: VG 1700/2.

Electrical System: 24 volt, negative ground.

Tires: 365/85 - R20.

Fuel Capacity: 300 liter

Maximum Speed: INA

Range: INA

Protection

Armor: INA
Applique Armor: INA
Active Protection System: No
NBC Protection: No
Smoke Equipment: INA

Notes:

This heavy equipment transporter (HET) is equipped with a hydraulic loading platform. Probably the last in a batch of MAN 35.464 VFAK acquired from year 2002 onwards. On top a British JCB back hoe loader.

Kamaz 43114 Russian 6x6 Multipurpose Truck






Tiers:

1 2 **3** 4

System

Alternative Designation: Kamaz 43114

Type: Multipurpose Truck

Family: Kamaz

Crew: ea1

Cab Seating: 2

Cargo Capacity: 6,000 kg

Towed Load: 12,000 kg

Note: Kamaz created three classes of multipurpose vehicles with 6-ton, 8-ton and 10-ton axial load developing a full range of 4x4, 6x6, 8x8 military trucks sharing 85 percent of components and designed to meet military requirements.

Dimensions

Length: 5.20 m

Width: 2.32 m

Wheelbase: 3.34 m

Height: INA

Cargo Capacity: 6,000 kg

Max Gross Train Weight: 27,350 kg

Max Weight: 15,350 kg

Towed Load: 12,000 kg

Automotive

Engine Name: Kamaz 740.31 Euro 2

Engine Type: Turbocharged Diesel

Engine Power: hp225

Max Torque: 912 Nm (6,599 ft-lb)

Ditch Crossing Ability: 0.60 m

Fording Depth: 1.75 m

Step Climbing Ability: 0.55 m

Protection

Armor: The trucks have the option of an armored cab including hidden armoring of the cab.

Applique Armor: Available

Active Protection System: No

NBC Protection: INA

Notes:

Description: The Kamaz-43114 is a 15-ton class, 6x6 flexible and mobile multipurpose truck system intended to carry personnel and cargo as part of the logistics support for military and peacekeeping missions. It is also suitable for other applications such as water/fuel tank bodies carrier, loading cranes, special purpose vans, and various weapon systems platform. This truck can tow trailers and keep on moving through desert sands and along stony tracks, over scree and mud, snow and ice thanks to its all-wheel drive climbing the most extreme gradients, ford rivers and chase across any terrain. It is powered by a Kamaz 740.31 Euro 2 turbocharged diesel V8 engine developing 225-hp of power or alternatively a Kamaz 740.11 Euro 1 turbocharged diesel V8 engine developing 230-hp of power. Kamaz created three classes of multipurpose vehicles with 6-ton, 8-ton and 10-ton axial load developing a full range of 4x4, 6x6, 8x8 military trucks sharing 85 percent of components and designed to meet military requirements. The trucks have the option of an armored cab including hidden armoring of the cab. The Kamaz-43114 truck is able to carry up to 6-ton payload and towing a trailer of 12-ton. Kamaz has produced this truck system for the Russian Ministry of Defense and export customers across the world.

M977 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Cargo Truck





Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.
- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.

- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M977 HEMTT

Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Cargo Truck

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: 9,979 kg

Material Handling Crane Maximum Capacity: 1,134 kg at 5.8 m boom length

Dimensions

Length: 10.17 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 5.33 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89 × 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-speed transfer case. The front axles on all HEMTTs are single-reduction Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration.

The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production models have the suffix A4.

M1086 American 6x6 Medium Tactical Vehicle (MTV) Long Wheel Base (LWB) Truck




Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1086

Type: Medium Tactical Vehicle (MTV) Long Wheel Base (LWB) Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Winch: The M1086 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

Material Handling Equipmen: Loads/unloads cargo bed and trailer, hydraulic operation, 2,500 lb (1,134 kg) lift at 14 ft (4.3 m), 5,000 lb (2,268 kg) at 7 ft (2.1 m), includes stabilizers and local and remote controls

Dimensions

Length: 9.67 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 5.50 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 11,198 kg

Cargo Bed Length: 6,096 mm

Cargo Bed Width: 2,413 mm

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 330 hp (246 kW) at 2,400 rpmm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1086 LWB Truck with MHE is designed to transport soldiers and cargo in International Standardized Operations Containers. The M1086 has a payload capacity of 10,000 pounds and lift capacity of 2,500 to 5,000 pounds using the on board MHE. The cargo bed side rails are hinged for the ease of loading and unloading cargo. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1086 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

MT-T Russian Heavy Tracked Cargo Carrier





Tiers:



Variants:

- **BAT-2:** BAT-2: The BAT-2 is an armored tracklayer designed to supplement the older BAT-M that is based on the AT-T chassis. The role of the BAT-2 is road grading and clearing existing roads of debree. The BAT-2 is fitted with a variable geometry dozer blade, 2 t light crane, 25 t winch and a ripper. Unlike the MT-T and MDK-3 the BAT-2 has the automotive components fitted at the rear. A smaller cab is fitted in order to make room for the hydraulic equipment of the dozer blade.
- **MDK-3:** MDK-3: The MDK-3 is a trench digger based on the MT-T chassis. I twas produced from 1976 - 1991. The MDK-3 is fitted with a dozer blade on the front and trench digging system at the rear. When digging trenches the MDK-3 moves in reverse. In a single pass the MDK-3 can dig a trench up to 1.75 m deep. By moving 500 to 600 cubic meters of earth per hour the MDK-3 has roughly twice the performance over the older MDK-2 that is based on the AT-T chassis.

System

Alternative Designation: MT-T
Date of Introduction: 1979
Type: tracked prime mover
Family: MT-T
Proliferation: INA
Crew: 1 + 4 men
In Service: 1979-Present
Troops: It provides seating for up to 18 troops

Dimensions

Length: m8.710
Width: m3.28
Height: m3
Weight, Empty: tons25
Ground Pressure: INA
Payload Capacity: tons12

Automotive

Engine Name: V-64-4
Engine Type: Diesel
Engine Power: hp710
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Gradient: %60
Side Slope: %30
Vertical Step: 0.65
Trench: 2.5
Fording Depth: m1.3

Communications

Missile System

Name:
Guidance:
Length/Caliber: mm
Seeker Field of View:
Self-Destruct Time:
Missile Speed:
Max Elevation: deg
Min Elevation: deg
Traverse Range: deg
Traverse Left: deg
Traverse Right: deg
Max Rate of Fire: rds/min
Sustain Rate of Fire: rds/min
Time the Max Rate of Fire can be Sustained:
Explosive Weight:
Range Finder Type:

Coaxial Weapon System

↳***System***

Name:

Type:
Max Rate of Fire:
Sustain Rate of Fire:
Time the Max Rate of Fire can be sustained:
:

↳***Ammunition***

Type:
Caliber: mm
Muzzle Velocity: m/s
Basic Load:
Effective Range: km
Proximity Fuse:
:
:
:

Fire Control

↳***Fire Control System***

Name:
Computerized FCS:
Direct Fire:
Indirect Fire:
Fire Control Sensors:
IADS Integration:

↳***Radar***

Name:
Type:
Function:
Frequency/Band:
Range:
Number of Targets System can Track:
:
:

Protection

Hull Armor: INA

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The MT-T is a tracked prime mover of Soviet origin. It was developed in the late 1970's as a follow up to the AT-T tracked prime mover. Whereas the AT-T was based on the T-55 tank chassis the MT-T is based on the T-64. The MT-T mainly served as a chassis for specialist vehicles. Since many heavy towed guns were replaced by self-propelled guns many AT-T became available for general purpose towing duties. The MT-T is based on the T-64 running gear and transmission but uses the V-64-4 diesel engine from the T-72. Unlike the T-64 the MT-T has the automotive components and drive sprocket located at the front. A large forward control cab is fitted. A load area with tarpaulin cover makes up the rear of the vehicle.

M1093 American 6x6 Medium Tactical Vehicle (MTV) LVAD Cargo Truck





Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1093

Type: Medium Tactical Vehicle (MTV) LVAD Cargo Truck.

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Airlift Capability: The M1093 Standard Cargo Truck, LVAD is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available.

Winch: The M1093 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line

Dimensions

Length: 6.94 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 8,889 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1093 Standard Cargo Truck, LVAD is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available. The vehicle is equipped to transport cargo and soldiers, as required. The M1093 has a payload capacity of 10,000 pounds and to facilitate loading/unloading, the bed side rails are mounted on hinges. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1093 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line

Dongfeng EQ2102 Chinese 3.5 Ton Cargo Truck







Tiers:

1 **2** 3 4

Variants:

- **1+4 (EQ2102):** INA
- **1+2 (EQ2102G):** INA

System

Alternative Designation: Dongfeng EQ2102
Type: 3.5 tonne capacity troop/cargo carrier truck
Manufacturer: Dongfeng Motor Corporation
In Service: 1996-Present
Crew: ea1
Configuration: 6x6
Seating: 1+4 (EQ2102); or 1+2 (EQ2102G)
Load: 5,000 kg (road); 3,500 kg (cross-country)
Towed Load: 4,800 kg

Dimensions

Length: 7,495mm
Width: 2.470mm
Height: 3.240m (with canvas and bow kit)
Weight, Without Winch: 6,920 kg
Weight, With Winch: 7,120 kg

Wheelbase: 3,475mm / 1,250mm

Ground Clearance: 305mm

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Cruising Range: INA

Speed, Maximum Road: km/h90

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Dongfeng EQ2102 is a 3.5 tonne capacity troop/cargo carrier truck developed and built by Dongfeng Motor Corporation and used by the People's Liberation Army of the People's Republic of China for transport. The truck is a copied version of the Nissan Diesel Condor CM series. When in civilian use, this series of trucks uses a variety of different names (from EQ1101 to EQ5108 depending on the version) but is usually referred to as the Dongfeng 145. A facelifted version is called the "160". It entered service in the 1990s to replace the aging CA-30 and the EQ245/EQ2100.

Vityaz DT-10PM Russian All Terrain Carrier



Tiers:

1 2 **3** 4

System

Crew: 5
Curb Weight: mt27.5
Alternative Designation: Vezdesushchy (Omnipresent)
Description: Advanced articulated tracked vehicle
Payload: mt10

↳*Dimensions*

Height, Overall: m3.325
Length, Overall: m14.21
Width, Overall: m3.1
Width, Track: m0.96

Automotive

Engine Power: hp800
Range, Cruising: km700
Speed, Maximum Road: km/h44
Speed, Maximum Swim: km/h5
Fording Depth: Amphibious vehicle
Engine Name: YaMZ-847.10
Engine Type: Diesel, water cooled
Vertical Step: m1
Trench Crossing: m4
Angle of Approach: degrees30
Side Slope: %22
Gradient: %39 (EST)

Brakes: Air

Electrical System: Volts24

Notes:

The DT-10PM articulated tracked vehicle's function is to carry munitions, military equipment, and personnel through difficult terrain and weather conditions. It has excellent offroad capabilities in any season, including swamps, virgin snow, unimproved dirt roads and water obstacles throughout Russia’s Siberia and far east districts. These are two unit transport vehicles with all four tracks driving. Because of low ground pressure, the vehicle is theoretically immune to certain types of at mines. ATVs are indispensable as recovery vehicles, since they have a high pull ratio and can approach a stuck or damaged vehicle from any direction in bad road conditions. The DT-10PM transporters are very efficient as part of search and rescue teams operating in extreme conditions (bad roads, floods, snow-drifts, land and snow slides and large-scale destruction) when it is necessary to evacuate people, animals, and various cargoes up to 30 ton by weight, or transport rescue teams, medical personnel, various equipment and food to the affected area. The DT-10PM has a fully enclosed forward control cab, which provides seating for driver and four passengers. Engine compartment is located behind the cab. The rear unit can accommodate a variety of bodies. In some cases the rear unit can vary considerably from the front. This all-terrain tracked transporter is fully amphibious. On water it is propelled by its tracks. Owing to their unique design, the Vityaz family of ATVs are capable of operating in conditions impossible for other all-terrain vehicles, for example: • Amphibious return to a mother ship • Off-road movement with one unit disabled or without one, or even without both tracks of one of the units • Negotiating ditches and clefts up to 4.0 m wide • Unloading of a ship offshore if it cannot come close to waterfront (i.e. in the Arctic and Antarctic regions, or in flooded regions, etc.); negotiating waterways in severe ice conditions • Operation in mountains up to an altitude of 4,000 m

Coder GM-2E-1750 French 17-Ton Semi-Trailer



Tiers:



System

Alternative Designation: Semi-remorque 17-tonne GM-2E-1750

Brake system (rear): Air

Number of Axles: ea2

Number of Tires: ea8

Trailer Type: Low-bed semi-trailer

Payload: mt17-19

Wheels Central Tire Pressure Regulation System: No

Wheels Size: in12.00X20

Mobility

Mobility, Towing Vehicle: Berliet 6X6 Truck Tractor

Notes:

Maximum payload is 19 metric tons but recommend not to exceed 17 tons. If the payload exceeds 19 tons, the trailer dolly (AVT-135) must be used converting this into a full trailer. Equipped with the AVT-135 front dolly, the GM-2E-1750 can be pulled by any vehicle having adequate power and the necessary connections for compressed air and electricity.

Vityaz DT-30PM Russian All Terrain Carrier



Tiers:



Variants:

- **DT-30PMNE1:** Outfitted with a hydraulic excavator. To facilitate work of the excavator the carrier features three hydraulically-operated outriggers, in an amphibious version the second section is equipped with quick-detachable drop sides. Moreover the front section has enclosed sealed body intended for transportation of up to 12 tons of equipment.
- **DT-30PK8-1:** Universal drilling system was built designated for drilling and construction-and-assembly works on scattered sites on soils with low bearing capacity. The system is fitted with universal drilling equipment suitable for boring wells in soils of I-IV categories (including permafrost soils, as well as soils highly saturated and those containing quick sands and lenses).
- **DT-30PMN:** Fitted with articulated carrier with crane equipment. The crane system is designated KS-5771. The three-unit telescopic boom made of high-resistance steel provides vast crane operations envelope (engaged zone is 960 sq .m) and great hoisting height (up to 25 m).
- **Weapons Carrier:** The rear compartment can be configured to mount surface-to-air missiles, multiple launch rocket systems, heavy mortars, and tube artillery. In 2017, photographs were taken of DT-30PM's outfitted with the Pantsir weapon station and Tor-M2 air defense missile systems.

System

Crew: ea5
Ground Pressure: kg/cm20.30 (29.4kPa)
Alternative Designation: Vityaz
Description: Amphibious articulated track carrier
Cooling: Water
Curb Weight: mt30
Number of Tires: ea12 rubber roadwheels per compartment
Payload: mt30
Weight, Gross Vehicle: mt60

↳*Dimensions*

Height, Overall: m3.3
Width, Overall: m3.1
Length, Overall: m16.15
Width, Tracks: m1.1

Automotive

Engine Power: hp800
Range, Cruising: km700
Speed, Maximum Road: km/h43
Speed, Maximum Swim: km/h5
Fording Depth: m1.2
Engine Name: YaMZ-847.10
Engine Type: Diesel
Turning Radius: m17.3
Gradient: %33 (est)
Trench: m4.5
Vertical Step: m1.2
Angle of Approach: degrees30
Side Slope: degrees15
Temperature Range: degrees-45C to +40C

Notes:

The 30PM series of articulated tracked vehicles function is to carry munitions, military equipment, and personnel through difficult terrain and weather conditions. It has excellent offroad capabilities in any season, including swamps, virgin snow, unimproved dirt roads and water obstacles throughout Russia’s Siberia and far east districts. These are two unit transport vehicles with all four tracks driving. Because of low ground pressure, vehicle is theoretically immune to certain types of at mines. ATVs are indispensable as recovery vehicles, since they have a high pull ratio (approximately 500 kn for the DT-30PM) and can approach a stuck or damaged vehicle from any direction in bad road conditions. The DT-30PM transporters are very efficient as part of search and rescue teams operating in extreme conditions (bad roads, floods, snow-drifts, land and snow slides and large-scale destruction) when it is necessary to evacuate people, animals, and various cargoes up to 30 ton by weight, or transport rescue teams, medical personnel, various equipment and food to the affected area. The DT-30PM has a fully enclosed forward control cab, which provides seating for driver and four passengers. Engine compartment is located behind the cab. The rear unit can accommodate a variety of bodies. In some cases the rear unit can vary considerably from the front. This all-terrain tracked transporter is fully amphibious. On water it is propelled by its tracks. Owing to their unique design, the Vityaz family of ATVs are capable of operating in conditions impossible for other all-terrain vehicles, for example: • Amphibious return to a mother ship • Off-road movement with one unit disabled or without one, or even without both tracks of one of the units • Negotiating ditches and clefts up to 4.0 m wide • Unloading of a ship offshore if it cannot come close to waterfront (i.e. in the Arctic and Antarctic regions, or in flooded regions, etc.); negotiating waterways in severe ice conditions • Operation in mountains up to an altitude of 4,000 m

Victory-58 North Korean 4x4 Utility Truck



Tiers:

1 2 3 4

System

Alternative Designation: Victory-58; Sungri 58

Type: Utility Truck

Manufacturer: Sungri Motor Plant

Family: INA

In Service: 1958-Present

Crew: ea1

Passenger Capacity: INA

Payload Capacity: tons2

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Engine Name: 3.5L GAZ-51 I6

Engine Type: 3.5-litre 6-cylinder petrol engine.

Engine Power: hp70

Cruising Range: INA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: No

Smoke Equipment: No

Notes:

Sungri-58 (□□ 58□ - 'Victory 58') - A clone of the Soviet GAZ-51 (ГАЗ-51) Truck, however with weaker springs. The Sungri-58 also suffers from unusually high fuel consumption due to its crudely copied GAZ-51 carburetor which has been used since 1961. It was first built in 1958. Later Sungri-58KA and Sungri-58NA (4x4) modifications with new cabin are appeared in the 1970s. Made from 1958- 1979. Based on Russian GAZ 51. Name Sungri (Synri, Sungli, Sungni) translated as Victory. Made by the Sungri General Auto Works, Tokchon. 4x2 truck, 2 ton payload, 3.5-litre 6-cylinder petrol engine. Exists as cargo truck, bus conversion, fire truck, and truck tractor. Often seen powered by gas generator (wood convertor). Most important North Korean truck for years. The GAZ-51 (nickname Gazon) was a Soviet truck manufactured by GAZ. Its first prototypes were produced before the end of World War II, and mass production started in 1946. A 2.5 ton 4×2 standard variant was joined in 1947 by almost identical 2 ton 4×4 GAZ-63. Both variants were powered by 70 hp (52 kW) 6-cylinder 3485 cc engine. GAZ-63s was manufactured with some changes until 1968 and production of GAZ-51 continued until 2 April 1975. The trucks were also manufactured under the Soviet license in Poland (as the Lublin-51), North Korea (as the Sungri-58) and China (as the Yuejin NJ-130).

ZIL-157 Russian 6x6 General Purpose Truck





Tiers:



Variants:

- **ZIL-157:** (ЗИЛ-157) - cargo truck, produced 1958 - 1961[
- **ZIL-157K:** cargo truck, produced 1962 - 1978
- **ZIL-157KV:** tractor unit, produced 1962 - 1978
- **ZIL-157KD:** 5-ton cargo truck, produced since 1978
- **ZIL-157KDV:** tractor unit, produced since 1978
- **ZIL-165:** Prototype for ZIL-131. Produced in 1958.
- **KMM:** Soviet military bridgelayer on ZiL-157 chassis

System

Alternative Designation: Zil-157
Type: 6x6 Cargo Truck
Manufacturer: ZIL
Crew: ea1
Passenger Capacity: INA
Cargo Capacity: INA

Dimensions

Length: 6.93 m
Width: 2.32 m
Height: 2.74 m
Weight, Empty: 5,540 kg

Automotive

Engine Name: ZIL-157
Engine Type: Diesel
Engine Power: hp1041
Transmission: 5 speed X 2 range transfer case
Cruising Range: INA

Speed, Maximum Road: km/h40

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: INA

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The ZIL-157 is a general purpose 2 1⁄2-ton 6x6 truck, produced post-World War II in the Soviet Union by ZiL. The ZIL-157 was the standard truck used by the army until it was replaced by the ZIL-131 and Ural-375 series that became the standard Soviet army trucks alongside the GAZ-66. The People's Liberation Army also operated the CA-30, a copy of the ZIL-157.

PTS-M (Ob'yekt 65) Russian Tracked Amphibious Transport Vehicle




Tiers:

1 2 3 4

Variants:

- **PTS-2:** INA
- **PTS-3:** INA
- **PTS-4:** In 2014, the Russian Defense Ministry intends to purchase an undetermined number of PTS-4s, which underwent acceptance trials in 2011. The vehicle will be fitted with a remotely operated 12.7 mm (0.50 in) machine gun and a multi-fuel engine. The PTS-4 weighs 33 tons, with a payload of 12 tons on land (18 tons on water). Projected maximum road speed is 60 km/h (37 mph), with an expected maximum speed in water of 15 km/h (9.3 mph). Unlike its predecessors, it uses T-80 suspension components. The fully enclosed cab offers protection against small arms fire and splinter. Production began in 2014.

System

Alternative Designation: PTS-M (Ob'yekt 65)

Type: Track Amphibious Transport

Manufacturer: Soviet State Factories

Family: PTS

Cab Seating: 1 + 2 men

Passenger Capacity: 70 troops,

Maximum Payload Capacity on Land: tons10

Maximum Payload Capacity on Water: tons5

Dimensions

Length: m12

Width: m3.17

Height: m3.3

Weight, Empty: tons17

Maximum Payload Capacity on Water: tons5

Maximum Payload Capacity on Land: tons10

Automotive

Engine Name: A-712P

Engine Type: Diesel

Engine Power: hp340

Maximum Cruising Range: km380

Speed, Maximum Road: km/h42

Speed, Average Cross: INA

Speed Maximum Swim: km/h12

Gradient: %60

Side Slope: %30

Vertical Step: m0.65

Trench: m2.5

Fording Depth: mAmphibious

Sea State: 4

Winch: Yes

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The PTS is a Soviet tracked amphibious transport. PTS stands for Plavayushchij Transportyer - Sryednyj or medium amphibious transport vehicle. Its industrial index was Ob'yekt 65. Introduced in 1965, it is large, with a substantial payload of 10 tons, two to four times the capacity of the BAV 485, and better cross-country performance, at the cost of greater somewhat higher purchase costs because it is tracked. The most common model is the improved PTS-M that is powered by a 350 hp diesel engine. The PTS has a boxy, open watertight hull, with six road wheels per side, front drive sprocket, rear idler sprocket, and no return rollers. Like the BAV 485, and unlike the DUKW, it has a rear loading ramp. The crew is seated at the front, leaving the rear of the vehicle open for a vehicle, which can be driven (or backed) in, rather than lifted over the side. To aid in facilitating this, the engine is under the floor. Propulsion in water is by means of twin propellers, in tunnels to protect them from damage during land operations. The PTS-M also has a companion vehicle, the PKP, a boat-like amphibious two-wheeled trailer, with fold-out sponsons providing stability on water; the combination allows the PTS-M to accommodate an artillery tractor, field gun (up to medium caliber), its crew, and a quantity of ammunition, all in one load.

MZKT-7930 Astrolog Russian 8x8 Special Wheeled Chassis





Tiers:



System

Alternative Designation: MZKT-7930

Type: Special wheeled chassis

Crew : ea1 + 2 men

Troop Capacity : eaINA

Mission: It is mainly used to mount various weapon systems. This high mobility vehicle is used as a chassis for the Iskander short range ballistic missile system and Bal costal defense missile system, TMM-6 heavy mechanized bridge and other applications. It also carries radar of the S-400 missile system.

Airlift Capable: Yes, The special wheeled chassis can be airlifted by military transport aircraft, however these have to be as large as An-124 or An-22.

↳*Dimensions*

Length, Overall : m12.7

Width, Overall : m3

Height, Overall : m3.29

Weight, Empty: tons20.5

Maximum Payload: tons24

Automotive

Engine Name: YaMZ-846

Engine Type: Diesel

Engine Power : hp500

Range, Cruising : kmINA

Maximum Range: km1,100

Speed, Maximum Road : km/h70

Gradient: %45

Side Slope: %30

Vertical Step: m0.6

Trench: m2

Fording: m1.4

Note: his heavy load carrier is primarily designed for off-road applications.

Protection

Armor: Protection for the crew against small arms fire and artillery shell splinters.

Applique Armor: Available

Active Protection System: No

NBC Protection: Yes

Night Visition: No

Smoke Equipment: No

Emergency Roof Hatch: Yes

Armament: This vehicle lacks any defensive armament

Notes:

MZKT-7930 Astrolog (Russian: МЗКТ-7930) is a Russian army 8×8 transporter-erector-launcher designed and developed by the MZKT in Belarus. The MZKT-79292 is a 10 x 10 MZKT-7930 derivative intended for heavyweight TEL applications, and is a direct competitor to the BAZ-6909 10 x 10 variants.

Ruslan TTM-4902 PS-10 Russian All Terrain Carrier



Tiers:

1 2 3 4

System

Payload: mt4

Troop Capacity: ea22 total: Six personnel in forward compartment, 16 personnel in rear compartment

Wheels: 10 roadwheels in each compartment

Crew: 2

↳*Dimensions*

Height, Overall: m2.66

Length, Overall: m11.57

Width, Overall: m2.94

Width, Tracks: m0.760

Automotive

Engine Type: KaMAZ, turbodieseL

Fording Depth: mAmphibious vehicle

Ground Clearance: mm0.40

Power: hp330

Temperature Range: degrees-50C to +50C (-58F-+122F)

Mobility

Mobility: Can be deployed from landing ships

Notes:

The Ruslan TTM-4902PS-10 carrier is a two-section tracked amphibious all-terrain vehicle. It has a 300 horsepower engine which is capable of transporting up to 22 people and provide overnight bed space for five. Manufactured by the CJSC Transport Company, the Ruslan was designed to transport cargo, repair teams and equipment (up to 4000 kg) in off-road conditions. The first section is a power module (load-carrying capacity 500 kg). It is able to carry 6 people and has 2 full beds. The second section is a passenger module (16 people, 6 beds). The vehicle was tested in harsh conditions in the Murmansk region north of the Arctic Circle before entering into service. These vehicles are currently in use by Russian units in the Arctic.

M1083 American 6x6 Medium Tactical Vehicle (MTV) Cargo Truck







Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782

- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1083

Type: Medium Tactical Vehicle (MTV) Cargo Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea3

Winch: The M1083 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

Dimensions

Length: 6.94 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 8,889 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 330 hp (246 kW) at 2,400 rpmm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1083 Standard Cargo Truck is designed to transport cargo and soldiers. The M1083 has a payload capacity of 10,000 pounds and to facilitate loading/unloading, the bed side rails are mounted on hinges. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1083 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

ZIL-135LM Russian Special Wheeled Chassis







Tiers:



Variants:

- **Note:** *ZIL-135 (9P113): launcher for FROG-7 (Luna-M) missile (1959) *ZIL-135B: amphibious version of ZIL-135 (1959) *ZIL-135e: non-amphibious version of ZIL-135B (1960) *ZIL-135E: Diesel-electric transmission (1965) *ZIL-135K: launcher for C-5 missile (1961) *ZIL-135KM: launcher for SS-N-3 Shaddock missile (1962, prototype for BAZ) *ZIL-135KP: land train (1969) *ZIL-135L: improved suspension (1961) *ZIL-135LM: ZIL-135L with manual transmission (1964) *ZIL-135LN: chassis-cab based on ZIL-135K *ZIL-135P: amphibious landing transport (landing barge) (1965) *ZIL-135SH: zero-turn radius (1967)

System

Alternative Designation: ZiL-135LM
Type: Special Wheeled Chassis
Manufacturer: ZiL; BAZ
Crew: ea1
Passenger Capacity: 2
Payload Capacity: up to 9.4 t

Dimensions

Length: 9.26 m
Width: 2.8 m
Height: 2.53 m
Weight, Combat: 10.9 t
Payload Capacity: up to 9.4 t

Automotive

Engine Name: 2 x ZiL-375Ya

Engine Type: Petrol

Engine Power: 2 x 180 hp

Range: km590

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg50

Side Slope: deg40

Vertical Step: m0.9

Trench: m2

Fording Depth: m1.2

Main Weapon System

Note: None

Protection

Armor: Protection from small arms and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The ZIL-135 is a large, eight-wheeled military transport and self-propelled artillery truck produced in the Cold War by the Soviet Union starting in 1959. Its purpose was to carry and launch an artillery missile, specifically a FROG-7, from surface-to-surface. The ZIL-135 was widely exported to other communist countries, most notably North Korea, where it is a common sight in films and military marches. It also served as the TEL for the BM-27 Uragan artillery rocket system. This vehicle has two gasoline engines that power its 20 tonnes to a maximum speed of 65 kilometers per hour. One engine drives the four wheels on the left of the truck, while the other engine drives the four wheels on the right. The ZIL-135 has eight wheel drive, but only the front and rear axles are used for steering. It has a maximum cruising range of 500 kilometers. The cab of the ZIL-135 is NBC protected, allowing the rockets to be fired without exposing the crew to possible contaminants. The six-man crew can emplace or displace the system in three minutes.

GAZ-3308 Russian 4X4 Light Utility Truck



Tiers:



System

Alternative Designation: Sadko

Brake system (front): Drums

Brake system (rear): Drums

Cargo Height: mm1.36

Cooling: Water

Curb Weight: kg3.71

Number of Axles: ea2

Number of Tires: ea4

Payload: mt2.0

Troop Capacity: ea2

Wheels Central Tire Pressure Regulation System: Yes

Wheel Size: in1200R18

↳*Dimensions*

Height: mm2570

Length: mm6250

Width: m2.34

Wheelbase: m3.77

Automotive

Engine Type: ZMZ-513 gasoline, 4.25L, 116hp; 0r ZMZ-5233 gasoline, 4.67L, 122hp

Fording Depth: m1

Ground Clearance: mm315

Range, Cruising: km950

Speed: km/h90

Turning Radius: m11

Vertical Step: m0.6

Side Slope: %40

Angle of Approach: degree48

Angle of departure: degree32

↳***Fuel***

Fuel Capacity: liters210

Fuel Type: Gasoline

Mobility

Mobility, Air Lift:

Mobility, Towing Vehicle:

Moblity, Towing Vehicle:

Payload

Cargo Payload On: 2

Cargo Space Cargo Bed Area: m27.272

Cargo Space Height: m1.36

Cargo Space Length: m3.39

Cargo Space Width: m2.145

Gradient, Loaded: deg68

Utility

Transport: Vehicle is used to carry troops and cargo while towing trailers or light artillery pieces.

↳***Variants***

GAZ-33081: MMZ D-245.7 turbodiesel engine

GAZ-33082: GAZ-562, 3.2L, turbodiesel engine

GAZ-33085: MZ-5233, 4.67L, gasoline engine; 4 ton, twin-tired rear axle

GAZ-33086: MMZD-245.7, 4.75L, turbodiesel, 117hp;

GAZ-33088: YaMZ-53442, 4.43L, turbodiesel engine; 4 ton, twin-tired rear axle

Sadko-NEXT: Increased carrying capacity of 3 tons; 3-person cab; YaMZ-534 turbocharged diesel 150hp engine

GAZ-3308811-10 Vepr (EN: Wild Boar): Targeted replacement for older GAZ-66 vans and office-type rear bodies.

N2: MLRS system produced in Armenia on the GAZ-3308 chassis

Notes:

GAZ-3308 Russian 4X4 Light Utility Truck

M1078 American 4x4 Light Medium Tactical Vehicle (LMTV) Cargo Truck



Tiers:



Variants:

- **Note:** *M1078 A0/A1/A1R/A1P2 - LMTV Cargo NSN 2320-01-549-8577 *M1078 A0/A1/A1R/A1P2 - LMTV Cargo with winch[6] NSN 2320-01-549-8611 *M1079 A0/A1/A1R/A1P2 - LMTV Van NSN 2320-01-552-7745 *M1079 A0/A1/A1R/A1P2 - LMTV Van with winch NSN 2320-01-552-7749 *M1080 A0/A1/A1R/A1P2 - LMTV Chassis 3.9 m NSN 2320-01-552-7791 *M1081 A0 - LMTV Cargo-airdrop LVAD *M1082 A1/A1R/A1P2 - Trailer, LMTV cargo[6] NSN 2320-01-449-1775 *M1083 A0/A1/A1R/A1P2 - MTV Cargo NSN 2320-01-549-8610 *M1083 A0/A1/A1R/A1P2 - MTV Cargo with winch NSN 2320-01-549-8565 *M1084 A0/A1/A1R/A1P2 - MTV Cargo with material handling equipment (MHE)[6] NSN 2320-01-552-7739 *M1084 A0/A1/A1R/A1P2/RSV - MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767 *M1085 A0/A1/A1R/A1P2 - MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo with winch NSN 2320-01-552-7770 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE NSN 2320-01-552-7780 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE & winch[6] NSN 2320-01-552-7776 *M1087 A1R/A1P2 - MTV Expansible Van NSN 2320-01-552-7781 *M1088 A0/A1/A1R/A1P2 - MTV Tractor NSN 2320-01-552-7759 *M1088 A0/A1/A1R/A1P2 - MTV Tractor with winch NSN 2320-01-552-7759 *M1089 A0/A1/A1R/A1P2 - MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994 *M1090 A0/A1 - MTV Dump *M1091 - MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production *M1092 A0/A1/A1R/A1P2 - MTV Chassis 4.1 m NSN 2320-01-552-7793 *M1093 A0 - MTV Cargo-airdrop LVAD *M1094 A0 - MTV Dump-airdrop LVAD *M1095 A1/A1R/A1P2 - Trailer, MTV Cargo NSN 2320-01-449-1776 *M1096 A0/A1/A1R/A1P2 - MTV LWB Chassis 4.5 m NSN 2320-01-552-7796 *M1140 A1/A1R HIMARS High Mobility Artillery Rocket System, launcher chassis *M1147 LHS (palletized) Load Handling System Trailer[6] NSN 2320-01-508-7887 *M1148 A1R/A1P2 LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546 *M1157 A1R/A1P2 10-ton Dump[6] NSN 2320-01-552-7787 *M1157 A1R/A1P2 10-ton Dump with winch NSN 2320-01-552-7782 *XM1160 10-ton MEADS air defence chassis (5.5 m wheelbase) Mongoose Mobile Launcher Chassis (MLC) (cancelled) M1273 A1P2 MTV 10-ton chassis[6] NSN 2320-01-621-6239

System

Alternative Designation: M1078

Type: Light Medium Tactical Vehicle (LMTV)

Family: FMTV Series

Configuration: 4x4

Crew: ea3

Troop Compartment Capacity: The cargo bed can be equipped with an optional bench seat kit for the transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails, and can be folded down and stowed when not in use. Soldiers are assisted when climbing in and out of the cargo bed area with the aid of a ladder, which is stowed on a vehicle when not in use.

Winch: The M1078 can be equipped with optional electrically operated self-recovery winch kit capable of fore and aft vehicle recovery operations.

Dimensions

Length: 6.43 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Weheeelbase: 3.90 m

Ground Clearance: 559 mm

Payload Capacity: 2,268 kg

Curb Weight: 7,484 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 225 hp (168 kW) at 2,600 rpm

Transmission: Allison MD-D7 automatic transmission; 7 forward/1 reverse gears

Power-to-Weight Ration: 18.9-32.62 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 40 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the

FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Note: A canvas and bows kit are available to keep both soldiers and cargo protected from the elements.

Notes:

M1078 Standard Cargo Truck The M1078 Standard Cargo Truck is designed to transport cargo and soldiers. The M1078 has a payload capacity of 5,000 pounds and to facilitate loading/unloading, the bed side rails are mounted on hinges and can be lowered. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is available to keep soldiers and cargo protected from the elements. The M1078 can be equipped with an optional electrically operated MHE and self-recovery winch kit capable of fore and aft vehicle recovery operations. The MHE has a lift capacity of 1,500 pounds. The winch has 308 feet of line capacity and 10,000 pounds bare drum line pull at 110% overload.

M1081 American 4x4 Light Medium Tactical Vehicle (LMTV) Standard Cargo LVAD Truck






Tiers:



Variants:

- **Note:** *M1078 A0/A1/A1R/A1P2 - LMTV Cargo NSN 2320-01-549-8577 *M1078 A0/A1/A1R/A1P2 - LMTV Cargo with winch[6] NSN 2320-01-549-8611 *M1079 A0/A1/A1R/A1P2 - LMTV Van NSN 2320-01-552-7745 *M1079 A0/A1/A1R/A1P2 - LMTV Van with winch NSN 2320-01-552-7749 *M1080 A0/A1/A1R/A1P2 - LMTV Chassis 3.9 m NSN 2320-01-552-7791 *M1081 A0 - LMTV Cargo-airdrop LVAD *M1082 A1/A1R/A1P2 - Trailer, LMTV cargo[6] NSN 2320-01-449-1775 *M1083 A0/A1/A1R/A1P2 - MTV Cargo NSN 2320-01-549-8610 *M1083 A0/A1/A1R/A1P2 - MTV Cargo with winch NSN 2320-01-549-8565 *M1084 A0/A1/A1R/A1P2 - MTV Cargo with material handling equipment (MHE)[6] NSN 2320-01-552-7739 *M1084 A0/A1/A1R/A1P2/RSV - MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767 *M1085 A0/A1/A1R/A1P2 - MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo with winch NSN 2320-01-552-7770 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE NSN 2320-01-552-7780 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE & winch[6] NSN 2320-01-552-7776 *M1087 A1R/A1P2 - MTV Expansible Van NSN 2320-01-552-7781 *M1088 A0/A1/A1R/A1P2 - MTV Tractor NSN 2320-01-552-7759 *M1088 A0/A1/A1R/A1P2 - MTV Tractor with winch NSN 2320-01-552-7759 *M1089 A0/A1/A1R/A1P2 - MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994 *M1090 A0/A1 - MTV Dump *M1091 - MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production *M1092 A0/A1/A1R/A1P2 - MTV Chassis 4.1 m NSN 2320-01-552-7793 *M1093 A0 - MTV Cargo-airdrop LVAD *M1094 A0 - MTV Dump-airdrop LVAD *M1095 A1/A1R/A1P2 - Trailer, MTV Cargo NSN 2320-01-449-1776 *M1096 A0/A1/A1R/A1P2 - MTV LWB Chassis 4.5 m NSN 2320-01-552-7796 *M1140 A1/A1R HIMARS High Mobility Artillery Rocket System, launcher chassis *M1147 LHS (palletized) Load Handling System Trailer[6] NSN 2320-01-508-7887 *M1148 A1R/A1P2 LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546 *M1157 A1R/A1P2 10-ton Dump[6] NSN 2320-01-552-7787 *M1157 A1R/A1P2 10-ton Dump with winch NSN 2320-01-552-7782 *XM1160 10-ton MEADS air defence chassis (5.5 m wheelbase) Mongoose Mobile Launcher Chassis (MLC) (cancelled) M1273 A1P2 MTV 10-ton chassis[6] NSN 2320-01-621-6239

System

Alternative Designation: M1081
Type: Light Medium Tactical Vehicle (LMTV) Cargo LVAD Truck
Family: FMTV Series
Configuration: 4x4
Crew: ea3
Winch: The M1081 can be equipped with an optional electrically operated MHE and self-recovery winch kit capable of fore and aft vehicle recovery operations. The MHE has a lift capacity of 1,500 pounds. The winch has 308 feet of line capacity and 10,000 pounds bare drum line pull at 110% overload.
Airlift Capability: The M1081 Standard Cargo LVAD Truck is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available.

Dimensions

Length: 6.43 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Weheeelbase: 3.90 m

Ground Clearance: 559 mm

Payload Capacity: 2,268 kg

Curb Weight: 6,351 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 225 hp (168 kW) at 2,600 rpm

Transmission: Allison MD-D7 automatic transmission; 7 forward/1 reverse gears

Power-to-Weight Ration: 18.9-32.62 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 40 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the

FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1081 Standard Cargo LVAD Truck is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available. The M1081 has a payload capacity of 5,000 pounds and to facilitate loading/unloading, the bed side rails are mounted on hinges. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1081 can be equipped with an optional electrically operated MHE and self-recovery winch kit capable of fore and aft vehicle recovery operations. The MHE has a lift capacity of 1,500 pounds. The winch has 308 feet of line capacity and 10,000 pounds bare drum line pull at 110% overload.

UAZ-452 Russian 4x4 Off-Road Van







Tiers:

1 2 3 4

System

Alternative Designation: UAZ-452

Type: Off-Road Van

Manufacturer: Ulyanovsk Automobile Plant

Family: UAZ

Crew: ea1

Passenger Capacity: INA

Note #1: Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular.

Note #2: The body of the van is normally equipped with two front doors, a single-wing door on the right side and a double-wing door at the rear, although the exact configuration can vary depending on the specific modification. Notable in the van are the fuel ports on the left and the right side of the van, leading to two separate fuel tanks.

Dimensions

Length: 4360 mm

Width: 1940 mm

Height: 2090 mm

Wheelbase: 2300 mm

Curb Weight: 1,760 kg

Ground Clearance: 220 mm

Automotive

Engine Name: UMZ 452MI

Engine Type: Gasoline

Engine Power: hp75

Range: kmINA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: None

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The UAZ-452 is a family of off-road vans produced at the Ulyanovsk Automobile Plant (UAZ) since 1965. Its predecessor model UAZ-450 (produced between 1958-1966) was based on the chassis and engine of the four-wheel drive light truck GAZ-69, and was the first "forward control" vehicle of this type to be built in the Soviet Union and Russia. Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular. In 1985 the van was upgraded and spun off into separate submodels: 39625, 3962, 3303, 3909 and 2206. The upgrade consisted of lighting fixtures that met modern international requirements, alarms, a new instrument panel, and a new speedometer. The brakes were redesigned. The engine was also upgraded, and its power output increased to 99 hp against the previous 78 hp. In the early 2000s, the model was given new plastic side mirrors taken from the GAZ GAZelle van, headrests on front seats; and new passenger seats for a minibus version (2206) were also given headrests. The pickup truck (version 3303) was fitted with a metal body instead of a wooden one.

MZKT-741351 Belarusian 8x8 Tractor



Tiers:

1 2 3 4

System

Cooling: Intercooled

Curb Weight: mt28

Number of Axles: ea4

Number of Tires: ea8

Towing Capability: mt136

Trailer Type: Semitrailer and trailer (999421 semitrailer and 837211 trailer)

Troop Capacity: 8 in cab

Weight, Gross Vehicle: mt54.8

Wheels Central Tire Pressure Regulation System: Yes

Layout: 8X8 full time

↳*Dimensions*

Height, Overall: m3.88

Length (Prime Mover): m10.3

Length, Overall: m42 (with two trailers)

Width (Prime Mover): m3.1

Width (Trailers): mAdjustable from 3.65 to 4.65

Armament

Armament: Roof mount for a general purpose machine gun

Armor: Add on armor for the cab is optional.

Automotive

Engine Type: Caterpillar C18 turbodiesel, 812hp

Range, Cruising: km1,000 with semitrailer. 800 with semitrailer and trailer.

Speed: km/h70 with semitrailer. 60 with semitrailer and trailer.

Side Slope (Prime Mover): %30

Vertical Step: mm480

Trench: m2

Winch: Double winches, each with a pulling capacity of 25 mt.

↳*Fuel*

Fuel Capacity: liters1,550

Mobility

Mobility, Air Lift: C-130 Hercules C-160 TRANSALL A-400M Atlas An-22 Antei An-124 Ruslan

Payload

Gradient (Prime Mover): %60

Gradient (Prime Mover + Semitrailer): %27

Gradient (Prime Mover + Semitrailer + Trailer): %11

↳*Payload Weight*

Payload on/off Highway: mt136

Notes:

The MZKT-741351 is powered by an 812 hp Caterpillar C18 turbocharged engine associated to an Allison electronically-controlled automatic gearbox. The vehicle has a full-time 8x8 drive. Maximum road speed is electronically limited to 70 km/h. The prime mover is fitted with a central tire inflation system. The unique feature of the MZKT-741351 prime mover is that it is used in conjunction with two trailers. These are MZKT-999421 6-axle semi-trailer which weighs 26,000 kg and has a payload capacity of 76 tons and MZKT-837211 6-axle trailer, which weighs 18 tons and has a payload capacity of 60 tons. Combined hauled load capacity for this road train is 136 tons. This vehicle can transport other loads, such as heavy armored vehicles, self-propelled artillery systems, three standard 20" containers, or various construction materials and equipment. Both the semi-trailer and the trailer have an adjustable width from 3.65 to 4.65 m. This feature allows to adjust the platform in order to carry various loads. Another feature of this road train is that the vehicles can drive onto the semi-trailer directly via the trailer. So there is no need for the crew to disconnect the trailers for the loading and unloading operations. The prime mover is fitted with a double winch for loading immobile vehicles. Each winch has a pulling capacity of 25 tons. The rear trailer has two front steerable axles. Double cab of the prime mover can accommodate the driver and 7 passengers. The vehicle can transport some crew members of the vehicles that it carries. Alternatively the rear seats can be folded to form two sleeping bunks. The cab has a provision for a roof hatch with a mount for general purpose machine gun. Also the cab can be fitted with add-on armor kit. The engine of the MZKT-741351 is located behind and under the cab. The cooling system is also located behind the cab. This feature allowed to reduce height of the vehicle. Also such design protects damage of the radiator or blockage with mud.

BAZ-6909 Russian 8x8 Special Wheeled Chassis





Tiers:



Variants:

- **BAZ-6402:** 6x6 tractor truck
- **BAZ-69092:** 6x6 special wheeled chassis
- **BAZ-6306:** 8x8 artillery tractor
- **BAZ-6403:** 8x8 tractor truck
- **BAZ-6910:** 8x8 shelter carrier;
- **REM-KS:** 8x8 repair and recovery vehicle
- **BAZ-69069:** 10x10 special wheeled chassi
- **BAZ-69099:** 12x12 special wheeled chassis

System

Alternative Designation: BAZ-6909
Type: 8x8 Special Wheeled Chassis
Manufacturer: Bryansk Automobile Plant
Family: BAZ
Mission: The BAZ-6909 is of conventional design. It was designed to carry specialized military equipment, such as weapons, missiles, shelters and radars.
Crew: ea3
Payload Capacity: tons18-20
Chassis: BAZ-6909
Note: It can be airlifted by An-22, An-124 or Il-76 transport aircraft

Dimensions (Chassis: BAZ-6909)

Length: m11.3
Width: m2.75
Height: m2.85
Weight, Empty: tons22

Automotive (Chassis: BAZ-6909)

Engine Name: YaMZ-8424.10

Engine Type: Diesel

Engine Power: hp470

Cruising Range: km1,000

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2.0

Fording Depth: m1.2

Climate Operational Range: -50°C to +45°C

Communications

Primary: INA

Protection

Armor: Vehicle is fitted with a three-person armored cab

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

IR Signature: No

Notes:

The BAZ-6909 is a Russian artillery tractor and missile vehicle that was developed as a successor to the MAZ-537 and MAZ-7310 by Bryansk Automobile Plant. It can haul semi-trailers and loads with the mass of 13-21 metric tons, both on and off-road. It uses a YaMZ-8424.10 diesel engine with 500 hp

PTS-4 Russian Amphibious Cargo Vehicle



Tiers:



System

Alternative Designation:
Brake system (front):
Brake system (rear):
Cargo Height: mm
Cooling:
Curb Weight: kg
Curb Weight (: mt
Date of Introduction:
Generator Height: mm
Number of Axles: ea
Number of Tires: ea
Payload: mt
Proliferation:
Tanker Height: mm
Towing Capability, Off:
Trailer Payload On:
Trailer Type:
Troop Capacity: ea
Vehicle Weight On:
Weight, Gross Vehicle: mt
Wheels Central Tire Pressure Regulation System:
Wheels Size: in
Width: mm

↳***Dimensions***

Height: mm

Height, Overall: m

Length: mm

Length, Overall: m

Width, Overall: m

Armament

Armament:

Automotive

Engine Type:

Fording Depth: m

Ground Clearance: mm

Range, Cruising: km

Speed: km/h

Turning Radius: m

↳***Fuel***

Fuel Capacity: liters

Fuel capacity (liters), Left Tank:

Mobility

Mobility, Air Lift:

Mobility, Towing Vehicle:

Moblity, Towing Vehicle:

Payload

Cargo Curb Weight: kg

Cargo Payload On:

Cargo Space Cargo Bed Area: m2

Cargo Space Height: m

Cargo Space Length: m

Cargo Space Width: m

Curb Weight: kg

Generator Payload on:

Gradient, Loaded: deg

Tanker Curb Weight: kg

Tanker Payload On:

Vehicle Weight On:

↳***Payload Weight***

Payload on/off Highway: kg

Curb Weight: kg

Trailer Payload On:

Utility

Transport:

MAN SX45 German 8x8 Heavy High Mobility Truck





Tiers:

1 **2** 3 4

System

Alternative Designation: NA

Type: Heavy High Mobility Truck

Configuration: 8x8

Crew: 2

Dimensions

Length: 10.5 m

Width: 2.55 m

Height: 3.92 m

Weight, Empty: 13 tons

Maximum Load Weight: 16 tons

Automotive

Engine Name: MAN D2066 LFG

Engine Type: Diesel

Engine Power: hp440

Cruising Range: km750

Speed, Maximum Road: km/h88

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: 0.6 m

Trench: 1.9 m

Fording Depth: up to 1.5 m

Protection

Hull Armor: The MAN SX45 is also available with an integrated armored cab, which provides protection against 7.62x51 mm armor-piercing rounds, artillery shell splinters and withstands 8 kg anti-tank mine blast. An integrated cab can be equipped with remotely controlled weapon stations, fitted with a 12.7 mm heavy machine gun or 40 mm automatic grenade launcher.
Applique Armor: The MAX SX family has a modular cab, which can be fitted with add-on armor protection kit. This kit was jointly developed by MAN and Krauss-Maffei Wegmann. It provides protection against 7.62x39 mm rounds, artillery shell splinters, grenades, small anti-personnel mines. Armored modules are attached to the outside of the cab. Armored kit can be installed within 10 hours in field conditions.
Explosive Reactive Armor: No
Active Protection System: No
Mine Clearing: No
NBC Protection: INA
Smoke Equipment: INA

Notes:

MAN SX45 Heavy High Mobility Truck

UAZ-452 Russian 4x4 Cargo Truck





Tiers:

1 2 3 **4**

System

Alternative Designation: UAZ-452D

Type: Cargo Truck

Manufacturer: Ulyanovsk Automobile Plant

Family: UAZ

Crew: ea1

Passenger Capacity: INA

Note #1: Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular.

Dimensions

Length: 4360 mm

Width: 1940 mm

Height: 2090 mm

Wheelbase: 2300 mm

Curb Weight: 1,760 kg

Ground Clearance: 220 mm

Automotive

Engine Name: UMZ 452MI

Engine Type: Gasoline

Engine Power: hp75

Range: kmINA

Speed, Maximum Road: INA

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Protection

Armor: None

Applique Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

UAZ-452D – A truck with double cab and wooden body The UAZ-452 is a family of off-road vans produced at the Ulyanovsk Automobile Plant (UAZ) since 1965. Its predecessor model UAZ-450 (produced between 1958-1966) was based on the chassis and engine of the four-wheel drive light truck GAZ-69, and was the first "forward control" vehicle of this type to be built in the Soviet Union and Russia. Vehicles produced between 1965–1979 were equipped with old-style lights: turn signal lights were colorless (white), rear lights were round, and the back of the body was rounder. Subsequent post-1979 models got amber (yellow) signal lights, and rear lights were slightly bigger and rectangular. In 1985 the van was upgraded and spun off into separate submodels: 39625, 3962, 3303, 3909 and 2206. The upgrade consisted of lighting fixtures that met modern international requirements, alarms, a new instrument panel, and a new speedometer. The brakes were redesigned. The engine was also upgraded, and its power output increased to 99 hp against the previous 78 hp. In the early 2000s, the model was given new plastic side mirrors taken from the GAZ GAZelle van, headrests on front seats; and new passenger seats for a minibus version (2206) were also given headrests. The pickup truck (version 3303) was fitted with a metal body instead of a wooden one.

M1085 American 6x6 Medium Tactical Vehicle (MTV) Long Wheel Base (LWB) Truck







Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782

- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1085

Type: Medium Tactical Vehicle (MTV) Long Wheel Base (LWB) Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Winch: The M1085 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

Standard Options: Troop seats, stowable non wooden; bows and tarp kit

Dimensions

Length: 8.86 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 9,451 kg

Cargo Bed Length: 6,096 mm

Cargo Bed Width: 2,413 mm

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 330 hp (246 kW) at 2,400 rpmm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1085 Long Wheel Base (LWB) Truck is designed to transport soldiers and cargo in International Standardized Operations Containers . The M1085 has a payload capacity of 10,000 pounds and to facilitate loading/unloading, the bed side rails are mounted on hinges. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1085 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch has 280 feet of line capacity and 15,500 pounds bare drum line pull at 110% overload.

Kamaz-6350 Russian 8x8 Heavy Utility Truck





Tiers:

1 2 3 4

Variants:

- **KamAZ-4350:**
- **KamAZ-5350:**

System

Alternative Designation: KamAZ-6350
Type: Heavy Utility Truck
Manufacturer: KamAZ
Family: Mustang family
Crew: 1 + 2 men
Payload Capacity: tons10
Towing Capacity: kg12,000
Note: A wide variety of body types and shelters are available. Vehicle has fixtures for transportation of standard removable containers. A standard troop/cargo body has drop sides, drop tailgate and removable tarpaulin with bows.

Dimensions

Length: m9.3
Width: m2.5
Height: m3.25
Weight, Combat: tons11.4

Automotive

Engine Name: KamAZ-740.50.360

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km1,000

Speed, Maximum Road: km/h95

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6 - 1.4

Fording Depth: m1.75

Communications

Primary: INA

Protection

Armor: It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

IR Signature: No

Notes:

The KamAZ-6350 (Russian КамАЗ-6350), also called "Mustang" (Russian Мустанг), is a heavy four-wheel drive truck from the production of KAMAZ plant in Naberezhnye Chelny . The vehicle has been built since 1998 and is also designed for military applications. The Ural 5323 is a very similar vehicle, which also comes from Russian production. The 6350 model is one of the largest trucks in KamAZ range. Its development began in 1987. First prototypes were completed in the early 1990s, however, this truck was officially accepted to service with the Russian Army only in 2002, as well as other trucks of the Mustang range. A low-rate production commenced in 2003

Taian TA5380 Chinese 8x8 Special Wheeled Chassis



Tiers:



Variants:

- **TA5382:** The TA5382 accommodates an additional four passengers due to the presence of a double cab, as well as being able to mount the WM-80 and WM-120 artillery rocket system.
- **TA5501:** The TA5501 is essentially a much larger variant with a 10x10 configuration, which offers better stability and mobility.

System

Alternative Designation: Taian TA580
Type: Special Wheeled Chassis
Manufacturer: Taian Special Vehicle Company
Family: Taian TA5380
Crew: 1 + 5 men

Dimensions

Length: m11
Width: m3
Height: m3
Weight, Empty: tons18
Payload Capacity: tons20

Automotive

Engine Name: Deutz Diesel
Engine Type: Diesel
Engine Power: hp517
Maximum Cruising Range: km800
Speed, Maximum Road: km/h80
Speed, Average Cross: km/h45
Speed Maximum Swim: Not Amphibious

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.5

Trench: m1.8

Fording Depth: m1.1

Communications

Tactical Radio: TBR-121

Fire Control

Note: The Taian TA5380 is a Special Wheeled Chassis

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The TAIAN TA580/TAS5380 is a 20-ton 8x8 special heavy duty truck developed and built by Taian Special Vehicle Manufacturer and used by the People's Liberation Army of the People's Republic of China as a transport/Transporter erector launcher. The TA580/TAS5380 specializes in carrying ballistic missiles, large-caliber artillery rockets, radar equipment as well as other forms of military assets. Unlike the much larger Wanshan WS51200 and the WS21200, the TA580/TAS5380 cannot carry much larger intermediate-range ballistic missiles and intercontinental ballistic missiles. Nevertheless, the TA580/TAS5380 has a maximum payload capacity of 20 tons, of which it primarily carries the HQ-9 air defense missile system. The TA580/TAS5380 comes in two additional variants. The TA5382 accommodates an additional four passengers due to the presence of a double cab, as well as being able to mount the WM-80 and WM-120 artillery rocket system. The TA5501 is essentially a much larger variant with a 10x10 configuration, which offers better stability and mobility.

Dongfeng EQ6670 Chinese 4x4 Bus



Tiers:



Variants:

- **EQ6840:** 6X6 version. Engine: Cummins EQ6BT5.9, 5.88 L, diesel, 160 hp Troop capacity: 24-30 Weight: 9.35mt Length: 8.38m Height: 2.93m. 2.13 with air conditioning unit Width: 2.35m Luggage compartment: 0.8m3 Speed: 85 km/h

System

Cooling: Water
Curb Weight: mt5
Number of Axles: ea2
Number of Tires: ea4
Troop Capacity: 3-19
Weight, Gross Vehicle: mt6.5
Wheels Central Tire Pressure Regulation System: No
Wheels Size: inDongfeng 11R18
Run Flat Tires: No

↳*Dimensions*

Height, Overall: m2.75. 2.96 with air conditioner
Length, Overall: m6.7
Width, Overall: m2.32

Automotive

Engine Type: Turbodiesel
Engine Name: Cummins ISDe140-30
Engine Size: Liters4.5
Engine Power: Hp138
Speed: km/h80
Engine Cooling: Water

↳*Fuel*

Fuel Capacity, Main: liters150

Fuel Capacity, Reserve: liters60

Fuel Type: Diesel

Armament

Armament: None

Mobility

Mobility, Air Lift: No

Payload

Cargo Space Cargo Bed Area: m31.05

↳*Payload Weight*

Payload on highway: mt1.5

Notes:

This bus is designed for non-tactical movement of troops and crews to and from airports and seaports. The engine is mounted in the front of this bus. Standard equipment includes an engine preheating device for cold weather operations. Options include an automatic brake gap adjustment arm; engine exhaust brake; ABS; air suspension; and automatic fire extinguishers within the engine compartment.

LVSR MKR16 American 10x10 Logistics Vehicle System Replacement (LVSR) Tractor Truck







Tiers:



Variants:

- **LSVR MKR15 Wrecker:** This version is equipped with a crane, winches and hydraulic spade. It can flat tow 110,000 lb (49,900 kg) on the highway. The truck has a lift and tow capacity of 97,000 lb (44,000 kg) gross vehicle weight with 24,000 lb (10,890 kg) lift capacity. The articulated crane has a lift capacity of 18,00 0 lb (8,170 kg) at 11 ft (3.35 m); and 10,000 lb (4,540 kg) at a maximum reach of 20 ft (6.1 m).
- **LSVR MKR16 Tractor:** This is the tractor variant of the LVSR. It is equipped with a recovery winch with a 60,000-lb (27,220-kg) capacity and 10,000-lb (4,540-kg) side-pull capacity.
- **MKR18 Cargo:** This is the cargo version of the LVSR. It is equipped with the Multilift Mk 18A1 load handling system. Towed trailers add 16.5 tons of payload.

System

Alternative Designation: LVSR MKR16

Type: Logistics Vehicle System Replacement (LVSR) Tractor Truck

Configuration: 10x10

Manufacturer: Oshkosh Defense, Oshkosh, Wis.

Crew: ea1

Cab Seating: 1x1

Airlift Capability: Vehicle can be airlifted by C-17 Globemaster III or C-5A Galaxy aircraft. Height of the vehicle can be reduced by 50 cm for easier transportation. With additional preparation it can be airlifted by the C-141 Starlifter.

Dimensions

Length: 10.41 m

Width: 2.49 m

Height: 3.11 m

Wheelbase: 5.42 m

Gross Weight: 48,530 kg

Gross Combined Weight: 82,100 kg

Curb Weight: 22,680 kg

Automotive

Engine Name: 1 x CAT C15

Engine Type: Diesel

Engine Power: hp600

Fuel Capacity: m628 liter

Maximum Speed: 105 km/h

Range: 480 km

Gradient: 60%

Side Slope: 30%

Vertical Step: 0.6 m

Trench: 2.5 m

Fording: 1.52 m

Note: The front two and the back two axles are steered.

Protection

Armor: It is fitted with an integrated armored cab and energy-absorbing seats.

Applique Armor: Yes, The add-on armor kit for LVSR was developed and supplied by Plasan of Israel. Plasan was awarded a contract in mid-2006 for 12 LVSR armor kits for testing. The November 2011-stated AAO for LVSR add-on armor B-kits quotes 651. The armor system for LVSR follows the A-kit/B-kit principle, with vehicles designed 'fitted for, but not with', protection. In the case of LVSR, 'fitted for' includes an armored cab floor as standard. Cargo and wrecker variants require an upgrade of the front springs. Protection kits can be installed and uninstalled from vehicles in the field using only basic tools. The A-kit is fitted on the production line and is the combination of a limited amount of armoring (in difficult-to-access areas of the vehicle), together with a significant amount of armour installation attachments and required support structures. The bulk of the armor, the B-kit, is installed in the field on an 'as required' basis. The benefits of the A-kit/B-kit principle are that armor is only fitted when required, this reducing vehicle wear and tear, and by default whole life cycle costs. Improvements and/or upgrades to armor are also far easier to integrate into an appliqué solution. The A-kit/B-kit principle is currently applied to all current production US tactical 'soft skin' vehicles.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: No

Notes:

MKR16 Tractor This is the tractor variant of the LVSR. It is equipped with a recovery winch with a 60,000-lb (27,220-kg) capacity and 10,000-lb (4,540-kg) side-pull capacity. The Logistic Vehicle System Replacement (LVSR) is a family of vehicles, based on a common 5-axle ten-wheel drive (10x10) chassis, that vary in individual configuration by mission requirements. The LVSR was designed and is manufactured by Oshkosh Defense. LVSR is a purpose-designed military vehicle and there are currently three variants in service, a cargo, a wrecker and a tractor truck. The first LVSRs were ordered in 2006. The LVSR is the U.S. Marines' equivalent of the U.S. Army's Oshkosh Heavy Expanded Mobility Tactical Truck (HEMTT) and Oshkosh Palletized Load System (PLS). The Marines do not use the HEMTT or PLS and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The predecessor of the LVSR, the MK48 Logistics Vehicle System (LVS), had entered service with the US Marine Corps (USMC) from 1985 and in the late 1990s a project to replace the LVS was started. As a precursor to a

formal LVS replacement programme a number of manufacturers co-operated with the USMC to build and evaluate an Advanced Technology Demonstrator (ATD). The ATD was built during 1998 at the Nevada Automotive Test Centre (NATC). LVS Modification Demonstrators (LVS-MDs) were also built, these integrating commercially proven automotive components and technologies. In April 2001, Logistics Management Institute (LMI) completed their final report for the 'Analysis of Alternatives (AoA) for the USMC Logistics Vehicle System Replacement (LVSR), concluding the best option was to rebuy a vehicle similar to the technology demonstrator. Five alternative options had been considered, these were: Inspect and Replace Only As Necessary (IROAN) for the LVS; rebuild the LVS; re-manufacture the LVS to a higher standard; rebuy a vehicle similar to the technology demonstrator; research and develop an entirely new vehicle. Around this time it was suggested that 2,000-3,000 vehicles might be required, although throughout the program numbers would fluctuate. An LVSR industry day was held in late 2001, and a formal solicitation to industry was released in early 2003. This had been delayed from an expected April 2002. The LVSR Request for Information (RfI) had originally been expected in May 2000. In March 2004 Oshkosh Truck Corporation (now Oshkosh Defense) announced that the US Marine Corps had awarded the company a Phase I System Development and Demonstration Contract to supply three LVSR trucks. These were to be delivered to the Marines for extensive endurance and performance testing within 12 months. This award was the first phase of a two-phase acquisition competition valued in March 2004 at $783 million for up to 1,581 vehicles. Competition for the Phase II production award (scheduled for March 2006) was limited to those companies that successfully completed Phase I evaluation. The other company selected for the Phase I evaluation was the American Truck Company (ATC) with a TATRA-based design. Phase 1 testing was completed in 2005 and in late-May 2006, the USMC awarded the LVSR Phase II contract to Oshkosh Truck Corporation. An initial LVSR order issued on 31 May 2006 was valued at $28 million and ordered 22 cargo, two wrecker (recovery), and tractor truck LVSR variants, plus vehicle kits, training (operator/maintainer-cargo), test support-production verification testing cargo, meetings, and contract data requirements. The first LVSR cargo variant began testing at the Aberdeen Proving Ground in June 2007. Tractor and wrecker prototype vehicles began testing in November 2007 and April 2008 respectively. An additional 123 cargo variants, which completed low rate initial production (LRIP) quantities, were subsequently ordered under option year two of the production contract. In January 2009, Oshkosh announced an LVSR delivery order valued at $176 million. This called for more than 425 LVSRs and transitioned LVSR from LRIP into full-rate production (FRP). LVSR fielding began in April 2009 for user trials and testing and the first vehicle was fielded to Afghanistan in September 2009. LVSR deliveries were completed in September 2013. Orders totalled 2,022, with the total order value around $965.78 million. Deliveries included 1,505 MKR18 cargo variants, 355 MKR16 tractor trucks, and 162 MKR15 wreckers. The requirement for an LVSR companion trailer for the USMC has also been provided by Oshkosh. The M1076, which is already in service with the US Army, is the selected trailer. In May 2009, it was announced that the Marine Corps would receive an initial 30 M1076 PLST for use with the LVSR. By early 2016 the USMC had purchased a total of 687 PLST through a separate contract with the US Army.

Wanshan WS2600 Chinese 10x8 Special Wheeled Chassis



Tiers:



System

Alternative Designation: NA

Type: Special wheeled chassis

Manufacturer: INA

Crew: 1

Passengers: 7

Configuration: 10x8

Cab Seating: INA

Dimensions

Length: 16.35 m

Width: 3.05 m

Height: 2.82 m

Weight, Curb: 22.5 t

Payload Capacity: 42.5 t

Automotive

Engine Name: Deutz

Engine Type: Diesel

Engine Power: hp544

Cruising Range: km650

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg40

Side Slope: deg20

Vertical Step: m0.4

Trench: m2.5

Fording Depth: m1.2

Protection

Armor: Protection from small arms and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The WS2600 is a 22.5 ton 10x8 and 10x10 transporter erector launcher used by the People's Liberation Army Rocket Force of the People's Republic of China. It is, along with the smaller WS2500, one of the principle mobility platforms in mounting China's medium-range ballistic missiles. It is a general purpose heavy duty missile transporter developed from the original WS2500 and is built by Wanshan Special Vehicle. Its other contemporary is the larger HTF5680A1. The WS2600 is a heavy duty TEL co-developed by a joint Chinese and Belarusian venture. The WS2600 is slightly bigger than the WS2500 and a larger version of the original WS2400 with an additional axle to support the increased payload. Due to its larger size, the WS2600 is able to carry much heftier missiles, of which its most common payload is the DF-21C medium-range ballistic missile and the DF-21D anti-ship ballistic missile. Both the WS2500 and WS2600 form one of the main TEL carriers of China's MRBM and ASBM stockpiles. Like the WS2500, the TEL has a 4-door cab, which allows the WS2600 to easily accommodates the driver and 7 additional passengers.

MAN 40.400 Danish 6x4 Tipper Cargo Truck







Tiers:

1 **2** 3 4

System

Alternative Designation: MAN 35.440
Type: Tipper Cargo Truck
Manufacturer: INA
Crew: ea1

Dimensions

Length: 8.4 m
Width: 2.5 m
Height: 3.26 m
Wheelbase: 3.9 m
Net Weight: 10,870 kg
Total Weight: 40,000 kg
Tires: 325/95R24

Automotive

Engine Name: D2066LF06
Engine Type: Diesel
Engine Power: 294Kw (400Pk)
Transmission: Manual (16 forward)
Fuel Capacity: 300 liter
Suspension: Steel suspension
Ties: 325/95R24

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: No

Smoke Equipment: INA

Notes:

MAN 40.400 Danish 6x4 Tipper Cargo Truck.

→Maintenance

→General Utility

9T452 Russian 8x8 Transloader Vehicle



Tiers:



System

Alternative Designation: 9T452
Type: 8x8 Transloader Vehicle
Manufacturer: ZiL; BAZ
In Service: 1966-Present
Crew: ea1
Passenger Capacity: 2
Payload Capacity: up to 9.4 t
Reload Rounds: The transloader vehicle carries 16 reload rounds arranged in two stacks positioned one either side of the vehicle.
Crane maximum Lifting Weight: 300 kg
Reload Time: 20 to 30 min

Dimensions

Length: 9.26 m
Width: 2.8 m
Height: 2.53 m
Weight, Combat: 10.9 t
Payload Capacity: up to 9.4 t

Automotive

Engine Name: 2 x ZiL-375Ya
Engine Type: Petrol

Engine Power: 2 x 180 hp

Range: km590

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: deg50

Side Slope: deg40

Vertical Step: m0.9

Trench: m2

Fording Depth: m1.2

Main Weapon System

Note: None

Protection

Armor: Protection from small arms and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Each BM 9P140 launcher is normally accompanied by at least one and sometimes two,9T452 transloader vehicles based on the same ZIL-135LM 8 × 8 chassis. The transloader vehicle carries 16 reload rounds arranged in two stacks positioned one either side of the vehicle. Mounted to the immediate rear of the cab is a hydraulic crane operated by one person, which is used to resupply the rocket launcher. This crane has a maximum lifting weight of 300 kg with the operator being seated to the rear. For reloading, the launcher has to be in the horizontal position and traversed to one side. The new rocket is then loaded into the tube via the crane and rammed home by the rammer. It is estimated that the reload time is 20 to 30 minutes, a long time when compared to the 227 mm US Lockheed Martin Missiles and Fire Control Multiple Launch Rocket System (MLRS).

M1094 American 6x6 Medium Tactical Vehicle (MTV) LVAD Dump Truck





Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1094

Type: Medium Tactical Vehicle (MTV) LVAD Dump Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Airlift Capability: The M1094 Dump Truck, LVAD is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available.

Winch: The M1094 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

Dimensions

Length: 7.19 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 4.10 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 9,969 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

M1094 Dump Truck, LVAD The M1094 Dump Truck, LVAD is designed to be loaded on and dropped from C130 aircraft into remote areas where landing strips are not available. The vehicle can transport dirt, rock, gravel, etc., in support of road construction missions. The M1094 is capable of transporting a 5 cubic yard, 10,000 pound payload. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1094 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

M113AS4 ALV Australian Armored Logistics Vehicle





Tiers:



Variants:

- **M113AS4 AF:** Armored fitted, fitted with a Hiab crane. A total of 38 of these vehicles will be delivered.
- **M113AS4 ARVL:** Armored recovery vehicle, fitted with a 13 t capacity winch. A total of 12 of these vehicles will be delivered.
- **M113AS4 AA:** Armored ambulance. A total of 15 of these vehicles will be delivered.
- **M113AS4 ACV:** Armored command vehicle. A total of 43 of these vehicles will be delivered.
- **M113AS4 ALV:** Armored logistics vehicle. It can take all types of combat supplies and carry them under armor. A total of 50 of these vehicles will be delivered.

System

Alternative Designation: M113AS4 ALV
Type: Armored Personnel Carrier (APC)
Manufacturer: Australia. Company: INA
Crew: ea2
Passenger Capacity: ea10

Dimensions

Length: 6 m
Width: 2.62 m
Height: 2.6 m
Weight, Combat: 18 tons

Automotive

Engine Name: MTU 6V199TE

Engine Type: Diesel

Engine Power: hp350

Cruising Range: km500

Speed, Maximum Road: km/h65

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 60

Side Slope: %30

Vertical Step: m0.6

Trench: m1.8 ~ 1.9

Fording Depth: m1.6

Main Gun

Turret: The M113AS4 ALV is fitted with a new one-man turret

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: mm12.7

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: ea2,000

Fire Control

Name: INA

Computerized FCS: No

Thermal Sight Vehicle Commander: INA

Thermal Sight Gunner: INA

Main Gun Stabilization: INA

Protection

Hull Armor: Vehicle's hull provides protection against up to 14.5 mm rounds.

Turret Armor: INA

Applique Armor: Protection of the upgraded APC was enhanced by add-on ceramic armor tiles. Hull was reinforced for additional protection against landmines and IED blasts. Interior was fitted with spall liner.

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

M113AS4 ALV armored logistics vehicle. It can take all types of combat supplies and carry them under armor. A total of 50 of these vehicles will be delivered. The M113AS4 is an Australian-made upgrade of the old M113AS1 and M113AS3 which are based on the American M113A1 tracked armoured personnel carrier (APC), one of the most popular light tracked APC in the world. The project of Australian M113 upgrade was leaded by BAE Systems. The decade long project to upgrade 433 M113 vehicles began in 2002, with the first completed vehicle delivered to the customer in January 2007. While the upgraded Australian M113s look similar to how they would have in the 1970’s, they are ‘a generational leap ahead’ with improved firepower, protection and habitability from the original M113 A1 vehicle. The finished vehicles are also more reliable and faster following the upgrade. The Australian Army operates a fleet of some 800 members of the M113 series of full-tracked armoured personnel carriers in different variants including ambulance, fire support, command post, mortar carrier, recovery and load carrier vehicles. The M113AS4 is currently the standard tracked APC of Australian armed forces. The M113 Armoured Personnel Carrier (APC) is an all-terrain vehicle designed to protect and transport its crew and up to ten Infantry personnel. In September 1996, the Australian Department of Defence selected the now Tenix Defence Systems Pty Ltd, Australia to upgrade 364 of the Australian Army's fleet of M113A1 series of full-tracked Armoured Personnel Carriers (APCs) to extend their operational life through to the year 2010.

Bushmaster Australian 4x4 Armored Combat Support Vehicle





Tiers:



Variants:

- **Planned Variants:** ADI (now Thales Australia) planned at least six variants. These included an armored ambulance; command vehicle; mortar carrier with internally mounted 81-mm or 120-mm weapon; fire support vehicle with 12.7-mm machine gun and 40-mm automatic grenade launcher; engineering vehicle; and firefighting vehicle.
- **Bushmaster ambulance:** This variant can transport two stretchered patients, or one stretchered and four seated patients at one time. They are equipped with the latest medical equipment and provide protection against blasts and ballistic threats.
- **Bushmaster EOD:** The Bushmaster explosive ordinance disposal (EOD) variant is fitted with a 27 ft 11 in (8.5 m) interrogator arm with a 225-degree arc of operation around the front of the vehicle. The arm can be installed onto any existing Bushmaster vehicle to modify it into an EOD variant. The two-piece articulated arm can include the following attachments: interrogation tool with clasp claw; work light; camera; detection equipment; and proximity detector. The vehicle can also be fitted with a roller clearance system that is hydraulically operated, steerable and easily attached and released. An EOD robot can also be stored internally .
- **Bushmaster combat support vehicle:** Thales Australia privately developed a prototype Bushmaster combat support vehicle in 2005. It was previously known as the Copperhead . This 4 x 4 vehicle features the Bushmaster cab at the front, with a flat-bed cargo area at the rear, which can carry up to 11,000 lb (5,000 kg) of cargo. The cargo area measures 101 sq ft (9.4 sq m). Upgradeable ballistic protection options are available for the crew cabin. The vehicle has a top speed of 60 mph (100 km/h) and a maximum range of 500 mi (800 km). It also offers high clearance for obstacles, tight turning circle and the ability to travel off-road in all conditions, according to the manufacturer. A dual-cab variant, offered for the British operational utility vehicle system (OUVS) program, featured a larger interior cabin with room for two crew and up to six passengers with four side-opening passenger doors and a flatbed area of 54 sq ft (5 sq m) and a 6,600-lb (3,000-kg) payload.
- **Bushmaster 6 x 6:** Thales Australia has conducted studies of a 6 x 6 version of the Bushmaster, which would have a gross vehicle weight of up to 25.6 tons.

System

Alternative Designation: Bushmaster Combat Support Vehicle; Copperhead
Type: Protected Mobility Vehicle
Crew: ea2 (commander, driver)
Passenger Capacity: 8 troops

Dimensions

Length, Overall: 6.60 m
Length, Hull: 7.09 m
Height: 2.65 m
Width: 2.50 m

Cabin Volume: 11.2 cubic m

Ground Clearance, Hull: 0.43 m

Ground Clearance, Axle Housings: 0.40 m

Wheel Track: 2.10 m

Wheel Base: 3.90 m

Weight, Unloaded: 12,500 kg

Weight, Combat: 15,000 kg

Weight, Payload: 2,500 kg

Flat-Bed Cargo Area: This 4 x 4 vehicle features the Bushmaster cab at the front, with a flat-bed cargo area at the rear, which can carry up to 11,000 lb (5,000 kg) of cargo. The cargo area measures 101 sq ft (9.4 sq m).

Automotive

Engine Name: 1 x Caterpillar 3126 ATAAC

Engine Type: 6-cylinder turbocharged air-to-air after-cooled diesel

Engine Power: 300 hp at 2,400 rpm with 25 percent torque rise

Transmission: ZF 7HP502 full automatic with front-end retarder for controlled slope descent

Tires: 395/85 R20 with bead locks or optional run-flat inserts

Inflation System: optional dual-channel with dash-mounted push button control, providing 4 settings highway, sand, mud/snow and emergency

Brakes: dual circuit Meritor air-operated disc brakes assisted by a hydraulic retarder

Suspension: AxleTech 4000 series coil spring with short-long-arm wishbone and double-acting hydraulic shock-absorbers, bump-stop rubbers

Axles: Arvin Meritor/Timoney 4000 series independent suspension axle system, 7,700-kg capacity with diff locks front, center and rear

Speed, Road: 100 km/h

Range: 800 km

Vertical Obstacle: 0.50 m

Fording: 1.20 m w/out preparation

Gradient: %60

Side Slope: %40

Approach Angle: deg40

Departure Angle: deg38

Turning Circle: 18.6 m

Fuel Capacity: 319 Liters

Main Gun

Note: Remote weapon station up to 12.7mm HMG or 40mm AGM launcher, or manned open turret up to 12.7mm HMG or 40mm AGM launcher

↳*System*

Name: M2 Browning
Type: Heavy Machine Gun
Caliber: 12.7 mm
Length: 1,654 mm
Barrel Length: 1,143 mm
Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)
Action: Short recoil-operated
Rate of Fire: 450–600 rounds/min
Muzzle Velocity: 890 m/s
Maximum Firing Range: 7,400 m
Effective Firing Range: 1,800 m
Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: .50 BMG (12.7×99mm NATO)
Basic Load: 1,200

Auxiliary Weapon System

Note: Manned swing mounts up to 7.62mm (one front and two rear)

Fire Control

Name: INA
Computerized FCS: No
Thermal Sight Vehicle Commander: INA
Thermal Sight Gunner: INA

Protection

Hull Armor: all-welded steel to withstand 5.56-mm and 7.62-mm ball ammunition
Turret Armor: INA
Applique Armor: Upgradeable ballistic protection options are available for the crew cabin.
Explosive Reactive Armor: No
Active Protection System: INA
Mine Clearing: No
Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: 8 x grenade launchers (bank of 4 on each side of vehicle hull)

Notes:

Bushmaster combat support vehicle Thales Australia privately developed a prototype Bushmaster combat support vehicle in 2005. It was previously known as the Copperhead . This 4 x 4 vehicle features the Bushmaster cab at the front, with a flat-bed cargo area at the rear, which can carry up to 11,000 lb (5,000 kg) of cargo. The cargo area measures 101 sq ft (9.4 sq m). Upgradeable ballistic protection options are available for the crew cabin. The vehicle has a top speed of 60 mph (100 km/h) and a maximum range of 500 mi (800 km). It also offers high clearance for obstacles, tight turning circle and the ability to travel off-road in all conditions, according to the manufacturer. A dual-cab variant, offered for the British operational utility vehicle system (OUVS) program, featured a larger interior cabin with room for two crew and up to six passengers with four side-opening passenger doors and a flatbed area of 54 sq ft (5 sq m) and a 6,600-lb (3,000-kg) payload. The Bushmaster Protected Mobility Vehicle or Infantry Mobility Vehicle is an Australian-built four-wheel drive armoured vehicle. The Bushmaster was primarily designed by the then government-owned Australian Defence Industries (ADI), and is currently produced by Thales Australia with a support contract provided by Oshkosh Truck following the acquisition of ADI. The Bushmaster is currently in service with the Australian Army, Royal Australian Air Force, Royal Netherlands Army, British Army, Japan Ground Self Defense Force, Fiji Infantry Regiment, Jamaica Defence Force and the New Zealand Army. The role of the Bushmaster is to provide protected mobility transport (or protected troop lift capability), with infantry dismounting from the vehicle before going into action. As the Bushmaster is only lightly armoured, the term Infantry Mobility Vehicle (IMV) was initially adopted to distinguish it from a heavier wheeled or tracked armoured personnel carrier, such as the ASLAV and M113 also in Australian service. Later the Bushmaster's designation was changed to Protected Mobility Vehicle (PMV). The Bushmaster is optimised for operations in northern Australia, and is capable of carrying up to 9 soldiers and their equipment, fuel and supplies for 3 days, depending on the type of variant. The vehicle is fitted with air conditioning and was once planned to have a cool water drinking system, but was omitted upon production due to cost constraints. After operational complaints the drinking water cooling system is being reconsidered for installation. It has a road cruise speed of 100 km/h and an operational range of 800 km. The Bushmaster is a mine protected vehicle and provides a high degree of protection against land mines, using its v-hull monocoque to deflect the blast away from the vehicle and its occupants. The vehicle's armour provides protection against small arms of up to 7.62 mm ball ammunition, 81mm mortar fragments, Claymore mines, and with additional applique armour, protection for armour-piercing ammunition of up to 7.62mm. The fuel and hydraulic tanks of the vehicle are located outside the crew compartment, while it also has an automatic fire suppression system. The troop carrier variant of the Bushmaster is fitted with one gun ring. The forward gun ring can be fitted with a 5.56 mm or 7.62 mm machine gun. The two rear hatches each have a mounting boss to allow the attachment of a swing mount capable of holding a 7.62 mm machine gun. The Bushmaster is air transportable by C-130 Hercules, C-17 Globemaster III and Mil Mi-26 aircraft. It is the first armoured vehicle to be designed and completely manufactured in Australia since the Sentinel tank during World War II.

Kamaz-5350 Russian 6x6 General Utility Truck





Tiers:

1 2 3 4

Variants:

- **KamAZ-4350 (4x4):** 4x4 Version
- **KamAZ-6350 (8x8):** 8x8 Version

System

Alternative Designation: KamAZ-5350
Type: General Utility Truck
Manufacturer: Kamaz
Family: Mustang Family
In Service: 2003-Present
Cab Seating: 1+2 Men
Passenger Capacity: INA
Configuration: 6x6
Liter/Stretcher Capacity: INA

Dimensions

Length: m7.85
Width: m2.5
Height: m3.29
Weight, Combat: tons9.2
Maximum Load: tons6

Automotive

Engine Name: KamAZ-740.13-260 Diesel
Engine Type: Diesel
Engine Power: hp260
Cruising Range: km1,000

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.75

Maximum Load: tons6

Note #1: Engine is also equipped with cold weather starting device and can be started at temperatures down to -50°C

Note #2: Vehicle has a full-time all-wheel drive and is fitted with a central tyre inflation system

Communications

Radio: R-168-5UN(1)E Russian VHF Manpack-Vehicular Radio Station

Protection

Armor: INA, It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

Notes:

The KamAZ-5350 general utility truck is a member of Mustang family. This family of military trucks includes the KamAZ-4350 (4x4) and KamAZ-6350 (8x8) with numerous variants. This general utility truck is a further development of the KamAZ-4310, which was launched in the early 1980s. It was officially accepted to service with the Russian Army in 2002 and a small-scale production commenced in 2003.

Kamaz 4310 Russian 6 Metric Ton 6x6 General Utility Vehicle



Tiers:



Variants:

- **KamAZ-43101:** More powerful 220hp engine
- **Numerous other variants for various duties.:**

System

Curb Weight: mt3.6
Ground Clearance: mm550
Number of Axles: ea3
Payload on/off Highway: kg6,000
Troop Capacity: 3 in cab, 18 in rear
Turning Radius: m10
Weight, Gross Vehicle: mt7
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in21x24

Automotive

Cooling: Water
Engine Type: V8, 165hp, Diesel turbo-charged
Fording Depth: m.5
Fuel capacity, Left Tank: liters120
Fuel capacity, Right Tank: liters120
Gradient, Loaded: deg31
Range, Cruising: km1,000
Speed: km/h85
Towing Capability, Off: kg2,000
Towing Capability, On: kg7,000

Cargo Space

Cargo Bed Area: m2~12
Width: m2.47
Length: m4.89
Height: m.89

↳*Dimensions*

Height, Overall: m3.375
Length, Overall: m7.73
Width, Overall: m3.34

Notes:

Besides operating as a general cargo carrier, the KamAZ-4310 is used as a command and control vehicle.

GAZ-66 Russian All Purpose Cargo Truck





Tiers:



Variants:

- **GAZ-66A:** Steel Cab
- **GAZ-66B:** Canvas-top cab for air transport or air drop.

System

Ground Clearance: mm315
Number of Axles: ea2
Payload on/off Highway: kg2,000
Troop Capacity: ea2 in cab, 21 in rear
Turning Radius: m10
Curb Weight: mt3.6
Weight, Gross Vehicle: mt5.8
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in12x18

Dimensions

Vehicle Length: m5.8
Vehicle Width: m2.3
Vehicle Height: m2.5
Wheelbase: m3.3
Curb Weight: kg3,440

Automotive

Cooling: Water
Engine Type: V8, 115hp, Gasoline
Fording Depth: m1
Fuel Capacity: liters210
Fuel capacity, Left Tank: liters105
Fuel capacity, Right Tank: liters105
Gradient, Loaded: deg39
Range, Cruising: km875
Speed: km/h95
Towing Capability, Off: 2,000
Towing Capability, On: kg2,000
Fuel Economy: mpg9

Cargo Space

Cargo Bed Area: m26.8
Width: m2.05
Height: m.89
Length: m3.33

Notes:

The GAZ-66 is a Soviet and later Russian 4x4 all-road (off-road) military truck produced by GAZ. It was one of the main cargo vehicles for motorized infantry of the Soviet Army and is still employed in former Soviet Union countries. It is nicknamed shishiga (шишига) shehsherik (шешерик) trueman (in Siberia). Almost one million vehicles of this type were built for both military and civil use. The GAZ-66 has gained legendary status in many countries around the world due to its reliability, simplicity and off-road capability. Thanks to standard features, such as a front-mounted winch, Central Tire Inflation System (CTIS) and self-locking differentials, the GAZ-66 is extremely popular worldwide with armed forces and off-road enthusiasts. Production ceased in 1999, with the GAZ-3308 being produced instead. Besides functioning as a general cargo carrier, the GAZ-66 is used as a prime mover for 120mm mortars. The DDA-66 variant is an NBC decontamination truck.

M1120 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Load Handling System (LHS)







Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo

bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS, as fitted to the Oshkosh PLS truck.

- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M1120 HEMTT Load Handling System (LHS)
Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Load Handling System (LHS)
Manufacturer: Oshkosh Corporation
Configuration: 8x8
Family: Heavy Expanded Mobility Tactical Truck (HEMTT)
Crew: ea2
Payload Capacity: 9,979 kg
Crane: A large arm-like crane grabs pre-loaded cargo flatracks, shelters and containers, and then hoists them on to the rear of the vehicle.
Trailer: A trailer can also be added to double the payload. It is designed for rapid transport of all classes of supply with a payload capacity of 22,000 lbs (9,979 kg).
Airdrop Capability: The HEMTT LHS is interoperable with NATO standard flatracks and air transportable in the C-130 aircraft.

Dimensions

Length: 10.17 m
Width: 2.44 m
Height: 2.57 m
Distance Between Equalizer Pivots: 5.33 m
Distance Between Axles, 1st to 2nd: 1.52 m
Distance Between Axles, 2nd to 3rd: 3.81 m
Distance Between Axles, 3rd to 4th: 1.52 m
Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

M1120 HEMTT Load Handling System (LHS) This modified HEMTT M977 Cargo Truck was redesigned to incorporate the LHS used on the Palletized Loading System (PLS), allowing the truck to be loaded and unloaded with cargo without additional material handling equipment. A large arm-like crane grabs pre-loaded cargo flatracks, shelters and containers, and then hoists them on to the rear of the vehicle. A trailer can also be added to double the payload. It is designed for rapid transport of all classes of supply with a payload capacity of 22,000 lbs (9,979 kg). The HEMTT LHS is interoperable with NATO standard flatracks and air transportable in the C-130 aircraft. FUE First Digitized Division (4th Infantry Division), Fort Hood, in November 2000. A variant -- HEMTT-LHS THAAD -- has been modified for use as launch platforms for the Theater High Altitude Area Defense (THAAD) weapon system. The first two vehicles were delivered in October 2002. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89

× 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-speed transfer case. The front axles on all HEMTTs are single-reduction Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration. The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production models have the suffix A4.

Ural-43203 Russian 6x6 General Utility Truck




Tiers:

1 2 3 4

Variants:

- **Ural-4320VV:** Originally built for the Internal Troops
- **Ural-4420:** tractor truck.
- **Ural-4320-0911-30:** is a long wheelbase model. It has a payload capacity of up to 10 t. This version can carry more cargo, 39 troops or various specialized bodies
- **Ural-43206:** a 4x4 version. It has a payload capacity of up to 4.2 t. It can carry up to 24 troops at the rear. This truck is capable of towing trailers with a maximum weight of 7 t. The 4x4 version is powered by a diesel engine, developing 180 hp. It was adopted by the Russian Army in 1996 and production commenced during the same year.
- **Ural-4320-70,:** also known as Ural Next is new version of the Ural-4320. It is fitted with a new cab of steel and polymer construction. Production of the commercial Ural Next commenced in 2015, though militarizes model was also proposed for the Russian military. Initially the new Ural Next was produced alongside the older Ural-4320 trucks.

System

Alternative Designation: Ural-43203
Type: General Utility Truck
Manufacturer: Ural Automotive Plant
Family: Ural 4320 Series
Configuration: 6x6
Crew: ea1
Passenger Capacity: ea27
Note: Production of the Ural-4320 still continues.

Dimensions

Length: m7.37
Width: m2.5
Height: m4.5
Weight, Empty: tons8
Payload capacity (on road): tons6
Payload capacity (off road): tons4.5
Maximum Tow Capacity: tons12

Automotive

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Communications

Primary: INA

Fire Control

Laser Target Desinator: INA

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

The Ural-43203 - chassis with reinforced front suspension The Ural-4320 is a general purpose off-road 6x6 vehicle, produced at the Ural Automotive Plant in Miass, Russia for use in the Russian army. Introduced in 1976, it is still in production today. The wheel arrangement for the Ural-4320 was designed for transporting cargo, people and trailers on all types of roads and terrain. It also serves as a launching platform for the BM-21 "Grad" rocket launcher. The Ural-4320 is a diesel-powered development of the Ural-375D. The Ural-4320 chassis has good ground clearance, so it is preferred in regions where roads are difficult to traverse due to sand or big rocks. In the proverbial Russian tradition, the Ural-4320 is reliable and easy to repair and maintain. It has civilian uses as a fire truck, a garbage truck, or a logging truck. It is also used for water, oil and gas drilling using the 1BA15 and URB-3A3 drilling rigs, which are mounted on the chassis.

MZKT-7930 Belarusian 8x8 Special Wheeled Chassis




Tiers:

1 2 3 4

Variants:

- **MZKT-79306:** MZKT-79306 is a proposed export version. A prototype was completed in 2000. It is fitted with a Deutz BF8M diesel engine, developing 544 hp. Engine is mated to an Allison automatic transmission. This vehicle has a payload capacity of 25 000 kg.
- **MZKT-7930-300:** MZKT-7930-300 is an improved version, fitted with a Belarusian 6-speed automatic transmission. It was adopted by Belarus, as a chassis for Polonez artillery rocket system.
- **MZKT-7415:** MZKT-7415 is a prime mover with a shorter wheelbase. It was originally intended to replace the MAZ-7410.
- **MZKT-79292:** MZKT-79292 is a larger 10x10 version, that can carry 35 t of payload. Maximum speed is limited to 45 km/h. This vehicle was designed to compete with a Russian BAZ-69096 special wheeled chassis with 10x10 configuration, which is planned to be used as a transporter erector launcher for a new Russian S-500 long-range air defense and anti-ballistic missile system.
- **MZKT-7909:** MZKT-7909 is a newer 8x8 version. It is powered by a TMZ-84631.10 turbocharged diesel engine, developing 525 hp. This vehicle has a payload capacity of 22 700 kg and is fitted with a new cab. It is used to carry a Turkish Khan short-range ballistic missiles.

System

Alternative Designation: MZKT-7930

Type: Special Wheeled Chassis

Manufacturer: INA

Crew: ea1

Passengers: ea2

Chassis: MZKT-7930

Note: This high mobility vehicle is used as a chassis for the Iskander short range ballistic missile system and Bal costal defense missile system, TMM-6 heavy mechanized bridge and other applications. It also carries radar of the S-400 missile system.

Dimensions

Length: m12.7

Width: m3.00

Height: m3.29

Weight, Combat: tons20.5

Ground Pressure: kg/mINA

Automotive

Engine Name: YaMZ-846

Engine Type: Diesel

Engine Power: hp500

Cruising Range: km1,000

Speed, Maximum Road: km/h70

Speed, Off Road: km/h35

Speed Maximum Swim: Not Amphibious

Gradient: deg45

Side Slope: deg30

Vertical Step: m0.6

Trench: m2

Fording Depth: m1.4

Protection

Hull Armor: It provides protection for the crew against small arms fire and artillery shell splinters. This vehicle lacks any defensive armament.

Applique Armor: Avaialble

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The MZKT-7930 special wheeled chassis was developed in Belarus the early 1990s. Sometimes this vehicle is nicknamed the Astrolog (Astrologer). It was designed to replace the ageing MAZ-543 special wheeled chassis.

ZIL-131 Russian 6x6 General Purpose Truck




Tiers:

1 2 3 4

System

Alternative Designation: ZIL-131

Type: General Purpose Truck

Manufacturer: ZIL (Russia)

In Service: 1962-Present

Crew: ea1

Seating Capacity, Cab: 3

Passenger Capacity: INA.

Cab Design: Forward Engine

Payload: 5000 kg plus trailer 5000 kg (on road), or 3,500 kg plus trailer 4000 kg off road.

Dimensions

Length: m7.04

Width: m2.49

Height, Cab: m2.49

Height, Transport Body: m2.97

Curb Weight: kg6,700

Wheelbase: 10 ft 10 in (3.30 m)+4 ft 7 in (1.40 m)

Automotive

Engine Name: INA

Engine Type: V8 gasoline (carburetor) ZIL-130

Engine Power: hp

Cruising Range: km

Speed, Maximum Road: km/h

Speed, Average Cross: km/h

Speed Maximum Swim: km/h

Gradient: INA

Side Slope: INA

Vertical Step: INA

Trench: INA

Fording Depth: mINA

Suspension: solid axles with leaf springs.

Transmission: 5 m, 2-speed transfer case

Fuel Economy: 5.9 mpg-US (40 L/100 km; 7.1 mpg-imp) (city), 50 to 100 liters/100 km (cross-country).

Fuel Tanks: 2x45 gal.

Maneuverability: turning circle 33'5.6", approach angle 36°, departure angle 40°, max. ascent angle 31° (with 3,750 kg (8,267 lb) load), ground clearance 13 in (330 mm), overcome ford 4 ft 7 in (1.40 m)

Stopping Distance at 35 km/h: 12 m

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The ZIL-131 is a general purpose 3.5 tons 6x6 army truck designed in the Soviet Union by ZIL. The basic model being a general cargo truck. Variants include a tractor-trailer truck, a dump truck, a fuel truck, and a 6x6 for towing a 4-wheeled powered trailer. The ZIL-131 also serves as a platform for the 9P138 rocket launcher, a 30-tube variant of the BM-21 "Grad". The ZIL-131 was introduced in 1966; it is a military version of the ZIL-130, that was introduced in 1962, and a family of two trucks is sharing identical components. The ZIL-131 6x6 has the same equipment as the GAZ-66 and Ural-375D. The ZIL-130/131 was in production at the "AMUR" truck plant (as the AMUR 531340), with both gasoline and diesel engines, until 2012 when AMUR shut down and filed for bankruptcy.

Ural-375 Russian 6x6 General-Purpose Cargo Truck





Tiers:



Variants:

- **Ural-375:** Ural-375 has an open cab roof that could be covered by a canvas - i.e.: a softtop cab rather than a hardtop.
- **Ural-375A:** Ural-375A has a fully enclosed all-steel cab, was a chassis for wagon-style body, payload 12,787 lb (5,800 kg), framework shortened to 13.2'
- **Ural-375D:** Ural-375D Most produced 375.
- **Ural-375E KET-L:** Ural-375E KET-L was a recovery vehicle equipped a front-mounted and a rear-mounted winch along with a jib crane.
- **Ural-375S:** Ural-375S was a tractor-trailer truck with framework shortened to 5.3'.
- **Ural-377:** Ural-377-civilian 6×4 truck
- **Ural-377S:** Ural-377S was a civilian 6×4 tractor-trailer.

System

Alternative Designation: NA
Type: 6x6 General-Purpose Cargo Truck
Manufacturer: Ural Automobile Plant, Miass
Cab Capacity: 1 driver, 1 passenger
Passenger Capacity: INA
Payload Capacity: 4500 kg (plus trailer: 22,050 lb, 10,002 kg)

Dimensions

Length: m7.35
Width: m2.96
Height: m2.98
Weight, Empty: t8
Payload Capacity: t5
Ford: m1.5
Ground Clearance: INA

Automotive

Engine Name: 7.0L ZIL-375YA V8

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h76

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 65%

Side Slope: 40%

Vertical Step: m0.8

Trench: m0.7

Fording Depth: m1.2

Suspension: Solid axles, leaf springs, rear wheels at balance-cart.

Fuel Capacity: 79 gallon tank and 16 gallon tank

Fuel Economy: 4.9 mpg (19-25 mph), 2.94 mpg (city)

Protection

Armor: Protection from small arms fire and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Ural-375 is a general purpose 4.5 ton 6×6 truck, produced at the Ural Automotive Plant in the Russian SFSR since 1961. The Ural 375 replaced the ZIL-157 as the standard Soviet Army truck in 1979. It was itself replaced by the Ural-4320. The Soviets found the trucks an ideal platform for the BM-21 Grad rocket launcher. Other modes for the Ural-375D included troop carrier, supply carrier, etc.

Ural-43206 Russian 4x4 General Utility Truck




Tiers:



Parent:

Ural-4320 Russian General Utility Truck

Variants:

- **Ural-4320VV:** Originally built for the Internal Troops
- **Ural-4420:** Tractor truck.
- **Ural-4320-0911-30:** Is a long wheelbase model. It has a payload capacity of up to 10 t. This version can carry more cargo, 39 troops or various specialized bodies
- **Ural-43206:** A 4x4 version. It has a payload capacity of up to 4.2 t. It can carry up to 24 troops at the rear. This truck is capable of towing trailers with a maximum weight of 7 t. The 4x4 version is powered by a diesel engine, developing 180 hp. It was adopted by the Russian Army in 1996 and production commenced during the same year.
- **Ural-4320-70,:** Also known as Ural Next is new version of the Ural-4320. It is fitted with a new cab of steel and polymer construction. Production of the commercial Ural Next commenced in 2015, though militarizes model was also proposed for the Russian military. Initially the new Ural Next was produced alongside the older Ural-4320 trucks.

System

Alternative Designation: Ural-43206
Type: General Utility Truck
Manufacturer: Ural Automotive Plant
Family: Ural 4320 Series
Configuration: 4x4
Crew: ea1
Cab Configuration: 1 + 2 personnel
Passenger Capacity: ea24
Note: This high mobility truck is used in large numbers as a troop or cargo transport.

Dimensions

Length: m7.37
Width: m2.5
Height: m2.7

Weight, Empty: tons8.1

Payload Capacity: tons4.2

Maximum Tow Capacity: tons7.7

Automotive

Engine Name: YaMZ-236M2

Engine Type: Diesel

Engine Power: hp180

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg58

Side Slope: deg40

Vertical Step: m0.55

Trench: m0.6

Fording Depth: m1.75

Communications

Primary: INA

Fire Control

Laser Target Desinator: INA

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

The Ural-43206 is a 4x4 version, developed from the larger Ural-4320, which has a 6x6 configuration. It was developed both for internal market, as well as the export customers. It is worth mentioning that the 4x4 version is less expensive than the larger 6x6. The Ural-43206 was adopted by the Russian Army in 1996. Its production commenced the same year. This high mobility truck is used in large numbers as a troop or cargo transport.

Ural-4320 Russian 6x6 General Utility Truck





Tiers:



Variants:

- **Ural-4320VV:** Originally built for the Internal Troops
- **Ural-4420:** tractor truck.
- **Ural-4320-0911-30:** is a long wheelbase model. It has a payload capacity of up to 10 t. This version can carry more cargo, 39 troops or various specialized bodies
- **Ural-43206:** a 4x4 version. It has a payload capacity of up to 4.2 t. It can carry up to 24 troops at the rear. This truck is capable of towing trailers with a maximum weight of 7 t. The 4x4 version is powered by a diesel engine, developing 180 hp. It was adopted by the Russian Army in 1996 and production commenced during the same year.
- **Ural-4320-70,:** also known as Ural Next is new version of the Ural-4320. It is fitted with a new cab of steel and polymer construction. Production of the commercial Ural Next commenced in 2015, though militarizes model was also proposed for the Russian military. Initially the new Ural Next was produced alongside the older Ural-4320 trucks.

System

Alternative Designation: Ural-4320
Type: General Utility Truck
Manufacturer: Ural Automotive Plant
Family: Ural 4320 Series
Configuration: 6x6
Crew: ea1
Passenger Capacity: ea27
Note: Production of the Ural-4320 still continues.

Dimensions

Length: m7.37
Width: m2.5
Height: m4.5
Weight, Empty: tons8
Payload capacity (on road): tons6
Payload capacity (off road): tons4.5
Maximum Tow Capacity: tons12

Automotive

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Communications

Primary: INA

Fire Control

Laser Target Desinator: INA

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

The Ural-4320 is a general purpose off-road 6x6 vehicle, produced at the Ural Automotive Plant in Miass, Russia for use in the Russian army. Introduced in 1976, it is still in production today. The wheel arrangement for the Ural-4320 was designed for transporting cargo, people and trailers on all types of roads and terrain. It also serves as a launching platform for the BM-21 "Grad" rocket launcher. The Ural-4320 is a diesel-powered development of the Ural-375D. The Ural-4320 chassis has good ground clearance, so it is preferred in regions where roads are difficult to traverse due to sand or big rocks. In the proverbial Russian tradition, the Ural-4320 is reliable and easy to repair and maintain. It has civilian uses as a fire truck, a garbage truck, or a logging truck. It is also used for water, oil and gas drilling using the 1BA15 and URB-3A3 drilling rigs, which are mounted on the chassis.

M985 HEMTT American 8x8 Heavy Expanded Mobility Tactical Truck (HEMTT) Cargo Truck







Tiers:



Variants:

- **M977:** The M977 cargo truck variant is the base member of the HEMTT family. The current model is the M977A4; there was no M977A1. In addition to the basic M977A0/A2/A4 cargo truck, two other variants are available. The M977A0/A2/A4 Electrical Power Plant (EPP) has an extended cargo body (6.041 m (19.82 ft) inside length) and is used to hold and transport generators for the Patriot air-defence missile system. There is no material handling crane on the EPP. The M977A0/A2/A4 Large Repair Parts Transporter (LRPT) and the basic M977 cargo truck are fitted with a light-duty Grove materials handling crane mounted at the rear of the chassis.
- **M978:** The M978 is a 9,500 liter capacity tanker. The current model is the M978A4; there was no M978A1. The M978A0 was produced in both potable water (approximately 18) and fuel servicing truck variants, the A2 and A4 models have only been produced in the fuel servicing truck variant.
- **M983 Tractor:** The M983 is a tractor unit for use with the trailer-mounted MIM-104 Patriot missile system. It can also be used with the Interim Stryker Recovery System, or other trailers. An earlier variant fitted with a 30 kW generator and crane mounted behind the cab was used to tow the Pershing II Erector Launcher in CONUS (a M1001 MAN tractor was used in West Germany). The M983A2/A4 Light Equipment Transporter (LET) tractor is mainly used to transport construction and engineer equipment. It has a 45,000 lb (20,000 kg)) 2 speed hydraulic winch mounted behind the cab used to load the trailer. It does not have a self-recovery winch.
- **M984A1 Wrecker:** The M984 wrecker is the only HEMTT variant to have been produced in the A1 configuration, and this resulting in the change of recovery crane and retrieval system between A0 and A1 configurations. The current model is the M984A4. Standard equipment includes a 27,240 kg (60,050 lb) capacity two-speed recovery winch, a rear-mounted 11,340 kg capacity vehicle retrieval system, and a 6,350 kg (14,000 lb) at 2.74 m (9.0 ft) capacity Grove materials handling crane. A 9,072 kg (20,000 lb) bare drum capacity self-recovery winch is fitted as standard on the M984.
- **M985 Cargo:** The M985 is available in two variants. The current models are A4; there were no A1 models. The M985 cargo variant is similar to the M977 cargo truck but was developed to support the M270 Multiple Launch Rocket System (MLRS) with a M989A1 HEMAT trailer. It may also used to transport Patriot missiles. The M985 Guided Missile Transporter (GMT) was developed specifically for use with the Patriot system and it can be distinguished easily from other cargo models by its rear-mounted Hiab 8108/2 materials handling crane
- **Taiwanese RT-2000 Multiple Rocket Launcher:** The RT-2000 [Lit; Ray-Ting-2000 or Thunder -2000] rocket launcher mounted on an M977 chassis. In service about 1997. Can mount any one of three launchers: Mk 15 117-mm, 60 rounds; Mk 30, 30 rounds with HE; AP/AM cluster warhead - >18-mile range; Mk 45 12 rounds, > 27-mile range, GPS targeting. See separate record for details.
- **M1120 HEMTT Load Handling System (LHS):** The M1120 Load Handling System (LHS) variant was initially introduced as part of the HEMTT overhaul/rebuild program, during which returned M977 cargo trucks have their cargo bodies and materials handling cranes removed, to be replaced by a Multilift Mark 5 (now designated MPH165-LHS) LHS,

as fitted to the Oshkosh PLS truck.

- **M1977 HEMTT Common Bridge Transporter (CBT):** The M1977 HEMTT Common Bridge Transporter (CBT) is a further development of the M1120 LHS, and in common with the M1120 LHS was initially introduced as part of the HEMTT overhaul/rebuild program. It is used for loading, transporting, and unloading Ribbon Bridge components and bridge erection boats.
- **M1142:** The M1142 is a Tactical Fire Fighting Truck (TFFT) capable of extinguishing aircraft, petroleum, brush, and structural fires at isolated military installations. The TFFT is based on a HEMTT M977A2 chassis with the heavier duty M1120 LHS HEMTT variant rear suspension. The TFFT contract was awarded to Pierce Manufacturing with Oshkosh Corporation as a subcontractor to Pierce.
- **M977 A2 Cargo Truck:** Basic version.
- **M977 A2 EPP:** Electrical power plant.
- **M977 A2 LRPT:** Large repair parts transporter.
- **M978 A2:** Fuel servicing transporter truck tanker.
- **HEMTT M983 A2 LET:** Light equipment transporter.
- **HEMTT M983 A2:** Patriot missile tractor.
- **M984 A2:** Recovery truck.
- **M985 A2:** Cargo and MRLS resupply.
- **M985 A2 GMT:** Guided missile transporter.
- **M1120 A2 HEMTT-LHS:** Heavy expanded mobility tactical truck.
- **M1977 A2 CBT:** Common bridge transporter.

System

Alternative Designation: M985 HEMTT

Type: Heavy Expanded Mobility Tactical Truck (HEMTT) Cargo Truck

Manufacturer: Oshkosh Corporation

Configuration: 8x8

Family: Heavy Expanded Mobility Tactical Truck (HEMTT)

Crew: ea2

Payload Capacity: 9,979 kg

Material Handling Crane Maximum Capacity: 2,449 kg at 5 m boom length

Dimensions

Length: 10.17 m

Width: 2.44 m

Height: 2.57 m

Distance Between Equalizer Pivots: 5.33 m

Distance Between Axles, 1st to 2nd: 1.52 m

Distance Between Axles, 2nd to 3rd: 3.81 m

Distance Between Axles, 3rd to 4th: 1.52 m

Weight: 17,191 kg

Automotive

Engine Name: 1 x Detroit Diesel 8V-92TA

Engine Type: 736-cu in(12.06-liter) liquid-cooled, 2-stroke, V-8 diesel

Engine Power: 445 hp at 2,100 rpm

Power-to-Weight Ratio: 16.18 hp/metric ton

Transmission: Allison HT740D automatic transmission with torque converter 4 forward/1 reverse gears

Suspension: 8 x 8 (8 wheels driving, 4-wheel steering); Hendrickson leaf spring w/steel saddle, equalizing beams, and 10-in (254-mm) vertical travel on front and rear; RT340 model rear springs on all but M985 (RT380) and M984A1 (RT500)

Maximum Speed: 88 km/h

Range: 483 km; w/full load at 54 km/h

Fuel Capacity: 589 liters

Tire Size: 16.00R20

Gradient: 60 percent

Side Slope: 30 percent

Fording Depth: 1.23 m

Payload Capacity: 9,979 kg

Protection

Armor: A-kit/B-kit; U.S. Army Long Term Armor Strategy (LTAS) compliant

Applique Armor: Available

Active Protection System: INA

NBC Protection: Yes

Smoke Equipment: No

Notes:

M985 Cargo This variant is the same as the 977 except that it is equipped with an 89,100-ft lb (12,319-kg m) heavy-duty crane. It is used to carry Multiple Launched Rocket System (MLRS) ammunition. The Heavy Expanded Mobility Tactical Truck (HEMTT) is an eight-wheel drive, diesel-powered, 10-short-ton (9,100 kg), tactical truck used by the US military and others. In evolving configurations, it has been in continuous production since 1982. The M977 HEMTT entered service with the U.S. Army as a replacement for the M520 Goer. By mid 2019, around 35,000 HEMTTs in various configurations had been produced by Oshkosh Defense through new-build contracts and around 13,000 of these had been re-manufactured. Current variants have the A4 suffix. The 10×10 Oshkosh Logistic Vehicle System Replacement (LVSR) is the U.S. Marines' equivalent to the U.S. Army's Oshkosh 8×8 HEMTT and Oshkosh 10×10 Palletized Load System (PLS). The Marines do not use the HEMTT or PLS, and the Army does not use the LVSR, but both services use a common trailer (M1076) with all three truck types. The HEMTT's objective is to provide heavy transport capabilities for supply and re-supply of combat vehicles and weapons systems. Compared to earlier generation 5-ton trucks in U.S. Army service it offers increased payload and mobility. The HEMTT is available in a variety of configurations, including cargo, tanker, tractor and wrecker. The HEMTT was developed from the outset as a tactical truck, but to minimize procurement and life cycle costs included militarized commercial automotive components where possible, these including the engine and transmission. Some components used in early HEMTTs are common with the Oshkosh Logistics Vehicle System (LVS) vehicles which were supplied to the U.S. Marine Corps. With the exception of the M984 wrecker variant (254 × 89 × 9.5 mm, front; 356 × 89 × 9.5 mm, rear), on all HEMTT variants the chassis is formed of 257 × 89 × 9.5 mm heat-treated carbon manganese steel with a yield strength of 758 MPa. Bolted construction with Grade 8 bolts is used throughout. A centrally mounted self-recovery winch is an option and this is fitted to around 20% of production. The HEMTT's two-door forward control cab seats two. It is of heavy-duty welded steel construction with corrosion-resistant sheet metal skins. Simula Inc. (acquired by Armor Holdings in 2003 and now BAE Systems) supplied 186 add-on cab armoring kits for use in the former Yugoslavia. These were not issued, but from 2004 were used in Iraq. BAE systems supplied a next-generation armor kit for the HEMTT and by late-2006 had supplied the U.S. Army with around 3600 kits for the Oshkosh HEMTT and PLS. The HEMTT A4 is fitted with the slightly larger from the Oshkosh PLS A1. This cab complies with the U.S. Army's Long Term Armor Strategy (LTAS) requirements of an A- and B-kit armoring philosophy. It also comes as standard with integrated floor armor, an integrated mount for a machine gun and gunner protection kit, and air-conditioning. A Detroit Diesel 8V92TA V-8 two-stroke diesel developing 445 hp (332 kW) is fitted in HEMTT A0 and A1 models, with the DDECIV version of this engine fitted to A2 HEMTTs. An EPA 2004 compliant Caterpillar (CAT) C-15 six-cylinder, 15.2-liter diesel developing a peak of 515 hp (384 kW) is fitted to HEMTT A4 models. HEMTT A0 and A1 models are fitted with an Allison HT 740D 4F/1R automatic transmission, torque converter, and Oshkosh 55,000-pound (25,000 kg) two-speed transfer case. HEMTT A2 models have the Allison HD 4560P 6F/1R automatic transmission. HEMTT A4 models are fitted with an Allison 4500SP 5F/1R automatic transmission and an uprated version of Oshkosh's 55,000-pound (25,000 kg) two-speed transfer case. The front axles on all HEMTTs are single-reduction

Oshkosh 46K, the rear are Dana single-reduction which vary according to configuration. Drive to the front axles is selectable and all axles have differential locks. Suspension on A0/A1/A3 models is by Hendrickson leaf springs with equalizing beams. Suspension on A4 models is Holland air suspension, load rating on the rear axles varying by configuration. Tire size is 1600 R20 on all models, and standard tire fit is Michelin XZL. All models are capable of fording water crossings up to 48 in (120 cm) deep, and can climb a gradient of at least 60%. All original variants are air transportable in the C-130. All variants are air-transportable in the C-17. Original HEMTT models now have the suffix A0. Only the M984 wrecker was produced in A1 configuration. All models were produced in A2 configuration. The A3 suffix is applied to HEMTT technology demonstrators with a diesel-electric drive system. Current HEMTT production models have the suffix A4.

M1087 American 6x6 Medium Tactical Vehicle (MTV) Expandable Van







Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782

- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1087
Type: Medium Tactical Vehicle (MTV) Expandable Van
Family: FMTV Series
Configuration: 6x6
Crew: ea1
Cab Seating: 3-Man
Winch: INA

Dimensions

Length: 9.88 m
Width: 2.44 m
Height, Top of Cab: 2.76 m
Height, Air Transport: 2.59 m
Height, Air Drop: 2.18 m
Wheelbase: 5.50 m
Ground Clearance: 559 mm
Payload Capacity: 4,536 kg
Curb Weight: 11,198 kg
Cargo Bed Length: 6,096 mm
Cargo Bed Width: 2,413 mm

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC
Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel
Engine Power: 290 hp (216 kW) at 2,600 rpm
Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears
Power-to-Weight Ration: 19.52-34.47 hp/metric ton
Maximum Speed: 88 km/h
Range: 483 km
Approach Angle: 40 deg
Departure Angle: 63 deg
Gradient: 60 percent
Side Slope: 30 percent
Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1087 Expandable Van is envisioned to be a mobile office used at various echelons in a field environment. The M1087 van sides pull out from the main body to form the office complex. It is equipped with 110V AC to operate computer, radio and air condition systems. A 24 VDC electrical system is provided to operate the electrical components (radios and blackout lights, etc.) until the office complex can be set up. The vehicle is still in the developmental phase.

M1090 American 6x6 Medium Tactical Vehicle (MTV) Dump Truck




Tiers:



Variants:

- **M1078 A0/A1/A1R/A1P2:** LMTV Cargo NSN 2320-01-549-8577
- **M1078 A0/A1/A1R/A1P2:** - LMTV Cargo with winch NSN 2320-01-549-8611
- **M1079 A0/A1/A1R/A1P2:** LMTV Van NSN 2320-01-552-7745
- **M1079 A0/A1/A1R/A1P2:** LMTV Van with winch NSN 2320-01-552-7749
- **M1080 A0/A1/A1R/A1P2:** LMTV Chassis 3.9 m NSN 2320-01-552-7791
- **M1081 A0:** LMTV Cargo-airdrop LVAD
- **M1082 A1/A1R/A1P2:** Trailer, LMTV cargo NSN 2320-01-449-1775
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo NSN 2320-01-549-8610
- **M1083 A0/A1/A1R/A1P2:** MTV Cargo with winch NSN 2320-01-549-8565
- **M1084 A0/A1/A1R/A1P2:** MTV Cargo with material handling equipment (MHE) NSN 2320-01-552-7739
- **M1084 A0/A1/A1R/A1P2/RSV:** MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767
- **M1085 A0/A1/A1R/A1P2:** MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo with winch NSN 2320-01-552-7770
- **M1085 A0/A1/A1R/A1P2:** MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE NSN 2320-01-552-7780
- **M1086 A0/A1/A1R/A1P2:** MTV LWB Cargo with MHE & winch NSN 2320-01-552-7776
- **M1087 A1R/A1P2:** MTV Expansible Van NSN 2320-01-552-7781
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor NSN 2320-01-552-7759
- **M1088 A0/A1/A1R/A1P2:** MTV Tractor with winch NSN 2320-01-552-7759
- **M1089 A0/A1/A1R/A1P2:** MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994
- **M1090 A0/A1:** MTV Dump
- **M1091:** MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production
- **M1092 A0/A1/A1R/A1P2:** MTV Chassis 4.1 m NSN 2320-01-552-7793
- **M1093 A0:** MTV Cargo-airdrop LVAD
- **M1094 A0:** MTV Dump-airdrop LVAD
- **M1095 A1/A1R/A1P2:** Trailer, MTV Cargo NSN 2320-01-449-1776
- **M1096 A0/A1/A1R/A1P2:** MTV LWB Chassis 4.5 m NSN 2320-01-552-7796
- **M1140 A1/A1R HIMARS:** High Mobility Artillery Rocket System, launcher chassis
- **M1147:** LHS (palletized) Load Handling System Trailer NSN 2320-01-508-7887
- **M1148 A1R/A1P2:** LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546
- **M1157 A1R/A1P2:** 10-ton Dump NSN 2320-01-552-7787
- **M1157 A1R/A1P2:** 10-ton Dump with winch NSN 2320-01-552-7782
- **XM1160:** 10-ton MEADS air defence chassis (5.5 m wheelbase)
- **M1273 A1P2:** MTV 10-ton chassis NSN 2320-01-621-6239

System

Alternative Designation: M1090

Type: Medium Tactical Vehicle (MTV) Dump Truck

Family: FMTV Series

Configuration: 6x6

Crew: ea1

Cab Seating: 3-Man

Winch: The M1090 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

Dump Body Construction: Welded steel, 5 cu yd (4 m3), 10,000 lb (4,536 kg) capacity Provisions for troop seats and cover kit

Dimensions

Length: 7.19 m

Width: 2.44 m

Height, Top of Cab: 2.76 m

Height, Air Transport: 2.59 m

Height, Air Drop: 2.18 m

Wheelbase: 5.30 m

Ground Clearance: 559 mm

Payload Capacity: 4,536 kg

Curb Weight: 9,969 kg

Automotive

Engine Name: 1 x Caterpillar 3116 ATAAC

Engine Type: 403-cu in (6.6-liter) liquid-cooled, turbocharged, aftercooled, in-line 6-cylinder diesel

Engine Power: 290 hp (216 kW) at 2,600 rpm

Transmission: Allison MD 3070 PT automatic/select electronically controlled; 7 forward/1 reverse gears

Power-to-Weight Ration: 19.52-34.47 hp/metric ton

Maximum Speed: 88 km/h

Range: 483 km

Approach Angle: 40 deg

Departure Angle: 63 deg

Gradient: 60 percent

Side Slope: 30 percent

Fording, Unprepared: 0.91 m

Fording, Prepared: 1.52 m

Tires: Super singles with CTIS

Main Weapon System

Note: 1 x 12.7-mm machine gun mount over cab

Protection

Armor: Current and recent operational scenarios now call for logistic trucks of the FMTV type to at least have the option of cab armoring. When it entered production, armoring was not considered an option for the FMTV. The first protection solution for the FMTV was not in answer to such scenarios, but was developed by Stewart & Stevenson and O'Gara-Hess & Eisenhardt Armoring Company (OHE). Called the Crew Protected Cab, it was specifically for the HIMARS variant and offered flash and Foreign Object Debris (FOD) protection during launch. Designs followed for an Enhanced Crew Protected Cab, and later an Armor Protected Cab, each adding more ballistic capability against direct fire, artillery burst and mines.

Applique Armor: To meet emerging threats on deployed operations, in March 2004 DRS Technical Services was awarded a $16.3 million contract to provide 272 armor protection kits for the FMTV. A total of 1,862 kits are understood to have been produced in total. These kits were based around ballistic-protection panels installed on standard FMTV cabs. In answer to demands for greater crew protection, BAE Systems developed the Low Signature Armored Cab (LSAC) for all variants of the FMTV. The LSAC replaced the standard FMTV cab (with which it shares internals) in a remove and replace operation. To meet the US Army's current Long Term Armor Strategy (LTAS) for armored cabs, BAE Systems developed the LTAS cab for the FMTV. BAE Systems states that it produced over 9,000 LTAS cabs for the FMTV A1P2 variant. All Oshkosh FMTV vehicles include the company's own LTAS-compliant armor solution. LTAS is based around the A and B kit principles, this allowing for vehicles to be armored as required, and with the add-on applique package adaptable to prevailing threats and upgradeable as new armoring technologies emerge. The A-Kit, which includes a new cab, modifies the FMTV to allow the addition of armour; the B-Kit being the bulk of the armor itself.

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The M1090 Dump Truck is designed to transport construction material in support of combat engineer road and bridge projects. The M1090 has a 5 cubic yard, 10,000 pound payload capacity. The cargo bed can be equipped with an optional bench seat kit for transport of soldiers. The bench seats are constructed of a non-wood material and attach to the cargo bed side rails. The seats can be folded down and stowed when not in use. Soldiers are assisted climbing in and out of the cargo bed area with the aid of a ladder stowed on the vehicle when not in use. A canvas and bows kit is provided to keep soldiers and cargo protected from the elements. The M1090 can be equipped with a self-recovery winch capable of fore/aft vehicle recovery operations. The winch is equipped with 280 feet line capacity and 15,500 pounds bare drum line pull at 110% overload.

→Trailers

M1082 American Light Medium Tactical Vehicle (LMTV) Trailer



Tiers:



Variants:

- **Note:** *M1078 A0/A1/A1R/A1P2 - LMTV Cargo NSN 2320-01-549-8577 *M1078 A0/A1/A1R/A1P2 - LMTV Cargo with winch[6] NSN 2320-01-549-8611 *M1079 A0/A1/A1R/A1P2 - LMTV Van NSN 2320-01-552-7745 *M1079 A0/A1/A1R/A1P2 - LMTV Van with winch NSN 2320-01-552-7749 *M1080 A0/A1/A1R/A1P2 - LMTV Chassis 3.9 m NSN 2320-01-552-7791 *M1081 A0 - LMTV Cargo-airdrop LVAD *M1082 A1/A1R/A1P2 - Trailer, LMTV cargo[6] NSN 2320-01-449-1775 *M1083 A0/A1/A1R/A1P2 - MTV Cargo NSN 2320-01-549-8610 *M1083 A0/A1/A1R/A1P2 - MTV Cargo with winch NSN 2320-01-549-8565 *M1084 A0/A1/A1R/A1P2 - MTV Cargo with material handling equipment (MHE)[6] NSN 2320-01-552-7739 *M1084 A0/A1/A1R/A1P2/RSV - MTV Cargo with MHE (HIMARS RSV) NSN 2320-01-552-7767 *M1085 A0/A1/A1R/A1P2 - MTV Cargo, Long Wheelbase Cargo (LWB) NSN 2320-01-552-7773 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo with winch NSN 2320-01-552-7770 *M1085 A0/A1/A1R/A1P2 - MTV LWB Cargo w/ Sideboard Delete NSN 2320-01-552-7770 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE NSN 2320-01-552-7780 *M1086 A0/A1/A1R/A1P2 - MTV LWB Cargo with MHE & winch[6] NSN 2320-01-552-7776 *M1087 A1R/A1P2 - MTV Expansible Van NSN 2320-01-552-7781 *M1088 A0/A1/A1R/A1P2 - MTV Tractor NSN 2320-01-552-7759 *M1088 A0/A1/A1R/A1P2 - MTV Tractor with winch NSN 2320-01-552-7759 *M1089 A0/A1/A1R/A1P2 - MTV Wrecker Oshkosh-produced M1089 have different recovery equipment NSN 2320-01-595-3994 *M1090 A0/A1 - MTV Dump *M1091 - MTV 1,500 gallon Fuel Tanker Type Classified but did not enter production *M1092 A0/A1/A1R/A1P2 - MTV Chassis 4.1 m NSN 2320-01-552-7793 *M1093 A0 - MTV Cargo-airdrop LVAD *M1094 A0 - MTV Dump-airdrop LVAD *M1095 A1/A1R/A1P2 - Trailer, MTV Cargo NSN 2320-01-449-1776 *M1096 A0/A1/A1R/A1P2 - MTV LWB Chassis 4.5 m NSN 2320-01-552-7796 *M1140 A1/A1R HIMARS High Mobility Artillery Rocket System, launcher chassis *M1147 LHS (palletized) Load Handling System Trailer[6] NSN 2320-01-508-7887 *M1148 A1R/A1P2 LHS (palletized) Load Handling System Truck, eight metric tonnes / 8.8-ton NSN 2320-01-557-4546 *M1157 A1R/A1P2 10-ton Dump[6] NSN 2320-01-552-7787 *M1157 A1R/A1P2 10-ton Dump with winch NSN 2320-01-552-7782 *XM1160 10-ton MEADS air defence chassis (5.5 m wheelbase) Mongoose Mobile Launcher Chassis (MLC) (cancelled) M1273 A1P2 MTV 10-ton chassis[6] NSN 2320-01-621-6239

System

Alternative Designation: M1082
Type: Light Medium Tactical Vehicle (LMTV) Trailer
Family: FMTV Series

Dimensions

Length, Overall: (5,321 mm
Cargo Bed Length: 3,780 mm
Height. Overall: 2,002 mm
Deck Height Empty: 1,532 mm

Deck Height Full: 1,448 mm

Width, Overall: 2,438 mm

Width, Cargo Bed (Inside): 2,306 mm

Curb Weight: 2,953 kg

Gross Weight: 5,221 kg

Ground Clearance, Empty: 406 mm

Ground Clearance, Loaded: 343 mm

Maximum Payload: 2,268 kg

Automotive

Maximum Grade: 60%

Side Slope: 30%

Fording: 1,524 mm

Maximum Payload: 2,268 kg

Brakes:

Anti Lock System: Yes

Cargo Bed Construction: All-steel, E-coat rustproofing dropside with side rail storage

Ladder: Stowed, metallic

Tie Down Points: Yes

Standard Options: Bows and tarp kit

Electric System: 12/24 Volt with blackout

Tires: 395/80R20

Integral Sling Bar: Slung under CH-47 and CH-53

Suspension: High travel single axle leaf parabolic spring with anti-sway bar

Protection

Armor: INA

Active Protection System: No

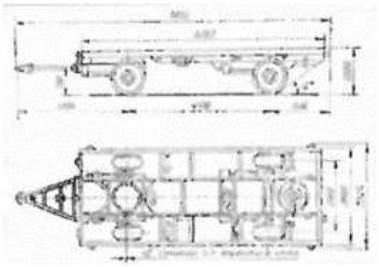
NBC Protection: INA

Smoke Equipment: INA

Notes:

The XM1082 LMTV Trailer (LMTVT) is designed to be towed by the LMTV family of vehicles. The M1082 trailer is a single axle trailer with a gross payload capacity of 5000 pounds. The trailer is equipped with an air brake system actuated from the prime mover brake systems and a parking brake system to prevent movement of the trailer when not connected to the prime mover. A canvas and bows kit is provided to protect the cargo from the elements.

MAZ-8950 Russian Trailer





Tiers:



System

Alternative Designations: None
Nominal Payload: tons10
Trailer Type: Full
Height: mm1,200
Length: mm8,920
Width: mm2,820
Ground Clearance (mm):
Number of axles: 2
Number of tires: 4
Brake system (rear): Mechanical and rear wheels
Brake system (front): Pneumatic, all-wheel

Utility

Transport: Various types of equipment up to 10 tons

Payload Weight Data

Tanker Payload on-road: liters10,500
Cargo payload on-road (kg):
Curb Weight: kg4,500
Cargo Curb Weight (kg):
Gross Vehicle Weight on-road: kg15,000

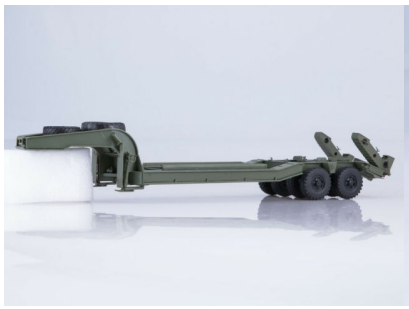
Mobility

Towing Vehicle: Kraz-255B

Notes:

Double axel, low-frame chassis has specifically constructed frame intended for mounting various types of equipment. Trailer has four stabilizing jacks which can be switched to traveling position when the vehicle is in motion.

ChMZAP-5247 G Russian 50 Tons Trailer





Tiers:

1 2 **3** 4

Variants:

- **ChMZAP-5247B:** The ChMZAP-5247B is a simple flatbed transporter with two axles in the rear of the trailer and a total of eight tires, each with airbrakes. The ChMZAP-5247B has adjustable track guides, guide bars, and the standard selection of tools and materials for the securing of vehicles or cargo. Two spare tires are also provided.

System

Alternative Designation: ChMZAP-5247G
Type: Trailer
Manufacturer: INA
Load: 50 tons

Dimensions

Length: 9.33 m
Width: 3.2 m
Height: INA
Weight, Combat: 18 ton

Protection

Armor: W(2)/HF1 HS1 HR1
Applique Armor: INA
Active Protection System: No

Notes:

The ChMZAP-5247G is a more advanced form of this trailer; the load deck is within a "well" of sorts, with an incline behind the load area and the gooseneck in front of it. It is a little over half a meter longer than its predecessor and almost three-quarters of a meter wider. It can carry more weight, and has powered folding loading ramps at the rear (the ChMZAP-5247B has only removable loading ramps).

ChMZAP-9990 Russian 57-Ton Semi-Trailer



Tiers:



Variants:

- **Serdobsk Low Loader Semitrailer Model 9990.052:** Payload on-road: 52mt GVW on-road: 67mt Tractors: MZKT-7428 8X8 MZKT-74135 8X8 MZKT-7401 8X8 Length: 14.44m Width: 2.15m Height: 3.3m Curb weight: 15mt Wheelbase: 1.41m between wheels Wheelbase: 3.3m from 1st wheel to tractor rear-wheel Cargo bed length: 9.19m Cargo bed width: 3.15m Cargo bed height: 1.3m # of axles: 2 # of wheels: 8 Tire size: 14.00XR20
- **MWTP-99941/2 70 ton semi-trailer:** Weight loaded: 95mt Weight empty: 25 mt Max fifth wheel loading: 30mt Max payload: 70mt Length overall: 10.02m Width overall: 3.65m Height overall: 3.62m Ground clearance: 0.54m at full load Cargo bed length: 13.9m Cargo bed height: 1.4m Wheelbase between traler axes: 1.6m Max towing spedd: 90km/h Tires: 525/65R 20 with tibes and CTI system Electrical system: 12V Primary tractor: MZKT-74135 8X8 Alternate name: METO-99942

System

Number of Axles: ea3
Number of Tires: ea12
Payload: mt52
Trailer Type: Semitrailer
Weight, Gross Vehicle: mtWith MAZ-537G tractor: 75.54581
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in1025X420-457

Mobility

Mobility, Towing Vehicle: MAZ-537G
Speed, off-road, 40 ton payload: mph10
Speed, off-road, 55 ton payload: mph7.5
Speed, off-road, 70 ton payload: mph6

Payload

Cargo Curb Weight: kg18
Cargo Payload On: 52
Cargo Bed Height: m3.19

Cargo Bed Length: m14.42

Cargo Bed Width: m3.15

Curb Weight: kg18

Cargo Payload Off: mt52

Ground Clearance: m.279

Angle of Approach: degrees35

Angle of Departure: degrees28

Rolling Radius: m9.215

Cargo area: m228

Cargo volume: m255

Notes:

The CHMZAP-9990 semitrailer is an excellent, rugged tank transporter and general bulk cargo carrier design capable of operations on paved roads, natural roads, trails and selected off-road terrain. The CHMZAP-9990 has three equally spaced axles and 12 tires (wheels). The 12 tires are arranged in pairs on half-axles, with each pair independent of the pair across the vehicle from it. There is no axle across the vehicle. Each half-axle and wheel pair is mounted on a center pivot which allows 15 degrees of roll freedom in each direction. All three axle pairs on each side of the vehicle are connected to a walking beam or rocker arm type. This beam is 8 feet long, tapered towards the ends and a massive weldment in structure. The extreme wheel pairs (axles 1 and 3) are connected at the ends of the beam, while the middle axle is co-located with the walking beam pivot in the center of the beam and connected through an auxiliary walking beam of somewhat unknown design. Loads are transferred from the semitrailer through the walking beam pivot to the walking beam. The first and third axles receive their loads at the ends of the walking beam while load to the center axle is through the auxiliary walking beam. The CHMZAP-9990 semitrailer has stakebody sides and a cargo floor bed. When carrying general cargo it provides tremendous capability. The gooseneck section includes two spare tires, landing legs, and a tire-handling boom. A very useful feature of this semitrailer is the low-tire-inflation-pressure warning system. The system is designed to warn the operator of a fall in tire pressure below 4.4 kg/cm2 in any of the 12 tires on the trailer (5.5 kg/cm2 is normal). Sensors in each wheel of the trailer make an electrical connection when tire pressure falls below the designated pressure. This activates a horn or buzzer in the operator's cab, warning only that one or more tires is low. The operator must then stop the truck and go to a terminal panel box on the trailer. This panel box contains a series of press-to-test buttons, arranged in a pattern to represent wheel placement. By pressing each button or a series of them, the operator can determine the low tire; the buzzer will stop sounding when the button (or buttons) for the low-pressure wheel (or wheels) is pressed. Components on the trailer are connected by means of a detachable shielded conduit to the buzzer and a 24-v electrical power source in the tractor.

Aircraft

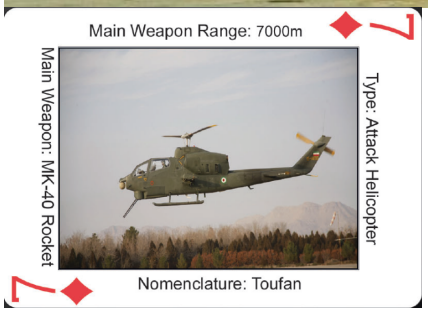
→Rotary Wing Aircraft

→→Attack Helicopter

Panha 2091 (Toufan I) Iranian Attack Helicopter







Tiers:



Variants:

- **Toufan II:** Toufan II unveiled on January 2013

System

Alternative Designation: PANHA 2091 (Toufan), IAIO Toufan or Toophan
Type: Attack Helicopter
In Service: 1998-Present
Manufacturer: Iran Helicopter Support and Renewal Company (PANHA)
Crew: ea2
Blades, Main Rotor: 2
Blades, Tail Rotor: ea2
Number of Engines: ea1
Day/Night Capable: Yes
All Weather Capable: INA
Takeoff or Landing Limitations: INA

Number of Hard Points: INA

Note #1: Developed from Bell AH-1J International Cobra

Note #2: There is little information online about the Panha 2091 (Toufan I)

Dimensions

Length: m16

Width: m13

Height: m4

Weight, Combat: kg4,530

Weight, Empty: kg2,802

Automotive

Engine Name: 1 x Pratt and Whitney-based Turboshaft Engines

Engine Type: Turboshaft Engine

Engine Power: hp1,800

Cruising Range: km600

Speed, Maximum: km/h236

Speed, Average: INA

Ceiling: m12,000

Rate of Climb: m/s494

Communications

Radio: INA

Chin Mounted Gun

↳*System*

Name: M197 electric cannon

Type: 20mm three-barreled electric Gatling-type rotary cannon

In Service: 1967-Present

Manufactuer: General Dynamics Armament Systems

Barrels: 3-barrel (progressive RH parabolic twist, 9 grooves)

Rate of Fire: Up to 1500 rpm

Maximum Effective Range: INA

↳*Ammunition*

Name: kmM53

Type: API

Caliber: mm20

Cartidge: 20 × 102 mm

Muzzle Velocity: m/s1,030

Basic Load: ea2,000

Bursting Charged: 4.2 g incendiary

Penetration: Penetration 20mm at 25-degree impact and 100 meter range, 6.3mm RHA at 0-degree impact and 1000-m range.

Wing Mounted Weapons

↳*Rocket System*

Name: Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR)

Type: 5in unguided rocket

In Service: 1957-Present

Manufacturer: United States

Length: mm2,000

Diameter: mm130

Warhead Type: Various

Engine: Solid-fuel rocket

Operational Range: km8

Speed: km/h2,599

Guidance System: None

Basic Load: INA

↳*Missile System*

Name: AIM-9 Sidewinder

Type: Short-range air-to-air missile

In Service: 1956-Present

Manufacturer: Raytheon Company[1] Ford Aerospace Loral Corp.

Length: m3.02

Diameter: mm127

Wingspan: mm279.4

Weight: kg85.3

Warhead: WDU-17/B annular blast-frag

Warhead Wieght: kg9.4

Detonation Mechanism: IR Proximity Fuze

Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket

Operational Range: km1-35.4

Speed: Mach 2.5

Guidance system: Infrared homing (most models) semi-active radar homing (AIM-9C)

Fire Control

Fire Control System Type: Rocket-launching digital control system

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: INA

Sensor Suite(s) Available: Yes

Position Location System: Yes

Central Smart Arms Management System: Yes

Multi-Display Monitor,: Yes

Protection

Fuselage: INA

Cockpit Glass: INA

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The Panha 2091 "Toufan" is an Iranian overhaul and upgrade of the Bell AH-1J International (export version of the SeaCobra) attack helicopter purchased before the 1979 Islamic Revolution. The overhaul and upgrade program is known as project number 2091 of the Iranian Helicopter Support and Renewal Company (also known as Panha). Reported upgrades include: new cockpit armored panels new, Iranian-designed canopy new avionics nose-mounted camera new cockpit design The upgraded attack helicopter has a narrower airframe for greater flexibility and is armed with an M197 three-barreled 20-mm Gatling-type cannon in the A/A49E turret. Its wing-stub stations carry a pair of 19-tube 70-mm rocket launchers. Bulletproof glass protects the pilot's cockpit and weapons officer station, internal avionics have been revamped with the addition of a GPS and receiver in the nose, and a warning radar attached to the rear, with four antennae providing 360 degrees coverage and all electronics systems integrated.

Eurocopter Tiger German Attack Helicopter







Tiers:



Variants:

- **Tiger ARH (armed reconnaissance helicopter):** The Tiger ARH is a modified Tiger HAP with upgraded MTR390 engines and a laser designator incorporated in the Strix sight for the firing of Hellfire II missiles. Australian Aerospace is to set up a production assembly in Australia for assembly and parts for the duration of the program.
- **Tiger HAC (anti-tank helicopter, Helicoptere Anti-Char):** Carries an Osiris mast-mounted sight equipped with infrared charge coupled device (IRCCD) camera and laser rangefinder. The nose-mounted forward looking infrared (FLIR) has a 40 degree x 30 degree field of view. The Tiger HAC can be equipped with four Mistral or Stinger air-to-air missiles for air defense missions. For ground-attack missions, the Tiger is designed to carry both the HOT -3 and Trigat -LR anti-tank missiles. The pilots have helmet-mounted display sites. This variant was ultimately cancelled in favor of the HAD version.
- **Tiger HAP (fire support helicopter, Helicoptere d'Appui et de Protection):** A lighter Tiger used for ground fire support and engaging airborne threats. Equipped with a turreted Giat 30-mm AM-30781 automatic cannon, gun and either four Mistral missiles, 44 rockets plus four Mistral missiles, or 68-mm rockets. Only one weapon can be activated at a time. The helicopter typically carries four Mistral missiles and two pods, each carrying 22 68-mm rockets. The Tiger HAP also has a Strix roof-mounted sight with gyro-stabilized platform, laser rangefinder, direct optical sight, infrared camera and charge-coupled device television camera (CCDTV). French Tiger HAPs will be capable of deployment from MISTRAL- and FOUDRE-class amphibious ships and the aircraft carrier CHARLES DE GAULLE. Initial operational capability in the maritime role was scheduled for late 2008.
- **Tiger UHT (anti-tank helicopter, Unterstuzungs Hubschrauber):** Similar to the HAC version, although it does not have helmet-mounted display sites. Instead, the UHT uses integrated day and night helmets. The Osiris mast-mounted sight features second-generation infrared charge-coupled device (IRCCD) and television cameras for the gunner and a nose-mounted IRCCD camera with a 40-deg x 30-deg field of view for the pilot. German armament includes 12.7-mm machine gun pods, 70-mm rockets, FIM-92 Stinger anti-air missiles, HOT and Trigat anti-tank missiles and the Osiris mast-mounted sight. Electronic warfare equipment includes missile approach warning receivers and decoy launchers.
- **Tiger HAD (support destruction helicopter, Helicoptère d'Appui Destruction):** This version is very similar to the HAP variant, but features upgraded Enhanced MTR 390E engines, providing 14 percent more power; improved ballistic protection; identification friend or foe (IFF) interrogation system; new optronic sight; and enhanced electronic warfare systems. It is fitted with the Strix roof-mounted sight and can be equipped with TRIGAT-LR, Hellfire or Spike anti-tank missiles. The Safran Strix is a gyrostabilized elector-optical system featuring a thermal imager, daylight camera and laser rangefinder. It supports day/night operations for all weapons the Tiger carries, including Hellfire laser-guided missiles, rockets and Spike anti-tank missiles. This version was selected by the Spanish army. The French army also decided to upgrade all of its HAP helicopters to the HAD standard, leading to the cancellation of the HAC version. French versions are armed with eight Hellfire II anti-tank missiles, a 30-mm cannon, 70-mm rockets and four Mistral air-to-air missiles. Spanish variants are equipped with Spike-ER missiles. The Tiger HAD Block 2 configuration features new

software with man-machine interface improvements; improved firing capability; high-frequency data link; naval capabilities; an enlarged firing envelope for the Spike missile; and a new engine control monitoring unit (ECMU-B).
- **Afghanistan Stabilization German Army Rapid Deployment (ASGARD):** This is an upgrade program for German army Tiger helicopters that are to be deployed to Afghanistan. The modifications include a sand filter, additional defensive weapons and ballistic protection, mission data recorder and enhanced communications equipment. The engines are up-rated for improved hot-and-high performance.

System

Alternative Designation: Eurocopter Tiger
Type: Attack Helicopter
Crew: ea2
Blades, Main Rotor: 4
Blades, Tail Rotor: ea3
Number of Engines: ea2
Payload Capacity: 3,968 lb (1,800 kg) max
Number of Hard Points: two inner hardpoints and outer hardpoints
Inner Hardpoints Capacity: *1x 20 mm (0.787 in) autocannon pods, or *22x 68 mm (2.68 in) SNEB unguided rockets in a pod, or *19x 70 mm (2.75 in) Hydra 70 unguided rockets in a pod or *4x AGM-114 Hellfire missiles (Australia/France) or *4x Spike-ER missiles (Spain) or *4x PARS 3 LR missiles (Germany) or *4x HOT3 missiles (Germany)
Outer Hardpoints Capacity: *2x Mistral air-to-air missiles, or *2x FIM-92 Stinger air-to-air missiles (Germany), or 12x 68 mm (2.68 in) SNEB unguided rockets in a pod or *7x 70 mm (2.75 in) Hydra 70 unguided rockets in a pod

Dimensions

Length, Fuselage: 51 ft 10 in (15.80 m)
Length, Rotors Turning: 45 ft 11 in (14.00 m)
Wingspan: 15 ft 1 in (4.60 m)
Height: 14 ft 2 in (4.32 m) to top of tail rotor
Rotor Diameter: 42 ft 8 in (13.00 m)
Dsic Area: 1,428.2 sq ft (132.7 m sq)
Weight, Empty: 7,275 lb (3,300 kg)
Weight Mission: 11,905 lb (5,400 kg)
Weight, Takeoff: 13,230 lb (6,000 kg) max

Automotive

Engine Name: 2 x MTR390 turboshaft; 1,290 shaft hp each; or 2 x MTR390-E (Tiger HAD); 1,470 shaft hp each
Engine Type: INA
Engine Power: hp1,290 through 1,470
Fuel: 2,250 lb (1,020 kg) internal 3,472 lb (1,575 kg) max internal and external
Mission Range: 430 nm (500 mi, 800 km) on internal fuel 691 nm (800 mi, 1,280 km) with external fuel
Maximum Endurance: 3 hr 25 min on internal fuel
Mission Maximum: 2 hr 50 min

Maximum Speed: 145 knots (167 mph, 267 km/h)

Never Exceed Speed: 161 knots (185 mph, 298 km/h)

Cruise Speed: 123 knots (142 mph, 228 km/h)

Vertical Rate of Climb: 17.1 ft/sec (5.2 m/sec)

Maximum Rate of Climb: 35.1 ft/sec (10.7 m/sec)

Hover Ceiling: 10,663 ft (3,250 m)

Chin Mounted Gun

↳*System*

Name: 1× 30 mm (1.18 in) GIAT 30 cannon in chin turret.

Type: Revolver Cannon

Caliber: 30mm

Length: 2.4 m

Weight: 120 kg

Barrels: 1

Action: Seven-chamber revolver

Rate of Fire: 2,500 rounds/min

Muzzle Velocity: 1,025 m/s

↳*Ammunition*

Type: Rifle

Caliber: 30mm

Shell: 30 × 113mm B (M 781), 30 x 150mm B (M 791)

Basic Load: 450 rounds

Wing Mounted Weapons

↳*Inner Hardpoints*

Note: *1x 20 mm (0.787 in) autocannon pods, or 22x 68 mm (2.68 in) SNEB unguided rockets in a pod, or *19x 70 mm (2.75 in) Hydra 70 unguided rockets in a pod or *4x AGM-114 Hellfire missiles (Australia/France) or *4x Spike-ER missiles (Spain) or *4x PARS 3 LR missiles (Germany) or *4x HOT3 missiles (Germany)

↳*Outer Hardpoints*

Note: *2x Mistral air-to-air missiles, or *2x FIM-92 Stinger air-to-air missiles (Germany), or *12x 68 mm (2.68 in) SNEB unguided rockets in a pod or *7x 70 mm (2.75 in) Hydra 70 unguided rockets in a pod

Avionics

Note: Amongst the key avionics features of the aircraft are the EUROGRID battlefield management and map display systems, integrated communications (HF/VHF/FM radio and satellite) and data transfer links, a high-authority digital automatic flight control system, and redundant MIL 1553 data buses. Two redundant mission computers control the

weapons, sensors, and targeting functions. The Tiger's navigational suite includes GPS, dual redundant inertial referencing, Doppler radar, separated air data units, radio altimeter and distributed air speed sensors. A dedicated nose-mounted forward-looking infrared (FLIR) sensor is used by the pilot for night time flying. Each crew member has a pair of multifunction liquid crystal data displays at their control station, typically used to display internal systems information and sensory data, and to interact with the aircraft's higher systems. An additional display system is available to both crew in the form of the helmet-mounted display (HMD). The HMD is used by the flying pilot to display basic flight data with digitally enhanced optics, such as night vision or infrared imagery from the sensors, superimposed against; the gunner can use the HMD to interact with and control onboard weapon systems and view targeting data. Perhaps the most significant single avionics system fitted upon the Tiger is the mast-mounted Osiris sight/sensor; this incorporates optical TV and thermal cameras, a laser range finder/tracker/designator, and multiple gyroscopes for stabilisation. Osiris performs as the main sensor for target observation and acquisition, providing firing and targeting data via the weapons computer; Osiris also enables entirely passive target acquisition to be undertaken and was developed to maximise the capabilities of the Trigat anti-tank missile developed in parallel to the Tiger itself. An alternative optical system to Osiris is mounted on the aircraft's roof upon some variants. The Tiger can be fitted with various armaments including rockets, cannons, and a range of air-to-air and air-to-surface missiles, controlled via a dedicated weapons control computer. Munitions for anti-ground warfare include the nose-mounted 30mm Nexter turret; an assortment of external gun pods, anti-tank missiles, and up to four launchers for 70mm and 68mm rockets can be mounted on the Tiger's stub wings. When deploying missiles such as the Mistral, the Tiger is capable of taking advantage of the munition's off-boresight capabilities. A guided 70mm rocket will be developed for the Tiger based on the Roketsan Cirit.

Protection

Note: The protection systems employed on the Tiger includes stealth; aspects such as the visual, radar, infra red and acoustic signatures have been minimised to better evade threats that may be present upon the battlefield. According to Andrew Warner, the Tiger's survivability "relies on stealth and agility". The use of composite materials on the airframe has resulted in reductions in radar cross-section (RCS), infra red and acoustic signatures to improve battlefield survivability. The fuselage is armoured and was developed to withstand small arms fire and 23 mm (0.91 in) cannon rounds. The helicopter has various radar/laser warning and missile approach detection systems, including EADS's AN/AAR-60 MILDS (Missile Launch Detection System), as well as flares and chaff dispensers. The Tiger is the first all-composite helicopter developed in Europe.[53] The fuselage of the Tiger is made from 80% carbon fibre reinforced polymer and kevlar, 11% aluminium, and 6% titanium. The entire tail section is made of composites, including the single section tail boom.The rotors are composed of a fibre plastic composite material able to withstand combat damage and bird strikes. The structure of the Tiger also incorporates protection against lightning strikes and electromagnetic pulses via an embedded copper/bronze grid and copper bonding foil. The design of the Tiger includes a high degree of crash worthiness; many of the onboard systems have redundancies and are segregated to minimise the effect of damage. Components of the propulsion system, such as the rotors and drive shaft, were deliberately designed for greater ballistic tolerance than traditional designs; the gearbox is rated for a 60-minute dry run capability if lubrication is lost. Fuel is contained in two main internal fuel tanks, and an additional two smaller tanks are housed inside the stub wings. Fuel tanks have self-sealing capability to decrease the vulnerability. In the inhospitable conditions of the Afghanistan theatre, the Tiger had a reported operational availability of 90%.

Notes:

The Eurocopter (now Airbus Helicopters) Tiger is a four-bladed, twin-engined attack helicopter which first entered service in 2003. It is manufactured by Eurocopter (now Airbus Helicopters), the successor company to Aérospatiale's and DASA's respective helicopter divisions, which designate it as the EC665. Following their languages, in Germany it is known as the Tiger; in France and Spain it is called the Tigre. Development of the Tiger started during the Cold War, and it was initially intended as an anti-tank helicopter platform to be used against a Soviet ground invasion of Western Europe. During its prolonged development period the Soviet Union collapsed, but France and Germany chose to proceed with the Tiger, developing it instead as a multirole attack helicopter. It achieved operational readiness in 2008. The Tiger has the distinction of being the first all-composite helicopter developed in Europe; even the earliest models also incorporate other advanced features such as a glass cockpit, stealth technology, and high agility to increase its survivability. Improved variants have since entered service, outfitted with more powerful engines and compatible with a wider range of weapons. Since the type's introduction to service, Tigers have been used in combat in Afghanistan, Libya, and Mali. The Tiger is capable of undertaking a wide range of combat missions, including armed reconnaissance and surveillance, anti-tank and close air support, escort and protection of friendly assets; and can operate during day or night in all-weather conditions, and has been designed to include operations in the aftermath of nuclear, biological, or chemical warfare. The Tiger can also be used in the maritime environment, able to operate from the decks of ships including frigates and during extreme weather conditions. Amongst the Tiger's notable qualities, it possesses very high levels of agility, much of which is attributed to the design of its 13-meter four-bladed hingeless main rotor; the Tiger can perform full loops and negative g manoeuvres. Power is provided by a pair of FADEC-controlled MTU Turbomeca Rolls-Royce MTR390 turboshaft engines. he Tiger has a tandem-seat 'glass cockpit' and is operated by a two-man crew; the pilot is placed in the forward position, with the gunner seated behind. Either of the crew members can manage the weapon systems or the primary flight controls, switching roles if necessitated; in addition to flying the aircraft, the Tiger's pilot would typically be in control of the self-defence systems and communications, as well as some secondary weapons functions. While

some of the weapons use dedicated control interfaces, such as the anti-tank Trigat missile, air-to-air weapons can be managed via controls on both sets of collective and cyclic sticks. Crew new to the Tiger have to undergo substantial retraining due to the differences from older platforms, particularly in higher workload management and the additional capabilities afforded by the type; one major change from preceding attack helicopters is a far greater degree of operational autonomy. According to Andrew Warner, chief test pilot during the Tiger's development, it is "the easiest-handling aircraft I have ever flown". The system cost (helicopter, armament, support) and unit cost varies between variants; Australia's Tiger ARH has a price per unit of A$68 million, the latest Tiger HAD variant is estimated to cost US$44–48 million

Z-10 (WZ-10) Chinese Attack Helicopter





Tiers:



Variants:

- **Z-10ME:** Upgraded variant first unveiled in 2018 with active and passive countermeasures, missile approach warning system, radar warning receiver, new engine exhaust nozzle pointed upwards to reduce infrared signature, new intake filtration systems and armor panels, more powerful 1200 kW engine, larger ammunition magazine, appliqué graphene-based armor panels, infrared jammer, and a new IFF interrogator.
- **Z-10H:** Pre-production series powered by Pratt & Whitney Canada PT6C-76 turboshaft engine
- **Z-10K:** Simplified Z-10H powered with domestic Chinese WZ-9 engine of 930 - 950 kW range. Due to the drastic reduction of power by nearly a third, MASWS, IRCM and some other subsystems removed armor is also greatly reduced to save weight.
- **Z-10M:** 3 samples built for Pakistan with equipment missing in Z-10K added back, powered by WZ-9C engine with maximum power around 1000 - 1100 kW. Was not selected by Pakistan after evaluation, but the design was used to upgrade Z-10 built earlier when more powerful engine became available
- **Z-10 Millimeter Wave Radar:** Equipped with Z-19's millimeter wave radar for ground testing.

System

Alternative Designation: CAIC Z-10, WZ-10, Fierce Thunderbolt
Function: Attack, Anti-Tank, Air-to-Air
Crew: ea2
Blades, Main Rotor: 5
Blades, Tail Rotor: 4
Number of Engines: 2
Night/Weather Capabilities: All weather capable within the commander's risk assessment
Takeoff Limitations: INA
Vertical Clime Rate: iNA
Number of Hard Points: ea4
YH Millimetre-Wave Fire-Control Radar: Yes
Helmet mounted sight with night vision goggles: Yes

Dimensions

Length: m14.2
Width: m4.3

Height: m3.8

Main Rotor Diameter: m12

Weight, Combat: kg5,500

Weight, Payload (Max): kg1,500

Weight, Empty: kg5,100

Weight, Maximum Take Off: kg7,257

Automotive

Engine Type: 2 x Pratt & Whitney Canada PT6C-67C turboshaft

Engine Power: hp1,531 (1,142 kW) each

Cruising Range: km800

Speed, Maximum: km/h300

Speed, Average: km/h250

Service Ceiling: m6,400

Climb Rate: m/s>10

Communications

Radio: INA

Armament

Notes: Due to its modular design concept, Z-10 can be armed with a wide variety of weaponry. The adaptation of Chinese GJV289A standard, the Chinese equivalent of the MIL-STD-1553B databus architecture, enables weaponry of both Soviet and western origin to be adopted by Z-10. Offensive weaponry consists of machine guns, cannons, rockets and missiles. The stub wings have two hardpoints each for a total of four, each hardpoint being able to carry up to 4 missiles for a total of up to 16.

↳*23mm Automatic Chain Gun (Chin Mounted-Option 1)*

Name: Gryazev-Shipunov GSh-23

Location: Chin Mounted

Cailber/Length: 23mm x 115

Barrels: 2

Number of Rounds: ea2,000

Armor Penetration: Yes

Muzzle Velocity: m/s715

Muzzle Break: Yes

Maximum Effective Range: m200-1,800

Rate of Fire: rds/m3,400-3,600

↳*25mm M242 Bushmaster (Chin Mounted-Option 2)*

Location: Chin Mounted

Type: Similar to the 25mm chain gun found in the US Bradley Fighting Vehicle

Caliber / Length: 25mm x 137

Number of Rounds: 2,000

Maximum Effective Range: m3,000

Muzzle Velocity: m/s1,100

Armor Penetration: Yes

Barrels: Single Barrel (Progressive RH parabolic Twist)

Rate of Fire: Cyclic: 200rpm with 1hp or 500rpm with 8hp

Notes:: A wide range of ammunition has been developed for this weapon, providing it with the capability to defeat the majority of armored vehicles it is likely to encounter, up to and including some light tanks. Primarily though, it fires six types of rounds: the M791, M792, M793, M910, MK210, and M919.

↳*14.5 mm Gatling Gun (Chin Mounted-Option 3)*

Location: Chin Mounted

Caliber / Length: 14.5 mm

Number of Rounds: 40- Round Belt

Maximum Effective Range: m3,000

Muzzle Velocity: m/s1,000

Armor Penetration: Yes

Rate of Fire: rpm600

Notes:: BS: Armor-piercing incendiary; B-32: Armor-piercing incendiary full metal jacket round with a hardened steel core; BZT: Armor-piercing incendiary tracer full metal jacket round with a steel core; MDZ: High-explosive incendiary bullet of instant action; ZP: Incendiary tracer round

↳*HJ-9 Anti-Tank Missile (Wing Mounted-Option 1)*

Location: Wing Mounted

Length: mm1200

Diameter: mm152

Weight: kg37

Engine: Rocket Motor

Warhead: Tandem HEAT warhead, 1100-1200 mm penetration RHAe

Detonation Mechanism: Contact Fuse

Guidance System: Laser-beam-riding & MMW Radar

Operational Range: m100-5,500

Combat Load: INA

Notes: Additional Guided and Unguided Missisles include: HJ-8, HJ-9, PL-9, AIM-9 Sidewinder

↳*HJ-10 Anti-Tank Missile (Wing Mounted-Option 2)*

Location: Wing Mounted

Length: INA

Weight: kg50

Warhead: Heat and others

Engine Propellant: Solid Fuel

Operational Range: km3-10

Speed: Supersonic

Guidance System: Fiber-optic wire-guided missile (AFT-10) semi-active laser homing and millimeter wave radar seeker (AKD-10) Infrared homing

Aircraft Capible to Carry: ea16

↳***TY-90 Air-to-Air Missiles (Wing Mounted-Option 2)***

Location: Wing Mounted

Length: m1.9

Diameter: mm90

Weight, Warhead: kg3

Aircraft Capible to Carry: ea16

Detonation Mechansim: Impact/Proximity

Engine Propllant: Soldi Fuel

Operational Range: km0.5-6

Flight Ceiling: km6

Flight Alitude: km0-6

Speed: Mach2

Guidance System: ImiR IR

Protection

Fuselage: INA

Cockpit Glass: Glass is rated to protect against 7.62mm rounds

Stealth Properties: Yes, fuselage is designed to reduce radar cross section

Heat Signature Reduction: INA

Armor: Cockpit and fuselage have armor plating, providing protection against 12.7mm rounds.

Add on Armor: On Oct 10th, 2018, the Global Times reported that additional graphene (strong and lightweight material) had been added to the fuselage to protect key components, fuel cells, and the cockpit.

NBC Protection: Yes

EW Counter Measures/CCM: Radar receiving warning, laser receiving warning, infrared jammer, missile approach warning sensors (MAWS) and dispensers for chaff and flares.

Engine Exhaust: Directed slightly up into rotor wash to reduce heat signature

Counter Measures (Chaf/Flares): Yes

Forward-Looking Infrared (FLIR) Systems: Yes

Laser Designator and Rangefinder: Yes

Missile Approach Warning Sensors (MAWS): Yes, located behind the nose

Fire Control

Fire Control System Type: Fly-by-wire (fully automatic)

Fire Control Radar: YH millimeter-wave fire control radar

Cockpit: "Glass" cockpit (fully automated) with digital multi-function displays

Digitial or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Disignator: Yes

Automated Helmet: Yes, helmet mounted cueing system with heads up display and weapons control. NVG capable.

Sensor Suites(s) Available: Fitted to the nose and includes a TV camera, FLIR, laser designator, and range finder.

Position Location System: Yes

Notes:

The Z-10 is an attack helicopter under development in China. It is designed primarily for anti-tank and battlefield interdiction operations, with a secondary air-to-air capability. It is said to be in the same class as the AgustaWestland A129 Mangusta, Denel Rooivalk and Eurocopter Tiger. The Z-10 has a conventional attack helicopter layout with the pilot and weapon system operator sitting in tandem, stepped cockpits. The helicopter has a five-blade main rotor and a four-blade tail rotor. It has two engines, each in a pod aft of the cockpit. The fuselage has sloped sides in a diamond configuration to reduce the aircraft's radar cross-section. Nicknames of characters in the Chinese classic novel Water Margin have been used to name Z-10 and its smaller counterpart Harbin Z-19: Z-10 is called Fierce Thunderbolt (Pi Li Huo, □□□), the nickname of Qin Ming, while Z-19 is called Black Whirlwind (Hei Xuan Feng, □□□), the nickname of Li Kui.[8][9] In September 2016, the PLA announced that all of its ground force aviation units had been equipped with the WZ-10. The Kamov design bureau was contracted to perform the development work under a secret contract. Kamov worked with the Chinese to establish base specifications, such as weight, speed and payload capacity after which they had full freedom to design the helicopter. Kamov designed, tested and verified the helicopter design, after which it was provided to the Chinese team. Although designed in Russia, the prototype construction, flight testing and further development was performed by the Chinese.[1][2][3][4] Wu Ximing (□□□) of the 602nd Research Institute, one of the Chinese top scientists involved in the 863 Program was publicly credited with being the chief designer of the Z-10, in an attempt to preserve the secrecy of the Kamov contract. Wu had earlier participated in the designs of the armed version of transport helicopters Z-8A and WZ-9. In order to complete the necessary development, the 602nd Research Institute and CAIC had jointly built a new engineering design center, industrial simulator, aircraft engine ground test center, fatigue laboratory, and rotary test platform (nicknamed as Iron Bird Platform, □□□). In the end of 2001, the final test was completed on the full-scale rotary test platform, paving the way for test flights. Composite material is widely used in the Z-10 but China faced difficulties in this field, particularly in the area of survivability during crashes. Huge efforts were spent to domestically develop composite materials able to provide comparable levels of survivability to Western counterparts. This achievement earned a second place in the Commission for Science, Technology and Industry for National Defense (COSTIND) progress reward. The main contractor of the avionics of Z-10 is the 613th Research Institute, which was responsible for integrating all of the avionics subsystems provided by subcontractors. Although foreign technologies are utilized (particularly French and Israeli, as rumored), this is limited to hardware only. All software applicable to Z-10 are completely indigenously developed by China on its own. Reportedly, the most time consuming part of the software engineering for Z-10 was to develop all of the mathematic models needed for Z-10. Instead of using French standard DIGIBUS, Z-10 is built to Chinese GJV289A standard, the Chinese equivalent of MIL-STD-1553B. The adaptation of western military standard means that western weaponry can be readily deployed on Z-10, and the developer claims that all it needed was to add a module or interface to accomplish this. The ease of being compatible with multiple weaponry would also help to expand the export market of Z-10 in the future.

Z-19 Harbin (Black Whirlwind) Chinese Attack Helicopter







Tiers:



Variants:

- **Z-19 Millimeter Wave Radar Platform:**
- **Z-19E:** Export Model

System

Alternative Designation: Harbin Z-19 or WZ-19
Primary Function: Reconnaissance/attack helicopter
Crew: ea2
Blades, Main Rotor: 4
Blades, Tail Rotor: ea11
Tail Rotor: 13 Z-9A, 11 Z-9B/WZ-9
Day/Night Capable: Yes
Vertical Clime Rate: m/s549
Takeoff or Landing Limitations: INA
Max Speed: kph280
Laser Range Finder: Yes
Under-Nose Low-Light TV: Yes
Infrared Observing and Tracking: Yes
Roof Mounted Optical Sight: Yes

Dimesions

Length: m12

Main Rotor Diameter: m11.9

Height: m4

Weight, (Empty): kg2,131

Weight, (Maximum Take Off): kg4,082

Automotive

Engine Type: 2 x WZ-8A turboshafts

Engine Power: hp2 x 848

Cruising Range: km700

Speed, Maximum: km/h280

Speed, Average Cross: km/h245

Service Ceiling: m4,500

Endurance: hours4

Rate of Climb: m/s9

Communications

Radio: INA

Aramant

↳*TY-90 Air-to-Air Missiles*

Location: Wing Mounted

Length: m1.8

Diameter: mm90

Operational Range: km0.5 - 6

Number of Rounds: INA

Guidance System: ImIR IR

Weight (Total): kg20

Weight (Warhead): kg3

Speed: Mach2

Max Range: km6

Min Range: m500

↳*Single Twin Barrel GSh-23L Autocannon*

Location: Wing Mounted

Caliber/Length: mm23x115

Maximum Effective Range: km2

Cyclic Rate of Fire: rpm3,000

Muzzle Velocity: m/s690

Armor Penetration: Yes

↳***HJ-8 Anti-Tank Missiles***

Location: Wing Mounted

Function: Wire-Guided Anti-Tank Missile System

Length: mm1,566

Diameter: mm120

Operational Range: m3,000-4,000

Number of Rounds: ea8

Guidance System: SACLOS Wire Guidance

Power: Solid Fuel

Muzzle Velocity: m/s200

Armor Penetration: Yes

Fire Control

Fire Control System Type: Millimeter Wave FCS Radar

Fire Control Radar: Yes

Digital Cockpit: Yes

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: Yes

Sensor Suite(s) Available: INA

Position Location System: Yes

Gyro-Stabilised Sensor Turret: Yes

X-Band KLC-1 Search Radar: Yes

Protection

Fuselage: INA

Anti-Armor: Yes

Cockpit Glass: Yes

Low Acoustic Signature: Yes

Infrared-Suppressing Exhaust System: Yes

Heat Signature Reduction: Yes

Armor Plating: Available

NBC Protection: Yes

EW: Yes

EW Counter Measures/CCM: Yes

Crash-Resistant Seats: Yes

FLIR: Yes

Helmit Mounted Sights (HMS): Yes

Notes:

The Z-19 is a Chinese light scout and observation helicopter. It was locally developed by Harbin. It was a China's attempt to develop a modern and capable helicopter. The whole development programme was kept in high secrecy. The Z-19 is esentially a tandem-seat version of the Z-9W, which in turn is a license-built version of the Eurocopter AS365 Dauphin. However this helicopter also shares some resemblance with the Japanese OH-1. The Z-19 made its first flight in 2011 and was publicly revealed in 2012. This helicopter is in service with Chinese army aviation regiment. It operates alongside the dedicated Z-10 attack helicopter. The Z-19 is lightly armored. Both pilots are seated on crash-resistant seats. This scout and observation helicopter is equipped with a nose-mounted FLIR, TV and laser rangefinder. The Z-19 is an updated modified version of the Harbin Z-9W (similar to the development of the Bell AH-1 Cobra from the UH-1). It is a twin-seat tandem helicopter using mechanical components derived from the Eurocopter AS365 Dauphin series, as the Z-9 series are licence-built versions of the Dauphin. The Z-19 features a fenestron tail, reducing the noise level and therefore allowing it to achieve some level of acoustic stealthiness. The exhausts have also been designed to reduce the infrared signature. The helicopter is equipped with a millimeter wave fire control radar. Unlike most other attack helicopters, it lacks a nose-mounted machine gun or autocannon. The Z-19 also features armor plating, crash-resistant seats, and a turret with FLIR, TV, and laser rangefinder. It is also equipped with advanced helmet mounted sight (HMS), which looks different from that of the CAIC WZ-10. The general designer of the WZ-19 was Wu Ximing (□□□) of the 602nd Research Institute, one of the Chinese top scientists involved in the 863 Program, after graduating from Nanjing University of Aeronautics and Astronautics in 1984. Wu had earlier participated in the designs of the armed version of the transport helicopters Z-8A, Z-11 and WZ-9. He also participated in the development and flight testing of another Chinese attack helicopter, the CAIC WZ-10. At the 9th Zhuhai Airshow held in November 2012, Aviation Industry Corporation of China formally announced the official names of the WZ-10 and WZ-19 at a televised news release conference, with both attack helicopters named after fictional characters in the Water Margin, one of the Four Great Classical Novels of Chinese literature. WZ-10 is named as Lighting fire (Pili Huo, □□□), the nickname of Qin Ming, while WZ-19 is named as Black Whirlwind (Hei Xuanfeng, □□□), the nickname of Li Kui. Harbin is developing the Z-19, which is expected to function and support with a heavier attack helicopter, the CAIC WZ-10, in the near future. Export variants will be designated WZ-19 (Wǔzhuāng Zhíshēngjī, □□□□□ - attack helicopter), but aircraft used in China will be designated Z-19 as WZ is used by the PLAAF for UAVs (WZ - Wúrén Zhēnchá, □□□□ (Unmanned Reconnaissance)).

Mi-28 (Havoc) Russian Attack Helicopter







Tiers:



Variants:

- **Mi-28N/MMW Havoc:** All weather day-night version adopted by Russian military in 2009. Equipped with a top-mounted millimeter wave radar, thermographic camera-TV, and a laser rangefinder. Powered by two Russian Klimov TV3-117VMA-SB3 engines (2,500 hp each), produced by the Ukrainian Motor-Sich and replaced by Russian-made VK-2500 engines as of 2016. Max takeoff weight: 11,500 kg, max payload: 2,350 kg.
- **Mi-28NE:** Export version of the Mi-28N. In service with the Iraqi and Algerian Air Force. In August 2018, the Russian Helicopters unveiled an upgraded Mi-28NE variant, with improvements made in the main rotor system and engine unit and new on-board radio-electronic equipment.
- **Mi-28NM:** An upgraded version of the Mi-28N under development since 2009. The helicopter has redesigned nose hull due to removal of its nose antenna, new H025 radar station for all-round visibility, more powerful Klimov VK-2500 engines instead of the previous Klimov TV3-117VMA engines and improved rotor blades to increase its maximum speed by 13% and cruise speed by 10%.
- **Mi-28D:** Simplified daylight operation version. Similar to Mi-28N, but without top-mounted radar and FLIR
- **Mi-28NAe:** Export version offered to North Korea
- **Mi-40:** Proposed armed transport version. Never reached prototype stage.
- **Mi-28UB:** (Učebno-Bojevoj – training-and-combat) version, designed for training for Mi-28N. Has dual hydromechanical flight controls that can be operated from tandem cockpits, a more spacious lower cockpit to house a flight instructor, a wider pilot canopy, and new energy-absorbing crew seats. Serves as a trainer but can perform attack helicopter tasks.
- **Mi-40:** The Mil Mi-40 was a projected utility version of the Mi-28, first initiated in 1983, announced in 1992 and shown at the Moscow Airshow in 1993. It was primarily intended for the "Aerial Infantry Fighting Vehicle" category as a successor to the Mil Mi-24 and Mi-8 assault helicopters.

System

Alternative Designation: Mil Mi-28
Manufacturer: Mil
In Service: 1982-Present
Type: Attack Helicopter
Function: new-generation attack helicopter that functions as an air-to-air and air-to-ground partner for the Mi-24 Hind and Ka-50 Hokum.

Crew: ea2 1 pilot, 1 WSO)

Passenger Capacity: ea3

Blades, Main Rotor: 5

Blades, Tail Rotor: ea4

Number of Main Engines: ea2

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: Two pylons under each stub wing to mount bombs, rockets, missiles, and gun pods.

Radar Type: Arbalet millimeter-wave radar

Pilot HUD: Yes

Cockpit Type: Tandem, stepped-up cockpits

Note #1: The Mil Mi-28 is capable of auto-hover and hover/heading lock-in attack mode

Note #2: For anti-armor missions the Mi-28 can be equipped with Ataka, Shturm-V or Vikhr anti-tank guided missiles.

Dimensions

Length: m16.85

Length, with rotors revolving: m21.16

Width: m4.81

Height: m3.82

Rotor Diameter: m17.20

Weight, Full Load: kg11,500

Weight, Normal: kg10,400

Weight, Empty: kg7,890

Weight, Combat Load: kg638

Weight, Maximum Combat Load: kg1,605

Automotive

Engine Name: Two(2) x Klimov TV3-117

Engine Type: Turboshaft engines

Engine Power: hp2,200 hp each

Speed, Maximum: km/h282

Speed, Cruise: km/h260

Ceiling, Hovering: m3,450

Ceiling, Service: m5,750

Range, Normal Takeoff Weight: km460

Range, Ferry with Drop Tanks: km1,105

Endurance: hours2

G Limits: G+3 -0.5

Fuel Capacity, Internal: kg1,337

Drop Tanks: ea4

Drop Tanks Total Fuel Capacity: kg445

Landing Gear: non-retractable tricycle tail-wheel type landing gear.

Communications

UHF Radio: Yes

VHF Radio: Yes

IFF Capabile: Yes

Chin Mounted Gun

Note: The Mi-28 is equipped with a chin-mounted NPPU-28 turret with 30 mm automatic Shipunov 2A42 autocannon.

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Caliber: mm30

Manufacturer: Tulamashzavod

Proliferation: Widely Proliferated

Total Length: mm3,027

Number of Barrel: ea1

Barrel Length: 2,416

Weight: kg115

Max Rate of Fire (Low): 200-300 rds/min

Max Rate of Fire (High): 550-800 rds/min

Maximum Firing Range: m4,000

Effective Firing Range: m2,000

Action: Gas-operated

Feed System: Twin Feed

↳*Ammunition (Option 1)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: 30mm × 165mm

Muzzle Velocity: m/s1,260

Basic Load: ea300

Note #1: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy

penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

Note #2: Rounds from High Explosive Incendiary (HEI) to Armour-Piercing Discarding Sabot (APDS) can be used.

Wing Mounted Weapons

↳*Rocket System*

Name: B-13L Rocket Pod

Type: Rocket Pod

Basic Load: 2 x Rocket Pods

Length: mm3560

Diameter: mm410

Unloaded Weight: kg160

Number of Rockets per Rocket Pod: ea5

Firing Interval: sec0.15

↳*Rocket System Ammunition*

Name: S-13

Type: 122 mm calibre unguided rocket weapon

Proliferation: The S-13 is a 122 mm calibre unguided rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and some other countries.

Length: m2.54

Diameter: mmINA

Muzzle Velocity: m/sINA

Basic Load: ea5 Rockets per B-13L

Launch Weight: kg57

Warhead Weight: kg21

Effective Range: km1.1-3

Penetration: Penetrates 3 m of earth and 1 m of reinforced concrete. On runways it produces a demolition area of 20 m². Velocity 650 m/s.

Note: In total the Mi-28 carries 10 S-13 Rockets (5 Rockets in each B-13L Rocket Pod).

↳*Anti-Tank Guided Missile System (Option 2)*

Name: Shturm

Type: ATGM

In Service: 1976-Present

Basic Load: ea8

Missile Length: mm1,630

Missile Diameter: mm130

Fin Span: mm360

Missile Weight: kg31.4

Warhead Type: HEAT

Warhead Weight: kg5.3

Guidance System: Radio Guided

Range of Fire: km5

↳***Anti-Tank Guided Missile System (Option 2)***

Name: Ataka (AT-9 Spiral-2)

Type: ATGM

In Service: 1990-Present

Basic Load: ea8

Missile Length: m1.83

Missile Diameter: m0.13

Fin Span: m0.36

Missile Weight: kg42.5

Warhead Type: tandem HEAT, fuel-air explosive, expanding rod

Warhead Weight: kg7.4

Range of Fire: km6

Guidance System: Radio-Guided & Semi-Automatic Command to Line of Sight (SACLOS) guidance

Speed: supersonic

Fire Control

Fire Control System Type: integrated surveillance and fire control system

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Laser Rangfinder: Yes

Automated Helmet: Yes, target designation and indication system

Sights: TV Channel, Thermal, EO

GPS: Yes

Navigation: Integrated Inertial Navigation

Night Vision Compatible Cockpit: Yes

Protection

Crew Compartment Armor: It withstands hits from 12.7 mm armor-piercing rounds and 20 mm HE-FRAG rounds. It is claimed that this helicopter can not be defeated by a single short-range anti-aircraft missile.

Windsheild: Protection from 7.62 and 12.7 mm armor piercing bullets and 20 mm shell fragments.

Warning System: Mak IR Warnign System

NBC Protection: Yes

EW: INA

Counter Measures (Chaff/Flares): Yes, UV-26 flares

IR Sensors: Yes, 2 x fixed IR sensors

IR Suppressors: Yes

Jammer System: Platan Jammer

Radar Warning System: Yes

Laser Warning System: Yes

Energy Absorbing Seats: Yes

Parachute Escape System: Yes, in a hatch on the port side to the rear of the wing

Notes:

Mi-28 Havoc attack aircraft interdictor technical data sheet specifications intelligence description information identification pictures photos images video Mil Russia Russian Air Force aviation air defence industry military technology Description. The Mil Mi-28A/N (NATO reporting name "Havoc") is a Russian all-weather, day-night, military tandem, two-seat anti-armor attack helicopter designed and produced by Mil Moscow Helicopter Plant. It is a dedicated attack helicopter with no intended secondary transport capability, better optimized than the Mil Mi-24 gunship for the role. Design work on the Mi-28 began under Marat Tishchenko in 1981, and the first prototype was flown on 10 November 1982. The Mi-28 program was cancelled in 1993 because it was deemed uncompetitive with the Ka-50, and in particular, it was not all-weather capable. The Mi-28 is a new-generation attack helicopter that functions as an air-to-air and air-to-ground partner for the Mi-24 Hind and Ka-50 Hokum. The five-blade main rotor is mounted above the body midsection, short, wide, tapered, weapon-carrying wings are mounted to the rear of the body midsection. Two turboshaft engines in pods are mounted alongside the top of the fuselage with downturned exhausts. The fuselage is slender and tapers to the tail boom and nose. It features tandem, stepped-up cockpits, a cannon mounted beneath the belly, and a non-retractable tricycle tail-wheel type landing gear. Due to the energy-absorbing landing gear and seats the crew can survive a vertical fall of up to 12 m/s. The Mi-28 has a fully armoured cabin, including the windshield, which withstands 7.62 and 12.7 mm armor piercing bullets and 20 mm shell fragments. The helicopter design is based on the conventional pod and boom configuration, with a tail rotor. The main rotor head has elastomeric bearings and the main rotor blades are made from composite materials. The tail rotor is designed on a biplane configuration, with independently controlled X-shaped blades. A new design of all-plastic rotor blades, which can sustain 30 mm shells, is installed on the Mi-28N night attack variant. It is equipped with two heavily armored cockpits, a windshield able to withstand 12.7–14.5 mm caliber bullets, in-nose electronics, and a narrow-X tail rotor (55 deg), with reduced noise characteristics. It is powered by two 2,200 hp Isotov TV-3-117VM (t/n 014) turboshaft engines. While the Mi-28 is not intended for use as a transport, it does have a small passenger compartment capable of carrying three people. The planned purpose of this is the rescue of downed helicopter crews. The Mi-28N features a helmet mounted display for the pilot. The pilot designates targets for the navigator/weapons officer, who proceeds to fire the weapons required to fulfill that particular task. The integrated surveillance and fire control system has two optical channels providing wide and narrow fields of view, a narrow-field-of-view optical television channel, and laser rangefinder. The system can move within 110 degrees in azimuth and from +13 to −40 degrees in elevation. The night attack variant helicopter retains most of the structural design of the original Mi-28. The main difference is the installation of an integrated electronic combat system. Other modifications include: new main gearbox for transmitting higher power to the rotor, new high-efficiency blades with swept-shaped tips, and an engine fuel injection control. The pilot uses a helmet-mounted target designator, which allocates the target to the navigator's surveillance and fire control system. The navigator/weapons officer is then able to employ guided weapons or guns against the target. The targeting system follows the direction of the pilot's eyes. Russia's military rotary-wing aircraft fleet has been fully refitted with new night vision goggles (NVG). Mil Mi-28N attack helicopters of the Russian Aerospace Forces (VKS) received GEO-ONV1-family NVGs.

Ka-50 Black Shark (Hokum A) Russian Attack Helicopter






Tiers:



Variants:

- **Kamov V-80:** Prototype version for Ka-50.
- **Kamov Ka-50:** Single-seat version.
- **Kamov Ka-50N:** Ka-50 with night attack capability.
- **Kamov Ka-50Sh:** Ka-50 with improved night attack capability.
- **Kamov Ka-50-2 "Erdogan":** Version with a two-seat tandem cockpit.
- **Kamov Ka-52 "Alligator":** Highly upgraded version with a two-seat side-by-side cockpit for the Russian Air Force.
- **Kamov Ka-52K "Katran":** Naval version with folding blade and reinforced landing gear, wing shortened for basing on ships and the possibility of using Kh-35 anti-ship missile.

System

Alternative Designation: Kamov Ka-50 "Black Shark", Hokum A
Type: single-seat attack helicopter
Manufacturer: Kamov
In Service: 1995-Present
Crew: ea1
Blades, Main Rotor: Each rotor has three blades with swept tips
Blades, Tail Rotor: No tail rotor necessary in this configuration
Number of Engines: ea2
Day/Night Capable: The Ka-50N Night Shark was developed to overcome the challenges of operating at night that the ka-50 has.
All Weather Capable: Yes
Takeoff or Landing Limitations: INA
Number of Hard Points: 4 (6 on Ka-52) under-wing hardpoints, plus 2 on wingtips for countermeasures or air-to-air

missiles with a capacity of 2,000 kg

Digital Autopilot: Yes

Maximum Pylons Capacity: 2,300 kg

Landing Gear: Two-wheel nose landing gear retracts to the rear under the cockpit

Note #1: The lack of a tail rotor enables the aircraft to perform flat turns within the entire flight speed range

Note #2: If the Ka-50 is to operate at night, it must be equipped with a Saturn night targeting pod. This pod takes up one of the underwing pylons

Dimensions

Length with Rotors: m16

Rotor Diameter: m14.50

Wingspan: m7.30

Height: m4.90

Weight, Empty: kg7,692

Weight, Takeoff Normal: kg9,800

Weight, Takeoff Maximum: kg10,800

Disc Area: 330.4 m sq

Automotive

Engine Name: 2 x turboshaft Klimov TV3-117VMA

Engine Type: Turboshaft

Engine Power: 2,200 shaft hp each

Speed, Maximum Level: km/h315

Speed, Maximum Dive: km/h350

Speed, Cruise: km/h270

Speed, Backwards: km/h90

Speed, Sideways: km/h70

Range, Combat Radius: km250

Range, Normal Radius: km460

Range, Ferry: km1,160

Climb Rate: 600 m/min

Ceiling Hover: m4,000

Ceiling Service: m5,500

Load Factor: 3.5 g (max vertical)

Endurance: 3 Hours

Communications

Radio: INA

Chin Mounted Gun

↳*System*

Name: Shipunov 2A42,

Type: 30mm Autocannon

Manufacturer: Tulamashzavod

In Service: 1980-Present

Length: m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min (high)

Effective Firing Range (AP-t): m2,000

Maximum Firing Range (HEI): m4,000

Feed System: Twin Feed

↳*Ammunition*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: ea2,000

Armor Penetration: INA

Projectile Weight: grams389

Bursting Charge: grams49

Note: A high-explosive incendiary round with A-670M nose fuze.[10] The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Wing Mounted Weapons

Note: The Ka-50 can also be outfitted with the Kh-25MP (AS-12 Kegler) Missile and FAB 500 or tactical dispensers

↳*Rocket System*

Name: S-8 Rocket

Type: Rocket

Rocket Pod Type: B series of rocket pods, carrying either seven or 20 rockets.

Number of Rocket Pods: ea4

Rocket Length: m1.56

Rocket Diameter: mm80

Launch Weight: kg11.5

Warhead Type: HEAT

Warhead Weight: kg3.6

Basic Load: ea80 separate S-80 Rockets in four B-8 Series Rocket Pods

Maximum Effective Range: km4

Minimum Effective Range: km1.3

Speed: m/s692

Armor Penetration: 350 mm versus RHA

Fuze Type: N-26A fuze

Motor: BIK-2D motor powder

↳*Missile System*

Name: R-60 Missile (AA-8 Aphid")

Type: Short-range lightweight infrared homing air-to-air missile

In Service: 1974-Present

Manufacturer: Vympel

Length: mm2,090

Diameter: mm120

Wingspan: mm390

Basic Load: INA

Warhead Type: kg3

Detonation mechanism: Proximity

Engine: Solid-fuel rocket engine

Operational Range: km8

Flight Altitude: m20,000

Speed: Mach 2.7

Guidance System: Infrared Homing

Note: The Ka-50 can also carry the R-73 (AA-11 Archer) Missile

↳*Anti-Tank Guided Missile System*

Name: 9K121 Vikhr (AT-16 Scallion)

Type: Laser-Guided ATGM Missile

In Service: 1985-Present

Length: m2.80

Diameter: mm130

Wingspan: mm380

Missile Weight: kg45

Warhead Type: Tandem HEAT charge

Warhead Weight: kg8-12

Armor Penetration (ERA): mm1,000

Basic Load: ea12

Detonation Mechanism: Proximity and Impact

Engine: Solid-fuel rocket

Propellant: Sold Fuel

Operational Range: km10-12

Speed: m/s600

Guidance System: Laser beam riding

Note: The KA-50 can also carry 9M120 Ataka (Spiral-2) ATGMs.

Fire Control

Fire Control System Type: INA

Fire Control Radar: Millimetre wave radar

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Laser Rangefinder: Yes

Night Vision: electro-optical sight; takes one pylon slot

Position Location System: Yes

IFF: Yes, Slap Shot System

Heads Up Display (HUD): Yes

Helmet-Mounted Display: Yes

Data Link: Yes, with ground units

Protection

Armor: protection against 12.7-mm armor-piercing bullets and 23-mm projectile fragments

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: Yes, Exhaust infrared (IR) suppressors

Add on Armor: INA

NBC Protection: Yes

EW Counter System: Yes

Counter Measures (Chaff/Flares): Yes, launchers in wingtip pods

Ejection System: K-37-800 rocket-assisted

Automatic Fire Suppression System: Yes

Note #1: Extensive provision of steel armor adds 770 lb (350 kg) to aircraft weight.

Note #2: Armored, self-sealing composite fuel cells are buried in the fuselage.

Notes:

The Ka-50, also nicknamed the Chernaya Akula (Black Shark) was a Soviet attack helicopter. Its NATO reporting name was Hokum. The Ka-50 was planned as a rival to the Mi-28 in a competition to provide the Soviet armed forces with a new battlefield attack helicopter. Kamov opted for a single-crew layout to save weight for more armor, more powerful armament, and a greater number of advanced sensors. The first of three V-80 prototypes made its maiden flight on 17 June 1982. In October 1986 the Ka-50 was selected for production. With the collapse of the Soviet Union, Russia faced military budget cuts. Production of the original Ka-50 was stopped with only around 10 of these helicopters ever built. In 2000 a pair of production Ka-50 helicopters was used during the Second Chechen War, where these gunships were basically tested by the Russian military to evaluate the type. However the original Ka-50 never reached full operational capability. If the Ka-50 is to operate at night, it must be equipped with a Saturn night targeting pod. This pod takes up one of the underwing pylons.

AH-1W Super Cobra American Attack Helicopter





Tiers:



Variants:

- **AH-1J SeaCobra:** Original twin engine version.
- **AH-1J International:** Export version of the AH-1J SeaCobra.
- **AH-1T Improved SeaCobra:** Improved version with extended tail boom and fuselage and an upgraded transmission and engines.
- **AH-1(4B)W Viper:** "Four-Bladed Whiskey" test version with a four-bladed bearingless composite main rotor based on Bell 680 rotor. A prototype was converted from AH-1T 161022.
- **AH-1Z Viper:** A new variant nicknamed "Zulu Cobra", and developed in conjunction with the UH-1Y Venom for the H-1 upgrade program. The variant includes an upgraded four-blade main rotor and adds the Target Sight System (TSS).
- **Bell 309 KingCobra:** Experimental all-weather version based on the AH-1G single-engine and AH-1J twin-engine designs.[36] Two Bell 309s were produced; the first was powered by a PW&C T400-CP-400 Twin-Pac engine set and the second was powered by a Lycoming T-55-L-7C engine.
- **CobraVenom:** Proposed version for the United Kingdom.
- **AH-1RO Dracula:** Proposed version for Romania.
- **AH-1Z King Cobra:** AH-1Z offered for Turkey's ATAK program; selected for production in 2000, but later canceled when Bell and Turkey could not reach an agreement on production.
- **Panha 2091:** Unlicensed Iranian upgrade of AH-1J International.
- **IAIO Toufan:** Iranian copy / re-manufactured AH-1J International by Iran Aviation Industries Organization, with locally sourced avionics, and weapons.

System

Alternative Designation: AH-1W SuperCobra
Total Built: Total: +1,271 Bahrain Air Force [22] (AH-1E) Japan Army [78] (AH-1S) Jordan Air Force [41] (AH-1F w/TOW) Pakistan Army [25] (AH-1F w/TOW) South Korea Army [60] (AH-1F/AH-1J) Thailand Army [5] (AH-1F) Turkey Army [37] (AH-1P/AH-1W)
Type: Attack Helicopter
Manufacturer: Bell Helicopter
In Service: 1986-Present

Crew: eatwo: pilot, co-pilot/gunner

Cockpit Configuration: Two seats, in tandem (pilot in rear, copilot/gunner in front)

Blades, Main Rotor: 2

Blades, Tail Rotor: ea2

Number of Engines: ea2

Day/Night Capable: Yes

All Weather Capable: Yes

Takeoff or Landing Limitations: INA

Number of Hard Points: ea4

Landing Skids: Yes

Dimensions

Fuselage Length: m13.9

Main Rotor Diameter: m14.63

Height: m4.32

Weight, Maximum Take Off: tons6.69

Weight, Empty: tons4.6

Disc Area: 168.1 m²

Stub Wing Span: m3.28

Automotive

Engine Name: 2 x General Electric T700-GE-401 turboshafts

Engine Type: Turboshaft

Engine Power: 1725 hp for each engine

Cruising Range: km587-635

Speed, Maximum: km/h315

Speed, Crusing: km/h281

Service Ceiling: km3.72

Rate of Climb: m/s8.2

Ceiling: m5,486

Hover IGE: 4,267 m

Hover OGE: 792 m

Endurance: 3 hours

Fuel Capacity: 305 Gallons

Note: The second engine offers additional backup, as in case of failure or damage, the helicopter can still limp back home with one engine working

Communications

Radio: INA

Chin Mounted Gun

↳*System*

Name: M61 Vulcan

Type: Hydraulically, electrically or pneumatically driven, six-barrel, air-cooled, electrically fired Gatling-style rotary cannon

Caliber: mm20

Manufacturer: General Dynamics

In Service: 1946-Present

Length: m1.827

Weight, With Feed System: kg112

Weight, Without Feed System: kg92

Barrels: 6-barrel (progressive RH parabolic twist, 9 grooves)

Action: Hydraulically operated, electrically fired, rotary cannon

Rate of Fire, M61A1: rds/min6,000

Rate of Fire, M61A2: rds/min6,600

Feed System: Belt or linkless feed system

Note #1: The turret can pivot to both sides of the helicopter, as well as up and down.

Note #2: The Super Cobra can carry additional pods with miniguns on stub wings.

↳*Ammunition*

Name: M53

Type: HEI

Caliber: mm20

Cartridge: 20×102 mm

Muzzle Velocity: m/s1,050

Basic Load: round750

Armor Penetration: 6.4 mm (0.25 in) RHA penetration at 0 degree impact angle and 1,000 m (3,300 ft) range

Note: The M61 Vulcan can also fire M56A3/A4 and PGU-28A/B 20mm rounds

Wing Mounted Weapons

Additional Weapons the AH-1H can carry: 8 x AGM-71 TOW anti-tank missiles; or 2 x AGM-122 Sidearm anti-radar missiles; or 8 x AGM-114 Hellfire anti-tank missiles; or 4 x CMU-55B fuel-air explosive weapons; or 16 x 5-in (127-mm) Zuni rockets; or 4 x 78 gal (295-liter) auxiliary fuel tanks; or 2 x 100 gal (378-liter) auxiliary fuel tanks

Anti-Tank Guided Missile System

Name: AGM-114 Hellfire

Type: Anti-Tank Guided Missile (ATGM)

Manufacturer: Lockheed Martin, Boeing (previous second source), and Northrop Grumman (seeker only for AGM-114L Longbow Hellfire)

In Service: 1984-Present

Length: m1.6

Wingspan: mm330

Diameter: mm180

Weight: kg45-49

Warhead Type: High-explosive anti-tank (HEAT)

Engine: Solid-fuel rocket

Operational Range: 0.499–11.008 km

Speed: Mach 1.3

Guidance system: Semi-active laser homing millimeter wave radar seeker

Launch Platform: Rotary- and fixed-wing platforms, unmanned combat air vehicles, tripods, ships, and ground vehicles

Basic Load: ea4 ea, one on each hardpoint

Note: The Super Cobra is also armed with Hellfire or TOW anti-tank guided missiles. It can actually carry both types of missiles on the same mission.

↳*Air-to-Air Missile*

Name: AIM-9 Sidewinder

Type: short-range air-to-air missile

Length: m3.02

Diameter: mm127

Wingspan: mm279.4

Manufacturer: Raytheon Company[1] Ford Aerospace Loral Corp.

In Service: 1956-Present

Weight: kg85.3

Warhead Type: WDU-17/B annular blast-frag

Warhead Weight: kg9.4

Detonation Mechanism: IR proximity fuze

Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket

Operational Range: 1.0 to 35.4 km

Speed: Mach 2.5

Guidance system: Infrared homing (most models) semi-active radar homing (AIM-9C

↳Launch platform: Aircraft, naval vessels, fixed launchers, and ground vehicles

Basic Load: 4 ea, one on each hardpoint

Note: The Super Cobra can also carry AIM-92 Stinger short-range air-to-air missiles, and AGM-122 Sidearm anti-radiation missiles. This gunship also has provision for AGM-65 Maverick air-to-ground missiles.

↳*Rockets and Bombs*

Note: The SuperCobra can also carry various pods with unguided rockets, cluster munitions, napalm bombs

Fire Control

Fire Control System: Yes

Fire Control Radar: Yes, type INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: Yes

Laser Rangefinder: Yes

Sensor Suite(s) Available: Yes, low speed air data sensor

Position Location System: Yes

Forward-Looking Infra-Red (FLIR): Yes

TV Camera: Low-light TV camera

Autotrack System: Yes

Night Targeting System (NTS): Yes

Thermal Sights: thermal sights and a FLIR to allow for acquisition, launch, and tracking of all types of TOW missiles in all weather conditions

Digital Ballistic Computer: Yes

Heads Up Display: Yes

Navigation: Doppler navigation

In Flight Boresighting: Yes

Protection

Fuselage Type: The Super Cobra has a slim fuselage with a fighter-type cockpit

Cockpit Protection: The cockpit is surrounded by armor protection. Armored cockpit can withstand small arms fire.

Tailboom Protection: Tail boom are able withstand damage from 23-mm cannon hits.small arms fire, and composite blades and tailboom able to withstand damage from 23-mm cannon hits.

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

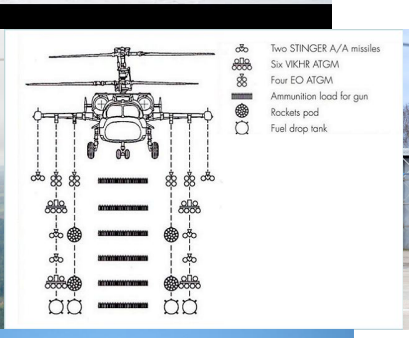
Counter Measures (Chaff/Flares): AN/ALE-39 Chaff system and SUU-4/1 Flare dispensers

Notes:

The Bell AH-1 Super Cobra is a twin-engine attack helicopter based on the United States Army's single-engine AH-1 Cobra. The twin Cobra family, itself part of the larger Huey family, includes the AH-1J Sea Cobra, the AH-1T Improved Sea Cobra, and the AH-1W Super Cobra. The AH-1W, the backbone of the United States Marine Corps's attack helicopter fleet for decades, is being replaced by the next generation Bell AH-1Z Viper. The Super Cobra was the first attack helicopter to qualify both the Sidewinder air-to-air missile and the Sidearm anti-radiation missile. Both missiles can use the same LAU-7 rail launcher. Sidearm has a range of more than 15km. AIM-9L Sidewinder is an all-aspect, short-range, air-to-air missile produced by Lockheed Martin and Raytheon. The missile has a range of 15km. A major upgrade of the Bell Super Cobra known as the H-1 program is underway. The program calls for the re-manufacture of the US Marine Corps fleet of 180 AH-1W Super Cobra and 100 UH-1N utility helicopters to an advanced four-bladed configuration, which will operate to beyond 2020.

Ka-52 Alligator (Hokum B) Russian Attack Helicopter







Tiers:



Variants:

- **Kamov V-80:** Prototype version for Ka-50.
- **Kamov Ka-50:** Single-seat version.
- **Kamov Ka-50N:** Ka-50 with night attack capability.
- **Kamov Ka-50Sh:** Ka-50 with improved night attack capability.
- **Kamov Ka-50-2 "Erdogan":** Version with a two-seat tandem cockpit.
- **Kamov Ka-52 "Alligator":** Highly upgraded version with a two-seat side-by-side cockpit for the Russian Air Force.
- **Kamov Ka-52K "Katran":** Naval version with folding blade and reinforced landing gear, wing shortened for basing on ships and the possibility of using Kh-35 anti-ship missile.

System

Alternative Designation: Ka-52 Alligator; Kamov Ka-52 Alligator ; Hokum B
Type: Two-seat version of the Ka-50
Mission: Reconnaissance, target designation and assignment, ground communications and combat support
Manufacturer: Kamov
In Service: 2008-Present
Crew: ea2 (pilot, weapons officer)
Blades, Main Rotor: Each rotor has three blades with swept tips

Blades, Tail Rotor: No tail rotor necessary in this configuration

Number of Engines: ea2

Day/Night Capable: Yes, unlike the Ka-50 which is very restricted when operating at night

All Weather Capable: Yes

Takeoff or Landing Limitations: INA

Number of Hard Points: 6 total (1 inner, 1 middle, 1 tip on each wing)

Digital Autopilot: Yes

Maximum Pylons Capacity: 2,300 kg

Landing Gear: Two-wheel nose landing gear retracts to the rear under the cockpit

Autonomous Mode Capable: Yes

Note #1: The lack of a tail rotor enables the aircraft to perform flat turns within the entire flight speed range

Dimensions

Length, with Rotors: m16

Length, without Rotors: m13.53

Rotor Diameter: m14.50

Wingspan: m7.34

Height: m4.95

Weight, Empty: kg8,550

Weight, Takeoff Normal: kg10,400

Weight, Takeoff Maximum: kg12,500

Disc Area: 330.4 m sq

Payload Capacity: kg2,800

Rotor Payload: 37.80 kg/sq m

Power Payload: 2.84 kg/hp

Pylons: 6 total (1 inner, 1 middle, 1 tip on each wing)

Pylons Maximum Load: kg2,000

Automotive

Engine Name: 2 x turboshaft Klimov TV3-117VMA-SB3

Engine Type: Turboshaft

Engine Power: 2,400 shaft hp each

Speed, Maximum Level: km/h310

Speed, Maximum Dive: km/h350

Speed, Cruise: km/h270

Speed, Backwards: km/h90

Speed, Sideways: km/h80

Range, Combat Radius: km250

Range, Normal Radius: km520

Range, Ferry: km1,200

Climb Rate: 480 m/min

Ceiling Hover: m3,600

Ceiling Service: m5,500

Load Factor: 3.5 g (max vertical)

Endurance: INA

Communications

Radio: INA

Chin Mounted Gun

↳*System*

Name: Shipunov 2A42,

Type: 30mm Autocannon

Manufacturer: Tulamashzavod

In Service: 1980-Present

Length: m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min (high)

Effective Firing Range (AP-t): m2,000

Maximum Firing Range (HEI): m4,000

Azimuth: -2 deg 30 min to 9 deg

Elevation: -37 deg to 3 deg 30 min

Feed System: Twin Feed

↳*Ammunition*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: ea460

Armor Penetration: INA

Projectile Weight: grams389

Bursting Charge: grams49

Note: armor-piercing and high-fragmentation incendiary, pilot/gunner selectable

Wing Mounted Weapons

Note: The ka-52 can also equip: INNER PYLON Rockets: B-8 V-20 80-mm rocket pod carrying 20 S-80 rockets Bombs: UPK-23-250 250-kg FAB-250 bomb 500-kg FAB-500 bomb 500-kg KAB-500Kr bomb KMGU cluster bomb Anti-Radar: Kh-25MP (AS-10 Kegler) missile MIDDLE PYLON: Anti-Tank: 6 x Vikhir-M (AT-9 Whirlwind) laser-guided missiles Rockets: B-8 V-20 80-mm rocket pod carrying 20 S-80 rockets B-13 122-mm rocket pod carrying 5 S-13 rockets Bombs: 250-kg FAB-250 bomb 500-kg FAB-500 bomb 500-kg KAB-500Kr bomb KMGU cluster bomb Other: ECM/aiming containers fuel tank aiming stations for Ka-50 TIP PYLON: Anti-Air: 2 or 4 Igla-V (SA-16 Gimlet)

↳*Rocket System*

Name: S-8 Rocket

Type: Rocket

Rocket Pod Type: B series of rocket pods, carrying either seven or 20 rockets.

Number of Rocket Pods: ea4

Rocket Length: m1.56

Rocket Diameter: mm80

Launch Weight: kg11.5

Warhead Type: HEAT

Warhead Weight: kg3.6

Basic Load: ea80 separate S-80 Rockets in four B-8 Series Rocket Pods

Maximum Effective Range: km4

Minimum Effective Range: km1.3

Speed: m/s692

Armor Penetration: 350 mm versus RHA

Fuze Type: N-26A fuze

Motor: BIK-2D motor powder

↳*Missile System*

Name: R-60 Missile (AA-8 Aphid")

Type: Short-range lightweight infrared homing air-to-air missile

In Service: 1974-Present

Manufacturer: Vympel

Length: mm2,090

Diameter: mm120

Wingspan: mm390

Basic Load: INA

Warhead Type: kg3

Detonation mechanism: Proximity

Engine: Solid-fuel rocket engine

Operational Range: km8

Flight Altitude: m20,000

Speed: Mach 2.7

Guidance System: Infrared Homing

Note: The Ka-52 can also equip R-73 X-25ML (AA-11 Archer) missiles

↳ ***Anti-Tank Guided Missile System***

Name: 9K121 Vikhr (AT-16 Scallion)

Type: Laser-Guided ATGM Missile

In Service: 1985-Present

Length: m2.80

Diameter: mm130

Wingspan: mm380

Missile Weight: kg45

Warhead Type: Tandem HEAT charge

Warhead Weight: kg8-12

Armor Penetration (ERA): mm1,000

Basic Load: ea12

Detonation Mechanism: Proximity and Impact

Engine: Solid-fuel rocket

Propellant: Sold Fuel

Operational Range: km10-12

Speed: m/s600

Guidance System: Laser beam riding

Note:

Fire Control and Electronics

Fire Control System Type: Samshit-E system

Fire Control Radar: Arbalet Radar

Sighting System: Shkval electro-optical sighting system

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Laser Rangefinder: Yes

Night Vision: Samshit-E optics

Position Location System: Yes

IFF: Yes, Slap Shot System

Heads Up Display (HUD): Yes

Helmet-Mounted Display: Yes, TopOwl helmet-mounted sight display

Data Link: Yes, with ground units

Infrared Camera: Yes

Flight Computer: Multi-level digital flight computer

Navigation System: Nadir-10 navigation system

Autonomous Mode Capable: Yes

Radar Warning Receiver: Pastel (L-150) radar warning receiver

Laser Warning System: Mak (L-136) infrared and Otklik (L-140) laser warning systems

Turett Sensor: GOES-451 sensor

Protection

Armor: protection against 12.7-mm armor-piercing bullets and 23-mm projectile fragments

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: Yes, Exhaust infrared (IR) suppressors

Add on Armor: INA

NBC Protection: Yes

EW Counter System: Yes, passive and active electronic warfare systems

Counter Measures (Chaff/Flares): Yes, can be loaded on pylons as required

Decoys: 23-mm rejector pods loaded on tip pylons as required, 32 decoys per pod

Ejection System: K-37-800 rocket-assisted

Automatic Fire Suppression System: Yes, autonomous fire-extinguishing system

Blast Proof Fuel Tanks: Yes

Note #2: Armored, self-sealing composite fuel cells are buried in the fuselage.

Notes:

The Kamov Ka-52 "Alligator" (Hokum-B) is an upgraded form of the original Ka-50 "Hokum" attack helicopter line. While the Ka-50 utilized a single-seat cockpit, the most notable difference in the new mark is the twin-seat, side-by-side cockpit. Development of this attack helicopter began in 1994 leading to a first flight recorded on June 25th, 1997. While the Ka-52 includes a radar suite, additional crew member, and all-new designation it more or less retains the same form and function as well as armament capabilities of the original. Additionally, the platform supports all-weather, day/night attack environments due to its various upgrades that include FLIR, TV sighting, helmet-mounted sighting, laser rangefinder, and mast-mounted radar antenna. The Ka-52 is billed as an armed reconnaissance and combat platform able to take on the roles of assault, Close-Air Support (CAS), convoy protection, and armed patrolling. The helicopter maintains its weaponry under its short wingstub assemblies which allow for four underwing hardpoints. Onboard countermeasures, including signature reduction features, chaff/flare dispensers, and crew/critical systems armoring enhances battlefield survivability. Each pilot is also afforded K-37-800M shock-absorbing ejection seats. The twin-seat arrangement sports control redundancy meaning either pilot can

manage the flight control aspects of the helicopter. The avionics suite is all-modern (complete with a high level of automation for reduced crew workloads) and the weapons suite flexible to support a broad range of weaponry. Attention has also been given to reduced maintenance and repair times by providing for better accessibility of key systems and components. The Alligator features the Kamov helicopter trademark coaxial main rotors arrangement (2 x three-bladed systems) which eliminate the need for a countering tail rotor unit (this also increased battlefield survivability to an extent). These main rotors are driven by 2 x Klimov VK-2500 series turboshaft engines which support "hot-and-high" operations as well as cold weather service. Performance includes a maximum speed of 300 kmh with a cruising speed nearing 260 kmh. Ferry range is 1,100 kilometers with a combat radius of about 460 kilometers. Its operational service ceiling reaches 5,500 meters. The Ka-52 carries a 30mm 2A42-1 cannon along the starboard side of its fuselage. There is limited traversal given which requires the pilots to position the entire aircraft in the direction of fire but overall accuracy is said to be better than that of a turreted chin gun seen in other modern attack helicopters. Beyond this standard installation, the wingstubs of the helicopter support Anti-Tank Guided Missiles (ATGMs), rockets, rocket pods, gun pods, and cannon pods as required. To date, the Ka-52 has only been adopted by the Russian Air Force with possible plans to feature it in the Russian Navy as well dependent upon successful procurement of a new amphibious warship / helicopter carrier. The Air Force is planning on a Ka-52 stock of 140 helicopters with the Navy adding a possible 40 more units.

Mi-24 (Hind) Russian Attack Helicopter



Tiers:



Variants:

- **V-24:** The first version, twelve prototypes and development aircraft. The first V-24 mockup resembled the Bell UH-1A Huey. Later models resembled the future Hind-A, one of which was modified in 1975 as A-10 for speed record attempts with wings removed and faired over and with inertia-type dampers on the main rotor head. The A-10 reached a speed of 368 km/h. It was armed with GSh-23 and could carry up to six missiles or rockets.
- **Mi-24:** (Hind-A) Other early versions were the armed assault helicopter, which could carry eight combat troops and three crew members. It could also carry four 57mm rocket pods on four underwing pylons, four MCLOS 9M17 Fleyta (AT-2 Swatter) anti-tank missiles on two underwing rails, free-fall bombs, plus one Afanasev A-12.7 12.7mm machine-gun in the nose. The Mi-24 was the first production model.
- **Mi-24F:** (Hind-A) Modified Hind-A with seven reinforcing ribs on the port fuselage aft of the wing and the SRO-2M Khrom ("Odd Rods") IFF antenna relocated from the canopy to the oil cooler. The APU exhaust was also extended and angled downwards. The designation may be unofficial.
- **Mi-24A:** (Hind-B) The Mi-24A was the second production model. Both the Mi-24 and Mi-24A entered the Soviet Air Forces service in 1972. They Lacked the four-barrel Yak-B 12.7mm machine gun under the nose.
- **Mi-24U:** (Hind-C) Training version without nose gun and wingtip stations.
- **Mi-24BMT:** Small number of Mi-24s converted into minesweepers.
- **Mi-24D (Hind-D):** The Mi-24D was a purer gunship than the earlier variants. It entered production in 1973. The Mi-24D has a redesigned forward fuselage, with two separate cockpits for the pilot and gunner. It is armed with a single 12.7mm four-barrel Yak-B machine-gun under the nose. It can carry four 57mm rocket pods, four SACLOS 9M17 Phalanga anti-tank missiles (a significant enhancement compared to the MCLOS system found on the Mi-24A), plus bombs and other weapons. One Mi-24D was sold to Poland in January 1996 and was used by the WTD 61 in Manching during 1994 for tests with the head of a MIM-23 Hawk missile in place of the chin-mounted gun. This version also had an unidentified modification in the rear cabin window on the starboard side.
- **Mi-24PTRK:** This version was the Mi-24D modification that was used for testing the Shturm V missile system for the Mi-24V.
- **Mi-24DU:** Small numbers of Mi-24Ds were built as training helicopters with doubled controls.
- **Mi-24V:** (Hind-E) Later development which entered production in 1976 and was first seen by the west in the early 1980s. It was armed with the more advanced 9M114 Shturm (AT-6 Spiral). Eight of those missile are mounted on four outer wing pylons. It was the most widely produced version with more than 1,500 made. In Polish service this aircraft is designated Mi-24W. One Mi-24V was referred to as Mi-24T for unknown reasons.
- **Arsenal Mi-24V upgrade:** Ukrainian upgrade for Mi-24V.
- **Mi-24P:** (Hind-F) The gunship version, which replaced the 12.7mm machine-gun with a fixed side-mounted 30mm GSh-30-2K twin-barrel autocannon.
- **Mi-24TECh-24:** Experimental Mi-24P to test abilities for recovery of downed aircraft.

- **Mi-24VP:** (Hind-E Mod) Development of Mi-24V made in 1985 which replaced the machine-gun with twin 23mm autocannons in a movable turret. Entered service in 1989, but only 25 were made before production ended the same year.[2] One Mi-24VP flew with the Delta-H tail rotor of the Mil Mi-28.
- **Mi-24RKhR:** (Hind-G1) NBC reconnaissance model, which is designed to collect radiation, biological and chemical samples. It was first seen during the 1986 Chernobyl disaster. Also known as the Mi-24R, Mi-24RK and Mi-24RKh (Rch).
- **Mi-24RR:** Radiation reconnaissance model derived from the Mi-24R.
- **Mi-24K:** (Hind-G2) Army reconnaissance, artillery observation helicopter.
- **Mi-24VM:** Upgraded Mi-24V with updated avionics to improve night-time operation, new communications gear, shorter and lighter wings, and updated weapon systems to include support for the 9M120 Ataka, Shturm and 9K38 Igla ATGM missiles and a 23mm main gun. Other internal changes have been made to increase the aircraft life-cycle and ease maintenance.
- **Mi-24VN:** (Hind-E) A night-attack version based on an Mi-24V in Mi-24VM Stage 1 configuration.
- **Mi-24PM:** Upgraded Mi-24P using same technologies as in Mi-24VM.
- **Mi-24PN:** PN version has a TV and a FLIR camera located in a dome on the front of the aircraft, and is armed with GSh-23L. The Russian Air Force received 14 Mi-24PNs in 2004
- **Mi-24PS:** Civil police or paramilitary version, equipped with a FLIR, searchlight, loudspeaker PA system and attachments for rappelling ropes.
- **Mi-24V Ecological Survey Version:** Environmental research modification developed by the Polyot Industrial Research Organisation.
- **Mi-24 SuperHind Mk.II:** Modern western avionics upgrade produced by South African company Advanced Technologies and Engineering (ATE)
- **Mi-24 SuperHind Mk.III:** Extensive operational upgrade of the original Mi-24 including weapons, avionics and counter measures.
- **Mi-PSV:** Experimental high-speed helicopter based on the Mi-24. PSV stands for Perspektivny skorostnoi vertolet (Перспективный скоростной вертолёт) – Prospective high speed helicopter). Single-seat streamlined cockpit, unarmed, fitted with experimental main rotors for research into high-speed flight, with a target of increasing the speed of the Mi-28N by 10% and the Mi-35M by 13%
- **Mi-35P:** Russian Helicopters holding has developed a common standard for Mi-24 modernization designated as Mi-35P. The Mi-35P has received the OPS-24N-1L observation-sight system with a third generation long-wave matrix thermal imager, TV camera, and laser rangefinder.
- **Mi-35MV:** Modernized version of Mi-35M with an additional armour and upgraded propulsion and optical systems. It is equipped with a opto-electronic OPS-24N1 surveillance and targeting system
- **Mi-35O:** Export version of the Mi-24VN using a Mexican FLIR camera and a glass cockpit with upgraded avionics. Operated by Mexico only.
- **Mi-35M4:** (AH-2 Sabre) Updated version of the Mi-35M with Israeli avionics for the Brazilian Air Force.
- **Mi-35M2:** Updated version of the Mi-35M for the Venezuelan Army.
- **Mi-35MS:** Flying Command Post variant of the Mi-35M. Operated by the Russian Federal Protective Service (FSO).

System

Alternative Designation: Mil Mi-24 Hind; Mil Mi-35 Hind
Manufacturer: Mil
In Service: 1972-Present
Type: Attack Helicopter
Crew: ea3 (pilot, co-pilot/gunner, engineer)
Troop Capacity: ea8
Litter Capacity: ea4
Blades, Main Rotor: 5
Blades, Tail Rotor: ea3
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: Yes
Number of Hard Points: ea6

Inner Harg Points Capacity: kg500

Outer Hard Points Capacity: kg250

Dimensions

Length: m18.60

Width: m4.80

Height: m6.50

Weight, Combat: kg11,000

Weight, Empty: kg8,400

Main Rotor Diameter: m17.20

Disc Area: 227 m sq

Tail Rotor Diameter: m3.9

Cargo Compartment Dimensions Floor Length: m2.5

Cargo Compartment Dimensions Floor Width: m1.5

Cargo Compartment Dimensions Floor Height: m1.2

Automotive

Engine Name: 2 x Klimov TV-3-117 turboshaft

Engine Type: Diesel

Engine Power: hp2,200 shaft hp each

Cruising Range: km450

Speed, Maximum: km/h320

Cruise Speed: km/h270

Internal Fuel: kg1,500

Cabin Auxiliary Fuel Tank: kg1,000

External Fuel Tanks: kg1,200

Climb Rate: 899 m/min

Ceiling, Service: m5,750

Ceiling, Hover: m3,100

Radius (Max Load) Internal Fuel: km160

Radius (Max Load) 2 External Tanks: km224

Radius (Max Load) 4 External Tanks: km288

Maximum Range with Auxiliary Fuel: km950

Maximum Range with Normal Load: km450

Max G Force: G1.75

Payload, Innternal Load: 8 combat troops or 4 litters

Payload, External Weapons Load:: kg1,500

Payload, External Load (no weapons): kg2,500

Communications

Radio: INA

Chin Mounted Gun

Note: The original Mi-24/Mi-25 was equipped with 1 x 4 barrel 12.7mm gun, which was later replaced with a 23mm twin-barrel cannon

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: twin-barreled 23mm autocannon d

Caliber: 23mm

Manufacturer: KBP Instrument Design Bureau

In Service: 1960-Present

Weight: kg49.2

Length: mm1,387

Barrel Length: mm1,000

Barrels: ea2

Action: Gas Principle

Rate of Fire: rds/min3,400-3,600

↳*Ammunition*

Type: Autocannon Rifle Round

Caliber: mm23

Cartridge: 23x115mm

Muzzle Velocity: m/s715

Basic Load: 450

Armor Penetration: INA

Ammo Types: HEFI, HEI, APT, APE, CC

Wing Mounted Weapons

↳*Rocket System #1 Launcher*

Name: UB-32

Type: 57mm, reusable, 32-salvo rocket pod

Basic Load (UB-32 Rocket Pod): ea2-4

Launcher Length: mm2,080

Launcher Diameter: mm464

Weight, Empty: kg103

Weight, Loaded: kg264

↳*Rocket System #1 Projectile*

Name: S-5M (ARS-57) Rocket

Type: Unguided HE-FRAG

Caliber: mm55

Length: m1.4

Diameter: mmINA

Weight: kg5

Basic Load (S-5 Rockets): ea32

Operational Range: km3-4

Engine: Solid Rocket Motor

Speed: 300 meters in 1.1 seconds

Note #1: Produces 75 Splinters

Note #2: The S-5 is carried in rocket pods, with 4–32 rockets.

↳*Rocket System #2*

Name: S-24 Rocket

Type: Unguided high-velocity airborne rocket

Diameter: mm240

Length: m2.33

Launch Weight: kg235

Warhead Type: blast-fragmentation warhead

Warhead Weight: kg123

Operational Range: km2-3

Basic Load: ea2-4

Proximity Fuze: R-24

Fragmentation Casualty Zone Radius: m300-400

Number of Fragments: 4,000

Penetration: 30mm of armor

Note: The S-24 Warhead detones 3 meters above the ground

↳*Anti-Tank Guided Missile System*

Name: AT-2 Swatter (3M11/9M17)

Type: Anti-Tank Guided Missile (ATGM)

In Service: 1964-Present

Manufacturer: Nudelman OKB-16

Weight: kg27

Length: cm116

Diamter: mm148

Warhead Type: HEAT

Warhead Weight: kg5.4

Engine: Solid fuel rocket

Wingspan: cm68

Operational Range: km0.5-2.5

Speed: 160 m/s (360 mph)

Guidance System: Radio command

Steering System: MCLOS

Launch Platform: Mi-4, Mi-8, Mi-24, Mi-25, BRDM-1, BRDM-2

Fire Control

Fire Control System Type: INA

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: INA

Sensor Suite(s) Available: electro-optical sensor systems

Position Location System: Yes

Radar Warning System: Sirena-3M radar warning system

IR Jammer: HO Brick IR Jammer

FLIR Equipped: Yes

RWR Equipped: Yes

Air Data Sensor: Yes

Missile Guidance Transmitter: Yes

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: No

EW Counter Measures/CCM: No

Counter Measures (Chaff/Flares): ASO-2V flare dispensers

Notes:

Mil Mi-24 is a twin-engined Combat helicopter intended for close support of ground forces, destruction of armored targets and transportation of persons or cargo. The Mi-24 is not a direct counterpart to the American AH-64 Apache, since unlike this and other Western attack helicopters it is also capable of transporting up to eight troops. As a combination gunship and troop transport, the Hind combat helicopter has no direct NATO counterpart. The combat helicopter is a flying infantry fighting vehicle, which blends features of both transport and attack helicopters. Soviet pilots called the aircraft 'letayushiy tank' or flying tank. Another common nickname is 'Krokodil' (Crocodile) - due to the helicopter's camouflage and fuselage shape and "Drinking Glass", (Stakan) because of the flat glass plates that surround the Mi-24's cockpit. The core of the aircraft was derived from the Mil Mi-8 (NATO reporting name "Hip") with two top-mounted turboshaft engines driving a mid-mounted 17.3 m five-blade main rotor and a three-blade tail rotor. The engine configuration gave the aircraft its distinctive double air intake. Original versions have an angular greenhouse-style cockpit; Model D and later have a characteristic tandem cockpit with a "double bubble" canopy. Other airframe components came from the Mi-14 "Haze". Two mid-mounted stub wings provide weapon hardpoints, each offering three stations, in addition to providing lift. The loadout mix is mission dependent; Mi-24s can be tasked with close air support, anti-tank operations, or aerial combat. The Mi-24 fuselage is armored and can resist impacts from 12.7 mm (0.50 in) rounds from all angles. The titanium rotor blades are resistant to 12.7 mm rounds. The cockpit is protected by ballistic-resistant windscreens and a titanium-armored tub. The cockpit and crew compartment are over pressurized to protect the crew in NBC conditions. Considerable attention was given to making the Mi-24 fast. The airframe was streamlined, and fitted with retractable tricycle undercarriage landing gear to reduce drag. At high speed, the wings provide considerable lift (up to a quarter of total lift). The main rotor was tilted 2.5° to the right from the fuselage to compensate for translating tendency at a hover. The landing gear was also tilted to the left so that the rotor would still be level when the aircraft was on the ground, making the rest of the airframe tilt to the left. The tail was also asymmetrical to give a side force at speed, thus unloading the tail rotor. Comparison to Western helicopters As a combination of armoured gunship and troop transport, the Mi-24 has no direct NATO counterpart. While the UH-1 ("Huey") helicopters were used in the Vietnam War either to ferry troops, or as gunships, they were not able to do both at the same time. Converting a UH-1 into a gunship meant stripping the entire passenger area to accommodate extra fuel and ammunition, and removing its troop transport capability. The Mi-24 was designed to do both, and this was greatly exploited by airborne units of the Soviet Army during the 1980–89 Soviet–Afghan War. The closest Western equivalent was the Sikorsky S-67 Blackhawk, which used many of the same design principles and was also built as a high-speed, high-agility attack helicopter with limited troop transport capability using many components from the existing Sikorsky S-61. The S-67, however, was never adopted for service. Other Western equivalents are the Romanian Army's IAR 330, which is a licence-built armed version of the Aérospatiale SA 330 Puma, and the MH-60 Direct Action Penetrator, a special purpose armed variant of the Sikorsky UH-60 Black Hawk. The Hind has been called the world's only "assault helicopter" due to its combination of firepower and troop-carrying capability A modified Mi-24B, named A-10, was used in several speed and time-to-climb world record attempts. The helicopter had been modified to reduce weight as much as possible—one measure was the removal of the stub wings. The previous official speed record was set on 13 August 1975 over a closed 1000 km course of 332.65 km/h (206.7 mph); many of the female-specific records were set by the all-female crew of Galina Rastorguyeva and Lyudmila Polyanskaya. On 21 September 1978, the A-10 set the absolute speed record for helicopters with 368.4 km/h (228.9 mph) over a 15/25 km course. The record stood until 1986, when it was broken by the current official record holder, a modified British Westland Lynx.

AH-64 Apache American Guardian Attack Helicopter





Tiers:



Variants:

- **AH-64A:** The AH-64A is the original production attack helicopter. The crew sit in tandem in an armored compartment. It is powered by two GE T700 turboshaft engines. The A-model was equipped with the −701 engine version until 1990 when the engines were switched to the more powerful −701C version. U.S. Army AH-64As are being converted to AH-64Ds. The service's last AH-64A was taken out of service in July 2012 before conversion at Boeing's facility in Mesa, Arizona. On 25 September 2012, Boeing received a $136.8M contract to remanufacture the last 16 AH-64As into the AH-64D Block II version and this was forecast to be completed by December 2013.
- **AH-64B:** In 1991, after Operation Desert Storm, the AH-64B was a proposed upgrade to 254 AH-64As. The upgrade would have included new rotor blades, a Global Positioning System (GPS), improved navigation systems and new radios. U.S. Congress approved $82M to begin the Apache B upgrade. The B program was canceled in 1992. The radio, navigation, and GPS modifications were later installed on most A-model Apaches through other upgrades.
- **AH-64C:** Additional funding from Congress in late 1991 resulted in a program to upgrade AH-64As to an AH-64B+ version. More funding changed the plan to upgrade to AH-64C. The C upgrade would include all changes to be included in the Longbow except for mast-mounted radar and newer −700C engine versions. However, the C designation was dropped after 1993. With AH-64As receiving the newer engine from 1990, the only difference between the C model and the radar-equipped D model was the radar, which could be moved from one aircraft to another; thus the decision was made to simply designate both versions "AH-64D".
- **AH-64D:** The AH-64D Apache Longbow is equipped with a glass cockpit and advanced sensors, the most noticeable of which being the AN/APG-78 Longbow millimeter-wave fire-control radar (FCR) target acquisition system and the Radar Frequency Interferometer (RFI), housed in a dome located above the main rotor. The radome's raised position enables target detection while the helicopter is behind obstacles (e.g. terrain, trees or buildings). The AN/APG-78 is capable of simultaneously tracking up to 128 targets and engaging up to 16 at once; an attack can be initiated within 30 seconds. A radio modem integrated with the sensor suite allows data to be shared with ground units and other Apaches, allowing them to fire on targets detected by a single helicopter. The aircraft is powered by a pair of uprated T700-GE-701C engines. The forward fuselage was expanded to accommodate new systems to improve survivability, navigation, and 'tactical internet' communications capabilities. In February 2003, the first Block II Apache was delivered to the U.S. Army, featuring digital communications upgrades. The Japanese Apache AH-64DJP variant is based on the AH-64D; it can be equipped with the AIM-92 Stinger air-to-air missiles for self-defense.
- **AH-64E:** Formerly known as AH-64D Block III, in 2012, it was redesignated as AH-64E Guardian to represent its increased capabilities. The AH-64E features improved digital connectivity, the Joint Tactical Information Distribution System, more powerful T700-GE-701D engines with upgraded face gear transmission to accommodate more power, capability to control unmanned aerial vehicles (UAVs), full IFR capability, and improved landing gear. New composite rotor blades, which successfully completed testing in 2004, increase cruise speed, climb rate, and payload capacity. Deliveries began in November 2011. Full-rate production was approved on 24 October 2012,[318] with 634 AH-64Ds to be upgraded to AH-64E standard and production of 56 new-build AH-64Es to start in 2019/20. Changes in production lots 4 through 6 shall include a cognitive decision aiding system and new self-diagnostic abilities. The updated Longbow radar has an oversea capacity, potentially enabling naval strikes; an AESA radar is under consideration. The E model is to be fit for maritime operations. The Army has expressed a desire to add extended-range fuel tanks to the AH-64E to further increase range and endurance. AH-64Es are to have the L-3 Communications MUM-TX datalink installed in place of two previous counterparts, communicating on C, D, L, and Ku frequency bands to transmit and receive data and video with all Army UAVs. Lots 5 and 6 will be equipped with Link 16 data-links.[323] As of April 2020, 500 AH-64E have been delivered.
- **AH-64F:** In 2014, Boeing conceptualized an Apache upgrade prior to the introduction of the U.S. Army's anticipated attack version of the Future Vertical Lift (FVL) aircraft, forecast to replace the Apache by 2040. The conceptual AH-64F

would have greater speed via a new 3,000 shp turboshaft engine from the Improved Turbine Engine Program, retractable landing gear, stub wings to offload lift from the main rotor during cruise, and a tail rotor that can articulate 90 degrees to provide forward thrust. In October 2016, the Army revealed they would not pursue another Apache upgrade to focus on funding FVL; the Army will continue buying the Apache through the 2020s until Boeing's production line ends in 2026, then FVL is slated to come online in 2030.

- **Compound Apache:** In October 2018, Boeing began testing the AH-64E Block 2 Compound, a compound helicopter design which added a larger fixed wing and a pusher propeller to the Apache airframe to provide additional lift and thrust, respectively. In addition, the engine exhaust was redirected downwards. Collectively, the modifications were anticipated to improve speed to 185 kn (343 km/h; 213 mph), range to 460 nmi (850 km; 530 mi), payload to 5,900 lb (2,700 kg), and fuel economy. A 30% scale model completed wind tunnel testing in January 2019. The Compound Apache has been pitched as an interim replacement for the Apache before its replacement under the Future Vertical Lift program.
- **Sea Apache:** During the 1980s naval versions of the AH-64A for the United States Marine Corps and Navy were examined. Multiple concepts were studied with altered landing gear arrangements, improved avionics and weapons. The USMC was very interested and conducted a two-week evaluation of the Apache in September 1981, including shipboard operation tests. Funding for a naval version was not provided; the Marine Corps continued to use the AH-1. The Canadian Forces Maritime Command also examined a naval Apache. In 2004, British Army AgustaWestland Apaches were deployed upon the Royal Navy's HMS Ocean, a Landing Platform Helicopter, for suitability testing; there was U.S. interest in the trials. During the 2011 military intervention in Libya, the British Army extensively used Apaches from HMS Ocean. In 2013, U.S. 36th Combat Aviation Brigade AH-64Ds were tested on a variety of U.S. Navy ships.
- **Export Apaches:** Several models have been derived from both AH-64A and AH-64D for export. The British-built AgustaWestland Apache (assembled from kits purchased from Boeing) is based on the AH-64D Block I with several different systems, including more powerful engines, folding rotor blades, and other modifications for operation from Royal Navy vessels.

System

Alternative Designation: AH-64 Apache American Guardian Attack Helicopter
Type: Attack Helicopter
Crew: ea2
Blades, Main Rotor: ea4
Blades, Tail Rotor: ea2
Number of Engines: ea2
Number of Hard Points: INA
:
:
:

Dimensions

Length: m17.7
Width: INA
Main Rotor Diameter: m14.6
Weight, Combat: t10.43
Height: m5
:
:
:

Automotive

Engine Name: 2 x General Electric T700-GE-701D turboshafts

Engine Type: Turboshaft

Engine Power: shp2x1 994

Cruising Range: km476

Speed, Maximum: km/h

Speed, Average: km/h275

Maximum Altitude: km6.4

:

Main Gun System

↳*System*

Name: McDonnell Douglas Helicopter's M230 30-mm chain gun

Type: Chain Gun

Caliber: mm30

Barrel Length: INA

Weight: kg56

Muzzle Velocity: m/s805

Rate of Fire: rpm625 +/- 25

Maximum Firing Range: m4000

Effective Firing Range: m1500

:

↳*Ammunition*

Name: M789

Type: HEDP

Caliber: mm30

Cartridge: INA

Basic Load: INA

Armor Penetration: INA

Bursting Charge: g21.5

Missile Weapon Systems

↳*Missile System*

Name: Rockwell AGM-114 Hellfire laser-guided anti-tank missiles

Type: Air-to-surface and surface-to-surface missile

Length: m1.6

Weight: kg45-49

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:

Rocket Weapon Systems

↳*Rocket System*

Name: Hydra 70 2.75-in (70-mm) rocket pods

Type: air-to-ground

Length: mm1060

Diameter: mm70

Weight: kg6.2

Muzzle Velocity: m/s700

Effective Firing Range: m8000

Maximum Firing Range: m10,500

Maximum Speed: m/s739

Basic Load: INA

Guidance System: Unguided

Anti-Tank Guided Missile System

Name: INA

Type: INA

Length: INA

Diameter: INA

Weight: INA

:

:

:

:

:

:

Basic Load: INA

Fire Control and Avionics

Fire Control System Type: AN/APG-78 Longbow
Fire Control Radar: Longbow Fire Control Radar
Navigation Radar: It performs wide area search, precise detection, location and classification of up to 256 simultaneous moving and stationary targets. From these, the system then prioritizes the top 16 targets for immediate evaluation and, if desired, engagement by the aircrew.
Digital or Analog Cockpit: INA
Direct Fire Control: INA
Laser Designator: INA
:
:
:
:

Protection

Add on Armor: INA
Stealth Properties: INA
Heat Signature Reduction: INA
NBC Protection: INA
EW Counter Measures/CCM: INA
Counter Measures (Chaff/Flares): INA

Notes:

The Boeing AH-64 Apache is an American twin-turboshaft attack helicopter with a tailwheel-type landing gear arrangement and a tandem cockpit for a crew of two. It features a nose-mounted sensor suite for target acquisition and night vision systems. It is armed with a 30 mm (1.18 in) M230 chain gun carried between the main landing gear, under the aircraft's forward fuselage, and four hardpoints mounted on stub-wing pylons for carrying armament and stores, typically a mixture of AGM-114 Hellfire missiles and Hydra 70 rocket pods. The AH-64 has significant systems redundancy to improve combat survivability. The Apache began as the Model 77 developed by Hughes Helicopters for the United States Army's Advanced Attack Helicopter program to replace the AH-1 Cobra. The prototype YAH-64 was first flown on 30 September 1975. The U.S. Army selected the YAH-64 over the Bell YAH-63 in 1976, and later approved full production in 1982. After purchasing Hughes Helicopters in 1984, McDonnell Douglas continued AH-64 production and development. The helicopter was introduced to U.S. Army service in April 1986. The advanced AH-64D Apache Longbow was delivered to the Army in March 1997. Production has been continued by Boeing Defense, Space & Security, with over 2,400 AH-64s being produced by 2020. The U.S. Army is the primary operator of the AH-64. It has also become the primary attack helicopter of multiple nations, including Greece, Japan, Israel, the Netherlands, Singapore, and the United Arab Emirates. It has been built under license in the United Kingdom as the AgustaWestland Apache. American AH-64s have served in conflicts in Panama, the Persian Gulf, Kosovo, Afghanistan, and Iraq. Israel used the Apache in its military conflicts in Lebanon and the Gaza Strip. British and Dutch Apaches have seen deployments in wars in Afghanistan and Iraq.

Mi-35M (Hind E) Russian Attack Helicopter





Tiers:



Variants:

- **V-24:** The first version, twelve prototypes and development aircraft. The first V-24 mockup resembled the Bell UH-1A Huey. Later models resembled the future Hind-A, one of which was modified in 1975 as A-10 for speed record attempts with wings removed and faired over and with inertia-type dampers on the main rotor head. The A-10 reached a speed of 368 km/h. It was armed with GSh-23 and could carry up to six missiles or rockets.
- **Mi-24:** (Hind-A) Other early versions were the armed assault helicopter, which could carry eight combat troops and three crew members. It could also carry four 57mm rocket pods on four underwing pylons, four MCLOS 9M17 Fleyta (AT-2 Swatter) anti-tank missiles on two underwing rails, free-fall bombs, plus one Afanasev A-12.7 12.7mm machine-gun in the nose. The Mi-24 was the first production model.
- **Mi-24F:** (Hind-A) Modified Hind-A with seven reinforcing ribs on the port fuselage aft of the wing and the SRO-2M Khrom ("Odd Rods") IFF antenna relocated from the canopy to the oil cooler. The APU exhaust was also extended and angled downwards. The designation may be unofficial.
- **Mi-24A:** (Hind-B) The Mi-24A was the second production model. Both the Mi-24 and Mi-24A entered the Soviet Air Forces service in 1972. They Lacked the four-barrel Yak-B 12.7mm machine gun under the nose.
- **Mi-24U:** (Hind-C) Training version without nose gun and wingtip stations.
- **Mi-24BMT:** Small number of Mi-24s converted into minesweepers.
- **Mi-24D (Hind-D):** The Mi-24D was a purer gunship than the earlier variants. It entered production in 1973. The Mi-24D has a redesigned forward fuselage, with two separate cockpits for the pilot and gunner. It is armed with a single 12.7mm four-barrel Yak-B machine-gun under the nose. It can carry four 57mm rocket pods, four SACLOS 9M17 Phalanga anti-tank missiles (a significant enhancement compared to the MCLOS system found on the Mi-24A), plus bombs and other weapons. One Mi-24D was sold to Poland in January 1996 and was used by the WTD 61 in Manching during 1994 for tests with the head of a MIM-23 Hawk missile in place of the chin-mounted gun. This version also had an unidentified modification in the rear cabin window on the starboard side.
- **Mi-24PTRK:** This version was the Mi-24D modification that was used for testing the Shturm V missile system for the Mi-24V.
- **Mi-24DU:** Small numbers of Mi-24Ds were built as training helicopters with doubled controls.
- **Mi-24V:** (Hind-E) Later development which entered production in 1976 and was first seen by the west in the early 1980s. It was armed with the more advanced 9M114 Shturm (AT-6 Spiral). Eight of those missile are mounted on four outer wing pylons. It was the most widely produced version with more than 1,500 made. In Polish service this aircraft is designated Mi-24W. One Mi-24V was referred to as Mi-24T for unknown reasons.
- **Arsenal Mi-24V upgrade:** Ukrainian upgrade for Mi-24V.
- **Mi-24P:** (Hind-F) The gunship version, which replaced the 12.7mm machine-gun with a fixed side-mounted 30mm GSh-30-2K twin-barrel autocannon.
- **Mi-24TECh-24:** Experimental Mi-24P to test abilities for recovery of downed aircraft.
- **Mi-24VP:** (Hind-E Mod) Development of Mi-24V made in 1985 which replaced the machine-gun with twin 23mm autocannons in a movable turret. Entered service in 1989, but only 25 were made before production ended the same year.[2] One Mi-24VP flew with the Delta-H tail rotor of the Mil Mi-28.
- **Mi-24RKhR:** (Hind-G1) NBC reconnaissance model, which is designed to collect radiation, biological and chemical samples. It was first seen during the 1986 Chernobyl disaster. Also known as the Mi-24R, Mi-24RK and Mi-24RKh (Rch).
- **Mi-24RR:** Radiation reconnaissance model derived from the Mi-24R.
- **Mi-24K:** (Hind-G2) Army reconnaissance, artillery observation helicopter.
- **Mi-24VM:** Upgraded Mi-24V with updated avionics to improve night-time operation, new communications gear, shorter and lighter wings, and updated weapon systems to include support for the 9M120 Ataka, Shturm and 9K38 Igla ATGM missiles and a 23mm main gun. Other internal changes have been made to increase the aircraft life-cycle and ease

maintenance.

- **Mi-24VN:** (Hind-E) A night-attack version based on an Mi-24V in Mi-24VM Stage 1 configuration.
- **Mi-24PM:** Upgraded Mi-24P using same technologies as in Mi-24VM.
- **Mi-24PN:** PN version has a TV and a FLIR camera located in a dome on the front of the aircraft, and is armed with GSh-23L. The Russian Air Force received 14 Mi-24PNs in 2004
- **Mi-24PS:** Civil police or paramilitary version, equipped with a FLIR, searchlight, loudspeaker PA system and attachments for rappelling ropes.
- **Mi-24V Ecological Survey Version:** Environmental research modification developed by the Polyot Industrial Research Organisation.
- **Mi-24 SuperHind Mk.II:** Modern western avionics upgrade produced by South African company Advanced Technologies and Engineering (ATE)
- **Mi-24 SuperHind Mk.III:** Extensive operational upgrade of the original Mi-24 including weapons, avionics and counter measures.
- **Mi-PSV:** Experimental high-speed helicopter based on the Mi-24. PSV stands for Perspektivny skorostnoi vertolet (Перспективный скоростной вертолёт) – Prospective high speed helicopter). Single-seat streamlined cockpit, unarmed, fitted with experimental main rotors for research into high-speed flight, with a target of increasing the speed of the Mi-28N by 10% and the Mi-35M by 13%
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- **Mi-35MV:** Modernized version of Mi-35M with an additional armour and upgraded propulsion and optical systems. It is equipped with a opto-electronic OPS-24N1 surveillance and targeting system
- **Mi-35O:** Export version of the Mi-24VN using a Mexican FLIR camera and a glass cockpit with upgraded avionics. Operated by Mexico only.
- **Mi-35M4:** (AH-2 Sabre) Updated version of the Mi-35M with Israeli avionics for the Brazilian Air Force.
- **Mi-35M2:** Updated version of the Mi-35M for the Venezuelan Army.
- **Mi-35MS:** Flying Command Post variant of the Mi-35M. Operated by the Russian Federal Protective Service (FSO).

System

Alternative Designation: Mil Mi-30M

Manufacturer: Mil

In Service: 2010-Present

Type: Attack Helicopter

Crew: ea2

Troop Capacity: ea8

Litter Capacity: ea4

Blades, Main Rotor: 5

Blades, Tail Rotor: ea3

Number of Engines: ea2

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: ea6

Inner Harg Points Capacity: kg500

Outer Hard Points Capacity: kg250

Internal Payload: 2.4 tons

Note: Landing gear of the Mi-35M is no longer retractable. This reduced overall weight of the helicopter. Also in case of the crash the landing gear absorbs some of the energy.

Dimensions

Length: m17
Width: m4.80
Height: m6.50
Weight, Combat: kg11,500
Weight, Empty: kg8,000
Main Rotor Diameter: m17.0
Disc Area: 227 m sq
Tail Rotor Diameter: m3.9
Cargo Compartment Dimensions Floor Length: m2.5
Cargo Compartment Dimensions Floor Width: m1.5
Cargo Compartment Dimensions Floor Height: m1.2

Automotive

Engine Name: 2 x GTD TV3-117VMA turboshafts
Engine Type: INA
Engine Power: hp2 x 2 200 shp
Maximum Range: km435
Ferry Range: 1,000 km
Speed, Maximum: km/h310
Internal Fuel: kg1,500
Cabin Auxiliary Fuel Tank: kg1,000
External Fuel Tanks: kg1,200
Climb Rate: 899 m/min
Ceiling, Service: m5,750
Ceiling, Hover: m3,100
Radius (Max Load) Internal Fuel: km160
Radius (Max Load) 2 External Tanks: km224
Radius (Max Load) 4 External Tanks: km288
Maximum Range with Auxiliary Fuel: km950
Maximum Range with Normal Load: km450
Max G Force: G1.75
Payload, Innternal Load: 8 combat troops or 4 litters
Payload, External Weapons Load:: kg1,500
Payload, External Load (no weapons): kg2,500

Chin Mounted Gun

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: twin-barreled 23mm autocannon d

Caliber: 23mm

Manufacturer: KBP Instrument Design Bureau

In Service: 1960-Present

Weight: kg49.2

Length: mm1,387

Barrel Length: mm1,000

Barrels: ea2

Action: Gas Principle

Rate of Fire: rds/min3,400-3,600

↳*Ammunition*

Type: Autocannon Rifle Round

Caliber: mm23

Cartridge: 23x115mm

Muzzle Velocity: m/s715

Basic Load: 450

Armor Penetration: INA

Ammo Types: HEFI, HEI, APT, APE, CC

Wing Mounted Weapons

Note: This attack helicopter can carry different weapons, including podded guns, 8 older Shturm-V or newer Ataka-V anti-tank missiles, Igla-V air-to-air missiles, unguided rockets or bombs. Armament depends on customer requirements.

↳*Rocket System #1 Launcher*

Name: UB-32

Type: 57mm, reusable, 32-salvo rocket pod

Basic Load (UB-32 Rocket Pod): ea2-4

Launcher Length: mm2,080

Launcher Diameter: mm464

Weight, Empty: kg103

Weight, Loaded: kg264

↳*Rocket System #1 Projectile*

Name: S-5M (ARS-57) Rocket

Type: Unguided HE-FRAG

Caliber: mm55

Length: m1.4

Diameter: mmINA

Weight: kg5

Basic Load (S-5 Rockets): ea32

Operational Range: km3-4

Engine: Solid Rocket Motor

Speed: 300 meters in 1.1 seconds

Note #1: Produces 75 Splinters

Note #2: The S-5 is carried in rocket pods, with 4–32 rockets.

↳*Rocket System #2*

Name: S-24 Rocket

Type: Unguided high-velocity airborne rocket

Diameter: mm240

Length: m2.33

Launch Weight: kg235

Warhead Type: blast-fragmentation warhead

Warhead Weight: kg123

Operational Range: km2-3

Basic Load: ea2-4

Proximity Fuze: R-24

Fragmentation Casualty Zone Radius: m300-400

Number of Fragments: 4,000

Penetration: 30mm of armor

Note: The S-24 Warhead detones 3 meters above the ground

↳*Anti-Tank Guided Missile System*

Name: AT-2 Swatter (3M11/9M17)

Type: Anti-Tank Guided Missile (ATGM)

In Service: 1964-Present

Manufacturer: Nudelman OKB-16

Weight: kg27

Length: cm116

Diamter: mm148

Warhead Type: HEAT

Warhead Weight: kg5.4

Engine: Solid fuel rocket

Wingspan: cm68

Operational Range: km0.5-2.5

Speed: 160 m/s (360 mph)

Guidance System: Radio command

Steering System: MCLOS

Launch Platform: Mi-4, Mi-8, Mi-24, Mi-25, BRDM-1, BRDM-2

Fire Control

Fire Control System Type: INA

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: INA

Sensor Suite(s) Available: electro-optical sensor systems

Position Location System: Yes

Radar Warning System: Sirena-3M radar warning system

IR Jammer: HO Brick IR Jammer

FLIR Equipped: Yes

RWR Equipped: Yes

Air Data Sensor: Yes

Missile Guidance Transmitter: Yes

Note: Electronic core of the helicopter underwent fundamental modifications. A whole spectrum of new electronic systems were adopted in the cockpit. The Mi-35M is fitted with upgraded avionics and improved sensor package, including night vision system. Helicopter is also fitted with electro-optical rangefinder/targeting system with thermal imaging guidance channel, satellite positioning and navigation system, electronic multifunction displays, onboard computer and new generation jam-proof communications equipment.

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: No

EW Counter Measures/CCM: No

Counter Measures (Chaff/Flares): ASO-2V flare dispensers

Notes:

Mi-35M is a multi-role combat helicopter manufactured by Rostvertol, a subsidiary of Russian Helicopters. It is an export variant of Mi-24 Hind attack helicopter. Primarily designed for attack and military transport missions, the helicopter offers a more superior flight performance and manoeuvrability compared to its predecessor. The production of Mi-35M started in 2005. The aircraft integrates modern, high-precision weaponry for destroying ground-based armoured targets and providing air support for ground missions. It can be modified as an attack, ground assault, medical evacuation (MEDEVAC) or transport platform. Mi-35M is one of the modern combat helicopters in the Russian Air Force inventory. It is also operated by the armed forces of Venezuela, Brazil, Azerbaijan, Nigeria, Kazakhstan and Mali.

A129 Mangusta Italian Attack Helicopter





Tiers:



System

Alternative Designation: A129 Mangusta; Mongoose	
Type: Attack Helicopter	
In Service: 1983-Present	
Crew: 2 (pilot, co-pilot/gunner)	
Blades, Main Rotor: ea5	
Blades, Tail Rotor: ea2	
Number of Engines: ea2	
Number of Hard Points: 4, for use with gun pods, rocket pods, missiles	

Dimensions

Length, Overall: 14.29 m	
Length, Fuselage: 12.28 m	
Width: 3.60 m	
Height: 3.35 m	
Rotor Diameter: 11.90 m	
Disc Area: 2,529 kg	
Weight, Empty: 2,529 kg	
Weight, Takeoff Anti-tank: 3,700 kg	
Weight, Takeoff Maximum Load: 4,100 kg	
Weight, External Load: 1,200 kg	

Automotive

Engine Name: 2 x Rolls-Royce Gem 2 Mk 1004D turboshaft	
Engine Type: Diesel	
Engine Power: 825 shaft hp each	

Fuel Capacity: 720 kg

Maximum Speed: 265 km/h

Cruise Speed: 250 km/h

Rate of Climb: 637 m/min

Hovering Ceiling: 10,800 ft (3,290 m) in ground effect (IGE) 7,850 ft (2,390 m) out of ground effect (OGE)

Maximum Range: 750 km

Chin Mounted Gun

Note #1: 1 x Lucas .50-cal, optional

Note #2: 1× 20 mm (0.787 in) M197 three-barrel Gatling-type cannon (500 rounds) in a TM197B Light Turreted Gun System (only CBT version)

Wing Mounted Weapons

Hardpoints: 4, for use with gun pods, rocket pods, missiles

↳*Rocket System (Option 1)*

Name: INA

Type: 38× 81 mm (3.19 in) unguided rockets

Basic Load: INA

↳*Rocket System (Option 2)*

Name: INA

Type: 6× 70 mm (2.75 in) unguided rockets or

Basic Load: INA

↳*Missile System (Option 1)*

Name: AGM-114 Hellfire

Type: Air-to-Surface Missile

Basic Load: 8 x AGM-114 Hellfire Missiles

Length: 1.6 m

Diameter: 180 mm

Wingspan: 0.33 m

Weight: 45–49 kg

Warhead Type: High-explosive anti-tank Shaped charge Tandem anti-armor Metal augmented charge Blast fragmentation

Engine: Solid-fuel rocket

Operational Range: 546 yd (0.499 km) to 6.84 mi (11.01 km)

Maximum Speed: Mach 1.3

Guidance System: Semi-active laser homing millimeter wave radar seeker

↳*Missile System (Option 2)*

Name: AIM-92 Stinger
Type: Air-to-Surface Missile
Basic Load: 4-8 x AIM-92 Stinger Missiles
Length: 1.52 m
Diameter: 70 mm
Wingspan: 140 mm
Weight: 16 kg
Guidance System: Fire-and-forget passive infrared seeker for Block I and Fire-and-forget passive IR focal plane array seeker in Block II version
Warhead: 3 kg HE blast fragmentation
Speed: Mach 2.2
Range: 8 km

Fire Control and Radar System

Fire Control System Type: INA
Fire Control Radar: Elettronica ELT-156 radar warning receiver
Direct Fire Control: INA
Laser Designator: INA
Automated Helmet: kmINA

Protection

Stealth Properties: No
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: INA
EW: INA
Jammer: BAE Systems IEWS AN/ALQ-144A infrared jammer
Counter Measures (Chaff/Flares): Yes

Notes:

The Agusta A129 Mangusta (English: Mongoose) is an attack helicopter originally designed and produced by Italian company Agusta. It is the first attack helicopter to be designed and produced wholly in Europe. It has continued to be developed by AgustaWestland, the successor company to Agusta. The A129 has undergone several combat deployments since entering service with the Italian Army in the 1990s. A derivative of the A129, the TAI/AgustaWestland T129 ATAK, is being developed by Turkish Aerospace Industries (TAI) in cooperation with AgustaWestland. TAI will produce the T129 for the Turkish Army and potentially export customers. The A129 Mangusta is the first European attack helicopter; as such it has several original aspects to its design, such as being the first helicopter to make use of a fully computerised integrated management system to reduce crew workload. It was decided that much of the helicopter's functionality was to be automated; as such, parts of the flight and armament systems are monitored and directly controlled by onboard computers. The A129 shares considerable design similarities to Agusta's earlier A109 utility helicopter; the rear section of the A129 was derived from the A109 and incorporated to an entirely new forward section. The A129's fuselage is highly angular and armoured for ballistic protection; the composite

rotor blades are also able to withstand hits from 23mm cannon fire. The two man crew, comprising a pilot and gunner, sit in a conventional tandem cockpit. The A129 can be used in the anti-armour, armed reconnaissance, ground attack, escort, fire support and anti-aircraft roles. For the anti-ground mission the helicopter can employ various armaments, such as up to eight Hellfire missiles. In the air-to-air role, the FIM-92 Stinger missile was certified for use in 2003. The A129 can also be equipped with 81 mm or 70 mm (2.75 in) unguided rockets; a M197 three-barrel 20 mm cannon is also installed onto a nose-mounted Oto Melara TM-197B turret. By 2014, the Spike-ER, a fourth-generation anti-tank missile, had been added to the A129's arsenal. Power is provided by a pair of Rolls-Royce Gem 2-1004D turboshaft engines, the engines have been designed to incorporate infrared heat signature reduction measures. One of the key protective measures incorporated onto the A129 include the electronic warfare and SIAP (Single Integrated Air Picture) self-protection suite. Elements of the mission interface systems and the onboard software integrated onto later aircraft were produced by Selex Galileo. The A129 is equipped with infrared night vision systems and is capable of operating at day or night in all-weather conditions. Laser systems are fitted onto newer aircraft for range-finding and target designation purposes, the A129 can laser-designate targets for other friendly aircraft to attack. On the AW129D, Rafael Advanced Defense Systems's Toplite III sight is used as the primary targeting system; it is able to act as a FLIR and has both manual and automatic target tracking modes, Toplite also provides a greater detection and identification range than the 1970s era HeliTOW sensor it replaced. In 1998, Israel Aircraft Industries (IAI) formally partnered with Agusta to offer various avionics and weapons upgrades to potential A129 operators; various IAI technologies have since been proposed and implemented on Italian A129s.

Rooivalk (Ah-2) South African Attack Helicopter





Tiers:



Variants:

- **Rooivalk Mk 1 Block 1F:** The Mk 1 Block 1F introduced modifications to improve the Rooivalk's safety and reliability and accuracy of weapon systems. The work included a significant remanufacturing of some gearbox mounting components. Old electronics were replaced and reliability issues with the 20-mm F2 cannon were resolved. The upgraded helicopter also features new Denel Saab Aerostructures external fuel tanks that increase self-deployment range by 50 percent and provides integration with the Denel Mokopa air-to-ground missile.

System

Alternative Designation: AH-2 Rooivalk Attack Helicopter
Primary Function: Anti-Tank Attack Helicopter
Type: Attack Helicopter
Crew: ea2
Blades, Main Rotor: 4
Blades, Tail Rotor: ea1
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: INA
Takeoff or Landing Limitations: 8,750 kg
Vertical Climb Rate Two Engines: m/s799
Vertical Climb Rate One Engine: 390
Hover Ceiling IGE: 5,852 m
Hover Ceiling OGE: 5,456 m
Number of Hard Points: 6
Maximum Forward Speed: km/h278
Maximum Sideway Speed: km/h93
Cruise Speed: kts150
Cruising Range Internal Fuel: km700

Cruising Range External Fuel: km1200

Note:: AH-2 Rooivalk Attack Helicopter is 130 deployable

Dimensions

Length: m18.73

Height: m5.19

Main Rotor Diameter: m15.58

Empty Weight:: kg5,730

Combat Weight: kg8,750

Automotive

Engine Name: Makila

Engine Type: 2 x 1K2

Engine Power: hp3,008 hp (2,243 kW)

Communications

Radio: 2 x VHF/UHF (AM and FM) transceivers, 1 High Frequency radio and an IFF (Identify Friend or Foe) Transponder

Chin Mounted Gun

Name: 1 x 20-mm F2 dual-feed gas-operated chin mounted

Type: Single Barrel Cannon

Caliber: 20mm

Manufacturer: GIAT France

OA Length: 2.600m

Recoil Stroke: 60mm

Weight: 71kg

Rate of Fire: 900rds/min

Barrel Length: 100calibers

Basic Load: 900rds

↳*Ammunition. Chin Mounted Gun*

Name: 20mm F2 cannon, high velocityF2

Type Munitions/Muzzle Velocity: HE: 3,440 fps: APDS: 4,100 fps

Ammunition Stowage: 300rds/magazine

Approximate Barrel Life: 16,000rds

Wing Mounted Weapons

Rocket System #1

Name: 70-mm (2.75in) Zeebrugge

Type: FFAR (Folding Fin Aerial Rocket)

Basic Load: up to 76 Rockets (19 70mm rockets/pod)

↳*Air-to-Air Missile System*

Name: Mistral

Type: Air-to-air

Manufacturer: MBDA France

Proliferation: Widely proliferated over 30 countries.

Basic Load: 4

Length: m1.86

Diameter: mm90

Range: km6

Guidance: Infrared Homing

Warhead: High Explosive with High density tungsten balls

Warhead Weight: 2.95kg

Detonation Mechanism: Laser proximity or impact trigger

Engine: Solid Rocket Motor

Speed: 800 m/s, approx. Mach 2.6 (high supersonic)

↳*Anti-Tank Guided Missile System #1*

Name: ZT-6 Mokopa

Type: Air-to-surface

Manufacturer: Denel Dynamics, South Africa

Length: 1.995mm

Diameter: 178mm

Missile Weight: 49.8kg

Min Range: kmINA

Maximum Range: km10

Missile Velocity: m/sVaries by type of munition

Armor Penetration: 1350mm

Warhead Type: Tandem High Explosive Anti-Tank (HEAT) and Blast Fragmentation

Guidance: Semi-active laser homing millimeter wave radar seeker

Anti-Tank Guided Missile System #2

↳

Name: HOT-3 (French: Haut subsonique Optiquement Téléguidé Tiré d'un Tube)

Type: Anti-tank

Manufacturer: MBDA

Length: 1.3m

Diameter: .15m

Missile Weight: 24.5kg

Minimum Range: 75m

Maximum Range: 4,300m

Missile Velocity: 864 km/h

Armor Penetration: 1250mm

Warhead Type: Tandem charge HEAT

Guidance: Semi-automatic command to line of sight (SACLOS)

Engine: Two-stage solid fuel rocket

Anti-Tank Guided Missile System #3

Name: AGM-114 Hellfire

Type: Air-to-Surface

Manufacturer: Northrop Grumman, Lockheed Martin, Boeing, United States of America

Length: 1.6m

Diameter: 180mm

Missile Weight: 45-49kg

Minimum Range: 499m

Maximum Range: 11,008m

Missile Velocity: 1601 km/h

Armor Penetration: INA

Warhead Type: High-explosive anti-tank (HEAT); 9.1 kg tandem anti-armor. Metal augmented charge (MAC); 8.2 kg shaped charge Blast fragmentation

Guidance: Semi-active laser homing millimeter wave radar seeker

Enginie: Solid-fuel rocket

Fire Control

Fire Control Target Detection System: Auto-tracking FLIR (Forward Looking Infrared Radar)

Direct Fire Control: Target detection, acquisition and tracking system (TDATS). TDATS has an auto-tracker, forward-looking infrared (FLIR) sensor with three fields of view, laser designator, laser rangefinder and low-level television sensor.

Laser Designator: Yes

Automated Helmet: kmTop Owl helmet mounted sight

Position Location System: GPS

Note:: The pilot flies the Rooivalk with hands-on-collective-and-stick (HOCAS) controls, assisted by a Thales Avionics Top Owl helmet-mounted sight display (HMSD). The HMSD gives both crewmembers a head-up display (HUD) for nap-of-the-earth (NOE) flight and low-level target engagement.

Protection

Cockpit Protection: Protected cockpit

Heat Signature Reduction: INA

NBC Protection: INA

EW Protection: Rooivalk also carries a full electronic warfare suite to increase survivability on the battlefield. The fully integrated helicopter electronic warfare self-protection suite (HEWSPS) can be reprogrammed using threat libraries matching the potential hazards of the area of operations.

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Manual, semi-automatic or automatic chaff and flares

Waring Systems: Laser and radar warning systems

Notes:

The Denel Rooivalk (previously designated AH-2 and CSH-2) is an attack helicopter manufactured by Denel Aviation of South Africa. Rooivalk is Afrikaans for "Red Falcon". Development of the type began in 1984 by the Atlas Aircraft Corporation, its development is closely connected to the Atlas Oryx transport helicopter, both aircraft being based on the Aérospatiale SA 330 Puma and having started development at the same time. Development of the Rooivalk was protracted due to the impact of limited budgets during the 1990s, and a desire to produce a highly advanced attack helicopter. The South African Air Force (SAAF) ordered 12 Rooivalk, designated the Rooivalk Mk 1 in SAAF service, the first of was officially handed over in April 2011. The helicopters are flown by 16 Squadron, based at AFB Bloemspruit near Bloemfontein. Due to the SAAF's decades of helicopter experience in the harsh African environment, the Rooivalk has been designed to operate for prolonged periods without sophisticated support. All that is needed to keep the Rooivalk flying is a medium transport helicopter equipped with a basic spares supply plus four ground crew. The Rooivalk carries a range of weapons depending on the mission profile. It is generally fitted with a nose-mounted 20 mm cannon and can also carry air-to-air missiles, anti-armour missiles and unguided rockets. The Rooivalk has a fire control system for target acquisition and tracking as well as an advanced navigation system using Doppler radar and GPS. Also incorporated is an electronic countermeasures suite coupled with chaff and flare dispensers. Notable features include a tandem cockpit, starboard tail rotor with a port tailplane, a fixed wheeled undercarriage as well as wire cutters above and below the cockpit and on the undercarriage. The Rooivalk is capable of doing a loop and thus momentarily "flying upside down". The first manned helicopter to do a loop was the Sikorsky S-52 flown by Harold E. Thompson on May 9th, 1949. The following types of missions are foreseen for the Rooivalk: reconnaissance, heliborne escort, close air support, deep penetration, and anti-armour. In 2016, Denel was reportedly proceeding with a Mk 1.1 upgrade program for the existing Rooivalk fleet; prospective improvements include the addition of a missile approach warning system and enhancements to the rotorcraft avionics. On 15 September 2016, it was announced that Airbus Helicopters and Denel had signed a memorandum of understanding to cooperate on the SAAF modernisation program; further details on the changes included reliability and survivability improvements, an increased payload, and the replacement of obsolete targeting systems and armaments. In September 2014, Denel Group chief executive Riaz Saloojee stated that the firm were currently studying the feasibility of reopening the Rooivalk production line, which had been mothballed in 2007 after the production of the initial 12 SAAF aircraft. Saloojee stated that talks were under way; it was mooted that new production aircraft conforming to an entirely new platform that used Rooivalk technology could be produced. In September 2016, the South African government authorised government-to-government negotiations on the topic of restarting production of the Rooivalk. According to Victor Xaba, deputy chief executive of Denel Aerostructures, the company would need commitments for at least 70 rotorcraft for the re-establishment of the assembly line to be viable.[8] The production of a prospective Rooivalk Mk 2 has been periodically mooted.[5] In July 2015, Saloojee spoke on the company's efforts to gain support for a Rooivalk Mk 2 programme which would involve a large proportion of new systems and for which the firm had already produced a roadmap. In late 2016, Denel stated that it was conducting a series of talks with various nations on the Rooivalk Mk 2, including Egypt, Brazil, Nigeria, Poland, and India.

AH-1F Cobra American Attack Helicopter





Tiers:



Variants:

- **AH-1J:** AH-1 variant with upgraded engines and powertrain for improved performance. This minimally expanded rotor system and overall dimensions of the AH-1J. Most older AH-1J Seacobra and AH-1Ts are still in operation, having been upgraded to the AH-1W standard.
- **AH-1T:** Construction of a variant, possibly called “Dracula”, may occur in the near future
- **AH-1RO (Romania)::** Four-bladed variant called the “King Cobra” or “Viper”, with better flight performance. It contains an integrated digital tandem cockpit and digital map display. Improved FCS includes helmet-mount sight system.
- **AH-1Z/AH-1(4B)W:** Four-bladed variant called the “King Cobra” or “Viper”, with better flight performance. It contains an integrated digital tandem cockpit and digital map display. Improved FCS includes helmet-mount sight system.

System

Alternative Designation : AH-1F Cobra; Bell 209
Date of Introduction: 1986
Proliferation: Total: +1,116 At least 10 countries
Manufacturer: Bell Helicopter
Crew : two: one pilot, one co-pilot/gunner (CPG)
In Service: Retired from US Army in 2001, but this helicopter is still used in other parts of the world
Main Blades: ea2
Tail Blades: ea2
Hardpoints: ea4

↳*Dimensions*

Height : m4.2
Length, Fuselage : m13.6

Length, rotors turning : m16.1

Rotor Diameter: m13.6

Height: m4.12

Empty Weight: 2,993 kg

Max. Takeoff Weight:: 4,500 kg

Stub Wing Span: 3.15 m

Automotive

Engine Name: 1 × Lycoming T53-L-703

Engine Type: Turboshaft,

Engine Power: hp1,800

Ceiling, Hover (in ground effect) : m4270.0

Ceiling, Hover (out of ground effect) : m915.0

Ceiling, Service : m5703.0

Range, Normal Load : km590.0

Range, with aux fuel : kmINA

Speed , Cruising : km/h270.0

Speed , Maximum : km/h277

Speed, Maximum "G" Force : g+2.5 to -0.5 g

Vertical Climb Rate : m/s4.0

Fuel Capacity: liters1,150

Standard Payload: kg1740.0

Rate of Climb: m/s8.2

Chin Mounted Gun

Note: Armament consists of the three-barrel M197 20mm automatic gun mounted on the M97A4 armament subsystem

↳*System*

Name: M197 electric cannon

Type: 20mm three-barreled electric Gatling-type rotary cannon

In Service: 1967-Present

Manufactuer: General Dynamics Armament Systems

Barrels: 3-barrel (progressive RH parabolic twist, 9 grooves)

Rate of Fire: Up to 1500 rpm

Maximum Effective Range: INA

↳*Ammunition*

Name: M53

Type: API

Caliber: mm20

Cartridge: 20 × 102 mm

Muzzle Velocity: 1,030 m/s

Basic Load: 2,000 ea

Bursting Charge: 4.2 g incendiary

Penetration: Penetration 20mm at 25-degree impact and 100 meter range, 6.3mm RHA at 0-degree impact and 1000-m range.

Wing Mounted Weapons

Note #1: Hydra 70 2.75 in (70 mm) rockets – 7 rockets mounted in the M260 launcher or 19 rockets in the M261 launcher

Note #2: The AH-1F can also be equipped with TOW Missiles – 4 or 8 missiles mounted in two-missile launchers on each hardpoint

↳***System***

Name: Hydra 70

Type: 70mm Fin-stabilized unguided rocket

In Service: 1980s-Present

Manufacturer: United States of America

Length: 1,060 mm

Diameter: 70 mm

Muzzle Velocity: 700 m/s

Effective Firing Range: 8,000 m

Maximum Firing Range: 10,500 m

Speed: 739 m/s

Guidance System: Unguided

Basic Load: 7 or 19

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: Analog

Heads Up Display (HUD): Yes

Laser Rangefinder: Yes

Data System: M143 Air Data Subsystem (ADS)

ASE: Yes, Allied Signal Engines (ASE)

Protection

Armor Type: carbon fiber side panels and seats, with composite commonly called “chicken plates
Jammer: infrared jammer mounted above the engine exhaust
EW Capable: INA
Engine Exhaust Suppression System: Yes, infrared suppressing engine exhaust system
Note: There is very little written about the protection of the AH-1F

Notes:

Bell AH-1F Cobra Developed from the Huey transport helicopter, the Cobra was the first purpose-built helicopter gunship to enter military service. It was the mainstay of U.S. Army attack aviation from its combat debut in South Vietnam during 1967 until replaced by the AH-64 Apache in the 1980s and ‘90s. Versions of the Cobra continue to serve in the U.S. Marine Corps and the armed forces of many nations. Avionics/sensor/optics: the missile targeting system uses a telescopic sight unit (traverse 110º, elevation – 60º/+30º) with two magnifications/fields of view, a laser augmented tracking capability, TV, and video. Additional missions include: direct air support, escort, target designation, security, reconnaissance, air to air combat, and anti-ship. This aircraft costs approximately $10.7 million, inexpensive compared to other modern attack helicopters; but its performance is similar. Thus many nations consider this aircraft as a good candidate for fielding in attack helicopter squadrons. This is the Hybrid Threat tier 1 representative helicopter system.

AH-1J SeaCobra American Attack Helicopter





Tiers:



Variants:

- **AH-1J International:** Export version of the AH-1J SeaCobra.
- **AH-1T Improved SeaCobra:** Improved version with extended tail boom and fuselage and an upgraded transmission and engines.
- **AH-1W SuperCobra:** ("Whiskey Cobra"), day/night version with more powerful engines and advanced weapons capability.
- **AH-1(4B)W Viper:** "Four-Bladed Whiskey" test version with a four-bladed bearingless composite main rotor based on Bell 680 rotor. A prototype was converted from AH-1T 161022
- **AH-1Z Viper:** A new variant nicknamed "Zulu Cobra", and developed in conjunction with the UH-1Y Venom for the H-1 upgrade program. The variant includes an upgraded four-blade main rotor and adds the Target Sight System (TSS).
- **Bell 309 KingCobra:** Experimental all-weather version based on the AH-1G single-engine and AH-1J twin-engine designs.[36] Two Bell 309s were produced; the first was powered by a PW&C T400-CP-400 Twin-Pac engine set and the second was powered by a Lycoming T-55-L-7C engine.
- **CobraVenom:** Proposed version for the United Kingdom.
- **AH-1RO Dracula:** Proposed version for Romania.[
- **AH-1Z King Cobra:** AH-1Z offered for Turkey's ATAK program; selected for production in 2000, but later canceled when Bell and Turkey could not reach an agreement on production.
- **Panha 2091:** Unlicensed Iranian upgrade of AH-1J International.
- **IAIO Toufan:** Iranian copy / re-manufactured AH-1J International by Iran Aviation Industries Organization, with locally sourced avionics, and weapons.

System

Alternative Designation: PANHA 2091 (Toufan), IAIO Toufan or Toophan
Type: Attack Helicopter
In Service: 1970-Present
Manufacturer: Bell Helicopter
Capabilities: Ground Attack; Close-Air Support; Navy/Maritime
Crew: ea2
Blades, Main Rotor: 2
Blades, Tail Rotor: ea2
Number of Engines: ea1
Day/Night Capable: Yes
All Weather Capable: INA

Takeoff or Landing Limitations: INA

Number of Hard Points: INA

Dimensions

Length, Total: m16.26

Length, Fuselage: m13.59

Rotor Diameter: m13.41

Height: m4

Weight, Combat: kg5,534

Weight, Empty: kg3,294

Disc Area: 141.3 m sq

Automotive

Engine Name: 2 x Pratt & Whitney T400-CP-400 turboshaft

Engine Type: Turboshaft Engine

Engine Power: hp1,800

Cruising Range: km620

Speed, Maximum: km/h333

Speed, Average: INA

Ceiling: m3,215

Rate of Climb: m/s494

Fuel Capacity: 305 Gallons

Hover IGE: 3,794 m

Hover OGE: 1,097 m

Communications

Radio: INA

Chin Mounted Gun

↳*System*

Name: M197 electric cannon

Type: 20mm three-barreled electric Gatling-type rotary cannon

In Service: 1967-Present

Manufactuer: General Dynamics Armament Systems

Barrels: 3-barrel (progressive RH parabolic twist, 9 grooves)

Rate of Fire: Up to 1500 rpm

Maximum Effective Range: INA

↳*Ammunition*

Name: kmM53

Type: API

Caliber: mm20

Cartidge: 20 × 102 mm

Muzzle Velocity: m/s1,030

Basic Load: ea2,000

Bursting Charged: 4.2 g incendiary

Penetration: Penetration 20mm at 25-degree impact and 100 meter range, 6.3mm RHA at 0-degree impact and 1000-m range.

Basic Load: ea750

Wing Mounted Weapons

Additional Weapons the AHJ-1J can carry: 4 x LAU-68A/A (7-tube) 2.75-in (70-mm) rocket pods; or 4 x LAU-61A/A (19-tube) 2.75-in (70-mm) rocket pods; or 2-4 x M181E minigun pods

↳*Rocket System (Option 1)*

Name: Hyrda 70

Type: 70mm Fin-stabilized unguided rocket

In Service: 1980s-Present

Manufacturer: United States of America

Length: mm1,060

Diameter: mm70

Muzzle Velocity: m/s700

Effective Firing Range: m8,000

Maximum Firing Range: m10,500

Speed: m/s739

Guidance System: Unguided

Basic Load: ea14

↳*Rocket System (Option 2)*

Name: Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR)

Type: 5in unguided rocket

In Service: 1957-Present

Manufacturer: United States

Length: mm2,000

Diameter: mm130

Warhead Type: Various

Engine: Solid-fuel rocket

Operational Range: km8

Speed: Mach 2.1

Guidance System: Unguided

Basic Load: ea8

↳***Missile System***

Name: AIM-9 Sidewinder

Type: Short-range air-to-air missile

In Service: 1956-Present

Manufacturer: Raytheon Company[1] Ford Aerospace Loral Corp.

Length: m3.02

Diameter: mm127

Wingspan: mm279.4

Weight: kg85.3

Warhead: WDU-17/B annular blast-frag

Warhead Wieght: kg9.4

Detonation Mechanism: IR Proximity Fuze

Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket

Operational Range: km1-35.4

Speed: Mach 2.5

Guidance system: Infrared homing (most models) semi-active radar homing (AIM-9C)

Fire Control

Fire Control System Type: Rocket-launching digital control system

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: INA

Sensor Suite(s) Available: Yes

Position Location System: Yes

Central Smart Arms Management System: Yes

Multi-Display Monitor,: Yes

Protection

Fuselage: INA

Cockpit Glass: INA

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The USMC desired a twin engine AH-1G, based on a desire for improved safety and redundancy for over-water operation, which would become a hallmark of all subsequent USMC AH-1 types. The AH-1J "Sea Cobra" was developed and the USMC ordered this version of the Cobra in May 1968. Featuring the Pratt and Whitney Twinpac T400 engine (two 900-hp turboshaft engines coupled together) giving an overall increase in installed power, the AH-1J Sea Cobra included a new nose turret gun, with the three barrel XM197 20mm cannon, as well as other improvements. While development and production of the first 49 ordered were under way, the Marines obtained 38 AH-1Gs from the Army. The Marines depended on attack helicopters to provide close-in fire support coordination in serial and ground escort operations. Such support was required during amphibious ship-to-shore movements and subsequent shore operations within the objective area. As a result the AH-1 was designed for the following tasks: Armed escort for helicopters carrying personnel and cargo Landing zone fire suppression support Visual armed reconnaissance Target marking and direction for high-performance attack aircraft and naval gunfire Convoy escort and fire suppression for ground units Operations from air capable ships Point target attack of threatening armor Self-defense and protection of helicopters carrying personnel and cargo from threatening air-to-air weapon-equipped helicopters

→→Medium Multi-role Helicopter

Z-9 Harbin (WZ-9) Gun Ship Chinese Medium Multi-Role






Tiers:



Variants:

- **Z-9A:** Military production version with some upgrades, such as Arriel 1C2 engine, upgrade instrument panel, and 150-kg payload increase.
- **Z-9A 100:** Prototypes for domestic market versions with WZ8A engines. First flight 16 January 1992, approved 30 December 1992
- **Z-9B:** Current production version for multi-role use, based on Dauphin 2 designs. Changes include 11-blade tail rotor.
- **Z-9C:** Naval version for ASW and SSM, with Sinatra HS-12 dipping sonar and torpedo. It has a datalink to support targeting for YJ-82 SSM. An expected near-term upgrade is the C-701 TV guided air-to-surface missile.
- **WZ-9:** Light attack version of Z-9B (see ARMAMENT, left). Poss aka Z-9W. Export version is Z-9G.
- **Z-9Z:** Reconnaissance prototype.
- **Z-9EC:** ASW variant produced for the Pakistan Naval Air Arm. Configured with pulse-compression radar, low frequency dipping sonar, radar warning receiver and doppler navigation system, it is also armed with torpedoes for use aboard Pakistan Navy's Zulfiquar-class frigates
- **Z-9EH:** Transport, emergency and/or passenger variant
- **Z-9W (WZ-9):** Armed version with optional pylon-mounted armament, gyro stabilization and roof-mounted optical sight. Export designation Z-9G, roof-mounted sight optional. First flown in 1987, with the first weapons tests in 1989
- **Z-9WA:** A newer night-capable version has been built with nose-mounted FLIR. July 2011, Xinhua News Agency released a photo of Z-9WA firing ADK10 air-to-ground missile. Incorporates a domestic Chinese helmet mounted sight that is compatible with anti-tank missiles such as HJ-8/9/10, as well as light anti-ship missiles such as C-701/703 and TL-1/10 when they are used as air-to-surface missiles, air-to-air missiles such as TY-90 and other MANPAD missiles for self-defense
- **H410A:** Version with 635 kW WZ8C turbo-shaft engines. First flight September 2001, CAAC certification 10 July 2002. One is currently being fitted with a new Mast-Mounted Sighting (MMS) system.
- **H425:** Newest VIP version of the H410A, that has upgraded 635 kW WZ8C turbo-shaft engines and a new Mast-Mounted Sighting (MMS) system.
- **H450:** Projected development
- **WZ-19:** Attack helicopter development with tandem seats. The WZ-19 shares the same power plant as the WZ-9WA.

System

Alternative Designations: Z-9 Harbin; WZ-9

Crew: ea1 for Z-9, 2 for WZ-9. Transports 9-12 troops, 4-8 litters or cargo.

Passengers: ea10 (4,189 lb)

Primary Function: Medium Multi-role Helicopter

Blades – Main Rotor: ea4

Blades Tail Rotor: ea11

Tail rotor: 13 Z-9A, 11 Z-9B/WZ-9

All Weather Capable: Yes

Day/Night Capable: Yes

Vertical Clime Rate: m/s246

Cruise: kkm/h260

Hover (out of ground effect): 1,020 Z-9A 1,600 Z-9B

Service: 4,500 Z-9A, 6,000 Z-9B/WZ-9

Hover (in ground effect): m1,950 Z-9A 2,600 Z-9B

Speed: Max: km/h305

Ferry Range: km1,000

Under-Nose Low-Light TV: Yes

Infrared Observing and Tracking: Yes

Roof Mounted Optical Sight: Yes

Number of Hard Points: ea2

Dimensions

Length (fuselage): m12.11

Main Rotor Diameter: m13.7

Main Rotor Area: m211.98

Height: m4.01

Weight, Combat: kg4,100

Weight, Empty: kg2,050

External Fuel Tank: kg180

Normal Fuel Load: kg860

With Auz Fuel: kg1,000

Automotive

Engine Type: Two Zhuzhou Aeroengine Factory WZ-8A Turbo shaft Engines

Engine Power: hp650 shaft hp each

Number of Engines: ea2

Cruising Range: km1,000

Speed, Maximum: kph305

Speed, Average Cross: km/h260

Climb Rate: m/per min549

Ceiling: m4,500

Ferry Range: km1,000

Endurance: hours5

Service Ceiling: m4,500

Hovering Ceiling in Ground Effect: m2,600

Hovering Ceiling out of Ground Effect: m1,600

Communications

BG-06 Radio Altimeter: Yes

Type 150 Single-Sideband Radio: Yes

INS/GPS Transponder: Yes

KTR-908 VHF Command Radio Set: Available

TB-31 Intercom System: Available

Armament

Description: Two fixed 23-mm guns or 12.7-mm MGs. Two pylons permit mounting up to 8 ATGMs, or 4 plus 2 rocket pods.

Most Probable Armament: Combat versions (WZ-9 and Z-9G) have Twin 23-mm gun, four Red Arrow-8F ATGMs, 2x 7-round 90-mm rocket pods, and 2 TY 90 IR-homing AAMs.

↳*HJ-8 or HJ-8E ATMs*

Location: Wing Mounted

Function: Wire-Guided Anti-Tank Missile System

Caliber/Length: mm1,566

Diameter: mm120

Muzzle Velocity: m/s200

Operational Range: m3,000-4,000

Number of Rounds: ea8

Guidance System: SACLOS Wire Guidance

Armor Penetration: Yes

↳*Single Twin Barrel GSh-23L Autocannon*

Location: Chin

Caliber/Length: mm23 x 115

Maximum Effective Range: km2

Number of Rounds: ea1,000

Cyclic Rate of Fire: rpm3,000

Muzzle Velocity: m/s690

Armor Penetration: Yes

Fire Control

Fire Control System Type: INA

Fire Control Radar: Yes

Digital Cockpit: Yes

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: Yes

Sensor Suite(s) Available: INA

Position Location System: Yes

X-Band KLC-1 Search Radar: Available

Protection

Fuselage: INA

Anti-Armor: Yes

Cockpit Glass: Yes

Stealth Properties: No

Heat Signature Reduction: Yes

Add on Armor: INA

NBC Protection: Yes

EW: Yes

Chaff Flare Dispensers: Yes

EW Counter Measures/CCM: Yes

Notes:

Despite statements from some sources, WZ-9 is too lightly protected to be an "Attack helicopter". The Z-9 was designed to be adaptable for a variety of roles, including transport, direct air support, escort, security, reconnaissance, ambulance, anti-submarine warfare, IW, airborne C2, search and rescue, antiship, and anti-submarine warfare. Each fuselage side has one pylon allowing for a single pod or missile rack. An expected upgrade for WZ-9/Z-9g is the red arrow 9 laser-beam rider/MMW guided ATGM, with 1,200 mm penetration and 5 km range. The first Z-9 flew in 1981, and was built in China from components supplied by Aérospatiale as part of a production patent bought on 15 October 1980. On 16 January 1992, the indigenous variant Z-9B, constructed with 70% Chinese-made parts, flew successfully. The flight test was completed in November 1992 and the design was finalized a month later. Z-9B production began in 1993 and entered PLA service in 1994. The Z-9B features an 11-blade Fenestron faired-in tail rotor with wider-chord, all-composite blades replacing the 13-blade used in the original AS365N. As a light tactical troop transport, the Z-9 has the capacity to transport 10 fully armed soldiers. Generally the Z-9 is identical to the AS365N Dauphin, though later variants of the Z-9 incorporate more composite materials to increase structural strength and lower radar signature. The helicopter has a four-blade main rotor, with two turboshaft engines mounted side by side on top of the cabin with engine layout identical to the AS365N. The Z-9 teardrop-shaped body features a tapered boom to the tail fin, with rounded nose and stepped-up cockpit, retractable gear, and all flat bottom. In 2002, Harbin obtained Chinese certification for the new H410A variant of the Z-9, which features more powerful Turbomeca Arriel 2C turboshaft engines; Eurocopter issued official objections to Harbin's decision to continue production in spite of the license-production agreement having expired, leading to a period of highly sensitive international negotiations to resolve the dispute.

Z-8 (Zhishengji-8) Chinese Multi-Role Helicopter





Tiers:



Variants:

- **Z-8A:** The Z-8A is a military version of the original model Z-8 and is used for transportation.
- **Z-8F:** The Z-8F is an advance utility variant. The variant is used for search and rescue, general utility and logistics support missions. The Z-8F is installed with three Pratt & Whitney Canada PT6A-67B turboshaft engines.
- **Z-8K/KA:** The Z-8K is an enhanced version of Z-8F, built primarily to execute search and rescue missions. This variant is also fitted with forward looking infra-red (FLIR) sensors and a search light underneath the cockpit.
- **Z-8JA:** The Z-8JA is a ship-borne variant of Z-8. It is able to land on water. Z-8JA and Z-8JH are currently in service with PLANAF, executing transport and medical evacuation operations respectively.

System

Alternative Designation: Z-8; Zhishengji-8
Capabilities: Anti-Submarine Warfare; Anti-ship; Commercial Market; Search and Rescue; Reconnaissance; Special Forces
Type: Chinese Multi-Role Helicopter
Manufacturer: Sud Aviation Aérospatiale
In Service: 1976-Present
Crew: ea3
Passenger Capacity: It can accommodate 27 fully armed troops or 15 medical stretchers.
Blades, Main Rotor: 6
Blades, Tail Rotor: ea5
Number of Engines: ea3
Day/Night Capable: Yes
All Weather Capable: Yes
Hoist and Basket for SAR: Available
Hoist and Winch: Available, 275kg hoist and winch
Number of Hard Points: ea2

Dimensions

Fuselage Length: m20.27
Fuselage Width (with pontoon): m5.2

Width of Cargo bay (at the floor): m1.90

Height of Cargo Bay: m1.83

Weight,Empty: kg6,865

Weight, MTOW: kg13,000

Main Rotor Diameter: m18.9

Tail Rotor Diameter: m4

Whole Cabin Volume: 28.9m3

Main Rotor Disc: 280.48m2

Tail Rotor Disc: 12.57m2

Maximum Payload Capacity: 4,000kg

Maximum Payload Capacity with Sling Loads: 5,000kg

Automotive

Engine Name: 3 x Turbomeca Turmu IIIC Turboshaft Engines

Number of Engines: ea3

Engine Type: Turboshaft

Engine Power: 1,570 hr each engine

Maximum Range: km1,020

Speed, Maximum: km/h275

Ceiling: m3,150

Rate of Climb: 401 meters per min

Vertical Climb Rate: 6.66 m/s

Main Rotor Blade: Six-Bladed

Tail Rotor Blade: Five-Bladed

Fuel Capacity: 3,900 liters

Fuel Capacity, Internal Aux: 1,900 liters

Endurance: 4 hours

Landing Gear: non-retractable tricycle type landing gear comprising two wheels and low air pressure shock absorbers.

Communications

Radio: INA

Wing Mounted Weapons

Note: The helicopter can accommodate rockets and gun pods on the external pylons for anti-piracy missions.

↳*Missile System (Option 1)*

Name: YJ-8/C-802 (NATO: CSS-N-4 Sardine)

Type: Anti-Ship & Air-to-Surface Missiles

Manufactuer: China Aerospace Science and Industry Corporation

In Service: 1980s-Present

Length: m5.81

Width: INA

Weight: kg815

Warhead Type: High-explosive fragmentation

Warhead Weight: kg165

Engine: Rocket

Propellant: Solid Rocket

Operational Range: km42

Flight Altitude: m5-7

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: ea2

↳*Missile System (Option 2)*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Subsonic anti-ship cruise missile

Manufacturer: China Aerospace Science and Industry Corporation

In Service: 1998-Present

Length: INA

Diameter: INA

Warhead Type: High-explosive fragmentation

Warhead Weight: kg190

Operational Range: km180

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: ea2

↳*Torpedo*

Name: A244S Torpedo

Type: Fire and Forget Torpedo

Length: m2.75

Diameter: mm324

Muzzle Velocity: INA

Effective Firing Range: km13.5

Maximum Firing Range: 6 km for Mod. 1, 13.5 km for Mod. 3

Filling: high explosive STANAG 4439 and MURAT-2 compliant

Detonation Mechanism: Various

Note: The Torpedo can be launched from surface vessels or from aircraft, and locates the target by means of an acoustic seeker.

Fire Control

Fire Control System Type: INA

Fire Control Radar: Bar-shape Array

Digital or Analog Cockpit: INA

Direct Fire Control: INA

Laser Designator: INA

Sensor Suite(s) Available: Yes

Position Location System: Yes

ASW Radar: Yes

Dipping Sonar: Yes, HS-12 dipping sonar

FLIR: Yes

Searchlight: Yes

Sonobuoys: Available

Note: The Helicopter can carry anti-submarine and Anti-ship torpedoes externally

Protection

Fuselage: INA

Cockpit Glass: Ballistic

Stealth Properties: No

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The Changhe Z-8 (Zhishengji-8) is a triple engine, multi-role helicopter designed and manufactured by the Changhe Aircraft Industry Group (CAIG) of China. It is derived from SA 321 Super Frelon Helicopter built by Aerospatiale. The Z-8 is designed to execute both civil and military missions. The civil operations capable of being performed by the aircraft include geological survey, aerial mapping, construction, forest fire protection, power line erection and communication. The military uses of the Z-8 include liaison, search and rescue, fire fighting, frontier patrol, troop transport, anti-submarine warfare (ASW) and emergency medical service (EMS). Z-8 helicopter design The design of Changhe Z-8 began in 1976. The final design was approved in November 1994. The helicopter is designed to manoeuvre even in bad weather conditions. A six-bladed main rotor system is mounted on the centre of the upper fuselage section. The helicopter has a five-blade tail rotor. The fuselage section is designed in a robust semi-monocoque shape with boat-hull inside its bottom. The Z-8 is designed to execute both civil and military missions. The civil operations capable of being performed by the aircraft include geological survey, aerial mapping, construction, forest fire protection, power line erection and communication. The military uses of the Z-8 include liaison, search and rescue, fire fighting, frontier patrol, troop transport, anti-submarine warfare (ASW) and emergency medical service (EMS).

Development The development of the Z-8 began in 1976 at the Jingdezhen-based Changhe Aircraft Factory. The development programme was delayed in 1979 due to technical difficulties and financial crisis. CAIG resumed the programme in 1985 with its own funding. The maiden flight of the first Z-8 prototype took place in December 1985. The second prototype took its first flight in October 1987. The domestic type approval was granted in April 1989. The Z-8 entered service with the PLANAF in August 1989. Features The Z-8 features a flight control system, gear boxes, a horizontal stabiliser, boat hull fuselage and bar-shape array radar. It is also equipped with a 275kg hoist and winch as well as a scoop fitted atop starboard side cabin door for rescue missions. It is fitted with a standard fuel tank of 3,900l capacity. An auxiliary fuel tank installed in the cabin offers extended-range, increasing the total capacity to 5,800l. Cockpit The glass-cockpit seats a pilot and a co-pilot. It is fitted with two cockpit doors and broad side sliding windows for providing clear visibility to the cockpit crew. The cabin provides plenty of space for passengers on-board. The cabin is incorporated with ventilators, heaters, a hydraulic actuated rear loading door, soundproof and vibration proof systems.It can accommodate 27 fully armed troops or 15 medical stretchers. Armaments The Z-8 is fitted with a HS-12 dipping sonar, sonobuoys and an A244S torpedo under the fuselage section. It is also equipped with YJ-81 or YJ-83K air-to-surface missiles (ASM) for anti-ship operations. The helicopter can accommodate rockets and gunpods on the external pylons for anti-piracy missions. Engines The Z-8 is powered by three Changzhou WZ-6 turboshaft engines, each of which can produce 1,128kW of output power. Two engines are fitted adjacent to each other on the forward fuselage of the main rotor, while the third is integrated behind the main rotor system. It is a Chinese copy of the French-developed Turbomeca Turmo engine. The Z-8F is installed with three Pratt & Whitney Canada PT6A-67B turboshaft engines. Landing gear The helicopter is fitted with a non-retractable tricycle type landing gear comprising two wheels and low air pressure shock absorbers. The hull shaped landing gear allows the helicopter to take-off or land on water during emergencies. Performance The Z-8 can climb at the rate of 690m/min. Its maximum and cruise speeds are 315km/h and 266km/h respectively. The economical cruise speed is 255km/h. The range of the helicopter is 700km and the service ceiling is 3,100m. Its maximum endurance is four hours.

Ka-28 Russian Anti-Submarine Helicopter





Tiers:



Variants:

- **Ka-27PL (Helix-A):** baseline anti-submarine warfare helicopter.
- **Ka-27PS (Helix-D):** is a search and rescue helicopter.
- **Ka-27M:** s a recent improved version. It is being tested and evaluated by the Russian Navy. This helicopter has got new radar and some other improvements.
- **Ka-28 (Helix-A):** is an export version of the Ka-27PL ordered by China, India, Vietnam and Yugoslavia. This version has a revised avionics suite.
- **Ka-29 (Helix-B):** is a naval assault transport helicopter. This helicopter is intended especially for the support of Russian Navy's amphibious operations and featuring a substantially changed airframe. The type entered service in 1985. About 59 of these helicopters were produced. These are in service with Russia and Ukraine.
- **Ka-31:** is an airborne early warning helicopter, based on the basic Ka-29. Its main mission is a long-range detection of airborne and naval threats.
- **Ka-32 (Helix-C):** is a simplified civilian version. It is used in Russia and has been exported to a number of countries. It is even used by some Western countries.
- **Ka-32K:** is a civilian flying crane.
- **Ka-32S:** is a specialized version, designed to operate from icebreakers. It can be used for ice patrolling, search and rescue, oil rig support, and other tasks. This version is fitted with a radar.
- **Ka-32T:** is a civilian transport helicopter. It lacks radar and has simplified avionics. It can carry passengers or freight. It has a payload capacity of 4 000 kg internally or 5 000 kg externally.

System

Alternative Designation: Kamov Ka-28;
Primary Function: Anti-submarine warfare helicopter
Manufacturer: Kamov
In Service: 1982-Present
Crew: ea2 (pilot, navigator) + 1-3 sensor operators
Passenger: The main cabin holds ASW gear or up to 16 passengers
Blades, Main Rotor: 6
Blades, Tail Rotor: No Rail Rotor
Number of Engines: ea2
Day/Night Capable: Yes, due to the Automatic Flight Control System
Takeoff or Landing Limitations: INA
All Weather Capable: Yes, due to the Automatic Flight Control System

Number of Hard Points: INA

Stabilizer: horizontal stabilizer (with elevators) fitted with endplate fins and full-height rudders

Auto-hovering: Yes

Automatic Flight Control System: Yes

Landing Gear: Fixed, quadricycle landing gear

Note: One fully articulated, three-blade assembly is carried close to the roof, rotating counter-clockwise when seen from above. The other three-blade hub is fitted to the upper end of the mast and rotates clockwise. Each assembly has its own pitch change mechanism and each has folding blades. The blades are of all-composite construction and the main rotor hub is made of titanium and steel.

Dimensions

Length: m11.30

Width: m5.65

Height: m5.40

Main Rotor Diameter: m15.90

Weight, Empty: kg6,400

Weight, Normal Takeoff: kg10,700

Weight, Maximum Takeoff: kg11,000

Weight, Internal Payload: kg4,000

Cabin Length: m4.52

Cabin Width: m1.30

Cabin Height: m1.32

Disc Area: 199 m sq

Automotive

Engine Name: 2 x Isotov TV3-117KM turboshaft

Engine Power: hp2,200 shaft hp each

Cruising Range: km800

Speed, Maximum: km/h250

Speed, Cruise: km/h230

Internal Fuel Capacity: 4,720 liters

Ceiling: m6,000

Hovering Ceiling: m3,500

Communications

Radio: Various depending on country and mission

Wing Mounted Weapons

Note: The Ka-28 can be equipment with 1 × torpedoes (AT-1M, VTT-1, UMGT-1 Orlan, APR-2 Yastreb) or 36 RGB-NM & RGB-NM-1 sonobuoys

↳*Torpedoe System*

Name: Torped 45

Type: lightweight torpedo intended for ASW and surface targets, providing multiple-target active/passive homing combined with wire guidance.

Manufacturer: Saab Dynamics (Sweden)

In Service: 1995-Present

Length: mm2,850

Diameter: mm400

Weight: kg320

Engine: Electric DC motor with gearbox

Basic Load: ea3

Guidance System: Hydro-acoustic homing combined with wire guidance and on-board computer

↳*Bomb System*

Note: Additionally, the Ka-27 can carry 10 x PLAB 250-120 anti-submarine bombs

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: INA

Laser Designator: INA

Submarine Search Radar: Osminog in undernose radome

Doppler Radar: DISS-15 Doppler navigational

Position Location System: Yes

Navigation System: NKV-252 navigation system

Gyroscope: MGV-1V gyroscopic system

Radio Compass: A-031 radio compass

Flight System: PKV-252 flight system

Protection

Fuselage: The fuselage resembles that of the Hormone and has a similar semi-monocoque pod and boom type that has been stretched approximately 5 ft (1.5 m).

Cockpit Glass: unstepped windshield

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

KA-28 The Ka-28 helicopter is an export version of the Ka-27 anti-sub and rescue helicopter of the Russian Navy. Aircraft of the type were mass-produced in Kumertau, with a total of 267 built. By 2000, 33 Ka-28s were assembled. They were sold to China, India, Vietnam, Syria, Yugoslavia and Cuba. Under the 1998 contract, five Ka-28 anti-sub helicopters and three Ka-27PS search and rescue ones were delivered to China, three in 1999 and five in 2000. The ship-based anti-submarine helicopter KA-28 is intended to be used to search, to track and to destroy submarines in under-water and above-water positions, day and night, in simple and complicated weather conditions at the depth of their immersion up to 500 m and travel speeds up to 75 km/h, in the regions being remote from the point of the helicopter basing at the distance up to 200 km. These tasks are fulfilled at the flights from the land aerodromes and from the deck a ship at the sea disturbance up to 5 number. The helicopter is equipped with the inflatable ballonnets system allowing to carry out an emergent landing of the helicopter on the water surface, and also with the blade folding mechanism what makes it possible to considerably diminish the overall dimensions at its storage in the hangars of ships and aerodromes. Coaxial Ka-28 helicopter has two rotors of 15.9-m diameter each. The polymeric composite blades are equipped with electrical thermal de-icing system and blade folding system allowing to keep the helicopter in the ship hangars. Compact airframe with the empennage of a fixed-wing A/C type has four-leg non-retractable landing gear for operating the helicopter from ship decks in the sea state conditions of up to ±10 degrees. The export version of Ka-28 is developed on the basis of Ka-27 and differs from it by some on-board equipment units, "friend-or-foe" identification system and larger fuel system capacity - 4,470 l. The operating ratings of TV3-117VMA engines, developed by the company, headed by Mr. A. Sarkisov, Designer General, were supplemented by higher-power emergency rating in case one of the engines fails. Due to the unique qualities of a coaxial rotor layout the helicopter features high power-to-weight ratio, small dimensions, maneuverability, simplicity of control and safety of flight operations from ship decks in stringent sea conditions and turbulent atmosphere. Simplicity of piloting techniques and perfect flight-navigational package make it possible for one pilot to fly prolonged combat missions above reference-free water surface in any time of the year, day-and-night, and in IFR conditions. After the target is detected the on-board avionics suite in combination with the automatic control system of the helicopter solve the task of bringing the helicopter to the designated point and automatic firing of the weapons selected by the pilot. The flight tests of the upgraded Ka-28 helicopter with new avionics have started to be over in mid-2007. The upgraded version features the Kopyo-A airborne radar developed by the Fazotron-NIIR corporation. The flight tests were expected to be over in the middle of 2008. Several foreign countries have initiated talks with the "Rosoboronexport" over modernization of Ka-28 helicopters supplied to them by the Soviet Union earlier. The "Kopyo-A" new long-range airborne radar has surveillance radius of 250 km. It is a pulse-Doppler X-band multimode radar with high resolution. Kopyo-A ensures all-weather 360-deg surveillance in maritime border patrols. In addition to its main functions, the radar allows making high-resolution maps, as well as identifying and tracking up to ten water objects, searching and detecting aerial targets. It can also be used for navigation, and missile guidance. He added that modernized Ka-28s would be able to launch X-35 air-to-surface and air-to-ship guided missiles. Chinese helicopters have most advanced "Izumrud" (Emerald) search radar system installed.

AW139M Italian Multi-Role Helicopter





Tiers:



Variants:

- **AB139:** Original Italian-built production aircraft, 54 built.
- **AW139M:** Militarized variant, capable of carrying various weapons payloads.
- **HH-139A:** Italian Air Force designation for ten search-and rescue configured AW139Ms.
- **VH-139A:** Italian Air Force designation for two VIP configured AW139s.
- **US139:** Military variant, was the AgustaWestland proposed entry for the US Army Light Utility Helicopter programm in partnership with L-3 Communications.
- **MH-139 Grey Wolf:** This is a militarized variant selected by the U.S. Air Force. It can carry nine fully equipped troops; has a top cruise speed of 135 knots and can fly at least three hours, and a minimum distance of 225 nm, without needing refueling. The helicopter is equipped with an electro-optical/infrared sensor turret under the nose and provisions for machine gun mounts on either side. For some operations, it may be fitted with hoists for search-and rescue or other mission-specific gear.
- **AW139 (long nose configuration):** Long nose variant with increased room for avionics built in Italy and the United States.

System

Primary Function: Utility Helicopter
Crew: 2
Blades, Main Rotor: ea5
Blades, Tail Rotor: ea4
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: Yes
Vertical Climb Rate: INA
Number of Hard Points: INA
Cockpit Options: A Honeywell Primus Epic core avionics system comes in either the basic visual flight rules (VFR),

instrument flight rules (IFR) three-axis automatic flight control system (AFCS), IFR four-axis digital AFCS or SAR versions

Passengers: 15, less if fully equipped, not to exceed 2,500kgs

Litters: ILO passengers, 6 liters with 4 medical personnel

FLIR: Yes

Dimensions

Length, Overall: m16.6

Length, Fuselage: m13.5

Width, Across Cabin: m2.3

Width, Across Sponsons: m3.2

Height: m4.9

Weight, Max Takeoff: kg6,000

Main Rotor Diameter: m13.8

Load, Useful: kg2,500

Load, External: kg2,700

Cabin, Interior Volume: m38

Automotive

Engine Name: Pratt and Whitney Canada PT6C-67C

Engine Type: Turboshafts with FADEC (full-authority digital engine control)

Engine Power: Maximum continuous power of 1,531hp (1,142 kW)

Cruising Range: 750km, 3 hours and 54 minutes without reserves

Speed, Maximum: km/h309

Speed, Average: km/h290

Armament

Note: The AW139M can be armed with Internal and external weapons such as general purpose machine guns, sniper rifles, heavy machine gun pods and 70mm rocket pods, forward firing rockets and machine guns, pintle mounted machine gun and Air-to-Surface Missile (ASM) system. The firing of weapons is controlled by a weapon management system equipped with head up display.

Protection

Note: The low thermal and acoustic signature improves the survivability of the AW139M helicopter. The cockpit and cabin can be equipped with ballistic protection. The crew protection is further improved with armored seats. The helicopter also includes ballistic-tolerant, self-sealing fuel tanks. The onboard missile approach warning system provides threat information to the pilot for actuating the helicopter’s countermeasures. The Counter Measures Dispensing System (CMDS) deceives incoming missiles.

Cockpit Glass: Yes

Stealth Properties: No

Heat Signature Reduction: Yes

Add on Armor: No

NBC Protection: INA

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

IR: Low acoustic and infrared (IR) emissions

Notes:

The AW139 is a 15-seat medium-sized twin-engined helicopter developed and built by AgustaWestland, now called Leonardo. It is marketed at several different roles, including military (AW139M), VIP/corporate transport, offshore transport, fire fighting, law enforcement, search and rescue, emergency medical service, disaster relief, and maritime patrol. In addition to AgustaWestland's manufacturing facilities in Italy and the United States, the AW139 is produced in Russia by HeliVert, a joint venture between AgustaWestland and Russian Helicopters. The AW139 was originally designed and developed jointly by Agusta and Bell Helicopters and marketed as the Agusta-Bell AB139, being redesignated AW139 when Bell withdrew from the project. Since entering service in 2003, the AW139 has become one of AgustaWestland's most influential products; it has been subsequently developed into two enlarged medium-lift helicopters, the military-orientated AW149 and the AW189 for the civil market. The AW139 is a conventional twin-engine multi-role helicopter. It has a five-bladed fully articulated main rotor with a titanium hub and composite blades and a four-bladed articulated tail rotor. It is fitted with retractable tricycle landing gear, the two aft wheels retracting into external sponsons which are also used to house emergency equipment. It is flown by a crew of two pilots, with up to 15 passengers accommodated in three rows of five. The AW139 had been aimed at a vacant niche in the market, sitting below larger types such as the Eurocopter AS332 Super Puma and Sikorsky S-92, and above smaller ones like the Bell 412 and Eurocopter EC155. "Rotor & Wing" has described the AW139's flying attitude as 'docile and predictable'. The AW139 is powered by two FADEC-controlled Pratt & Whitney Canada PT6C turboshaft engines; the FADEC system seamlessly adjusts the engines for pilot convenience and passenger comfort, and can automatically handle a single-engine failure without noticeable deviation. It was constructed with maintenance requirements in mind; critical systems can be readily accessed, where possible the number of parts has been reduced, and many components have been designed for an extended lifecycle; a Health and Usage Monitoring System (HUMS) is also equipped. More than a thousand customizable items of equipment can be configured per customer demand, including auxiliary fuel tanks, rescue hoists, cargo hooks, search and weather radar, ice protection systems, external cameras and searchlights, and seating arrangements. The AW139 features a modular glass cockpit, a commonly-installed feature being the four-axis autopilot, which enables functions such as auto-hover capability. The cockpit has been designed to enable single-pilot flight operations under instrument flight rules conditions, and it is also compatible with the use of night vision goggles. Pilot training for the type is available via advanced Level D Full Flight Simulators. According to "Shipping & Marine", the AW139 has "the largest cabin in its class"; containing up to 15 passengers or four litters and accompanying medics, an additional baggage compartment is used to stow equipment to keep the main cabin clear for use. Large sections of the AW139 have been developed and produced by a range of different companies. Airframes are typically produced by PZL-Świdnik, who delivered their 200th airframe in April 2014. Pratt & Whitney Canada produce the type's PT6C turboshaft engines, while the primary and secondary transmissions were developed by Westland GKN and Kawasaki Heavy Industries respectively. A significant portion of the avionics are sourced from Honeywell. Turkish Aerospace Industries has been subcontracted to manufacture various elements of the AW139, including the fuselage, canopy, and radome. Final assembly of most AW139s is performed at AgustaWestland's facilities in Philadelphia, United States, and Vergiate, Italy; those destined for customers within the Commonwealth of Independent States are typically assembled by a third final manufacturing plant in Tomilino, Moscow operated by HeliVert.

H215 Super Puma French Multi-Role Helicopter







Tiers:

1 2 3 4

System

Alternative Designation: H215
Type: Multi-Role Helicopter
Primary Function: The H215 is a 9-ton class twin-engine helicopter in the famous COUGAR / SUPER PUMA family. They combine the rugged experience of the AS532 / AS332 dynamic and basic assemblies with the most advanced avionics of the H225M. They also include full glass cockpit avionics and the latest generation autopilot. These aircraft are reliable, fast helicopters and have outstanding all weather capabilities: a great power reserve and high maneuverability. The powerful MAKILA 1A1 engines give them the ability to fly almost any mission, no matter the temperature and altitude. They ensure maximum operational safety, even in the most difficult situations (discretion, low vulnerability, crash survivability and icing conditions).
Crew: 2 (pilot, co-pilot)
Passengers: 21-25
Number of Engines: ea2
Number of Hard Points: INA

Dimensions

Length: 15.53 m
Height: 4.92 m
Main Rotor Diameter: 15.60 m
Disc Area: 191.1 sq m
Cabin Length: 6.05 m
Cabin Width: 1.80 m
Cabin Height: 1.55 m

Cabin Volume: 11.4 cu m

Empty Weight: 4,265 kg

Maximum Takeoff Weight, with Internal Load: 9,000 kg

Maximum Takeoff Weight, With Sling Load: 9,350 kg

Internal Load Weight: 3,000 kg

Automotive

Engine Name: 2 x Turbomeca Makila 1A

Engine Type: Turboshaft

Engine Power: 1,780 shaft hp each

Cruise Speed: 251 kph

Climb Rate: 426 m/min

Hovering Ceiling, in Ground Effect: 2,800 m

Hovering Ceiling, Out of Ground Effect: 1,650 m

Range, with Internal Tanks: 871 km

Range, with External Tanks: 1,260 km

Main Gun System

Note: mix of air-to-surface missiles, 20-mm; or 7.62-mm gun pods, 7.62-mm door guns, and rocket pods; - or -2 x ASW torpedoes; or 2 x AM 39 Exocet missiles; or up to 6 AS15TT anti-ship missiles

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: INA

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Airbus Helicopters H215 is an evolution of the twin-engine AS332 C1e/L1e aircraft intended for business and industrial operators. The H215 is a versatile, economic and robust helicopter that combines advanced avionics and a reliable platform for rugged multi-mission capabilities. It offers long range capabilities, power, speed, a large useful payload and very good lifting performance in hot and high environments. Both EASA and FAA certified, the aircraft is equipped with the latest, most modern technologies meeting the latest safety requirements of the market. This includes a glass cockpit and the renowned 4-axis autopilot used on the H225. The H215 helicopter was launched in November 2015 and the first production aircraft is scheduled to roll off the assembly line in Romania by 2017.

AS 332 Super Puma (AS 532UC Cougar) French Multi-Role Helicopter





Tiers:



Variants:

- **AS 332 Super Puma/AS 532UC Cougar:** Initial production short fuselage transport version. Seats two crew and 21 passengers. The military version has a reinforced floor.
- **AS 332L1 Super Puma/AS 532UL Cougar:** Long fuselage version. Civil version can carry 20 passengers in an airline interior. Military version can carry up to 25 troops and is equipped with IR suppressors, radar warning receiver, chaff dispensers, flare launchers and armored protection for the crew and passengers.
- **AS 532AC/AL Cougars:** Armed versions of short and long fuselage army Cougars. For tactical transport operations, the AS 532AL can carry 24 troops or 18 troops in crashworthy seats. It has space for six stretchers and 10 seats in casualty evacuation configuration. It can carry 9,900 lb (4,500 kg) of cargo in an external sling. The helicopter can also be equipped with external weapons, including rocket pods and machine guns.
- **AS 532SC Cougar:** Naval version with ASW equipment, anti-corrosion treatment, larger landing gear sponsons, and modifications for shipboard operation including a folding tail-rotor pylon and haul-down system. It is equipped with a full glass cockpit, including active matrix liquid crystal displays (AMLCDs).
- **AS 532U2 Cougar Mk 2/AS 332L2 Super Puma Mk 2:** Fitted with improved Spheriflex rotor head and longer blades (53 ft 1 3/4 in/16.2 m rotor diameter) with parabolic tips, fully articulated four-blade anti-torque rotor, rear fuselage lengthened by 1 ft 5 3/4 in (0.45 m). Cockpit considerably reworked and fitted with Sextant Avionique Electronic Flight Instrumentation System (EFIS) with four multi-function displays (MFD). Uprated Makila engines with better hot and high performance.
- **H215 (AS 332 L1e/C1e):** This is the latest variant of the Super Puma, which was unveiled in November 2012. It features new avionics, including a four-axis autopilot, from the EC 225 helicopter. Certification was scheduled for 2013.
- **AS 332L2 Super Puma Mk 2 VIP:** Variant equipped with an eight to 15 seat interior, full galley and toilet.
- **Horizon:** Helicopter-borne battlefield surveillance radar fitted in an AS 532UL airframe that can detect ground vehicles, slow moving aircraft and ships. It is a flat-plate radar on retractable mount; extends well below the helicopter in flight to provide 360-deg scan. It is linked to a ground station, which provides information to ground commanders.
- **AS 532A2 Combat Search-and-Rescue (CSAR) Cougar:** Specially equipped Cougar Mk II, deployed by French and Saudi air forces. This version is designed to rescue downed pilots behind enemy lines. Specialized equipment that is deployed on this aircraft includes: rescue hoist, FLIR, GPS , searchlight, night-vision-compatible cockpit, infrared and radar jammers, countermeasure launchers, radar warning receiver, missile approach warner and an encrypted position locator system. Armament includes 20-mm cannon and door-mounted .50 caliber machine guns.
- **Growth Super Puma:** In July of 1998, Eurocopter announced the development of a growth version of its Super Puma transport helicopter, called the Mk III, which was designed to compete with such helicopters as Sikorsky's S-92 . A military version was also planned. It was ultimately scrapped in favor of the EC 225/EC 725 , due to high development costs.
- **H225M Caracal/EC 725:** The H225M completed its first flight in November 2000. The H225M is based on the proven fuselage and structural design of the Cougar Mk 2 with a new five-bladed main rotor and reinforced main gearbox. The helicopter also has a suite of integrated displays and piloting system. The H225M can carry a much higher military payload (24,692 lb), at a faster speed (150-170 kts) and a longer distance (800 nm) than its predecessors. Based on the 1990 nomenclature adjustment, the H225 Puma is the civil version of this latest variant. See separate record for more details.

System

Alternative Designation: 332 Super Puma; AS 532UC Cougar

Type: Multi-Role Helicopter

Crew: 2 (pilot, co-pilot)

Passengers: 21

Number of Engines: ea2

Number of Hard Points: INA

Dimensions

Length: 15.53 m

Height: 4.92 m

Main Rotor Diameter: 15.60 m

Disc Area: 191.1 sq m

Cabin Length: 6.05 m

Cabin Width: 1.80 m

Cabin Height: 1.55 m

Cabin Volume: 11.4 cu m

Empty Weight: 4,265 kg

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Automotive

Engine Name: 2 x Turbomeca Makila 1A

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Cruise Speed: 251 kph

Climb Rate: 426 m/min

Hovering Ceiling, in Ground Effect: 2,800 m

Hovering Ceiling, Out of Ground Effect: 1,650 m

Range, with Internal Tanks: 871 km

Range, with External Tanks: 1,260 km

Main Gun System

Note: mix of air-to-surface missiles, 20-mm; or 7.62-mm gun pods, 7.62-mm door guns, and rocket pods; - or -2 x ASW torpedoes; or 2 x AM 39 Exocet missiles; or up to 6 AS15TT anti-ship missiles

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: INA

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Eurocopter AS332 Super Puma is a four-bladed, twin-engine, medium-size utility helicopter marketed for both civil and military use. Originally designed and built by Aérospatiale, it is an enlarged and re-engined version of the original Aérospatiale SA 330 Puma. First flying in 1978, the Super Puma succeeded the SA 330 Puma as the main production model of the type in 1980; since 1990 Super Pumas in military service have been marketed under the AS532 Cougar designation. In civilian service a next generation successor to the AS 332 was introduced in 2004, the further-enlarged Eurocopter EC225 Super Puma.

Ka-27 Helix Russian Anti-Submarine Helicopter







Tiers:



Variants:

- **Ka-27PL (Helix-A):** baseline anti-submarine warfare helicopter.
- **Ka-27PS (Helix-D):** is a search and rescue helicopter.
- **Ka-27M:** s a recent improved version. It is being tested and evaluated by the Russian Navy. This helicopter has got new radar and some other improvements.
- **Ka-28 (Helix-A):** is an export version of the Ka-27PL ordered by China, India, Vietnam and Yugoslavia. This version has a revised avionics suite.
- **Ka-29 (Helix-B):** is a naval assault transport helicopter. This helicopter is intended especially for the support of Russian Navy's amphibious operations and featuring a substantially changed airframe. The type entered service in 1985. About 59 of these helicopters were produced. These are in service with Russia and Ukraine.
- **Ka-31:** is an airborne early warning helicopter, based on the basic Ka-29. Its main mission is a long-range detection of airborne and naval threats.
- **Ka-32 (Helix-C):** is a simplified civilian version. It is used in Russia and has been exported to a number of countries. It is even used by some Western countries.
- **Ka-32K:** is a civilian flying crane.
- **Ka-32S:** is a specialized version, designed to operate from icebreakers. It can be used for ice patrolling, search and rescue, oil rig support, and other tasks. This version is fitted with a radar.
- **Ka-32T:** is a civilian transport helicopter. It lacks radar and has simplified avionics. It can carry passengers or freight. It has a payload capacity of 4 000 kg internally or 5 000 kg externally.

System

Alternative Designation: Kamov Ka-27; Helix
Primary Function: Anti-submarine warfare helicopter
Manufacturer: Kamov
In Service: 1982-Present
Crew: ea2 (pilot, navigator) + 1-3 sensor operators
Passenger: The main cabin holds ASW gear or up to 16 passengers
Blades, Main Rotor: 6

Blades, Tail Rotor: No Rail Rotor

Number of Engines: ea2

Day/Night Capable: Yes, due to the Automatic Flight Control System

Takeoff or Landing Limitations: INA

All Weather Capable: Yes, due to the Automatic Flight Control System

Number of Hard Points: INA

Stabilizer: horizontal stabilizer (with elevators) fitted with endplate fins and full-height rudders

Auto-hovering: Yes

Automatic Flight Control System: Yes

Landing Gear: Fixed, quadricycle landing gear

Note: One fully articulated, three-blade assembly is carried close to the roof, rotating counter-clockwise when seen from above. The other three-blade hub is fitted to the upper end of the mast and rotates clockwise. Each assembly has its own pitch change mechanism and each has folding blades. The blades are of all-composite construction and the main rotor hub is made of titanium and steel.

Dimensions

Length: m11.30

Width: m5.65

Height: m5.40

Main Rotor Diameter: m15.90

Weight, Empty: kg6,400

Weight, Normal Takeoff: kg10,700

Weight, Maximum Takeoff: kg11,000

Weight, Internal Payload: kg4,000

Cabin Length: m4.52

Cabin Width: m1.30

Cabin Height: m1.32

Disc Area: 199 m sq

Automotive

Engine Name: 2 x Isotov TV3-117KM turboshaft

Engine Power: hp2,200 shaft hp each

Cruising Range: km800

Speed, Maximum: km/h250

Speed, Cruise: km/h230

Internal Fuel Capacity: 4,720 liters

Ceiling: m6,000

Hovering Ceiling: m3,500

Communications

Radio: Various depending on country and mission

Wing Mounted Weapons

Note: The Ka-27 can be equipment with 1 × torpedoes (AT-1M, VTT-1, UMGT-1 Orlan, APR-2 Yastreb) or 36 RGB-NM & RGB-NM-1 sonobuoys

↳*Torpedoe System*

Name: Torped 45

Type: lightweight torpedo intended for ASW and surface targets, providing multiple-target active/passive homing combined with wire guidance.

Manufacturer: Saab Dynamics (Sweden)

In Service: 1995-Present

Length: mm2,850

Diameter: mm400

Weight: kg320

Engine: Electric DC motor with gearbox

Basic Load: ea3

Guidance System: Hydro-acoustic homing combined with wire guidance and on-board computer

↳*Bomb System*

Note: Additionally, the Ka-27 can carry 10 x PLAB 250-120 anti-submarine bombs

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: INA

Laser Designator: INA

Submarine Search Radar: Osminog in undernose radome

Doppler Radar: DISS-15 Doppler navigational

Position Location System: Yes

Navigation System: NKV-252 navigation system

Gyroscope: MGV-1V gyroscopic system

Radio Compass: A-031 radio compass

Flight System: PKV-252 flight system

Protection

Fuselage: The fuselage resembles that of the Hormone and has a similar semi-monocoque pod and boom type that has

been stretched approximately 5 ft (1.5 m).
Cockpit Glass: unstepped windshield
Stealth Properties: No
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: Yes
EW: INA
EW Counter Measures/CCM: INA
Counter Measures (Chaff/Flares): INA

Notes:

KA-27 Helix A Ka-27, Kamov 'Helix-A is an improved version of the Ka-25. The fuselage was redesigned to give a large increase in cabin room, with only a small increasse in external dimensions. This allows the Ka-27 to operate from the same ships as the Ka-25. As the 1960s drew to a close, the need arose for a new shipboard anti-submarine warfare helicopter to replace the Soviet Navy's main ASW chopper, the Kamov Ka-25 which was becoming obsolescent. The objective was to greatly increase the payload, internal volume and engine power while still allowing the helicopter to use the same deck helipads and shipboard hangars. The design bureau led by Nikolay Il'yich Kamov started work on the new ASW helicopter in 1969. Given the size requirements, the engineers logically chose to retain the preceding model's contra-rotating rotor layout - a feature which had been a Kamov "trademark" from the start. Initially designated Ka-252 (though the designation was later changed to Ka-27), the prototype made its first hover on 8th August 1973 and the first free flight on 24th December 1973 [1974?]. After a period of rigorous testing the helicopter officially entered service with the Soviet Navy in 1981. The KA-27 helicopter is intended to be used for search-rescue provision of aircraft flights over the sea and the land, and also for provision of emergency-rescue operations at the disasters of ships and vessels, at day and night time, in simple and complicated weather conditions at the sea roughness up to 5 number, alone and in combination with ships. To carry out rescue operations, the helicopter is equipped with the winch with lifting capacity 300 kg. The flight-navigation complex of the helicopter allows to conduct an automatically controlled flight of the helicopter according to the pre-set route, a landing of the helicopter on deck a ship and an unloading of the ship without the stoppage of the latter, an autonomous hovering of the helicopter over the pre-determined point, and together with the radar "Osminog", leading out of the helicopter into the point of the flight pre-set by the pilot. An inflatable ballonnet system ensures the floatage of the helicopter in case of its emergency landing on the water surface. The blade folding mechanism allows to considerably diminish the overall dimensions of the helicopter at its storage in the hangars of the ships and aerodromes. The KA-27PS is intended for fulfilling of search and rescue operations and transport transportation at sea and on dry land. High flight-performance data of helicopter and the perfect equipment ensure the fulfillment of the endurance flight above aqueous the surface without reference points and the search for above-water objects at the significant removal from the ship of basing. Onboard radio-electronic complex provides automatic control of helicopter in flight according to route and precise output of helicopter into the calculation point. The KA-27PS helicopter is equipped with all necessary means of the group and individual rescuing of victims. For lifting the victim onboard the helicopter is established the controlled by hydraulics lifting boom with the electric hoist by load capacity 300 kg. for the transport of large-dimension loads on the helicopter KA-27PS additionally it is established the system of external suspension. Helicopter is equipped with the system of the storing of blades for the arrangement in the deck and bilge hangars. For guaranteeing the buoyancy in the case of emergency landing on the aqueous surface the helicopter is supplied [bystronapolnyaemymi] with air by ballonets. Helicopter is capable to accomplish takeoff and landing on the limited ship area with the tossing + -10 The design turned out to be extremely versatile, and specialised versions began appearing before long. The original Ka-27PL ASW chopper was supplemented by the Ka-27PS search and rescue version, the Ka-28 export variant supplied to friendly nations, the civil Ka-32, the armoured Ka-29 assault helicopter for the Soviet Marines and the Ka-31 airborne early warning version with its unusual rotating radar antenna stowed under the belly when not in use. The civil version found use in such varied roles as long line operations and heli-logging, ice patrol and ship support, firefighting, law enforcement and flying crane operations, with specialised sub-variants appearing accordingly. The considerable capabilities of the Ka-32 quickly earned it recognition in the West, attracting orders from such nations as Canada, Switzerland and South Korea, which were certainly not among the usual buyers of Russian hardware.

AS532 Cougar (H215M) French Multipurpose Helicopter





Tiers:



Variants:

- **SA 330 Puma:** Developed in the late 1960s by Aerospatiale in France. Others were built in the UK, Indonesia, Romania.
- **AS 532 Cougar Mk I UC/AC:** is a military version with a short fuselage capable of carrying 21 commandos, which can be fitted with equipment for maximum efficiency in all theaters of operation: radar or missile detector, decoy-launcher. Moreover, its optional equipment make it truly multi-purpose: winch, projector, specific equipment for SAR missions, or, for instance, crashworthy seats, IR camera, NVG compatible cockpit for special missions. The AC version is the armed version and can be equipped with side-mounted machine-guns and axial pods fitted with either 20-mm guns or 68-mm rocket-launchers
- **AS 332 Super Puma:** Differs from the SA 330 Puma through an improved rotor system, upgraded engines, stretched fuselage, and a modified nose shape.
- **AS-532 Cougar Mk I UE:** is the basic version with long fuselage of the military Cougar MK1 range. The aircraft can transport 25 commandos in addition to the crew (1 chief of stick + 24 troop seats). For tactical transport and logistical support missions the Cougar UE is offered "ready for use". Its standard configuration includes a minimum of radio (2 VHF/AM,TRANSPONDER, ICS...) and navigation
- **AS 532 Cougar Mk I UL/AL:** s the "long" version which can carry up to 25 commandos or 6 injured passengers lying down and 10 other people. Like the other versions, it is capable of lifting 4.5 tons on a sling. The Horizon battlefield ground surveillance system can be installed on the AS 532 UL.
- **AS 532 Cougar Mk I SC:** s the naval version of the Cougar, and its main missions are the following: anti-surface unit warface (ASUW) fitted with AM 39 missiles, anti-submarine warfare (ASW) with a variable-depth sonar and torpedoes, and search and rescue and sea patrols.
- **AS 532 Cougar Mk II U2 A2:** helicopter has the biggest cabin volume in its category : 29 commandos or 12 stretchers with medical equipment, and is capable of carrying 5 tons on the sling. This 1992 version is the longest variant of the Cougar line. It has an improved Spheriflex rotor system with only 4x tail rotor blades, and 2x 2,100-shp Turbomeca Makila 1A2 turboshaft engines that allow an increased cargo carrying capability. It can transport 29 troops or 12 litters, or an external load of 5,000 kg. Primarily used for combat search and rescue, and as an armed version. It may be armed additionally with a 20-mm cannon or pintle-mounted .50 caliber machine guns. Its basic design with screens in the cockpit and a 4-axis autopilot with built-in coupler makes it possible to reduce the crew workload and increase its safety for tactical flight by the same degree.
- **AS 535 Cougar Mk II A2 RESCO:** he main mission of the A2 RESCO is to recover aircrews downed in combat areasplant (RESCO is the French acronym for Combat Search and Rescue or CSAR). For very long range operations, the CSAR Cougar Mk 2 can operate at a higher alternate gross weight of 11,200 kg compared to its normal maximum mission weight of 9,750 kg. With this enhanced capability, the Cougar can rescue two crew members 400 nautical miles away.

System

Alternative Designation: Eurocopter AS532 Cougar (now Airbus Helicopters H215M)
Primary Function: Armed transport
Manufactuer: Aérospatiale Eurocopter Airbus Helicopters
In Service: 1981-Present

Similar Aircraft: Super Frelon, HH-3E Jolly Green Giant, SH-3 Sea King, CH-53 Sea Stallion, Mi-8 Hip, UH-60 Black Hawk

Crew: ea2

Troop Capacity: 20-29 troops

Payload Capacity: 3,000 kg

Blades, Main Rotor: 4

Blades, Tail Rotor: ea5

Day/Night Capable: INA

All Weather Capable: INA

Number of Hard Points: ea4

Takeoff or Landing Limitations: INA

Dimensions

Length, with Rotors Turning: m19.5

Length, Fuselage: m16.8

Main Rotor Diameter: m16.2

Tail Rotor Diameter: m3.2

Height: m4.6

Width: m3.8

Length, Cargo Compatment Floor: m7.9

Width, Cargo Compatment Floor: m1.8

Height, Cargo Compatment Floor: m1.5

Weight, Empty: 4,760 kg

Weight, Normal Takeoff: 8,600 kg

Weight, Maximum Gross: 9,000 kg

Internal Payload: kg3,000

Automotive

Engine Name: 2 x Turbomeca Makila 1A1 Turboshaft

Engine Type: Turboshaft

Engine Power: 1,877-shp each engine

Range, Normal Load: km800

Range, with Auxiliary Fuel: km1,176

Speed, Maximum: km/h275

Speed, Average: km/h249-270

Service Ceiling: m4,100

Hover, Out of Ground Effect: m1,650

:

Hover, In Ground Effect: m2,800

Troop Capacity: 20-29 troops

Maximum Payload: 4,650 kg

Casualty Evacuation: 6-12 litters (variant dependant)

Max Cargo Sling Load: 4,500 kg

Fuel Capacity, Internal Tank: 2,020 liters

Fuel Internal Auxilery Tanks: ea4

Fuel Capacity, Internal Aux Tank: 475 liters each

Maximum Emergency Power: 1,877-shp each engine

Communications

Radio: INA

Door Mounted Gun

Note #1: The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role. The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.

Wing Mounted Weapons

Note #1: Hydra 70 2.75 in (70 mm) rockets – 7 rockets mounted in the M260 launcher or 19 rockets in the M261 launcher

Note #2: Additional Armament that can be equipped on the AS532 Cougar are: 7.65-mm MG 2 - 20-mm twin gun pods 2 - 68-mm rocket pods (22 each) 2 - 2.75-in rocket pods (19 each) 600 liters External fuel tanks

↳*Rocket System*

Name: Hydra 70

Type: 70mm Fin-stabilized unguided rocket

Launcher Name: M261 Launcher

Number of M261 Launchers: ea2

In Service: 1980s-Present

Manufactuer: United States of America

Length: 1,060 mm

Diameter: 70 mm

Muzzle Velocity: 700 m/s

Effective Firing Range: 8,000 m

Maximum Firing Range: 10,500 m

Speed: 739 m/s

Guidance System: Unguaided

Basic Load: 19 each per M261 Launcher

↳*Gun Pod Weapon System*

Name: M61 Vulcan
Type: hydraulically, electrically or pneumatically driven, six-barrel, air-cooled, electrically fired Gatling-style rotary cannon which fires 20 mm rounds
Manufactuer: General Dynamics
In Servcie: 1946-Present
Length: m1.827
Weight: kg112
Barrels: 6-barrel (progressive RH parabolic twist, 9 grooves)
Action: twist, 9 grooves) Action Hydraulically operated, electrically fired, rotary cannon
Rate of Fire: rds/min6,000
Muzzle Velocity: m/s1,050
Feed System: Belt or linkless feed system

↳*Ammunition*

Name: M53
Type: API
Caliber: mm20
Cartridge: 20×102 mm
Bursting Charge: 4.2 grams of incendiary
Muzzle Velocity: m/s1,050
Armor Penetration: 6.4 mm (0.25 in) RHA penetration at 0 degree impact angle and 1,000 m (3,300 ft) range.
Maximum Effective Range: km1.6
Basic Load: 900

Fire Control and Avionics

Fire Control System Type: INA
Fire Control Radar: INA
Digital or Analog Cockpit: INA
Automated Helmet: INA
Position Location System: Yes
Radar Warning Receiver: Yes
Laser Warning Receiver: Optionally Available
Missile Launch Detector: Optionally Available
Missile Approach Deterctor: Optionally Available
NVG Compatible: Yes
Autopilot: Full autopilot

Navigation Computer: Yes

Protection

Armor, Fuselage: Armour plates for the cargo

Cockpit Glass: INA

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: Yes

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: Optionally Available

Counter Measures (Chaff/Flares): Optionally Available

Deiced Capable: Main and tail rotor blades electrically deiced

Infrared Jammer: Optionally Available

Decopy Launcher: Optionally Available

PLS (Personal Locator System): Yes

Notes:

The Eurocopter AS532 Cougar (now Airbus Helicopters H215M) is a twin-engine, medium-weight, multipurpose helicopter developed by France. The AS532 is a development and upgrade of the Aérospatiale SA 330 Puma in its militarized form. Its civilian counterpart is the Eurocopter AS332 Super Puma. The AS532 has been further developed as the Eurocopter EC725. The Cougar name was adopted for all military variants, and in 1990, all Super Puma designations were changed from AS 332 to AS 532 to distinguish between civil and military variants. The Cougar was designed to provide high performance, ease of deployment, low operating cost, comfort, plus high mission readiness. For military use and adapting to modern battlefield conditions, it features survivability, suitability for tactical flight thanks to exceptional manoeuvrability, low observability, low vulnerability to projectiles, crashworthiness. A multirole helicopter, the Cougar can be armed with machine-guns and pod-mounted cannons, with rockets, or with antisubmarine or antisurface weapon systems to suit different mission requirements. Additional missions include: VIP transport, electronic warfare, and anti-submarine warfare.

Mi-8AMT Russian Multi-Role Helicopter







Tiers:



Variants:

- **List of Variants - See Below:** Mi-8 Hip-A Mi-8 Hip-B Mi-8T Hip-C (Transportny, transport) Mi-8TM Mi-8TV Mi-8S Hip-C (Salon) Mi-8 VIP Mi-8VZPU Hip-D Mi-8TB Hip-E Mi-8TBK Hip-F (Kommercheskiy, commercial) Mi-9 Hip-G Mi-8MPS Mi-8SMV Hip-J Mi-8P/PPA Hip-K Mi-8AMTSh/Mi-171Sh Mi-8AMTSh-V Mi-8AMTSh-VA Mi-8TG Mi-8 Rana Mi-8MTPR-1 Mi-17/Mi-8MT/Mi-8MTV/Mi-17V Hip-H Mi-17P Mi-17PI Mi-17PG Mi-17Z-II Mi-17MD Mi-17KF Mi-171 Mi-171M/Mi-171A2 Mi-17M/Mi-171V Mi-172 Mi-8MTV (Visotnii, high altitude) Mi-17 Pratap Mi-17-1VA Mi-17V5 Mi-171E Mi-171E2

System

Alternative Designation: Mi-8AMT
Type: Medium twin-turbine Multi-Role helicopter
Manufactuer: Ulan-Ude Aviation Plant
Mission: The helicopter can carry out multiple missions including search and rescue (SAR), surveillance, patrolling, fire-fighting, medical evacuation (MEDEVAC), and observation missions. It can also be deployed for transportation of cargo and personnel.
Crew: ea3 (2x pilots, 1x flight engineer)
Blades, Main Rotor: 5
Blades, Tail Rotor: ea3
Day/Night Capable: The Mi-8AMT is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
All Weather Capable: The Mi-8AMT is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
Takeoff or Landing Limitations: INA
Vertical Climb Rate: m/s9
Number of Hard Points: ea4

Cargo Capacity: 4,000 kg

Seat Capacity: 37 troop seats or 26 passenger chairs.

Landing Gear: Fixed main gear struts run down and out from attachment points on the upper, rear fuselage. A second strut holds the wheel well away from the lower fuselage. The two-wheel nose gear is fitted under the fuselage just behind the cockpit

Winch: The helicopter is fitted with LPG-150M winch and SLG-300 hoist systems for lifting people during search and rescue tasks.

External Sling: An external sling hydraulic weighing system is attached to carry up to 4,000kg of payload. The helicopter can perform lifting, loading and unloading of freight in-flight.

Note: Additional equipment onboard the Mi-8AMT includes an anti-icing system, fluorescent lighting, a spotlight with IR filter, information and emergency lighting panels, and winches.

Dimensions

Length, with Rotors Turning: m25.2

Length, Fuelage: m18.2

Width: m2.5

Height: m5.65

Main Rotor Diameter: m21.3

Tail Rotor Diameter: m3.9

Cargo Compartment, Length: m5.3

Cargo Compartment, Width: m2.3

Cargo Compartment, Height: m1.8

Weight, Maximum Gross: kg12,000

Weight, Normal Takeoff: kg11,100

Weight, Empty: kg6,350

Automotive

Engine Name: 2 x TV3-117VM

Engine Type: Medium twin-turbine

Engine Power: Each engine develops a take-off power of 2,200 hp and a contingency power of 2,200 hp.

Speed, Maximum: km/h250

Speed, Average: km/h230

Service Ceiling: m4,500

Range, Maximum Load: km350

Range, Normal Load: km460

Range, with Auxilery Fuel: km950

Fuel, Internal: 445 liters

Fuel, Internal Aux Tank: 915 liters ea

Fuel, External Fuel Tank: 45 liters in port tank, 680 liters in starboard tank

Service Ceiling, Service: m4,500

Service Ceiling,Hover (out of ground effect): m800

Service Ceiling,Hover (in ground effect): m1,900

Vertical Climb Rate: m/s9

Note: Maximum operational height is 6,000m, and the helicopter can operate in temperatures ranging between +50°C and -50°C. It can also withstand high winds.

Communications

Radio: INA

Door Mounted Gun

Note: Loaded combat troops can fire personal weapons through windows from inside cabin.

Wing Mounted Weapons

Additional Armament that can be equipped on the Mi-8T: 2 x 7.62-mm or 1 x 12.7-mm MG 4-6 - AT-2C Swatter or AT-3 Sagger ATGMs 4-6 - 57-mm rocket pods (16 each) 2 - 80-mm rocket pods (20 each) 4 - 250-kg bombs 2 - 500-kg bombs 2 - 12.7-mm MG pod 2 - Twin 23-mm gun pods 1,830 liters Additional fuel tanks

↳*Rocket System*

Name: UB-32 (rocket pod)

Type: 57 mm, reusable, 32-salvo rocket pod

Length, Launcher: mm2,080

Diameter, Launcher: mm464

Basic Load for the UB-32 Rocket Pod: ea4, one on each hardpoint

Number of Rockets in each UB-32 Rocket Pod: ea32

↳*Rocket*

Name: S-5 Rockets

Type: Rocket

Length, Rocket: mm2,080

Diameter, Rocket: mm481

Weight Empty: kg103

Weight Loaded: kg264

Warhead Types: produced in a variety of sub-types with different warheads, including HEAT anti-armour (S-5K), high-explosive fragmentation (S-5M/MO), smoke, and incendiary rounds

Maximum Effective Range: 3-4 km depending on the warhead and fuze

Basic Load: 32 S-5 Rockets per UB-32 Rocket Pod

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Weather Radar: Type 8A-813

Navigation: DISS-32-90 Doppler navigation under tailboom

Note: Mi-8AMT multi-role helicopter is equipped with advanced navigation and radio communications equipment for improved situational awareness. The latest in-cockpit piloting equipment ensures flight safety. The helicopter also features multifunctional global positioning system (GPS) / global satellite navigation system (GLONASS), a forward looking infrared (FLIR) system and an early ground proximity warning system.

Protection

Armor Type: Bolt-on

Fuselage: semi-monocoque pod and boom fuselage has a nearly stepless front

Cockpit Glass: large, five-section windshield and lower nose windows

Stealth Properties: No

Heat Signature Reduction: IR over engine exhausts

Add on Armor: Available

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes,

Jammer: Hot Brick IR

Notes:

Mi-8AMT is designed to solve a wide range of tasks: transporting passengers and cargo, transporting bulky cargo on an external load, conducting search and rescue operations, evacuating the injured. When developing the Mi-8AMT helicopter, the vast experience of operating more than 12,000 helicopters of the Mi-8 family in all climatic and natural zones was taken into account. “Comfort and safety!” Is the motto under which this passenger helicopter was created. To ensure the safety of passengers, the Mi-8AMT helicopter is equipped with three Class III emergency hatches that meet the requirements of FAR-29, as well as several additional emergency exits. For flights above the water surface, the helicopter is equipped with an emergency landing system, equipped with life jackets. The transport modification upon the customer’s request can be equipped with an additional right extended door, a ladder in the rear part of the cab.

AS 332L1 Super Puma (AS 532UL Cougar) French Multi-Role Helicopter







Tiers:



Variants:

- **AS 332 Super Puma/AS 532UC Cougar:** Initial production short fuselage transport version. Seats two crew and 21 passengers. The military version has a reinforced floor.
- **AS 332L1 Super Puma/AS 532UL Cougar:** Long fuselage version. Civil version can carry 20 passengers in an airline interior. Military version can carry up to 25 troops and is equipped with IR suppressors, radar warning receiver, chaff dispensers, flare launchers and armored protection for the crew and passengers.
- **AS 532AC/AL Cougars:** Armed versions of short and long fuselage army Cougars. For tactical transport operations, the AS 532AL can carry 24 troops or 18 troops in crashworthy seats. It has space for six stretchers and 10 seats in casualty evacuation configuration. It can carry 9,900 lb (4,500 kg) of cargo in an external sling. The helicopter can also be equipped with external weapons, including rocket pods and machine guns.
- **AS 532SC Cougar:** Naval version with ASW equipment, anti-corrosion treatment, larger landing gear sponsons, and modifications for shipboard operation including a folding tail-rotor pylon and haul-down system. It is equipped with a full glass cockpit, including active matrix liquid crystal displays (AMLCDs).
- **AS 532U2 Cougar Mk 2/AS 332L2 Super Puma Mk 2:** Fitted with improved Spheriflex rotor head and longer blades (53 ft 1 3/4 in/16.2 m rotor diameter) with parabolic tips, fully articulated four-blade anti-torque rotor, rear fuselage lengthened by 1 ft 5 3/4 in (0.45 m). Cockpit considerably reworked and fitted with Sextant Avionique Electronic Flight Instrumentation System (EFIS) with four multi-function displays (MFD). Uprated Makila engines with better hot and high performance.
- **H215 (AS 332 L1e/C1e):** This is the latest variant of the Super Puma, which was unveiled in November 2012. It features new avionics, including a four-axis autopilot, from the EC 225 helicopter. Certification was scheduled for 2013.
- **AS 332L2 Super Puma Mk 2 VIP:** Variant equipped with an eight to 15 seat interior, full galley and toilet.
- **Horizon:** Helicopter-borne battlefield surveillance radar fitted in an AS 532UL airframe that can detect ground vehicles, slow moving aircraft and ships. It is a flat-plate radar on retractable mount; extends well below the helicopter in flight to provide 360-deg scan. It is linked to a ground station, which provides information to ground commanders.
- **AS 532A2 Combat Search-and-Rescue (CSAR) Cougar:** Specially equipped Cougar Mk II, deployed by French and Saudi air forces. This version is designed to rescue downed pilots behind enemy lines. Specialized equipment that is deployed on this aircraft includes: rescue hoist, FLIR, GPS , searchlight, night-vision-compatible cockpit, infrared and radar jammers, countermeasure launchers, radar warning receiver, missile approach warner and an encrypted position locator system. Armament includes 20-mm cannon and door-mounted .50 caliber machine guns.
- **Growth Super Puma:** In July of 1998, Eurocopter announced the development of a growth version of its Super Puma transport helicopter, called the Mk III, which was designed to compete with such helicopters as Sikorsky's S-92 . A military version was also planned. It was ultimately scrapped in favor of the EC 225/EC 725 , due to high development costs.
- **H225M Caracal/EC 725:** The H225M completed its first flight in November 2000. The H225M is based on the proven

fuselage and structural design of the Cougar Mk 2 with a new five-bladed main rotor and reinforced main gearbox. The helicopter also has a suite of integrated displays and piloting system. The H225M can carry a much higher military payload (24,692 lb), at a faster speed (150-170 kts) and a longer distance (800 nm) than its predecessors. Based on the 1990 nomenclature adjustment, the H225 Puma is the civil version of this latest variant. See separate record for more details.

System

Alternative Designation: AS 332L1 Super Puma; AS 532UL Cougar

Type: Multi-Role Helicopter

Crew: 2 (pilot, co-pilot)

Passengers: 20

Number of Engines: ea2

Number of Hard Points: INA

Dimensions

Length: 16.29 m

Height: 4.92 m

Main Rotor Diameter: 15.60 m

Disc Area: 191.1 sq m

Cabin Length: 6.81 m

Cabin Width: 1.80 m

Cabin Height: 1.55 m

Cabin Volume: 13.3 cu m

Empty Weight: 4,265 kg

Maximum Takeoff Weight, with Internal Load: 9,000 kg

Maximum Takeoff Weight, With Sling Load: 9,350 kg

Internal Load Weight: 3,000 kg

Automotive

Engine Name: 2 x Turbomeca Makila 1A

Engine Type: Turboshaft

Engine Power: 1,780 shaft hp each

Fuel Capacity: 2,060 liters

Climb Rate: 426 m/min

Cruise Speed: 251 kph

Hovering Ceiling, in Ground Effect: 2,800 m

Hovering Ceiling, Out of Ground Effect: 1,650 m

Range, with Internal Tanks: 871 km

Range, with External Tanks: 1,260 km

Main Gun System

Note: mix of air-to-surface missiles, 20-mm; or 7.62-mm gun pods, 7.62-mm door guns, and rocket pods; - or -2 x ASW torpedoes; or 2 x AM 39 Exocet missiles; or up to 6 AS15TT anti-ship missiles

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: INA

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

AS 332L1 Super Puma/AS 532UL Cougar Long fuselage version of the AS 332 Super Puma. Civil version can carry 20 passengers in an airline interior. Military version can carry up to 25 troops and is equipped with IR suppressors, radar warning receiver, chaff dispensers, flare launchers and armored protection for the crew and passengers. It can also be equipped for VIP missions and search-and-rescue operations.

SA-321 Super Frelon (Super Hornet) French Multi-Role Helicopter





Tiers:



Variants:

- **SA 321G:** Anti-submarine warfare version for the French Navy, it was powered by three Turbomeca IIIC-6 turboshaft engines; 26 built.
- **SA 321Ga:** Utility and assault transport helicopter for the French Navy.
- **SA 321GM:** Export version for Libya, fitted with Omera ORB-32WAS radar.
- **SA 321H:** Export version for Iraq, it was powered by three Turbomeca Turmo IIIE turboshaft engines, fitted with Omera ORB-31D search radar, and armed with Exocet anti-ship missiles.
- **SA 321F:** Commercial airline helicopter, powered by three Turbomeca IIIC-3 turboshaft engines, with accommodation for 34 to 37 passengers.
- **SA 321J:** Commercial transport helicopter and accommodation for 27 passengers.
- **SA 321Ja:** Improved version of the SA 321J.
- **SA 321K:** Military transport version for Israel.
- **SA 321L:** Military transport version for South Africa, fitted with air inlet filters.
- **SA 321M:** Search and rescue, utility transport helicopter for Libya.
- **Changhe Z-8:** Chinese built version with three Changzhou Lan Xiang WZ6 turboshaft engines.
- **Changhe Z-8A:** Army transport.
- **Changhe Z-8F:** Chinese built version with Pratt & Whitney Canada PT6B-67A turboshaft engines.
- **Changhe Z-8AEW:** Chinese AEW helicopter with retractable radar antenna, AESA radar, 360 degree coverage, redesigned nose similar to the AC313, and FLIR.
- **Changhe Z-8L:** Chinese variant with enlarged fuel sponsons, first spotted in January 2019

System

Alternative Designation: SA 321 Super Frelon; Super Hornet
Capabilities: Anti-Submarine Warfare; Anti-ship; Commercial Market; Search and Rescue; Reconnaissance; Special Forces
Type: Chinese Multi-Role Helicopter
Manufacturer: Sud Aviation Aérospatiale
In Service: 1966-Present
Crew: ea3
Passenger Capacity: It can accommodate 27 fully armed troops or 15 medical stretchers.
Blades, Main Rotor: 6
Blades, Tail Rotor: ea5
Number of Engines: ea3
Day/Night Capable: Yes

All Weather Capable: Yes

Hoist and Basket for SAR: Available

Hoist and Winch: Available, 275kg hoist and winch

Number of Hard Points: ea2

Dimensions

Fuselage Length: m20.27

Fuselage Width (with pontoon): m5.2

Width of Cargo bay (at the floor): m1.90

Height of Cargo Bay: m1.83

Weight,Empty: kg6,865

Weight, MTOW: kg13,000

Main Rotor Diameter: m18.9

Tail Rotor Diameter: m4

Whole Cabin Volume: 28.9m3

Main Rotor Disc: 280.48m2

Tail Rotor Disc: 12.57m2

Maximum Payload Capacity: 4,000kg

Maximum Payload Capacity with Sling Loads: 5,000kg

Automotive

Engine Name: 3 x Turbomeca Turmu IIIC Turboshaft Engines

Number of Engines: ea3

Engine Type: Turboshaft

Engine Power: 1,570 hr each engine

Maximum Range: km1,020

Speed, Maximum: km/h275

Ceiling: m3,150

Rate of Climb: 401 meters per min

Vertical Climb Rate: 6.66 m/s

Main Rotor Blade: Six-Bladed

Tail Rotor Blade: Five-Bladed

Fuel Capacity: 3,900 liters

Fuel Capacity, Internal Aux: 1,900 liters

Endurance: 4 hours

Landing Gear: non-retractable tricycle type landing gear comprising two wheels and low air pressure shock absorbers.

Communications

Radio: INA

Wing Mounted Weapons

Note: The helicopter can accommodate rockets and gun pods on the external pylons for anti-piracy missions.

↳*Missile System (Option 1)*

Name: YJ-8 (CSS-N-4 Sardine)

Type: Surface-launched subsonic anti-ship cruise missile.

Manufactuer: China Aerospace Science and Industry Corporation

In Service: 1980s-Present

Length: m5.81

Width: INA

Weight: kg815

Warhead Type: High-explosive fragmentation

Warhead Weight: kg165

Engine: Rocket

Propellant: Solid Rocket

Operational Range: km42

Flight Altitude: m5-7

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: ea2

↳*Missile System (Option 2)*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Subsonic anti-ship cruise missile

Manufacturer: China Aerospace Science and Industry Corporation

In Service: 1998-Present

Length: INA

Diameter: INA

Warhead Type: High-explosive fragmentation

Warhead Weight: kg190

Operational Range: km180

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: ea2

↳***Torpedo***

Name: A244S Torpedo

Type: Fire and Forget Torpedo

Length: m2.75

Diameter: mm324

Muzzle Velocity: INA

Effective Firing Range: km13.5

Maximum Firing Range: 6 km for Mod. 1, 13.5 km for Mod. 3

Filling: high explosive STANAG 4439 and MURAT-2 compliant

Detonation Mechanism: Various

Note: The Torpedo can be launched from surface vessels or from aircraft, and locates the target by means of an acoustic seeker.

Fire Control

Fire Control System Type: INA

Fire Control Radar: Bar-shape Array

Digital or Analog Cockpit: INA

Direct Fire Control: INA

Laser Designator: INA

Sensor Suite(s) Available: Yes

Position Location System: Yes

ASW Radar: Yes

Dipping Sonar: Yes, HS-12 dipping sonar

FLIR: Yes

Searchlight: Yes

Sonobuoys: Available

Note: The Helicopter can carry anti-submarine and Anti-ship torpedoes externally

Protection

Fuselage: INA

Cockpit Glass: Ballistic

Stealth Properties: No

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The Aérospatiale (formerly Sud Aviation) SA 321 Super Frelon ("Super Hornet") is a three-engined heavy transport helicopter produced by aerospace manufacturer Sud Aviation (later Aérospatiale) of France. It held the distinction of being the most powerful helicopter to be built in Europe at one point, as well as being the world's fastest helicopter. The Super Frelon was a more powerful development of the original SE.3200 Frelon, which had failed to enter production. On 7 December 1962, the first prototype conducted the type's maiden flight. On 23 July 1963, a modified Super Frelon flew a record-breaking flight, setting the new FAI absolute helicopter world speed record with a recorded speed of 217.7 mph (350.4 km/h). Both civilian and military versions of the Super Frelon were produced; the type was predominantly sold to military customers. In 1981, Aerospatiale, Sud Aviation's successor company, chose to terminate production due to a lack of orders. The Super Frelon was most heavily used by naval air arms, such as the French Navy and the People's Liberation Army Naval Air Force. On 30 April 2010, the type was retired by the French Navy, having been replaced by a pair of Eurocopter EC225 helicopters as a stopgap measure pending the availability of the NHIndustries NH90 helicopter. The Super Frelon was in use for an extended period within China, where it was manufactured under license and sold by the Harbin Aircraft Industry Group as the Harbin Z-8. A modernised derivative of the Z-8, marketed as the Avicopter AC313, performed its first flight on 18 March 2010. The Aérospatiale SA 321 Super Frelon is a large, heavy-lift single-rotor helicopter, furnished with a relatively atypical three-engine configuration; these are Turboméca Turmo IIIC turboshaft engines set on top of the fuselage, a pair of turbines positioned side by side at the front and one located aft of the main rotor. The naval anti-submarine and anti-ship variants are usually equipped with navigation and search radar (ORB-42), and a 50-metre rescue cable. They are most often fitted with a 20 mm cannon, countermeasures, night vision, a laser designator and a Personal Locator System. The Super Frelon can also be fitted for inflight refueling. The front engines have simple individual ram intakes, while the rear one is fitted with a semi-circular scoop to provide air; all three bifurcated exhausts are near to the rotor head. The three engines and the reduction gearbox are mounted on a horizontal bulkhead and firewall which forms the roof of the cabin and upper structural member of the fuselage. The engines are isolated by multiple firewalls, including transverse firewalls separating front and rear engines from the rotor gearbox, and zonal engine firewalls. Eight sturdy hinged doors provide access to the compact Turmo engines, which have ample space around them to enable ground crew to service them without using external platforms. The fuselage is actually a hull, which makes use of a semi-monocoque light alloy construction; according to aerospace publication Flight International, the hull design was "reminiscent of flying-boat engineering". The main cabin lacks any transverse bracing, except for a single bulkhead between the cockpit and cabin. Substantial built-up frames connect the strengthened roof structure with the floor/planing-bottom of transverse under-floor bulkheads and outer skin. A conventional exterior skin is used, employing longitudinal stiffeners as well as two lines of deep channel members, while the under-floor cross members are reinforced with vertical stiffeners. There is no keel, at the floor level there are horizontal members between frames which are stiffened by transverse shear angles. Flexible fuel cells are stored in four watertight under-floor compartments lying fore and aft of the rotor axis, while the floor itself is fitted with removable panels. A hatch set into the floor, positioned approximately underneath the rotor axis, is used for sling-load operations. At the rear of the cabin is a tapered section of simple semi-monocoque construction, which is closed by a robust hinged rear loading ramp, which serves as the main entrance for bulky loads or equipment. The loading ramp is jettisonable in emergency situations. Additionally, there is a sliding door located on the forward starboard side, while a small hinged emergency door is set on the aft port side. The tail boom uses conventional semi-monocoque construction, supported by closely spaced notched channel-section frames and continuous stringers, absent of any major longitudinal sections or longerons. The cranked section carrying the tail rotor and trim plane is more robust, strengthened by a solid-web spar, frames, and stiffeners. The juncture of the main boom and cranked section is hinged in order to reduce the rotorcraft's folded length to 58 ft. Along the top of the boom, the shaft for the tail rotor is covered by a fairing. The fixed landing gear has twin wheels on each of the three vertical shock absorber-equipped struts. The main leading gear units are mounted on triangulated tubular structures, while the nose gear is bracketed to the cockpit bulkhead via a watertight seal in the planing bottom. The main wheels have hydraulic brakes operated from the pedals, complete with a parking hand brake, while the nose unit is fully castoring. The nose, which is covered by large glazed panels, has a bow chine and planing bottom built as a unit with the flight deck, which is higher than the main cabin floor

→→Light Helicopter

OH-1 Japanese Light Scout and Observation Helicopter





Tiers:



Variants:

- **AH-2:** Proposed attack helicopter derivative that would have featured uprated engines and additional anti-tank armaments; rejected in favour of Boeing AH-64 Apache.
- **UH-X utility helicopter:** Technology developed by Kawasaki for the OH-1 is being integrated into a new aircraft design, the UH-X , in order to "reduce technological risks associated with development and appropriately control life cycle costs," according to the company. The new aircraft is expected by 2017, according to a Shephard Media release dated May 29, 2012. Kawasaki has proposed a new cabin, transmission, avionics and engines for the utility version, including a new control system, rotor hub and enhanced rotor-blade transmission protection. In fiscal year 2006, Tokyo began funding development of a more powerful engine (with a goal of 1,300 shp). More than 120 helicopters are needed to meet the JGSDF requirement for a utility helicopter. Fuji Heavy Industries was selected as prime contractor for the UH-X helicopter program in July 2015. The aircraft will be based on the Bell 412 twin-engine utility helicopter.

System

Alternative Designation: Kawasaki OH-1 Japanese Light Scout and Observation Helicopter
Type: Attack Helicopter
Primary Function: Reconnaissance missions, Ground attack and Close-Air Support
Manufacturer: Kawasaki
Crew: ea2
Blades, Main Rotor: ea4
Number of Engines: ea2
Main rotor diameter: m11.6
Main rotor area: ft1138
Tail Rotor, Name: Fenestron (fantail) tail rotor
Blades, Tail Rotor: ea8-18
Number of Hard Points: Hardpoints: 4 × pylons for rockets, gun pods, anti-tank missiles, or Type 91 air-to-air missiles
Note #1:: Each crew member has two LCD colour multi-function displays, and the gunner has a head-up display. The mission avionics include a trainable roof-mounted Kawasaki package (forward of the main rotor) with a Fujitsu thermal imager, NEC colour TV camera and NEC laser rangefinder. Protection is enhanced by the installation of an infra-red jammer on the helicopter's spine to rear of the main gearbox.

Dimensions

Length: m12

Width: INA

Main Rotor Diameter: m11.6

Weight, Combat: kg3550

Weight, Empty: kg2500

Weight, Gross: kg4000

Height: m3.8

Automotive

Engine Name: 2 x Mitsubishi TS1-M-10

Engine Type: Turboshaft

Engine Power: hp888

Cruising Range: km550

Speed, Maximum: km/h306

Speed, Average: INA

Maximum Altitude: m5000

Main Gun System

Hardpoints: Hardpoints: 4 × pylons for rockets, gun pods, anti-tank missiles, or Type 91 air-to-air missiles

Missile Weapon Systems

↳*Missile System #1*

Name: Toshiba Type 91 short-range air-to-air missiles, anti-tank missiles

Type: Air to Air and Anti-tank Missiles

Length: m1.43

Weight: kg11.5

Diameter: mm80

Engine: Solid Rocket Motor Mach 1.9

Guidance System: Infrared homing

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Digital or Analog Cockpit: Digital Cockpit

Direct Fire Control: INA

Laser Designator: INA

Protection

Add on Armor: Cockpit is fitted with armor protection

Stealth Properties: INA

Heat Signature Reduction: INA

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Kawasaki OH-1 (nickname: "Ninja") is a military scout/observation helicopter developed and manufactured by the Kawasaki Aerospace Company. The primary operator is the Japan Ground Self-Defense Force (JGSDF), who originally procured the OH-1 as a domestically-produced successor to their existing OH-6D Loach fleet. The OH-1 has the distinction of being the first helicopter to be entirely produced in Japan. In addition to its use an observation helicopter, it can also be armed with various munitions to directly participate in combat; such weapons include a limited quantity of anti-tank missiles or air-to-air missiles for self-defense purposes. Several variants of the OH-1 have been proposed, these have included derivatives of the type to serve as an attack helicopter as well as an aborted project to develop utility helicopter based on OH-1. As of March 2014, a total of 38 OH-1s have entered service with the JGSDF, so far these have complemented the existing OH-6Ds rather than replace them.

BO-105 German Light Utility Helicopter







Tiers:



Variants:

- **Bo 105A:** First production model primarily for civil use and equipped with two Allison 250-C18 turbine engines.
- **Bo 105ATH:** Anti-tank version for the Spanish Army.
- **Bo 105C:** Initial version. Developed in 1972 and equipped with two Allison 250-C20 turbines engines.
- **Bo 105CB:** Light observation, utility transport version. Developed in 1976 and equipped with two Allison 250-C20B turbine engines of which 30 were delivered to The Royal Netherlands Air Force.[
- **Bo 105CBS:** Utility transport version, with the fuselage stretched by 10 inches and an extra window for emergency medical service duties
- **EC-Super Five:** High performance version of the Bo 105CBS.
- **Bo 105CBS-5:** Also known as Superfive, with increased lifting capabilities similar to the LS A3 Superlifter
- **Bo 105D:** UK certified offshore version.
- **Bo 105GSH:** Armed scout version for the Spanish Army.
- **Bo 105HGH:** A high speed research variant wint aerodynamic refinements, such as a rotor head fairing, rear fuselage fairing, small individual skids and 6 m (20 ft) long fixed auxiliary wings.
- **Bo 105 KLH:** license-produced combat version of CBS-5 custom-fitted with Korean mission equipment package including communication, navigation, electronic warfare and target acquisition system, to meet Republic of Korea Army's operational requirements. KLH also has greatly improved rotor blade and transmission system. 12 are in service.
- **Bo 105LOH:** Observation version for the Spanish Army.
- **Bo 105LS A1:** Developed in 1984 with stretched fuselage and two Allison 250-C28C turbine engines.
- **Bo 105LS A3:** Developed in 1986 with maximum take-off weight increased to 2,600 kg.
- **Bo 105LS A3 "Superlifter":** Developed in 1995 with maximum mission weight increased to 2,850 kg.
- **Bo 105M:** With its army designation "VBH" (Verbindungshubschrauber; 'liaison chopper'), is a light transport and surveillance helicopter
- **Bo 105MSS:** Maritime version, fitted a search radar.
- **Bo 105P/BSH:** Proposed escort version for the German Army, armed with Stinger air-to-air missiles.
- **Bo 105P/PAH-1:** With its army designation "PAH-1" and "PAH-1A1" for the upgraded version (PAH=Panzerabwehrhubschrauber; 'Tank-defence helicopter'), is an anti-tank helicopter armed with wire-guided HOT ATGMs (HOT2 for the upgraded A1 version).
- **Bo 105P/PAH-1A1:** Improved anti-tank version for the German Army, fitted with six HOT missile tubes.[
- **Bo 105P/PAH-1 Phase 2:** Proposed night attack version for the German Army
- **Bo 105S:** Search and rescue version.
- **Bo 105/Ophelia:** Test and trials aircraft fitted with a mast-mounted sight.
- **NBO-105:** Were Manufactured by IPTN under license from MBB (now Airbus Helicopters) 1976–2011; only rotors and transmission now supplied by Germany; originally NBO-105 CB, but stretched NBO-105 CBS available from 101st

aircraft onwards. 122 were produced, Dirgantara Indonesia stopped production in 2008.

- **Bo 105 Executaire:** Boeing Vertol and Carson Helicopters manufactured a 24.5 cm stretched version of the Bo 105 under license as the Executaire in an attempt to break into the U.S. light helicopter market, but sales were dismal.
- **Bo 105E-4:** 12 German Army Bo 105P upgraded and overhauled for a 10 million euro contract and donated to Albania first batch delivered in 2006, the helicopters have better performance and avionics. The conversion of other Bo 105 helicopters from the German Armed Forces is also under consideration with a view to future sales.
- **Bo 106:** Widened cabin to seat 7 instead of 5. First flight was on 26 September 1973. A single helicopter of that variant has been made (registration D-HDCI, serial no. 84). The Bo 106 was also equipped with more powerful Allison 250 C 20B engines. In 1981, the German air rescue organization Deutsche Rettungsflugwacht/DRF Luftrettung bought that prototype and had it rebuilt into a 105 CB-2 with a standard cabin. It flew for DRF until November 1993 under the registration D-HCCC, but in 1994 it was put aside to gain spare parts for another DRF helicopter (Bo 105 CBS-S, registration D-HNNN, serial number 662).
- **PADC Hummingbird:** An unlicensed development of the Bo 105C with revised cockpit structure.

System

Alternative Designation: B0-105, MBB BO 105, Messerschmitt-Bölkow-Blohm Bo 105

Primary Function: light, twin-engine, multi-purpose helicopter

Manufacturer: Messerschmitt-Bölkow-Blohm (MBB)

In Service: 1970-Present

Crew: ea1 or 2

Passengers: ea4-5

Blades, Main Rotor: 4

Blades, Tail Rotor: ea2

Number of Engines: ea2

Day/Night Capable: Yes

All Weather Capable: Yes

Takeoff or Landing Limitations: INA

Number of Hard Points: INA

Skids: The main body rests on a pair of skids (with optional flotation skids for seagoing helicopters).

Note: The rotor system is entirely hingeless, the rotor head consisting of a solid titanium block to which the four blades are bolted;

Dimensions

Length: m11.6

Width: m2.53

Height: m3.00

Rotor Diameter: m9.84

Tailrotor Diameter: m1.90

Weight, Empty: kg1,433 kg

Weight, Takeoff: kg2,500 kg

Weight, Sling Load: kg1,200 kg

Automotive

Engine Name: 2 x Allison 250-C 20B Turbine

Engine Type: Turbine

Engine Power: hp400

RPM: 424

Cruising Range: km528

Speed, Maximum: km/h243

Speed, Cruise: km/h204

Ceiling: 5,180 m

Fuel Capacity: 570 liters

Hover Ceiling IGE: 1,829 m

Hover Ceiling OGE: 1,158 m

Climb Rate: 7.4 m/sec

Endurance: 3 hr 30 min (standard fuel, maximum payload)

Airfoil: NACA 23012

Communications

Radio: Various depending on country and mission

Wing Mounted Weapons

↳*Missile System*

Name: HOT (missile)

Type: High Subsonic, Optical, Remote-Guided, Tube-Launched ATGM Missile

Manufacturer: Euromissile (now MBDA)

In Service: 1977-Present

Variants: HOT 1, HOT 2, HOT 3

Length: m1.30

Diameter: m0.15

Weight: kg24.5

Wingspan: m0.31

Basic Load: ea6

Warhead Type: Tandem charge HEAT

Engine: Two-stage solid fuel rocket

Operational Range: m75-4,300

Speed: 864 km/h

Guidance System: SACLOS

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: Analog

Direct Fire Control: INA

Laser Designator: INA

Automated Helmet: INA

Sensor Suite(s) Available: Yes

Position Location System: Yes

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: Available

NBC Protection: Yes

EW: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Messerschmitt-Bölkow-Blohm Bo 105 is a light, twin-engine, multi-purpose helicopter developed by Bölkow of Ottobrunn, West Germany. It was the first light twin-engine helicopter in the world, and the first rotorcraft that could perform aerobatic maneuvers such as inverted loops.[5][6] The Bo 105 features a revolutionary hingeless rotor system, at that time a pioneering innovation in helicopters when it was introduced into service in 1970. Production of the Bo 105 began at the then-recently merged Messerschmitt-Bölkow-Blohm (MBB). The BO105 is considered a rugged, time-proven design. It is easily maintained in the field and is highly maneuverable in flight due to a unique hingeless main rotor system. The compact cabin has a flat floor, rear clamshell doors and provides excellent visibility for the pilot. The main production facilities for producing the Bo 105 were located in Germany and Canada; due to the level of export sales encountered, additional manufacturing lines were set up in Spain, Indonesia, and the Philippines.[7] MBB became a part of Eurocopter in 1991, who continued production of the type until 2001. The Bo 105 was formally replaced in Eurocopter's product range by the newer Eurocopter EC135, which was itself a development of the Bo 105.

SA-341/342 Gazelle French Light Utility Helicopter







Tiers:



Variants:

- **SA 341H:** Can carry 4x AT-3 ATGMs, and 2x SA-7, or 128-mm or 57-mm rockets, and 7.62-mm machinegun in cabin.
- **SA 341H:** Export variant.
- **SA 342L:** Export light attack variant with Astazou XIVM engine.
- **SA 342L:** Export light attack variant with either rocket pods or Machine guns.
- **SA 342K:** Armed antitank version with 4-6x HOT ATGMs and 7.62- mm MG. Missile Weight (kg): 32 (in tube). Warhead: Tandem shaped Charge. Armor Penetration (mm CE): 1250. Maximum Range (m): 75/4,000. Rate of fire (missiles/min): 3-4, depending on range.
- **SA 342M:** Armed version with 4 x HOT ATGMs, 2x Mistral AAM, 7.62-mm MG.
- **SA 341 GAZELLE:** Developed by Aerospatiale in France. Others were built in the UK by Westland, and in Yugoslavia.
- **SA 341F:** Production version for French Army. A GIAT M.621 20-mm cannon is installed on right side of some aircraft. Rate of fire is either 300 or 740 rpm. Upgraded engine to Astazou IIIC.
- **SA 342K:** Armed SA 341F with Upgraded 870-shp Astazou XIVH engine, mostly exported to the Middle East
- **SA 342M:** Improved ground attack variant for French Army, with 4-6 HOT ATGMs, possibly fitted with Mistral air- to-air missiles. Similar to SA 342L, but with improved instrument panel, engine exhaust baffles to reduce IR signature, navigational systems, Doppler radar, and other night flying equipment. Fitted with Viviane FCS with thermal sight for night attack. This the Hybrid Threat Tier 1 baseline light helicopter.
- **SA 341B/C/D/E:** Production versions for British military. Used in communications and training and roles

System

Alternative Designation : SA 341 Gazelle
Crew : ea1 or 2 (pilots)
Type: Light Utility Helicopter
Manufacturer: AEROSPATIALE, WESTLAND
Role: real time air to air defense, overall defense operations against enemy helicopters and slow-moving aircraft.
In Service: 1973-Present
Crew: ea1 or 2

Transports: 3 troops or 1 litter, or cargo.

Main Rotor, Blades : ea3.0

Tail Rotor, Blades: 13 (fenestron enclosed in tail)

Similar Aircraft: Alouette II, Alouette III, Scout/Wasp, OH-13 Sioux, Dauphin 2

Day/Night Flying: Yes

↳***Dimensions***

Length, with Rotors Turning: m11.9

Length, Fuselage: m9.5

Rotor Diameter: m10.5

Tail Rotor Diameter: m0.7

Height: m3.1

Weight: m2.0

Length, Cargo Compartment: m2.2

Width, Cargo Compartment: m1.3

Height, Cargo Compartment: m1.2

Standard Payload, Internal Load: kg750

Standard Payload, External on Sling Only: kg700

Standard Transport Payload: Transports 3 troops or 1 litter, or cargo

Weight, Maximum Gross: kg1,800

Weight, Normal Takeoff: kg1,800

Weight, Empty: kg998

Automotive

Engine Name: 1x Turbomeca Astazou IIIB turboshaft

Engine Type: Turboshaft

Engine Power: hp590

Fuel, Internal: 445 Liters

Fuel, Internal Aux Tank: 90 Liters

Fuel, Additional Internal Aux Tank: 200 Liters

Speed, Maximum: km/h310

Speed, Cruise: km/h270

Range, Normal Load: km710

Service Ceiling: m4,100

Ceiling, Hover out of ground effect: m2,000

Ceiling, Hover in ground effect: m2,850

Vertical Climb: m/s12.2

Communication

Radio: INA

Wing Mounted Weapon System

Additional Armament that can be Equipped: Weapon & Armament Types 1 - 7.62-mm MG or 1 - 20-mm GIAT M.621 cannon [100 rounds] or 2 - 7.62-mm AA-52 FN MG pods [1,000 rounds] 2 - 2.75-in rocket pods (7 ea.) 2 - 68-mm SNEB rocket pods (12 ea) 2 - 57-mm rockets (18 ea.) 4-6 - HOT ATGM 4 - AT-3 SAGGER ATGM 2-4 - AS-11 ASM, or AS-12 ASM 2 - SA-7 GRAIL AAM 2 - MISTRAL AAM

↳*Main Weapon System*

Name: M621 Cannon

Type: 20 mm automatic cannon

Manufacturer: Nexter Systems

In Service: INA-Present

Length: mm2,207

Width: mm202

Height: mm245

Weight: kg45.5

Action: Blowback Operated

Rate of Fire: rds/min800

Feed System: Open-link M12 belt

↳*Ammunition*

Type: Rifle

Caliber: mm20

Cartridge: 20×102mm

Muzzle Velocity: 1,005 m/s (3,297 ft/s) (AP-T) 985 m/s (3,231.6 ft/s) (HEI and TP)

Basic Load: INA

Fire Control and Avionics

Fire Control System: INA

Fire Control Radar: INA

Laser Designator: INA

NVG Compatible: Yes

Autopilot: Yes

Navigation Computer: Yes

Protection

Armor: INA

Stealth Properties: No

IR Signature Suppressor: Yes, IR signature suppressor on engine exhaust.

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Aérospatiale Gazelle (company designations SA 340, SA 341 and SA 342) is a French five-seat helicopter, commonly used for light transport, scouting and light attack duties. It is powered by a single Turbomeca Astazou turbine engine and was the first helicopter to feature a fenestron tail instead of a conventional tail rotor. It was designed by Sud Aviation, later Aérospatiale, and manufactured in France and the United Kingdom through a joint production agreement with Westland Aircraft. Further manufacturing under license was performed by SOKO in Yugoslavia and the Arab British Helicopter Company (ABHCO) in Egypt. Since being introduced to service in 1973, the Gazelle has been procured and operated by a number of export customers. It has also participated in numerous conflicts around the world, including by Syria during the 1982 Lebanon War, by Rwanda during the Rwandan Civil War in the 1990s, and by numerous participants on both sides of the 1991 Gulf War. In French service, the Gazelle has been supplemented as an attack helicopter by the larger Eurocopter Tiger, but remains in use primarily as a scout helicopter.

Mi-2 (Hoplite) Russian Small Transport Helicopter







Tiers:



Variants:

- **Mi-2B:** Upgrade with improved navigation and electrical systems
- **Mi-2R:** Ambulance version that carries 4x litter patients
- **Mi-2T:** Transport version that carries 8 personnel.
- **Mi-2URN:** Armed reconnaissance variant, employs 57-mm unguided rockets, and mounts a gun sight in the cockpit for aiming all weapons.
- **Mi-2URP:** The antitank variant. Carries 4x AT-3C Sagger ATGMs on external weapons racks, and 4x additional missiles in the cargo compartment.
- **Mi-2US:** The gunship variant, employs an airframe modification that mounts a 23-mm NS-23KM cannon to the portside fuselage. It also employs 2x 7.62-mm gun pods on external racks, and 2x 7.62-mm pintle-mounted machineguns in the cabin.
- **PZL Swidnik:** A Polish-produced variant under license from Russia. It features minor design changes, but same performance, characteristics, and missions. Polish MOD officials will upgrade the gunship version with a new ATGM. Likely choice is between the Israeli 6 km FOG-M Spike-ER missile, and the 4 km HOT-3. The 4-missile launcher will also have a thermal night sight.

System

Alternative Designations: Mi-2 (Hoplite)

Crew: ea1 (pilot)

Engines: 2x 400-shp PZL GTD-350 (series III and IV) turboshaft

Max “G” Force: INA

Vertical Climb Rate (m/s): m/s4.5

↳*Blades*

Main rotor: ea3

Tail rotor: ea2

↳*Weight*

Maximum Gross: kg3,700

Normal Takeoff: kg3,550

Empty: kg2,372

↳*Speed*

Max (level): km/h220

Cruise: km/h194

Sideward: INA

Rearward: INA

↳*Ceiling*

Service: m4,000

Hover (out of ground effect): m1,000

Hover (in ground effect): m2,000

↳*Fuel*

Internal: liters600

External Fuel Tank: liters238

↳*Range*

Max Load: km170

Internal Fuel Load: km440

With Aux Fuel: km790

↳*Dimensions*

Main Rotor Diameter: m14.6

Tail Rotor Diameter: m2.7

Length (rotors turning): m17.4

Length (fuselage): m11.9

Width: m3.2

Height: m3.7

↳*SURVIVABILITY/COUNTERMEASURES*

Description: Main and tail rotor blades electrically deiced.

↳*ARMAMENT*

Description: The Lynx employed by ground forces can be equipped with two 20-mm cannons mounted externally to permit 7.62-mm machineguns to be fired from the cabin. Two fuselage pylons allow for external stores.

↳*AVIONICS/SENSOR/OPTICS*

Description: The cannon is pilot sighted, and fire is adjusted by controlling attitude of the aircraft.

↳*NIGHT/WEATHER CAPABILITIES*

Description: The Mi-2 is primarily a daylight only aircraft.

Notes:

The Mil Mi-2 (NATO reporting name Hoplite) is a small, lightly armed turbine-powered transport helicopter that could also provide close air support when armed with 57 mm rockets and a 23 mm cannon. The Mi-2 was produced exclusively in Poland, in the WSK "PZL-Świdnik" factory in Świdnik. The first production helicopter in the Soviet Union was the Mil Mi-1, modelled along the lines of the S-51 and Bristol Sycamore and flown by Mikhail Mil's bureau in September 1948. During the 1950s it became evident, and confirmed by American and French development, that helicopters could be greatly improved with turbine engines. S. P. Isotov developed the GTD-350 engine and Mil used two of these in the far superior Mi-2. The twin shaft-turbine engines used in the Mi-2 develop 40% more power than the Mi-1's piston engines, for barely half the engine weight, with the result that the payload was more than doubled. The Mi-2 fuselage was extensively altered from its predecessor, with the engines mounted overhead. However, the external dimensions remained similar. The Mil-built prototype first flew in the Soviet Union on 22 September 1961, after the initial development the project was transferred to Poland in 1964. The first Świdnik-built example flew on 4 November 1965 (making this the only Soviet-designed helicopter to be built solely outside the Soviet Union). PZL-Świdnik produced a total of 5,497 helicopters, about a third for military users. The factory also developed fiberglass rotor blades, and developed the wide-body Mi-2M seating 10 passengers instead of eight. Most typical role-change kits include four stretchers for air ambulance usage, or aerospraying or cropdusting applications. In Poland, several specialized military variants were also developed for support or reconnaissance roles, with 23 mm autocannon, machine guns and/or two 57 mm rocket pods, four 9K11 Malyutka anti-tank missiles or Strela-2 AA missiles. The Mi-2 was first introduced into the Soviet Air Force in 1965. The Mi-2 is used by mainly former Soviet and Eastern Bloc countries, although it was also purchased by Mexico and Myanmar armed forces. Most of the armed Mi-2 variants were used by Poland. Some were also used by the former East Germany (with machine gun and unguided rocket armament only). North Korea still maintains a large active fleet of Mi-2s.

MD 530F Cayuse Warrior American Scout Attack Helicopter







Tiers:



Parent:

MD 500 Defender American Light Multi-Role Helicopter

Variants:

- **500D Scout Defender:** Armed reconnaissance version
- **500M Defender:** Military export version of the 500 and 500C, built under license by Kawasaki in Japan (as the OH-6J)[7] and Breda Nardi in Italy.
- **500M/ASW Defender:** Export version for the Spanish Navy.
- **NH-500M Defender:** Italian-built version of the 500M Defender. Licensed by Breda Nardi before merge with Agusta.
- **500MD Defender:** Military version of the 500D. Korean Air's aerospace division from 1976 to 1984 with 200 choppers made. 50 were armed with TOW anti-tank missiles and 150 choppers used for transportation and support duties.
- **500MD/ASW Defender:** Maritime version of the 500MD Defender.
- **500MD/TOW Defender:** Anti-tank version of the 500MD Defender, armed with TOW anti-tank missiles.
- **500MD/MMS-TOW Defender:** Anti-tank version, fitted with a mast-mounted sight, armed with TOW anti-tank missiles.
- **500MD Quiet Advanced Scout Defender:** Fitted with noise suppression equipment.
- **500MD Defender II:** Improved version.
- **500MG Defender:** Military version of the 500E.
- **520MG Defender:** Philippine military version. Special Forces version. Modified 500MG Defender that carry .50 caliber machine guns and 7-tube rocket pods and operates as a light attack aircraft.
- **520MK Black Tiger:** South Korean-built military version, built by Korean Air Aerospace Division[
- **530MG Defender:** Military version of the 530F.
- **MD530 Nightfox:** Night attack version.
- **MD530MG Paramilitary Defender:** Police or border patrol version.
- **MD540F:** Upgraded MD530F, incorporating a 6-bladed, fully articulated rotor blade system made of composite material, a more rugged landing skid for heavier take-off and landing weights, a fully integrated digital glass cockpit with multi-function color displays and a pilot Helmet Display and Tracking System (HDTS), which couples together a targeting FLIR and laser designator.
- **MD530G:** Designed based on the MD 530F airframe and is engineered with advanced technology to deliver enhanced combat capabilities.

System

Alternative Designation: MD530 Cayuse Warrior

Type: Light multi-role military helicopter

Manufacturer: Hughes Helicopters McDonnell Douglas Helicopter Systems MD Helicopters

In Service: 2011-Present

Crew: ea2 (pilot, co-pilot)

Passengers: + 6 troops

Blades, Main Rotor: five-blade main rotor, many with four-blade anti-torque rotor

Blades, Tail Rotor: ea2

Number of Engines: ea1

Day/Night Capable: Yes, depending on additional equipment added

All Weather Capable: Yes, depending on additional equipment added

Takeoff or Landing Limitations: INA

Number of Hard Points: ea2

Landing Skid: The parallel-skid landing gear has internal oleo-pneumatic shock absorbers

Dimensions

Length, Main Rotor Blade to Tail Rotor: m9.78

Length, Nose to Tail: m7.28

Rotor Diameter: m8.34

Rotor Diameter: m8.1

Height: m2.62

Width, Skid to Skid: m1.97

Width, Fuselage: m1.40

Width, Tail: m1.66

Weight: kg72

Weight, Maximum Takeoff: kg1,406

Weight, Maximum Takeoff with External Load: kg1,701

Weight, Useful Load: kg684

Automotive

Engine Name: 1 x 1 x Rolls-Royce 250-C30

Engine Type: INA

Engine Power: hp425

Maximum Range, at Sea Level: 381 km

Maximum Range, at 5,000 feet: 430 km

Fuel Capacity: 242 liters

Speed, Never-Exceed: 282 km/h

Speed, Cruise (At Sea Level): 248 km/h

Speed, Cruise (At 5,000 feet): 249 km/h

Speed, Economical: 219 km/h

Climb Rate: 631 m/min

Ceiling: 5,700 m

Maximum Operating Altitude: 6,096 m

Hover, In Ground Effect: 4,877 m

Hover, Outof Ground Effect: 4,389 m

Endurance: 2.2 hours

Internal Fuel Tanks: 240 liters

Optional Aux Tank: 80 liters

Communications

Radio: Rhode & Schwarz M3AR tactical radio system

Transmitter/Receiver: Honeywell KY196 transmitter/receiver and KT76 transponder or a Rockwell Collins VHF-251 and TDR-950 transceiver and responder

Antennas: Aviatech tactical communication antennas

Wing Mounted Weapons

Note: There is a variety of different types of Armament that can be equipped on the MD 500. Examples include the following: Armament * four TOW anti-tank missiles, or * two 7.62mm General Electric M134 Miniguns plus ammunition, or * four General Dynamics Stinger air-to-air missile, or * Mk 44 or Mk 46 lightweight torpedoes (ASW Version), or * two seven-shot rocket pods * .50-cal machine-gun pods, or * 7- or 12-tube 2.75-in rocket pods, or * 40-mm grenade launcher

↳*.50 Caliber Machine Gun Pod*

Name: FN® HMP400 Pod

Type: .50-caliber machine gun Pod

Manufacturer: FN America

In Service: INA

Length: mm1,941

Barrel Length: INA

Height: mm434.3

Weight, Empty: kg89.4

Weight, Loaded: kg138.3

Rate of Fire: 950 - 1,100 RPM

Speed: .75 Mach capability

Note: Pod is capable of emergency jettison from the aircraft

↳*Ammunition*

Type: Rifle
Caliber: mm12.7
Cartridge: .50 BMG (12.7×99mm NATO)
Muzzle Velocity: m/s890
Basic Load: Customer Specified, FN pod featuring a 400-round ammo box and links and cases collector

↳*Rocket System*

Name: Hydra 70 Rocket
Type: 2.75-inch (70 mm) diameter fin-stabilized unguided rocket
Purpose: Air-to-Ground Rocket
Length: mm1,060
Diameter: mm70
Muzzle Velocity: m/s700
Effective Firing Range: m8,000
Maximum Firing Range: m10,500
Speed: m/s739
Guidance System: Unguided

Fire Control

Fire Control System Type: INA
Fire Control Radar: INA
Digital or Analog Cockpit: Analog
Direction Finder: Honeywell KR-85 automatic direction finder
Laser Designator: INA
Navigation System: Honeywell dual KX175 navigation system
Night-Flying Capable: Yes, night-flying lighting
Position Location System: Yes
Gyroscope: Attitude and directional gyroscopes
Rate-Climb Indicator.: Yes
Sighting: Dillon Aero mission configurable aircraft system and fixed forward sighting system

Protection

Armor Type: Kinetic Defense ballistic armor panels
Crew Cabin: The crew cabin features a glazed nose for maximum forward visibility.
Stealth Properties: No
Heat Signature Reduction: INA

Add on Armor: INA
NBC Protection: Yes
EW: INA
EW Counter Measures/CCM: INA
Counter Measures (Chaff/Flares): INA

Notes:

An evolution of the fabled OH-6 Cayuse light observation helicopter and known for speed, safety, agility and the ability to operate with ease in confined spaces, the Armed MD530F Light Scout Attack Helicopter delivers increased operational capabilities, greater mission versatility and superior performance in the execution of a broad range of mission profiles. Upgraded MD530F, incorporating a 6-bladed, fully articulated rotor blade system made of composite material, a more rugged landing skid for heavier take-off and landing weights, a fully integrated digital glass cockpit with multi-function color displays and a pilot Helmet Display and Tracking System (HDTS), which couples together a targeting FLIR and laser designator

SA-342L Gazelle French Light Attack Helicopter







Tiers:



Variants:

- **SA 341H:** Can carry 4x AT-3 ATGMs, and 2x SA-7, or 128-mm or 57-mm rockets, and 7.62-mm machinegun in cabin.
- **SA 341H:** Export variant.
- **SA 342L:** Export light attack variant with Astazou XIVM engine.
- **SA 342L:** Export light attack variant with either rocket pods or Machine guns.
- **SA 342K:** Armed antitank version with 4-6x HOT ATGMs and 7.62- mm MG. Missile Weight (kg): 32 (in tube). Warhead: Tandem shaped Charge. Armor Penetration (mm CE): 1250. Maximum Range (m): 75/4,000. Rate of fire (missiles/min): 3-4, depending on range.
- **SA 342M:** Armed version with 4 x HOT ATGMs, 2x Mistral AAM, 7.62-mm MG.
- **SA 341 GAZELLE:** Developed by Aerospatiale in France. Others were built in the UK by Westland, and in Yugoslavia.
- **SA 341F:** Production version for French Army. A GIAT M.621 20-mm cannon is installed on right side of some aircraft. Rate of fire is either 300 or 740 rpm. Upgraded engine to Astazou IIIC.
- **SA 342K:** Armed SA 341F with Upgraded 870-shp Astazou XIVH engine, mostly exported to the Middle East
- **SA 342M:** Improved ground attack variant for French Army, with 4-6 HOT ATGMs, possibly fitted with Mistral air- to-air missiles. Similar to SA 342L, but with improved instrument panel, engine exhaust baffles to reduce IR signature, navigational systems, Doppler radar, and other night flying equipment. Fitted with Viviane FCS with thermal sight for night attack. This the Hybrid Threat Tier 1 baseline light helicopter.
- **SA 341B/C/D/E:** Production versions for British military. Used in communications and training and roles

System

Alternative Designation : SA 341 Gazelle
Crew : ea1 or 2 (pilots)
Type: Light Attack Helicopter
Manufacturer: AEROSPATIALE, WESTLAND
Role: real time air to air defense, overall defense operations against enemy helicopters and slow-moving aircraft.
In Service: 1973-Present
Crew: ea1 or 2

Transports: 3 troops or 1 litter, or cargo or 4 Passengers

Main Rotor, Blades : ea3.0

Tail Rotor, Blades: 13 (fenestron enclosed in tail)

Similar Aircraft: Alouette II, Alouette III, Scout/Wasp, OH-13 Sioux, Dauphin 2

Day/Night Flying: Yes

↳*Dimensions*

Length, with Rotors Turning: m11.9

Length, Fuselage: m9.5

Rotor Diameter: m10.5

Disc Area: 86.59 m sq

Tail Rotor Diameter: m0.7

Height: m3.1

Weight: m2.0

Length, Cargo Compartment: m2.2

Width, Cargo Compartment: m1.3

Height, Cargo Compartment: m1.2

Weight, Maximum Take off: kg2,000

Weight, Payload: kg700

Weight, Empty: kg997

Automotive

Engine Name: 1 x Turbomeca Astazou IIIB turboshaft

Engine Type: Turboshaft

Engine Power: hp858

Fuel, Internal: 545 Liters

Fuel, Internal Aux Tank: 90 Liters

Fuel, Additional Internal Aux Tank: 200 Liters

Speed, Maximum: km/h260

Speed, Economical: km/h232

Range, At Sea Level (Internal Fuel Tank): km710

Range, at 4,000 feet (Aux Fuel Tank): km1,091

Climb Rate: 468 meters per minute

Ceiling: m4,100

Hover IGE ISA: 3,040 m

Hover OGE ISA: 2,370 m

Communication

Radio: INA

Wing Mounted Weapon System

Additional Armament that can be Equipped: Weapon & Armament Types 4 x AS11; or 2 x AS12; or 4 x HOT anti-tank missiles; or Rocket pods; or Gun pods; or Mistral air-to-air missiles

↳*Main Weapon System*

Name: M621 Cannon

Type: 20 mm automatic cannon

Manufacturer: Nexter Systems

In Service: INA-Present

Length: mm2,207

Width: mm202

Height: mm245

Weight: kg45.5

Action: Blowback Operated

Rate of Fire: rds/min800

Feed System: Open-link M12 belt

↳*Ammunition*

Type: Rifle

Caliber: mm20

Cartridge: 20×102mm

Muzzle Velocity: 1,005 m/s (3,297 ft/s) (AP-T) 985 m/s (3,231.6 ft/s) (HEI and TP)

Basic Load: INA

↳*Missile System*

Name: Mistral (Missile)

Type: Infrared Homing Missile

Manufacturer: MBDA (France)

In Service: 1988-Present

Length: m1.86

Diameter: mm90

Effective Firing Range: km6

Warhead Type: High Explosive with high density tungsten balls

Warhead Weight: kg2.95

Detonation Mechanism: Laser proximity or impact triggered

Engine: Solid Rocket Motor

Speed: m/s800

Guidance System: Infrared Homing

Fire Control and Avionics

Fire Control System: Available

Fire Control Radar: INA

Laser Designator: Available

NVG Compatible: Yes

Autopilot: Yes

Navigation Computer: Yes

Sight: Roof-mounted stabilized sight available

DCM: Radar warning receiver available

FLIR: Available

Protection

Armor: INA

Stealth Properties: No

IR Signature Suppressor: Yes, IR signature suppressor on engine exhaust.

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The SA-342L is a export light attack variant of the SA-341/342 Gazelle. The Eurocopter/Aerospatiale SA 341/342 Gazelle is a French built light utility helicopter which was first flown in 1967. Military missions include attack, antitank, anti helicopter, reconnaissance, utility, transport, and training. The three-blade main rotor is mounted on top of the fuselage at the rear of the cabin. The single turboshaft engine, mounted on top of the fuselage and to the rear of the rotor shaft, features a prominent, upturned exhaust. The teardrop-shaped fuselage has a round, glassed-in cockpit and landing skids. The tapering tail boom mid-mounted on the fuselage has a swept-back tail fin which is tapered with a square tip and rectangular flats with small fins. The fan rotor housing is built into the lower tail.

MD 500 Defender American Light Multi-Role Helicopter





Tiers:



Variants:

- **500D Scout Defender:** Armed reconnaissance version
- **500M Defender:** Military export version of the 500 and 500C, built under license by Kawasaki in Japan (as the OH-6J)[7] and Breda Nardi in Italy.
- **500M/ASW Defender:** Export version for the Spanish Navy.
- **NH-500M Defender:** Italian-built version of the 500M Defender. Licensed by Breda Nardi before merge with Agusta.
- **500MD Defender:** Military version of the 500D. Korean Air's aerospace division from 1976 to 1984 with 200 choppers made. 50 were armed with TOW anti-tank missiles and 150 choppers used for transportation and support duties.
- **500MD/ASW Defender:** Maritime version of the 500MD Defender.
- **500MD/TOW Defender:** Anti-tank version of the 500MD Defender, armed with TOW anti-tank missiles.
- **500MD/MMS-TOW Defender:** Anti-tank version, fitted with a mast-mounted sight, armed with TOW anti-tank missiles.
- **500MD Quiet Advanced Scout Defender:** Fitted with noise suppression equipment.
- **500MD Defender II:** Improved version.
- **500MG Defender:** Military version of the 500E.
- **520MG Defender:** Philippine military version. Special Forces version. Modified 500MG Defender that carry .50 caliber machine guns and 7-tube rocket pods and operates as a light attack aircraft.
- **520MK Black Tiger:** South Korean-built military version, built by Korean Air Aerospace Division[
- **530MG Defender:** Military version of the 530F.
- **MD530 Nightfox:** Night attack version.
- **MD530MG Paramilitary Defender:** Police or border patrol version.
- **MD540F:** Upgraded MD530F, incorporating a 6-bladed, fully articulated rotor blade system made of composite material, a more rugged landing skid for heavier take-off and landing weights, a fully integrated digital glass cockpit with multi-function color displays and a pilot Helmet Display and Tracking System (HDTS), which couples together a targeting FLIR and laser designator.
- **MD530G:** Designed based on the MD 530F airframe and is engineered with advanced technology to deliver enhanced combat capabilities.

System

Alternative Designation: MD 500 Defender; 500MD Defender
Type: Light multi-role military helicopter
Manufacturer: Hughes Helicopters McDonnell Douglas Helicopter Systems MD Helicopters

In Service: 1976-Present

Crew: ea2 (pilot, co-pilot)

Passengers: + 6 troops

Blades, Main Rotor: five-blade main rotor, many with four-blade anti-torque rotor

Blades, Tail Rotor: ea2

Number of Engines: ea1

Day/Night Capable: Yes, depending on additional equipment added

All Weather Capable: Yes, depending on additional equipment added

Takeoff or Landing Limitations: INA

Number of Hard Points: ea2

Landing Skid: The parallel-skid landing gear has internal oleo-pneumatic shock absorbers

Dimensions

Length, Main Rotor Blade to Tail Rotor: m9.40

Length, Nose to Tail: m7.28

Rotor Diameter: m8.1

Height: m2.66

Width, Skid to Skid: m1.90

Width, Fuselage: m1.40

Width, Tail: m1.70

Automotive

Engine Name: 1 x Rolls-Royce 250-C20R

Engine Type: INA

Engine Power: hp450

Maximum Range, at Sea Level: 478 km

Maximum Range, at 5,000 feet: 537 km

Fuel Capacity: 242 liters

Speed, Never-Exceed: 282 km/h

Speed, Cruise (At Sea Level): 249 km/h

Speed, Cruise (At 5,000 feet): 246 km/h

Speed, Economical: 222 km/h

Climb Rate: 540 m/min

Ceiling: 4,230 m

Maximum Operating Altitude: 4,877 m

Hover, In Ground Effect: 2,590 m

Hover, Outof Ground Effect: 1,830 m

Endurance: 2.8 hours

Internal Fuel Tanks: 240 liters

Optional Aux Tank: 80 liters

Communications

Radio: Rockwell Collins VHF-251/231 navigation receiver

Transmitter/Receiver: Honeywell KY196 transmitter/receiver and KT76 transponder or a Rockwell Collins VHF-251 and TDR-950 transceiver and responder

Wing Mounted Weapons

Note: There is a variety of different types of Armament that can be equipped on the MD 500. Examples include the following: Armament * four TOW anti-tank missiles, or * two 7.62mm General Electric M134 Miniguns plus ammunition, or * four General Dynamics Stinger air-to-air missile, or * Mk 44 or Mk 46 lightweight torpedoes (ASW Version), or * two seven-shot rocket pods * .50-cal machine-gun pods, or * 7- or 12-tube 2.75-in rocket pods, or * 40-mm grenade launcher

↳*MiniGun*

Name: M134 Minigun

Type: 7.62×51mm NATO six-barrel rotary machine gun

Combat Load: 2 X M134 Miniguns

Manufacturer: General Electric, Dillon Aero, Garwood Industries, Profense

In Service: 1962-Present

Proliferation: Widely Proliferated

Length: mm801.6

Barrel Length: mm558.8

Weight: 39 kg

Barrels: ea6

Action: Electrically driven rotary breech

Rate of Fire: 2,000–6,000 rpm

Maximum Firing Range: m1,000

Feed System: Disintegrating M13 linked belt or linkless feed; dependent on installation [500-5,000-round belt]

Sights: Dependent on installation; no fixed sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×51mm NATO

Muzzle Velocity: m/s853

Basic Load: INA

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: Analog

Direction Finder: Honeywell KR-85 automatic direction finder

Laser Designator: INA

Navigation System: Honeywell dual KX175 navigation system

Night-Flying Capable: Yes, night-flying lighting

Position Location System: Yes

Gyroscope: Attitude and directional gyroscopes

Rate-Climb Indicator.: Yes

Protection

Armor Type: INA

Crew Cabin: The crew cabin features a glazed nose for maximum forward visibility.

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The McDonnell Douglas Helicopter Systems MD 500 Defender is a light multi-role military helicopter based on the MD 500 light utility helicopter and OH-6 Cayuse Light Observation Helicopter. The Defender 500 foreign military sales helicopter is offered with either a four- or five-blade main rotor, depending on the model, with a weapons platform mounted on the lower rear body. This light utility commercial helicopter could seat five passengers in comfort, and is used mainly by the military, being very flexible and offering good all round capabilities. Other missions include: direct air support, antitank, reconnaissance, observation, and light utility. A single engine is mounted inside the body with air intakes on top of the cabin and a black hole exhaust. The fuselage is teardrop-shaped a features a round, glassed-in cockpit and landing skids. External stores are mounted on weapons racks on each side of the fuselage. Each rack has one hardpoint. The tail fin is boomerang-shaped, swept-back, and tapered. The tail flats are back-tapered with small fins attached to the tips, with the flats high-mounted on the fin forming a T. The rotor is mounted on the lower left of the tail boom. The successful Hughes 500/MD 500 series began life in response to a U.S. Army requirement for a Light Observation Helicopter (LOH). Hughes' Model 369 won the contest against competition from Bell and Hiller. The subsequent OH-6 Cayuse first flew in February 1963. The 500 series design features shock-absorbing landing skid struts, a turboshaft engine mounted at a 45-degree angle toward the rear of the cabin pod, a fuel tank cell under the floor and the battery in the nose. The engine exhaust port is located at the end of the cabin pod underneath the tailboom. It has a short-diameter main rotor system and a short tail, giving it agile control response and is less susceptible to weather-cocking. Hughes won the U.S. Army's LOH contest with its OH-6 helicopter by submitting a very low and aggressive price per airframe (without an engine). Due to rising prices, the U.S. Army later re-opened the contest, where Hughes offered the machine at a more realistic price, but was undercut by the redesigned Bell OH-58 Kiowa (military JetRanger). OH-6 helicopters were still ordered by the U.S. Army, though at a much reduced number. Prior to the OH-6's first flight, Hughes announced it was developing a civil version, to be marketed as the Hughes 500, available in basic five- and seven-seat configurations.[3] A utility version with a more powerful engine was offered as the 500U (later called the 500C). The improved Hughes 500D became the primary model in 1976, with a more powerful engine, a T-tail, and a new five-blade main rotor; a four-blade tail rotor was optional. The 500D was replaced by the 500E from 1982 with a pointed nose and various interior improvements, such as

greater head- and legroom. The 530F was a more powerful version of the 500E optimized for hot and high work. McDonnell Douglas acquired Hughes Helicopters in January 1984, and from August 1985 the 500E and 530F were built as the MD 500E and MD 530F Lifter. Following the 1997 Boeing-McDonnell Douglas merger, Boeing sold the former MD civil helicopter lines to MD Helicopters in early 1999. Military variants are marketed under the MD 500 Defender name.

→→Utility Helicopter

AS565 Dauphin French Medium Utility Helicopter





Tiers:



Variants:

- **SA 365 C:** A twin-engined version of the Dauphin, designated as the Dauphin 2, was announced in early 1973. The first prototype's first flight took place on 24 January 1975; production model deliveries began in December 1978. In comparison with the earlier model, the SA 365 C featured twin 470 kW (630 shp) Arriel 1 turboshafts in a new engine fairing, a Starflex main rotor hub and a higher maximum take-off weight (3,400 kg (7,496 lb) or 7,495 lb). Its Fenestron anti-torque device featured 13 metal blades. Production of both the SA 360 and SA 365 C ceased in 1981, by which time approximately 40 SA 360s and 50 SA 365 C/C1s had been built; both were replaced by the SA 365 N.
- **SA 365 C1:** Variant powered by Arriel 1A1 certified in March 1979.
- **SA 365 C2:** Variant powered by Arriel 1A2 certified in February 1980.
- **SA 365 C3:** Variant powered by Arriel 1C certified in January 1982.
- **SA 365 N:** A much improved version of the SA 365 C Dauphin 2, the first prototype flying on 31 March 1979. This version introduced the uprated 492 kW (660 shp) Arriel 1C turboshafts, a retractable tricycle undercarriage, enlarged tail surfaces, and revised transmission, main rotor, rotor mast fairing and engine cowlings. The aircraft's initial M.T.O.W. of 3,850 kg (8,490 lb) was later raised to 4,000 kg (8,800 lb). Deliveries of the production model began in 1982.
- **SA 365 N1:** Incorporating many of the improvements developed for the SA 366 G1 (HH-65 Dolphin), this version introduced upgraded 526 kW (705 shp) Arriel 1C1 turboshafts, an improved 11-blade Fenestron with wider-chord blades (which reduced the AS365 N1's noise signature), movable undercarriage doors replaced by simplified fairings and a higher gross weight of 4,100 kg (9,000 lb).
- **AS 365 N2:** This version – designated AS365 N2 from the outset – introduced the upgraded 549 kW (737 shp) Arriel 1C2 turboshafts, an uprated gearbox, increased maximum take-off weight of 4,250 kg (9,370 lb), redesigned cabin doors and revised interior, enlarged tail fin with all composite Fenestron. Deliveries of this version started in 1990. Licensed versions were assembled in China as the Z-9, Z-19 and AVIC AC312.
- **AS365 N3:** The high-performance AS365 N3 was developed for operations in 'hot and high' climates, and introduced 635 kW (851 shp) Arriel 2C turboshafts equipped with a single channel DECU (Digital Engine Control Unit) with manual reversion, mated to an uprated main transmission for better single engine performance. The AS365 N3 also features a redesigned ten blade composite Fenestron anti-torque device with asymmetric blade distribution, offering a further reduction in noise signature. The AS365 N3's gross weight is 4,300 kg (9,500 lb). Production deliveries began in December 1998.
- **AS365 N3+:** This version was presented at the 2009 Paris Air Show and differs mainly in new avionics including 4-axis auto-pilot This version is currently still in production.
- **AS365 N4:** Produced as the EC155.
- **AS365 X:** Better known as the DGV 200 or Dauphin Grand Vitesse (High Speed Dauphin), the AS365 X was developed

from the X-380 DTP (Developpement Technique Probatoire or Probatory Technical Development) testbed, first flown on 20 March 1989. The aircraft was first flown in the AS365 X configuration two years later in March 1991, and featured a smaller Fenestron, a new main rotor with five high-inertia blades with swept tips, a composite rotor hub/mast and 624 kW (837 shp) Turbomeca Arriel IX turboshafts. On 19 November 1991, this aircraft set a Class E1e (3,000 to 4,500 kg) speed record of 201 knots (372 km/h; 231 mph) over a 3 km (1.9 mi) triangular course.

- **EC155 B/B1:** This version was originally to follow the N3 as the AS365 N4, and was announced at the 1997 Paris Airshow before being redesignated as the EC155 B. As with the N3 version, it has two Arriel 2C/2C2 turboshafts equipped with FADEC as well as a five blade Spheriflex main rotor (derived from the AS365 X DGV). It also features a 30% larger main cabin (achieved with bulged doors and cabin plugs). The first flight of the first prototype took place on 17 June 1997 and this version is currently in production (as the EC155 B1).
- **SA 366 G1 Dauphin:** The SA 366 G1 Dauphin version was selected by the US Coast Guard (USCG) in 1979 as its new air-sea rescue helicopter and given the designation HH-65A Dolphin. In total 99 helicopters, optimized for the USCG's short-range recovery (SRR) search and rescue role, were initially acquired, with additional aircraft later procured.
- **SA 365 N Dauphin:** A much improved version of the SA 365 C Dauphin 2, the first prototype flying on 31 March 1979. This version introduced the upgraded 492 kW (660 shp) Arriel 1C turbo-shafts, a retractable tricycle undercarriage, enlarged tail surfaces, and revised transmission, main rotor, rotor mast fairing and engine cowlings. The aircraft's initial M.T.O.W. of 3,850 kg (8,490 lb) was later raised to 4,000 kg (8,800 lb). Deliveries of the production model began in 1982.
- **SA 365 F Dauphin:** The SA 365 F is a variant of the SA 365 N for the French Navy. It has been used since 1991 for general duties and for backup purposes aboard an aircraft carrier. A helicopter with rescue divers is always in the air during flight operations to be able to assist the pilot in case of an accident. First experiments were successfully carried out in 1990 on board the Clemenceau. The variant 365F is used since 1999 with Flottille 35F called AS365F Dauphin Pedro.
- **AS365 N3 Dauphin:** The high-performance AS365 N3 was developed for operations in 'hot and high' climates, and introduced 635 kW (851 shp) Arriel 2C turbo-shafts equipped with a single channel DECU (Digital Engine Control Unit) with manual reversion, mated to an upgraded main transmission for better single engine performance. The AS365 N3 also features a redesigned ten blade composite Fenestron anti-torque device with asymmetric blade distribution, offering a further reduction in noise signature. The AS365 N3's gross weight is 4,300 kg (9,500 lb). Production deliveries began in December 1998.
- **AS365 N3+:** This version was presented by Eurocopter at the 2009 Paris Air Show and differs mainly in new avionics including 4-axis auto-pilot

System

Alternative Designation: AS365 Dauphin; The Eurocopter (now Airbus Helicopters) AS365 Dauphin (Dolphin), also formerly known as the Aérospatiale SA 365 Dauphin 2.

Type: Medium Utility Helicopter

Manufacturer: Aérospatiale Eurocopter Airbus Helicopters

Crew: 2 (pilot, co-pilot)

Blades, Main Rotor: ea4

Blades, Tail Rotor: INA

Number of Engines: ea2

Number of Hard Points: INA

Dimensions

Length, Rotors Turning: 13.74 m

Fuselage Length: 12.11 m

Rotor Diameter: 11.94 m

Disc Area: 112 sq m

Height: 3.50 m

Empty Weight: 2,249 kg

Sling Load Weight: 1,600 kg

Maximum Takeoff Weight: 4,100 kg

Automotive

Engine Name: 2 x Turbomeca Arriel

Engine Type: Turboshaft

Engine Power: 650 shaft hp each

Internal Fuel Capacity: 1,135 liters

Cruise Speed: 285 kph

Economical Speed: 259 kph

Ceiling: 6,000 m

Hovering Ceiling in Ground Effect: 2,150 m

Hovering Ceiling out of Ground Effect: 1,200 m

Maximum Range with Internal Fuel: 865 km

Maximum Range with Auxiliary Fuel Tanks: 1,067 km

Main Gun System

Note: 20-mm or 7.62-mm General-Purpose Machine Guns.

Missile Weapon Systems

↳*Missile System #1*

Name: AS15TT Anti-Ship Missile

Type: Anti-Ship Missile

Length: 2.30 m

Diameter: 190 mm

Wingspan: 0.56 m

Warhead: 30 kg derived from OP3C APHE

Fuze: impact

Weight: 98 kg

Maximum Range: 15 km

Maximum Speed: 1,007 kph

Guidance System: SACLOS by Thomson-CSF Agrion 15 chin-mounted I/J-band radar

Basic Load: INA

Anti-Tank Guided Missile System

Name: HOT

Type: Air-to-Ground Anti-Tank Missile

Length: 1.27 m

Diameter, Launcher: 175 mm

Diameter, Missile: 136 mm

Launcher Weight: 23.5 kg

Launcher and Missile Weight: 32.0 kg

Warhead Weight: 5.0 kg

Warhead: Octol hollow-charge high-explosive anti-tank or multi-purpose penetration of rolled homogeneous armor (RHA). Penetrates up to 47 in (1,200 mm) of armor.

Engine: 1 x two-stage solid-propellant rocket; Bugeat booster with a burn of 0.9 sec; Epictete sustainer, 53 lb (24 kg) static thrust with a burn of 17.4 sec

Maximum Speed: Mach 0.74

Maximum Range: 4,000 m

Minimum Range: 400 m

Flight Time to 2,000 m: 9 sec

Flight Time to 3,000 m: 13 sec

Flight Time to 4,000 m: 17 sec

Guidance System: SACLOS wire-guided

Tracking System: optical or IR tracking of target; IR tracking of missile.

Basic Load: INA

Fire Control and Avionics

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: No

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The Eurocopter (now Airbus Helicopters) AS365 Dauphin (Dolphin), also formerly known as the Aérospatiale SA 365 Dauphin 2, is a medium-weight multipurpose twin-engine helicopter produced by Airbus Helicopters. It was originally developed and manufactured by French firm Aérospatiale, which was merged into the multinational Eurocopter company during the 1990s. Since entering production in 1975, the type has been in continuous production for more than 40 years. The intended successor to the Dauphin is the Airbus Helicopters H160, which is yet to enter operational service as of January 2020. The Dauphin 2 shares many similarities with the Aérospatiale SA 360, a commercially unsuccessful single-engine helicopter; however the twin-engine Dauphin 2 did meet with customer demand and has been operated by a wide variety of civil and military operators. Since the type's introduction in the 1970s, several major variations and specialised versions of the Dauphin 2 have been developed and entered production, including the military-oriented Eurocopter Panther, the air-sea rescue HH/MH-65 Dolphin, the Chinese-manufactured Harbin Z-9 and the modernised Eurocopter EC155. The AS365 Dauphin is a twin-engine helicopter

capable of travelling long ranges, and well suited to operating in climates of a high ambient temperature or at locations of significant altitude. The Dauphin is typically powered by a pair of Turbomeca Arriel turboshaft engines; on later variants, these are equipped with FADEC units, which provide additional functionality such as an automated start-up sequence and a training mode. The engines drive the rotorcraft's foldable Starflex main rotor and its Fenestron anti-torque tail rotor via two separate transmissions; these gearboxes are also connected to two separate hydraulic systems as well as a stand-by hydraulic system for emergency use, such as deployment of the landing gear. Electrical power is provided by a pair of starter generators and a cadmium-nickel main battery, an emergency battery is also present. The main fuselage of the rotorcraft comprises the cabin area, a separate luggage compartment, and a retractable tricycle landing gear arrangement; a total of four conventional doors to access the main cabin are typically installed, which can be optionally replaced by a single clamshell air stair entrance instead. Various portions of the rotorcraft are made from composite materials, such as the rotor blades that made of carbon fiber, other materials are used in portions of the fuselage. The fuselage features anti-corrosion protection and is structurally reinforced for an optional hoist or cargo sling to be installed, various other mooring and gripping points are also fitted on the rotocraft's exterior surface. Various types and models of radar can be installed in the Dauphin's nose. The combination of the rotorcraft's Starflex main rotor and Fenestron tail provides a low-noise and low-vibration flight experience for those on board; Airbus Helicopters has claimed the sound emissions of the AS365 N3 to be 3.1 decibels below International Civil Aviation Organization (ICAO) standards, making it the quietest helicopter in its class. The Dauphin can take off under a full load from sea level under Category A conditions. The main cabin area is designed to be reconfigurable, a feature which is promoted to emergency medical service (EMS) and search and rescue (SAR) operators. In a regular passenger transport layout, the cabin can accommodate up to 12 passengers in addition to the two pilots; up to seven passengers can be accommodated in a VIP layout. Access to the cabin is via large sliding doors on either side of the helicopter, built-in boarding steps are typically installed to ease the boarding of passengers. While the cockpit is typically equipped with dual flight controls for two-man operations, the Dauphin can be readily flown by a single pilot while operating under instrument flight rules; this was achieved in part by avionics such as the 4-axis Dual Digital Automatic Flight Control System (older production aircraft use a 3-axis flight control system with integrated autopilot instead) to reduce crew workload. The principal flight control system are connected to a total of 3 dual-chamber primary servo-units for cyclical and collective pitch control, and a single dual-chamber rear servo-unit for tail rotor pitch control.[6] Other major avionics include 10.4-inch multi-mission touch screen displays, weather radar, global positioning system (GPS) receiver, traffic alert and collision avoidance system (TCAS), automatic voice alarm device (AVAD), health and usage monitoring system (HUMS), quick access records for helicopter flight data management, and digital audio communication system (DACS).

AS565 Panther French Medium Utility Helicopter





Tiers:



Variants:

- **SA 365 C:** A twin-engined version of the Dauphin, designated as the Dauphin 2, was announced in early 1973. The first prototype's first flight took place on 24 January 1975; production model deliveries began in December 1978. In comparison with the earlier model, the SA 365 C featured twin 470 kW (630 shp) Arriel 1 turboshafts in a new engine fairing, a Starflex main rotor hub and a higher maximum take-off weight (3,400 kg (7,496 lb) or 7,495 lb). Its Fenestron anti-torque device featured 13 metal blades. Production of both the SA 360 and SA 365 C ceased in 1981, by which time approximately 40 SA 360s and 50 SA 365 C/C1s had been built; both were replaced by the SA 365 N.
- **SA 365 C1:** Variant powered by Arriel 1A1 certified in March 1979.
- **SA 365 C2:** Variant powered by Arriel 1A2 certified in February 1980.
- **SA 365 C3:** Variant powered by Arriel 1C certified in January 1982.
- **SA 365 N:** A much improved version of the SA 365 C Dauphin 2, the first prototype flying on 31 March 1979. This version introduced the uprated 492 kW (660 shp) Arriel 1C turboshafts, a retractable tricycle undercarriage, enlarged tail surfaces, and revised transmission, main rotor, rotor mast fairing and engine cowlings. The aircraft's initial M.T.O.W. of 3,850 kg (8,490 lb) was later raised to 4,000 kg (8,800 lb). Deliveries of the production model began in 1982.
- **SA 365 N1:** Incorporating many of the improvements developed for the SA 366 G1 (HH-65 Dolphin), this version introduced upgraded 526 kW (705 shp) Arriel 1C1 turboshafts, an improved 11-blade Fenestron with wider-chord blades (which reduced the AS365 N1's noise signature), movable undercarriage doors replaced by simplified fairings and a higher gross weight of 4,100 kg (9,000 lb).
- **AS 365 N2:** This version – designated AS365 N2 from the outset – introduced the upgraded 549 kW (737 shp) Arriel 1C2 turboshafts, an uprated gearbox, increased maximum take-off weight of 4,250 kg (9,370 lb), redesigned cabin doors and revised interior, enlarged tail fin with all composite Fenestron. Deliveries of this version started in 1990. Licensed versions were assembled in China as the Z-9, Z-19 and AVIC AC312.
- **AS365 N3:** The high-performance AS365 N3 was developed for operations in 'hot and high' climates, and introduced 635 kW (851 shp) Arriel 2C turboshafts equipped with a single channel DECU (Digital Engine Control Unit) with manual reversion, mated to an uprated main transmission for better single engine performance. The AS365 N3 also features a redesigned ten blade composite Fenestron anti-torque device with asymmetric blade distribution, offering a further reduction in noise signature. The AS365 N3's gross weight is 4,300 kg (9,500 lb). Production deliveries began in December 1998.
- **AS365 N3+:** This version was presented at the 2009 Paris Air Show and differs mainly in new avionics including 4-axis auto-pilot This version is currently still in production.
- **AS365 N4:** Produced as the EC155.
- **AS365 X:** Better known as the DGV 200 or Dauphin Grand Vitesse (High Speed Dauphin), the AS365 X was developed from the X-380 DTP (Developpement Technique Probatoire or Probatory Technical Development) testbed, first flown on 20 March 1989. The aircraft was first flown in the AS365 X configuration two years later in March 1991, and featured a smaller Fenestron, a new main rotor with five high-inertia blades with swept tips, a composite rotor hub/mast and 624 kW (837 shp) Turbomeca Arriel IX turboshafts. On 19 November 1991, this aircraft set a Class E1e (3,000 to 4,500 kg) speed record of 201 knots (372 km/h; 231 mph) over a 3 km (1.9 mi) triangular course.
- **EC155 B/B1:** This version was originally to follow the N3 as the AS365 N4, and was announced at the 1997 Paris Airshow before being redesignated as the EC155 B. As with the N3 version, it has two Arriel 2C/2C2 turboshafts equipped with FADEC as well as a five blade Spheriflex main rotor (derived from the AS365 X DGV). It also features a 30% larger main cabin (achieved with bulged doors and cabin plugs). The first flight of the first prototype took place on 17 June 1997 and this version is currently in production (as the EC155 B1).
- **SA 366 G1 Dauphin:** The SA 366 G1 Dauphin version was selected by the US Coast Guard (USCG) in 1979 as its new air-sea rescue helicopter and given the designation HH-65A Dolphin. In total 99 helicopters, optimized for the USCG's

short-range recovery (SRR) search and rescue role, were initially acquired, with additional aircraft later procured.

- **SA 365 N Dauphin:** A much improved version of the SA 365 C Dauphin 2, the first prototype flying on 31 March 1979. This version introduced the upgraded 492 kW (660 shp) Arriel 1C turbo-shafts, a retractable tricycle undercarriage, enlarged tail surfaces, and revised transmission, main rotor, rotor mast fairing and engine cowlings. The aircraft's initial M.T.O.W. of 3,850 kg (8,490 lb) was later raised to 4,000 kg (8,800 lb). Deliveries of the production model began in 1982.
- **SA 365 F Dauphin:** The SA 365 F is a variant of the SA 365 N for the French Navy. It has been used since 1991 for general duties and for backup purposes aboard an aircraft carrier. A helicopter with rescue divers is always in the air during flight operations to be able to assist the pilot in case of an accident. First experiments were successfully carried out in 1990 on board the Clemenceau. The variant 365F is used since 1999 with Flottille 35F called AS365F Dauphin Pedro.
- **AS365 N3 Dauphin:** The high-performance AS365 N3 was developed for operations in 'hot and high' climates, and introduced 635 kW (851 shp) Arriel 2C turbo-shafts equipped with a single channel DECU (Digital Engine Control Unit) with manual reversion, mated to an upgraded main transmission for better single engine performance. The AS365 N3 also features a redesigned ten blade composite Fenestron anti-torque device with asymmetric blade distribution, offering a further reduction in noise signature. The AS365 N3's gross weight is 4,300 kg (9,500 lb). Production deliveries began in December 1998.
- **AS365 N3+:** This version was presented by Eurocopter at the 2009 Paris Air Show and differs mainly in new avionics including 4-axis auto-pilot

System

Alternative Designation: AS565 Panther
Type: Medium Utility Helicopter
Manufacturer: Aérospatiale Eurocopter Airbus Helicopters
Crew: 2 (pilot, co-pilot)
Blades, Main Rotor: ea4
Blades, Tail Rotor: INA
Number of Engines: ea2
Number of Hard Points: INA

Dimensions

Length, Rotors Turning: 13.74 m
Fuselage Length: 12.11 m
Rotor Diameter: 11.94 m
Disc Area: 112 sq m
Height: 3.50 m
Empty Weight: 2,249 kg
Sling Load Weight: 1,600 kg
Maximum Takeoff Weight: 4,100 kg

Automotive

Engine Name: 2 x Turbomeca Arriel
Engine Type: Turboshaft
Engine Power: 650 shaft hp each
Internal Fuel Capacity: 1,135 liters

Cruise Speed: 285 kph

Economical Speed: 259 kph

Ceiling: 6,000 m

Hovering Ceiling in Ground Effect: 2,150 m

Hovering Ceiling out of Ground Effect: 1,200 m

Maximum Range with Internal Fuel: 865 km

Maximum Range with Auxiliary Fuel Tanks: 1,067 km

Main Gun System

Note: 20-mm or 7.62-mm General-Purpose Machine Guns.

Missile Weapon Systems

↳***Missile System #1***

Name: AS15TT Anti-Ship Missile

Type: Anti-Ship Missile

Length: 2.30 m

Diameter: 190 mm

Wingspan: 0.56 m

Warhead: 30 kg derived from OP3C APHE

Fuze: impact

Weight: 98 kg

Maximum Range: 15 km

Maximum Speed: 1,007 kph

Guidance System: SACLOS by Thomson-CSF Agrion 15 chin-mounted I/J-band radar

Basic Load: INA

Anti-Tank Guided Missile System

Name: HOT-1

Type: Air-to-Ground Anti-Tank Missile

Length: 1.27 m

Diameter, Launcher: 175 mm

Diameter, Missile: 136 mm

Launcher Weight: 23.5 kg

Launcher and Missile Weight: 32.0 kg

Warhead Weight: 5.0 kg

Warhead: Octol hollow-charge high-explosive anti-tank or multi-purpose penetration of rolled homogeneous armor (RHA). Penetrates up to 47 in (1,200 mm) of armor.

Engine: 1 x two-stage solid-propellant rocket; Bugeat booster with a burn of 0.9 sec; Epictete sustainer, 53 lb (24 kg) static thrust with a burn of 17.4 sec

Maximum Speed: Mach 0.74

Maximum Range: 4,000 m

Minimum Range: 400 m

Flight Time to 2,000 m: 9 sec

Flight Time to 3,000 m: 13 sec

Flight Time to 4,000 m: 17 sec

Guidance System: SACLOS wire-guided

Tracking System: optical or IR tracking of target; IR tracking of missile.

Basic Load: INA

Fire Control and Avionics

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: No

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes

Notes:

The Eurocopter (now Airbus Helicopters) AS565 Panther is the military version of the Eurocopter AS365 Dauphin medium-weight multi-purpose twin-engine helicopter. The Panther is used for a wide range of military roles, including combat assault, fire support, anti-submarine warfare, anti-surface warfare, search and rescue, and medical evacuation (MEDEVAC). The AS565 Panther is a twin-engine medium-sized multi-mission rotorcraft. It is capable of performing various naval and land-based missions, such as maritime security, search and rescue (SAR), casualty evacuation (CASEVAC), vertical replenishment, surveillance, special forces operations, anti-submarine warfare (ASW) and Anti-surface warfare (ASuW). The Panther is powered by a pair of Turbomeca Arriel turboshaft engines, which drives the rotorcraft's main rotor as well as the fenestron anti-torque tail rotor device. The flight profile of the Panther has been described as being easy to manoeuver, possessing generous g-force limitations and a high level of stability. In the commando-transport configuration, the Panther may carry up to 10 fully armed soldiers on board at a time in addition to the two pilots flying the aircraft. The main cabin can be rapidly reconfigured to conduct various roles, such as troop-transport, SAR, and MEDIVAC missions; optional equipment includes a full medical suite, forward-looking infrared (FLIR) camera, emergency flotation, loudspeaker, variable-speed hoist, cargo sling, search light, and a stretcher-support structure. Various avionics are present upon the Panther; some variants are fitted with the advanced human-machine interface (HMI) glass cockpit. It features the vehicle and engine multifunction display (VEMD), integrated electronic standby instrument (ESI), usage monitoring system (UMS), traffic collision avoidance system (TCAS), terrain awareness and warning system (H-TAWS), and dedicated mission display coupled with a multi-sensor processor, a 4-axis automatic flight control system (AFCS), flight management system (FMS), and an advanced search radar. The design of the cockpit and avionics systems, such as the engine management system, provides a high level of automation as part of an effort to reduce workload upon the pilots. The cockpit was deliberately designed with extra panel space to accommodate future upgrades and additional instrumentation that may be installed. The principle element of ASW-configured Panthers is the Helicopter Long-Range Active Sonar (HELRAS), a dipping sonar equipped with a descending array of seven projection elements and a receiving array equipped with eight extending arms, which is capable of detecting submarines up to 500 meters below the water's surface. According to Airbus Helicopters, the Panther family has been qualified to operate from the flight decks of over 100 classes of

NATO vessels, and complies with NATO standardization agreements. The compact size of the Panther has enabled the type to be operated from smaller ocean-going vessels such as corvettes. To aid in shipboard landings under rough sea conditions and high winds, some variants can be furnished with the hydraulic Harpoon deck-lock securing device. The Panther can be armed with several different sets of munitions and armaments, dependent upon the intended role. Munitions include 20mm pod-mounted cannons, 68mm rocket pods, a maximum of eight Mistral air-to-air missiles, or a maximum of eight HOT anti-tank missiles; all of which can be mounted onto a universal weapon support beam. The weapon systems are integrated with a Crouzet HDH-2A electronic sight and the autopilot, the latter of which provides automatic flight handling assistance during weapons deployment to avoid negative tendencies such as nose droop. For improved survivability, the radar signature is reduced due to the use of composite materials across the airframe and the use of the fenestron tail rather than a conventional tail rotor; low infrared paints are also typically applied to the exterior surfaces and jet exhaust dilution devices are installed on the engines to reduce the Panther's infrared signature. Damage resistance is increased by the adoption of self-sealing fuel tanks and armor-plated crew seating.

MRH90 Australian Utility Helicopter





Tiers:

1 2 3 4

System

Alternative Designation: MRH90
Type: Utility Helicopter
Role: - Anti-Submarine Warfare (ASW) - Anti-Ship - Transport - Medical Evacuation (MEDEVAC) - Search and Rescue (SAR) - Special Forces
Status: 2016-Present
Crew: ea3
Blades, Main Rotor: 4
Blades, Tail Rotor: ea4
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: Yes

Dimensions

Length: m16.15 m
Main Rotor Diameter: 16.3 m
Height: 5.25 m
Weight, Empty: 6,400 kg
Weight, Combat: 10,600 kg

Automotive

Engine Name: 2 x Rolls-Royce Turbomeca RTM322-01/9
Engine Type: turboshaft engines
Engine Power: developing 2,230 horsepower each
Cruising Range: km800
Speed, Maximum: km/h300

Service Ceiling: 6,000 m

Rate-of-Climb: 480 m/min

Fuel Capcity: 1,900 kg

Main Weapon System

Note: The MRH90 typically only has a door-mounted machine gun for local defense.

Protection

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

For decades the Australian military relied on the ubiquitous Bell UH-1 "Huey" helicopter line and thought (and funding) was finally given to adopt a more modern product - this became the MRH-90 "Taipan" (MRH = "Multi-Role Helicopter") based on the NHIndustries NH90 series. The NH90 serves in the medium-lift role and can undertake many mission types for military and civilian industries. Nearly 250 have been produced (2015) with service seen through the French, Italian and Finnish armies. The helicopter is an original product from NHIndustries (NHI), the helicopter arm of what was once Eurocopter - now falling under the Airbus Helicopters brand label. For the Australian military the Taipan fulfills a utility role and will serve both its Army and Navy forces. An early-batch order in 2005 called for twelve helicopters to replace UH-1 models and a 2006 follow-on order totaled 34 systems to succeed outgoing Sikorsky UH-60 "Black Hawk" and Westland "Sea King" helicopters. The Australian military plans to procure no more than 47 MRH-90s in all with four to be produced in Europe and the remainder in Australia by Airbus Helicopters subsidiary Australian Aerospace of Brisbane. Forty units are set aside for Army use and six are to be used by the Navy. While the original order was for 46 total aircraft, a renegotiated contract of 2013 yielded the Australian government one extra airframe which will be set aside for training duty. The MRH-90 has had a rocky development, forcing revisions as evaluations were being undertaken. Since 2010 the helicopter was repeatedly showing up on the Australian government's "shame list" for its many problems and delayed service entry. While first deliveries came in 2007, final examples will not be on hand until 2016 or 2017 - over ten years since the initial order was placed. For cost reasons, the Army will still be forced to use their Black Hawks until 2018. Initial Operational Capability (IOC) was finally had in 2014 by the Army with the Navy following a year later. The MRH-90 has experience issues with object ingestion in its turboshaft (Rolls-Royce) engines despite the fact that protective screens were in place (the screens were not suitable for the debris available in the Australian landscape). Additionally, windshield cracking was a constant which resulted in a special film being applied for added strength and a new installation procedure being drawn up. In 2010 a single engine failure occurred to an MRH-90 by Adelaide which caused a fleet grounding during the review process (shaft bowing was blamed). A stronger cabin floor was then ordered when it was found that the original lightweight design suffered under the stress of equipment-laden Australian infantry. Beyond other scheduled additions (rappelling equipment, door guns, etc...) it appears that the darkest days of the MRH-90 program are behind it.

AS-532/Cougar European Multirole Helicopter







Tiers:

1 2 **3** 4

Variants:

- **AS-532 Cougar UL/AL Mk I::** This version has an extended fuselage, which allows it to carry 25 troops and more fuel. It is also capable of carrying an external load of 4,500 kg.
- **AS-532 Cougar U2/A2 Mk II::** This 1992 version is the longest variant of the Cougar line. It has an improved Spheriflex rotor system with only 4x tail rotor blades, and 2x 2,100-shp Turbomeca Makila 1A2 turboshaft engines that allow an increased cargo carrying capability. It can transport 29 troops or 12 litters, or an external load of 5,000 kg. Primarily used for combat search and rescue, and as an armed version. It may be armed additionally with a 20-mm cannon or pintle-mounted .50 caliber machine guns.
- **SA 330 Puma::** Developed in the late 1960s by Aerospatiale in France. Others were built in the UK, Indonesia, and Romania.
- **AS 332 Super Puma::** Differs from the SA 330 Puma through an improved rotor system, upgraded engines, stretched fuselage, and a modified nose shape.
- **AS-532 Cougar UC/AC Mk I::** The basic version with a short fuselage to carry 20 troops.

System

Alternative Designation : AS 332 Super Puma, SA 330 Puma

Blades, Main Rotor: 4.0

Crew : ea2 (pilots). Transports: 20-29 troops or 6- 12 litters (variant dependent), or cargo.

↳*Dimensions*

Width : m1.8

↳*Survivability/Countermeasures*

Survivability/Countermeasures: Main and tail rotor blades electrically deiced. A radar warning receiver is standard, while a laser warning receiver, missile launch detector, missile approach detector, infrared jammer, decoy launcher, and flare/chaff dispensers are optionally available.

Armament

Most Probable Armament: The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.

Notes: Mission dictates weapons configuration. Not all will be employed at the same time.

Other Loading Options: 20-mm twin gun pods (2), 68-mm rocket pods (22 each), (2), 2.75-in rocket pods (19 each), (2), External fuel tanks (600 liters).

↳***Weapon 1***

Caliber/Length : mm7.62

Type: Machine Gun

Armaments

Armament: The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role

Avionics/Sensor/Optics

Avionics/Sensor/Optics: The aircraft is NVG compatible, and through its instruments, avionics, full autopilot, and navcomputer, is capable of operation in day, night, and instrument meteorological conditions

Payload

Standard Payload, External : kg4500, on sling only

Standard Payload, Internal : kg3000.0

Performance

Ceiling : m270.0

Ceiling, Service : m4100.0

Vertical Climb Rate : m/s7.0

Notes:

This helicopter is produced by the Eurocopter company. It was formed as a joint venture between Aerospatiale of France, and Daimler-Benz aerospace of Germany. Additional missions include: VIP transport, electronic warfare, and anti-submarine warfare.

→→Transport Helicopter

Mi-17 (Hip H) Russian Medium Transport Helicopter





Tiers:



Variants:

- **List of Variants - See Below:** Mi-8 Hip-A Mi-8 Hip-B Mi-8T Hip-C (Transportny, transport) Mi-8TM Mi-8TV Mi-8S Hip-C (Salon) Mi-8 VIP Mi-8VZPU Hip-D Mi-8TB Hip-E Mi-8TBK Hip-F (Kommercheskiy, commercial) Mi-9 Hip-G Mi-8MPS Mi-8SMV Hip-J Mi-8P/PPA Hip-K Mi-8AMTSh/Mi-171Sh Mi-8AMTSh-V Mi-8AMTSh-VA Mi-8TG Mi-8 Rana Mi-8MTPR-1 Mi-17/Mi-8MT/Mi-8MTV/Mi-17V Hip-H Mi-17P Mi-17PI Mi-17PG Mi-17Z-II Mi-17MD Mi-17KF Mi-171 Mi-171M/Mi-171A2 Mi-17M/Mi-171V Mi-172 Mi-8MTV (Visotnii, high altitude) Mi-17 Pratap Mi-17-1VA Mi-17V5 Mi-171E Mi-171E2

System

Alternative Designation: Mi-17; Mil Mi-17; Hip H
Manufactuer: Kazan Helicopter Plant Ulan-Ude Aviation Plant
Primary Function: Armed assault-transport
Type: Medium twin-turbine transport helicopter
In Service: 1975-Present
Crew: ea3 (2x pilots, 1x flight engineer)
Blades, Main Rotor: 5
Blades, Tail Rotor: ea3
Day/Night Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
All Weather Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
Takeoff or Landing Limitations: INA

Vertical Climb Rate: m/s9

Number of Hard Points: ea4

Standard Payload: HIP C: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Landing Gear: Fixed main gear struts run down and out from attachment points on the upper, rear fuselage. A second strut holds the wheel well away from the lower fuselage. The two-wheel nose gear is fitted under the fuselage just behind the cockpit

Dimensions

Length, with Rotors Turning: m25.2

Length, Fuelage: m18.2

Width: m2.5

Height: m5.65

Main Rotor Diameter: m21.3

Tail Rotor Diameter: m3.9

Cargo Compartment, Length: m5.3

Cargo Compartment, Width: m2.3

Cargo Compartment, Height: m1.8

Weight, Maximum Gross: kg13,000

Weight, Normal Takeoff: kg11,100

Weight, Empty: kg7,489

Automotive

Engine Name: 2 x TV3-117VM

Engine Type: Medium twin-turbine

Engine Power: hp1,900

Speed, Maximum: km/h250

Speed, Average: km/h240

Service Ceiling: m4,500

Range, Maximum Load: km350

Range, Normal Load: km460

Range, with Auxilery Fuel: km950

Fuel, Internal: 445 liters

Fuel, Internal Aux Tank: 915 liters ea

Fuel, External Fuel Tank: 45 liters in port tank, 680 liters in starboard tank

Service Ceiling, Service: m6,000

Service Ceiling,Hover (out of ground effect): m800

Service Ceiling,Hover (in ground effect): m1,900

Vertical Climb Rate: m/s9

Standard Payload: HIP H: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Communications

Radio: INA

Door Mounted Gun

Note: Loaded combat troops can fire personal weapons through windows from inside cabin.

Wing Mounted Weapons

Additional Armament that can be equipped on the Mi-8T: 2 - 7.62-mm or 1x 12.7-mm MG 4-6 - AT-2C Swatter or AT-3 Sagger ATGMs 4-6 - 57-mm rocket pods (16 each) 2 - 80-mm rocket pods (20 each) 4 - 250-kg bombs 2 - 500-kg bombs 2 - 12.7-mm MG pod 2 - Twin 23-mm gun pods 1,830 liters Additional fuel tanks

↳*Rocket System*

Name: UB-32 (rocket pod)

Type: 57 mm, reusable, 32-salvo rocket pod

Length, Launcher: mm2,080

Diameter, Launcher: mm464

Basic Load for the UB-32 Rocket Pod: ea4, one on each hardpoint

Number of Rockets in each UB-32 Rocket Pod: ea32

↳*Rocket*

Name: S-5 Rockets

Type: Rocket

Length, Rocket: mm2,080

Diameter, Rocket: mm481

Weight Empty: kg103

Weight Loaded: kg264

Warhead Types: produced in a variety of sub-types with different warheads, including HEAT anti-armour (S-5K), high-explosive fragmentation (S-5M/MO), smoke, and incendiary rounds

Maximum Effective Range: 3-4 km depending on the warhead and fuze

Basic Load: 32 S-5 Rockets per UB-32 Rocket Pod

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Weather Radar: Type 8A-813

Navigation: DISS-32-90 Doppler navigation under tailboom

Protection

Armor Type: Bolt-on

Fuselage: semi-monocoque pod and boom fuselage has a nearly stepless front

Cockpit Glass: large, five-section windshield and lower nose windows

Stealth Properties: No

Heat Signature Reduction: IR over engine exhausts

Add on Armor: Available

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes,ASO-3 and ASO-2 chaff/flare countermeasures system

Jammer: Hot Brick IR

Notes:

The Mil Mi-17 (NATO reporting name: Hip) is a Soviet/Russian helicopter in production at two factories in Kazan and Ulan-Ude. It is known as the Mi-8M series in Russian service. It is a medium twin-turbine transport helicopter. There are also armed gunship versions. The improved version of the Mi-8 is the Mi-17 Hip multipurpose helicopter, also known as the Mi-8TMB. It is specifically designed for improved capabilities at high altitudes and in hot weather conditions. The Mi-17 is identifiable from the Mi-8 by the additional air filters on the turbine air intakes, as well as left hand side mounted tail rotor, required by the more powerful TB-3-117A turboshaft engines it is fitted with. The Mi-17 can climb at the rate of 8m/s. The maximum and cruise speed of the helicopter are 250km/h and 225 km/h respectively. The range of the helicopter is 465 km and the service ceiling is 6,000m. The aircraft weighs around 7,489 kg and its maximum take-off weight is 13,000kg. The Mi-8/17 have given rise to a bewildering range of versions that fulfil a wide variety of specialized roles. Dedicated combat support variants include airborne reserve command post, electronic counter measures (with onboard jammers), Communications intelligence and command relay. Other versions carry out delivery of fuel to front-line units, photo-reconnaissance, artillery fire-correction, reconnaissance, VIP transport, minelaying and mine clearing.

Mi-171 Russian Medium Transport Helicopter







Tiers:



Variants:

- **List of Variants - See Below:** Mi-8 Hip-A Mi-8 Hip-B Mi-8T Hip-C (Transportny, transport) Mi-8TM Mi-8TV Mi-8S Hip-C (Salon) Mi-8 VIP Mi-8VZPU Hip-D Mi-8TB Hip-E Mi-8TBK Hip-F (Kommercheskiy, commercial) Mi-9 Hip-G Mi-8MPS Mi-8SMV Hip-J Mi-8P/PPA Hip-K Mi-8AMTSh/Mi-171Sh Mi-8AMTSh-V Mi-8AMTSh-VA Mi-8TG Mi-8 Rana Mi-8MTPR-1 Mi-17/Mi-8MT/Mi-8MTV/Mi-17V Hip-H Mi-17P Mi-17PI Mi-17PG Mi-17Z-II Mi-17MD Mi-17KF Mi-171 Mi-171M/Mi-171A2 Mi-17M/Mi-171V Mi-172 Mi-8MTV (Visotnii, high altitude) Mi-17 Pratap Mi-17-1VA Mi-17V5 Mi-171E Mi-171E2

System

Alternative Designation: Mi-171
Manufactuer: Kazan Helicopter Plant Ulan-Ude Aviation Plant
Primary Function: Armed assault-transport
Type: Medium twin-turbine transport helicopter
In Service: 1999-Present
Crew: ea3 (2x pilots, 1x flight engineer)
Blades, Main Rotor: 5
Blades, Tail Rotor: ea3
Day/Night Capable: The Mi-171 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
All Weather Capable: The Mi-171 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
Takeoff or Landing Limitations: INA
Vertical Climb Rate: m/s9
Number of Hard Points: ea4

Standard Payload: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Landing Gear: Fixed main gear struts run down and out from attachment points on the upper, rear fuselage. A second strut holds the wheel well away from the lower fuselage. The two-wheel nose gear is fitted under the fuselage just behind the cockpit

Dimensions

Length, with Rotors Turning: m25.2

Length, Fuelage: m18.2

Width: m2.5

Height: m5.65

Main Rotor Diameter: m21.3

Tail Rotor Diameter: m3.9

Cargo Compartment, Length: m5.3

Cargo Compartment, Width: m2.3

Cargo Compartment, Height: m1.8

Weight, Maximum Gross: kg13,000

Weight, Normal Takeoff: kg11,100

Weight, Empty: kg7,489

Automotive

Engine Name: 2 x TV3-117VM Engines

Engine Type: Medium twin-turbine

Engine Power: 2,070 shaft hp each

Speed, Maximum: km/h250

Speed, Average: km/h240

Service Ceiling: m4,500

Range, Maximum Load: km350

Range, Normal Load: km460

Range, with Auxilery Fuel: km950

Fuel, Internal: 445 liters

Fuel, Internal Aux Tank: 915 liters ea

Fuel, External Fuel Tank: 45 liters in port tank, 680 liters in starboard tank

Service Ceiling, Service: m6,000

Service Ceiling,Hover (out of ground effect): m830

Service Ceiling,Hover (in ground effect): m1,900

Vertical Climb Rate: m/s9

Standard Payload: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Communications

Radio: INA

Door Mounted Gun

Note: Loaded combat troops can fire personal weapons through windows from inside cabin.

Wing Mounted Weapons

Additional Armament that can be equipped on the Mi-8T: 2 - 7.62-mm or 1x 12.7-mm MG 4-6 - AT-2C Swatter or AT-3 Sagger ATGMs 4-6 - 57-mm rocket pods (16 each) 2 - 80-mm rocket pods (20 each) 4 - 250-kg bombs 2 - 500-kg bombs 2 - 12.7-mm MG pod 2 - Twin 23-mm gun pods 1,830 liters Additional fuel tanks

↳*Rocket System*

Name: UB-32 (rocket pod)

Type: 57 mm, reusable, 32-salvo rocket pod

Length, Launcher: mm2,080

Diameter, Launcher: mm464

Basic Load for the UB-32 Rocket Pod: ea4, one on each hardpoint

Number of Rockets in each UB-32 Rocket Pod: ea32

↳*Rocket*

Name: S-5 Rockets

Type: Rocket

Length, Rocket: mm2,080

Diameter, Rocket: mm481

Weight Empty: kg103

Weight Loaded: kg264

Warhead Types: produced in a variety of sub-types with different warheads, including HEAT anti-armour (S-5K), high-explosive fragmentation (S-5M/MO), smoke, and incendiary rounds

Maximum Effective Range: 3-4 km depending on the warhead and fuze

Basic Load: 32 S-5 Rockets per UB-32 Rocket Pod

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Weather Radar: Type 8A-813

Navigation: DISS-32-90 Doppler navigation under tailboom

Protection

Armor Type: Bolt-on

Fuselage: semi-monocoque pod and boom fuselage has a nearly stepless front

Cockpit Glass: large, five-section windshield and lower nose windows

Stealth Properties: No

Heat Signature Reduction: IR over engine exhausts

Add on Armor: Available

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes,ASO-3 and ASO-2 chaff/flare countermeasures system

Jammer: Hot Brick IR

Notes:

The MI-171 is a variant of the Mi-17 that is outfitted with a TV3-117VM Engine.

Mi-2 (Hoplite) Russian Transport Helicopter





Tiers:



Variants:

- **V-2V:** Armament prototype
- **Mi-2 Platan:** Aerial minelayer version.
- **Mi-2B:** Upgraded export version for the Middle East, fitted with improved systems and navigational aids.
- **Mi-2Ch Chekla:** Chemical reconnaissance / smokescreen layer version.
- **Mi-2D Przetacznik:** Aerial command post equipped with R-111 radio.
- **Mi-2FM:** Survey version.
- **Mi-2P:** Passenger / cargo version, with accommodation for 6 passengers.
- **Mi-2R:** Agricultural version.
- **Mi-2RL:** Land rescue/ambulance version.
- **Mi-2RM:** Sea rescue version equipped with electric winch for two people and dropped rafts.
- **Mi-2Ro:** Reconnaissance version equipped with cameras.
- **UMi-2Ro:** Reconnaissance trainer version.
- **Mi-2MSB-V or MSB-2MO:** Modernized by Motor Sich for Ukrainian Air Force., Original engine replaced with AI-450M 465 HP engine, armed with Rocket and machine gun pods, IR-jamming system and flares dispenser for defence against MANPADS.
- **Mi-2MSB or MSB-2 Nadia ('Hope'):** Modernized by Motor Sich to passenger-transport version for the civil aviation.
- **Mi-3:** Planned Mi-2 derivative that lacked suitable engines for the program to continue.
- **Mi-2 Plus:** Upgraded Mi-2 with uprated GTD-350W2 engines, all-composite rotor blades, new avionics and other modifications.
- **Mi-2URP-G Gniewosz ('Smooth snake'):** Mi-2URP with additional 4x AA missiles Strzała-2 (Strela 2) in two Gad rocket launchers.
- **Mi-2URP Salamandra ('Salamander'):** Gunship and anti-tank variant, armed with 23mm NS-23 gun, optional window-mounted 7,62mm PK machine gun, and 4x AT-3 Sagger (9M14M Malutka) wire-guided missiles on external weapons racks and 4x additional missiles in the cargo compartment.
- **Mi-2URN Żmija ('Viper'):** Armed reconnaissance variant armed with a fixed 23mm NS-23 gun and two 16x57mm S-5 unguided rocket pods Mars-2. Optional 7,62mm PK machine gun window-mounted.
- **Mi-2US:** Armed version fitted with a fixed 23mm NS-23 cannon, 4 x 7,62mm PKT machine gun pods and optional cabin PK machine gun.
- **Mi-2U:** Dual-control training version.

System

Alternative Designation: Mil Mi-2 Hoplite
Primary Function: Its military roles include anti-tank, liaison, air ambulance, training and scout. The Hoplite has been one of the most widely produced helicopter designs
Type: Transport Helicopter
Manufacturer: Mil Moscow Helicopter Plant
In Service: 1965-Present

Crew: ea1

Cargo Capacity: 8 passengers / 700 kg internal cargo / 800 kg external cargo

Blades, Main Rotor: 3

Blades, Tail Rotor: ea2

Day/Night Capable: The Mi-2 is primarily a daylight only aircraft

All Weather Capable: INA

Takeoff or Landing Limitations: INA

Number of Hard Points: INA

Landing Gear: fixed tricycle gear has the main wheels extend on a tripod of struts from the lower rear of the cabin

Tail Skid: A fixed tail skid is fitted to the tail boom below the horizontal stabilizer

Note: The cabin can be reconfigured to take cargo, four litters and a medical attendant, or two sitting casualties and two litters

Dimensions

Length: m11.1

Height: m3.75

Main Rotor Diameter: m14.50

Disc Area: 166.4 sq m

Weight, Empty: 2,365 kg

Weight, Maximum Takeoff: 3,550 kg

Weight, Maximum Internal Payload: 700 kg

Weight, Maximum Payload, Total: 800 kg

Automotive

Engine Name: 2 x Isotov GTD-350

Engine Type: Turboshaft

Engine Power: 400 hp each

Speed, Never Exceed: 210 km/h

Speed, Cruise: 200 km/h

Speed, Maximum Range: 190 km/h

Range, Maximum Payload: 170 km

Ragne, Maximum Internal Fuel: 440 km

Range, Maximum Internal and Auxiliary Fuel, No Reserves: 797 km

Climb Rate: 270 m/min

Time to 1,000 meters: 5 min 30 sec

Time to 4,000 meters: 26 min

Ceiling, Service: 4,000 m

Ceiling, Hovering in Ground Effect: 2,000 m

Ceiling, Hovering Out of Ground Effect: 1,000 m

Communications

Radio: INA

Armament

Note: The Mil Mi-2's primary mission is as a transport helicopter, but the helicopter can be equipped with: Machine guns, cannon, up to 4 AT-3 Sagger missiles, 2 SA-7 Grail or rocket pods on some military models

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Digital or Analog Cockpit: Analog

Direct Fire Control: No

Laser Designator: No

Automated Helmet: No

Sensor Suite(s) Available: INA

Position Location System: INA

Protection

Fuselage: its fuselage is built in three sections to facilitate mission tailoring

Cockpit Glass: stepped windshield and a short nose with large cheek windows for better downward view

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: No

EW Counter Measures/CCM: No

Counter Measures (Chaff/Flares): INA

Note: Main and tail rotor blades electrically deiced

Notes:

The MI-2 Hoplite provides transport and fire support. The MI-2 can conduct reconnaissance, resupply guerrillas and provide close air support with 57mm rockets. It can also have a smoke generator mounted to provide a wide area smoke screen in front of units, screening their movements. Additional missions include; direct air support, antitank, armed reconnaissance, transport, medevac, airborne command post, minelaying, and training. Although the Mi-2 Hoplite was developed by the Mil bureau in the former Soviet Union, the aircraft was produced exclusively in Poland by the PZL Swidnik aircraft factory. Several thousand of these aircraft were built and it remained in production until 1985. The Hoplite has been one of the most widely produced helicopter designs. The three-blade main rotor is mounted on top of a large hump above the body midsection. Two turboshaft enginess are mounted side-by-side on top of cabin, forming a hump, with round air intakes above the cockpit and oval exhausts on the sides of the engines. The small, bus-like fuselage with fixed landing gear features a stepped-up cockpit and rounded nose, and a tadpole-shaped body when viewed from bottom. The tapered tail boom has small, unequally tapered flats and a

thin, swept-back fin with a rotor on the right.

Mi-26 (Halo) Russian Heavy Transport Helicopter





Tiers:



Variants:

- **Mi-26A:** Upgraded military version with a new flight/navigation system. Flown in 1985 but no production
- **Mi-26M:** Upgraded version of the Mi-26 for better performance.
- **Mi-26S:** Disaster response version developed in response to nuclear accident at Chernobyl
- **Mi-26T:** Basic civil cargo/freight transport version. Production from 1985.[
- **Mi-26TS:** Civil cargo transport version, also marketed as Mi-26TC.
- **Mi-26TM:** Flying crane version with under-nose gondola for pilot/crane operator.
- **Mi-26TP:** Firefighting version with internal 15,000 litres (4,000 US gal; 3,300 imp gal) fire retardant tank.
- **Mi-26MS:** Medical evacuation version of Mi-26T. Up to 60 stretcher cases in field ambulance role, or can be equipped for intensive care or as field hospital.[
- **Mi-26P:** 63 seat passenger version.[
- **Mi-26PK:** Flying crane derivative of Mi-26P
- **Mi-26T2:** Improved version of the Mi-26T equipped with BREO-26 airborne electronic system, allowing it to fly any time, day or night, under good and bad weather conditions. Serial production began on May 22, 2015.[
- **Mi-26T2V:** Newest modernization variant intended for the Russian military, equipped with new NPK90-2V avionics suite allowing it to fly routes in automatic mode, airborne defense complex "Vitebsk", anti-blast seats and new navigation and satellite communication systems. The cockpit is fitted with multifunctional displays with provision for use of night-vision goggles during night ops. The Mi-26T2V made its maiden flight in August 2018
- **Mi-27:** Proposed airborne command post variant; two prototypes bui

System

Alternative Designation: Mil Mi-26; Halo
Primary Function: Heavy Transport Helicopter
In Service: 1983-Present
Manufacturer: Rostvertol
Crew: ea5 (pilot, co-pilot, navigator, flight engineer,loadmaster)
Passengers: 85; or 60 paratroopers
Blades, Main Rotor: 8
Blades, Tail Rotor: ea5
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: INA
Number of Hard Points: INA

Dimensions

Length: m33.73

Width: mINA

Height: m8.15

Main Rotor Diameter: m32.0

Disc Area: m804.25 sq m

Cabin, Length: m12.00

Cabin, Width: m3.25

Cabin, Height: 2.95 m to 3.17 m

Cabin, Volume: 120 cu m

Weight, Empty: 28,200 kg

Weight, Normal Takeoff: 49,500 kg

Weight, Maximum Takeoff: 56,000 kg

Maximum Payload: 20,000 kg

External Payload, out of Ground Effect: 14,515 kg

External Payload, in Ground Effect: 18,144 kg

Automotive

Engine Name: 2 x Lotarev D-136 (Mi-26)

Engine Type: INA

Engine Power: 11,094 shp (8,729 kW) each

Speed, Maximum: km/h295

Speed, Cruise: km/h255

Range w/Maximum Internal Fuel and Maximum Payload: km800

Range, Ferry: 1,920 km

Ceiling: 4,600 m

Ceiling, Hovering in Ground Effect: m4,500

Ceiling, Hovering out of Ground Effect: m1,800

Internal Fuel Capacity: 11,900 liters

Communications

Radio: INA

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: No

Laser Designator: INA

Sensor Suite(s) Available: INA

Position Location System: Yes

Radar: 1 x Doppler/weather radar in nose

Protection

Fuselage: INA

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Mil Mi-26 (Russian: Миль Ми-26, NATO reporting name: Halo) is a Soviet/Russian heavy transport helicopter. Its product code is izdeliye 90. Operated by both military and civilian operators, it is the largest and most powerful helicopter to have gone into series production. The Mi-26 helicopter, the heaviest and most powerful helicopter in the world, was designed for carrying large-size cargoes weighing up to 20 tons. It is the result of an early 1970s specification for a transport helicopter whose empty weight, without fuel, was not to exceed half of its maximum take-off weight. It can be used for construction projects ranging from bridges to power transmission lines. The combination of high load-carrying capacity and high cruise speed makes the use of the helicopter economically efficient. The helicopter is loaded through the cargo hatch in the tail of the fuselage with lowered ladder and subladders. The cargo cabin is equipped with two electric hoists and lifting and loading devices ensuring loading and carrying along the cabin of cargoes weighing up to 5 tons. Mil Moscow helicopter plant joint stock company is the major designer and producer of military transport, civil transport, heavy-lift,multi-role helicopters. Mil is associated with the Rostov and Kazan production enterprises. Rostov makes the Mi-26 heavy-lift helicopters.

Mi-6 (Hook) Russian Heavy Transport Helicopter







Tiers:



Variants:

- **Mi-6VKP Vozkuzhnyi Komandnii Punkt (Hook-B):** This airborne command post version is equipped with various antennas and communications equipment.
- **Mi-6AYa/Mi-22 (Hook-C):** Advanced airborne command post version.
- **Mi-10 Harke:** This was an airborne crane version of the Mi-6. It is no longer in service. See separate database entry for more information.

System

Alternative Designation: Mil Mi-6; Hook
Primary Function: Heavy Transport Helicopter
Manufacturer: Mil Moscow Helicopter Plant
In Service: 1957-2002 Russia 1957-Present Other Nations
Missions: Missions include heavy-lift cargo operations, medical evacuation, troop transport and civil operations such as fire-fighting.
Crew: ea5 (pilot, co-pilot, navigator, flight engineer, radio operator)
Passengers: + 70 troops; or 41 litters + 2 attendants; or 26,450 lb (12,000) cargo
Blades, Main Rotor: 5
Blades, Tail Rotor: ea4
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: INA
Number of Hard Points: INA

Landing Gear: The helicopter has a tricycle landing gear with oleo pneumatic shock-absorbers

Dimensions

Length: m33.18

Height: m9.86

Main Rotor Diameter: m35.0

Disc Area: m962 sq m

Cabin Length: m12.0

Cabin Width: m2.65

Cabin Height, Front: m2.01

Cabin Height, Rear: m2.50

Cabin Volume: 80 cu m

Weight, Empty: kg27,240

Weight, Maximum Takeoff: kg42,500

Payload, Internal: kg12,000

Cargo Capacity: + 70 troops; or 41 litters + 2 attendants; or 26,450 lb (12,000) cargo

Payload, Sling Load: kg8,000

Wing Area: 35 m2 (380 sq ft) auxiliary wing (when fitted)

Airfoil, Root: TsAGI P-35 (15%)

Airfoil, Tip: TsAGI P-35 (12%) [

Automotive

Engine Name: 2 x Soloviev D-25V (TV-2BM) turboshaft

Engine Type: INA

Engine Power: hp5,500 shaft hp each

Speed, Maximum: km/h300

Speed, Cruise: km/h250

Range, with 8,000 kg Payload: km620

Range, Fitted w/External Tanks: km1,000

Range, Fitted w/External and Cabin Ferry Tanks: 1,450 km

Ceiling: 4,500 m

Fuel Capacity: 8,250 l (2,180 US gal; 1,810 imp gal) (6,315 kg (13,922 lb)) in 11 fuselage tanks + 4,500 l (1,200 US gal; 990 imp gal) in two external tanks + optional 4,500 l (1,200 US gal; 990 imp gal) in auxiliary cabin tanks

Maximum Fuel Capacity: 17,250 l (4,560 US gal; 3,790 imp gal)

Endurance: 2 hours 51 minutes at 140–160 km/h (87–99 mph; 76–86 kn) at 1,000 m (3,281 ft) and 40,500 kg (89,287 lb) TOW

Time to altitude: at 40,500 kg (89,287 lb) TOW 3,000 m (9,843 ft) in 9 minutes 42 seconds 4,500 m (14,764 ft) in 20 minutes 42 seconds

Communications

Radio: INA

Main Weapons System

↳*System*

Name: Afanasev A-12.7

Type: 12.7mm Heavy Machine Gun

Manufacturer: Tulamashzavod Tula Izhmash Izhevsk Kovrov KMZ

In Service: 1949-Present

Length: mm1,423

Barrel length: mm1,005

Width: mm153

Height: mm154.5

Weight: kg25.5

Barrels: ea1

Action: Gas operation

Rate of Fire: 800–1,100 rpm

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartrdidge: 12.7×108mm

Basic Load: 270

Muzzle Velocity: m/s818

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: Analog

Direct Fire Control: INA

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Protection

Fuselage: The fuselage has a stepped front with a heavily framed and glazed "navigator" nose

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Mil Mi-6 (NATO reporting name Hook), given the article number izdeliye 50 and company designation V-6, is a Soviet/Russian heavy transport helicopter that was designed by the Mil design bureau. It was built in large numbers for both military and civil roles and used to be the largest helicopter in production until Mil Mi-26 was put in production in 1980. The development of the Mil Mi-6 began in the first half of the ‘50s to meet the needs of the Soviet armed forces and those of the state-owned industries that were looking for a helicopter capable of carrying large payloads over long distances. In those years, a period often known as the Cold War period, there were military and industrial projects scattered throughout the Soviet Union, even in remote areas such as the immense Siberian regions. Having successfully completed the construction of the Mi-4 Mikhail Leontyevich Mil (1909-1979) accepted a new challenge and started designing a rotorcraft with a greater load-carrying capacity. Mil was a brilliant aeronautical engineer at the head of one of the many OKB, acronym for Opytnoe Konstructorskoe Bjuro, thus experimental design bureau.

Mi-4 (Hound) Russian Transport Helicopter





Tiers:



Variants:

- **Variants:** V-12 Prototype. Designation reused for the Mi-12. Mi-4 (NATO – Hound-A) Basic production version. Mi-4A Assault transport helicopter. Mi-4AV Armed versions based on the Mi-4A. V for Vooruzhenniy (Armed). Mi-4A with additional armament. Modification of 1967 had weapons complex K-4V, included four 9M17M ATGM "Phalanga" and 96 57-mm NAR S-5M in six blocks UB-16-57U (or six 100-kg bombs or four 250-kg bombs or tanks with an incendiary substance); 185 helicopters were converted to Mi-4AV. Mi-4GF Factory designation for demilitarised Mi-4 for use in the Civil Air Fleet. Mi-4L Lyukes Six-seat VIP transport version, sometimes converted into an air ambulance helicopter. Mi-4VL Fire-fighting version of Mi-4L. Mi-4M (NATO – Hound-C) Anti-submarine warfare helicopter with searching radar station SPRS-1 ("Kurs-M"), hydroacoustic station "Baku", additional fuel tank and rescue boat with operator in under-fuselage gun turret. Mi-4ME Export modification of Mi-4M. Mi-4VM Slightly modified version of Mi-4M, differed by some avionics system. Mi-4MR Upgraded version of Mi-4VM with the searching radar station "Rubin-V" instead of "Kurs-M". Mi-4P / Mi-4VP Civil transport helicopter, with accommodation for between 8 and 11 passengers, plus eight stretchers and a medical attendant for air ambulance duties. Mi-4PL (NATO – Hound-B) Anti-submarine warfare helicopter. Mi-4PS SAR version. Mi-4S Salon VIP transport helicopter. Mi-4Skh Multi-role agricultural helicopter, with a large chemical container in the main cabin. Also used as a fire-fighting helicopter. Mi-4T Major military production version, equipped with a large diameter main rotor and bulged windows. Mi-4VM (VM-12) Anti-submarine warfare helicopter. Mi-4BT Minesweeper with floats. Mi-4RI Mi-4M equipped with the Rion experimental sonar. Mi-4MT Torpedo-carrying ASW attack (killer) aircraft derived from Mi-4M. Mi-4MU Attack helicopter. Mi-4MO Search helicopter with Oka sonar. Mi-4MS Search helicopter with Soora infra-red sensor. Mi-4FV (Mi-4KV) Photographic and guidance helicopter. Mi-4Schch "Polar version" of Mi-4FV for working at the Soviet Arctic and Antarctic research stations. Mi-4SP Special rescue modification. Mi-4PG Experimental version equipped with an external load sling system. Mi-4SV Mi-4 with improved heat insulation for working in the Far North. Mi-4N "Filin" (Horned owl) Experimental reconnaissance version intended for night-time use. Mi-4KK (Mi-4VKP) Mobile command post. Mi-4KU (Mi-4VPU) Mobile command post for controlling Air Force units. Mi-4U Target-designator version carrying the Oospekh (Success) system. Mi-4GR Mi-4 fitted with Grebeshok-3 (Haircomb-3) wide-range panoramic detection and relay radar. Mi-4TARK TV-equipped artillery reconnaissance and spotting helicopter. Mi-4MK (Mi-4PP) ECM version. Mi-4UM Radio-controlled target drone version. Harbin Z-5 Chinese military transport helicopter. Chinese production version. Harbin Z-6 Prototype turbine powered version of the Z-5, no production undertaken. Xuanfeng Chinese civil transport helicopter. Chinese production version.

System

Alternative Designation: Mil Mi-4; Type 36; NATO: Hound
Type: Transport Helicopter
Manufacturer: Mil Moscow Helicopter Plant
Crew: ea1 or 2
Passengers: 16 troops
Blades, Main Rotor: ea4
Blades, Tail Rotor: ea3

Number of Engines: ea1

Number of Hard Points: INA

Dimensions

Length: 16.8 m

Width: INA

Height: 4.4 m

Main Rotor Diameter: 21 m

Main Rotor Area: 346.4 m2

Cargo Capacity: 1,600 kg of cargo

Weight, Empty: 5,100 kg

Weight, Gross: 7,150 kg

Automotive

Engine Name: 1 × Shvetsov ASh-82V

Engine Type: 14-cylinder air-cooled radial piston engine

Engine Power: hp1,680

Maximum Speed: 185 km/h

Range: 500 km

Service Ceiling: 5,500 m

Disk Loading: 41 kg/m2

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Laser Designator: INA

Protection

Stealth Properties: None

Add on Armor: INA

Heat Signature Reduction: INA

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Mil Mi-4 (USAF/DoD reporting name "Type 36", NATO reporting name "Hound") is a Soviet transport helicopter that served in both military and civilian roles. The Mi-4 was designed in response to the American H-19 Chickasaw and the deployment of U.S. helicopters during the Korean War. While the Mi-4 strongly resembles the H-19 Chickasaw in general layout, including the

innovative engine position in front of the cockpit, it is a larger helicopter, able to lift more weight and built in larger numbers. The first model entered service in 1953. The helicopter was first displayed to the outside world in 1952 at the Soviet Aviation Day in Tushino Airfield. One Mi-4 was built with a jettisonable rotor. It served as an experimental vehicle for future pilots' means of safety and ejection designs

EC725 Caracal (H225M Super Cougar) French long-Range Tactical Transport Helicopter



Tiers:



Variants:

- **SA 330 Puma:** Developed in the late 1960s by Aerospatiale in France. Others were built in the UK, Indonesia, Romania.
- **AS 532 Cougar Mk I UC/AC:** is a military version with a short fuselage capable of carrying 21 commandos, which can be fitted with equipment for maximum efficiency in all theaters of operation: radar or missile detector, decoy-launcher. Moreover, its optional equipment make it truly multi-purpose: winch, projector, specific equipment for SAR missions, or, for instance, crashworthy seats, IR camera, NVG compatible cockpit for special missions. The AC version is the armed version and can be equipped with side-mounted machine-guns and axial pods fitted with either 20-mm guns or 68-mm rocket-launchers
- **AS 332 Super Puma:** Differs from the SA 330 Puma through an improved rotor system, upgraded engines, stretched fuselage, and a modified nose shape.
- **AS-532 Cougar Mk I UE:** is the basic version with long fuselage of the military Cougar MK1 range. The aircraft can transport 25 commandos in addition to the crew (1 chief of stick + 24 troop seats). For tactical transport and logistical support missions the Cougar UE is offered "ready for use". Its standard configuration includes a minimum of radio (2 VHF/AM,TRANSPONDER, ICS...) and navigation
- **AS 532 Cougar Mk I UL/AL:** s the "long" version which can carry up to 25 commandos or 6 injured passengers lying down and 10 other people. Like the other versions, it is capable of lifting 4.5 tons on a sling. The Horizon battlefield ground surveillance system can be installed on the AS 532 UL.
- **AS 532 Cougar Mk I SC:** s the naval version of the Cougar, and its main missions are the following: anti-surface unit warface (ASUW) fitted with AM 39 missiles, anti-submarine warfare (ASW) with a variable-depth sonar and torpedoes, and search and rescue and sea patrols.
- **AS 532 Cougar Mk II U2 A2:** helicopter has the biggest cabin volume in its category : 29 commandos or 12 stretchers with medical equipment, and is capable of carrying 5 tons on the sling. This 1992 version is the longest variant of the Cougar line. It has an improved Spheriflex rotor system with only 4x tail rotor blades, and 2x 2,100-shp Turbomeca Makila 1A2 turboshaft engines that allow an increased cargo carrying capability. It can transport 29 troops or 12 litters, or an external load of 5,000 kg. Primarily used for combat search and rescue, and as an armed version. It may be armed additionally with a 20-mm cannon or pintle-mounted .50 caliber machine guns. Its basic design with screens in the cockpit and a 4-axis autopilot with built-in coupler makes it possible to reduce the crew workload and increase its safety for tactical flight by the same degree.
- **AS 535 Cougar Mk II A2 RESCO:** he main mission of the A2 RESCO is to recover aircrews downed in combat areasplant (RESCO is the French acronym for Combat Search and Rescue or CSAR). For very long range operations, the CSAR Cougar Mk 2 can operate at a higher alternate gross weight of 11,200 kg compared to its normal maximum mission weight of 9,750 kg. With this enhanced capability, the Cougar can rescue two crew members 400 nautical miles away.

System

Alternative Designation: Eurocopter EC725; EC725 Caracal; Super Cougar H225M
Primary Function: long-Range Tactical Transport Helicopter
Manufactuer: Aérospatiale Eurocopter Airbus Helicopters
In Service: 1900-Present

Crew: ea2

Similar Aircraft: Super Frelon, HH-3E Jolly Green Giant, SH-3 Sea King, CH-53 Sea Stallion, Mi-8 Hip, UH-60 Black Hawk

Troop Capacity: 2 pilots + 1 chief of stick + 28 seats

VIP Transport: 2 pilots + 8 to 12 passengers

Payload Capacity: 3,000 kg

Blades, Main Rotor: 4

Blades, Tail Rotor: ea5

Day/Night Capable: INA

All Weather Capable: INA

Number of Hard Points: ea4

Takeoff or Landing Limitations: INA

Dimensions

Length, with Rotors Turning: m19.5

Length, Fuselage: m16.8

Main Rotor Diameter: m16.2

Tail Rotor Diameter: m3.2

Height: m4.6

Width: m3.8

Length, Cargo Compatment Floor: m7.9

Width, Cargo Compatment Floor: m1.8

Height, Cargo Compatment Floor: m1.5

Weight, Empty: 5,715 kg

Weight, Normal Takeoff: 8,600 kg

Weight, Maximum Gross: kg11,000

Internal Payload: kg5,337

Useful Load: kg5,285

Automotive

Engine Name: 2 x 2 Turbomeca Makila 2A1

Engine Type: Turboshaft

Engine Power: 1,877-shp each engine

Range, Normal Load (At 5,000 ft.): km1,339

Range, without reserve at Economical Cruise Speed: km909

Speed, Maximum: km/h324

Speed, Average: km/h262

Fast cruise speed (at MTOW): km/h262

Service Ceiling: m3,968

Hover, Out of Ground Effect: m1,650

Hover, In Ground Effect: m2,800

Troop Capacity: 2 pilots + 1 chief of stick + 28 seats

VIP Transport: 2 pilots + 8 to 12 passengers

Maximum Payload: 4,650 kg

Casualty Evacuation: 2 pilots + up to 11 stretchers + 4 seats

Max Cargo Sling Load: 4,750 kg

Fuel Capacity, Internal Tank: 2,020 liters

Fuel Internal Auxilery Tanks: ea4

Fuel Capacity, Internal Aux Tank: 475 liters each

Standard Fuel Capacity: 2,247 kg

Maximum Emergency Power: 2,382 each engine

Take-Off Power Per Engine: 2,101 shp each engine

Operational Environment: from - 45°C (- 49°F) up to + 50°C (122°F).

Maximum Endurance: > 4 h 20 min @ 148 km/h-80 kts

Vertical Climb Rate: m/s5.4

Communications

Radio: INA

Door Mounted Gun

Note #1: The Mk I variants may employ 2x 7.65-mm machine guns on pintle-mounts in the cabin doors when employed in a transport role. The armed versions have side-mounted 20-mm machineguns and/or axial pods fitted with 68-mm rocket launchers.

Wing Mounted Weapons

Note #1: Hydra 70 2.75 in (70 mm) rockets – 7 rockets mounted in the M260 launcher or 19 rockets in the M261 launcher

Note #2: Additional Armament that can be equipped on the AS532 Cougar are: 7.65-mm MG 2 - 20-mm twin gun pods 2 - 68-mm rocket pods (22 each) 2 - 2.75-in rocket pods (19 each) 600 liters External fuel tanks

↳*Gun Pod Weapon System*

Name: M61 Vulcan

Type: hydraulically, electrically or pneumatically driven, six-barrel, air-cooled, electrically fired Gatling-style rotary cannon which fires 20 mm rounds

Manufactuer: General Dynamics

In Servcie: 1946-Present

Length: m1.827

Weight: kg112

Barrels: 6-barrel (progressive RH parabolic twist, 9 grooves)

Action: twist, 9 grooves) Action Hydraulically operated, electrically fired, rotary cannon

Rate of Fire: rds/min6,000

Muzzle Velocity: m/s1,050

Feed System: Belt or linkless feed system

↳*Rocket System*

Name: Hydra 70

Type: 70mm Fin-stabilized unguided rocket

Launcher Name: M261 Launcher

Number of M261 Launchers: ea2

In Service: 1980s-Present

Manufactuer: United States of America

Length: 1,060 mm

Diameter: 70 mm

Muzzle Velocity: 700 m/s

Effective Firing Range: 8,000 m

Maximum Firing Range: 10,500 m

Speed: 739 m/s

Guidance System: Unguaided

Basic Load: 19 each per M261 Launcher

↳*Ammunition*

Name: M53

Type: API

Caliber: mm20

Cartridge: 20×102 mm

Bursting Charge: 4.2 grams of incendiary

Muzzle Velocity: m/s1,050

Armor Penetration: 6.4 mm (0.25 in) RHA penetration at 0 degree impact angle and 1,000 m (3,300 ft) range.

Maximum Effective Range: km1.6

Basic Load: 900

Fire Control and Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Automated Helmet: INA

Position Location System: Yes

Radar Warning Receiver: Yes

Laser Warning Receiver: Yes

Missile Launch Detector: Yes

Missile Approach Deterctor: Yes

NVG Compatible: Yes

Autopilot: Full autopilot

Navigation Computer: Yes

Protection

Fuselage Protection: Protection Against 7.62 or 12.7 mm

Cockpit Protection: Crew cockpit protection: armoured and energy absorbing crew seats

Armor Plating: Armour plating in the cabin: either collective floor and walls or individual armour plating carpets

Heat Signature Reduction: IR signature divided by 10

Fuel Tank Protection: Self sealing Fuel tanks and crashworthy fuel tanks

Blade Protection: Blades multibox structure Bullet impact resistant

Add on Armor: Yes

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: Optionally Available

Counter Measures (Chaff/Flares): Optionally Available

Deiced Capable: Main and tail rotor blades electrically deiced

Infrared Jammer: Optionally Available

Decopy Launcher: Yes

PLS (Personal Locator System): Yes

Notes:

The Eurocopter EC725 Caracal, now called Airbus Helicopters H225M, is a long-range tactical transport military helicopter developed from the Eurocopter AS532 Cougar for military use. It is a twin-engined aircraft and can carry up to 28 seated troops along with two crew, depending on customer configuration. The helicopter is marketed for troop transport, casualty evacuation, and combat search and rescue duties, and is similar to the civilian EC225. The new helicopter made its first flight in 2000. First helicopter was delivered to the French Air Force in 2005. Later it has been adopted by the French Army. It has seen combat in with French armed forces in Afghanistan and Mali. The Caracal has been exported to Brazil, Indonesia, Malaysia, Mexico and Thailand. Some other countries ordered this helicopter. There is also an ASW version of this helicopter. It can be fitted with MU90 Impact aerial-launch torpedo.

CH-47 American Medium Transport Helicopter







Tiers:



Variants:

- **HC-1B:** The pre-1962 designation for Model 114 development aircraft that would be redesignated CH-47 Chinook
- **CH-47A:** The all-weather, medium-lift CH-47A Chinook was powered initially by Lycoming T55-L-5 engines rated at 2,200 horsepower (1,640 kW), but then replaced by the T55-L-7 rated at 2,650 hp (1,980 kW) engines or T55-L-7C engines rated at 2,850 hp (2,130 kW). The CH-47A had a maximum gross weight of 33,000 lb (15,000 kg), allowing for a maximum payload around 10,000 lb (4,500 kg)
- **ACH-47A:** The ACH-47A was originally known as the Armed/Armored CH-47A (or A/ACH-47A). It was officially designated ACH-47A as a U.S. Army Attack Cargo Helicopter, and unofficially referred to as Guns A Go-Go. Four CH-47A helicopters were converted to gunships by Boeing Vertol in late 1965. Three were assigned to the 53rd Aviation Detachment in South Vietnam for testing, with the remaining one retained in the U.S. for weapons testing. By 1966, the 53rd was redesignated the 1st Aviation Detachment (Provisional) and attached to the 228th Assault Support Helicopter Battalion of the 1st Cavalry Division (Airmobile). By 1968, only one gunship remained, and logistical concerns prevented more conversions. It was returned to the United States, and the program stopped.
- **CH-47B:** The CH-47B was an interim solution while Boeing worked on a more substantially improved CH-47C. The CH-47B was powered by two Lycoming T55-L-7C 2,850 shp (2,130 kW) engines. It featured a blunted rear rotor pylon, redesigned asymmetrical rotor blades, and strakes along the rear ramp and fuselage to improve flying characteristics. It could be equipped with two door-mounted M60D 7.62 mm NATO machine guns on the M24 armament subsystem and a ramp-mounted M60D using the M41 armament subsystem. Some CH-47 "bombers" were equipped to drop tear gas or napalm from the rear cargo ramp onto Viet Cong bunkers. The CH-47B could be equipped with a hoist and cargo hook. The Chinook proved especially valuable in "Pipe Smoke" aircraft recovery missions. The "Hook" recovered about 12,000 aircraft valued at over $3.6 billion during the war; 108 were built.
- **CH-47C:** The CH-47C principally featured more powerful engines and transmissions.[61] Three sub-versions were built; the first had Lycoming T55-L-7C engines delivering 2,850 shp (2,130 kW). The "Super C" included Lycoming T55-L-11 engines delivering 3,750 shp (2,800 kW), an upgraded maximum gross weight of 46,000 lb (21,000 kg), and a pitch stability augmentation system. The T55-L-11 engines suffered difficulties, as they had been hurriedly introduced to increase payload; thus, they were temporarily replaced by the more reliable Lycoming T55-L-7C. The type was distinguishable from the standard "C" by the uprated maximum gross weight.
- **CH-47D:** The CH-47D shares the same airframe as earlier models, the main difference being the adoption of more powerful engines. Early CH-47Ds were originally powered by two T55-L-712 engines, the most common engine is the later T55-GA-714A. With its triple-hook cargo system, the CH-47D can carry heavy payloads internally and up to 26,000 pounds (12 t) (such as 40-foot or 12-metre containers) externally. It was first introduced into service in 1979. In air assault operations, it often serves as the principal mover of the 155 mm M198 howitzer, accompanying 30 rounds of ammunition, and an 11-man crew. The CH-47D also has advanced avionics, such as the Global Positioning System. Nearly all US Army CH-47D were conversions from previous A, B, and C models, a total of 472 being converted. The last

U.S. Army CH-47D built was delivered to the U.S. Army Reserve, located at Fort Hood, Texas, in 2002.[

- **MH-47D:** The MH-47D variant was developed for special forces operations and has inflight refueling capability, a fast rope-rappelling system, and other upgrades. The MH-47D was used by U.S. Army 160th Special Operations Aviation Regiment. 12 MH-47D helicopters were produced. Six were conversions from CH-47A models and six were conversions from CH-47C models.
- **MH-47E:** The MH-47E has been used by U.S. Army Special Operations. Beginning with the E-model prototype manufactured in 1991, a total of 26 Special Operations Aircraft were produced. All aircraft were assigned to 2–160th SOAR(A) "Nightstalkers", home based at Fort Campbell, Kentucky. E models were conversions from existing CH-47C model airframes. The MH-47E has similar capabilities as the MH-47D, but includes an increased fuel capacity similar to the CH-47SD and terrain following/terrain avoidance radar.
- **CH-47F:** In 2001, the first CH-47F, an upgraded CH-47D, made its maiden flight; the first production model rolled out on 15 June 2006 at Boeing's facility in Ridley Park, Pennsylvania, and first flew on 23 October 2006. Upgrades include 4,868-shaft-horsepower (3,630 kW) Honeywell engines and the airframe featuring greater single-piece construction to lower maintenance requirements. The milled construction reduces vibration, as well as inspection and repair needs, and eliminates flexing points to increase service life. The CH-47F can fly at speeds of over 175 mph (282 km/h) with a payload of more than 21,000 lb (9.5 t). New avionics include a Rockwell Collins Common Avionics Architecture System (CAAS) cockpit, and BAE Systems' Digital Advanced Flight Control System (DAFCS).[75] AgustaWestland assembles the CH-47F under license, known as the Chinook ICH-47F, for several customers.[78] Boeing delivered 48 CH-47Fs to the U.S. Army through August 2008; at that time Boeing announced a $4.8 billion contract with the Army for 191 Chinooks.
- **MH-47G:** The MH-47G Special Operations Aviation (SOA) version is currently being delivered to the U.S. Army. It is similar to the MH-47E, but features more sophisticated avionics including a digital Common Avionics Architecture System (CAAS). The CAAS is a common glass cockpit used by different helicopters such as MH-60K/Ls, CH-53E/Ks, and ARH-70As. The MH-47G also incorporates all of the new sections of the CH-47F.
- **CH-47J:** The CH-47J is a medium-transport helicopter for the Japan Ground Self-Defense Force (JGSDF), and the Japan Air Self-Defense Force (JASDF).[95] The differences between the CH-47J and the CH-47D are the engine, rotor brake and avionics, for use for general transportation, SAR and disaster activity like U.S. forces.The CH-47JA, introduced in 1993, is a long-range version of the CH-47J, fitted with an enlarged fuel tank, an AAQ-16 FLIR in a turret under the nose, and a partial glass cockpit. Both versions are built under license in Japan by Kawasaki Heavy Industries, who produced 61 aircraft by April 2001.
- **HH-47:** On 9 November 2006, the HH-47, a new variant of the Chinook based on the MH-47G, was selected by the U.S. Air Force as the winner of the Combat Search and Rescue (CSAR-X) competition. Four development HH-47s were to be built, with the first of 141 production aircraft planned to enter service in 2012.[
- **Sea Chinook:** For years US Navy has been operating different versions of the CH-53 helicopter. CH-47s regularly conduct ship-based operations for U.S. Special Forces and other international operators. Due to budget issues, technical problems and delays with CH-53K, the director of the Pentagon’s cost assessment office directed US Navy to consider maritime versions of CH-47. Naval versions must be protected against the corrosive seaborne environment and be able to operate from aircraft carriers and amphibious ships
- **Civilian models:** Model 234LR (long range): Commercial transport helicopter. The Model 234LR can be fitted out as an all-passenger, all-cargo, or cargo/passenger transport helicopter. Model 234ER (extended range): Commercial transport version. Model MLR (multi-purpose long range): Commercial transport version. Model 234UT (utility transport): Utility transport helicopter. Model 414: The Model 414 is the international export version of the CH-47D. It is also known as the CH-47D International Chinook.

System

Alternative Designation: CH-47

Primary Function: The CH-47 performs various transport missions. It transports troops, war supplies and battlefield equipment. This helicopter is also deployed in medical evacuation, search and rescue, aircraft recovery, parachute drop and other operations.

In Service: 1962-Present

Type: Medium Transport Helicopter

Crew: ea2-4

Passengers: 44 men

Blades, Main Rotor: 3

Blades, Tail Rotor: ea3

Maximum Payload Capacity: 10.3 t of cargo

Cargo Hooks: The helicopter has three external cargo hooks and can carry various loads, such as light vehicles, artillery pieces or shelters.

Note #1: Between 1982 and 1998 over 480 of the US Army's Chinooks were remanufactured to CH-47D standard with greatly enhanced capability; the RAF has also upgraded 32 of its surviving Chinooks to this standard as Chinook HC.Mk 2s and also received a further eight new-build HC.Mk 2s, as well as nine HC.Mk 3s, which are similar to the US Army's MH-47E special missions helicopter. The MH-47 is fitted with terrain-following radar, additional fuel tanks, in- flight refueling probe and a number of defensive modifications for operation behind enemy lines. Other nations operating Chinook in CH-47D International Chinook and CH-47SD Super D forms for export.

Note #2: Even though the CH-47F is still in production, Boeing is already looking for a future enhancements. It is planned that between 2020 and 2025 helicopters will be fitted with more powerful engines, new rotor blades derived from the cancelled RAH-66 Commanche, will have a strengthened airframe and will be capable to carry more payload. The planned future versions are nominally referred as CH-47G and CH-47H. These helicopters are planned to remain operational with the US Army beyond 2060, or over 100 years after the type first entered service.

Dimensions

Length: 15.54 m

Main Rotor Diameter: 18.29 m

Height: 5.77 m

Weight, Empty: 10.1 t

Weight, Maximum Take Off: 22.6 t

Automotive

Engine Name: 2 x Textron Lycoming T55-L-712

Engine Type: Turboshafts

Engine Power: 2 x 3 750 shp

Maximum Speed: 256 km/h

Cruising Speed: INA

Service Ceiling: INA

Range: 56 - 185 km with maximum internal and external payload

Main Weapon System

Note: This military transport helicopter can be armed with up to three 7.62 mm machine guns or miniguns. Two of them can be mounted in the doors and one on loading ramp.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Boeing CH-47 Chinook is an American twin-engined, tandem rotor, heavy-lift helicopter developed by American rotorcraft company Vertol and manufactured by Boeing Vertol (later known as Boeing Rotorcraft Systems). The CH-47 is among the heaviest lifting Western helicopters. Its name, Chinook, is from the Native American Chinook people of modern-day Washington state. The Chinook was originally designed by Vertol, which had begun work in 1957 on a new tandem-rotor helicopter, designated as the Vertol Model 107 or V-107. Around the same time, the United States Department of the Army announced its intention to replace the piston engine-powered Sikorsky CH-37 Mojave with a new, gas turbine-powered helicopter. During June 1958, the U.S. Army ordered a small number of V-107s from Vertol under the YHC-1A designation; following testing, it came to be considered by some Army officials to be too heavy for the assault missions and too light for transport purposes. While the YHC-1A would be improved and adopted by the U.S. Marine Corps as the CH-46 Sea Knight, the Army sought a heavier transport helicopter, and ordered an enlarged derivative of the V-107 with the Vertol designation Model 114. Initially designated as the YCH-1B, on 21 September 1961, the preproduction rotorcraft performed its maiden flight. In 1962, the HC-1B was redesignated CH-47A under the 1962 United States Tri-Service aircraft designation system. The Chinook possesses several means of loading various cargoes, including multiple doors across the fuselage, a wide loading ramp located at the rear of the fuselage and a total of three external ventral cargo hooks to carry underslung loads. Capable of a top speed of 170 knots (196 mph, 315 km/h), upon its introduction to service in 1962, the helicopter was considerably faster than contemporary 1960s utility helicopters and attack helicopters, and is still one of the fastest helicopters in the US inventory. Improved and more powerful versions of the Chinook have also been developed since its introduction; one of the most substantial variants to be produced was the CH-47D, which first entered service in 1982; improvements from the CH-47C standard included upgraded engines, composite rotor blades, a redesigned cockpit to reduce workload, improved and redundant electrical systems and avionics, and the adoption of an advanced flight control system. It remains one of the few aircraft to be developed during the early 1960s – along with the fixed-wing Lockheed C-130 Hercules cargo aircraft – that had remained in both production and frontline service for over 50 years. The military version of the helicopter has been exported to nations across the world; the U.S. Army and the Royal Air Force (see Boeing Chinook (UK variants)) have been its two largest users. The civilian version of the Chinook is the Boeing Vertol 234. It has been used by civil operators not only for passenger and cargo transport, but also for aerial firefighting and to support logging, construction, and oil extraction industries.

Mi-26T2 Russian Heavy Transport Helicopter







Tiers:



Parent:

Mil Mi-26 (Halo) Russian Heavy Transport Helicopter

Variants:

- **Mi-26A:** Upgraded military version with a new flight/navigation system. Flown in 1985 but no production
- **Mi-26M:** Upgraded version of the Mi-26 for better performance.
- **Mi-26S:** Disaster response version developed in response to nuclear accident at Chernobyl
- **Mi-26T:** Basic civil cargo/freight transport version. Production from 1985.[
- **Mi-26TS:** Civil cargo transport version, also marketed as Mi-26TC.
- **Mi-26TM:** Flying crane version with under-nose gondola for pilot/crane operator.
- **Mi-26TP:** Firefighting version with internal 15,000 litres (4,000 US gal; 3,300 imp gal) fire retardant tank.
- **Mi-26MS:** Medical evacuation version of Mi-26T. Up to 60 stretcher cases in field ambulance role, or can be equipped for intensive care or as field hospital.[
- **Mi-26P:** 63 seat passenger version.[
- **Mi-26PK:** Flying crane derivative of Mi-26P
- **Mi-26T2:** Improved version of the Mi-26T equipped with BREO-26 airborne electronic system, allowing it to fly any time, day or night, under good and bad weather conditions. Serial production began on May 22, 2015.[
- **Mi-26T2V:** Newest modernization variant intended for the Russian military, equipped with new NPK90-2V avionics suite allowing it to fly routes in automatic mode, airborne defense complex "Vitebsk", anti-blast seats and new navigation and satellite communication systems. The cockpit is fitted with multifunctional displays with provision for use of night-vision goggles during night ops. The Mi-26T2V made its maiden flight in August 2018
- **Mi-27:** Proposed airborne command post variant; two prototypes bui

System

Alternative Designation: Mil Mi-26; Halo
Primary Function: Heavy Transport Helicopter
In Service: 2015-Present
Manufacturer: Rostvertol

Crew: ea2-3 (pilot, co-pilot and loadmaster when carrying an external load)

Passengers: The modernised helicopter is designed to transport heavy cargo and equipment. It can be used to quickly transport up to 82 troops and their equipment, as well as a wide range of heavy-weight combat vehicles.

Blades, Main Rotor: 8

Blades, Tail Rotor: ea5

Number of Engines: ea2 ea, however the helicopter has the ability to fly with only one engine

Day/Night Capable: Yes

All Weather Capable: Yes, NPK90-2 integrated avionics equipment system (IAES)

Number of Hard Points: INA

Note: Crew requirements are reduced with the elimination of the flight engineer and navigator.

Dimensions

Length: m33.73

Width: mINA

Height: m8.15

Main Rotor Diameter: m32.0

Disc Area: m804.25 sq m

Cabin, Length: m12.00

Cabin, Width: m3.25

Cabin, Height: 2.95 m to 3.17 m

Cabin, Volume: 120 cu m

Weight, Empty: kg28,600

Weight, Normal Takeoff: 49,500 kg

Weight, Maximum Takeoff: 56,000 kg

Maximum Payload: 20,000 kg

External Payload, out of Ground Effect: 14,515 kg

External Payload, in Ground Effect: 18,144 kg

Automotive

Engine Name: 2 x Progress D-136-2

Engine Type: INA

Engine Power: 11,650 shp (8,690 kW) each

Transmission Rating: 20,000 shp (14,914 kW)

Speed, Maximum: km/h295

Speed, Cruise: km/h255

Range w/Maximum Internal Fuel and Maximum Payload: km800

Range, Ferry: 1,920 km

Ceiling: 4,600 m

Ceiling, Hovering in Ground Effect: m4,600

Ceiling, Hovering out of Ground Effect: m1,520

Internal Fuel Capacity: 11,900 liters

Fuel Consumption: 0.437 lb (0.198 kg)/hp/hour

Note: The helicopter can also provide self-contained refuelling to ground-based vehicles

Communications

Radio: INA

Fire Control and Avionics

Fire Control System Type: INA

Radar: 1 x Doppler/weather radar in nose

Digital or Analog Cockpit: Digital

Fire Control Radar: INA

Direct Fire Control: No

Laser Designator: INA

Sensor Suite(s) Available: Yes, NPK90-2 Integrated Avionics Equipment System (IAES)

Position Location System: Yes

Full Authority Digital Engine Control (FADEC): Yes

Terrain Mapping: Yes

GPS: Yes, GPS/GLONASS/NAVSTAR position finding

Navigation Type: Inertial Navigation

Velocity Sensor: Doppler Velocity Sensor

Display Screens: five multi-functional liquid-crystal displays

Electronic Flight Instrumentation System (EFIS): Yes

Searchlight: Transas TSL-1600 searchlight

Night Vision: infrared illuminator for use with night-vision goggles

Note: The sling operator can control the external load visually through a BTU-3 television system that shows a color image on a cockpit display.

Protection

Fuselage: INA

Cockpit Glass: INA

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Mi-26T2 is the latest upgraded version of the Mi-26. The Mi-26T2 is a modernisation of the Mi-26T heavy-lift transport helicopter designed by Mil Moscow Helicopter Plant, a division of Russian Helicopters.The modernised helicopter is designed to transport heavy cargo and equipment. It can be used to quickly transport up to 82 troops and their equipment, as well as a wide range of heavy-weight combat vehicles. Mi-26T2 - an upgraded version of the helicopter, Mi-26T2 is fitted with a new BREO-26 avionics suite and glass cockpit with five multifunctional LCD displays, new digital autopilot, and NAVSTAR/GLONASS supported navigation system. The Mi-26T2’s array of on-board equipment ensures the helicopter can operate in any part of the world, and ensures it can perform flights to international standards. The latest avionics suite fitted also makes it possible to reduce the number of crew needed from 5 to 2 people, plus an operator should the external sling be in use.

Mi-8 (Hip) Russian Medium Transport Helicopter





Tiers:



Variants:

- **List of Variants - See Below:** Mi-8 Hip-A Mi-8 Hip-B Mi-8T Hip-C (Transportny, transport) Mi-8TM Mi-8TV Mi-8S Hip-C (Salon) Mi-8 VIP Mi-8VZPU Hip-D Mi-8TB Hip-E Mi-8TBK Hip-F (Kommercheskiy, commercial) Mi-9 Hip-G Mi-8MPS Mi-8SMV Hip-J Mi-8P/PPA Hip-K Mi-8AMTSh/Mi-171Sh Mi-8AMTSh-V Mi-8AMTSh-VA Mi-8TG Mi-8 Rana Mi-8MTPR-1 Mi-17/Mi-8MT/Mi-8MTV/Mi-17V Hip-H Mi-17P Mi-17PI Mi-17PG Mi-17Z-II Mi-17MD Mi-17KF Mi-171 Mi-171M/Mi-171A2 Mi-17M/Mi-171V Mi-172 Mi-8MTV (Visotnii, high altitude) Mi-17 Pratap Mi-17-1VA Mi-17V5 Mi-171E Mi-171E2

System

Alternative Designation: Mi-8T; Hip
Primary Function: Armed assault-transport
Type: Medium twin-turbine transport helicopter
Manufactuer: Kazan Helicopter Plant Ulan-Ude Aviation Plant
Crew: ea3 (2x pilots, 1x flight engineer)
Blades, Main Rotor: 5
Blades, Tail Rotor: ea3
Day/Night Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
All Weather Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.
Takeoff or Landing Limitations: INA
Vertical Climb Rate: m/s9
Number of Hard Points: ea4
Standard Payload: HIP C: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Landing Gear: Fixed main gear struts run down and out from attachment points on the upper, rear fuselage. A second strut holds the wheel well away from the lower fuselage. The two-wheel nose gear is fitted under the fuselage just behind the cockpit

Dimensions

Length, with Rotors Turning: m25.2
Length, Fuelage: m18.2
Width: m2.5
Height: m5.65
Main Rotor Diameter: m21.3
Tail Rotor Diameter: m3.9
Cargo Compartment, Length: m5.3
Cargo Compartment, Width: m2.3
Cargo Compartment, Height: m1.8
Weight, Maximum Gross: kg12,000
Weight, Normal Takeoff: kg11,100
Weight, Empty: kg6,990

Automotive

Engine Name: 2 x TV2-117
Engine Type: Medium twin-turbine
Engine Power: hp1,482
Speed, Maximum: km/h250
Speed, Average: km/h225
Service Ceiling: m4,500
Range, Maximum Load: km350
Range, Normal Load: km460
Range, with Auxilery Fuel: km950
Fuel, Internal: 445 liters
Fuel, Internal Aux Tank: 915 liters ea
Fuel, External Fuel Tank: 45 liters in port tank, 680 liters in starboard tank
Service Ceiling, Service: m4,500
Service Ceiling,Hover (out of ground effect): m800
Service Ceiling,Hover (in ground effect): m1,900
Vertical Climb Rate: m/s9
Standard Payload: HIP C: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Communications

Radio: INA

Door Mounted Gun

Note: Loaded combat troops can fire personal weapons through windows from inside cabin.

Wing Mounted Weapons

Additional Armament that can be equipped on the Mi-8T: 2 - 7.62-mm or 1x 12.7-mm MG 4-6 - AT-2C Swatter or AT-3 Sagger ATGMs 4-6 - 57-mm rocket pods (16 each) 2 - 80-mm rocket pods (20 each) 4 - 250-kg bombs 2 - 500-kg bombs 2 - 12.7-mm MG pod 2 - Twin 23-mm gun pods 1,830 liters Additional fuel tanks

↳*Rocket System*

Name: UB-32 (rocket pod)

Type: 57 mm, reusable, 32-salvo rocket pod

Length, Launcher: mm2,080

Diameter, Launcher: mm464

Basic Load for the UB-32 Rocket Pod: ea4, one on each hardpoint

Number of Rockets in each UB-32 Rocket Pod: ea32

↳*Rocket*

Name: S-5 Rockets

Type: Rocket

Length, Rocket: mm2,080

Diameter, Rocket: mm481

Weight Empty: kg103

Weight Loaded: kg264

Warhead Types: produced in a variety of sub-types with different warheads, including HEAT anti-armour (S-5K), high-explosive fragmentation (S-5M/MO), smoke, and incendiary rounds

Maximum Effective Range: 3-4 km depending on the warhead and fuze

Basic Load: 32 S-5 Rockets per UB-32 Rocket Pod

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Weather Radar: Type 8A-813

Navigation: DISS-32-90 Doppler navigation under tailboom

Protection

Armor Type: Bolt-on

Fuselage: semi-monocoque pod and boom fuselage has a nearly stepless front

Cockpit Glass: large, five-section windshield and lower nose windows

Stealth Properties: No

Heat Signature Reduction: IR over engine exhausts

Add on Armor: Available

NBC Protection: Yes

EW: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): Yes,

Jammer: Hot Brick IR

Notes:

The Mil Mi-8 (Russian: Ми-8, NATO reporting name: Hip) is a medium twin-turbine helicopter, originally designed by the Soviet Union, and now produced by Russia. In addition to its most common role as a transport helicopter, the Mi-8 is also used as an airborne command post, armed gunship, and reconnaissance platform. Along with the related, more powerful Mil Mi-17, the Mi-8 is among the world's most-produced helicopters, used by over 50 countries. As of 2015, it is the third most common operational military aircraft in the world. Mikhail Mil originally approached the Soviet government with a proposal to design an all-new two-engined turbine helicopter after the success of the Mil Mi-4 and the emergence and effectiveness of turbines used in the Mil Mi-6; but the military argued against a new helicopter, as they were content with the current Mil Mi-4.To counter this, Mikhail Mil proposed that the new helicopter was more of an update to new turbine engines rather than an entirely new helicopter; this persuaded the council of ministers to proceed with production. Due to the position of the engine, this enabled Mikhail Mil to justify redesigning the entire front half of the aircraft around the single engine (designed by Oleksandr Ivchenko at OKB-478 in Zaporizhzhia, Ukraine, originally for fixed wing aircraft as all other soviet turbines had been up to that point). The prototype, which was named V-8, was designed in 1958 and based on the Mil Mi-4 with a larger cabin. Powered by an AI-24 2,010 kW (2,700 shp) Soloviev turboshaft engine, the single engined V-8 prototype had its maiden flight in June 1961 and was first shown on Soviet Aviation Day parade (Tushino Air Parade) in July 1961. The Soviet military originally showed little interest in the Mi-8 until the Bell UH-1's involvement in the Vietnam war became widely publicised as a great asset to the United States, allowing troops to move swiftly in and out of a battlefield and throughout the country. It was only then that the Soviet military rushed a troop-carrying variant of the Mil Mi-8 into production. By 1967, it had been introduced into the Soviet Air Force as the Mi-8. There are numerous variants, including the Mi-8T, which, in addition to carrying 24 troops, is armed with rockets and anti-tank guided missiles. The Mil Mi-17 export version is employed by around 20 countries; its equivalent in Russian service in the Mi-8M series. The only visible difference between the Mi-8 and Mi-17 is that the tail rotor is on the starboard side (right side) of the Mi-8, whereas in Mi-17 it is on the port side. Also Mi-17 also has some improved armour plating for its crew. The naval Mil Mi-14 version is also derived from the Mi-8. The Mi-8 is constantly improving and the newest version still remains in production in 2016. During an official visit to the United States in September 1959, Nikita Khrushchev took a flight in the S-58 presidential helicopter for the first time and was reportedly extremely impressed.[9][10] On Khrushchev's return, he ordered the creation of a similar helicopter, which was to be ready for the return visit by the American president, to save face. A luxury version of the Mi-4 was quickly created and Khrushchev took an inspection flight, during which Mikhail Mil proposed that his helicopter in development was more suitable. However, it would be necessary to have a second engine for reliability. This gave Mikhail Mil the power under the orders of Khrushchev to build the original two-engined helicopter, which for the first time in Soviet history would need purpose-built turbine engines, rather than those adapted from fixed wing aircraft (as in the Mil Mi-6 and the first prototype V-8) and an entirely new main rotor gear box that would be designed in-house for the first time. In May 1960, the order was given for Mikhail Mil to create his twin engine helicopter. The Sergei Isotov Design Bureau accepted the task of creating the engines. The second prototype (still equipped with the one turbine engine as the Isotov engines were still under development) flew in September 1961. Two months after the engines were completed by Isotov, the third prototype designated V-8A equipped with two 1,120 kW (1,500 shp) Isotov TV2 engines, made its first flight piloted by Nikolai Ilyushin on 2 August 1962, marking the first flight of any Soviet helicopter to fly with purpose built gas turbine engines. The aircraft completed its factory based testing in February 1963. The fourth prototype was designed as a VIP transport, with the rotor changed from four blades to five blades in 1963 to reduce vibration, the cockpit doors replaced by blister perspex slides and a sliding door added

to the cabin. The fifth and final prototype was a mass production prototype for the passenger market. In November 1964, all joint testing had been completed and the soviet government began mass production. Production started in the Kazan Production Plant, with the first aircraft completed by the end of 1965.

CH-47F American Medium Transport Helicopter





Tiers:



Variants:

- **HC-1B:** The pre-1962 designation for Model 114 development aircraft that would be redesignated CH-47 Chinook
- **CH-47A:** The all-weather, medium-lift CH-47A Chinook was powered initially by Lycoming T55-L-5 engines rated at 2,200 horsepower (1,640 kW), but then replaced by the T55-L-7 rated at 2,650 hp (1,980 kW) engines or T55-L-7C engines rated at 2,850 hp (2,130 kW). The CH-47A had a maximum gross weight of 33,000 lb (15,000 kg), allowing for a maximum payload around 10,000 lb (4,500 kg)
- **ACH-47A:** The ACH-47A was originally known as the Armed/Armored CH-47A (or A/ACH-47A). It was officially designated ACH-47A as a U.S. Army Attack Cargo Helicopter, and unofficially referred to as Guns A Go-Go. Four CH-47A helicopters were converted to gunships by Boeing Vertol in late 1965. Three were assigned to the 53rd Aviation Detachment in South Vietnam for testing, with the remaining one retained in the U.S. for weapons testing. By 1966, the 53rd was redesignated the 1st Aviation Detachment (Provisional) and attached to the 228th Assault Support Helicopter Battalion of the 1st Cavalry Division (Airmobile). By 1968, only one gunship remained, and logistical concerns prevented more conversions. It was returned to the United States, and the program stopped.
- **CH-47B:** The CH-47B was an interim solution while Boeing worked on a more substantially improved CH-47C. The CH-47B was powered by two Lycoming T55-L-7C 2,850 shp (2,130 kW) engines. It featured a blunted rear rotor pylon, redesigned asymmetrical rotor blades, and strakes along the rear ramp and fuselage to improve flying characteristics. It could be equipped with two door-mounted M60D 7.62 mm NATO machine guns on the M24 armament subsystem and a ramp-mounted M60D using the M41 armament subsystem. Some CH-47 "bombers" were equipped to drop tear gas or napalm from the rear cargo ramp onto Viet Cong bunkers. The CH-47B could be equipped with a hoist and cargo hook. The Chinook proved especially valuable in "Pipe Smoke" aircraft recovery missions. The "Hook" recovered about 12,000 aircraft valued at over $3.6 billion during the war; 108 were built.
- **CH-47C:** The CH-47C principally featured more powerful engines and transmissions.[61] Three sub-versions were built; the first had Lycoming T55-L-7C engines delivering 2,850 shp (2,130 kW). The "Super C" included Lycoming T55-L-11 engines delivering 3,750 shp (2,800 kW), an upgraded maximum gross weight of 46,000 lb (21,000 kg), and a pitch stability augmentation system. The T55-L-11 engines suffered difficulties, as they had been hurriedly introduced to increase payload; thus, they were temporarily replaced by the more reliable Lycoming T55-L-7C. The type was distinguishable from the standard "C" by the uprated maximum gross weight.
- **CH-47D:** The CH-47D shares the same airframe as earlier models, the main difference being the adoption of more powerful engines. Early CH-47Ds were originally powered by two T55-L-712 engines, the most common engine is the later T55-GA-714A. With its triple-hook cargo system, the CH-47D can carry heavy payloads internally and up to 26,000 pounds (12 t) (such as 40-foot or 12-metre containers) externally. It was first introduced into service in 1979. In air assault operations, it often serves as the principal mover of the 155 mm M198 howitzer, accompanying 30 rounds of ammunition, and an 11-man crew. The CH-47D also has advanced avionics, such as the Global Positioning System. Nearly all US Army CH-47D were conversions from previous A, B, and C models, a total of 472 being converted. The last

U.S. Army CH-47D built was delivered to the U.S. Army Reserve, located at Fort Hood, Texas, in 2002.[

- **MH-47D:** The MH-47D variant was developed for special forces operations and has inflight refueling capability, a fast rope-rappelling system, and other upgrades. The MH-47D was used by U.S. Army 160th Special Operations Aviation Regiment. 12 MH-47D helicopters were produced. Six were conversions from CH-47A models and six were conversions from CH-47C models.
- **MH-47E:** The MH-47E has been used by U.S. Army Special Operations. Beginning with the E-model prototype manufactured in 1991, a total of 26 Special Operations Aircraft were produced. All aircraft were assigned to 2–160th SOAR(A) "Nightstalkers", home based at Fort Campbell, Kentucky. E models were conversions from existing CH-47C model airframes. The MH-47E has similar capabilities as the MH-47D, but includes an increased fuel capacity similar to the CH-47SD and terrain following/terrain avoidance radar.
- **CH-47F:** In 2001, the first CH-47F, an upgraded CH-47D, made its maiden flight; the first production model rolled out on 15 June 2006 at Boeing's facility in Ridley Park, Pennsylvania, and first flew on 23 October 2006. Upgrades include 4,868-shaft-horsepower (3,630 kW) Honeywell engines and the airframe featuring greater single-piece construction to lower maintenance requirements. The milled construction reduces vibration, as well as inspection and repair needs, and eliminates flexing points to increase service life. The CH-47F can fly at speeds of over 175 mph (282 km/h) with a payload of more than 21,000 lb (9.5 t). New avionics include a Rockwell Collins Common Avionics Architecture System (CAAS) cockpit, and BAE Systems' Digital Advanced Flight Control System (DAFCS).[75] AgustaWestland assembles the CH-47F under license, known as the Chinook ICH-47F, for several customers.[78] Boeing delivered 48 CH-47Fs to the U.S. Army through August 2008; at that time Boeing announced a $4.8 billion contract with the Army for 191 Chinooks.
- **MH-47G:** The MH-47G Special Operations Aviation (SOA) version is currently being delivered to the U.S. Army. It is similar to the MH-47E, but features more sophisticated avionics including a digital Common Avionics Architecture System (CAAS). The CAAS is a common glass cockpit used by different helicopters such as MH-60K/Ls, CH-53E/Ks, and ARH-70As. The MH-47G also incorporates all of the new sections of the CH-47F.
- **CH-47J:** The CH-47J is a medium-transport helicopter for the Japan Ground Self-Defense Force (JGSDF), and the Japan Air Self-Defense Force (JASDF).[95] The differences between the CH-47J and the CH-47D are the engine, rotor brake and avionics, for use for general transportation, SAR and disaster activity like U.S. forces.The CH-47JA, introduced in 1993, is a long-range version of the CH-47J, fitted with an enlarged fuel tank, an AAQ-16 FLIR in a turret under the nose, and a partial glass cockpit. Both versions are built under license in Japan by Kawasaki Heavy Industries, who produced 61 aircraft by April 2001.
- **HH-47:** On 9 November 2006, the HH-47, a new variant of the Chinook based on the MH-47G, was selected by the U.S. Air Force as the winner of the Combat Search and Rescue (CSAR-X) competition. Four development HH-47s were to be built, with the first of 141 production aircraft planned to enter service in 2012.[
- **Sea Chinook:** For years US Navy has been operating different versions of the CH-53 helicopter. CH-47s regularly conduct ship-based operations for U.S. Special Forces and other international operators. Due to budget issues, technical problems and delays with CH-53K, the director of the Pentagon’s cost assessment office directed US Navy to consider maritime versions of CH-47. Naval versions must be protected against the corrosive seaborne environment and be able to operate from aircraft carriers and amphibious ships
- **Civilian models:** Model 234LR (long range): Commercial transport helicopter. The Model 234LR can be fitted out as an all-passenger, all-cargo, or cargo/passenger transport helicopter. Model 234ER (extended range): Commercial transport version. Model MLR (multi-purpose long range): Commercial transport version. Model 234UT (utility transport): Utility transport helicopter. Model 414: The Model 414 is the international export version of the CH-47D. It is also known as the CH-47D International Chinook.

System

Alternative Designation: CH-47F

Primary Function: The CH-47F performs various transport missions. It transports troops, war supplies and battlefield equipment. This helicopter is also deployed in medical evacuation, search and rescue, aircraft recovery, parachute drop and other operations.

Type: Medium Transport Helicopter

Crew: ea3

Passengers: The CH-47F accommodates 33 to 55 passengers, depending on cargo area configuration. However usually it carries less passengers. Alternatively it can carry up to 24 litters, plus medical attendants.

Blades, Main Rotor: ea3

Blades, Tail Rotor: ea3

Cargo Capacity: It can carry up to 10 900 kg of cargo internally and 12 700 kg externally on a sling load.

Cargo Hooks: The helicopter has three external cargo hooks and can carry various loads, such as light vehicles, artillery

pieces or shelters.

Internal Payload: 10.9 tons

External Payload: 12.7 tons

Dimensions

Length: 30.1 m

Main Rotor Diameter: 18.29 m

Height: 5.68 m

Weight, Empty: 10.19 tons

Weight, Maximum Take Off: 22.68 tons

Automotive

Engine Name: 2 x Honeywell T55-GA-714A

Engine Type: Turboshafts

Engine Power: 2 x 4 733 shp

Maximum Speed: 315 km/h

Cruising Speed: 291 km/h

Service Ceiling: 5.64 km

Range: 741 km

Ferry Range: 2 252 km

Main Weapon System

Note: This military transport helicopter can be armed with up to three 7.62 mm machine guns or miniguns. Two of them can be mounted in the doors and one on loading ramp.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

In 2001, the first CH-47F, an upgraded CH-47D, made its maiden flight; the first production model rolled out on 15 June 2006 at Boeing's facility in Ridley Park, Pennsylvania, and first flew on 23 October 2006. Upgrades include 4,868-shaft-horsepower (3,630 kW) Honeywell engines and the airframe featuring greater single-piece construction to lower maintenance requirements.[75] The milled construction reduces vibration, as well as inspection and repair needs, and eliminates flexing points to increase service life. The CH-47F can fly at speeds of over 175 mph (282 km/h) with a payload of more than 21,000 lb (9.5 t). New avionics include a Rockwell Collins Common Avionics Architecture System (CAAS) cockpit, and BAE Systems' Digital Advanced Flight Control System (DAFCS). AgustaWestland assembles the CH-47F under license, known as the Chinook ICH-47F, for several customers. Boeing delivered 48 CH-47Fs to the U.S. Army through August 2008; at that time Boeing announced a $4.8 billion contract with the Army for 191 Chinooks. In February 2007, the Royal Netherlands Air Force became the first

international customer, ordering six CH-47Fs, expanding their fleet to 17. On 10 August 2009, Canada signed a contract for 15 extensively modified and upgraded CH-47Fs for the Canadian Forces, later delivered in 2013–2014 with the Canadian designation CH-147F. On 15 December 2009, Britain announced its Future Helicopter Strategy, including the purchase of 24 new CH-47Fs to be delivered from 2012. Australia ordered seven CH-47Fs in March 2010 to replace its six CH-47Ds between 2014 and 2017. In late 2015, Australia has sought permission to order three more CH-47Fs. In September 2015 India approved purchase of 15 CH-47F Chinooks. On 7 November 2016, Singapore announced that the CH-47F would replace its older Chinooks, which had been in service since 1994. This would enable the Republic of Singapore Air Force to meet its requirements for various operations, including Search and Rescue (SAR), Aeromedical Evacuation (AME), and Humanitarian Assistance and Disaster Relief (HADR) operations. A CH-47F Block 2 is planned to be introduced after 2020. The Block 2 aims for a payload of 22,000 lb (10,000 kg) with 4,000 ft (1,200 m) and 95 °F (35 °C) high and hot hover performance, eventually increased up to 6,000 ft (1,800 m), to carry the Joint Light Tactical Vehicle; maximum takeoff weight would be raised to 24,500 kg (54,000 lb). It features the composite-based Advanced Chinook Rotor Blade (derived from the cancelled RAH-66 Comanche) 20% more powerful Honeywell T55-715 engines, and the active parallel actuator system (APAS); the APAS enhances the digital advanced flight-control system, providing an exact torque split between the rotors for greater efficiency. A new fuel system combines the three fuel cells in each sponson into one larger fuel cell and eliminating intracell fuel transfer hardware, reducing weight by 90 kg (200 lb) and increasing fuel capacity. Electrical capacity is increased by three 60 kVA generators. The U.S. Army plans for a Block 3 upgrade after 2025, which could include a new 6,000 shp-class engine with boosted power capacity of the transmission and drive train developed under the future affordable turbine engine (FATE) program and a lengthened fuselage. The Future Vertical Lift program plans to begin replacing the Army's rotorcraft fleet in the mid-2030s, initially focusing on medium-lift helicopters, thus the CH-47 is planned to be in service beyond 2060, over 100 years after first entering service.

EC725 French Caracal Medium Transport Helicopter





Tiers:



Variants:

- **H225:** This is the civilian variant of the H225M. It can carry 24 passengers and an attendant for offshore operations or eight to 10 passengers in a VIP configuration. It is also equipped with a full de-icing/anti-icing system.
- **H225e:** This is an improved version of the H225 launched in February 2014. It is designed for longer-range flights, particularly for offshore oil and gas airlift missions. The helicopter is powered by Turbomeca Makila 2B turboshaft engines, which provide enhanced performance and an extended range of 300 nm (555 km) with 10 passengers. The engine has a new combustion chamber and blades in the high-pressure turbine, which permits the H225e to take off at its maximum weight. A new seating layout provides increased comfort for passengers and offers better access. The upgraded cockpit features a Euronav 7 moving map system; automatic identification system (AIS); TCAS2 collision-avoidance system; and a flight-management system. Enhanced operational capabilities include the ability to perform automatic GPS approaches to oil rigs or airfields that are not equipped with radio navigation systems.
- **Eurocopter EC225 Super Puma:** The Airbus Helicopters H225 (previously Eurocopter EC225 Super Puma) is a long-range passenger transport helicopter developed by Eurocopter as the next generation of the civilian Super Puma family. It is a twin-engined aircraft and can carry up to 24 passengers along with two crew and a cabin attendant, dependent on customer configuration. The helicopter is marketed for offshore support and VIP passenger transport duties, as well as public service missions. The civil-orientated EC225 has a military counterpart, which was originally designated as the Eurocopter EC725; it was rebranded in 2015 as the H225M. In 2015, the EC225 was formally renamed to the H225, in line with Eurocopter's corporate rebranding as Airbus Helicopters

System

Alternative Designation: Eurocopter EC725 French Caracal Medium Transport Helicopter

Type: Attack Helicopter

Primary Function: INA

Crew: 1 or 2 (pilot + co-pilot)

Blades, Main Rotor: ea5

Blades, Tail Rotor: ea4

Number of Engines: ea2 x Turbomeca Makila 2A

Number of Hard Points: INA

Number of Passengers: 28 troop members

Dimensions

Length: m19.5

Width: INA

Height: m4.6

Main Rotor Diameter: m16.2

Main Rotor Area: 206.1 m2

Weight, Combat: 5,330 kg

Gross Weight: 11,000 kg

Maximum Takeoff Weight: 11,200 kg

Automotive

Engine Name: Turbomeca Makila 2A1

Engine Type: Free-turbine turboshaft

Engine Power: 2382 hp each

Maximum Speed: 324 km/h

Cruise Speed: 262 km/h

Never Exceed Speed: 324 km/h

Range: 920 km

Ferry Range: 1,253 km

Service Ceiling: 6,095 m

Rate of Climb: 7.4 m/s

Main Gun System

↳ ***System***

Name: AA-52

Type: General-Purpose Machine Gun

Caliber: mm7.62

Quantity: 2 x AA-52

Length: 1080 mm

Barrel Length: 600 mm

Weight: 9.970 kg

Action: Lever-delayed blowback

Rate of Fire: 900 round/min

Muzzle Velocity: 830 m/s

Effective Firing Range: 600 m

Maximum Firing Range: 3,200 m

Feed System: 50-round non-disintegrating belt

Sights: Iron Removable APX (SOM) telescopic sights IR scope

Ammunition

Type: Rifle

Caliber: mm7.62

Cartridge: 7.5×54mm French 7.62×51mm NATO

Basic Load: INA

Rocket Weapon Systems

Note: The EC725 Caracal can carry 68mm Rocket Pods

Fire Control and Avionics

Fire Control Radar: INA

Navigation Radar: INA

Protection

Add on Armor: INA

Stealth Properties: None

Heat Signature Reduction: No

NBC Protection: INA

EW Counter Measures/CCM: INA

Counter Measures (Chaff/Flares): INA

Notes:

The Eurocopter EC725 Caracal, now called Airbus Helicopters H225M, is a long-range tactical transport military helicopter developed from the Eurocopter AS532 Cougar for military use. It is a twin-engined aircraft and can carry up to 28 seated troops along with two crew, depending on customer configuration. The helicopter is marketed for troop transport, casualty evacuation, and combat search and rescue duties, and is similar to the civilian EC225. The EC725 was developed to meet a French Air Force requirement for a specialist helicopter for Combat Search and Rescue operations. The AS 532 A2 Cougar model was examined and rejected for this purpose following extensive trials between 1996 and 1999. The primary improvements desired by the French Air Force were more powerful engines, greater flight endurance and improved combat durability. Eurocopter opted to pursue development of a more ambitious derivative of the AS 532 to meet this need, which was later designated as the EC725. The EC725 was initially named Cougar Mk II+ due to treaty reasons. The new aircraft also featured new mission equipment and autonomous avionics, along with other changes to meet the French specification. On 27 November 2000, the first EC725 prototype performed its maiden flight at Marignane, and on 15 January 2001, the first public presentation of the new helicopter took place. In concurrent development of the military-orientated EC725, Eurocopter also developed a civil-orientated counterpart, which was designated as the EC225. The French Air Force subsequently ordered an initial six EC725s to perform the Combat Search & Rescue mission, the first of these was delivered in February 2005. A follow-on order for eight more EC725s was placed for the French Armed Forces in November 2002; a total fleet of 20 EC725s in French service was envisioned in 2004. By 2015, the EC725, since re-designated as the H225M, was being manufactured on two separate production lines in France and Brazil. In July 2015, Airbus Helicopters announced that it was considering setting up a third assembly line in India if the firm was successful at winning an Indian tender for naval helicopters. he EC725 is based on the Eurocopter AS 532 Cougar, improving upon the design with a five-blade composite main rotor incorporating a new airfoil shape to reduce vibration levels. The helicopter can be fitted with removable armour plating to protect the troops and is powered by two Turbomeca Makila 1A4 turboshaft engines mounted over the cabin, which feature a dual-channel Full Authority Digital Engine Control (FADEC) system. They can be fitted with an anti-icing system to enable the aircraft to operate in very cold climates. Other improvements include a reinforced main rotor gearbox and an all glass cockpit. The cockpit is equipped with an integrated display system featuring a digital map and Active Matrix Liquid Crystal Displays. The helicopter has day and night time search and rescue capabilities by way of a search radar and Forward Looking Infra Red (FLIR); these allow the EC725 to be flown under visual meteorological and instrument flight rules conditions. The EC725 can be equipped with various military equipment and armaments, such as a pair of 7.62 mm FN MAG machine guns mounted within forward left and right windows, or a pair of 68 mm (2.75") Thales Brandt or

Forges de Zeebrugge side-mounted rocket launchers, each with 19 rockets, or the MU90 Impact aerial-launched torpedo. Brazilian EC725s are equipped with a Helibras-built countermeasures suite, which includes chaff and flares to confuse radar and heat-guided missiles respectively; Thales has also produced self-protection systems to equip French EC725s. The Exocet anti-ship missile has also been integrated upon Brazilian Navy EC725s. Eurocopter developed four primacy cabin configurations for the type. The Troop Transport version contains a seating arrangement for a maximum of 29 troops, in addition to the crew. A dedicated VIP transport version is designed to contain between 8 and 12 passengers. The Casualty Evacuation version can carry up to 12 stretchers along with a total of four seated medical staff. The Combat SAR configuration is fully equipped to perform search and rescue duties in a combat environment. According to Airbus Helicopters, the H225M is capable of undertaking various mission roles including combat search and rescue, long-range tactical transport, aeromedical transport, logistic support and shipboard maritime operations. The armed version carries gun pods, rocket pods and Hellfire air-to-surface missiles (HForce Generic Weapon System (GWS) with Thales Scorpion helmet-mounted sight display (HMSD) and Wescam electro-optical sensor)

→Fixed Wing Aircraft

→→Fighter Aircraft

MiG-23 (Flogger) Russian Fighter Aircraft





Tiers:



System

Alternative Designations: MiG-27, Bahadur, or Valiant (Indian variant)
Crew: 1
Landing Speed: 270
Max “G” Force (g): 8.5
Ceiling (m): 18,000
Vertical Climb Rate (m/s): 240

↳*Engines*

28,660-shp Soyuz/Kachaturov R-35-300 turbojet, afterburner (MiG-23): 1
25,335-shp R-29B-300 turbojet, afterburner (MiG-27): 1

↳*Weight (kg)*

↳*Speed (km/h)*

Max (sea level): Mach 1.2
Takeoff/Landing Speed: 315/270

↳*Max “G” Force (g)*

MiG-23: 8.5
MiG-27: 7

↳*Ceiling (m)*

Service (clean): 18,600

With External Stores: INA

↳***Fuel (liters)***

External 800 liter tanks: 5

↳***Range (km)***

Max Load: 1,500

With Aux Fuel: 2,500

Combat Radius: 1,150

↳***Takeoff Run/Landing Roll (m)***

↳***Dimensions (m)***

↳***Standard Payload (kg)***

↳***Hardpoints***

MiG-23: 6

MiG-27: 7

↳***Survivability/Countermeasures***

Pressurized cockpit with zero/130 ejection seat: Yes

Infrared and radar jammer: Yes

Radar warning receiver: Yes

Decoy: Yes

Chaff and flares: Yes

Armored Cockpit (MiG-27): Yes

ARMAMENT

Gsh-6-23:

↳***23-mm twin gun, Gsh-23L***

Range (practical) (m): 2,500

Elevation/Traverse (rigidly mounted): None

Rate of Fire (rpm): 9,000

Ammo Type: HEFI

↳***23-mm 6x barrel Gatling gun, Gsh-6-23***

Range (m) (practical): 2,500

Elevation/Traverse (rigidly mounted): None

Ammo Type: HEFI

Rate of Fire (rpm): 9,000

↳*Weapon & Ammunition Types*

23-mm Gsh-23L-twin gun (rnds): 200

23-mm Gsh-6-23 Gatling gun: 260

Other Loading Options: 2

AA-7 APEX (K-23R/T): 2

AA-8/APHID AAM launchers: 2

AS-7/KERRY ASM: 4

AS-10/KAREN ASM: 4

AS-12/KEGLER ASM: 4

AS-14/KEDGE ASM: 4

Rockets: 4

240-mm S-24 rockets: 1

80-mm S-8 rkt pods: 20

57-mm S-5 rkt pods: 32

AVIONICS/SENSOR/OPTICS

Acquisition and tracking radar (MiG-23): Yes

IR Sensor (MiG-23): Yes

Doppler Nav System (MiG-23): Yes

Laser rangefinder/designator (MiG-23B and MiG-27): Yes

TV sighting system (MiG-23B and MiG-27): Yes

Acquisition and tracking radar (MiG-23B and MiG-27): Yes

↳*Night/Weather Capabilities*

MiG-23 (Night and day only): Yes

MiG-27: Yes

NOTES

Description: INSET LINE-DRAWING SHOWS NOSE AND INTAKE DIFFERENCES OF THE MIG-27.THIS DIFFERENCE ALLOWS FOR A LASER RANGEFINDER/TARGET DESIGNATOR. THE SWEEP WING IS CAPABLE OF THREE ANGLES: 16, 45, AND 72 DEGREES. THE VENTRAL FIN ON THE BOTTOM REAR OF THE FUSELAGE FOLDS FOR TAKEOFF AND LANDING. UP TO FIVE EXTERNAL FUEL TANKS CAN BE CARRIED ON THE MIG-23, AND FOUR ON THE MIG-27, BUT THE MIG-27 CAN ALSO BE FITTED FOR AERIAL REFUELING. AVAILABLE MUNITIONS ARE SHOWN ABOVE; NOT ALL MAY BE EMPLOYED AT ONE TIME. MISSION DICTATES WEAPONS CONFIGURATION. EXTERNAL STORES ARE MOUNTED ON UNDERWING AND UNDERBODY HARDPOINTS. EACH WING HAS ONE POINT, TWO POINTS ARE UNDER THE INTAKES ALONG THE FUSELAGE, AND THE CENTER FUSELAGE ATTACHMENT POINT GIVES FIVE TOTAL STATIONS. THE MIG-27 THEN ADDS TWO MORE BOMB RACKS UNDER THE WINGS FOR A TOTAL OF SEVEN STATIONS.

↳***APPEARANCE***

↳***APPEARANCE***

VARIANTS

↳***MIG-23M/FLOGGER B***

Description: FIRST PRODUCTION VERSION AS STANDARD INTERCEPTOR, - PULSE DOPPLER RADAR, IMPROVED ENGINE, IRST, AA-7, ETC.

↳***MIG-23U/-23UM/-23UB/FLOGGER C***

Description: A TANDEM SEAT COMBAT AND TRAINER VARIANT.

↳***MIG-23MS/FLOGGER E***

Description: EXPORT BUILT TO B STANDARD. MIG-23MF DOWNSPEC VERSION

↳***MIG-23B/FLOGGER F***

Description: INTERIM GROUND ATTACK VARIANT WITH AL-21 TURBOJET ENGINE, NO RADAR, AND TAPERED NOSE. THE MIG-23BN VARIANT RETURNED TO THE R-35-300 ENGINE.

↳***MIG-23ML/FLOGGER G***

Description: LIGHTWEIGHT VERSION WITH IMPROVED ENGINE AND AVIONICS

↳***MIG-23P/FLOGGER G***

Description: FIGHTER VARIANT SIMILAR TO FLOGGER B, BUT WITH DIGITAL AUTOPILOT FOR GROUND CONTROL.

↳***MIG-23BK/-23BM/FLOGGER-H***

Description: GROUND ATTACK VERSIONS WITH THE UPRATED ENGINE, AND AVIONICS PODS BORROWED FROM THE MIG-27.

↳***MIG-23MLD/FLOGGER K***

Description: UPGRADED MULTI-ROLE FIGHTER WITH IMPROVED AERODYNAMICS, LATEST MISSILE, AND OTHER IMPROVEMENTS. THIS IS CONSIDERED THE BEST CURRENT PRODUCTION UPGRADE AVAILABLE.

↳***MIG-27K/FLOGGER D***

Description: GROUND-ATTACK VARIANT WITH INTERNAL GSH-6-23 23-MM GUN. APPEARANCE DIFFERS BY TAPERED NOSE.

↳***MIG-27D/-27M/FLOGGER J***

Description: APPEARANCE DIFFERS BY A LONG DOWNWARD-SLOPING, POINTED NOSE. AIRCRAFT HAS A TV/LASER DESIGNATOR. CAN BE FITTED WITH A THREE-CAMERA RECON POD.

↳***MIG-27L***

Description: EXPORT VERSIONS BUILT BY HINDUSTAN AERONAUTICS IN INDIA.

↳***J-8***

Description: CHINESE AIRCRAFT IS LOOSELY BASED ON MIG-21AND MIG-23 FEATURES.

Notes:

The Mikoyan-Gurevich MiG-23 (Russian: Микоян и Гуревич МиГ-23; NATO reporting name: Flogger) is a variable-geometry fighter aircraft, designed by the Mikoyan-Gurevich design bureau in the Soviet Union. It is a third-generation jet fighter, the world's most-produced variable-geometry aircraft, along with similar Soviet fighters such as the Su-15 "Flagon". It was the first Soviet fighter to field a look-down/shoot-down radar and one of the first to be armed with beyond visual range missiles. Production started in 1969 and reached large numbers with over 5,000 aircraft built. Today the MiG-23 remains in limited service with some export customers. The basic design was also used as the basis for the Mikoyan MiG-27, a dedicated ground-attack variant. Among many minor changes, the MiG-27 replaced the MiG-23's nose-mounted radar system with an optical panel holding a laser designator and a TV camera. The MiG-23's armament evolved as the type's avionics were upgraded and new variants were deployed. The earliest versions, which were equipped with the MiG-21's fire control system, were limited to firing variants of the R-3/K-13 (AA-2 "Atoll") missile. The R-60 (AA-8 "Aphid") replaced the R-3 during the 1970s, and from the MiG-23M onwards the BVR R-23/R-24 (AA-7 "Apex") was carried. The MiG-23MLD is capable of firing the R-73 (AA-11 "Archer"), but this missile was not exported until the MiG-29 was released for export. The helmet-mounted sight associated with the R-73 missile was fitted on the MiG-23MLDG and other experimental MiG-23MLD sub variants that never entered production as had been originally planned. The reason was that these MiG-23MLD sub variants had less priority than the then ongoing MiG-29 program, and the Mikoyan bureau therefore decided to concentrate all their efforts on the MiG-29 program and halted further work on the MiG-23. Nevertheless, a helmet-mounted sight is now offered as part of the MiG-23-98 upgrade. There were reports of the MiG-23MLD being capable of firing the R-27 (AA-10 "Alamo") beyond experimental tests; however, it seems only Angola's MiG-23-98s are capable of doing so. A MiG-23 was used to test and fire the R-27, R-73, and R-77 (AA-12 "Adder") air-to-air missiles during their early flight and firing trials. Ground-attack armament includes 57 mm rocket pods, general-purpose bombs up to 500 kg in size, gun pods, and Kh-23 (AS-7 "Kerry") radio-guided missiles. Up to four external fuel tanks could be carried.

MiG-17 (Fresco) Russian Fighter Aircraft







Tiers:

1 2 3 4

System

Alternate Designation(s): MiG-17; NATO: Fresco
Primary Function / Type: Fighter Aircraft
Manufacturer: Mikoyan-Gurevich
Crew: 1
Number of Engines: 1
Number of Hard Points: 2 pylons with a capacity of up to 500 kg (1,100 lb) of stores

Dimensions

Length: 11.36 m
Height: 3.36 m
Wingspan: 9.63 m
Wing Area: 22.60 sq m
Weight, Empty: 3,930 kg
Weight, Maximum Takeoff: 6,700 kg

Automotive

Engine Name: Klimov VK-1A
Number of Engines: 1
Engine Type: Turbojet

Maximum Power, Dry: 2,700 kg

Maximum Power with Afterburner: 3,380 kg

Internal Fuel Capacity: 1,410 liters

Maximum Speed: 1,100 km/h

Maximum Range: 2,020 km

Service Ceiling: 16,600 m

G Limits: +8

Rate of Climb: 65 m/s

Main Gun System

↳*Gun System #1*

Name: Nudelman-Rikhter NR-23

Type: Autocannon

Caliber: 23mm

Quantity: 2 × 23 mm (0.906 in) Nudelman-Rikhter NR-23 autocannon

Length: 1,980 mm

Barrel Length: 1,450 mm

Width: 165 mm

Height: 136 mm

Weight: 39 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 800–850 rpm

Muzzle Velocity: 690 m/s

↳*Gun System #1 Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23×115 mm

Basic Load: 80 rounds per gun, 160 rounds total

↳*Gun System #2*

Name: Nudelman N-37

Type: Autocannon

Caliber: 37mm

Length: 2,455mm

Barrel Length: INA

Weight: 103 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 400 rounds per minute

Muzzle Velocity: 690 m/s

↳***Gun System #2 Ammunition***

Type: Rifle

Caliber: 37mm

Cartridge: 37x155mm

Basic Load: 40 rounds total

Main Missile Systems

Note: 6 x wing pylons for two external fuel tanks and four eight-round rocket pods or two 551-lb (250-kg) bombs

↳***Main Missile System #1***

Name: K-5; NATO: AA-1 Alkali

Type: Air-to-Air Missile

Manufacturer: Kaliningrad Series Production Plant

Length: 2.49 m

Diameter: 200 mm

Weight: 82.7 kg

Warhead Type: High explosive

Warhead Weight: 13 kg

Engine: Rocket

Operational Range: 2-6 km

Maximum Speed: 2,880 km/h

Guidance System: beam riding

Rocket Weapon Systems

Note: 2 × UB-16-57 rocket pods for S-5 rockets

Bomb Weapon Systems

Bomb Capacity: 2 × 250 kg (550 lb) bombs

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The design of the MiG-17 was undertaken to correct the deficiencies that the earlier MiG-15 had at higher speeds. It was the first Soviet fighter to have an afterburning engine, the Klimov VK-1. In 1949, the Mikoyan-Gurevich (MiG) design bureau began work on a new fighter to replace the MiG-15. Two features of the aircraft were a thinner wing of greater sweep and a redesigned tail that improved stability and handling at speeds approaching Mach 1 (speed of sound). Although similar in appearance to the MiG-15, the MiG-17 has more sharply swept wings, an afterburner, better speed and handling characteristics and is about three feet longer. The wings of the aircraft are mid-mounted, swept-back, and tapered with blunt tips. They have wide wing roots. The engine is one turbojet inside the body and has a round air intake in the nose. It has a single, small exhaust. The fuselage is short, thick, cigar-shaped and tapered to the rear. It has a blunt nose and bubble canopy. The tail fin is swept-back and tapered with rounded tip. Flats are high-mounted on the tail fin, swept-back, and tapered. Flats and fin overhang the exhaust. The prototype MiG-17 (NATO code name Fresco) first flew in January 1950 and was reported to have exceeded Mach 1 in level flight. Production began in late 1951, but the aircraft were not available in sufficient quantities to take part in the Korean War. Deliveries to the Soviet Air Force began in 1952. Five versions of the aircraft eventually were produced. Early production MiG-17s were fitted with the VK-1 engine, a Soviet copy of the Rolls-Royce Nene. The VK-1F, an improved version with a simple afterburner and variable nozzle, was developed for the main production version, the MiG-17F (Fresco C). In 1955 the radar equipped MiG-17PF (Fresco D) entered service as a limited all-weather interceptor. The MiG-17PFU was armed with four AA-1 "Alkali" radar-guided missiles, making it the Soviet Union's first missile armed interceptor. Even though it was considered obsolete by the mid-1960s, the MiG-17 gave a good account over Vietnam, being flown by most of the top North Vietnamese pilots, including the leading ace, Colonel Tomb. The MiG-17 served with nearly 30 air forces worldwide, including the Soviet Union, Warsaw Pact countries, China, Afghanistan, North Korea, Sri Lanka, Syria, Morocco, Cuba, Indonesia, and Cambodia. Though smaller than the USAF F-86 Sabre of Korean War fame, its weight and performance favorably compared to that aircraft. Soviet production of the MiG-17 ended in 1958 with over 6,000 produced. It continued to be built under license in Poland as the Lim-5P and in China as the J-5/F-4. China's first reproduced jet fighter plane, the J-5, successfully flew in Shenyang for the first time on 19 July 1956, and General Nie Rongzhen went in person to Shenyang to offer congratulations.

JAS 39 Gripen Swedish Multirole Fighter Aircraft





Tiers:



Variants:

- **JAS 39A:** initial version that entered service with the Swedish Air Force in 1996. A number have been upgraded to the C standard.
- **JAS 39B:** two-seat version of the 39A for training, specialised missions and type conversion. To fit the second crew member and life support systems, the internal cannon and an internal fuel tank were removed and the airframe lengthened 0.66 m (2 ft 2 in).
- **JAS 39C:** NATO-compatible version of Gripen with extended capabilities in terms of armament, electronics, etc. Can be refuelled in flight.
- **two-seat version of the 39C, with similar alterations as the 39B.:** Improved version following on from the Gripen Demo technology demonstrator. Changes from the JAS 39C/D include the more powerful F414G engine, Raven ES-05 AESA radar, increased fuel capacity and payload, two additional hardpoints, and other improvements. These improvements have reportedly increased the Gripen NG costs to an estimated 24,000 Swiss Francs (US$27,000) per hour,[390] and increased the flyaway cost to 100 million Swiss Francs (US$113M).
- **AS 39E:** single-seat production version developed from the Gripen NG program, priced at US$85 million a unit. Sweden and Brazil have ordered the variant. Brazil's designation for this variant is F-39E
- **single-seat production version developed from the Gripen NG program, priced at US$85 million a unit.[392] Sweden and Brazil have ordered the variant.[84][173][235] Brazil's designation for this variant is F-39E:** two-seat version of the E variant. Eight ordered by Brazil,[248] to be developed and assembled in São Bernardo do Campo, Brazil; planned for pilot training and combat, being optimised for back seat air battle management, with jamming, information warfare and network attack, besides weapon system officer and electronic warfare roles. Brazil's designation for the variant is F-39F.

System

Alternate Designation(s): JAS 39 Gripen
Primary Function / Type: Fighter, attack, and reconnaissance aircraft
Manufacturer: Saab Group
In Service: 1996-Present
Crew: JAS 39A/C 1 JAS 39B/D 2

Number of Engines: 1

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Pylons: 5 (four wing, one centerline), 2 wingtip rails

Dimensions

Length: JAS 39A/C: 14.1 m; JAS 39B/D: 14.8 m

Width (Wing Span): 8.4 m

Height: 4.5 m

Wheelbase: JAS 39A/C: 5.2 m; JAS 39B/D: 5.9 m

Weight, Empty: JAS 39A: 6,500 kg; JAS 39B/D: 7,100 kg; JAS 39C: 6,800 kg

Weight, Maximum Takeoff: JAS 39A: 12,500 kg; JAS 39B/D: 14,000 kg; JAS 39C: 14,000 kg

Weight, Total Load: JAS 39B/D: 5,300 kg; JAS 39C: 5,300 kg

Automotive

Engine Name: Volvo RM12 turbofan engine (now GKN Aerospace Engine Systems), a licence-manufactured derivative of General Electric F404, fed by a Y-duct with splitter plates; changes include increased performance and improved reliability to meet single engine use safety criteria, as well as a greater resistance to bird strike incidents.

Number of Engines: 1

Type: The Volvo RM12 is a low-bypass afterburning turbofan jet engine developed for the Saab JAS 39 Gripen fighter.

Engine Power: Maximum thrust: 54 kN (12,100 lbf) military thrust 80.5 kN (18,100 lbf) with afterburner

Maximum Range: 3,000 km

Maximum Speed: 2,450 km/h, Mach 2.0

Service Ceiling: 16,000 m

Acceleration: 30 sec Mach 0.5 to Mach 1.1

Climb Rate: 100 sec, brake release to 32,084 ft (10,000 m) 180 sec, brake release to 45,932 ft (14,000 m)

Turn Rate: 20 deg/sec sustained, 30 deg/sec instantaneous

Load: 9 g/-3 g max

Cannon Weapon System

↳*System*

Name: Mauser BK-27

Type: 27 mm Revolver Cannon

Caliber: 27mm

Manufacturer: Mauser (now Rheinmetall)

Proliferation: 3,100

In Service: 1977-Present

Length: 2.31 m

Barrel Length: 1.73 m

Weight: 100 kg

Barrel: Single Barrel

Action: Revolver

Rate of Fire: 1,000–1,700 rpm

Muzzle Velocity: 1,100 m/s

↳*Ammunition*

Type: Rifle

Caliber: 27 mm

Cartridge: 27×145 mm

Basic Load: 120

Pylon Weapons System

Number of Pylons: 5 (four wing, one centerline), 2 wingtip rails

Note: The Gripen is compatible with a number of different armaments, beyond the aircraft's single 27 mm Mauser BK-27 cannon (omitted on the two-seat variants), including air-to-air missiles such as the AIM-9 Sidewinder, air-to-ground missiles such as the AGM-65 Maverick, and anti-ship missiles such as the RBS-15. In 2010, the Swedish Air Force's Gripen fleet completed the MS19 upgrade process, enabling compatibility with a range of weapons, including the long-range MBDA Meteor missile, the short-range IRIS-T missile and the GBU-49 laser-guided bomb.

Weapons Load: 3,600 kg

↳*Missile System (Option 1)*

Name: AIM-9 Sidewinder

Type: Short-Range Air-to-Air Missile

In Service: 1956-Present

Proliferation: Widely Proliferated

Basic Load: INA

Length: 3.02 m

Diameter: 127.0 mm

Warhead: WDU-17/B annular blast-frag

Warhead Weight: 9.4 kg

Detonation mechanism: IR proximity fuze

Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket

Wingspan: 279.4 mm

Operational Range: 1.0 to 35.4 km

Speed: Mach 2.5+

Guidance System: Infrared homing (most models) semi-active radar homing (AIM-9C)

Launch Platform: Aircraft, naval vessels, fixed launchers, and ground vehicles

↳*Missile System (Option 2)*

Name: AGM-65 Maverick

Type: Air-to-Ground Missile

Basic Load: INA

Manufacturer: Raytheon Missile Systems Raytheon

Proliferation: 70,000+

Length: 249 cm (8 ft 2 in)

Diameter: cm30

Warhead: 57 kg (126 lb) WDU-20/B shaped-charge (A/B/C/D/H models) 136 kg (300 lb) WDU-24/B penetrating blast-fragmentation (E/F/G/J/K models) E models utilize FMU-135/B delayed impact fuze

Weight: 210–304 kg

Engine: A/B:Thiokol SR109-TC-1 D/E/F/G/H/J/K: SR114-TC-1 (or Aerojet SR115-AJ-1) Solid propellant rocket motor via a WPU-4/B or WPU-8/B propulsion section

Wingspan: 710 mm

Propellant: Solid propellant

Operational Range: Greater than 22 km

Speed: 1,150 km/h

Guidance System: system A/B/H/J/K:: Electro-optical guidance D/F/G: imaging infrared guidance E: Laser guidance

↳*Missile System (Option 3)*

Name: RBS-15

Type: Long-Range Fire-and-Forget Surface-to-Surface and Ar-to-Surface, Anti-Ship Missile.

Manufacturer: Saab Bofors Dynamics, Diehl BGT Defence

In Service: 1985-Present

Proliferation: Widely Proliferated

Length: m4.33

Diameter: cm50

Wingspan: 1.4 m

Warhead: 200 kg HE blast and pre-fragmented warhead.

Detonation Mechanism: impact or proximity

Engine: Turbojet

Operational Range: 70 km for RBS-15 Mk. I and II, 250 km for RBS-15 Mk. III, 300+km for RBS-15 MkV

Flight Altitude: Sea skimming

Speed: Subsonic

Guidance System: inertial, GPS, terminal active radar homing (J band)

Launch Platform: naval ships, aircraft and land-based missile launchers

Rockets

Note: Bofors M70 rockets

↳*Bombs*

Note: DWS 39 submunition dispenser, iron bombs

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: Saab PS-05A

PS-05A Radar: The Gripen entered service using the PS-05/A pulse-Doppler X band multi-mode radar, developed by Ericsson and GEC-Marconi, which is based on the latter's advanced Blue Vixen radar for the Sea Harrier that also served as the basis for the Eurofighter's CAPTOR radar. The all-weather radar is capable of locating and identifying targets 120 km (74 mi) away,and automatically tracking multiple targets in the upper and lower spheres, on the ground and sea or in the air. It can guide several beyond visual range air-to-air missiles to multiple targets simultaneously. Saab stated the PS-05/A is able to handle all types of air defence, air-to-surface, and reconnaissance missions, and is developing a Mark 4 upgrade to it.The Mark 4 version has a 150% increase in high-altitude air-to-air detection ranges, detection and tracking of smaller targets at current ranges, 140% improvement in air-to-air mode at low altitude, and full integration of modern weapons such as the AIM-120C-7 AMRAAM, AIM-9X Sidewinder, and MBDA Meteor missiles.

Laser Desingator: Yes

Reconnaissance: Vinten Vicon 70 pod can be mounted on wingtip rails (to be replaced by MRPS)

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: Yes, Rb 74 pod can be mounted on wingtip rails

Chaffs/Flares: Yes

Notes:

The Saab JAS 39 Gripen (IPA: ['gri:pɛn]; English: griffin) is a light single-engine multirole fighter aircraft manufactured by the Swedish aerospace company Saab. It was designed to replace the Saab 35 Draken and 37 Viggen in the Swedish Air Force (Flygvapnet). The Gripen has a delta wing and canard configuration with relaxed stability design and fly-by-wire flight controls. It is powered by the Volvo RM12, and has a top speed of Mach 2. Later aircraft are modified for NATO interoperability standards and to undertake air to air refuelling. In 1979, the Swedish government began development studies for an aircraft capable of fighter, attack and reconnaissance missions to replace the Saab 35 Draken and 37 Viggen. A new design from Saab was selected and developed as the JAS 39, first flying in 1988. Following two crashes during flight development and subsequent alterations to the aircraft's flight control software, the Gripen entered service with the Swedish Air Force in 1996. Upgraded variants, featuring more advanced avionics and adaptations for longer mission times, began entering service in 2003. o market the aircraft internationally, Saab formed partnerships and collaborative efforts with overseas aerospace companies. One example of such efforts was Gripen International, a joint partnership between Saab and BAE Systems formed in 2001. Gripen International was responsible for marketing the aircraft, and was heavily involved in the successful export of the type to South Africa; the organisation was later dissolved amidst allegations of bribery being employed to secure foreign interest and sales. On the export market, the Gripen has achieved moderate success in sales to nations in Central Europe, South Africa and Southeast Asia; bribery has been suspected in some of these procurements, but authorities closed the investigation in 2009. A further version, designated Gripen JAS 39E/F, is beginning deliveries to the Swedish and Brazilian air forces as of 2019; it has previously been referred to as Gripen NG or Super-JAS. The changes include the adoption of a new power plant, the General Electric F414G, an active electronically scanned array radar, and significantly increased internal fuel capacity. Saab has proposed other derivatives, including a navalised Gripen Maritime for carrier operations and an optionally manned aircraft for

unmanned operations. Sweden and Brazil have ordered the Gripen E/F and Switzerland initially selected it for procurement. As of September 2019, 298 Gripens have been built. Gripen offers high agility, advanced target acquisition systems - including a powerful multi-role radar, modern weapons, low environmental signatures and a comprehensive electronic warfare (EW) suite. The JAS39 Gripen system is designed to counter all current and future threats. The aircraft has been developed for the Swedish Air Force by the Industry Group JAS (SAAB, Ericsson, Volvo Aero and FFV Aerotech) in close co-operation with the Swedish Defence Material Administration (FMV). In partnership with Sweden's Saab, British Aerospace is engaged in a number of marketing campaigns for the highly capable Gripen fourth generation combat aircraft. Engineering activity associated with improving the operability of the aircraft in the export market is now underway. In 1995 Saab and British Aerospace (BAe) signed an agreement for the joint marketing of the Gripen. Hereby, Saab gained access to the global sales organization of British Aerospace, as well as to its governmental support in international marketing. British Aerospace will adapt the export version of the Gripen to NATO standards, and also produce certain subsystems for the aircraft. The agreement, which followed on more than a decade of cooperation between the two companies, became the basis for a consolidation between Saab and British Aerospace. It also paves the way for SaabCs deepened integration with the European aerospace industry. Saab intends to be an active player along with British Aerospace, Aerospatiale (France), DASA (Germany) and CASA (Spain) in the creation of an integrated European defense and aerospace industry - Eurospace. In November 1998, South Africa announced that it will probably buy 28 Gripens. The value of the order is 12 billion SEK (1.5 billion USD) and the contract was expected to be signed in May or June of 1999. During the coming 10-15 years, Saab hopes to export at least 400 aircraft, on a total market for fighter aircraft estimated at 2,000 aircraft. The Gripen is currently being offered to Chile, the Philippines, the Czech Republic, Hungary, Austria and Brazil. Another candidate, Poland, recently announced that it will chose the Boeing F 18 Hornet. An important factor when offering the Gripen for export, is the aircraft missile system. Currently, the Gripens used by the Swedish Air Force are armed with AIM-120 AMRAAM, AIM-9 Sidewinder, the Saab Dynamics RBS 15 for ship targets, and the Maverick ground attack missile. Saab Dynamics cooperates with the major European missile manufacturers in the development of new air-to-air missiles for the Eurofighter, the Rafale and the Gripen. The two main projects currently underway are the Meteor and the IRIS-T. The Meteor is a radar-guided, medium range (10-120 km.) air-to-air missile, which will compete with future versions of the Raytheon AIM-120 AMRAAM. The Meteor program features Matra BAe Dynamics, Saab Dynamics, Alenia Difesa, Marconi and German LFK. The IRIS-T is an IR-guided, short-range air-to-air missile, primarily funded by Germany for the Eurofighter. The project group includes Bodenseewerk Geratechnik and Saab Dynamics.

Su-57 (Felon) Russian Stealth Fighter





Tiers:



System

Alternate Designation(s): Su-57; NATO: Felon
Primary Function / Type: stealth, single-seat, twin-engine multirole fifth-generation jet fighter
Manufacturer: Komsomolsk-on-Amur Aircraft Plant
Crew: 1
Number of Engines: 2
Day/Night Capable: Yes
All Weather Capable: Yes
Number of Hard Points: 8

Dimensions

Length: 20.1 m
Height: 4.6 m
Wingspan: 14.1 m
Weight, Empty: 18,000 kg
Weight, Normal: 25,000 kg
Weight, Maximum: 35,000 kg
Weight, Combat Load: 7,500 kg
Weight, Air-to-Air Payload: 2,260 kg

Automotive

Engine Name: 2 x Saturn/Lyulka 117S
Number of Engines: 2
Engine Power: 14,200 kg each
Fuel: 10,300 kg
Maximum Speed: 2,450 km/h, Mach 2.0
Supersonic Cruise: 1,590 km/h, Mach 1.3
Maximum Range: 3,500 km
Supersonic Range: 1,500 km
Climb Rate: 350 m/sec
Ceiling: 20,000 m
Load Limit: 10-11 g
Endurance: 3.3 hours

Chin Mounted Weapon System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: mm30
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Muzzle Velocity: 900 m/s
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Rifle
Caliber: mm30
Shell: 30×165mm
Basic Load: INA

Wing Mounted Weapon Systems

Hardpoints: 8

Anti-ship Missiles: 2 × Kh-35E

Anti-Radiation Missiles: *4 × Kh-58UShKE *250, 500, 1500 kg guided bombs *Anti-tank "Drill"500 kg cluster-bomb + active homing[

↳*Missile System (Option 1)*

Name: R-77 (AA-12 Adder)

Type: Medium-Range Air-to-Air Missile

Basic Load: 4 x R-77 (AA-12 Adder)

Operational Range: 80–100 km

Flight Altitude: 5–25 km

Speed: Mach 4

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

↳*Missile System (Option 2)*

Name: Kh-38/Kh-38M Missile

Type: Air-to-Surface Missile

Basic Load: 4 x Kh-38/Kh-38M Missile

Date of Introduction: 2012

Manufacturer: Tactical Missiles Corporation JSC

Length: 4.2 m

Diameter: 0.31 m

Wingspan: 1.14 m

Weight: 520 kg

Warhead: HE fragmentation, cluster warhead, armor-piercing

Warhead Weight: up to 250 kg

Detonation Mechanism: Contact fuse

Engine: Solid rocket motor

Operational Range: up to 70 km

Flight Ceiling: 12000 m

Flight Altitude: 200-12000 m

Speed: Mach 2.2

Guidance System: Laser, active radar, IR, satellite, depending on variant

↳*Missile System (Option 3)*

Name: R-37 (AA-X-13/AA-13 Axehead) Missile

Type: Supersonic Air-to-Air Missile

Manufacturer: Tactical Missiles Corporation

Date of Introduction: 2019

Basic Load: 2 x R-37 (AA-X-13/AA-13 Axehead) Missile

Length: 4.20 m

Diameter: 38 cm

Wingspan: 0.7 m

Weight: 600 kg

Warhead: HE, fragmenting

Propellant: Boost-Sustain Solid Rocket

Warhead Weight: 60 kg

Operational Range: 150-398 km

Speed: Mach 5

Guidance System: Inertial with mid-course update, semi-active and active radar homing

Fire Control / Avionics

Fire Control Radar: Byelka radar (400 km, 60 tracks with 16 targeted)

Laser Desingator: Yes, 101KS-O: Laser Directional Infrared Counter Measures

Radio Electronic System: Sh-121 multifunctional integrated radio electronic system (MIRES)

Radar Systems: N036-1-01: Frontal X-band active electronically scanned array (AESA) radar N036B-1-01: Cheek X-band AESA radars for increased angular coverage N036L-1-01: Slat L-band arrays for IFF

IFF: Yes

Protection

Stealth Properties: The Su-57 is planned to be the first operational aircraft in Russian Air Force service to use stealth technology. Similar to other stealth fighters such as the F-22, the airframe incorporates planform edge alignment to reduce its radar cross-section (RCS); the leading and trailing edges of the wings and control surfaces and the serrated edges of skin panels are carefully angled to reduce the number of directions the radar waves can be reflected. Weapons are carried internally in weapons bays within the airframe and antennas are recessed from the surface of the skin to preserve the aircraft's stealthy shape. The infrared search-and-track sensor housing is turned backwards when not in use and its rear is treated with radar-absorbent material (RAM) to reduce its radar return. To mask the significant RCS contribution of the engine face, the walls of the inlet ducts are coated with RAM and the partial serpentine ducts obscure most of the engines' fan and inlet guide-vanes (IGV); the remaining exposed engine face is masked by a radar blocker similar in principle to that used on the F/A-18E/F. According to Sukhoi's radar blocker patent, the slanted blocker grid is placed in front of the IGV at a distance of 0.7—1.2 times the diameter of the duct. The fuselage of the aircraft is coated with RAM to absorb radar emissions and reduce the reflection back to the source. Due to the extensive use of polymeric carbon plastics composites, the aircraft has four times fewer parts compared to the Su-27, weighs less and is easier to mass-produce.The aircraft canopy is made of composite material and 70-90 nm thick metal oxide layers with enhanced radar wave absorbing to minimize the radar return of the cockpit by 30% and protect the pilot from the impact of ultraviolet and thermal radiation. The Su-57's design emphasizes frontal stealth, with RCS-reducing features most apparent in the forward hemisphere; the shaping of the aft fuselage, the seams between parts, and rivets are much less optimized for radar stealth compared to the F-22.However, during MAKS 2019 the craftsmanship of the fuselage was actually finer than expected and looked smooth despite the rivets. The combined effect of airframe shape and RAM of the production aircraft is estimated to have reduced the aircraft's RCS to a value thirty times smaller than that of the Su-27.Sukhoi's patent for the Su-57's stealth features cites an average RCS of approximately 0.1 to 1 m2,compared to the Su-27's of approximately 10 to 15 m2.Like other stealth fighters, the Su-57's low observability measures are chiefly effective against high-frequency (between 3 and 30 GHz) radars, usually found on other aircraft. The effects of Rayleigh scattering and resonance mean that low-frequency radars, employed by weather radars and early-warning radars are more likely to detect the Su-57 due to its size. Such radars are also large, susceptible to clutter and

are less precise.
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: Yes
EW Counter Measures: L402 Himalayas electronic countermeasure suite
Chaffs/Flares: Yes
Warning System: 101KS-U: Ultraviolet missile approach warning system

Notes:

The Sukhoi Su-57 (Russian: Сухой Су-57; unconfirmed NATO reporting name: Felon) is a stealth, single-seat, twin-engine multirole fifth-generation jet fighter being developed since 2002 for air superiority and attack operations. The aircraft is the product of the PAK FA (Russian: ПАК ФА, short for: Перспективный авиационный комплекс фронтовой авиации, romanized: Perspektivny Aviatsionny Kompleks Frontovoy Aviatsii, lit. ''prospective aeronautical complex of front-line air forces''), a fifth-generation fighter programme of the Russian Air Force. Sukhoi's internal name for the aircraft is T-50. The Su-57 is planned to be the first aircraft in Russian military service to use stealth technology. Its maiden flight took place on 29 January 2010 and the first production aircraft are planned to be delivered in 2020. The fighter is designed to have supercruise, supermaneuverability, stealth, and advanced avionics to overcome the prior generation fighter aircraft as well as ground and naval defences. The Su-57 is intended to succeed the MiG-29 and Su-27 in the Russian Air Force. The prototypes and initial production batch are to be delivered with a highly upgraded Lyulka AL-31 variant, the AL-41F1, as an interim powerplant while an advanced clean-sheet design engine, currently designated the izdeliye 30, currently in final stages of development and expected to be available after mid-2020s. The aircraft is expected to have a service life of up to 35 years. The Su-57 is intended to be a fifth-generation multirole fighter aircraft and the first operational stealth aircraft for the Russian Air Force. Although most information is classified, sources within the Sukhoi company and Defence Ministry have openly stated that the aircraft is to be stealthy, supermaneuverable, have supercruise capability, incorporate substantial amounts of composite materials, and possess advanced avionics such as active phased-array radar and sensor fusion. The aircraft has a blended wing body fuselage and incorporates all-moving horizontal and vertical stabilizers; the vertical stabilizers toe inwards to serve as the aircraft's airbrake. The aircraft incorporates thrust vectoring and has adjustable leading–edge vortex controllers (LEVCONs) designed to control vortices generated by the leading edge root extensions, and can provide trim and improve high angle of attack behaviour, including a quick stall recovery if the thrust vectoring system fails. The advanced flight control system and thrust vectoring nozzles make the aircraft departure-resistant and highly maneuverable in both pitch and yaw, enabling the aircraft to perform very high angles of attack maneuvers such as the Pugachev's Cobra and the bell maneuver, along with doing flat rotations with little altitude loss. The Su-57 has a climb rate ranging from 330 m/s (1,100 ft/s) to 361 m/s (1,180 ft/s). The aircraft makes extensive use of composites, with the material comprising 25% of the structural weight and almost 70% of the outer surface. Weapons are housed in two tandem main weapons bays between the engine nacelles and smaller bulged, triangular-section bays near the wing root. Internal weapons carriage eliminates drag from external stores and enables higher performance compared to external carriage, as well as enhancing stealth. The Su-57's aerodynamics and engines enable it to achieve Mach 2 and fly supersonic without afterburners, or supercruise, a significant kinematic advantage over prior generations of aircraft. Combined with a high fuel load, the fighter has a supersonic range of over 1,500 km (930 mi), more than twice that of the Su-27. Extendable refueling probe is available to further increase its range. In the Su-57's design, Sukhoi addressed what it considered to be the F-22's limitations, such as its inability to use thrust vectoring to induce roll and yaw moments and a lack of space for weapons bays between the engines, and complications for stall recovery if thrust vectoring fails.

J-11 (Flanker-L) Chinese Air Superiority Fighter





Tiers:

1 **2** 3 4

Variants:

- **J-11A:** Chinese/Russian assembled Su-27SK from Russian-made kits. 104 were built. They were later upgraded with MAWS. Unconfirmed upgrades include improved cockpit displays, and fire control systems for R-77 or PL-10 missiles. It is also called J-11.
- **J-11B:** Indigenously-produced version using Chinese technology, and the first J-11 variant to use the WS-10A turbofan. The airframe is slightly lighter due to greater use of composites. It has new avionics, a glass cockpit, MAWS, and onboard oxygen generator system. Upgrading to AESA radar may have been planned. Photos of China's latest, very long range PL-15 missile on a J-11B may well indicate the undergoing upgrades of AESA radar to the aircraft. More recently aircraft have been spotted with light grey radomes which may indicate ongoing upgrades.
- **J-11BS:** A twin-seat version of the J-11B. In 2012, the number of J-11B and J-11BS in service was over 120.
- **J-11BH:** Naval version of the J-11B. It was first sighted in May 2010.
- **J-11BSH:** Naval version of the J-11BS.
- **J-15:** Carrier-based version based on the J-11B, incorporating structural elements from the Sukhoi Su-33 prototype purchased from Ukraine in 2001. It uses avionics from the J-11B.
- **J-16:** Twin-seat strike fighter based on Russian Sukhoi Su-30MKK sold to China in 2000.[33] A further development of the J-11BS.
- **J-11D:** ariant with fixed electronically scanned array radar, IRST, and capability to fire heavier imaging/infrared (IIR) air-to-air missiles. The airframe makes greater use of composite materials, especially in the engine intakes for lower radar observability. The wings have three hardpoints each. Unconfirmed reports claim it has a new fly-by-wire control system, glass cockpit, improved EW systems, and an improved version of the WS-10A engine.

System

Alternate Designation(s): J-11 (Flanker-L)
Primary Function / Type: Air Superiority Fighter
Manufacturer: Shenyang Aircraft Corporation
Crew: 1
Number of Engines: 2
Number of Hard Points: 0: 2 under fuselage, 2 under air ducts, 4 under wings, 2 on wingtips with provisions to carry

combinations of: Missiles: PL-12; PL-9; PL-8; Vympel R-77; Vympel R-27; Vympel R-73

Dimensions

Length: 21.9 m
Width (Wing Span): 14.7 m
Height: 5.92 m
Wing Area: 52.84 m2
Empty Weight: 16,380 kg
Gross Weight: 23,926 kg
Max Takeoff Weight: 33,000 kg
Fuel Capacity, Internal Fuel Tank: 9,400 kg

Automotive

Engine Name: 2 × Lyulka AL-31F or afterburning turbofan engines
Number of Engines: 2
Engine Power: 75.22 / 123 kN (16,910 / 27,650 lbf) dry / afterburning
Maximum Range: 3,530 km
Maximum Speed: Mach 2.1
Service Ceiling: 9,000 m
Combat Range: 1,500 km
G Limits: +9
Rate of Climb: 300 m/s

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: mm30
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: 1,200 Rounds

Missile Systems

Missile Options: PL-12 PL-9 PL-8 Vympel R-77 Vympel R-27 Vympel R-73

↳*Main Missile System #1*

Name: PL-9

Type: Air-to-Air Missile

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Weight: 115kg

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2.0

Guidance System: multi-element infrared

Rocket Weapon Systems

Note: Unguided rocket launcher

Bomb Weapon Systems

Note: Free-fall cluster bombs

Fire Control / Avionics

Fire Control Radar: NIIP Tikhomirov N001VE Myech coherent pulse Doppler radar. J-11B to be equipped with AESA radar.

Laser Desingator: INA

Optic System: OEPS-27 electro-optic system

HUD: NSts-27 helmet-mounted sight (HMS)

ECM: Gardeniya ECM pods

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: Yes

Chaffs/Flares: INA

Notes:

The J-11 was finally born in 1998 as a Chinese version of the Soviet-designed Sukhoi Su-27SK air superiority fighter after China secured a $US2.5 billion production agreement which licensed China to build 200 Su-27SK aircraft using Russian-supplied kits. Under the terms of the agreement, these aircraft would be outfitted with Russian avionics, radars and engines. However, in 2004, Russian media reported that Shenyang co-production of the basic J-11 was halted after around 100 examples were built. The PLAAF later revealed a mock-up of an upgraded multi-role version of the J-11 in mid-2002. The indigenous J-11B variant incorporates various Chinese material modifications and upgrades to the airframe with improved manufacturing methods in addition to the inclusion of domestic Chinese technologies such as radar, avionics suites and weaponry, including anti-ship and PL-12 air-to-air missiles presumably for the role of a maritime strike aircraft. The alleged reason for the sudden stop in the production line of the J-11 was because it could no longer satisfy the PLAAF's requirements, due to elements such as the obsolete avionics and radar, which were structured for aerial missions. The J-11/J-11B's legitimacy remains unproven, despite a wealth of information coming to light since 2007. In the course of a press conference at the 2009 Farnborough Airshow, Alexander Fomin, Deputy Director of Russia's Federal Service for Military-Technical Co-operation, reported that Russia had not so far tabled any questions to China with regard to "copying" military equipment. Fomin reported that Russia handed China the licences to manufacture the aircraft and its components, including an agreement on the production of intellectual property rights. Details of intellectual property rights, however have not been disclosed, fuelling speculation about a "secret" contract or parts of the original contract. The licence, at least officially, did not include an aircraft carrier version- Sukhoi Su-33 nor any variant of it, such as the Shenyang J-15. At the MAKS 2009, Rosoboron export's General Manager Anatoli Isaykin was quoted saying: "Russia is going to investigate the J-11B, as a Chinese copy of the Su-27 and Sukhoi Company is partaking in the process." In 2010, Rosoboronexport announced via their official website that it was in talks with the Chinese side, regarding the ongoing production of weapons that Russia considers as unlicensed. In light of the ongoing investigations, Rosoboronexport expressed its concern over future sales of advanced Russian systems and components to China. At the Zhuhai 2002 airshow, a photo was released allegedly depicting a J-11 modified for flight testing of a single WS-10 Taihang turbofan. Andrei Chang, a military specialist on China reported that one J-11A was outfitted with the indigenously produced WS-10A turbofan engine, J-11B also uses WS-10A. However, Russian media reports also indicate that China still intends to upgrade the current J-11 fleet's engines with either Saturn-Lyulka or Salyut powerplants. Engines under consideration include the Saturn AL-31-117S (a development of the Lyulka AL-31F planned for the Russo-Indian Su-30MKIs), and the Salyut AL-31F-M1, an improved variant of the AL-31F engine. In 2002, Russian media reported that Shenyang Aircraft Corporation was looking into replacing Russian-made J-11/Su-27SK components with domestic, Chinese-made parts. Specifically, to replace the Russian-made NIIP N001 radar with a Chinese-made fire control radar based on the Type 147X/KLJ-X family, the AL-31F engine with WS-10A, and Russian R-77 AAM's with Chinese-made PL-9 and PL-12 AAM's. One J-11 was photographed with an AL-31F and a WS-10A engine installed for testing in 2002. However, it was not until 2007 when the Chinese government finally revealed information on the domestic J-11: the J-11 used to test WS-10 was designated as J-11WS, and it was when state television station CCTV-7 aired J-11B footages in mid-2007 when the existence of J-11 with domestic components was finally confirmed officially. Serial manufacturing of the WS-10 and integration with the J-11, proved to be more difficult than expected. As a result, even though several related prototypes had been tested and at least one regiment converted to the Taihang powered J-11B version in 2007, these aircraft were later grounded for an extended period due to a poor operational reliability. A report in the Washington Times suggested that the Chinese engines lasted 30 hours before they needed servicing, compared to 400 hours for the Russian versions. Defects were traced back to the engine manufacturer, Shenyang Liming Aircraft Engine Company employing sub-standard manufacturing and quality control procedures. Several subsequent batches temporarily reverted to the original, Russian AL-31F turbofans. The engines manufacturing problems had finally been solved by the end of 2009 and the WS-10A had reportedly proved mature enough to power the Block 02 aircraft.

F-7 (Airguard) Chinese Fighter Aircraft



Tiers:

1 2 3 **4**

Variants:

- **Note:** Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7 ; NATO: FIshcan

Crew: 1

Ceiling: m18800

Standard Payload: kg1800

↳*Engines*

9,700 lbs. thrust Wopen-7B turbofan, 13,500 lbs. thrust w afterburner: 1

↳*Weight (kg)*

↳*Speed (km/h)*

Max: 2175

Landing Speed: 310-330

↳*Vertical Climb Rate (m/s)*

(F-7B): 150

(F-7M): 180

↳*Fuel (liters)*

Internal: 2385

↳*Range (km)*

Low Alt: 370

↳*Dimensions (m)*

Length: 14.9

Wingspan: 7.2

Height: 4.1

↳*Hardpoints*

Wing Pylons: 2

↳*Survivability/Countermeasures*

Zero/130-850 km/h ejection seat: Yes

ARMAMENT

M239A2 20-mm cannon: 2

30-mm type 30-1 cannons with 60 rounds each in farings under front fuselage: 2

↳*Weapon & Ammunition Types*

23mm type 23- twin barrel (F-7M): INA

30mm Type 30-1 Cannons: 2

AVIONICS/SENSOR/OPTICS

Skyranger or Super Skyranger radar: Yes

Heads-Up-Display and Weapons Aiming Computer: Yes

ECM pod: Yes

↳*Night/Weather Capabilities*

J-7111: Yes

NOTES

Description: THE SOVIETS LICENSED THE MANUFACTURE OF THE MIG-21F AND ITS ENGINE TO CHINA IN 1961, AND ASSEMBLY OF THE FIRST J-7 USING CHINESE-MADE COMPONENTS BEGAN EARLY1964. THE J-7 AIRCRAFT WAS THE MOST WIDELY PRODUCED CHINESE FIGHTER, REPLACING OLDER J-6 FIGHTERS, THE CHINESE VERSION OF THE MIG-19. IN 1995 IT WAS PROJECTED THAT J-7 PRODUCTION WOULD CONTINUE FOR AT LEAST ANOTHER DECADE, RESULTING IN A TOTAL INVENTORY OF NEARLY 1000 AIRCRAFT BY 2005, BUT THE PLAAF INVENTORY HAS REMAINED AT ABOUT 500 AIRCRAFT, SUGGESTING THAT PRODUCTION WAS EITHER SUSPENDED OR TERMINATED.

Notes:

The Chengdu J-7 (Chinese: □-7; third generation export version F-7; NATO reporting name: Fishcan is a People's Republic of China license-built version of the Soviet Mikoyan-Gurevich MiG-21. Though production ceased in 2013, it continues to serve, mostly as an interceptor, in several air forces, including the People's Liberation Army Air Force. In the 1950s and early 1960s, the Soviet Union shared most of its conventional weapons technology with the People's Republic of China. The famous MiG-21, powered by a single engine and designed on a simple airframe, was inexpensive but fast, suiting the strategy of forming large groups of 'people's fighters' to overcome the technological advantages of Western aircraft. However, the Sino-Soviet split abruptly ended the initial cooperation, and from July 28 to September 1, 1960, the Soviet Union withdrew its advisers from China, resulting in the project being stopped in China. Soviet Premier Nikita Khrushchev unexpectedly wrote to Mao Zedong in

February, 1962, to inform Mao that the Soviet Union was willing to transfer MiG-21 technology to China, and he asked the Chinese to send their representatives to the Soviet Union as soon as possible to discuss the details. The Chinese viewed this offer as a Soviet gesture to make peace, and they were understandably suspicious, but they were nonetheless eager to take up the Soviet offer for an aircraft deal. A delegation headed by General Liu Yalou, the commander-in-chief of the People's Liberation Army Air Force (PLAAF) and himself a Soviet military academy graduate, was dispatched to Moscow immediately, and the Chinese delegation was given three days to visit the production facility of the MiG-21, which was previously off-limits to foreigners. The authorization for this visit was personally given by Nikita Khrushchev, and on March 30, 1962, the technology transfer deal was signed. However, given the political situation and the relationship between the two countries, the Chinese were not optimistic about gaining the technology, and thus they were prepared for reverse engineering. Russian sources state that several complete examples of the MiG-21 were sent to China, flown by Soviet pilots, and China also received MiG-21Fs in kits, along with parts and technical documents. Just as the Chinese had expected, however, when the Soviets delivered the kits, parts and documents to Shenyang Aircraft Factory five months after the deal was signed, the Chinese discovered that the technical documents provided by the Soviets were incomplete and that some of the parts could not be used. China set about to reverse-engineer the aircraft for local production, and in doing so, they succeeded in solving 249 major problems and reproducing eight major technical documents that were not provided by the Soviet Union. One of the major flaws was with the Hydraulics systems, which grounded up to 70% of aircraft in some squadrons until the systems were upgraded. Another major upgrade was modifications to the fuel storage to make the aircraft more stable. The MiG-21 carries most of its fuel in the forward fuselage, causing the center of gravity to shift and become unstable after about 45 minutes of operation. The J-7 has redesigned fuel tanks and significantly larger drop tanks in order to maintain a more stable center of gravity, and therefore better Longitudinal static stability. The cockpit was also revised to replace the Soviet ejection seat, which was found to be unacceptable. The forward opening canopy was replaced by a standard canopy hinged to the rear and jettisoned before the seat ejected. Otherwise, the re-engineering effort was largely successful, as the Chinese-built J-7 aircraft showed only minor differences in design and performance from the original Soviet MiG-21. In March 1964, Shenyang Aircraft Factory began the first domestic production of the J-7 jet fighter, which they successfully accomplished the next year. However, the mass production of the J-7 aircraft was severely hindered by an unexpected social and economic problem—the Cultural Revolution—that resulted in poor initial quality and slow progress, which, in turn, resulted in full-scale production only coming about in the 1980s, by which time the original aircraft design was showing its age. In 1987 the J-7E was released, having a greatly improved wing, among other improvements. It was roughly 45% more maneuverable, and its takeoff and landing performance was greatly increased. It was also equipped with a helmet mounted sight, as well as being the first MiG-21 to be equipped with HOTAS and a multipurpose display. Many of the electronic components were British in origin, such as the gun sight and the multi purpose display. The aircraft is capable of using PL-8/Python 3 missiles with both the helmet mounted sight or the radar fire control, but the two are not connected. The pilot may use only one system at a time.[5] In the mid 1980s Pakistan requested an aircraft with greater radar capabilities. Both the standard radar and the British Marconi radar were plagued by ground clutter, but China did not have any experience with air to ground radar at the time. In 1984 Pakistan provided assistance by having their American trained F-16 pilots provide training on proper operation of ground attack radar, which enabled the Chinese to develop the J-7M. In the late 1980s the J-7MP and J-7PG introduced significant upgrades to the radar system by converting to an Italian FAIR Grifo-7 radar. This more than tripled the effective range of the radar, as well as greatly increased the angle which the radar could detect target. The J-7 only reached its Soviet-designed capabilities in the mid 1980s. However, the fighter is affordable and has been widely exported as the F-7, often with Western systems incorporated, like the ones sold to Pakistan. There are over 20 different export variants of the J-7, some of which are equipped to use European weaponry, such as French R.550 Magic missiles. The Discovery Channel's Wings Over The Red Star series claims that the Chinese intercepted several Soviet MiG-21s en route to North Vietnam (during the Vietnam War), but these aircraft did not perform in a manner consistent with their original specifications, suggesting that the Chinese actually intercepted down-rated aircraft that were intended for export, rather than fully capable production aircraft. For this reason, the Chinese had to re-engineer the intercepted MiG-21 airframes in order to achieve their original capabilities. China later developed the Shenyang J-8 based both on the expertise gained by the program, and by utilizing the incomplete technical information acquired from the Soviet Ye-152 developmental jet. In May 2013, J-7 production has ceased after decades of manufacturing. The last 12 F-7BGIs were delivered to the Bangladesh Air Force.

J-8F Chinese Interceptor Fighter Aircraft




Tiers:



Variants:

- **J-8 (Finback-A) Series:** First flew on 5 July 1969. Initial day fighter variant, resembles an enlarged MiG-21. Equipped with 2 x WP-7A turbojet engines, SR-4 ranging radar 2 x Type 30-I 30mm cannon (200 rounds each), and 2 x PL-2 IR-guided AAMs. Limited production. J-8I First flew on 24 April 1981. Improved all-weather version with SL-7A fire-control radar (40 km range), twin-barrel Type 23-III 23 mm cannon, & up to 4 AAMs (or rockets/bombs). Limited production. J-8E Final version of the J-8I series. J-8E is equipped with a type 204 (JL-7) mono-pulse fire-control radar with look down shot down capability, SM-8A aeronautical optical gun-sight, onboard computer, new cockpit panel, and redesign ejection escape system and oxygen supply system. The original two Type 30-I 30mm cannons were replaced by two Type 23-III 23mm cannons. The four under-wing stores stations are capable of carrying the more advanced PL-5 series short-range AAM. These aircraft were also fitted with an improved electronic countermeasures (ECM) suite including KJ-8602B all-aspect radar warning receiver (RWR). JZ-8 (J-8R) Reconnaissance version of J-8 or J-8I. J-8ACT First flew on 24 June 1990, fly-by-wire testbed aircraft.
- **J-8II (Finback-B) Series:** J-8II (Finback-B) First flown on 12 June 1984, the improved J-8I prototype with redesigned nose/front section and fuselage. replacing the nose air inlet with a solid nose and lateral air intakes, similar to those of the MiG-23. China received several MiG-23s in the late 1970s from Egypt and the hinged ventral fin and lateral intakes indicate probable reverse engineering from the MiG-23. Equipped with Type 208 (SL-4A) monopulse radar (40 km range). J-8II Batch 02 (J-8IIB) First flew in November 1989, improved J-8II with SL-8A (Type 208?) PD radar (70 km range). Powered by 2 x WP-13AII turbojet engines. Armed with twin-barrel 23mm Type 23-III cannon (copy of GSh-23L) and up to 4 PL-5 or PL-8 AAMs (or rockets/bombs). No BVR capability. Peace Pearl J-8 (J-8II) During the Sino-US cooperation era, up to 50 J-8IIs were to be delivered to the US for upgrades and installation of AN/APG-66(v) radar and fire control system for US$500 million, under the Peace Pearl programme. However, the project was cancelled and only about 24 J-8II were produced. USAF Air Force Flight Test Center (6510 Squadron) took the task of test flight of modified J-8II. J-8IIACT (J-8II-BW2) First flew in 1988, fly-by-wire testbed and technology demonstrator. J-8IID (J-8D) First flew on 21 November 1990, modified J-8B with fixed refuelling probe and updated avionics such as TACAN navigation system. F-8IIM Unveiled in Zhuhai Air Show 1996, export version of J-8B with Russian Phazotron Zhuk-8II PD radar (75 km range, and able to track up to ten airborne targets and attack two of them simultaneously), R-27R1 (AA-10) AAM and Kh-31P anti-radiation missile. The F-8IIM was to be powered by two, more powerful WP-13B turbojet engines. This aircraft is often mistakenly referred to as the "J-8IIM" with Kh-31A anti-ship missile (ASM) capability, but its radar lacked sea search mode for anti-shipping role. The F-8IIM failed to attract any export customers and no domestic orders.[7] Conversion from older airframe was reportedly much fewer than the 100 units of Zhuk-8II radar delivered, and the conversion might have only been an experimental programme with none entering service. The F-8IIM fighter will probably be equipped with Russia's or China's helmet sight and advanced PL-9 and P-73 missiles. Phazotron, a Russian firm, has signed contracts with China to provide 150–200 improved Zhuk radars mainly in support of China's new F-8II fighter. J-8III (J-8C) Upgraded J-8II with FBW system and 2 x WP-14 powerplants. Compared to the J-8II, the J-8C had a number of improvements including a new multi-mode pulse Doppler radar which was reportedly based on the Israeli Elta EL/M 2035 radar technology. The aircraft was also equipped with a digital fire-control system and a new 'glass' cockpit with multifunctional displays (MFD). The J-8C programme entered full scale development around 1991 and the aircraft first flew successfully on 12 December 1993. Development halted in favour of other version described below, but was used to test new radars such as Type 1471 (KLJ-1) and other avionics associated with FBW system. From this version on, electronic warfare pods such as BM/KG300G and KZ900, as well as navigational / targeting pods including Blue Sky navigation pod and FILAT become operational on J-8II. Canceled after 2nd testbed had crashed. J-8IIF (J-8F) It is reported that during 2006–2008, J-8II production suffered major setback due to engine problem. J-8IIG Modified J-8II with tail hook and other improvements for developmental work on ship-borne aircraft for carrier operations, such as in April 1987, evaluating & testing the Chinese reverse-engineered steam catapult from that of HMAS Melbourne (R21), which

was finally confirmed 27 years later in April 2014 by CCTV-13. J-8G An advanced modified variant of the J-8II tasked with the suppression of enemy air defence (SEAD) mission was said to have been developed by the SAC in the 2000s. The aircraft, reportedly designated J-8G, was said to be capable of carrying two indigenous YJ-91 anti-radiation missile and electronic warfare suite to attack enemy radar stations. J-8IIM (2006) At Zhuhai Air Show 2006, a new variant "J-8IIM" was put on display with upgraded systems similar to the J-8H.[16] The most significant improvement is the radar upgrade with a new Type 1471 domestic radar used by the J-8H. JZ-8F A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon. J-8T Upgraded J-8 with JL-10A X-band radar. Export variant, F-8T, has WP-13B-II engines. China National Aero-Technology Import & Export Corporation claims J-8T is equipped with improved integrate avionic and various guided weapons. J-8T can carry out air-to-air BVR intercepting mission, air-to-ground precise attacking mission and stand-off attacking mission. J-8DF J-8D upgraded to J-8F standard. Lack of cooling duct below intake. Can fire PL-12 and PL-8 missiles.

System

Alternative Designations: J-8F

Manufactuer: Shenyang Aircraft Corporation

Crew: 1

Underfuselage Hardpoint: 1 x under fuselage hardpoint

Underwing Hardpoints: 6 x underwing hardpoints for external fuel, bombs,rockets or PL-2B or PL-7 air-to-air missiles

Dimensions

Length: 21.59 m

Height: 5.41 m

Wingspan: 9.34 m

Wing Area: 42.2 sq m

Empty Weight: 9,820 kg

Normal Takeoff Weight: 14,300 kg

Maximum Takeoff Weight: 17,800 kg

Automotive

Engine Name: 2 x Wopen 13A-II turbojets

Engine Power: 14,815 lb (6,720 kg) static thrust each with afterburner

Maximum Speed at Maximum Altitude: 1,263 knots (1,454 mph, 2,340 km/h, Mach 2.2)

Maximum Speed at Sea Level: 01 knots (808 mph, 1,300 km/h)

Combat Radius: 800 km

Climb Rate: 12,000 m/min

Acceleration: 20,000 m

Ceiling: 20,000 m

Main Gun System

↳*Gun System #1*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: 23mm

Location: underfuselage gun pack

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min (alleged)

Muzzle Velocity: 715 m/s

Effective Firing Range: INA

↳*Gun System #1 Ammunition*

Type: Autocannon

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 1,000 Rounds

Missile Weapon System

↳*Missile Weapon System #1*

Name: PL-2B

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)

Length: 2.99 m

Diameter: 127 mm

Wingspan: 528 m

Weight: 76 kg

Warhead: 11.3 kg high explosive

Detonation Mechanism: Impact / Proximity

Propellant: solid fuel

Operational Range: 10 km

Flight Ceiling: 21,500 m

Maximum Speed: Mach 2.5

Guidance System: Nitrogen cooled passive InPb infrared seeker

↳*Missile Weapon System #2*

Name: PL-7

Type: Air-to-Air Missile

Length: 2.74 m

Wingspan: 0.66 m

Weight: 89 kg

Warhead: 12.5 kg

Speed: Mach 2.5

Range: 14 km

Guidance System: Infrared Homing

↳***Missile Weapon System #3***

Name: PL-12

Type: Air-to-Air Missile

Length: INA

Diameter: INA

Weight: 180 kg

Operational Range: 100 km

Guidance System: Active Radar

Avionics / Fire Control

Fire Control Radar: Type 1492 X-band fire-control radar

Data Link Antenna: Yes

Navigation Radar: INA

In-FLight Refueling Probe: Yes

Intelligence Pod: BM/KZ900 electronic intelligence pod

Notes:

The J-8F Chinese Interceptor Fighter Aircraft is a model of the J-8II Series. This variant features the Type 1492 X-band fire-control radar, glass cockpit and more powerful WP-13BII engines. Plans called for the latter to be replaced by the WP-4 power plant. There is an additional pair of wing fences to improve handling. Some newer models are equipped with a new data link antenna behind the cockpit. The J-8F is armed with the newer PL-12 active radar-guided missile. The J-8F features a glass cockpit, in-flight refueling probe and a secondary air-to-ground capability. The BM/KZ900 electronic intelligence pod has been integrated with the aircraft's centerline station. Development began in 1997, followed by a first flight in 2000. Testing concluded in 2002. The J-8F entered service in 2003. Retrofitted models are designated J-8DF. The naval variant is the J-8FH. The J-8II series appear quite different from the original J-8, with a new forward fuselage, intake ramps with splitter plates and nose structure more reminiscent of the F-4 Phantom II or Sukhoi Su-15 to house a new, more powerful radar. The J-8II is powered by two Wopen-13A (WP-13A) engines. The design and development team was led by Gu Songfen, who is also a key member of J-8I design team. It was hoped to equip the production J-8B with an American AN/APG-66(V) radar (to be dubbed the J-8C), but this proved politically impossible after the Tiananmen Square protests of 1989 so the indigenous Type 208A monopulse radar fire-control radar initially was used. Although the Type 208A was an improvement over the original J-8I radar, the Type 208A did not have true beyond visual range capabilities (The detection range of the Type 208 was 40 km) nor look-down/shoot-up ground attack capabilities, thereby falling short of the PLAAFs initial requirements and the redesign of the airframe. The J-8B was the early production batch of the new J-8II series. In addition to receiving a new radar, new engine and redesigned noses, cockpit and intake, the J-8B also benefited from a new head-up display, integrated inertial navigation system/Global positioning satellite system and TACAN technology. Later J-8Bs were equipped with the more robust KLJ-1 pulse-Doppler radar fire-control radar and radar warning receiver, theoretically giving the later batch BVR capabilities. J-8B is the second Chinese aircraft to be equipped with a data link, the first being the Chengdu J-7III, and the data link is designated as Type 483 (developed from Type 481 data link used for J-7III), which enables ground-controlled interception centres to feed

directions directly to the autopilots of J-8Bs to fly "hands off" to the interception. At least 30 J-8Bs have been converted by the PLA Navy to J-8D standard, with an aerial refuelling probe for use with Xian H-6DU tankers in addition to newly built J-8Ds. The most significant difference between the J-8B and J-8D is the use of the new Type-02 airframe that was heavier than the J-8B and featured uneven length wing fences. The heavier 'Type 02' airframe is able to carry a larger payload and can tolerate higher G-loadings. The new airframe also has a stiffer radome. A few minor differences between the later J-8B batches and the J-8D are the J-8Ds slightly improved avionics. The use of the KLJ-1 pulse-Doppler radar was used through the J-8Ds entire production run. The J-8B and J-8D both suffered from China's difficulty in developing a MRAAM. Although the Type 208A was theoretically capable of using semi-active radar homing missiles and the KLJ-1 was certainly capable; no such missile, semi-active or active, were available at the time. Both variants were only initially armed with SRAAMs such as the PL-2 and PL-5, and the more advanced infrared-homing PL-8 SRAAM. An early attempt to remedy these technological shortcomings still present after the redesign of the J-8 to the J-8II was the J-8C. The project began shortly after failure to obtain American cooperation for the J-8B, so Shenyang turned to Israel and Russia instead. The J-8C was considered a 'radical' upgrade of the original J-8II with a new radar based on the Israeli Elta EL/M 2035 multi-mode pulse Doppler radar, digital fire-control system, a new 'glass' cockpit, in-flight refuelling probe and equipped with a new WP-14 Kunlun engine. These upgrades were said to 'bring the fighter into the same league as modern Russian and Western fighters such as Mikoyan MiG-29 and Dassault Mirage 2000'. The project was cancelled in the late 1990s after two prototypes were built in favour of further development of the Shenyang J-11 fighter (which is based on the Sukhoi Su-27). The J-8IIM, first flown in 1996, is a further improved version. One major improvement over the J-8II is the capable Russian-made Zhuk-8II coherent pulse-Doppler radar, 100 of which have been delivered in the 1990s. Additionally, the J-8IIM carried new multifunction displays, integrated INS/GPS navigation system, new fire-control systems, new alternators and a new electronic countermeasures suite. The J-8IIM possessed true BVR capabilities with the use of the R-27 (air-to-air missile) semi-active infrared seeker medium-ranged missile. New WP-13B turbojet engines were adopted as well. The J-8IIM has had no new orders from China or the export market, where it is offered as the F-8IIM. It was heavily marketed to Iran but ultimately was not exported anywhere. However the experience and technological achievements gained from the J-8C and F-8IIM projects were later applied by Shenyang Aircraft Company to the later J-8H/F variants. It was also during this time that the Shanghai Academy of Spaceflight Technology certified the PL-11 in 2001 after successfully test firing five missiles from the J-8II. The J-8H configuration features the more powerful WP-13B turbojet engines, improved avionics and the improved Type 1471 pulse-doppler fire control radar with look-down/shoot-down capability and a range of new operating modes. With the radar upgrade comes the ability to fire the PL-11 and the PL-12/SD-10 MRAAM, which employs an Active radar homing (ARH) seeker. The J-8H also is equipped with IFR probe, INS/GPS, HOTAS, and an integrated ECM suite, with twin wing fences on each side of the wings that greatly increased handling ability. The J-8Ds heavier airframe is used but with modified wing fences. Production of the J-8H and the J-8D it had superseded has now ceased in favor of upgrading earlier J-8D aircraft to J-8H standards. It is uncertain if the older J-8B will be upgraded to J-8H standards given the difference in airframe. The J-8F is the most modern and capable J-8 variant currently in service and has been in production since 2003. The J-8H/F has inherited many of the improvements of the earlier J-8C and F-8IIM, and in some cases, has improved on them. The J-8F features a glass cockpit, a more powerful WP-13BII turbojet engine and enhanced Type 1492 radar for enhanced air-to-air capabilities with the PL-12 active radar homing medium range air-to-air missile, full air-to-ground and air-to-sea capabilities using the AS-17 'Krypton' anti-radar missile, and a variety of Chinese designed precision guided laser and satellite guided bombs, making it the first true Multirole combat aircraft variant of the J-8 series. The J-8F also possesses all the avionic and electronic upgrades the J-8H received. The earlier J-8B/Ds can be distinguished from later J-8H/Fs by their dark green radomes, compared to the latter's black radomes. Introduction of the more powerful WP-14 Kunlun turbojet engine for the J-8 series is planned to go under way in the coming years. The J-8F also serves in the People's Liberation Army Naval Air Force as well. A notable variant of the J-8F is the JZ-8F which has been introduced into the PLAAF in the tactical reconnaissance role. Little information has been released on the JZ-8F, other than the use of an internal camera compartment which replaces the twin 23 mm cannon, rather than a camera pod as used by the older JZ-8. In 1988, one J-8II airframe was converted into the J-8ACT an experimental fly-by-wire testbed for the J-10 programme. The J-8ACT had a shorter fuselage and a pair of canards were fixed to the side of each intake, and replaced older FBW technological demonstrators based on the older Shenyang J-6 and J-8I airframes. To date, no plans for a twin-seat J-8 design have been announced.

MiG-23ML (Flogger-G) Russian Fighter Aircraft





Tiers:



System

Alternate Designation(s): MiG-23ML; Flogger-G
Primary Function / Type: Fighter Aircraft
Manufacturer: Mikoyan-Gurevich / Mikoyan
Crew: 1
Number of Engines: 1
Number of Hard Points: 2 × fuselage, 2 × wing glove and 2 × wing pylons with a capacity of up to 3,000 kg (6,600 lb) of stores

Dimensions

Length: 15.88 m
Wingspan, Extended: 13.95 m
Wingspan, Swept: 7.77 m
Wing Area: 27.3 m sq
Height: 4.80 m
Weight, Empty: 10,000 kg
Weight, Weapons Loaded: 3,000 kg
Weight, Normal Takeoff: 16,100 kg
Weight, Maximum Takeoff: 18,900 kg

Automotive

Engine Name: 1 x Khachaturov R-35-300
Number of Engines: 1
Engine Type: Turbojet
Engine Power, Dry: 8,006 kg
Engine Power, Afterburner: 12,474 kg

Fuel Capacity: 5,750 liters

Speed at Altitude: 2,443 km/h, Mach 2.3

Speed at Sea Level: 1,468 km/h, Mach 1.2

Service Ceiling: 18,300 m

G Limits: +8.5

Rate of Climb: 230 m/s

Take-Off Distance: 500 m

Landing Distance: 750 m

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: 23mm

Quantity: 1 × 23 mm Gryazev-Shipunov GSh-23L autocannon

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 260 rounds

Missile Systems

Air-to-Air Missiles: *2 × R-60 *R-73 *2 × R-23 *R-77 *2 × R-27R

Air-to-Surface Missiles: *Kh-23 Grom

↳*Missile System #1*

Name: R-23; NATO: AA-7 Apex

Type: Air-to-Air Missile

Manufacturer: Vympel NPO

Length: 4.50 m

Diameter: 223 mm

Weight: 222 kg

Warhead Type: expanding-rod high explosive

Warhead Weight: 25 kg

Engine: solid fuel rocket

Propellant: 1.04 m

Operational Range: 35 km

Maximum Speed: Mach 3

Guidance System: semi-active radar homing

Rocket Systems

↳*Rocket System #1*

Name: S-5

Type: Rocket

Note: The S-5 is a 55 mm (2.2 in) calibre unguided rocket fired from a 57 mm calibre tube. It is used by fighter bombers and helicopters. It consists of a steel body containing a solid fuel rocket, and a high-explosive warhead with a mechanical impact fuse. At the rear of the rocket is an elongated exhaust nozzle, with eight attached forward folding wings. The fins fold around the rocket when it is stowed in its launch tube, springing back as soon as it leaves the launch tube. In flight, the fins provide a stabilizing spin to the rocket, turning at approximately 750 rpm. The solid rocket motor burns for just 1.1 seconds, during which time it covers about 300 meters (985 ft). The S-5 is carried in rocket pods, with 4–32 rockets. The first were ORO-57 launchers, made in variants with capacity of 4, 8 and 16 rockets. Most typical became ORO-57K for 8 rockets, used especially with MiG-19. Then, beginning in the early 1960s, the typical launcher became UB-16-57, with 16 rockets, developed in several variants, for helicopters and planes. UB stands for "universal block", as it could be carried on conventional bomb hardpoints, "57" refers to the actual diameter of the launch tube (the diameter of the rocket plus 2 mm). The first variant and UB-16-57U had a conical forward part while the next variant UB-16-57D had a blunt forward part. Starting in 1968, a variant UB-16-57UMP was produced, with a conical forward part and five protruding inner tubes.[1] In the 1970s, UB-32 was developed with 32 rockets, carried by heavier aircraft. In Poland, Mars-2 launcher was developed for 16 rockets, and in Romania, LPR 57 launchers for 16 rockets.

Bomb Weapon Systems

Note: Bombs: Up to 500 kg (1,100 lb) bombs per hardpoint

Fire Control / Avionics

Search/Track Radar: High Lark J-band

Infrared: IRST with IR sensor

Laser Desingator: INA

Radar Warning: Sirena 3

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

MiG-23ML The early "Flogger" variants were intended to be used in high-speed missile attacks, but it was soon noticed that fighters often had to engage in more stressful close-in combat. Early production aircraft had actually suffered cracks in the fuselage during their service career. Maneuverability of the aircraft was also criticized. A considerable redesign of the airframe was performed, resulting in the MiG-23ML (L – lightweight), which made it in some ways a new aircraft. Empty weight was reduced by 1250 kg, which was achieved partly by removing a rear fuselage fuel tank. Aerodynamics were refined for less drag. The dorsal fin extension was removed. The lighter weight of the airframe resulted in a different sit on the ground, with the aircraft appearing more level when at rest compared to the nose-high appearance of earlier variants. This has led to a belief that the undercarriage was redesigned for the ML variant, but it is identical to earlier variants. The airframe was now rated for a g-limit of 8.5, compared to 8 g for the early generation MiG-23M/MF "Flogger-B". A new engine model, the R-35F-300, now provided a maximum dry thrust of 84 kN (18,800 lbf), and 127 kN (28,700 lb) with afterburner. This led to a considerable improvement in maneuverability and thrust-to-weight ratio. The avionics set was considerably improved as well. The S-23ML standard included Sapfir-23ML radar and TP-23ML IRST. The new radar was more reliable and a had maximum detection range of about 65 km against a fighter-sized target (25 km in look-down mode). The navigation suite received a new, much improved autopilot. New radio and datalink systems were also installed. The prototype of this variant first flew in 1976 and production began 1978.

MiG-19 (Farmer) Russian Fighter Aircraft





Tiers:



Variants:

- **Farmer-A:** Initial production day fighter version with Klimov VK-5 engine, one 37-mm and two 23-mm cannon, plus wing pylons for rocket pods.
- **Farmer-B (MiG-19S):** Similar to Farmer-A, but with Klimov RD-9B engine, night/all-weather capability.
- **Farmer-C:** Day fighter version with new armament. Models with AM-5 engine designated MiG-19S; those with RD-9F engine designated MiG-19SF.
- **Farmer-D:** Similar to Farmer-C, but with all-weather capability. Models with Farmer-C armament are designated MiG-19PF; those carrying four AA-1 Alkali** missiles are designated MiG-19PM.
- **Farmer-E:** Day fighter version with same armament as the MiG-19PM.
- **J-6/F-6:** Chinese-manufactured versions; see separate database entry.

System

Alternate Designation(s): MiG-19; NATO: Farmer
Primary Function / Type: Fighter Aircraft
Manufacturer: Mikoyan-Gurevich
Crew: 1
Number of Engines: 2
Number of Hard Points: 4 pylons in total, 2 for drop fuel tanks only, 2 for weapons, with a capacity of up to 500 kg (1,100 lb) of stores

Dimensions

Length: 12.54 m
Height: 3.80 m
Wingspan: 9.20 m
Wing Area: 25.0 sq m
Weight, Empty: 5,500 kg
Weight, Normal Takeoff: 7,500 kg
Weight, Maximum Takeoff: 10,200 kg

Automotive

Engine Name: 2 x Klimov RD-9F

Number of Engines: 2

Engine Type: Turbojet

Engine Power, Dry: 2,800 kg static thrust each

Engine Power, with Afterburner: 3,568 kg static thrust each

Internal Fuel Capacity: 2,170 liters

Maximum Speed, High Altitude: 1,452 km/h, Mach 1.35

Maximum Speed, Sea Level: 1,339 km/h, Mach 1.1

Cruise Speed: 950 km/h, Mach 0.9

Climb Rate: 6,900 m/min

Ceiling: 16,775 m

Ferry Range: 2,200 km

Main Gun System

↳*System*

Name: Nudelman-Rikhter NR-30

Type: Autocannon

Caliber: 30mm

Quantity: 3 × 30 mm Nudelman-Rikhter NR-30 autocannon

Length: 2,153 mm

Barrel Length: 1,600 mm

Width: 181 mm

Height: 186 mm

Weight: 66 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 850–1,000 rpm

Muzzle Velocity: 780 m/s

↳*Ammunition*

Type: Rifle

Caliber: 30mm

Cartridge: 30x155mm

Basic Load: (75 rounds for wing-root guns, 55 rounds for the fuselage gun

Main Missile Systems

↳*Main Missile System #1*

Name: K-13; NATO: AA-2 Atoll
Type: Infrared Homing Air-to-Air Missile
Length: 2.830 m
Diameter: 127 mm
Wingspan: 631 mm
Weight: 90 kg
Warhead Weight: 7.4 kg
Operational Range: 1-3.5 km
Maximum Speed: Mach 2.5
Guidance System: infrared homing

Fire Control / Avionics

Fire Control System Type: INA
Fire Control Radar: INA
Laser Desingator: INA

Protection

Stealth Properties: No
Heat Signature Reduction: No
Add on Armor: INA
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Mikoyan-Gurevich MiG-19 (Russian: Микоян и Гуревич МиГ-19; NATO reporting name: Farmer) is a Soviet second generation, single-seat, twin jet-engined fighter aircraft, the world's first mass-produced supersonic aircraft. It was the first Soviet production aircraft capable of supersonic speeds in level flight. A comparable U.S. "Century Series" fighter was the North American F-100 Super Sabre, although the MiG-19 would primarily oppose the more modern McDonnell Douglas F-4 Phantom II and Republic F-105 Thunderchief over North Vietnam.

MiG-21bis (Fishbed-L) Fighter Aircraft





Tiers:



Variants:

- **Note:** MiG-21 Fishbed-A/Ye-50 MiG-21 Fishbed-B/Ye-6 MiG-21F Fishbed-C MiG-21PF Fishbed-D MiG-21PF Fishbed-E MiG-21FL Fishbed-E MiG-21PFM Fishbed-F MiG-21 Fishbed-G MiG-21R Fishbed-H MiG-21PFMA Fishbed-J MiG-21MF Fishbed-J MiG-21M Fishbed-J MiG-21SMB Fishbed-K MiG-21bis Fishbed-L MiG-21bis Fishbed-N MiG-21-93 Fishbed-N MiG-21-2000 MiG-21 Lancer MiG-21 Bison MiG-21U Mongol-A** MiG-21US Mongol-B MiG-21UM Mongol-B J-7 (Jianjiji-7) Also See: https://en.wikipedia.org/wiki/List_of_Mikoyan-Gurevich_MiG-21_variants

System

Alternate Designation(s): MiG-21bis; NATO: Fishbed-L

Primary Function / Type: Fighter/Interceptor

Manufacturer: Russia

In Service: 1972-Present

Crew: 1

Number of Engines: 1

Number of Hard Points: 4 with a capacity of up to 2,000 kg (4,400 lb) of stores

Rocket-Assisted Take-Off, Ground (RATOG) Capable: Yes

Note #1: It has a broader fin and parachute brake housing relocated as bullet fairing below rudder.

Note #2: t incorporates a series of changes made during PF production and adds a side-hinged canopy and broader vertical tail surfaces.

Dimensions

Length: 14.7 m

Width (Wing Span): 7.154 m

Height: 4.1 m

Wing Area: 23 m2

Weight, Gross: 8,725 kg

Weight, Maximum Take Off: 8,800 kg

Automotive

Engine Name: 1 x Tumansky R-25-300 Turbojet
Number of Engines: 1
Static Thrust: 6,200-kg static thrust
Traction (dry / with afterburning): 40.2 / 67.2 kN
Maximum Range: 660 km (410 mi, 360 nmi) clean at 11,000 m (36,089 ft) 604 km (375 mi; 326 nmi) at 11,000 m (36,089 ft) with two R-3S missiles 793 km (493 mi; 428 nmi) at 10,000 m (32,808 ft) with two R-3S missiles and 800 l (210 US gal; 180 imp gal) drop-tank
Maximum Speed: 2,237 km/h
Cruising Speed: 1,000 km/h
Landing Speed: 250 km/h
Service Ceiling: 17,500 m
Time to Altitude: 17,000 m (55,774 ft) in 8 minutes 30 seconds
Fuel: 2,885 liters
Take-Off Run: 830 m
Landing Run with SPS and Brake Parachute: 550 m

Main Gun System

↳*System*

Name: 1 × internal 23 mm Gryazev-Shipunov GSh-23L autocannon
Type: 23mm Autocannon
Caliber: 23mm
Basic Load: 200
Length: GSh-23: 1,387 mm (4 ft 7 in) GSh-23L: 1,537 mm (5 ft 1 in)
Barrel Length: mm1,000
Weight: GSh-23: 49.2 kg (108 lb) GSh-23L: 50 kg (110 lb)
Barrels: 2
Action: Gast principle
Rate of Fire: 3,400–3,600 rounds/min
Muzzle Velocity: m/s715

↳*Ammunition*

Type: Rifle, Autocannon
Caliber: mm23
Cartridge: 23x115 mm
Basic Load: 200

Wing Mounted Weapon Systems

Air-to-Air Missiles: AA-12 Adder AA-11 Archer AA-10 Alamo AA-8 Aphid AA-2 Atoll

Air-to-Surface Missiles: unguided bombs, rockets AS-17 Krypton AS-12 Kegler AS-9 Kyle KAB-500Kr

↳*Missile System (Option 1)*

Name: R-77 (AA-12 Adder)

Type: Medium-range, active radar homing air-to-air missile.

Basic Load: INA

Production history Manufacturer: Vympel

In Service: 2002-Present

Proliferation: The Russian Air Force finally entered the R-77-1 (AA-12B) into service in 2015.[5][6] It was subsequently deployed by Su-35S fighters in Syria on combat air patrols.

Length: 3.6 m (R-77), 3.71 m (R-77-1)

DIameter: mm200

Warhead: 22.5 kg HE fragmenting (R-77)

Detonation Mechanism: laser proximity fuse

Engine: Solid fuel rocket motor (R-77), air-breathing ramjet (R-77-PD)

Wingspan: mm700

Operational Range: 80–100 km (R-77), 110 km (R-77-1) 193 km (R-77M)

Flight Altitude: km5-25

Speed: Mach 4,Mach 5 for K-77PD (RVV-AE-PD)[

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

Launch Platforms: Mikoyan-Gurevich MiG-21-93/LanceR/Bison, Mikoyan-Gurevich MiG-23, Mikoyan-Gurevich MiG-25, Mikoyan-Gurevich MiG-27, Mikoyan MiG-29, Mikoyan MiG-31, Mikoyan MiG-35, Sukhoi Su-27, Sukhoi Su-30, Sukhoi Su-33, Sukhoi Su-34, Sukhoi Su-35, HAL Tejas, Yakovlev Yak-141, Chengdu J-10

↳*Missile System (Option 2)*

Name: KH-31 (AS-17 Krypton)

Type: Medium-range air-to-surface

Basic Load: INA

Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)

In Service: 1988-Present

Proliferation: INA

Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)

Diameter: 360 mm

Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)

Warhead: HE shaped charge

Detonation Mechanism: Impact

Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb

Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory

Wingspan: mm914

Propellant: kerosene

Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)

Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)

Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar

Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M

↳*Bomb Weapon System*

Name: KAB-500Kr

Type: Electro-optical TV-guided fire and forget bomb

Basic Load: INA

Manufacturer: Russia

Proliferation: INA

Length: m3.05

Diameter: INA

Warhead Type: Hardened, armor-piercing warhead

Weight: kg520

Warhead Weight: kg380

Penetration: up to 1.5 metres (4 feet 11 inches) of reinforced concrete.

Effective Range: the weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.

Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Fire Control / Avionics

Radio: RSIU-5V

IFF: SRZO-2M Khrom-Nikel'

ADF: ARK-10

Radar Warning Receiver: SPO-10

Gun Sight: ASP-PFD-M

Radar: RP-22M

ATC Transponder: SOD-57M Globus-2

Command Link: ARL-S Lazur'-M

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: BVP-1F 120 x 26-mm cartridge dispenser

Notes:

MiG-21bis Fishbed-L This is a third-generation MiG-21 with the airframe redesigned for simpler construction, longer fatigue life, greater fuel capacity. The Jay Bird radar is believed to be compatible with the AA-8 Aphid** AAM. It may also be fitted with R-25 engine. The MiG-21bis has a 6,535-lb (7,500-kg) static thrust Tumansky R-25 engine and improved avionics, including a Swift Rods** instrument landing system (ILS) antenna. R-25-engined aircraft have initial rate of climb of 58,000 ft/min (17,700 m/min). It was also manufactured by Hindustan Aeronautics Ltd. (HAL) in Nasik, India. The Mikoyan-Gurevich MiG-21 (Russian: Микоян и Гуревич МиГ-21; NATO reporting name: Fishbed) is a supersonic jet fighter and interceptor aircraft, designed by the Mikoyan-Gurevich Design Bureau in the Soviet Union. Its nicknames include: Balalaika, because its planform resembles the stringed musical instrument of the same name; Ołówek, Polish for "pencil", due to the shape of its fuselage, and; Én bạc, meaning "Silver Swallow", in Vietnamese. Approximately 60 countries over four continents have flown the MiG-21, and it still serves many nations six decades after its maiden flight. It made aviation records, became the most-produced supersonic jet aircraft in aviation history, the most-produced combat aircraft since the Korean War and previously the longest production run of a combat aircraft (now exceeded by both the McDonnell Douglas F-15 Eagle and General Dynamics F-16 Fighting Falcon). It's also one of the earliest examples of planes capable of performing the Cobra maneuver. The MiG-21 was the first successful Soviet aircraft combining fighter and interceptor characteristics in a single aircraft. It was a lightweight fighter, achieving Mach 2 with a relatively low-powered afterburning turbojet, and is thus comparable to the American Lockheed F-104 Starfighter and Northrop F-5 Freedom Fighter and the French Dassault Mirage III. Its basic layout was used for numerous other Soviet designs; delta-winged aircraft included Su-9 interceptor and the fast E-150 prototype from MiG bureau while the mass-produced successful front fighter Su-7 and Mikoyan's I-75 experimental interceptor combined a similar fuselage shape with swept-back wings. However, the characteristic layout with the shock cone and front air intake did not see widespread use outside the USSR and finally proved to have limited development potential, mainly because of the very small space available for the radar. Like many aircraft designed as interceptors, the MiG-21 had a short range. This was exacerbated by the poor placement of the internal fuel tanks ahead of the centre of gravity. As the internal fuel was consumed, the center of gravity would shift rearward beyond acceptable parameters. This had the effect of making the plane statically unstable to the point of being difficult to control, resulting in an endurance of only 45 minutes in clean condition. This can be somewhat countered by carrying fuel in external tanks closer to the center of gravity. The Chinese variants somewhat improved the internal fuel tank layout (also second generation of Soviet variants), and also carry significantly larger external fuel tanks to counter this issue. Additionally, when more than half the fuel was used up, violent maneuvers prevented fuel from flowing into the engine hereby causing it to shut down in flight. This increased the risk of tank implosions (MiG-21 had tanks pressurized with air from the engine's compressor), a problem inherited from the MiG-15, MiG-17 and MiG-19. The short endurance and low fuel capacity of the MiG-21F, PF, PFM, S/SM and M/MF variants—though each had a somewhat greater fuel capacity than its predecessor—led to the development of the MT and SMT variants. These had an increased range of 250 km (155 mi) compared to the MiG-21SM, but at the cost of worsening all other performance figures, such as a lower service ceiling and slower time to altitude. The delta wing, while excellent for a fast-climbing interceptor, meant any form of turning combat led to a rapid loss of speed. However, the light loading of the aircraft could mean that a climb rate of 235 m/s (46,250 ft/min) was possible with a combat-loaded MiG-21bis, not far short of the performance of the later F-16A. Mig-21's Tumansky R-25 jet engine's specialty was the addition of a second fuel pump in the afterburning stage. Activating the ЧР (rus. "чрезвычайный режим" - emergency mode) booster feature allows the engine to develop 97.4 kilonewtons (21,896 lbf) of thrust under 4,000 meters (13,000 ft) of altitude. The limit of operation is 1 minute for dogfight practice and 3 minutes for an actual wartime emergency, as further use causes the engine to overheat. Use of this "diamond regime" provided a massive 97.4 kN of thrust for no more than 3 minutes in actual wartime use. Use of this temporary power gave the MiG-21bis slightly better than 1:1 thrust-to-weight ratio and a climbing rate of 254 meters/second, equalling the F-16's nominal capabilities in close-quarters dogfight. In air combat practice with the MiG-21bis, use of WEP thrust was limited to 1 minute, to spare on the engines' 800 flight hours lifetime, since every second of super-afterburner use counted as several minutes of regular power run due to extreme thermal stress. When WEP was on, the MiG-21bis's R-25 engine produced a huge 5 meter long blowtorch exhaust - the six or seven brightly glowing rhomboid "shock diamonds" visible inside the flames gave the emergency-power setting its "diamond regime" name. Given a skilled pilot and capable missiles, it could give a good account of itself against contemporary fighters. Its G-limits were increased from +7Gs in initial variants to +8.5Gs in the latest variants. It was replaced by the newer variable-geometry MiG-23 and MiG-27 for ground support duties. However, not until the MiG-29 would the Soviet Union ultimately replace the MiG-21 as a maneuvering dogfighter to counter new American air superiority types. The MiG-21 was exported widely and remains in use. The aircraft's simple controls, engine, weapons, and avionics were typical of Soviet-era military designs. The use of a tail with the delta wing

aids stability and control at the extremes of the flight envelope, enhancing safety for lower-skilled pilots; this in turn enhanced its marketability in exports to developing countries with limited training programs and restricted pilot pools. While technologically inferior to the more advanced fighters it often faced, low production and maintenance costs made it a favorite of nations buying Eastern Bloc military hardware. Several Russian, Israeli and Romanian firms have begun to offer upgrade packages to MiG-21 operators, designed to bring the aircraft up to a modern standard, with greatly upgraded avionics and armaments.

MiG-15 (Fagot) Russian Fighter Aircraft





Tiers:



Variants:

- **MiG-15:** This was a developmental/early production model with the RD-45 engine providing 4,850 lb (2,200 kg) of static thrust.
- **MiG-15bis:** This was the basic production version. Some were modified for ground attack and reconnaissance missions. Attack models could carry up to 2,200 lb (1,000 kg) of ordnance on wing pylons.
- **MiG-15UTI Midget:** This was a two-seat trainer version. Most had their guns removed. It was also built in Poland as the Lim-3; in the former Czechoslovakia as the CS-2; and in China as JJ-2 (domestic) and T-2 (export).

System

Alternate Designation(s): MiG-15; NATO: Fagot
Primary Function / Type: Fighter Aircraft
Manufacturer: Mikoyan-Gurevich
Crew: 1
Number of Engines: 1
Number of Hard Points: 2

Dimensions

Length: 11.10 m
Height: 3.39 m
Wingspan: 10.09 m
Wing Area: 20.60 sq m
Weight, Empty: 3,680 kg
Weight, Maximum Takeoff: 6,045 kg

Automotive

Engine Name: 1 x Klimov VK-1
Number of Engines: 1
Engine Type: Turbojet
Engine Power: 2,700 kg static thrust
Internal Fuel Capacity: 1,250 liters
Speed, Maximum at 12,000 m: 1,075 km/h
Speed, Sea Level: 1,050 km/h
Stall, Flaps Up: 210 km/h
Maximum Range, Internal Fuel: 1,085 km
Combat Radius: 451 km
Ferry: 2,012 km
Climb Rate time to 5,000 m: 2 min 18 sec
Climb Rate time to 10,000 m: 7 min 6 sec
Ceiling: 15,500 m

Main Gun Systems

↳*Gun System #1*

Name: Nudelman-Rikhter NR-23
Type: Autocannon
Caliber: 23mm
Quantity: 2 x Nudelman-Rikhter NR-23 23mm Autocannons
Length: 1,980 mm
Barrel Length: 1,450 mm
Width: 165 mm
Height: 136 mm
Weight: 39 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 800–850 rpm
Muzzle Velocity: 690 m/s

↳*Gun System #1 Ammunition*

Type: Rifle
Caliber: 23mm
Cartridge: 23×115 mm

Basic Load: 80 rounds per gun, 160 rounds total

↳*Gun System #2*

Name: Nudelman N-37

Type: Autocannon

Caliber: 37mm

Length: 2,455 mm

Barrel Length: INA

Weight: 103 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 400 rounds per minute

Muzzle Velocity: 690 m/s

↳*Gun System #2 Ammunition*

Type: Rifle

Caliber: 37mm

Cartridge: 37x155mm

Basic Load: 40 rounds total

Bomb Rocket Weapon Systems

Note: 100 kg (220 lb) bombs, drop tanks, or unguided rockets on 2 underwing hardpoints

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

The Mikoyan-Gurevich MiG-15 (Russian: Микоян и Гуревич МиГ-15; USAF/DoD designation: Type 14; NATO reporting name:

Fagot) is a jet fighter aircraft developed by Mikoyan-Gurevich for the Soviet Union. The MiG-15 was one of the first successful jet fighters to incorporate swept wings to achieve high transonic speeds. In combat over Korea, it outclassed straight-winged jet day fighters, which were largely relegated to ground-attack roles, and was quickly countered by the similar American swept-wing North American F-86 Sabre. When refined into the more advanced MiG-17, the basic design would again surprise the West when it proved effective against supersonic fighters such as the Republic F-105 Thunderchief and McDonnell Douglas F-4 Phantom II in the Vietnam War of the 1960s. The MiG-15 is believed to have been one of the most produced jet aircraft; in excess of 13,000 were manufactured. Licensed foreign production may have raised the production total to almost 18,000. The MiG-15 remains in service with the Korean People's Army Air Force as an advanced trainer. The first turbojet fighter developed by Mikoyan-Gurevich OKB was the Mikoyan-Gurevich MiG-9, which appeared in the years immediately after World War II. It used a pair of reverse-engineered German BMW 003 engines. The MiG-9 was a troublesome design that suffered from weak, unreliable engines and control problems. Categorized as a first-generation jet fighter, it was designed with the straight-style wings common to piston-engined fighters. The Germans had been unable to develop turbojets with thrust over 1,130 kilograms-force (11,100 N; 2,500 lbf) running at the time of the surrender in May 1945, which limited the performance of immediate Soviet postwar jet aircraft designs. They did inherit the technology of the advanced axial-compressor Junkers 012 and BMW 018 engines, in the class of the later Rolls-Royce Avon, that were some years ahead of the then currently available British Rolls-Royce Nene engine. The Soviet aviation minister Mikhail Khrunichev and aircraft designer A. S. Yakovlev suggested to Premier Joseph Stalin that the USSR buy the conservative but fully developed Nene engines from Rolls-Royce (having been alerted to the fact that the U.K. Labour government wanted to improve post-war UK-Russia foreign relations) for the purpose of copying them in a minimum of time. Stalin is said to have replied, "What fool will sell us his secrets?" However, he gave his consent to the proposal and Mikoyan, engine designer Vladimir Klimov, and others travelled to the United Kingdom to request the engines. To Stalin's amazement, the British Labour government and its Minister of Trade, Sir Stafford Cripps, were perfectly willing to provide technical information and a license to manufacture the Rolls-Royce Nene. Sample engines were purchased and delivered with blueprints. Following evaluation and adaptation to Russian conditions, the windfall technology was tooled for mass-production as the Klimov RD-45 to be incorporated into the MiG-15. To take advantage of the new engine, the Council of Ministers ordered the Mikoyan-Gurevich OKB to build two prototypes for an advanced high-altitude daytime interceptor to defend against bombers. It was to have a top speed of 1,000 kilometres per hour (620 mph) and a range of 1,200 kilometres (750 mi). Designers at MiG's OKB-155 started with the earlier MiG-9 jet fighter. The new fighter used Klimov's British-derived engines, swept wings, and a tailpipe going all the way back to a swept tail. The German Me 262 was the first fighter fitted with an 18.5° wing sweep, but it was introduced merely to adjust the center of gravity of its heavy Junkers Jumo 004 pioneering axial-compressor turbojet engines. Further experience and research during World War II later established that swept wings would give better performance at transonic speeds. At the end of World War II, the Soviets seized many of the assets of Germany's aircraft industry. The MiG team studied these plans, prototypes and documents, particularly swept-wing research and designs, even going so far as to produce a flying testbed in 1945 to investigate swept-wing design concepts as the piston-engined "pusher"-layout, MiG-8 Utka (Russian for "duck", from its tail-first canard design). The swept wing later proved to have a decisive performance advantage over straight-winged jet fighters when it was introduced into combat over Korea. The design that emerged had a mid-mounted 35-degree swept wing with a slight anhedral and a tailplane mounted up on the swept tail. Western analysts noted that it strongly resembled Kurt Tank's Focke-Wulf Ta 183, a later design than the Me 262 that never progressed beyond the prototype stage. While the majority of Focke-Wulf engineers (in particular, Hans Multhopp, who led the Ta-183 development team) were captured by Western armies, the Soviets did capture plans and wind-tunnel models for the Ta-183. The MiG-15 bore a much stronger likeness to the Ta-183 than the American F-86 Sabre, which also incorporated German research.[citation needed] The MiG-15 does bear a resemblance in layout, sharing the high tailplane and nose-mounted intake, although the aircraft are different in structure, details, and proportions. The MiG-15's design understandably shared features, and some appearance commonalities with the MiG design bureau's own 1945–46 attempt at a Soviet-built version of the Messerschmitt Me 263 rocket fighter in the appearance of its fuselage. The new MiG retained the previous straight-winged MiG-9's wing and tailplane placement while the F-86 employed a more conventional low-winged design. To prevent confusion during the height of combat the US painted their aircraft with bright stripes to distinguish them. The resulting prototypes were designated I-310. The I-310 was a swept-wing fighter with 35-degree sweep in wings and tail, with two wing fences fitted to each wing to improve airflow over the wing. The design used a single Rolls-Royce Nene fed by a split-forward air intake. A duct carried intake air around the cockpit area and back together ahead of the engine. Its first flight was 30 December 1947, some two months after the American F-86 Sabre had first flown. It demonstrated exceptional performance, reaching 1,042 kilometres per hour (647 mph) at 3,000 metres (9,800 ft). The Soviet Union's first swept-wing jet fighter had been the underpowered Lavochkin La-160, which was otherwise more similar to the MiG-9. The Lavochkin La-168, which reached production as the Lavochkin La-15, used the same engine as the MiG but used a shoulder mounted wing and t-tail; it was the main competitive design. Eventually, the MiG design was favoured for mass production. Designated MiG-15, the first production example flew on 31 December 1948. It entered Soviet Air Force service in 1949, and subsequently received the NATO reporting name "Fagot". Early production examples had a tendency to roll to the left or to the right due to manufacturing variances, so aerodynamic trimmers called "nozhi" (knives) were fitted to correct the problem, the knives being adjusted by ground crews until the aircraft flew correctly. An improved variant, the MiG-15bis ("second"), entered service in early 1950 with a Klimov VK-1 engine, another version of the Nene with improved metallurgy over the RD-45, plus minor improvements and upgrades. Visible differences were a headlight in the air intake separator and horizontal upper edge airbrakes. The 23 mm cannon were placed more closely together in their undercarriage. Some "bis" aircraft also adopted under-wing hardpoints for unguided rocket launchers or 50–250 kg (110–550 lb) bombs. Fighter-bomber modifications were dubbed "IB", "SD-21", and "SD-5". About 150 aircraft were upgraded to SD-21 specification during 1953–1954. The MiG-15 arguably had sufficient power to dive at supersonic speeds, but the lack of an "all-flying" tail greatly diminished the pilot's ability to control the aircraft as it approached

Mach 1. As a result, pilots understood they must not exceed Mach 0.92, where the flight surfaces became ineffective. Additionally, the MiG-15 tended to spin after it stalled, and often the pilot could not recover. Later MiGs incorporated all-flying tails. The MiG-15 was originally intended to intercept American bombers like the B-29. It was even evaluated in mock air-to-air combat trials with a captured U.S. B-29, as well as the later Soviet B-29 copy, the Tupolev Tu-4. To ensure the destruction of such large bombers, the MiG-15 carried autocannons: two 23 mm with 80 rounds per gun and a single 37 mm with 40 rounds. These weapons provided tremendous punch in the interceptor role, but their limited rate of fire and relatively low velocity made it more difficult to score hits against small and maneuverable enemy jet fighters in air-to-air combat. The 23 mm and 37 mm also had radically different ballistics, and some United Nations pilots in Korea had the unnerving experience of 23 mm shells passing over them while the 37 mm shells flew under. The cannon were fitted into a simple pack that could be winched out of the bottom of the nose for servicing and reloading, allowing pre-prepared packs to be rapidly swapped out.

Mirage F1 French Fighter Aircraft





Tiers:



Variants:

- **Mirage F1A:** Single-seat ground-attack fighter aircraft, with limited daylight-only air-to-air capability. Fitted with lightweight EMD AIDA 2 ranging radar instead of Cyrano IV of other variants, with laser rangefinder under nose, retractable refuelling probe and more fuel.[
- **Mirage F1B:** The French Air Force also ordered 20 Mirage F1Bs, a two-seat operational conversion trainer; these were delivered between October 1980 and March 1983. The extra seat and controls added only 30 cm (12 in) to the length of the fuselage, but at the cost of less internal fuel capacity and the loss of the internal cannon
- **Mirage F1C:** INA
- **Mirage F1D:** Two-seat training version, based on the Mirage F1E multi-role fighter, ground-attack aircraft.
- **Mirage F1E:** Single-seat all-weather multi-role fighter and ground-attack aircraft.
- **Mirage F1CG:** Greece operated 40 Dassault Mirage F1CG single seat aircraft. F1CG was first ordered in 1974 and entered service with the Hellenic Air Force in 1975 The aircraft were used by 334 Squadron and 342 Squadron.Mirage F1CG was armed with the Sidewinder AIM-9P missile, rather than the most commonly used Matra Magic II, and it could carry four AIM-9Ps, rather than just two.
- **Mirage F1CR:** When it became clear that the Mirage F1 was becoming a successful production aircraft, Dassault began investigating the possibility of a dedicated reconnaissance version for its most important client, the French Air Force. However, the escalating cost of fighter aircraft meant that add-on pods for this purpose were a more economical alternative.
- **Mirage F1CT:** The Mirage F1CT is a ground attack version of the Mirage F1C-200. Following their replacement in the air defence role by the Mirage 2000, the French Air Force had a number of surplus Mirage F1C-200s, and in 1988 it launched a conversion programme to turn these aircraft into interim ground attack aircraft to replace elderly Mirage IIIEs and Mirage Vs.
- **Mirage F1AZ and F1CZ:** The South African Air Force (SAAF) flew both the Mirage F1AZ ground-attack version as well as the radar-equipped Mirage F1CZ fighter. The first two examples of the first order (48 aircraft, comprising 32 F1AZ and 16 F1CZ) were delivered on 5 April 1975. In July of the same year, the remainder of the F1CZs were delivered and 3 Squadron was recommissioned to operate the aircraft from AFB Waterkloof. In 1975 the F1CZs also appeared at a South African airshow, the public were not informed that it was already in service. The SAAF retired the F1CZs in 1992, followed by the F1AZs in 1997.
- **Mirage F1 M-53:** Developed for the participation in the "European" NATO fighter competition of early seventies, seeking to replace the F-104G. It was equipped with a more powerful engine, the SNECMA M-53, and other improvements. Failed to succeed, the contest was eventually won by the General Dynamics F-16. The Mirage F.1 came in second place.
- **Mirage F1M:** The F1M upgrade (unrelated to the M-53 prototype) was applied to 48 Spanish F1CE/EE and four F1EDA trainers under a FFr700 million (US$96m) contract awarded to Thomson-CSF in October 1996. The prototype F1M flew in

April 1998, and CASA delivered the remainder between March 1999 and 15 March 2001. The project included a revised cockpit with colour LCDs and a Smart HUD from Sextant Avionique, a Sextant inertial navigation system with GPS interface; NATO-compatible Have Quick 2 secure communications; Mode 4 digital IFF; a defensive aids suite; and flight recorders.[

System

Alternate Designation(s): Mirage F1

Primary Function / Type: Fighter Aircraft

Manufacturer: Dassault Aviation

Total Built: Total: 720 Gabon Gabonese Air Force received 6 F1AZ aircraft from South Africa, with two more to be delivered. Iran Iranian Air Force Mirage F1BQ Islamic Republic of Iran Air Force seized 24 F1BQs and F1EQs flown over from Iraq, during the 1991 Persian Gulf War. Libya Libyan Air Force received 16 F1AD, 6 F1BD & 16 F1ED aircraft. All were grounded but, twelve were contracted for refurbishment, of which only four were returned to service. Of these twelve, two were taken to Malta when their pilots defected France will renovate Libya's small fleet of Mirage F1s and train its personnel as part of a defence co-operation agreement signed in 2012. Morocco Royal Moroccan Air Force received 30 F1CHs, 14 F1EHs & 6 F1EH-200s. 23 are still operational and 27 have been upgraded to ASTRAC. South Africa Paramount Aerospace Systems acquired four former French Air Force Mirage F1B. United States Draken International has acquired 20 former Spanish Air Force Mirage F1Ms and 2 F1B aircraft for use in the Adversary Air role providing support to the United States Air Force. Textron subsidiary Airborne Tactical Advantage Company acquired 63 former French Air Force Mirage F1B, F1CT, and F1CR for dissimilar air combat training and aggressor squadron purposes for the US Air Force

In Service: 1973-Present

Crew: 1

Number of Engines: 1

Day/Night Capable: Yes

Number of Hard Points: 1 centreline pylon, four underwing and two wingtip pylons with a capacity of 6,300 kg.

Dimensions

Length: 15.30 m

Wingspan, Clean: 8.40 m

Wingspan, with Missiles: 9.32 m

Height: 4.50 m

Wing Area: 25.00 sq. m

Weight, Empty: 7,400 kg

Weight, Maximum Weapons Load: 4,000 kg

Weight, Maximum External Load including Drop Tanks: 6,300 kg

Weight, Takeoff Normal: 10,900 kg

Weight, Takeoff Maximum: 16,200 kg

Automotive

Engine Name: 1 x SNECMA Atar 9K-50 turbojet

Number of Engines: 1

Max Power, Dry: 5,000 kg, static thrust

Max Power with Afterburner: 7,200 kg, static thrust

Internal Fuel Capacity: 4,200 liters

Speed at Sea Level: 1,471 km/h, Mach 1.2

Speed at 12,000 Meters: 2,334 km/h, Mach 2.2

Speed, Landing: 230 km/h

Climb Rate: 12,780 m/min

Ceiling: 20,000 m

Communications

Radio: INA

Armament

Number of Pylons: 1 centreline pylon, four underwing and two wingtip pylons

Capacity Centerline Fuselage: 2,100 kg

Capacity Inboard Wing Pylons: 1,300 kg

Capacity Outer Wing Pylon: 550-kg, including 1 x 2,200 Liter External Fuel Tank

Armament Options: 2 x Super R530 AAM or one Armat anti-radar missile; or 1 or 2 x AM 39 Exocet anti-ship missiles; or 1 to 2 x AS 30L air-to-ground missiles; or 2 x 30-mm DEFA gun pods, or 880-lb (400-kg), or 2,200-lb (1,000-kg) laser-guided bombs and ATLIS laser-designation pod; or 14 x 550-lb (250-kg) bombs; or BAP 100, BAT-100; or Durandal anti-runway bombs; or Belouga cluster bombs; or 8 x 18-round 68-mm rocket pods; or Remora or Caiman countermeasures pods OMERA camera pods and two 330-lb (150-kg) capacity wingtip missile rails for R550 Magic or AIM-9 Sidewinder AAM

↳*Cannon Weapon System*

Name: 2 x integral DEFA 553 30-mm cannon

Type: Autocannon

Caliber: mm30

Length: 1.66 m

Weight: 85 kg

Barrels: 1

Action: Five-chamber revolver

Rate of Fire: 1,300 rpm

Muzzle Velocity: m/s815

↳*Cannon Ammunition*

Type: Rifle, Cannon

Caliber: mm30

Cartridge: 30 × 113 mm

Basic Load: 135

↳*Missile (Option 1)*

Name: Super 530

Type: Short to medium-range air-to-air missile.

Manufacturer: France

Basic Load: 2

Proliferation: Widely Proliferated

Length: Super 530F: 3.54 m Super 530D: 3.80 m

Diameter: mm263

Weight: Super 530F: 245 kg Super 530D: 270 kg

Warhead Type: High-explosive fragmentation

Warhead Weight: kg30

Detonation Mechansim: Super 530F: RF Super 530D: Active Radar

Engine: Solid-fuel rocket motor

Wingspan: Super 530F: 0.88 m Super 530D: 0.62 m

Operational Range: Super 530F: 25 km Super 530D: 40 km

Speed: Super 530F: Mach 4.5 Super 530D: Mach <5.0

Guidance System: Semi-active radar homing (SARH)

↳***Missile (Option 2)***

Name: Matra R.530

Type: Short-range air-to-air missile

Basic Load: 2

Proliferation: Widely Proliferated

Manufacturer: Matra

In Service: 1962-Present

Length: 3.28 m

Diameter: 263 mm

Weight: 192 kg

Engine: two stage solid rocket, Hotchkiss-Brandt/SNPE Antoinette rocket 83.3 kN for 2.7 s + 6.5 s cruise

Wingspan: m1.1

Operational Range: 1.5 to 20 km

Speed: Mach 2.7

Guidance System: Semi active radar homing and Infrared homing[

Launch Platform: Dassault Mirage F1 Dassault Mirage III [1] F-8 Crusader

↳***Bomb (Option 1)***

Name: BL755

Type: Cluster Bomb

Basic Load: INA

Manufacturer: Hunting Engineering, Ltd.

Proliferation: Widely Proliferated

In Service: 1972-Present

Proliferation: As of January 1, 1996, 60,598 bombs and 8,925,906 submunitions[

Length: mm2,451

Diameter: mm419

Weight: kg264

Warhead: Shaped charge HEAT warhead

Fragments: 1,400 anti-personnel fragments

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: 1 x Thomson-CSF Cyrano IV fire-control radar

Laser Desingator: INA

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: Remora or Caiman countermeasures pods

Notes:

The Dassault Mirage F1 is a French fighter and attack aircraft designed and manufactured by Dassault Aviation. It was developed as a successor to the popular Mirage III family. During the 1960s, Dassault commenced development of what would become the Mirage F1 as a private venture, alongside the larger Mirage F2. Work on the F1 eventually took precedence over the more costly F2, which was cancelled during the late 1960s. The French Air Force (Armée de l'Air) took interest in the fledgling fighter to meet its requirement for an all-weather interceptor aircraft. Accordingly, initial production units were equipped with the Thomson-CSF Cyrano IV monopulse radar. During the latter half of 1974, the Mirage F1 entered service in the French Air Force. Shortly thereafter, the type was deployed as the main interceptor of the French Air Force, a capacity which it continued to serve in until the arrival of the Mirage 2000. It later transitioned to an aerial reconnaissance role. During June 2014, the last French Mirage F1s was retired from service. Powered by a single SNECMA Atar 9K-50 turbojet engine, which provided about 7 tonnes-force (69 kN; 15,000 lbf) of thrust, and armed with an array of French and American-sourced armaments, the Mirage F1 has been operated as a light multipurpose fighter and has been exported to around a dozen nations. The type has seen action in a large number of armed conflicts involving several of its operators, including the Western Sahara War, the Paquisha War, the Cenepa War, the Iran–Iraq War, the Gulf War, the South African Border War, the War in Afghanistan, the Chadian–Libyan conflict, the 2011 military intervention in Libya, and the Northern Mali conflict. More than 720 Mirage F1s were manufactured between 1966 and 1992. It was succeeded in production by the Dassault Mirage 2000. The Dassault Mirage F1 was a single-engine fighter aircraft, designed to function as both an interceptor aircraft and as a capable ground attack platform. While officially developed for the French Air Force as a capable air defense aircraft, Dassault had placed considerable emphasis on developing the Mirage F1 for ground attack duties as a secondary role during its early design. Developed by the company to function as a successor to the successful Mirage III and Mirage 5 families, it drew heavily upon its predecessors as well, sharing the same fuselage as the Mirage III, while adopting a considerably different wing configuration. The Mirage F1 used a shoulder-mounted swept wing, instead of the Delta wing of the Mirage III, which resulted in a more than 50% reduction in required runway lengths and increased internal fuel tankage for 40% greater combat range. The approach speed prior to landing is 25% less than the preceding Mirage IIIE. According to Dassault, the negative performance impact associated with the

increased thickness of the Mirage F1's wing over the Mirage III's counterpart had been offset by improvements made to the propulsion system.The wing is fitted with both double-slotted trailing edge flaps and full-span leading edge slats, the latter being automatically operated to reduce the aircraft's turn radius during combat. A key area of advancement on the Mirage F1 over its predecessors was in its onboard avionics. The Thomson-CSF Cyrano IV monopulse radar system, developed from the Cyrano II unit installed on the Mirage IIIE, serves as the main sensor; it operates in three different modes: air-target acquisition and tracking, ground mapping, and terrain avoidance. The later Cyrano IV-1 model also provided for a limited look-down capability. According to aerospace publication Flight International, the Cyrano IV radar was capable of detecting aerial targets at double the range of earlier models. The standard production Mirage F1 was furnished with an Instrument Landing System (ILS), radar altimeter, UHF/VHF radio sets, Tactical Air Navigation system (TACAN) and aground data link. Other avionics include an autopilot and yaw damper. The Mirage F1 was powered by a single SNECMA Atar 9K-50 turbojet engine, which was capable of providing roughly 7 tonnes-force (69 kN; 15,000 lbf) of thrust, giving the aircraft a maximum speed of 1,453 MPH and an altitude ceiling of 65,615 feet. Flight International described the Atar engine as being "unexpectedly simple", despite the adoption of an afterburner.[8] An improved engine, initially known as the Super Atar and later as the Snecma M53, was intended to be eventually adopted on production Mirage F1 aircraft, as well as for successor aircraft. The initial armament of the Mirage F1 was a pair of internal 30 mm cannons, and a single Matra R530 medium-range air-to-air missile, which was carried under the fuselage. It could carry a total combined payload of 13,889lb of bombs and missiles, all of which would be carried externally. After 1979, the medium-range R530 was replaced by the improved Matra Super 530 F missile as the latter came into service in quantity with the French Air Force. In 1977, the R550 Magic was released; the Mirage F1 has these missiles mounted on rails on the wingtips. Around the same time, the American AIM-9 Sidewinder was also introduced to the Mirage F1's armament; both the Spanish and Hellenic Air Forces had requested the integration of the Sidewinder upon their own Mirage F1CE and Mirage F1CG fighters.

J-7 (Fishcan) Chinese Fighter Aircraft



Tiers:

1 2 3 4

Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7 ; NATO: FIshcan
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 1
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1,800 kg
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x Liyang Wopen 7 turbojet
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,500 lb (6,124 kg) static thrust
Internal Fuel Capacity: 2,385 liters
Maximum Speed: 2,175 km/h
Touchdown Speed: 310-330 km/h

Ceiling: 18,800 m

Climb Rate: 9,000 m/min

Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: mm30

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon

Caliber: 30

Shell: 30×165mm

Basic Load: 1,000 Rounds

Missile Weapon Systems

↳*Missile Weapon System (Option #1)*

Name: PL-5

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: INA

Computerized FCS: Yes

Radar: 1 x Skyranger

Notes:

The Chengdu J-7 (Chinese: □-7; third generation export version F-7; NATO reporting name: Fishcan is a People's Republic of China license-built version of the Soviet Mikoyan-Gurevich MiG-21. Though production ceased in 2013, it continues to serve, mostly as an interceptor, in several air forces, including the People's Liberation Army Air Force. In the 1950s and early 1960s, the Soviet Union shared most of its conventional weapons technology with the People's Republic of China. The famous MiG-21, powered by a single engine and designed on a simple airframe, was inexpensive but fast, suiting the strategy of forming large groups of 'people's fighters' to overcome the technological advantages of Western aircraft. However, the Sino-Soviet split abruptly ended the initial cooperation, and from July 28 to September 1, 1960, the Soviet Union withdrew its advisers from China, resulting in the project being stopped in China. Soviet Premier Nikita Khrushchev unexpectedly wrote to Mao Zedong in February, 1962, to inform Mao that the Soviet Union was willing to transfer MiG-21 technology to China, and he asked the Chinese to send their representatives to the Soviet Union as soon as possible to discuss the details. The Chinese viewed this offer as a Soviet gesture to make peace, and they were understandably suspicious, but they were nonetheless eager to take up the Soviet offer for an aircraft deal. A delegation headed by General Liu Yalou, the commander-in-chief of the People's Liberation Army Air Force (PLAAF) and himself a Soviet military academy graduate, was dispatched to Moscow immediately, and the Chinese delegation was given three days to visit the production facility of the MiG-21, which was previously off-limits to foreigners. The authorization for this visit was personally given by Nikita Khrushchev, and on March 30, 1962, the technology transfer deal was signed. However, given the political situation and the relationship between the two countries, the Chinese were not optimistic about gaining the technology, and thus they were prepared for reverse engineering. Russian sources state that several complete examples of the MiG-21 were sent to China, flown by Soviet pilots, and China also received MiG-21Fs in kits, along with parts and technical documents. Just as the Chinese had expected, however, when the Soviets delivered the kits, parts and documents to Shenyang Aircraft Factory five months after the deal was signed, the Chinese discovered that the technical documents provided by the Soviets were incomplete and that some of the parts could not be used. China set about to reverse-engineer the aircraft for local production, and in doing so, they succeeded in solving 249 major problems and reproducing eight major technical documents that were not provided by the Soviet Union. One of the major flaws was with the Hydraulics systems, which grounded up to 70% of aircraft in some squadrons until the systems were upgraded. Another major upgrade was modifications to the fuel storage to make the aircraft more stable. The MiG-21 carries most of its fuel in the forward fuselage, causing the center of gravity to shift and become unstable after about 45 minutes of operation. The J-7 has redesigned fuel tanks and significantly larger drop tanks in order to maintain a more stable center of gravity, and therefore better Longitudinal static stability. The cockpit was also revised to replace the Soviet ejection seat, which was found to be unacceptable. The forward opening canopy was replaced by a standard canopy hinged to the rear and jettisoned before the seat ejected. Otherwise, the re-engineering effort was largely successful, as the Chinese-built J-7 aircraft showed only minor differences in design and performance from the original Soviet MiG-21. In March 1964, Shenyang Aircraft Factory began the first domestic production of the J-7 jet fighter, which they successfully accomplished the next year. However, the mass production of the J-7 aircraft was severely hindered by an unexpected social and economic problem—the Cultural Revolution—that resulted in poor initial quality and slow progress, which, in turn, resulted in full-scale production only coming about in the 1980s, by which time the original aircraft design was showing its age. In 1987 the J-7E was released, having a greatly improved wing, among other improvements. It was roughly 45% more maneuverable, and its takeoff and landing performance was greatly increased. It was also equipped with a helmet mounted sight, as well as being the first MiG-21 to be equipped with HOTAS and a multipurpose display. Many of the electronic components were British in origin, such as the gun sight and the multi purpose display. The aircraft is capable of using PL-8/Python 3 missiles with both the helmet mounted sight or the radar fire control, but the two are not connected. The pilot may use only one system at a time. In the mid 1980s Pakistan

requested an aircraft with greater radar capabilities. Both the standard radar and the British Marconi radar were plagued by ground clutter, but China did not have any experience with air to ground radar at the time. In 1984 Pakistan provided assistance by having their American trained F-16 pilots provide training on proper operation of ground attack radar, which enabled the Chinese to develop the J-7M. In the late 1980s the J-7MP and J-7PG introduced significant upgrades to the radar system by converting to an Italian FAIR Grifo-7 radar. This more than tripled the effective range of the radar, as well as greatly increased the angle which the radar could detect target. The J-7 only reached its Soviet-designed capabilities in the mid 1980s. However, the fighter is affordable and has been widely exported as the F-7, often with Western systems incorporated, like the ones sold to Pakistan. There are over 20 different export variants of the J-7, some of which are equipped to use European weaponry, such as French R.550 Magic missiles. The Discovery Channel's Wings Over The Red Star series claims that the Chinese intercepted several Soviet MiG-21s en route to North Vietnam (during the Vietnam War), but these aircraft did not perform in a manner consistent with their original specifications, suggesting that the Chinese actually intercepted down-rated aircraft that were intended for export, rather than fully capable production aircraft. For this reason, the Chinese had to re-engineer the intercepted MiG-21 airframes in order to achieve their original capabilities. China later developed the Shenyang J-8 based both on the expertise gained by the program, and by utilizing the incomplete technical information acquired from the Soviet Ye-152 developmental jet. In May 2013, J-7 production has ceased after decades of manufacturing. The last 12 F-7BGIs were delivered to the Bangladesh Air Force.

MiG-21 (Fishbed) Russian Fighter Aircraft







Tiers:



Variants:

- **Note:** MiG-21 Fishbed-A/Ye-50 MiG-21 Fishbed-B/Ye-6 MiG-21F Fishbed-C MiG-21PF Fishbed-D MiG-21PF Fishbed-E MiG-21FL Fishbed-E MiG-21PFM Fishbed-F MiG-21 Fishbed-G MiG-21R Fishbed-H MiG-21PFMA Fishbed-J MiG-21MF Fishbed-J MiG-21M Fishbed-J MiG-21SMB Fishbed-K MiG-21bis Fishbed-L MiG-21bis Fishbed-N MiG-21-93 Fishbed-N MiG-21-2000 MiG-21 Lancer MiG-21 Bison MiG-21U Mongol-A** MiG-21US Mongol-B MiG-21UM Mongol-B J-7 (Jianjiji-7) Also See: https://en.wikipedia.org/wiki/List_of_Mikoyan-Gurevich_MiG-21_variants

System

Alternate Designation(s): Mikoyan-Gurevich MiG-21

Primary Function / Type: Fighter

Manufacturer: Russia

In Service: 1959-Present

Crew: 1

Number of Engines: 1

Day/Night Capable:

All Weather Capable:

Takeoff or Landing Limitations:

Number of Hard Points: 4

Dimensions

Length: m15.76

Width (Wing Span): m7.5

Height: m4.1

Weight, Empty: tons5.46

Weight, Maximum Take Off: tons10.1

Automotive

Engine Name: 1 x R-25-300 turbojet

Number of Engines: 1

Traction (dry / with afterburning): 40.2 / 67.2 kN

Maximum Range: km1,225

Maximum Range with external Fuel Tanks: km1,470

Maximum Speed: 2,230 km/h

Cruising Speed: 1,000 km/h

Service Ceiling: km19

Time to Altitude: 17,000 m (55,774 ft) in 8 minutes 30 seconds

Fuel: 2,885 liters

Communications

Cannon Weapon System

↳*System*

Name: 1 × internal 23 mm Gryazev-Shipunov GSh-23L autocannon

Type: 23mm Autocannon

Caliber: 23mm

Basic Load: 200

Length: GSh-23: 1,387 mm (4 ft 7 in) GSh-23L: 1,537 mm (5 ft 1 in)

Barrel Length: mm1,000

Weight: GSh-23: 49.2 kg (108 lb) GSh-23L: 50 kg (110 lb)

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: m/s715

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm23

Cartridge: 23x115 mm

Basic Load: 200

Wing Mounted Weapon Systems

Air-to-Air Missiles: AA-12 Adder AA-11 Archer AA-10 Alamo AA-8 Aphid AA-2 Atoll

Air-to-Surface Missiles: unguided bombs, rockets AS-17 Krypton AS-12 Kegler AS-9 Kyle KAB-500Kr

↳*Missile System (Option 1)*

Name: R-77 (AA-12 Adder)

Type: Medium-range, active radar homing air-to-air missile.

Basic Load: INA

Production history Manufacturer: Vympel

In Service: 2002-Present

Proliferation: The Russian Air Force finally entered the R-77-1 (AA-12B) into service in 2015.[5][6] It was subsequently deployed by Su-35S fighters in Syria on combat air patrols.

Length: 3.6 m (R-77), 3.71 m (R-77-1)

DIameter: mm200

Warhead: 22.5 kg HE fragmenting (R-77)

Detonation Mechanism: laser proximity fuse

Engine: Solid fuel rocket motor (R-77), air-breathing ramjet (R-77-PD)

Wingspan: mm700

Operational Range: 80–100 km (R-77), 110 km (R-77-1) 193 km (R-77M)

Flight Altitude: km5-25

Speed: Mach 4,Mach 5 for K-77PD (RVV-AE-PD)[

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

Launch Platforms: Mikoyan-Gurevich MiG-21-93/LanceR/Bison, Mikoyan-Gurevich MiG-23, Mikoyan-Gurevich MiG-25, Mikoyan-Gurevich MiG-27, Mikoyan MiG-29, Mikoyan MiG-31, Mikoyan MiG-35, Sukhoi Su-27, Sukhoi Su-30, Sukhoi Su-33, Sukhoi Su-34, Sukhoi Su-35, HAL Tejas, Yakovlev Yak-141, Chengdu J-10

↳*Missile System (Option 2)*

Name: KH-31 (AS-17 Krypton)

Type: Medium-range air-to-surface

Basic Load: INA

Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)

In Service: 1988-Present

Proliferation: INA

Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)

Diameter: 360 mm

Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)

Warhead: HE shaped charge

Detonation Mechanism: Impact

Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb

Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory

Wingspan: mm914

Propellant: kerosene

Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)

Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)

Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar

Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M

↳*Bomb*

Name: KAB-500Kr

Type: Electro-optical TV-guided fire and forget bomb

Basic Load: INA

Manufacturer: Russia

Proliferation: INA

Length: m3.05

Diameter: INA

Warhead Type: Hardened, armor-piercing warhead

Weight: kg520

Warhead Weight: kg380

Penetration: up to 1.5 metres (4 feet 11 inches) of reinforced concrete.

Effective Range: he weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.

Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: Phazotron Kopyo

Laser Desingator: INA

Radar Warning: Sirena

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: BVP-1F 120 x 26-mm cartridge dispenser

Notes:

The Mikoyan-Gurevich MiG-21 (Russian: Микоян и Гуревич МиГ-21; NATO reporting name: Fishbed) is a supersonic jet fighter and interceptor aircraft, designed by the Mikoyan-Gurevich Design Bureau in the Soviet Union. Its nicknames include: Balalaika, because its planform resembles the stringed musical instrument of the same name; Ołówek, Polish for "pencil", due to the

shape of its fuselage, and; Én bạc, meaning "Silver Swallow", in Vietnamese. Approximately 60 countries over four continents have flown the MiG-21, and it still serves many nations six decades after its maiden flight. It made aviation records, became the most-produced supersonic jet aircraft in aviation history, the most-produced combat aircraft since the Korean War and previously the longest production run of a combat aircraft (now exceeded by both the McDonnell Douglas F-15 Eagle and General Dynamics F-16 Fighting Falcon). It's also one of the earliest examples of planes capable of performing the Cobra maneuver. The MiG-21 was the first successful Soviet aircraft combining fighter and interceptor characteristics in a single aircraft. It was a lightweight fighter, achieving Mach 2 with a relatively low-powered afterburning turbojet, and is thus comparable to the American Lockheed F-104 Starfighter and Northrop F-5 Freedom Fighter and the French Dassault Mirage III. Its basic layout was used for numerous other Soviet designs; delta-winged aircraft included Su-9 interceptor and the fast E-150 prototype from MiG bureau while the mass-produced successful front fighter Su-7 and Mikoyan's I-75 experimental interceptor combined a similar fuselage shape with swept-back wings. However, the characteristic layout with the shock cone and front air intake did not see widespread use outside the USSR and finally proved to have limited development potential, mainly because of the very small space available for the radar. Like many aircraft designed as interceptors, the MiG-21 had a short range. This was exacerbated by the poor placement of the internal fuel tanks ahead of the centre of gravity. As the internal fuel was consumed, the center of gravity would shift rearward beyond acceptable parameters. This had the effect of making the plane statically unstable to the point of being difficult to control, resulting in an endurance of only 45 minutes in clean condition. This can be somewhat countered by carrying fuel in external tanks closer to the center of gravity. The Chinese variants somewhat improved the internal fuel tank layout (also second generation of Soviet variants), and also carry significantly larger external fuel tanks to counter this issue. Additionally, when more than half the fuel was used up, violent maneuvers prevented fuel from flowing into the engine hereby causing it to shut down in flight. This increased the risk of tank implosions (MiG-21 had tanks pressurized with air from the engine's compressor), a problem inherited from the MiG-15, MiG-17 and MiG-19. The short endurance and low fuel capacity of the MiG-21F, PF, PFM, S/SM and M/MF variants—though each had a somewhat greater fuel capacity than its predecessor—led to the development of the MT and SMT variants. These had an increased range of 250 km (155 mi) compared to the MiG-21SM, but at the cost of worsening all other performance figures, such as a lower service ceiling and slower time to altitude. The delta wing, while excellent for a fast-climbing interceptor, meant any form of turning combat led to a rapid loss of speed. However, the light loading of the aircraft could mean that a climb rate of 235 m/s (46,250 ft/min) was possible with a combat-loaded MiG-21bis, not far short of the performance of the later F-16A. Mig-21's Tumansky R-25 jet engine's specialty was the addition of a second fuel pump in the afterburning stage. Activating the ЧР (rus. "чрезвычайный режим" - emergency mode) booster feature allows the engine to develop 97.4 kilonewtons (21,896 lbf) of thrust under 4,000 meters (13,000 ft) of altitude. The limit of operation is 1 minute for dogfight practice and 3 minutes for an actual wartime emergency, as further use causes the engine to overheat. Use of this "diamond regime" provided a massive 97.4 kN of thrust for no more than 3 minutes in actual wartime use. Use of this temporary power gave the MiG-21bis slightly better than 1:1 thrust-to-weight ratio and a climbing rate of 254 meters/second, equalling the F-16's nominal capabilities in close-quarters dogfight. In air combat practice with the MiG-21bis, use of WEP thrust was limited to 1 minute, to spare on the engines' 800 flight hours lifetime, since every second of super-afterburner use counted as several minutes of regular power run due to extreme thermal stress. When WEP was on, the MiG-21bis's R-25 engine produced a huge 5 meter long blowtorch exhaust - the six or seven brightly glowing rhomboid "shock diamonds" visible inside the flames gave the emergency-power setting its "diamond regime" name. Given a skilled pilot and capable missiles, it could give a good account of itself against contemporary fighters. Its G-limits were increased from +7Gs in initial variants to +8.5Gs in the latest variants. It was replaced by the newer variable-geometry MiG-23 and MiG-27 for ground support duties. However, not until the MiG-29 would the Soviet Union ultimately replace the MiG-21 as a maneuvering dogfighter to counter new American air superiority types. The MiG-21 was exported widely and remains in use. The aircraft's simple controls, engine, weapons, and avionics were typical of Soviet-era military designs. The use of a tail with the delta wing aids stability and control at the extremes of the flight envelope, enhancing safety for lower-skilled pilots; this in turn enhanced its marketability in exports to developing countries with limited training programs and restricted pilot pools. While technologically inferior to the more advanced fighters it often faced, low production and maintenance costs made it a favorite of nations buying Eastern Bloc military hardware. Several Russian, Israeli and Romanian firms have begun to offer upgrade packages to MiG-21 operators, designed to bring the aircraft up to a modern standard, with greatly upgraded avionics and armaments.

J-8 (Finback) Chinese Interceptor Fighter Aircraft





Tiers:



Variants:

- **J-8 (Finback-A) Series:** First flew on 5 July 1969. Initial day fighter variant, resembles an enlarged MiG-21. Equipped with 2 x WP-7A turbojet engines, SR-4 ranging radar 2 x Type 30-I 30mm cannon (200 rounds each), and 2 x PL-2 IR-guided AAMs. Limited production. J-8I First flew on 24 April 1981. Improved all-weather version with SL-7A fire-control radar (40 km range), twin-barrel Type 23-III 23 mm cannon, & up to 4 AAMs (or rockets/bombs). Limited production. J-8E Final version of the J-8I series. J-8E is equipped with a type 204 (JL-7) mono-pulse fire-control radar with look down shot down capability, SM-8A aeronautical optical gun-sight, onboard computer, new cockpit panel, and redesign ejection escape system and oxygen supply system. The original two Type 30-I 30mm cannons were replaced by two Type 23-III 23mm cannons. The four under-wing stores stations are capable of carrying the more advanced PL-5 series short-range AAM. These aircraft were also fitted with an improved electronic countermeasures (ECM) suite including KJ-8602B all-aspect radar warning receiver (RWR). JZ-8 (J-8R) Reconnaissance version of J-8 or J-8I. J-8ACT First flew on 24 June 1990, fly-by-wire testbed aircraft.
- **J-8II (Finback-B) Series:** J-8II (Finback-B) First flown on 12 June 1984, the improved J-8I prototype with redesigned nose/front section and fuselage. replacing the nose air inlet with a solid nose and lateral air intakes, similar to those of the MiG-23. China received several MiG-23s in the late 1970s from Egypt and the hinged ventral fin and lateral intakes indicate probable reverse engineering from the MiG-23. Equipped with Type 208 (SL-4A) monopulse radar (40 km range). J-8II Batch 02 (J-8IIB) First flew in November 1989, improved J-8II with SL-8A (Type 208?) PD radar (70 km range). Powered by 2 x WP-13AII turbojet engines. Armed with twin-barrel 23mm Type 23-III cannon (copy of GSh-23L) and up to 4 PL-5 or PL-8 AAMs (or rockets/bombs). No BVR capability. Peace Pearl J-8 (J-8II) During the Sino-US cooperation era, up to 50 J-8IIs were to be delivered to the US for upgrades and installation of AN/APG-66(v) radar and fire control system for US$500 million, under the Peace Pearl programme. However, the project was cancelled and only about 24 J-8II were produced. USAF Air Force Flight Test Center (6510 Squadron) took the task of test flight of modified J-8II. J-8IIACT (J-8II-BW2) First flew in 1988, fly-by-wire testbed and technology demonstrator. J-8IID (J-8D) First flew on 21 November 1990, modified J-8B with fixed refuelling probe and updated avionics such as TACAN navigation system. F-8IIM Unveiled in Zhuhai Air Show 1996, export version of J-8B with Russian Phazotron Zhuk-8II PD radar (75 km range, and able to track up to ten airborne targets and attack two of them simultaneously), R-27R1 (AA-10) AAM and Kh-31P anti-radiation missile. The F-8IIM was to be powered by two, more powerful WP-13B turbojet engines. This aircraft is often mistakenly referred to as the "J-8IIM" with Kh-31A anti-ship missile (ASM) capability, but its radar lacked sea search mode for anti-shipping role. The F-8IIM failed to attract any export customers and no domestic orders.[7] Conversion from older airframe was reportedly much fewer than the 100 units of Zhuk-8II radar delivered, and the conversion might have only been an experimental programme with none entering service. The F-8IIM fighter will probably be equipped with Russia's or China's helmet sight and advanced PL-9 and P-73 missiles. Phazotron, a Russian firm, has signed contracts with China to provide 150–200 improved Zhuk radars mainly in support of China's new F-8II fighter. J-8III (J-8C) Upgraded J-8II with FBW system and 2 x WP-14 powerplants. Compared to the J-8II, the J-8C had a number of improvements including a new multi-mode pulse Doppler radar which was reportedly based on the Israeli

Elta EL/M 2035 radar technology. The aircraft was also equipped with a digital fire-control system and a new 'glass' cockpit with multifunctional displays (MFD). The J-8C programme entered full scale development around 1991 and the aircraft first flew successfully on 12 December 1993. Development halted in favour of other version described below, but was used to test new radars such as Type 1471 (KLJ-1) and other avionics associated with FBW system. From this version on, electronic warfare pods such as BM/KG300G and KZ900, as well as navigational / targeting pods including Blue Sky navigation pod and FILAT become operational on J-8II. Canceled after 2nd testbed had crashed. J-8IIF (J-8F) It is reported that during 2006–2008, J-8II production suffered major setback due to engine problem. J-8IIG Modified J-8II with tail hook and other improvements for developmental work on ship-borne aircraft for carrier operations, such as in April 1987, evaluating & testing the Chinese reverse-engineered steam catapult from that of HMAS Melbourne (R21), which was finally confirmed 27 years later in April 2014 by CCTV-13. J-8G An advanced modified variant of the J-8II tasked with the suppression of enemy air defence (SEAD) mission was said to have been developed by the SAC in the 2000s. The aircraft, reportedly designated J-8G, was said to be capable of carrying two indigenous YJ-91 anti-radiation missile and electronic warfare suite to attack enemy radar stations. J-8IIM (2006) At Zhuhai Air Show 2006, a new variant "J-8IIM" was put on display with upgraded systems similar to the J-8H.[16] The most significant improvement is the radar upgrade with a new Type 1471 domestic radar used by the J-8H. JZ-8F A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon. J-8T Upgraded J-8 with JL-10A X-band radar. Export variant, F-8T, has WP-13B-II engines. China National Aero-Technology Import & Export Corporation claims J-8T is equipped with improved integrate avionic and various guided weapons. J-8T can carry out air-to-air BVR intercepting mission, air-to-ground precise attacking mission and stand-off attacking mission. J-8DF J-8D upgraded to J-8F standard. Lack of cooling duct below intake. Can fire PL-12 and PL-8 missiles.

System

Alternative Designations: F-8

Crew: 1

Limit “G” Force (g): 4.83

Ceiling (m): 20000

↳*Engines*

14,815 lbs. thrust with open 13A-II turbojets with afterburner: 1

↳*Weight (kg)*

Max Gross: 17800

Normal Takeoff: 14300

Empty: 9820

↳*Speed (km/h)*

Max (at altitude): 2340

Max (sea level): 1300

↳*Fuel (liters)*

Internal: 5400

External: 1760

Range (km): 2200

Combat Radius: 800

↳*Range (km)*

Range: 5400

Combat Radius: 800

↳*Takeoff Run/Landing Roll (m)*

Description: 670/1,000 (w/afterburner and drag chute)

↳*Dimensions (m)*

Length: 21.6

Wingspan: 9.4

Height: 5.4

↳*Standard Payload (kg)*

↳*Hardpoints*

External: 7

Underwing: 6

Centerline: 1

↳*Survivability/Countermeasures*

Pressurized cockpit with ejection seat: Yes

Radar warning receiver: Yes

chaff and flares: Yes

ARMAMENT

23-mm Type 23-3 twin-barrel cannon: 1

↳*Weapon & Ammunition Types*

23mm type 23- twin barrel (rnds): 200

Bombs: 3

Fuel Tanks: 3

AVIONICS/SENSOR/OPTICS

VHF/UHF and HF/SSB radios: Yes

'Odd Rods' type IFF: Yes

Monopulse nose-radar: Yes

NOTES

Description: THE BEST THAT CAN BE SAID FOR THE J-8 IS THAT ONCE UPGRADED IT WILL BE NO MORE THAN AN ADVANCED OBSOLETE AIRCRAFT, COMPARABLE IN CONFIGURATION AND AERODYNAMIC PERFORMANCE TO THE SU-15/FLAGON. THE J-8 AND J-8-II AIRCRAFT ARE TROUBLE-PRONE AIRCRAFT WITH A POOR WEAPON SUITE AND AN INEFFICIENT ENGINE. AT BEST, THE J-8-II CAN BE COMPARED WITH AN EARLY MODEL (1960S) US F-4 PHANTOM. IN FACT, AFTER TWENTY-SIX YEARS THE J-8-II IS STILL IN THE DEVELOPMENT STAGE, HAS RESULTED IN ONLY ABOUT 100 FIGHTERS DEPLOYED, AND MEETS NONE OF

THE REQUIREMENTS OF THE PLAN.

↳***APPEARANCE***

VARIANTS

Description: THIS AIRCRAFT IS AN ADAPTATION OF THE SOVIET MIG-21 FISHBED

↳***J-8/F-8-I FINBACK-A***

Description: INITIAL PRODUCTION VERSION WITH WP-7P ENGINES AND NOSE AIR INTAKES. J-8 IS DESIGNATION FOR AIRCRAFT IN CHINESE SERVICE. F-8/F-8M DENOTES EXPORT VERSION. MORE THAN 100 J-8/F-8-IS WERE PRODUCED

↳***J-8-II FINBACK-B***

Description: RADAR TYPE IS UNIDENTIFIED MONOPULSE RADAR, BUT MAY BE THE LEIHUA TYPE 317A IN SOLID NOSE HOUSING. SEVEN PYLONS FOR INCREASED WEAPONS INVENTORY AND NEW SIDE AIR INTAKES. OTHER CHARACTERISTICS SIMILAR TO F-8-II.

↳***F-8-II FINBACK-B***

Description: IMPROVED VERSION WITH NEW 14,815 WOPEN-13A ENGINES, WING ROOT INTAKES, AND ALL-FLYING HORIZONTAL STABILIZERS, FOLDING VENTRAL FIN, 80%-COMPOSITE MATERIAL VERTICAL FIN AND IMPROVED AVIONICS.

↳***F-8 ILM FINBACK-B***

Description: DESIGNATION FOR RUSSIAN MODIFIED F-8-IIS. INCLUDES RUSSIAN AA-12 AND AA-10 MISSILES, A HEADS-UPDISPLAY, GLOBAL POSITIONING SYSTEM RECEIVER, MULTI-FUNCTION COCKPIT DISPLAYS AND INTEGRATED ELECTRONIC COUNTERMEASURES. ALSO RUSSIAN PHAZOTRON ZHUK 8 II MULTI-FUNCTION PULSE DOPPLER FIRE-CONTROL RADAR.

Notes:

The Shenyang J-8 (Chinese: □-8; NATO reporting name: Finback) is a high-speed, high-altitude Chinese-built single-seat interceptor fighter aircraft. The effort to develop an all-weather interceptor began in full in 1964 and this produced the first Chinese-designed and built jet fighter to combat new, high altitude threats such as the B-58 Hustler bomber, F-105 Thunderchief fighter-bomber and Lockheed U-2 spy plane. In 1964 the People's Liberation Army Air Force requested an aircraft from Shenyang Aircraft Corporation and the 601 Institute to develop a fighter/interceptor to counter bombers and spy planes as the newly introduced Chengdu J-7 (a reverse engineered MiG-21) was incapable of doing so. The prototype took its maiden flight in 1969. Despite the mid 1960s origins of the J-8, due to the political turmoil of the Great Proletarian Cultural Revolution, the J-8 was not produced until 1979 and entered service in 1980. Its basic configuration resembles an enlargement of the delta-winged J-7, utilizes two Liyang (LMC) Wopen-7A turbojet engines, and features a maximum speed of Mach 2.2. The twin engined J-8 competed with rival Chengdu Aircraft Industry Group's single, turbofan powered engine, canard-delta J-9 project and ultimately emerged as the victor largely due to the existing availability of the former's MiG-21 based power plant and proven layout, while the J-9 project was cancelled in 1980 due to difficulty in creating a suitably powerful engine. In order to house a large radar set, the design called for a solid nose and variable geometry side air intakes. However, the lack of familiarity with this type of intake meant the J-8 had to settle for a MiG-21 style nose intake. The solid nose J-8 was finally realized in the J-8II (Finback-B), which was based on the layout of the J-8I (same improvement is like the J-6 to Q-5). The radar chosen for the J-8 was the Type 204 mono-pulse fire-control radar, a primitive ranging radar for daylight within-visual-range operations. The performance of the radar fell well short of the PLAAF's requirements as research into a more capable fire control radar and power source proved difficult and time-consuming. The aircraft was originally armed with cannons and seven hardpoints for missiles, bombs, rockets or fuel tanks. The original weapons layout of the J-8 was two 30 mm Type 30-1 cannons after initial problems with the 30 mm Type 30-II four-barrel Gatling gun. The J-8 was also planned to be armed with the experimental PL-4 medium ranged missile but technical issues and political upheavals prevented any in-depth development and the project was cancelled in 1985 citing unsatisfactory performance. Therefore, the PL-2 IR-homing short-range air-to-air missile (SRAAM) was used instead. Unguided bombs and rockets can also be carried on the J-8. And nowadays with the development of light-weight military nuclear weaponry, the J-8II will now be able to carry missiles with nuclear warheads. Despite entering service relatively recently, it was comparable to many older Soviet fighter designs, with limited maneuverability. The original combat avionics package was soon replaced with an all-weather capability in aircraft designated

J-8I (Finback-A). The J-8I (later redesignated as the J-8A) received a new gun sight, onboard computer, new cockpit design and redesigned ejection escape system and oxygen supply system. The gun armament was also changed from two 30 mm cannons to a single 23 mm twin-barreled cannon and the PL-5 short ranged AAM was also equipped. The later J-8E featured improved electronic warfare systems. The unsatisfactory performance of the J-8I led to a very short production run of 20–50 aircraft and the J-8I has slowly began being phased out as early as the 1990s. A tactical reconnaissance variant of the J-8, known as the JZ-8 was developed in the mid 1980s to take advantage of the J-8s few favourable qualities, most notably its capability of reaching high speeds and altitudes to replace the Shenyang JZ-6 in the tactical reconnaissance role. Using an under-fuselage reconnaissance pod with a KA-112A long focal-length optical camera, the JZ-8 usually operates at heights ranging from ~9,500m-15,000m during reconnaissance missions. By 1982 work began to replace the unimpressive J-8I type with a new design known as the J-8II. The new 1982 requirements from the PLAAF demanded being capable of beyond visual range combat (BVR) with the use medium ranged missiles (MRAAM) and secondary ground attack capabilities. In terms of performance, the aircraft was expected to have better aerodynamic performance at medium to low altitudes and at transonic speeds.

J-11B (Flanker-L) Chinese Air Superiority Fighter








Tiers:



Variants:

- **J-11A:** Chinese/Russian assembled Su-27SK from Russian-made kits. 104 were built. They were later upgraded with MAWS. Unconfirmed upgrades include improved cockpit displays, and fire control systems for R-77 or PL-10 missiles. It is also called J-11.
- **J-11B:** Indigenously-produced version using Chinese technology, and the first J-11 variant to use the WS-10A turbofan. The airframe is slightly lighter due to greater use of composites. It has new avionics, a glass cockpit, MAWS, and onboard oxygen generator system. Upgrading to AESA radar may have been planned. Photos of China's latest, very long range PL-15 missile on a J-11B may well indicate the undergoing upgrades of AESA radar to the aircraft. More recently aircraft have been spotted with light grey radomes which may indicate ongoing upgrades.
- **J-11BS:** A twin-seat version of the J-11B. In 2012, the number of J-11B and J-11BS in service was over 120.
- **J-11BH:** Naval version of the J-11B. It was first sighted in May 2010.
- **J-11BSH:** Naval version of the J-11BS.
- **J-15:** Carrier-based version based on the J-11B, incorporating structural elements from the Sukhoi Su-33 prototype purchased from Ukraine in 2001. It uses avionics from the J-11B.
- **J-16:** Twin-seat strike fighter based on Russian Sukhoi Su-30MKK sold to China in 2000.[33] A further development of the J-11BS.
- **J-11D:** ariant with fixed electronically scanned array radar, IRST, and capability to fire heavier imaging/infrared (IIR) air-to-air missiles. The airframe makes greater use of composite materials, especially in the engine intakes for lower radar observability. The wings have three hardpoints each. Unconfirmed reports claim it has a new fly-by-wire control system, glass cockpit, improved EW systems, and an improved version of the WS-10A engine.

System

Alternate Designation(s): J-11B (Flanker-L)
Primary Function / Type: Air Superiority Fighter
Manufacturer: Shenyang Aircraft Corporation
Crew: 1
Number of Engines: 2
Number of Hard Points: 0: 2 under fuselage, 2 under air ducts, 4 under wings, 2 on wingtips with provisions to carry

combinations of: Missiles: PL-12; PL-9; PL-8; Vympel R-77; Vympel R-27; Vympel R-73

Dimensions

Length: 21.9 m
Width (Wing Span): 14.7 m
Height: 5.92 m
Wing Area: 52.84 m2
Empty Weight: 16,380 kg
Gross Weight: 23,926 kg
Max Takeoff Weight: 33,000 kg
Fuel Capacity, Internal Fuel Tank: 9,400 kg

Automotive

Engine Name: 2 × WS-10A turbofan
Number of Engines: 2
Engine Power: 75.22 / 123 kN (16,910 / 27,650 lbf) dry / afterburning
Maximum Range: 3,530 km
Maximum Speed: Mach 2.1
Service Ceiling: 9,000 m
Combat Range: 1,500 km
G Limits: +9
Rate of Climb: 300 m/s

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: mm30
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: 1,200 Rounds

Missile Systems

Missile Options: PL-12 PL-9 PL-8 Vympel R-77 Vympel R-27 Vympel R-73

↳*Main Missile System #1*

Name: PL-9

Type: Air-to-Air Missile

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Weight: 115kg

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2.0

Guidance System: multi-element infrared

Rocket Weapon Systems

Note: Unguided rocket launcher

Bomb Weapon Systems

Note: Free-fall cluster bombs

Fire Control / Avionics

Fire Control Radar: NIIP Tikhomirov N001VE Myech coherent pulse Doppler radar. J-11B to be equipped with AESA radar.

Laser Desingator: INA

Optic System: OEPS-27 electro-optic system

HUD: NSts-27 helmet-mounted sight (HMS)

ECM: Gardeniya ECM pods

Onboard Oxygen Generator System (OBOGS): An Onboard Oxygen Generator System (OBOGS). Only the most recent Russian variants have an OBOGS.

MAWS System: An optical MAWS system claimed to operate in the UV band.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

Cockpit: A unique glass cockpit design, with an asymmetric layout quite different from the Su-30MKK/MK2 and Su-27SMK.

NBC Protection: Yes

EW Counter Measures: Yes

Chaffs/Flares: INA

Notes:

J-11B – Indigenously-produced version using Chinese technology, and the first J-11 variant to use the WS-10A turbofan. The airframe is slightly lighter due to greater use of composites. It has new avionics, a glass cockpit, MAWS, and onboard oxygen generator system. Upgrading to AESA radar may have been planned. Photos of China's latest, very long range PL-15 missile on a J-11B may well indicate the undergoing upgrades of AESA radar to the aircraft. More recently aircraft have been spotted with light grey radomes which may indicate ongoing upgrades. The controversial J-11B is an unauthorised derivative of the Sukhoi J-11A/Su-27SK, built by Shenyang in China. The aircraft has been the subject of an ongoing dispute between Beijing and Moscow which has caused the suspension of production of the second batch on indigenously manufactured legally licenced J-11A/Su-27SK. The J-11B is not an exact clone of the Su-27SK, despite the commonly held view this is so. The airframe and engines can be considered to be 'cloned' but the systems are mostly unique to this variant. Known differences include: A Chinese IRST set located in the centreline position as with the OLS-27 in early Su-27S. A planar array multimode radar which resembles the Phazotron Zhuk-27 series. It includes an IFF interrogator array. An Onboard Oxygen Generator System (OBOGS). Only the most recent Russian variants have an OBOGS. A unique glass cockpit design, with an asymmetric layout quite different from the Su-30MKK/MK2 and Su-27SMK. An optical MAWS system claimed to operate in the UV band. Dielectric panels on the stabilators not seen on any Russian variant. The differences between the J-11B, Su-27SK and Su-27SMK are sufficiently great that this must be considered a unique offshoot of the Flanker family of fighters, not a subtype of the baseline Su-27SK/J-11A. Chinese sources claim that the J-11B variant deployed with PLANAF units, such as the 22nd Fighter Regiment, 8th PLAN Fighter Division, is designated the J-11BH. In 2011 images emerged of the prototype of the J-11BS which is an analogue of the Su27UBK, with the PLANAF variant claimed to be the J-11BSH.

J-7B/J-7II (Fishcan) Chinese Fighter Aircraft



Tiers:

1 2 3 4

Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7B; J-7II; F-7B
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 1
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1,800 kg
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x improved WP-7B engine
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,200 lb (6,000 kg)
Internal Fuel Capacity: 2,385 liters
Maximum Speed: 2,175 km/h
Touchdown Speed: 310-330 km/h

Ceiling: 18,800 m

Climb Rate: 29,528 ft/min (9,000 m/min)

Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: mm30

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon

Caliber: 30

Shell: 30×165mm

Basic Load: 1,000 Rounds

Missile Weapon Systems

↳*Missile Weapon System (Option #1)*

Name: PL-5

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: INA

Computerized FCS: Yes

Radar: 1 x Skyranger

Notes:

J-7B: Renamed J-7II. In Jun 1991, PLAAF discovered heat isolation pads in the pressure accumulator compartment in the rear section of the fuselage of J-7IIs were burnt or melted due to high temperature, so all J-7IIs were grounded. CAC spent half a year to investigate and discovered over two dozen components were affected by the increased temperature of the new engine, and these components were operating outside the temperature range they were originally designed for. Fuselage was subsequently redesigned/reworked/repaired to fix the problem, and rework/repair lasted from January thru May 1992 to fix all J-7IIs in PLAAF and PLANAF. Experience gained was also adopted for all future productions of J-7s after January 1992, and the problem never occurred again afterward. The completion of J-7B marked the final satisfactory closure of the upgrade program originally started more than a decade and half ago with J-7I during Cultural Revolution, which lasted around a decade after the end of Cultural Revolution. The Chengdu J-7 (Chinese: □-7; third generation export version F-7; NATO reporting name: Fishcan is a People's Republic of China license-built version of the Soviet Mikoyan-Gurevich MiG-21. Though production ceased in 2013, it continues to serve, mostly as an interceptor, in several air forces, including the People's Liberation Army Air Force. In the 1950s and early 1960s, the Soviet Union shared most of its conventional weapons technology with the People's Republic of China. The famous MiG-21, powered by a single engine and designed on a simple airframe, was inexpensive but fast, suiting the strategy of forming large groups of 'people's fighters' to overcome the technological advantages of Western aircraft. However, the Sino-Soviet split abruptly ended the initial cooperation, and from July 28 to September 1, 1960, the Soviet Union withdrew its advisers from China, resulting in the project being stopped in China. Soviet Premier Nikita Khrushchev unexpectedly wrote to Mao Zedong in February, 1962, to inform Mao that the Soviet Union was willing to transfer MiG-21 technology to China, and he asked the Chinese to send their representatives to the Soviet Union as soon as possible to discuss the details. The Chinese viewed this offer as a Soviet gesture to make peace, and they were understandably suspicious, but they were nonetheless eager to take up the Soviet offer for an aircraft deal. A delegation headed by General Liu Yalou, the commander-in-chief of the People's Liberation Army Air Force (PLAAF) and himself a Soviet military academy graduate, was dispatched to Moscow immediately, and the Chinese delegation was given three days to visit the production facility of the MiG-21, which was previously off-limits to foreigners. The authorization for this visit was personally given by Nikita Khrushchev, and on March 30, 1962, the technology transfer deal was signed. However, given the political situation and the relationship between the two countries, the Chinese were not optimistic about gaining the technology, and thus they were prepared for reverse engineering. Russian sources state that several complete examples of the MiG-21 were sent to China, flown by Soviet pilots, and China also received MiG-21Fs in kits, along with parts and technical documents. Just as the Chinese had expected, however, when the Soviets delivered the kits, parts and documents to Shenyang Aircraft Factory five months after the deal was signed, the Chinese discovered that the technical documents provided by the Soviets were incomplete and that some of the parts could not be used. China set about to reverse-engineer the aircraft for local production, and in doing so, they succeeded in solving 249 major problems and reproducing eight major technical documents that were not provided by the Soviet Union. One of the major flaws was with the Hydraulics systems, which grounded up to 70% of aircraft in some squadrons until the systems were upgraded. Another major upgrade was modifications to the fuel storage to make the aircraft more stable. The MiG-21 carries most of its fuel in the forward fuselage, causing the center of gravity to shift and become unstable after about 45 minutes of operation. The J-7 has redesigned fuel tanks and significantly larger drop tanks in order to maintain a more stable center of gravity, and therefore better Longitudinal static stability. The cockpit was also revised to replace the Soviet ejection seat, which was found to be unacceptable. The forward opening canopy was replaced by a standard canopy hinged to the rear and jettisoned before the seat ejected. Otherwise, the re-engineering effort was largely successful, as the Chinese-built J-7 aircraft showed only minor differences in design and performance from the original Soviet MiG-21. In March 1964, Shenyang Aircraft Factory began the first domestic production of the J-7 jet fighter, which they successfully accomplished the next year. However,

the mass production of the J-7 aircraft was severely hindered by an unexpected social and economic problem—the Cultural Revolution—that resulted in poor initial quality and slow progress, which, in turn, resulted in full-scale production only coming about in the 1980s, by which time the original aircraft design was showing its age. In 1987 the J-7E was released, having a greatly improved wing, among other improvements. It was roughly 45% more maneuverable, and its takeoff and landing performance was greatly increased. It was also equipped with a helmet mounted sight, as well as being the first MiG-21 to be equipped with HOTAS and a multipurpose display. Many of the electronic components were British in origin, such as the gun sight and the multi purpose display. The aircraft is capable of using PL-8/Python 3 missiles with both the helmet mounted sight or the radar fire control, but the two are not connected. The pilot may use only one system at a time. In the mid 1980s Pakistan requested an aircraft with greater radar capabilities. Both the standard radar and the British Marconi radar were plagued by ground clutter, but China did not have any experience with air to ground radar at the time. In 1984 Pakistan provided assistance by having their American trained F-16 pilots provide training on proper operation of ground attack radar, which enabled the Chinese to develop the J-7M. In the late 1980s the J-7MP and J-7PG introduced significant upgrades to the radar system by converting to an Italian FAIR Grifo-7 radar. This more than tripled the effective range of the radar, as well as greatly increased the angle which the radar could detect target. The J-7 only reached its Soviet-designed capabilities in the mid 1980s. However, the fighter is affordable and has been widely exported as the F-7, often with Western systems incorporated, like the ones sold to Pakistan. There are over 20 different export variants of the J-7, some of which are equipped to use European weaponry, such as French R.550 Magic missiles. The Discovery Channel's Wings Over The Red Star series claims that the Chinese intercepted several Soviet MiG-21s en route to North Vietnam (during the Vietnam War), but these aircraft did not perform in a manner consistent with their original specifications, suggesting that the Chinese actually intercepted down-rated aircraft that were intended for export, rather than fully capable production aircraft. For this reason, the Chinese had to re-engineer the intercepted MiG-21 airframes in order to achieve their original capabilities. China later developed the Shenyang J-8 based both on the expertise gained by the program, and by utilizing the incomplete technical information acquired from the Soviet Ye-152 developmental jet. In May 2013, J-7 production has ceased after decades of manufacturing. The last 12 F-7BGIs were delivered to the Bangladesh Air Force.

MiG-21PF (Fishbed-E) Fighter/Intercept Aircraft



Tiers:

1 2 3 4

Variants:

- **Note:** MiG-21 Fishbed-A/Ye-50 MiG-21 Fishbed-B/Ye-6 MiG-21F Fishbed-C MiG-21PF Fishbed-D MiG-21PF Fishbed-E MiG-21FL Fishbed-E MiG-21PFM Fishbed-F MiG-21 Fishbed-G MiG-21R Fishbed-H MiG-21PFMA Fishbed-J MiG-21MF Fishbed-J MiG-21M Fishbed-J MiG-21SMB Fishbed-K MiG-21bis Fishbed-L MiG-21bis Fishbed-N MiG-21-93 Fishbed-N MiG-21-2000 MiG-21 Lancer MiG-21 Bison MiG-21U Mongol-A** MiG-21US Mongol-B MiG-21UM Mongol-B J-7 (Jianjiji-7) Also See: https://en.wikipedia.org/wiki/List_of_Mikoyan-Gurevich_MiG-21_variants

System

Alternate Designation(s): MiG-21PF; NATO: Fishbed-E

Primary Function / Type: Fighter/Interceptor

Manufacturer: Russia

In Service: 1961-Present

Crew: 1

Number of Engines: 1

Number of Hard Points: 4

Rocket-Assisted Take-Off, Ground (RATOG) Capable: Yes

Note: It has a broader fin and parachute brake housing relocated as bullet fairing below rudder.

Dimensions

Length: m15.76

Width (Wing Span): m7.5

Height: m4.1

Weight, Empty: tons5.46

Weight, Maximum Take Off: tons10.1

Automotive

Engine Name: 1 x RD-11-F2S-300 turbojet

Number of Engines: 1

Static Thrust: 6,200-kg static thrust

Traction (dry / with afterburning): 40.2 / 67.2 kN

Maximum Range: km1,225

Maximum Range with external Fuel Tanks: km1,470

Maximum Speed: 2,230 km/h

Cruising Speed: 1,000 km/h

Service Ceiling: km19

Time to Altitude: 17,000 m (55,774 ft) in 8 minutes 30 seconds

Fuel: 2,885 liters

Main Gun System

↳*System*

Name: 1 × internal 23 mm Gryazev-Shipunov GSh-23L autocannon

Type: 23mm Autocannon

Caliber: 23mm

Basic Load: 200

Length: GSh-23: 1,387 mm (4 ft 7 in) GSh-23L: 1,537 mm (5 ft 1 in)

Barrel Length: mm1,000

Weight: GSh-23: 49.2 kg (108 lb) GSh-23L: 50 kg (110 lb)

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: m/s715

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm23

Cartridge: 23x115 mm

Basic Load: 200

Wing Mounted Weapon Systems

Air-to-Air Missiles: AA-12 Adder AA-11 Archer AA-10 Alamo AA-8 Aphid AA-2 Atoll

Air-to-Surface Missiles: unguided bombs, rockets AS-17 Krypton AS-12 Kegler AS-9 Kyle KAB-500Kr

↳*Missile System (Option 1)*

Name: R-77 (AA-12 Adder)

Type: Medium-range, active radar homing air-to-air missile.

Basic Load: INA

Production history Manufacturer: Vympel

In Service: 2002-Present

Proliferation: The Russian Air Force finally entered the R-77-1 (AA-12B) into service in 2015.[5][6] It was subsequently deployed by Su-35S fighters in Syria on combat air patrols.

Length: 3.6 m (R-77), 3.71 m (R-77-1)

DIameter: mm200

Warhead: 22.5 kg HE fragmenting (R-77)

Detonation Mechanism: laser proximity fuse

Engine: Solid fuel rocket motor (R-77), air-breathing ramjet (R-77-PD)

Wingspan: mm700

Operational Range: 80–100 km (R-77), 110 km (R-77-1) 193 km (R-77M)

Flight Altitude: km5-25

Speed: Mach 4,Mach 5 for K-77PD (RVV-AE-PD)[

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

Launch Platforms: Mikoyan-Gurevich MiG-21-93/LanceR/Bison, Mikoyan-Gurevich MiG-23, Mikoyan-Gurevich MiG-25, Mikoyan-Gurevich MiG-27, Mikoyan MiG-29, Mikoyan MiG-31, Mikoyan MiG-35, Sukhoi Su-27, Sukhoi Su-30, Sukhoi Su-33, Sukhoi Su-34, Sukhoi Su-35, HAL Tejas, Yakovlev Yak-141, Chengdu J-10

↳*Missile System (Option 2)*

Name: KH-31 (AS-17 Krypton)

Type: Medium-range air-to-surface

Basic Load: INA

Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)

In Service: 1988-Present

Proliferation: INA

Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)

Diameter: 360 mm

Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)

Warhead: HE shaped charge

Detonation Mechanism: Impact

Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb

Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory

Wingspan: mm914

Propellant: kerosene

Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)

Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)

Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar

Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M

↳*Bomb Weapon System*

Name: KAB-500Kr

Type: Electro-optical TV-guided fire and forget bomb

Basic Load: INA

Manufacturer: Russia

Proliferation: INA

Length: m3.05

Diameter: INA

Warhead Type: Hardened, armor-piercing warhead

Weight: kg520

Warhead Weight: kg380

Penetration: up to 1.5 metres (4 feet 11 inches) of reinforced concrete.

Effective Range: he weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.

Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Fire Control / Avionics

Radio: RSIU-5V

IFF: SRZO-2 Khrom-Nikel'

ADF: ARK-54I

Radar Warning Receiver: SPO-2 Sirena-2

Gunsight: PKI

Radar: RP-9-21 (batch 1–6); RP-21 (7 on)

ATC Transponder: SOD-57M Globus-2

Command Link: ARL-S Lazur'

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: BVP-1F 120 x 26-mm cartridge dispenser

Notes:

MiG-21PF Fishbed-E This is thought to be the principal PF production variant. It has a broader fin and parachute brake housing relocated as bullet fairing below rudder. Later aircraft have a 13,670-lb (6,200-kg) static thrust RD-11-F2S-300 engine. The final, broad version of the fin has no dorsal fillet. A GP-9 23-mm gun pack was carried and it had provision for rocket-assisted take-off, ground (RATOG). Variants designated MiG-21PFS have boundary-layer blowing (known as SPS = sduva porgranichnovo sloya) over plain flaps in place of the earlier Fowler flaps. The Mikoyan-Gurevich MiG-21 (Russian: Микоян и Гуревич МиГ-21; NATO reporting name: Fishbed) is a supersonic jet fighter and interceptor aircraft, designed by the Mikoyan-Gurevich Design Bureau in the Soviet Union. Its nicknames include: Balalaika, because its planform resembles the stringed musical instrument of the same name; Ołówek, Polish for "pencil", due to the shape of its fuselage, and; Én bạc, meaning "Silver Swallow", in Vietnamese. Approximately 60 countries over four continents have flown the MiG-21, and it still serves many nations six decades after its maiden flight. It made aviation records, became the most-produced supersonic jet aircraft in aviation history, the most-produced combat aircraft since the Korean War and previously the longest production run of a combat aircraft (now exceeded by both the McDonnell Douglas F-15 Eagle and General Dynamics F-16 Fighting Falcon). It's also one of the earliest examples of planes capable of performing the Cobra maneuver. The MiG-21 was the first successful Soviet aircraft combining fighter and interceptor characteristics in a single aircraft. It was a lightweight fighter, achieving Mach 2 with a relatively low-powered afterburning turbojet, and is thus comparable to the American Lockheed F-104 Starfighter and Northrop F-5 Freedom Fighter and the French Dassault Mirage III. Its basic layout was used for numerous other Soviet designs; delta-winged aircraft included Su-9 interceptor and the fast E-150 prototype from MiG bureau while the mass-produced successful front fighter Su-7 and Mikoyan's I-75 experimental interceptor combined a similar fuselage shape with swept-back wings. However, the characteristic layout with the shock cone and front air intake did not see widespread use outside the USSR and finally proved to have limited development potential, mainly because of the very small space available for the radar. Like many aircraft designed as interceptors, the MiG-21 had a short range. This was exacerbated by the poor placement of the internal fuel tanks ahead of the centre of gravity. As the internal fuel was consumed, the center of gravity would shift rearward beyond acceptable parameters. This had the effect of making the plane statically unstable to the point of being difficult to control, resulting in an endurance of only 45 minutes in clean condition. This can be somewhat countered by carrying fuel in external tanks closer to the center of gravity. The Chinese variants somewhat improved the internal fuel tank layout (also second generation of Soviet variants), and also carry significantly larger external fuel tanks to counter this issue. Additionally, when more than half the fuel was used up, violent maneuvers prevented fuel from flowing into the engine hereby causing it to shut down in flight. This increased the risk of tank implosions (MiG-21 had tanks pressurized with air from the engine's compressor), a problem inherited from the MiG-15, MiG-17 and MiG-19. The short endurance and low fuel capacity of the MiG-21F, PF, PFM, S/SM and M/MF variants—though each had a somewhat greater fuel capacity than its predecessor—led to the development of the MT and SMT variants. These had an increased range of 250 km (155 mi) compared to the MiG-21SM, but at the cost of worsening all other performance figures, such as a lower service ceiling and slower time to altitude. The delta wing, while excellent for a fast-climbing interceptor, meant any form of turning combat led to a rapid loss of speed. However, the light loading of the aircraft could mean that a climb rate of 235 m/s (46,250 ft/min) was possible with a combat-loaded MiG-21bis, not far short of the performance of the later F-16A. Mig-21's Tumansky R-25 jet engine's specialty was the addition of a second fuel pump in the afterburning stage. Activating the ЧР (rus. "чрезвычайный режим" - emergency mode) booster feature allows the engine to develop 97.4 kilonewtons (21,896 lbf) of thrust under 4,000 meters (13,000 ft) of altitude. The limit of operation is 1 minute for dogfight practice and 3 minutes for an actual wartime emergency, as further use causes the engine to overheat. Use of this "diamond regime" provided a massive 97.4 kN of thrust for no more than 3 minutes in actual wartime use. Use of this temporary power gave the MiG-21bis slightly better than 1:1 thrust-to-weight ratio and a climbing rate of 254 meters/second, equalling the F-16's nominal capabilities in close-quarters dogfight. In air combat practice with the MiG-21bis, use of WEP thrust was limited to 1 minute, to spare on the engines' 800 flight hours lifetime, since every second of super-afterburner use counted as several minutes of regular power run due to extreme thermal stress. When WEP was on, the MiG-21bis's R-25 engine produced a huge 5 meter long blowtorch exhaust - the six or seven brightly glowing rhomboid "shock diamonds" visible inside the flames gave the emergency-power setting its "diamond regime" name. Given a skilled pilot and capable missiles, it could give a good account of itself against contemporary fighters. Its G-limits were increased from +7Gs in initial variants to +8.5Gs in the latest variants. It was replaced by the newer variable-geometry MiG-23 and MiG-27 for ground support duties. However, not until the MiG-29 would the Soviet Union ultimately replace the MiG-21 as a maneuvering dogfighter to counter new American air superiority types. The MiG-21 was exported widely and remains in use. The aircraft's simple controls, engine, weapons, and avionics were typical of Soviet-era military designs. The use of a tail with the delta wing aids stability and control at the extremes of the flight envelope, enhancing safety for lower-skilled pilots; this in turn enhanced its marketability in exports to developing countries with limited training programs and restricted pilot pools. While technologically inferior to the more advanced fighters it often faced, low production and maintenance costs made it a favorite of nations buying Eastern Bloc military hardware. Several Russian, Israeli and Romanian firms have begun to offer upgrade packages to MiG-21 operators, designed to bring the aircraft up to a modern standard, with greatly upgraded avionics and armaments.

J-6 (Farmer) Chinese Fighter Aircraft





Tiers:

1 2 3 4

System

Alternative Designations: J-6

Crew: 1 (pilot)

Vertical Climb Rate (m/s): 152+

Max “G” Force (g): 8

Ceiling (m): 19870

↳*Engines*

5,732 lbs. thrust Shenyang Wopen-6 turbojets (7,165 lbs. thrust with afterburner): 2

↳*Weight (kg)*

↳*Speed (km/h)*

Cruise: 950

↳*Fuel (liters)*

Internal: 2170

External (2 drop tanks): 800 or 1,520

↳*Range (km)*

Normal: 1390

With 2 x 760 L drop tanks: 2200

↳*Dimensions (m)*

Wingspan: 9.2

Height: 3.9

↳*Hardpoints*

Underwing: 6

↳ ***Survivability/Countermeasures***

Martin-Baker zero/zero ejection seats: Yes

Cockpit is pressurized: Yes

Fluid anti-icing system for windscreen: Yes

Tail warning system: Yes

ARMAMENT

30-mm automatic cannons: 3

250 kg Bombs, or: 2

400-L drop tanks, or: 2

760-L drop tanks, or: 2

CAA-1B AAM: 2

↳ ***Inboard Stations***

8 x 57-mm rockets, or: 4

16 x 57-mm rockets, or: 4

7 x 90-mm rockets, or: 4

Gun pods, or: 4

Practice bomb: 4

AVIONICS/SENSOR/OPTICS

Airborne interception radar: Yes

VHF transceiver: Yes

Blind-flying equipment,: Yes

Radio compass: Yes

Radio altimeter: Yes

Night/Weather Capabilities: No

NOTES

Description: THE F-6 (JIAN-6 FIGHTER AIRCRAFT) IS THE CHINESE VERSION OF THE MIG-19, WHICH WAS STILL IN PRODUCTION IN CHINA IN THE MID-1990S.

↳ ***APPEARANCE***

VARIANTS

J-6

Description: EQUIVALENT OF THE MIG-19S/SF DAYTIME FIGHTER WITH 3 X 30 MM GUNS, ONE AT EACH WING ROOT AND ONE ON THE FUSELAGE.

↳***J-6A***

Description: EQUIVALENT OF THE MIG-19PF ALL-WEATHER FIGHTER. ARMED WITH STANDARD J-6 GUNS AND ROCKETS.

↳***J-6B***

Description: EQUIVALENT OF THE MIG-19PM ALL-WEATHER FIGHTER. ARMED WITH THE AA-1 ALKALI RADAR HOMING MISSILES, NO GUNS.

↳***J-6C***

Description: SIMILAR TO THE J-6, BUT WITH BRAKE CHUTE HOUSED IN BULLET-FARING AT THE BASE OF TAILFIN. SAME GUNS AS THE J-6A. EXPORT VARIANT WITH MARTIN-BAKER EJECTION SEATS AND AIM-9 SIDEWINDER MISSILES.

↳***J-6XIN***

Description: SIMILAR TO J-6A, BUT WITH NOSE-MOUNTED INTERCEPTION RADAR. SAME GUNS AS THE J-6A.

↳***JJ-6***

Description: TRAINER VERSION WITH TANDEM TWO-SEAT COCKPIT. EXPORT VERSIONS ARE FT-6. ARMED WITH ONLY THE FUSELAGE GUN.

↳***JZ-6***

Description: A TACTICAL PHOTO-RECONNAISSANCE VERSION, ARMED WITH WING ROOT GUNS ONLY.

↳***F-6***

Description: EXPORT VERSIONS.

Notes:

The Shenyang J-6 (Chinese: □-6; designated F-6 for export versions; NATO reporting name: Farmer) is the Chinese-built version of the Soviet MiG-19 'Farmer' fighter aircraft, the world's first mass-produced supersonic aircraft. Although the MiG-19 had a comparatively short life in Soviet service, the Chinese came to value its agility, turning performance, and powerful cannon armament, and produced it for their own use between 1958 and 1981. While the basic Soviet-built MiG-19 has been retired from all nations, the Shenyang J-6 still flies for nine of its original 15 operators, however, in a very limited capacity. The J-6 airframe contributed to the Chinese ground attack version, the Q-5, which still flies for numerous nations. The J-6 was considered "disposable" and was intended to be operated for only 100 flight hours (or approximately 100 sorties) before being overhauled. The Pakistan Air Force was often able to extend this to 130 hours with diligent maintenance. The J-6 has a maximum speed at altitude of 1,540 km/h (960 mph), Mach 1.45. Service ceiling is 17,900 m (58,700 ft). Combat radius with two drop tanks is about 640 km (400 mi). Powerplant is two Liming Wopen-6A (Tumansky R-9) turbojet engines. In addition to the internal cannon armament, most have provision for four wing pylons for up to 250 kg (550 lb) each, with a maximum ordnance load of 500 kg (1,100 lb). Typical stores include unguided bombs, 55 mm rocket pods, or PL-2/PL-5 (Chinese versions of Soviet K-13 (NATO AA-2 'Atoll') air-to-air missiles.

↳

J-7C/J-7III (Fishcan) Chinese Fighter Aircraft







Tiers:

1 2 **3** 4

Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7C; J-7III; J-7C; Fishcan
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 1
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each
All-Weather Capable: Yes
:

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1,800 kg
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x improved WP-13F
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,200 lb (6,000 kg)
Internal Fuel Capacity: 2,385 liters
Maximum Speed: 2,175 km/h
Touchdown Speed: 310-330 km/h
Ceiling: 18,800 m
Climb Rate: 29,528 ft/min (9,000 m/min)
Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: mm30
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Muzzle Velocity: 900 m/s
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon
Caliber: 30
Shell: 30×165mm
Basic Load: 1,000 Rounds

Missile Weapon Systems

Missile Weapon System (Option #1)

Name: PL-5

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

↳

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: JL-7 multi-role pulse-Doppler fire-control radar

Computerized FCS: Yes

Radar: 1 x Skyranger

Data Link: Type 481 data link

HUD: HK-13A head-up display (HUD)

Autopilot: KJ-11 autopilot

Data Computer: ADS-1 air data computer

Radio Compass: WL-7 radio compass

Radio Altimeter: 64A radio altimeter

Beacon Receiver: XS-6A beacon marker receiver

Navigation System: Type 481 data transmission/navigation system

HF Radio: Type 506 HF radio

IFF: Type 605A IFF

Radar Warning Receiver: Type 930-II radar warning receiver (RWR)

Chaff and Flare Dispencer: GT-1 chaff and flare dispense

Notes:

J-7C: renamed production version of J-7III powered by WP-13F. Equipped with Type 481 data link, which enables the ground-controlled interception centers to feed directions directly to the autopilots of the aircraft to fly "hands off" to the interception, and Type 481 data link was later included as standard equipment of all later models for domestic use. A total of 17 built in the production run lasted from 1989 thru 1996. The Chengdu J-7 (Chinese: □-7; third generation export version F-7; NATO reporting name: Fishcan is a People's Republic of China license-built version of the Soviet Mikoyan-Gurevich MiG-21. Though production

ceased in 2013, it continues to serve, mostly as an interceptor, in several air forces, including the People's Liberation Army Air Force. In the 1950s and early 1960s, the Soviet Union shared most of its conventional weapons technology with the People's Republic of China. The famous MiG-21, powered by a single engine and designed on a simple airframe, was inexpensive but fast, suiting the strategy of forming large groups of 'people's fighters' to overcome the technological advantages of Western aircraft. However, the Sino-Soviet split abruptly ended the initial cooperation, and from July 28 to September 1, 1960, the Soviet Union withdrew its advisers from China, resulting in the project being stopped in China. Soviet Premier Nikita Khrushchev unexpectedly wrote to Mao Zedong in February, 1962, to inform Mao that the Soviet Union was willing to transfer MiG-21 technology to China, and he asked the Chinese to send their representatives to the Soviet Union as soon as possible to discuss the details. The Chinese viewed this offer as a Soviet gesture to make peace, and they were understandably suspicious, but they were nonetheless eager to take up the Soviet offer for an aircraft deal. A delegation headed by General Liu Yalou, the commander-in-chief of the People's Liberation Army Air Force (PLAAF) and himself a Soviet military academy graduate, was dispatched to Moscow immediately, and the Chinese delegation was given three days to visit the production facility of the MiG-21, which was previously off-limits to foreigners. The authorization for this visit was personally given by Nikita Khrushchev, and on March 30, 1962, the technology transfer deal was signed. However, given the political situation and the relationship between the two countries, the Chinese were not optimistic about gaining the technology, and thus they were prepared for reverse engineering. Russian sources state that several complete examples of the MiG-21 were sent to China, flown by Soviet pilots, and China also received MiG-21Fs in kits, along with parts and technical documents. Just as the Chinese had expected, however, when the Soviets delivered the kits, parts and documents to Shenyang Aircraft Factory five months after the deal was signed, the Chinese discovered that the technical documents provided by the Soviets were incomplete and that some of the parts could not be used. China set about to reverse-engineer the aircraft for local production, and in doing so, they succeeded in solving 249 major problems and reproducing eight major technical documents that were not provided by the Soviet Union. One of the major flaws was with the Hydraulics systems, which grounded up to 70% of aircraft in some squadrons until the systems were upgraded. Another major upgrade was modifications to the fuel storage to make the aircraft more stable. The MiG-21 carries most of its fuel in the forward fuselage, causing the center of gravity to shift and become unstable after about 45 minutes of operation. The J-7 has redesigned fuel tanks and significantly larger drop tanks in order to maintain a more stable center of gravity, and therefore better Longitudinal static stability. The cockpit was also revised to replace the Soviet ejection seat, which was found to be unacceptable. The forward opening canopy was replaced by a standard canopy hinged to the rear and jettisoned before the seat ejected. Otherwise, the re-engineering effort was largely successful, as the Chinese-built J-7 aircraft showed only minor differences in design and performance from the original Soviet MiG-21. In March 1964, Shenyang Aircraft Factory began the first domestic production of the J-7 jet fighter, which they successfully accomplished the next year. However, the mass production of the J-7 aircraft was severely hindered by an unexpected social and economic problem—the Cultural Revolution—that resulted in poor initial quality and slow progress, which, in turn, resulted in full-scale production only coming about in the 1980s, by which time the original aircraft design was showing its age. In 1987 the J-7E was released, having a greatly improved wing, among other improvements. It was roughly 45% more maneuverable, and its takeoff and landing performance was greatly increased. It was also equipped with a helmet mounted sight, as well as being the first MiG-21 to be equipped with HOTAS and a multipurpose display. Many of the electronic components were British in origin, such as the gun sight and the multi purpose display. The aircraft is capable of using PL-8/Python 3 missiles with both the helmet mounted sight or the radar fire control, but the two are not connected. The pilot may use only one system at a time. In the mid 1980s Pakistan requested an aircraft with greater radar capabilities. Both the standard radar and the British Marconi radar were plagued by ground clutter, but China did not have any experience with air to ground radar at the time. In 1984 Pakistan provided assistance by having their American trained F-16 pilots provide training on proper operation of ground attack radar, which enabled the Chinese to develop the J-7M. In the late 1980s the J-7MP and J-7PG introduced significant upgrades to the radar system by converting to an Italian FAIR Grifo-7 radar. This more than tripled the effective range of the radar, as well as greatly increased the angle which the radar could detect target. The J-7 only reached its Soviet-designed capabilities in the mid 1980s. However, the fighter is affordable and has been widely exported as the F-7, often with Western systems incorporated, like the ones sold to Pakistan. There are over 20 different export variants of the J-7, some of which are equipped to use European weaponry, such as French R.550 Magic missiles. The Discovery Channel's Wings Over The Red Star series claims that the Chinese intercepted several Soviet MiG-21s en route to North Vietnam (during the Vietnam War), but these aircraft did not perform in a manner consistent with their original specifications, suggesting that the Chinese actually intercepted down-rated aircraft that were intended for export, rather than fully capable production aircraft. For this reason, the Chinese had to re-engineer the intercepted MiG-21 airframes in order to achieve their original capabilities. China later developed the Shenyang J-8 based both on the expertise gained by the program, and by utilizing the incomplete technical information acquired from the Soviet Ye-152 developmental jet. In May 2013, J-7 production has ceased after decades of manufacturing. The last 12 F-7BGIs were delivered to the Bangladesh Air Force.

MiG-23UM (Flogger-C) Russian Fighter Aircraft





Tiers:

1 2 3 4

System

Alternate Designation(s): MiG-23UM; Flogger-C
Primary Function / Type: Fighter Aircraft (Trainer)
Manufacturer: Mikoyan-Gurevich / Mikoyan
Crew: 2
Number of Engines: 1
Number of Hard Points: 2 × fuselage, 2 × wing glove and 2 × wing pylons with a capacity of up to 3,000 kg (6,600 lb) of stores
Note: It was based on the MiG-23S, but featured a lengthened cockpit with a second crew station behind the first.

Dimensions

Length: 15.88 m
Wingspan, Extended: 13.95 m
Wingspan, Swept: 7.77 m
Wing Area: 27.3 m sq
Height: 4.80 m
Weight, Empty: 10,000 kg
Weight, Weapons Loaded: 3,000 kg
Weight, Normal Takeoff: 16,100 kg
Weight, Maximum Takeoff: 18,900 kg

Automotive

Engine Name: 1 x upgraded Tumansky engine
Number of Engines: 1
Engine Type: Turbojet
Engine Power, Dry: 8,006 kg

Engine Power, Afterburner: 12,474 kg

Fuel Capacity: INA, One forward fuel tank was removed to accommodate an extra seat; this was compensated for by adding a new fuel tank in the rear fuselage.

Speed at Altitude: 2,443 km/h, Mach 2.3

Speed at Sea Level: 1,468 km/h, Mach 1.2

Service Ceiling: 18,300 m

G Limits: +8.5

Rate of Climb: 230 m/s

Take-Off Distance: 500 m

Landing Distance: 750 m

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: 23mm

Quantity: 1 × 23 mm Gryazev-Shipunov GSh-23L autocannon

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 260 rounds

Missile Systems

Air-to-Air Missiles: *2 × R-60 *R-73 *2 × R-23 *R-77 *2 × R-27R

Air-to-Surface Missiles: *Kh-23 Grom

↳*Missile System #1*

Name: R-23; NATO: AA-7 Apex

Type: Air-to-Air Missile

Manufacturer: Vympel NPO

Length: 4.50 m

Diameter: 223 mm

Weight: 222 kg

Warhead Type: expanding-rod high explosive

Warhead Weight: 25 kg

Engine: solid fuel rocket

Propellant: 1.04 m

Operational Range: 35 km

Maximum Speed: Mach 3

Guidance System: semi-active radar homing

Rocket Systems

↳*Rocket System #1*

Name: S-5

Type: Rocket

Note: The S-5 is a 55 mm (2.2 in) calibre unguided rocket fired from a 57 mm calibre tube. It is used by fighter bombers and helicopters. It consists of a steel body containing a solid fuel rocket, and a high-explosive warhead with a mechanical impact fuse. At the rear of the rocket is an elongated exhaust nozzle, with eight attached forward folding wings. The fins fold around the rocket when it is stowed in its launch tube, springing back as soon as it leaves the launch tube. In flight, the fins provide a stabilizing spin to the rocket, turning at approximately 750 rpm. The solid rocket motor burns for just 1.1 seconds, during which time it covers about 300 meters (985 ft). The S-5 is carried in rocket pods, with 4–32 rockets. The first were ORO-57 launchers, made in variants with capacity of 4, 8 and 16 rockets. Most typical became ORO-57K for 8 rockets, used especially with MiG-19. Then, beginning in the early 1960s, the typical launcher became UB-16-57, with 16 rockets, developed in several variants, for helicopters and planes. UB stands for "universal block", as it could be carried on conventional bomb hardpoints, "57" refers to the actual diameter of the launch tube (the diameter of the rocket plus 2 mm). The first variant and UB-16-57U had a conical forward part while the next variant UB-16-57D had a blunt forward part. Starting in 1968, a variant UB-16-57UMP was produced, with a conical forward part and five protruding inner tubes.[1] In the 1970s, UB-32 was developed with 32 rockets, carried by heavier aircraft. In Poland, Mars-2 launcher was developed for 16 rockets, and in Romania, LPR 57 launchers for 16 rockets.

Bomb Weapon Systems

Note: Bombs: Up to 500 kg (1,100 lb) bombs per hardpoint

Fire Control / Avionics

Search/Track Radar: High Lark J-band

Infrared: IRST with IR sensor

Laser Desingator: INA

Radar Warning: Sirena 3

Protection

Stealth Properties: No
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

MiG-23UM Flogger-C (trainer) This tandem two-seat trainer with a Tumansky engine has an enlarged dorsal fairing aft of the rear cockpit.

JL-9 Chinese Supersonic Fighter Aircraft







Tiers:



Variants:

- **FTC-2000G:** This is a light attack/trainer variant of the JL-9 developed for export by Guizhou Aviation Industry. It has up to seven hardpoints with a maximum payload of 6,600 lb (3,000 kg). Maximum takeoff weight is increased to 24,250 lb (11,000 kg).

System

Alternate Designation(s): JL-9
Primary Function / Type: Fighter Aircraft
Manufacturer: Guizhou Aviation Industry Import/Export Company (GAIEC)
Crew: 2
Number of Engines: 1
Number of Hard Points: 5 with a capacity of 2,000 kg maximum

Dimensions

Length: 14.555 m
Height: 4.105 m
Width (Wing Span): 8.32 m
Wing Area: 26.15 m2
Gross Weight: 7,800 kg
Maximum Takeoff Weight: 9,800 kg

Automotive

Engine Name: 1 x WP-13F(C)

Number of Engines: 1

Engine Type: Turbojet

Engine Power: Maximum thrust 4,400 kg Afterburner 6,450 kg

Fuel Capacity: Internal 2,660 liters, The aircraft can carry up to three fuel drop tanks under its wings.

Ferry Range: 2,500 km

Maximum Speed: Mach 1.6

Service Ceiling: 16,000 m

Maximum Climb: 260 m/s

G Limit: +8/-3

Main Gun System

Note: 23-mm cannon; Name: INA

Main Missile Systems

Note: typically 2x PL-8 AAMs on inboard pylons + 2x PL-9 AAMs on outboard pylons

Fire Control / Avionics

Fire Control Radar Name: Italian Grifo S-7 pulse-Doppler fire-control radar

Fire Control System Type: The aircraft is equipped with a Chinese pulse-Doppler fire-control radar

HUD: XPS-2 head-up display (HUD

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

JianLian-9 (JL-9) is an advance trainer or light attack aircraft designed and manufactured by the Guizhou Aircraft Industry Corporation (GAIC) of China. The aircraft was designed for the People’s Liberation Army Air Force (PLAAF) and the People’s Liberation Army Naval Air Force (PLANAF). Its export version is designated as FTC-2000 (Fighter Trainer-2000) Mountain Eagle (Shanying). The JL-9 was derived from its forerunner, the JJ-7 jet trainer..

Mirage III French Fighter Aircraft





Tiers:

1 2 3 4

System

Alternative Designations: Mirage III
Crew: 1
Vertical Climb Rate (m/s): 84
Takeoff Run/Landing Roll (m): 700-1,600/700
Standard Payload (kg): 4,000

↳Engines

6,200 lbs. thrust SNECMA Atar 9C turbojet with afterburner (Mirage III/5): 1
7,200 lbs. thrust SNECMA Atar 9K50 turbojet, afterburner (Mirage 50): 1

↳Weight (kg)

Max Takeoff: 13,500
Empty: 7,050

↳Speed (km/h)

Max (at altitude): 2,350, Mach 2.2
Max (sea level): 1,390, Mach 1.1

↳Ceiling (m)

Mirage III: 17,000
Mirage 5: 17,000
Mirage 50: 18,000

↳Fuel (liters)

Internal: 3,330
External (III/5/50): 1,700/ 1,200/ 1,700

↳*Range (km)*

Ferry: 4,000

↳*Dimensions (m)*

Wingspan: 8.3

Height (gear extended): 4.3

↳*Survivability/Countermeasures*

Martin-Baker zero/267 km/h ejection seat: Yes

Separate cockpit and avionics air conditioning systems: Yes

Radar warning receiver: Yes

ARMAMENT

30-mm DEFA 552 (Mirage III): 2

30-mm DEFA 553 (Mirage 5): 2

30-mm DEFA 553 (Mirage 50): 2

↳*Weapon & Ammunition Types*

30-mm cannon: 125

Bombs: 12

125 kg /250 kg: 6

440 kg: 10

Rocket Pods: 1,967

68-mm or 100-mm: 2

2 x 30-mm Cannon Pods (rnds ea.): 250

AVIONICS/SENSOR/OPTICS

Intercept or ground mapping radar: Yes

Fire-control radar in the nose: Yes

Navigation computer: Yes

Automatic gun sight: Yes

↳*Night/Weather Capabilities*

All-weather, day and night capable: (III/5)

Clear-weather day fighter: (50)

NOTES

Description: ONE OF THE MOST SUCCESSFUL AIRCRAFT PRODUCED FOR EXPORT TO BE PRODUCED OUTSIDE OF THE

UNITED STATES AND THE FORMER SOVIET UNION. THE MIRAGE III/5/50 HAS PROVEN TO BE A COMPETENT GROUND ATTACK AIRCRAFT DESPITE ITS ORIGINAL DEVELOPMENT AS A HIGH ALTITUDE INTERCEPTOR. THE MIRAGE 5 AND 50 ARE SIMILAR TO THE III, BUT FITTED WITH SIMPLIFIED AVIONICS AND HAVE EXCLUSIVELY BEEN EXPORT VARIANTS.

↳***APPEARANCE***

VARIANTS

↳***MIRAGE IIIA***

Description: HIGH ALTITUDE INTERCEPTOR AND STRIKE AIRCRAFT FITTED WITH ROCKET MOTOR FOR TAKE-OFF.

↳***MIRAGE IIIB***

Description: TWO-SEAT TRAINER VERSION OF IIIA WITH STRIKE CAPABILITY RETAINED NO INTERNAL CANNON.

↳***MIRAGE IIIC***

Description: MAJOR PRODUCTION VARIANT OF IIIA. FITTED WITH ATAR 9B3 ENGINE, CYRANO II INTERCEPT AND GROUND-MAPPING RADAR.

↳***MIRAGE IIID***

Description: TWO-SEAT TRAINER/STRIKE AIRCRAFT. NO INTERNAL CANNON.

↳***MIRAGE IIIE***

Description: MAJOR PRODUCTION VARIANT. FITTED WITH ATAR 9C ENGINE, CYRANIO IIBIS RADAR, AND EXTRA AVIONICS BAY.

↳***MIRAGE IIIEA/EO***

Description: AUSTRALIAN LICENSE-BUILT AIRCRAFT. (52 ATTACK AND 48 INTERCEPTOR AIRCRAFT)

↳***MIRAGE 5***

Description: GROUND ATTACK VARIANT ORIGINALLY DEVELOPED FOR THE ISRAELI AIR FORCE. FITTED WITH TWO EXTRA FUSELAGE STORES STATIONS, FIRE CONTROL RADAR DELETED OR REPLACED BY RANGING RADAR. PERFORMANCE IDENTICAL TO MIRAGE III EXCEPT FOR LONGER RANGE ON INTERNAL FUEL

Notes:

The Dassault Mirage III (French pronunciation: [miʁaʒ]) is a family of single-seat, single-engine, fighter aircraft developed and manufactured by French aircraft company Dassault Aviation. It was the first Western European combat aircraft to exceed Mach 2 in horizontal flight. During 1952, the French government issued its specification, calling for a lightweight, all-weather interceptor. Amongst the respondents were Dassault with their design, initially known as the Mirage I. Following favourable flight testing held during 1954, in which speeds of up to Mach 1.6 were attained, it was decided that a larger follow-on aircraft would be required to bear the necessary equipment and payloads. An enlarged Mirage II proposal was considered, as well as MD 610 Cavalier (3 versions), but was discarded in favour of a further-developed design, powered by the newly developed Snecma Atar afterburning turbojet engine, designated as the Mirage III. During October 1960, the first major production model, designated as the Mirage IIIC, performed its maiden flight. Initial operational deliveries of this model commenced during July 1961; a total of 95 Mirage IIICs were obtained by the French Air Force (Armée de l'Air, AdA). The Mirage IIIC was rapidly followed by numerous other variants. The Mirage III was produced in large numbers for both the French Air Force and a wide number of export customers. Prominent overseas operators of the fighter included Argentina, Australia, South Africa, Pakistan and Israel, as well as a number of non-aligned nations. Often considered to be a second-generation fighter aircraft, the Mirage III experienced a lengthy service life with several of these operators; for some time, the type remained a fairly maneuverable aircraft and an effective opponent when engaged in close-range dogfighting. During its service with the French Air Force, the

Mirage III was normally armed with assorted air-to-ground ordnance or R.550 Magic air-to-air missiles. Its design proved to be relatively versatile, allowing the fighter model to have been readily adapted to serve in a variety of roles, including trainer, reconnaissance and ground-attack versions, along with several more extensive derivatives of the aircraft, including the Dassault Mirage 5, Dassault Mirage IIIV and Atlas Cheetah. Some operators have undertaken extensive modification and upgrade programmes of their flights, such as Project ROSE of the Pakistan Air Force. The Mirage III has been used in active combat roles in multiple conflicts by a number of operators. The Israeli Air Force was perhaps the most prolific operator of the fighter outside of France itself; Israel deployed their Mirage IIIs during both the Six-Day War, where it was used as both an air superiority and strike aircraft, and the Yom Kippur War, during which it was used exclusively in air-to-air combat in conjunction with the IAI Nesher, an Israeli-built derivative of the Mirage 5. Ace of ace Giora Epstein achieved all of his kills flying either the Mirage III or the Nesher. During the South African Border War, the Mirage III formed the bulk of the South African Air Force's fleet, comprising a cluster of Mirage IIICZ interceptors, Mirage IIIEZ fighter-bombers and Mirage IIIRZ reconnaissance fighters; following the introduction of the newer Mirage F1, the type was dedicated to secondary roles in the conflict, such as daytime interception, base security, reconnaissance and training. The Argentine Air Force utilised the Mirage IIIEA during the Falklands War, but their lack of an aerial refueling capability limited their usefulness in the conflict. Even using drop tanks, the Mirages only had an endurance of five minutes within the combat area around the British fleet.

J-7G (Fishcan) Chinese FIghter Aircraft







Tiers:



Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7G; Fishcan
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 1
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each
All-Weather Capable: Yes

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1.6 tons
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x improved WP-13F
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,200 lb (6,000 kg)
Internal Fuel Capacity: 2,485 liters
Maximum Speed: 2,175 km/h
Touchdown Speed: 310-330 km/h
Ceiling: 18,800 m
Climb Rate: 29,528 ft/min (9,000 m/min)
Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: mm30
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Muzzle Velocity: 900 m/s
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon
Caliber: 30
Shell: 30×165mm
Basic Load: 1,000 Rounds

Missile Weapon Systems

Missile Weapon System (Option #1)

Name: PL-5B

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

↳

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: the Chinese fire control radar for J-G is developed from EL/M-2032 fire control radar China obtained from I/J-band KLJ-6E Lieying (Falcon) pulse-Doppler fire-control radar, which is said to be derived from the Israeli EL/M-2001

Computerized FCS: Yes

Ranging Radar: Type 226 ranging radar

Data Link: Type 481 data link

HUD: JT-1 head-up display (HUD)

Autopilot: KJ-11 autopilot

Data Computer: Type 8430 air data computer

Radio Compass: WL-7 radio compass

Radio Altimeter: 64A radio altimeter

Beacon Receiver: XS-6A beacon marker receiver

Navigation System: JD-3 tactical aircraft navigation (TACAN)

HF Radio: Type 506 HF radio

IFF: Type III identification friend or foe (IFF) system

Radar Warning Receiver: KW8602 radar warning receiver (RWR)

Chaff and Flare Dispencer: Type 941-4AC chaff/flare dispenser

Radar Noise Jammer: KG-8605 internal radar noise jammer

Notes:

J/F-7G series is the further development of earlier J-7E series. Contrary to many frequent but erroneous claims, the fire control radar is not the Chinese development of EL/M-2001B radar, because EL/M-2001B is a pulse Doppler ranging only radar. Instead,

the Chinese fire control radar for J-G is developed from EL/M-2032 fire control radar China obtained from Israel when it was a subcontractor for Elbit in the Romanian MiG-21 LanceR program described above. J-7G: Upgraded J-7E with more than 30 improvements with Mr. Song Cheng-Zhi (□□□) as the general designer. Equipped HOTAS and a Chinese derivative of EL/M-2032. However, due to the inherit limitation of the small size of the nosecone, the antenna size of EL/M-2032 has to be greatly reduced, resulting in the drastic decrease of the original 150 km range of EL/M-2032 by approximately 60% to slightly more than 60 km. Development begun in March 2002 and completed in July 2004, with delivery begun in Nov 2004

J-20 Mighty Dragon (Black Eagle) Chinese Stealth Air Superiority Fighter



Tiers:



System

Alternate Designation(s): J-20 Mighty Dragon; Black Eagle

Primary Function / Type: Stealth Air Superiority Fighter

Manufacturer: Chengdu Aerospace Corporation

Crew: 1

Number of Engines: 2

Number of Hard Points: 4× under-wing pylon capable of carrying drop tanks.

Internal Weapons Bay: PL-10 short range AAM; PL-12 Medium Range AAM; PL-15 BVR long range AAM; PL-21 Long Range AAM; LS-6 Precision-guided bomb

Dimensions

Length: 20.4 m

Width (Wing Span): 13.5 m

Wing Area: 78 m2

Empty Weight: 19,391 kg

Gross Weight: 32,092 kg

Maximum Takeoff Weight: 37,013 kg

Automotive

Engine Name: 2 × WS-10B or AL-31FM2 afterburning turbofan

Number of Engines: 2

Engine Type: Afterburning turbofan

Engine Power: 140 or 145 kN (31,000 or 33,000 lbf) with afterburner

Maximum Range: 6,000 km

Maximum Speed: Mach 2

Combat Range: 2,000 km

Service Ceiling: 20,000 m

G Limits: +9/-3

Thrust/Weight: 0.92 (1.12 with loaded weight and 50% fuel) with AL-31FM2 (estimated)

Fuel Capacity: 11,340 kg

Main Gun System

Note: The J-20 is reported to lack an internal autocannon or rotary cannon, suggesting the aircraft is not intended to be used in short range dogfight engagements with other aircraft but engage them with from long standoff ranges with missiles such as the PL-15 and PL-21.

Main Missile Systems

↳*Main Missile System #1*

Name: PL-15

Type: Active Radar-Guided Very Long-Range Air-to-Air Missile

Manufacturer: 607 (Air-to-Air Missile Research Institute)

Length: 4.0 m

Diameter: INA

Wingspan: INA

Engine: Pulsed solid-propellant rocket

Operational Range: 300+ km

Maximum Speed: Mach 4

Guidance System: Active Radar-Guided

↳*Main Missile System #2*

Name: PL-21

Type: Active Radar-Guided Long Range Air-to-Air Missile

Manufacturer: China Aerospace Science and Technology Corporation

Length: 5.5 m

Diameter: 250–300 mm

Engine: Ramjet

Guidance System: active radar with AESA

Bomb Weapon Systems

↳*Bomb #1*

Name: LS-6

Type: Precision-Guided Bomb

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)

Length: INA

Diameter: INA

Weight: 50 kg version and a 100 kg version

Warhead: Various gravity bombs

Detonation Mechanism: Impact or Proximity

Maximum Speed: Free-fall

Guidance System: INS with GPS or laser guidance

Fire Control / Avionics

Fire Control Radar: INA

Active Electronically Scanned Array: Type 1475 (KLJ-5) active electronically scanned array

Optical Targeting System: EOTS-86 electro-optical targeting system (EOTS)

Infrared Search and Track System: EORD-31 infrared search and track

Targeting and Communication: Prototypes after application "2011" and production models feature revised nose section with an electro-optical/infra-red targeting system and an advanced communications suite on top of the aircraft enables it to datalink with other friendly platforms in service, such as airborne early warning drones. Six electro-optic sensors called Distributed Aperture System[a] similar to EODAS can provide 360-degree coverage for pilot with sensor fusion system combing radar signal with IR image in order to provide better situational awareness. The combination of an integrated targeting pod with spherically located passive-optical tracking system is reported similar to the design concept of Lockheed Martin F-35's avionic suite. Beijing A Star Science and Technology has developed the EOTS-86 electro-optical targeting system and Electro-Optical Distributed Aperture System for the J-20 and potentially other PLAAF fighters to detect and intercept stealth aircraft.

Cockpit, Helmet and Displays: The aircraft features a glass cockpit, with one primary large color liquid crystal displays (LCD) touchscreen, three smaller auxiliary displays, and a wide-angle holographic head-up display (HUD). The size of the primary LCD screen is 24 x 9 inches (25.63 by the diagonal) with two systems for redundant illumination.

Radar

Note: Official information on the type of radar that J-20s use have not yet been released publicly. Some analysts believed that J-20s used Type 1475 (KLJ-5) active electronically scanned array (AESA) radar with 1856 transmit/receive modules, but more recent information's revealed that this radar was designed for upgraded versions of J-11D. Other analysts point out that, based on nose cross-section of J-20 and known data about a single transmit/receive module surface in the J-16's AESA radar-system, J-20s likely fit 2000–2200 transmit/receive modules

Protection

Stealth Properties: Yes, Analysts noted that the J-20's nose and canopy use a similar stealth shaping design as the F-22, yielding similar signature performance in a mature design at the front, while the aircraft's side and axi-symmetric engine nozzles may expose the aircraft to radar. One prototype has been powered by WS-10G engines equipped with different jagged-edge nozzles and tiles for greater stealth. Others have raised doubts about the use of canards on a low-observable design, stating that canards would guarantee radar detection and a compromise of stealth. However, canards and low-observability are not mutually exclusive designs. Northrop Grumman's proposal for the U.S. Navy's Advanced Tactical Fighter (ATF) incorporated canards on a stealthy airframe. Lockheed Martin employed canards on a stealth airframe for the Joint Advanced Strike Technology (JAST) program during early development before dropping them due to complications with aircraft carrier recovery. McDonnell Douglas and NASA's X-36 featured canards and was considered to be extremely stealthy.[80] Radar cross-section can be further reduced by controlling canard deflection through flight control software, as is done on the Eurofighter. The diverterless supersonic inlet (DSI) enables an aircraft to reach Mach 2.0 with a simpler intake than traditionally required, and improves stealth performance by eliminating radar reflections between the diverter and the aircraft's skin. Analysts have noted that the J-20 DSI reduces the need for application of radar absorbent materials. In May 2018, Indian Air Chief Marshal B.S. Dhanoa claimed that Su-30MKI fighters could detect J-20 from "several kilometers away" amid reports from the Indian media that the J-20 is undetectable. Analyst Justin Bronk from Royal United Services Institute noted that Chinese are possibly flying the J-20 with radar reflectors during peacetime for safety and training purposes due to

the potential for accidents and identification from other aircraft or ground installations.[

Heat Signature Reduction: Yes

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: Yes

Notes:

The Chengdu J-20 (Chinese: □-20; pinyin: Jiān-Èrlíng), also known as Mighty Dragon (Chinese: □□; pinyin: Wēilóng, Nato reporting name is Black Eagle) is a single-seat, twinjet, all-weather, stealth, fifth-generation fighter aircraft developed by China's Chengdu Aerospace Corporation for the People's Liberation Army Air Force (PLAAF). The J-20 is designed as an air superiority fighter with precision strike capability; it descends from the J-XX program of the 1990s. The J-20 made its maiden flight on 11 January 2011, and was officially revealed at the 2016 China International Aviation & Aerospace Exhibition. The aircraft was introduced into service in March 2017, and began its combat training phase in September 2017. The first J-20 combat unit was formed in February 2018. The J-20 is the world's third operational fifth-generation stealth fighter aircraft after the F-22 and F-35. The J-20 has a long and wide fuselage, with a chiseled nose section and a frameless canopy. Immediately behind the cockpit are low observable intakes. All-moving canard surfaces with pronounced dihedral are placed behind the intakes, followed by leading edge extensions merging into the delta wing with forward-swept trailing edges. The aft section has twin outward canted all-moving fins, short but deep ventral strakes, and conventional round engine exhausts. One important design criterion for the J-20 is high instability. This requires sustained pitch authority at a high angle of attack, in which a conventional tail-plane would lose effectiveness due to stalling. On the other hand, a canard can deflect opposite to the angle of attack, avoiding stall and thereby maintaining control.[30] A canard design is also known to provide good supersonic performance, excellent supersonic and transonic turn performance, and improved short-field landing performance compared to the conventional delta wing design. Leading edge extensions and body lift are incorporated to enhance performance in a canard layout. This combination is said by the designer to generate 1.2 times the lift of an ordinary canard delta, and 1.8 times more lift than an equivalent sized pure delta configuration. The designer claims such a combination allows the use of a smaller wing, reducing supersonic drag without compromising transonic lift-to-drag characteristics that are crucial to the aircraft's turn performance.

MiG-21PFM (Fishbed-F) Fighter Aircraft







Tiers:

1 2 3 4

Variants:

- **Note:** MiG-21 Fishbed-A/Ye-50 MiG-21 Fishbed-B/Ye-6 MiG-21F Fishbed-C MiG-21PF Fishbed-D MiG-21PF Fishbed-E MiG-21FL Fishbed-E MiG-21PFM Fishbed-F MiG-21 Fishbed-G MiG-21R Fishbed-H MiG-21PFMA Fishbed-J MiG-21MF Fishbed-J MiG-21M Fishbed-J MiG-21SMB Fishbed-K MiG-21bis Fishbed-L MiG-21bis Fishbed-N MiG-21-93 Fishbed-N MiG-21-2000 MiG-21 Lancer MiG-21 Bison MiG-21U Mongol-A** MiG-21US Mongol-B MiG-21UM Mongol-B J-7 (Jianjiji-7) Also See: https://en.wikipedia.org/wiki/List_of_Mikoyan-Gurevich_MiG-21_variants

System

Alternate Designation(s): MiG-21PFM; NATO: Fishbed-F

Primary Function / Type: Fighter/Interceptor

Manufacturer: Russia

In Service: 1966-Present

Crew: 1

Number of Engines: 1

Number of Hard Points: 4

Rocket-Assisted Take-Off, Ground (RATOG) Capable: Yes

Note #1: It has a broader fin and parachute brake housing relocated as bullet fairing below rudder.

Note #2: t incorporates a series of changes made during PF production and adds a side-hinged canopy and broader vertical tail surfaces.

Dimensions

Length: m15.76

Width (Wing Span): m7.5

Height: m4.1

Weight, Empty: tons5.46

Weight, Maximum Take Off: tons10.1

Automotive

Engine Name: 1 x RD-11-F2S-300 turbojet

Number of Engines: 1

Static Thrust: 6,200-kg static thrust

Traction (dry / with afterburning): 40.2 / 67.2 kN

Maximum Range: km1,225

Maximum Range with external Fuel Tanks: km1,470

Maximum Speed: 2,230 km/h

Cruising Speed: 1,000 km/h

Service Ceiling: km19

Time to Altitude: 17,000 m (55,774 ft) in 8 minutes 30 seconds

Fuel: 2,885 liters

Main Gun System

↳*System*

Name: 1 × internal 23 mm Gryazev-Shipunov GSh-23L autocannon

Type: 23mm Autocannon

Caliber: 23mm

Basic Load: 200

Length: GSh-23: 1,387 mm (4 ft 7 in) GSh-23L: 1,537 mm (5 ft 1 in)

Barrel Length: mm1,000

Weight: GSh-23: 49.2 kg (108 lb) GSh-23L: 50 kg (110 lb)

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: m/s715

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm23

Cartridge: 23x115 mm

Basic Load: 200

Wing Mounted Weapon Systems

Air-to-Air Missiles: AA-12 Adder AA-11 Archer AA-10 Alamo AA-8 Aphid AA-2 Atoll

Air-to-Surface Missiles: unguided bombs, rockets AS-17 Krypton AS-12 Kegler AS-9 Kyle KAB-500Kr

↳*Missile System (Option 1)*

Name: R-77 (AA-12 Adder)

Type: Medium-range, active radar homing air-to-air missile.

Basic Load: INA

Production history Manufacturer: Vympel

In Service: 2002-Present

Proliferation: The Russian Air Force finally entered the R-77-1 (AA-12B) into service in 2015.[5][6] It was subsequently deployed by Su-35S fighters in Syria on combat air patrols.

Length: 3.6 m (R-77), 3.71 m (R-77-1)

DIameter: mm200

Warhead: 22.5 kg HE fragmenting (R-77)

Detonation Mechanism: laser proximity fuse

Engine: Solid fuel rocket motor (R-77), air-breathing ramjet (R-77-PD)

Wingspan: mm700

Operational Range: 80–100 km (R-77), 110 km (R-77-1) 193 km (R-77M)

Flight Altitude: km5-25

Speed: Mach 4,Mach 5 for K-77PD (RVV-AE-PD)[

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

Launch Platforms: Mikoyan-Gurevich MiG-21-93/LanceR/Bison, Mikoyan-Gurevich MiG-23, Mikoyan-Gurevich MiG-25, Mikoyan-Gurevich MiG-27, Mikoyan MiG-29, Mikoyan MiG-31, Mikoyan MiG-35, Sukhoi Su-27, Sukhoi Su-30, Sukhoi Su-33, Sukhoi Su-34, Sukhoi Su-35, HAL Tejas, Yakovlev Yak-141, Chengdu J-10

↳*Missile System (Option 2)*

Name: KH-31 (AS-17 Krypton)

Type: Medium-range air-to-surface

Basic Load: INA

Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)

In Service: 1988-Present

Proliferation: INA

Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)

Diameter: 360 mm

Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)

Warhead: HE shaped charge

Detonation Mechanism: Impact

Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb

Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory

Wingspan: mm914

Propellant: kerosene

Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)

Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)

Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar

Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M

↳*Bomb Weapon System*

Name: KAB-500Kr

Type: Electro-optical TV-guided fire and forget bomb

Basic Load: INA

Manufacturer: Russia

Proliferation: INA

Length: m3.05

Diameter: INA

Warhead Type: Hardened, armor-piercing warhead

Weight: kg520

Warhead Weight: kg380

Penetration: up to 1.5 metres (4 feet 11 inches) of reinforced concrete.

Effective Range: he weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.

Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Fire Control / Avionics

Radio: RSIU-5V

IFF: SRZO-2M Khrom-Nikel

ADF: ARK-10

Radar Warning Receiver: SPO-2 Sirena-2

Gunsight: PKI

Radar: RP-21M

ATC Transponder: SOD-57M Globus-2

Command Link: ARL-S Lazur'

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: BVP-1F 120 x 26-mm cartridge dispenser

Notes:

MiG-21PFM Fishbed-F This is a NATO designation for MiG-21PF. Modified PF/PFS (M = modifikatsirovanny). It incorporates a series of changes made during PF production and adds a side-hinged canopy and broader vertical tail surfaces. The Mikoyan-Gurevich MiG-21 (Russian: Микоян и Гуревич МиГ-21; NATO reporting name: Fishbed) is a supersonic jet fighter and interceptor aircraft, designed by the Mikoyan-Gurevich Design Bureau in the Soviet Union. Its nicknames include: Balalaika, because its planform resembles the stringed musical instrument of the same name; Ołówek, Polish for "pencil", due to the shape of its fuselage, and; Én bạc, meaning "Silver Swallow", in Vietnamese. Approximately 60 countries over four continents have flown the MiG-21, and it still serves many nations six decades after its maiden flight. It made aviation records, became the most-produced supersonic jet aircraft in aviation history, the most-produced combat aircraft since the Korean War and previously the longest production run of a combat aircraft (now exceeded by both the McDonnell Douglas F-15 Eagle and General Dynamics F-16 Fighting Falcon). It's also one of the earliest examples of planes capable of performing the Cobra maneuver. The MiG-21 was the first successful Soviet aircraft combining fighter and interceptor characteristics in a single aircraft. It was a lightweight fighter, achieving Mach 2 with a relatively low-powered afterburning turbojet, and is thus comparable to the American Lockheed F-104 Starfighter and Northrop F-5 Freedom Fighter and the French Dassault Mirage III. Its basic layout was used for numerous other Soviet designs; delta-winged aircraft included Su-9 interceptor and the fast E-150 prototype from MiG bureau while the mass-produced successful front fighter Su-7 and Mikoyan's I-75 experimental interceptor combined a similar fuselage shape with swept-back wings. However, the characteristic layout with the shock cone and front air intake did not see widespread use outside the USSR and finally proved to have limited development potential, mainly because of the very small space available for the radar. Like many aircraft designed as interceptors, the MiG-21 had a short range. This was exacerbated by the poor placement of the internal fuel tanks ahead of the centre of gravity. As the internal fuel was consumed, the center of gravity would shift rearward beyond acceptable parameters. This had the effect of making the plane statically unstable to the point of being difficult to control, resulting in an endurance of only 45 minutes in clean condition. This can be somewhat countered by carrying fuel in external tanks closer to the center of gravity. The Chinese variants somewhat improved the internal fuel tank layout (also second generation of Soviet variants), and also carry significantly larger external fuel tanks to counter this issue. Additionally, when more than half the fuel was used up, violent maneuvers prevented fuel from flowing into the engine hereby causing it to shut down in flight. This increased the risk of tank implosions (MiG-21 had tanks pressurized with air from the engine's compressor), a problem inherited from the MiG-15, MiG-17 and MiG-19. The short endurance and low fuel capacity of the MiG-21F, PF, PFM, S/SM and M/MF variants—though each had a somewhat greater fuel capacity than its predecessor—led to the development of the MT and SMT variants. These had an increased range of 250 km (155 mi) compared to the MiG-21SM, but at the cost of worsening all other performance figures, such as a lower service ceiling and slower time to altitude. The delta wing, while excellent for a fast-climbing interceptor, meant any form of turning combat led to a rapid loss of speed. However, the light loading of the aircraft could mean that a climb rate of 235 m/s (46,250 ft/min) was possible with a combat-loaded MiG-21bis, not far short of the performance of the later F-16A. Mig-21's Tumansky R-25 jet engine's specialty was the addition of a second fuel pump in the afterburning stage. Activating the ЧР (rus. "чрезвычайный режим" - emergency mode) booster feature allows the engine to develop 97.4 kilonewtons (21,896 lbf) of thrust under 4,000 meters (13,000 ft) of altitude. The limit of operation is 1 minute for dogfight practice and 3 minutes for an actual wartime emergency, as further use causes the engine to overheat. Use of this "diamond regime" provided a massive 97.4 kN of thrust for no more than 3 minutes in actual wartime use. Use of this temporary power gave the MiG-21bis slightly better than 1:1 thrust-to-weight ratio and a climbing rate of 254 meters/second, equalling the F-16's nominal capabilities in close-quarters dogfight. In air combat practice with the MiG-21bis, use of WEP thrust was limited to 1 minute, to spare on the engines' 800 flight hours lifetime, since every second of super-afterburner use counted as several minutes of regular power run due to extreme thermal stress. When WEP was on, the MiG-21bis's R-25 engine produced a huge 5 meter long blowtorch exhaust - the six or seven brightly glowing rhomboid "shock diamonds" visible inside the flames gave the emergency-power setting its "diamond regime" name. Given a skilled pilot and capable missiles, it could give a good account of itself against contemporary fighters. Its G-limits were increased from +7Gs in initial variants to +8.5Gs in the latest variants. It was replaced by the newer variable-geometry MiG-23 and MiG-27 for ground support duties. However, not until the MiG-29 would the Soviet Union ultimately replace the MiG-21 as a maneuvering dogfighter to counter new American air superiority types. The MiG-21 was exported widely and remains in use. The aircraft's simple controls, engine, weapons, and avionics were typical of Soviet-era military designs. The use of a tail with the delta wing aids stability and control at the extremes of the flight envelope, enhancing safety for lower-skilled pilots; this in turn enhanced its marketability in exports to developing countries with limited training programs and restricted pilot pools. While technologically inferior to the more advanced fighters it often faced, low production and maintenance costs made it a favorite of nations buying Eastern Bloc military hardware. Several Russian, Israeli and Romanian firms have begun to offer upgrade packages to MiG-21 operators, designed to bring the aircraft up to a modern standard, with greatly upgraded avionics and armaments.

Su-7 (Fitter) Russian Ground-Attack Fighter







Tiers:



System

Alternate Designation(s): Su-7; NATO: Fitter

Primary Function / Type: Ground-Attack Fighter

Manufacturer: Sukhoi

Crew: 1

Number of Engines: 1

Number of Hard Points: Hardpoints: 4 × under-wing & 2 × under-fuselage stations for 2,000 kg (4,400 lb) of disposable stores. 2 × reserved for 2,300 l (510 imp gal; 610 US gal) drop tanks with provisions to carry combinations of: *Rockets: UB-16-57U rocket pods for S-5 rockets *Missiles: *Air-to-air missiles: K-13M R-60 R-73A *Air-to-surface missiles: Kh-25ML Kh-29 *Anti-radiation missiles: Kh-27 Kh-58 *Bombs: FAB-250 general-purpose bomb FAB-500 GP bomb FAB-750 GP bomb 8U69 nuclear bomb

Dimensions

Length, with Nose Probe: 17.37 m

Height: 4.70 m

Wingspan: 8.93 m

Wing Area: 27.6 sq. m

Weight, Empty: 8,620 kg

Weight, Maximum Weapons Load: 1,000 kg

Normal Takeoff Weight: 12,000 kg

Maximum Takeoff Weight: 13,500 kg

External Stores: 1,000 kg, including bombs, rocket pods

Automotive

Engine Name: 1 x Lyulka AL-7F-1
Number of Engines: 1
Engine Type: Turbojet
Engine Power, Dry: 7,000 kg
Engine Power, with Afterburner: 10,000 kg
Internal Fuel Capacity: 2,941 liters
Speed, Sea Level with Afterburner: 1,352 km/h, Mach 1.1
Speed, Sea Level without Afterburner: 853 km/h, Mach 0.7
Speed at 11,000 m Clean: 1,700 km/h, Mach 1.6
Speed at 11,000 m with Four Loaded Pylons: 1,268 km/h
Maximum Range: 1,150 km/h
Service Ceiling: 17,600 m
Rate of Climb: 160 m/s

Main Gun System

↳*System*

Name: Nudelman-Rikhter NR-30
Type: Autocannon
Caliber: 30mm
Quantity: 2 × 30 mm Nudelman-Rikhter NR-30
Length: 2,153 mm
Barrel Length: 1,600 mm
Width: 181 mm
Height: 186 mm
Weight: 66 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 850–1,000 rpm
Muzzle Velocity: 780 m/s

↳*Ammunition*

Type: Rifle
Caliber: 30mm
Cartridge: 30x155mm
Basic Load: 70 rounds per gun, 140 rounds total

Main Missile Systems

↳*Main Missile System #1*

Name: K-13; NATO: AA-2 Atoll

Type: Infrared Homing Air-to-Air Missile

Manufacturer: Vympel

Length: 2.830 m

Diameter: 127 mm

Wingspan: 631 mm

Weight: 90 kg

Warhead Weight: 7.4 kg

Engine: solid-fuel rocket engine

Operational Range: 1.0 to 3.5 km

Maximum Speed: Mach 2.5

Guidance System: infrared homing

↳*Main Missile System #2*

Name: R-60

Type: Infrared Homing Air-to-Air Missile

Manufacturer: Vympel

Length: 2,090 mm

Diameter: 120 mm

Wingspan: 390 mm

Warhead: 3 kg

Detonation mechanism: proximity

Operational Range: 8 km

Flight Altitude: 20,000 m

Maximum Speed: Mach 2.7

Guidance System: Infrared homing

Rocket Weapon Systems

Note: UB-16-57U rocket pods for S-5 rockets

Bomb Weapon Systems

Note: *FAB-250 general-purpose bomb *FAB-500 GP bomb *FAB-750 GP bomb *8U69 nuclear bomb

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: I-band range-only air intercept

Laser Desingator: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: Sirena 3 radar warning system

Chaffs/Flares: Yes

Notes:

The Sukhoi Su-7 is a single seat ground attack aircraft that was long a standard tactical fighter-bomber with the Soviet Air Force. The development of Su-7 began in the early 1950's. First prototype called S-1 "Strela" made its first flight in 1955. The Su-7 was unveiled to the West at the 1956 Soviet Aviation Day display at Tushino Airport outside Moscow. The prototype came out to be very promising and Su-7 went in production several years later, with modifications including the Su-7B and Su-7BKL. The airplane was exported to Czechoslovakia, Poland, Romania, China, and other countries. The Su-7 is armed with two 30mm NR-30 guns in wing roots, each with 70 rounds. Under-wing pylons allow two 742 kg or two 495 kg of bombs or rocket pods. The wings are mid- to low-mounted (wings are mounted below center of aircraft) with wide wing roots, swept-back, and tapered with blunt tips. There is one engine in the body. There is a circular air intake in the nose and a large, single exhaust. The fuselage is a long, tubular body with a blunt nose and rear. There is a large, bubble canopy. The tail is swept-back and has a tapered tail fin with a blunt tip. It has swept-back and tapered flats mid- to low-mounted on the fuselage.

J-7E (Fishcan) Chinese Fighter Aircraft





Tiers:



Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: J-7E; Fishcan
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 1
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each
All-Weather Capable: Yes
Note: J-7E series is a series of day time fighter of J-7 that utilizing double delta wing which greatly improved maneuverability.

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1.6 tons
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x improved WP-13F
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,200 lb (6,000 kg)

Internal Fuel Capacity: 2,485 liters

Maximum Speed: 2,175 km/h

Touchdown Speed: 310-330 km/h

Ceiling: 18,800 m

Climb Rate: 29,528 ft/min (9,000 m/min)

Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: mm30

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon

Caliber: 30

Shell: 30×165mm

Basic Load: 1,000 Rounds

Missile Weapon Systems

↳*Missile Weapon System (Option #1)*

Name: PL-5B

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: INA

Computerized FCS: No

Ranging Radar: Type 226 ranging radar

Data Link: Type 481 data link

HUD: JT-1 head-up display (HUD)

Autopilot: KJ-11 autopilot

Data Computer: Type 8430 air data computer

Radio Compass: WL-7 radio compass

Radio Altimeter: 64A radio altimeter

Beacon Receiver: XS-6A beacon marker receiver

Navigation System: JD-3 tactical aircraft navigation (TACAN)

HF Radio: Type 506 HF radio

IFF: Type 605A IFF

Radar Warning Receiver: KW8602 radar warning receiver (RWR)

Chaff and Flare Dispencer: Type 941-4AC chaff/flare dispenser

Radar Noise Jammer: KG-8605 internal radar noise jammer

Notes:

J-7E series is a series of day time fighter of J-7 that utilizing double delta wing which greatly improved maneuverability. It was decided that in order to maintain good maneuverability, the series would not be equipped with fire control radar and medium range AAMs. Equipped with only ranging radar and close range AAM, J-7E series are still daytime fighter. New features of this series includes utilization of carbon-carbon composite brake that quadrupled the service life to more than a thousand landings, utilization of aluminum-lithium alloy that reduces weight by 17%, and pressure ground fueling system replaced gravity ground fueling system that drastically reduced the time of fueling by 80% to 6 minutes from the original half an hour. Deletion of the portside gun resulted in increase of fuel capacity by 100 liters, and the ammo for the starboard side gun is reduced to 60 rounds. WP-13F engine increased mean time between overhaul (MTBO) to 300 hours and service life to 900 hours.Maximum payload is increased to 1.6 ton. Newer avionics replaced the older ones on earlier J-7's. J-7E: Renamed production version of J-7IV with problems exposed by prototypes being stamped out, such as aileron flutter, automatic pitching, lateral Dutch roll, and that of HUD. This model is equipped with a Chinese version of Italian Pointer 2500 ranging radar originally used on Q-5M, modified to fit into the nosecone of J-7E. Pointer 2500 ranging radar is a development of Pointer ranging radar used on the

initial production version of AMX International AMX, which in turn, is a licensed Italian copy of Israeli Elta EL/M-2001B pulse Doppler ranging only radar. More than 260 were built when production stopped in 2001.

MiG-15bis (Fagot) Russian Fighter Aircraft





Tiers:



Variants:

- **MiG-15:** This was a developmental/early production model with the RD-45 engine providing 4,850 lb (2,200 kg) of static thrust.
- **MiG-15bis:** This was the basic production version. Some were modified for ground attack and reconnaissance missions. Attack models could carry up to 2,200 lb (1,000 kg) of ordnance on wing pylons.
- **MiG-15UTI Midget:** This was a two-seat trainer version. Most had their guns removed. It was also built in Poland as the Lim-3; in the former Czechoslovakia as the CS-2; and in China as JJ-2 (domestic) and T-2 (export).

System

Alternate Designation(s): MiG-15bis; NATO: Fagot
Primary Function / Type: Fighter Aircraft
Manufacturer: Mikoyan-Gurevich
Crew: 1
Number of Engines: 1
Number of Hard Points: 2

Dimensions

Length: 10.102 m
Height: 3.7 m
Wingspan: 10.085 m
Wing Area: 20.6 m2
Weight, Empty: 3,681 kg
Weight, Maximum Takeoff: 6,106 kg

Automotive

Engine Name: 1 x Klimov VK-1
Number of Engines: 1
Engine Type: Turbojet
Engine Power: 26.5 kN thrust
Internal Fuel Capacity: 1,420 liters
Speed, Maximum at 12,000 m: 1,075 km/h
Speed, Sea Level: 1,050 km/h
Cruise Speed: 850 km/h
Ferry Range: 2,520 km
Service Ceiling: 15,500 m
Rate of Climb: 51.2 m/s

Main Gun Systems

↳*Gun System #1*

Name: Nudelman-Rikhter NR-23
Type: Autocannon
Caliber: 23mm
Quantity: 2 x Nudelman-Rikhter NR-23 23mm Autocannons
Length: 1,980 mm
Barrel Length: 1,450 mm
Width: 165 mm
Height: 136 mm
Weight: 39 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 800–850 rpm
Muzzle Velocity: 690 m/s

↳*Gun System #1 Ammunition*

Type: Rifle
Caliber: 23mm
Cartridge: 23×115 mm
Basic Load: 80 rounds per gun, 160 rounds total

↳*Gun System #2*

Name: Nudelman N-37

Type: Autocannon

Caliber: 37mm

Quantity: 1 x Nudelman N-37

Length: 2,455 mm

Barrel Length: INA

Weight: 103 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 400 rounds per minute

Muzzle Velocity: 690 m/s

↳*Gun System #2 Ammunition*

Type: Rifle

Caliber: 37mm

Cartridge: 37x155mm

Basic Load: 40 rounds total

Bomb Rocket Weapon Systems

Note: 100 kg (220 lb) bombs, drop tanks, or unguided rockets on 2 underwing hardpoints

↳*Bomb #1*

Name: FT-2

Type: Satellite Guided 500 kg Bomb

Length: depends on the gravity bomb used

Height: depends on the gravity bomb used

Diameter: depends on the gravity bomb used

Wingspan: depends on the gravity bomb used

Weight: 550 kg

Warhead: various gravity bombs

Detonation Mechanism: Impact / Proximity

Range: 15-90 km

Drop Altitude: 3,000-12,000 m

CEP: 20 m

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

MiG-15bis This was the basic production version. Some were modified for ground attack and reconnaissance missions. Attack models could carry up to 2,200 lb (1,000 kg) of ordnance on wing pylons. The Mikoyan-Gurevich MiG-15 (Russian: Микоян и Гуревич МиГ-15; USAF/DoD designation: Type 14; NATO reporting name: Fagot) is a jet fighter aircraft developed by Mikoyan-Gurevich for the Soviet Union. The MiG-15 was one of the first successful jet fighters to incorporate swept wings to achieve high transonic speeds. In combat over Korea, it outclassed straight-winged jet day fighters, which were largely relegated to ground-attack roles, and was quickly countered by the similar American swept-wing North American F-86 Sabre. When refined into the more advanced MiG-17, the basic design would again surprise the West when it proved effective against supersonic fighters such as the Republic F-105 Thunderchief and McDonnell Douglas F-4 Phantom II in the Vietnam War of the 1960s. The MiG-15 is believed to have been one of the most produced jet aircraft; in excess of 13,000 were manufactured. Licensed foreign production may have raised the production total to almost 18,000. The MiG-15 remains in service with the Korean People's Army Air Force as an advanced trainer. The first turbojet fighter developed by Mikoyan-Gurevich OKB was the Mikoyan-Gurevich MiG-9, which appeared in the years immediately after World War II. It used a pair of reverse-engineered German BMW 003 engines. The MiG-9 was a troublesome design that suffered from weak, unreliable engines and control problems. Categorized as a first-generation jet fighter, it was designed with the straight-style wings common to piston-engined fighters. The Germans had been unable to develop turbojets with thrust over 1,130 kilograms-force (11,100 N; 2,500 lbf) running at the time of the surrender in May 1945, which limited the performance of immediate Soviet postwar jet aircraft designs. They did inherit the technology of the advanced axial-compressor Junkers 012 and BMW 018 engines, in the class of the later Rolls-Royce Avon, that were some years ahead of the then currently available British Rolls-Royce Nene engine. The Soviet aviation minister Mikhail Khrunichev and aircraft designer A. S. Yakovlev suggested to Premier Joseph Stalin that the USSR buy the conservative but fully developed Nene engines from Rolls-Royce (having been alerted to the fact that the U.K. Labour government wanted to improve post-war UK-Russia foreign relations) for the purpose of copying them in a minimum of time. Stalin is said to have replied, "What fool will sell us his secrets?" However, he gave his consent to the proposal and Mikoyan, engine designer Vladimir Klimov, and others travelled to the United Kingdom to request the engines. To Stalin's amazement, the British Labour government and its Minister of Trade, Sir Stafford Cripps, were perfectly willing to provide technical information and a license to manufacture the Rolls-Royce Nene. Sample engines were purchased and delivered with blueprints. Following evaluation and adaptation to Russian conditions, the windfall technology was tooled for mass-production as the Klimov RD-45 to be incorporated into the MiG-15. To take advantage of the new engine, the Council of Ministers ordered the Mikoyan-Gurevich OKB to build two prototypes for an advanced high-altitude daytime interceptor to defend against bombers. It was to have a top speed of 1,000 kilometres per hour (620 mph) and a range of 1,200 kilometres (750 mi). Designers at MiG's OKB-155 started with the earlier MiG-9 jet fighter. The new fighter used Klimov's British-derived engines, swept wings, and a tailpipe going all the way back to a swept tail. The German Me 262 was the first fighter fitted with an 18.5° wing sweep, but it was introduced merely to adjust the center of gravity of its heavy Junkers Jumo 004 pioneering axial-compressor turbojet engines. Further experience and research during World War II later established that swept wings would give better performance at transonic speeds. At the end of World War II, the Soviets seized many of the assets of Germany's aircraft industry. The MiG team studied these plans, prototypes and documents, particularly swept-wing research and designs, even going so far as to produce a flying testbed in 1945 to investigate swept-wing design concepts as the piston-engined "pusher"-layout, MiG-8 Utka (Russian for "duck", from its tail-first canard design). The swept wing later proved to have a decisive performance advantage over straight-winged jet fighters when it was introduced into combat over Korea. The design that emerged had a mid-mounted 35-degree swept wing with a slight anhedral and a tailplane mounted up on the swept tail. Western analysts noted that it strongly resembled Kurt Tank's Focke-Wulf Ta 183, a later design than the Me 262 that never progressed beyond the prototype stage. While the majority of Focke-Wulf engineers (in particular, Hans Multhopp, who led the Ta-183 development team) were captured by Western armies, the Soviets did capture plans and wind-tunnel models for the Ta-183. The MiG-15 bore a much stronger likeness to the Ta-183 than the American F-86 Sabre, which also incorporated German research.[citation needed] The MiG-15 does bear a resemblance in layout, sharing the high tailplane and nose-mounted intake, although the aircraft are

different in structure, details, and proportions. The MiG-15's design understandably shared features, and some appearance commonalities with the MiG design bureau's own 1945–46 attempt at a Soviet-built version of the Messerschmitt Me 263 rocket fighter in the appearance of its fuselage. The new MiG retained the previous straight-winged MiG-9's wing and tailplane placement while the F-86 employed a more conventional low-winged design. To prevent confusion during the height of combat the US painted their aircraft with bright stripes to distinguish them. The resulting prototypes were designated I-310. The I-310 was a swept-wing fighter with 35-degree sweep in wings and tail, with two wing fences fitted to each wing to improve airflow over the wing. The design used a single Rolls-Royce Nene fed by a split-forward air intake. A duct carried intake air around the cockpit area and back together ahead of the engine. Its first flight was 30 December 1947, some two months after the American F-86 Sabre had first flown. It demonstrated exceptional performance, reaching 1,042 kilometres per hour (647 mph) at 3,000 metres (9,800 ft). The Soviet Union's first swept-wing jet fighter had been the underpowered Lavochkin La-160, which was otherwise more similar to the MiG-9. The Lavochkin La-168, which reached production as the Lavochkin La-15, used the same engine as the MiG but used a shoulder mounted wing and t-tail; it was the main competitive design. Eventually, the MiG design was favoured for mass production. Designated MiG-15, the first production example flew on 31 December 1948. It entered Soviet Air Force service in 1949, and subsequently received the NATO reporting name "Fagot". Early production examples had a tendency to roll to the left or to the right due to manufacturing variances, so aerodynamic trimmers called "nozhi" (knives) were fitted to correct the problem, the knives being adjusted by ground crews until the aircraft flew correctly. An improved variant, the MiG-15bis ("second"), entered service in early 1950 with a Klimov VK-1 engine, another version of the Nene with improved metallurgy over the RD-45, plus minor improvements and upgrades. Visible differences were a headlight in the air intake separator and horizontal upper edge airbrakes. The 23 mm cannon were placed more closely together in their undercarriage. Some "bis" aircraft also adopted under-wing hardpoints for unguided rocket launchers or 50–250 kg (110–550 lb) bombs. Fighter-bomber modifications were dubbed "IB", "SD-21", and "SD-5". About 150 aircraft were upgraded to SD-21 specification during 1953–1954. The MiG-15 arguably had sufficient power to dive at supersonic speeds, but the lack of an "all-flying" tail greatly diminished the pilot's ability to control the aircraft as it approached Mach 1. As a result, pilots understood they must not exceed Mach 0.92, where the flight surfaces became ineffective. Additionally, the MiG-15 tended to spin after it stalled, and often the pilot could not recover. Later MiGs incorporated all-flying tails. The MiG-15 was originally intended to intercept American bombers like the B-29. It was even evaluated in mock air-to-air combat trials with a captured U.S. B-29, as well as the later Soviet B-29 copy, the Tupolev Tu-4. To ensure the destruction of such large bombers, the MiG-15 carried autocannons: two 23 mm with 80 rounds per gun and a single 37 mm with 40 rounds. These weapons provided tremendous punch in the interceptor role, but their limited rate of fire and relatively low velocity made it more difficult to score hits against small and maneuverable enemy jet fighters in air-to-air combat. The 23 mm and 37 mm also had radically different ballistics, and some United Nations pilots in Korea had the unnerving experience of 23 mm shells passing over them while the 37 mm shells flew under. The cannon were fitted into a simple pack that could be winched out of the bottom of the nose for servicing and reloading, allowing pre-prepared packs to be rapidly swapped out.

→→Attack Aircraft

Su-39 (Frogfoot) Russian Attack Aircraft



Tiers:



Variants:

- **Su-25:** The basic version of the aircraft was produced at Factory 31, at Tbilisi, in the Soviet Republic of Georgia. Between 1978 and 1989, 582 single-seat Su-25s were produced in Georgia, not including aircraft produced under the Su-25K export program. This variant of the aircraft represents the backbone of the Russian Air Force's Su-25 fleet, currently the largest in the world. The aircraft experienced a number of accidents in operational service caused by system failures attributed to salvo firing of weapons. In the wake of these incidents, use of its main armament, the 240 mm S-24 rocket, was prohibited. In its place, the FAB-500 500 kg (1,100 lb) general-purpose high-explosive bomb became the primary armament.
- **Su-25K:** The basic Su-25 model was used as the basis for a commercial export variant, known as the Su-25K (Komercheskiy). This model was also built at Factory 31 in Tbilisi, Georgia. The aircraft differed from the Soviet Air Force version in certain minor details concerning internal equipment. A total of 180 Su-25K aircraft were built between 1984 and 1989.
- **Su-25UB:** The Su-25UB trainer (Uchebno-Boyevoy) was drawn up in 1977. The first prototype, called "T-8UB-1", was rolled out in July 1985 and its maiden flight was carried out at the Ulan-Ude factory airfield on 12 August of that year. By the end of 1986, 25 Su-25UBs had been produced at Ulan-Ude before the twin-seater completed its State trials and officially cleared for service with the Soviet Air Force. It was intended for training and evaluation flights of active-duty pilots, and for training pilot cadets at Soviet Air Force flying schools. The performance did not differ substantially from that of the single-seater. The navigation, attack, sighting devices and weapons-control systems of the two-seater enabled it to be used for both routine training and weapons-training missions.
- **Su-25UBK:** From 1986 to 1989, in parallel with the construction of the main Su-25UB combat training variant, the Ulan-Ude plant produced the so-called "commercial" Su-25UBK, intended for export to countries that bought the Su-25K, and with similar modifications to that aircraft.
- **Su-25UBM:** The Su-25UBM is a twin seat variant that can be used as an operational trainer, but also has attack capabilities, and can be used for reconnaissance, target designation and airborne control. Its first flight was on 6 December 2008 and it was certified in December 2010. It will enter operational use with the Russian Air Force later. The variant has a Phazotron NIIR Kopyo radar and Bars-2 equipment on board. Su-25UBM's range is believed to be 1,300 km (810 mi) and it may have protection against infra-red guided missiles (IRGM), a minimal requirement on today's battle fields where IRGMs proliferate.
- **Su-25UTG:** The Su-25UTG (Uchebno-Trenirovochnyy s Gakom) is a variant of the Su-25UB designed to train pilots in takeoff and landing on a land-based simulated carrier deck, with a sloping ski-jump section and arrester wires. The first one flew in September 1988, and approximately 10 were produced. About half remained in Russian service after 1991; they were used on Russia's sole aircraft carrier, Admiral Kuznetsov. This small number of aircraft were insufficient to

meet the training needs of Russia's carrier air group, so a number of Su-25UBs were converted into Su-25UTGs. These aircraft being distinguished by the alternative designation Su-25UBP (Uchebno-Boyevoy Palubny)—the adjective palubnyy meaning "deck", indicating that these aircraft have a naval function. Approximately 10 of these aircraft are currently operational in the Russian Navy as part of the 279th Naval Aviation Regiment.

- **Su-25BM:** The Su-25BM (Buksirovshchik Misheney) is a target-towing variant of the Su-25 whose development began in 1986. The prototype, designated T-8BM1, successfully flew for the first time on 22 March 1990, at Tbilisi. After completion of the test phase, the aircraft was put into production. The Su-25BM target-tower was designed to provide towed target facilities for training ground forces and naval personnel in ground-to-air or naval surface-to-air missile systems. It is powered by an R-195 engine and equipped with an RSDN-10 long-range navigation system, an analogue of the Western LORAN system.
- **Su-25T:** The Su-25T (Tankovy) is a dedicated antitank version, which has been combat-tested with notable success in Chechnya. The design of the aircraft is similar to the Su-25UB. The variant was converted to one-seater, with the rear seat replaced by additional avionics. It has all-weather and night attack capability. In addition to the full arsenal of weapons of the standard Su-25, the Su-25T can employ the KAB-500Kr TV-guided bomb and the semi-active laser-guided Kh-25ML. Its enlarged nosecone houses the Shkval optical TV and aiming system with the Prichal laser rangefinder and target designator. It can also carry Vikhr laser-guided, tube-launched missiles, which is its main antitank armament. For night operations, the low-light TV Merkuriy pod system can be carried under the fuselage. Three Su-25Ts prototypes were built in 1983–86 and 8 production aircraft were built in 1990. With the introduction of a definitive Russian Air Force Su-25 upgrade programme, in the form of Stroyevoy Modernizirovannyi, the Su-25T programme was officially canceled in 2000.
- **Su-25TM (Su-39):** A second-generation Su-25T, the Su-25TM (also designated Su-39), has been developed with improved navigation and attack systems, and better survivability. While retaining the built-in Shkval of Su-25T, it may carry Kopyo (rus. "Spear") radar in the container under fuselage, which is used for engaging air targets (with RVV-AE/R-77 missiles) as well as ships (with Kh-31 and Kh-35 antiship missiles). The Russian Air Force has received 8 aircraft as of 2008. Some of the improved avionics systems designed for T and TM variants have been included in the Su-25SM, an interim upgrade of the operational Russian Air Force Su-25, for improved survivability and combat capability. The Su-25TM, as an all-inclusive upgrade programme has been replaced with the "affordable" Su-25SM programme.
- **Su-25SM:** The Su-25SM (Stroyevoy Modernizirovannyi) is an "affordable" upgrade programme for the Su-25, conceived by the Russian Air Force in 2000. The programme stems from the attempted Su-25T and Su-25TM upgrades, which were evaluated and labeled as over-sophisticated and expensive. The SM upgrade incorporates avionics enhancements and airframe refurbishment to extend the Frogfoot's service life by up to 500 flight hours or 5 years. The Su-25SM's all-new PRnK-25SM "Bars" navigation/attack suite is built around the BTsVM-90 digital computer system, originally planned for the Su-25TM upgrade programme. Navigation and attack precision provided by the new suite is three times better of the baseline Su-25 and is reported to be within 15 m (49 ft) using satellite correction and 200 m (660 ft) without it.
- **Su-25KM:** The Su-25KM (Kommercheskiy Modernizirovannyy), nicknamed "Scorpion", is an Su-25 upgrade programme announced in early 2001 by the original manufacturer, Tbilisi Aircraft Manufacturing in Georgia, in partnership with Elbit Systems of Israel. The prototype aircraft made its maiden flight on 18 April 2001 at Tbilisi in full Georgian Air Force markings. The aircraft uses a standard Su-25 airframe, enhanced with advanced avionics including a glass cockpit, digital map generator, helmet-mounted display, computerised weapons system, complete mission pre-plan capability, and fully redundant backup modes. Performance enhancements include a highly accurate navigation system, pinpoint weapon delivery systems, all-weather and day/night performance, NATO compatibility, state-of-the art safety and survivability features, and advanced onboard debriefing capabilities complying with international requirements. It has the ability to use Mark 82 and Mark 83 laser-guided bombs and air-to-air missiles, the short-range Vympel R-73.
- **Su-28:** The Sukhoi Su-28 (also designated Su-25UT – Uchebno-Trenirovochnyy) is an advanced basic jet trainer, built on the basis of the Su-25UB as a private initiative by the Sukhoi Design Bureau. The Su-28 is a light aircraft designed to replace the Czechoslovak Aero L-39 Albatros. Unlike the basic Su-25UB, it lacks a weapons-control system, built-in cannon, weapons hardpoints, and engine armour.
- **Su-25R (Razvedchik):** a tactical reconnaissance variant designed in 1978, but never built.
- **Su-25U3:** also known as the "Russian Troika", was a three-seat basic trainer aircraft. The project was suspended in 1991 due to lack of funding.
- **Su-25U (Uchebnyy):** a trainer variant of Su-25s produced in Georgia between 1996 and 1998. Three aircraft were built in total, all for the Georgian Air Force.
- **Su-25M1/Su-25UBM1:** Su-25 and Su-25UB exemplars slightly modernized by Ukrainian Air Force, at least nine modernized (eight single-seat and one two-seat). Upgrades include a new navigation system, enhanced survivability, more accurate weapon delivery and other minor changes
- **Ge-31:** is an ongoing Georgian program of Tbilisi Aircraft Manufacturing aiming at producing a renewed version of Su-25 without Russian components and parts.

System

Alternate Designation(s): Su-39; NATO: Frogfoot; (also known as the Su-25T or Su-25TM)
Primary Function / Type: Attack Aircraft

Manufacturer: Sukhoi

Crew: 1

Number of Engines: 2

Number of Hard Points: 11 hardpoints with a capacity of up to 4,400 kg (9,700 lb) of stores

Dimensions

Length: 15.33 m

Height: 5.20 m

Wingspan: 14.52 m

Wing Area: 30.10 m sq

Wing Load: 716.7 kg/m sq

Weight, Empty: 10,600 kg

Weight, Maximum Takeoff: 21,500 kg

Automotive

Engine Name: 2 x R-195

Number of Engines: 2

Engine Type: Turbojet

Engine Power: 9,920 lb (4,500 kg) each

Thrust-to-Weight Ratio: 1.38

Internal Fuel: 1,292 U.S. gal (4,890 liters)

Maximum SPeed: 950 km/h

Cruise Speed: 650 km/h

Ceiling: 18,000 m

Radius: 900 km

Ferry Distance: 2,500 km

Takeoff Roll, Concrete Runway: 600 m

Takeoff Roll, Unpaved Runway: 650 m

Landing Roll, Concrete Runway: 600 m

Landing Roll, Unpaved Runway: 750 m

Maximum G-Load: 6.5 g

Main Gun System

↳***System***

Name: Gryazev-Shipunov GSh-30-2

Type: Autocannon

Caliber: 30mm

Quantity: 1

Length: 2,044 mm

Weight: 105 kg

Barrels: 2

Action: Recoil operated

Rate of Fire: 1,000-3,000 rpm

Muzzle Velocity: 870 m/s

Maximum Firing Range: 1,800m

↳*Ammunition*

Type: Rifle

Caliber: 30mm

Shell: 30×165mm

Basic Load: 200 rounds

Missile Weapon Systems

Armament Load: 6,000 kg

Missile Options: R-27T, R-27ER, AAM-M, R-73E, S-25L, X-31(A), X-25(ML), X-29, Vikhr (up to 16 max), ASM-M, ASM-M2, S-8, S-13, S-25, X-31P, X-58UE

↳*Missile #1*

Name: R-27T/Alamo B; AA-10b

Type: Air-to-Air Missile

Manufacturer: Spetzetekhnika Vympel NPO, Moscow, Russia, in cooperation with Artem, Ukraine

Length: 3.70 m

DIameter: 230 mm

Wingspan: 0.77 m

Weight: 245 kg

Warhead: Conventional high-explosive wrapped by rods

Control Plane Span: 0.97 m

Propulsion: single-stage boost motor

Maximum Speed: supersonic

Maximum Range: 65 km

Guidance System: IR-cooled seeker, all-aspect capability, flare countermeasure filters; semi-active radar J band, CW monopulse seeker; ARM J band, passive IR homing, passive radar seeker

↳*Missile #2*

Name: R-27ER/Alamo C; AA-10c

Type: Air-to-Air Missile

Manufacturer: Spetzetekhnika Vympel NPO, Moscow, Russia, in cooperation with Artem, Ukraine

Length: 4.78 m

DIameter: 260 mm

Wingspan: 0.80 m

Weight: 350 kg

Warhead: 39 kg

Control Plane Span: 0.97 m

Propulsion: single-stage boost motor and sustainer engine

Maximum Speed: supersonic

Maximum Range: 60-63 km

Guidance System: IR-cooled seeker, all-aspect capability, flare countermeasure filters; semi-active radar J band, CW monopulse seeker; ARM J band, passive IR homing, passive radar seeker

↳***Missile #3***

Name: R-73E

Type: Air-to-Air Missile

Length: 2.90 m

Diameter: 170 mm

Wingspan: 0.51 m

Maximum Launch Distance, Front Hemisphere: 30 km

Maximum Launch Distance, Rear Hemisphere: 300 m

Maximum Range: 30 km

Minimum Range: 200 m

Maximum Target Speed: 2,500 km/h, Mach 2.35

Maximum Target Load: 12 g

Warhead: conventional high-explosive expanding rod

Guidance System: cooled IR seeker, probably with all-aspect capability, flare countermeasure filters

Bomb Weapon Systems

Bomb Options: AB-100, AB-250, AB-500, FB-500, RBK-250, RBK-500,KGM-U munitions pods, KAB-500R, BETAB-500

↳***Bomb #1***

Name: BETAB-500

Type: Concrete-Piercing Bomb

Length: 2,200 mm

Diameter: 350 mm

Weight: 477 kg

Explosive Weight: 98 kg

Release Altitude: 30–5,000 m

Release Speed: 600–1,200 km/h

↳***Bomb #2***

Name: RBK-250

Type: Cluster Bomb

Manufacturer: VO GED (General Export for Defense), Moscow, Russia Bazalt State Research and Production Enterprise, Moscow, Russia

Length: 2.12 m

Diameter: 325 mm

Lug Spacing: 250 mm

Weight: 275 kg

Warhead: HE Bomblets

Fuzes: INA

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: 1 x coherent-pulse RLPK Kopyu-25 radar

Fire Control Radar Band: 3-cm band, including cartographic mapping mode

Laser Desingator: INA

IFF: Yes

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

Electronic Recon: SRTR, 1.2-18 GHz range

Chaffs/Flares: INA

Active Jammer: deflecting, noise, scintillating and re-targeting countermeasures, automatic

Optronic Jammer: amplitude-frequency modulation interference against infrared (IR) seekers

IR Decoys: 192 projectiles

Aircraft Decoys: used to detect and deceive enemy air defense systems

Notes:

The Su-39 Frogfoot** is a derivative of the Su-25 Frogfoot **. It resulted in part from the lessons learned in combat by the Su-25 in Afghanistan. However, significant changes have been made not only in capabilities, but also in performance, making it

effectively a different aircraft. The Su-39 (also known as the Su-25T or Su-25TM) is a Frogfoot variant incorporating post-Afghanistan lessons-learned. Considering the combat experience of using the attack aircraft, the Su-25 modification conception was designed and implemented, and realized in Su-39 attack airplane. The conception provided the extension of its combat functions, and high level of effectiveness in achieving the main purpose destruction of single mobile targets of "tank", "armored troop-carrier" and "ship" types. In 1976 Design Bureau started work to produce a "tank buster" version of the attack aircraft Su-25T (T-8M) designed for antitank warfare. In the course of subsequent work, efforts were focused on making the plane capable of round-the-clock deployment. With this end in view, it was equipped with a highly automated electro-optical aiming system Shkval and a sophisticated antitank weapons system Vikhr. The first flight on the prototype aeroplane, T8M-1, was performed on 17th August 1984 by the design bureau's test pilot A.N. Isakov. In the period 1984-87, the three prototype planes were used to perform flight development tests, and official testing of the aeroplane took place in 1988-92. In 1989-91, Tbilisi produced a development batch of planes, with the first production Su-25T flight tested at the plant on 26th July 1990 by test pilot V.P. Korostiyev. At the beginning of the '90s, NPK Shturmoviki Sukhogo, or the Sukhoi Attack Aircraft Research-and-Production Facility, attempted to launch a project to develop a Su-25T-based attack aircraft under the name of Su-39. The Ulan-Ude factory put in place production arrangements and made first two pre-production planes. The Su-39 (also known as the Su-25T or Su-25TM) is a Frogfoot variant incorporating post-Afghanistan lessons-learned. It is based on the Su-25UB two-seat trainder, with the rear seat and cockpit replaced with a fuel cell and extra avionics. The Su-39 carries the Kopyo-25 multi mode radar in a pod under the fuselage. Armament includes ground attack missiles such as the AT-16 Vikhr , anti-ship missiles, and AAMs such as the R-27, R-27ER, R-60, R-73 and R-77. A four-fold reduction in thermal signature has been achieved through cooling intakes on the upper surface of aircraft, and a new center body which masks hot turbine blades. Only a few dozen of these aircraft have been built.

Su-24 (Fencer) Russian Attack Aircraft





Tiers:



Variants:

- **SU-24M/-24MK/FENCER D:** GROUND ATTACK VERSION AND EXPORT MODEL.
- **SU-24MK/FENCER D MODERNIZED:** CURRENTLY MARKETED GROUND ATTACK VARIANT HAS UPGRADES SUCH ASILS-31 HEADS-UP DISPLAY COMPUTER GPS FCS, DIGITAL MAP DISPLAY, KS-418E RADAR JAMMER PODS, AND ACCESS TO RECENT MISSILES (E.G., AS-13, AS-17, S-25LD LASER DESIGNATED ROCKETS AND AA-11 AAM).
- **SU-24MR/FENCER E:** RECONNAISSANCE VARIANT FOR MISSIONS TO 400 KM, WITH BKR-1SENSOR SUITE: A-100 SERIES AND AP- 402M CAMERAS, AIST-MTV CAMERA, SHPIL-2M LASER RADAR SYSTEM, ZIMA IR CAMERA, AND SHTIK SIDE-LOOKING RADAR (24 KM RANGE, 5M ACCURACY).SYSTEM CAN OPERATE DAY OR NIGHT. THE BOK-2 ECM SYSTEM IS USED. OPTIONS INCLUDE EFIR-1M RADIATION DETECTION POD, KADR FILM DROP SYSTEM, AND TANGAZH ELINT POD. DATA OTHER THAN OPTICAL IS TRANSMITTED DIGITALLY. ANOTHER OPTION IS 2 XAA-8/APHID ASMS.
- **SU-24MP/FENCER F:** ELECTRONIC WARFARE/ JAMMING/SIGINT VARIANT. BUKET SERIES JAMMERS ARE AKA SPS-22, -33, -44, OR -55.FASOL SERIES (SPS-5, -5M AND -5- 2X) RADAR NOISE JAMMERS ARE AVAILABLE. GERAN (SPS-161 OR GERAN F) IS A 2ND GENACTIVE JAMMER. GERAN/SPS-162 JAMS 6-12 GHZ, WITH 100 KW. ARMAMENT INCLUDES 23-MM GUN AND (OPTIONAL) 4 X AA- 8 ASMS

System

Alternative Designations: See Variants
Description: All-weather attack aircraft/Interdictor
Crew (pilot, weapons operator): 2
Engines 17,200-shp Lyluka AL- 21F-3A turbojet (24,700-shp with afterburner): 2

↳*Weapon & Ammunition Types*

23-mm 6x barrel Gsh-23 cannon (rnds): 250
Other Loading Options: 2

↳*TN1000 or TN11200 nuclear weapons*

100-kg FAB-100 bombs: 38
TV or laser-guided bombs: 4
AS-7/KERRY ASM: 1

↳*S-25LD 266-mm precision rockets*

Gun pods: 3

AA-8/APHID or AA-11 AAM: 2

External fuel tanks (liters): 2,000 – 3,000

↳*Weight (kg)*

Maximum Gross: kg39,700

Normal Takeoff: kg35,910

Empty: kg22,320

↳*Speed (km/h)*

Maximum (at altitude): km/h2,320

Maximum (sea level): km/h1,530

Maximum Attack Speed: km/h1,200

Cruise: INA

Takeoff/Landing Speed: INA

Max “G” Force: g+6.5 g

↳*Ceiling (m)*

Service (clean): m17,500

With External Stores: mINA

Vertical Climb Rate (m/s): m/s150

↳*Fuel (liters)*

Internal: l11,760

External: l8,000

↳*Range (km)*

Maximum Load: km940

With Aux Fuel: km1,230

Combat Radius: km950

↳*Takeoff Run/Landing Roll (m)*

Prepared Surface: m1,100-1,200/950

↳*Dimensions (m)*

Length: m24.6

↳*Wingspan*

Extended: m17.6

Swept: m10.4

Height (gear extended): m6.2

↳*Standard Payload (kg)*

External: kg8,000
Hardpoints underwing: 9

↳*Survivability/Countermeasures*

Pressurized cockpit with zero/zero ejection seats: Yes
Infrared and radar jammer: Yes
Radar and missile warning Receivers: Yes
Chaff and Flares: Yes

Armament

↳*23-mm 6x barrel Gatling gun, Gsh-6-23*

Range (practical): m2,500
Elevation/Traverse (rigid mount): None
Ammo Type: HEFI
Rate of Fire: rpm9,000

Avionics/Sensor/Optics

Integrated navigation and fire control radars: Yes
Pulse-doppler terrain following radar coupled to autopilot: Yes
Laser/TV targeting and weapon guidance: Yes
Night/Weather Capabilities: Yes

Notes:

The Sukhoi Su-24 (NATO reporting name: Fencer) is a supersonic, all-weather attack aircraft developed in the Soviet Union. The aircraft has a variable-sweep wing, twin-engines and a side-by-side seating arrangement for its crew of two. It was the first of the USSR's aircraft to carry an integrated digital navigation/attack system. It remains in service with the Russian Air Force, Syrian Air Force, Ukrainian Air Force, Azerbaijan Air Force and various air forces to which it was exported. The Su-24 has a shoulder-mounted variable geometry wing outboard of a relatively small fixed wing glove, swept at 69°. The wing has four sweep settings: 16° for take-off and landing, 35° and 45° for cruise at different altitudes, and 69° for minimum aspect ratio and wing area in low-level dashes. The variable geometry wing provides excellent STOL performance, allowing a landing speed of 230 kilometers per hour (140 mph), even lower than the Sukhoi Su-17 despite substantially greater take-off weight. Its high wing loading provides a stable low-level ride and minimal gust response. The Su-24 has two Saturn/Lyulka AL-21F-3A after-burning turbojet engines with 109.8 kN (24,700 lbf) thrust each, fed with air from two rectangular side mounted intakes with splitter plates/boundary-layer diverters. In early Su-24 ("Fencer A" according to NATO) aircraft these intakes had variable ramps, allowing a maximum speed of 2,320 kilometers per hour (1,440 mph), Mach 2.18, at altitude and a ceiling of 17,500 meters (57,400 ft). Because the Su-24 is used almost exclusively for low-level missions, the actuators for the variable intakes were deleted to reduce weight and maintenance. This has no effect on low-level performance, but absolute maximum speed and altitude are cut to Mach 1.35 and 11,000 meters (36,000 ft).[7] The earliest Su-24 had a box-like rear fuselage, which was soon changed in production to a rear exhaust shroud more closely shaped around the engines in order to reduce drag. The revised aircraft also gained three side-by-side antenna fairings in the nose, a repositioned braking chute, and a new ram-air inlet at the base of the tail fin. The revised aircraft were dubbed "Fencer-B" by NATO, but did not merit a new Soviet designation.

Su-25 Grach (Frogfoot) Russian Close Air Support Aircraft





Tiers:



Variants:

- **Su-25:** The basic version of the aircraft was produced at Factory 31, at Tbilisi, in the Soviet Republic of Georgia. Between 1978 and 1989, 582 single-seat Su-25s were produced in Georgia, not including aircraft produced under the Su-25K export program. This variant of the aircraft represents the backbone of the Russian Air Force's Su-25 fleet, currently the largest in the world. The aircraft experienced a number of accidents in operational service caused by system failures attributed to salvo firing of weapons. In the wake of these incidents, use of its main armament, the 240 mm S-24 rocket, was prohibited. In its place, the FAB-500 500 kg (1,100 lb) general-purpose high-explosive bomb became the primary armament.
- **Su-25K:** The basic Su-25 model was used as the basis for a commercial export variant, known as the Su-25K (Komercheskiy). This model was also built at Factory 31 in Tbilisi, Georgia. The aircraft differed from the Soviet Air Force version in certain minor details concerning internal equipment. A total of 180 Su-25K aircraft were built between 1984 and 1989.
- **Su-25UB:** The Su-25UB trainer (Uchebno-Boyevoy) was drawn up in 1977. The first prototype, called "T-8UB-1", was rolled out in July 1985 and its maiden flight was carried out at the Ulan-Ude factory airfield on 12 August of that year. By the end of 1986, 25 Su-25UBs had been produced at Ulan-Ude before the twin-seater completed its State trials and officially cleared for service with the Soviet Air Force. It was intended for training and evaluation flights of active-duty pilots, and for training pilot cadets at Soviet Air Force flying schools. The performance did not differ substantially from that of the single-seater. The navigation, attack, sighting devices and weapons-control systems of the two-seater enabled it to be used for both routine training and weapons-training missions.
- **Su-25UBK:** From 1986 to 1989, in parallel with the construction of the main Su-25UB combat training variant, the Ulan-Ude plant produced the so-called "commercial" Su-25UBK, intended for export to countries that bought the Su-25K, and with similar modifications to that aircraft.
- **Su-25UBM:** The Su-25UBM is a twin seat variant that can be used as an operational trainer, but also has attack capabilities, and can be used for reconnaissance, target designation and airborne control. Its first flight was on 6 December 2008 and it was certified in December 2010. It will enter operational use with the Russian Air Force later. The variant has a Phazotron NIIR Kopyo radar and Bars-2 equipment on board. Su-25UBM's range is believed to be 1,300 km (810 mi) and it may have protection against infra-red guided missiles (IRGM), a minimal requirement on today's battle fields where IRGMs proliferate.
- **Su-25UTG:** The Su-25UTG (Uchebno-Trenirovochnyy s Gakom) is a variant of the Su-25UB designed to train pilots in takeoff and landing on a land-based simulated carrier deck, with a sloping ski-jump section and arrester wires. The first one flew in September 1988, and approximately 10 were produced. About half remained in Russian service after 1991; they were used on Russia's sole aircraft carrier, Admiral Kuznetsov. This small number of aircraft were insufficient to meet the training needs of Russia's carrier air group, so a number of Su-25UBs were converted into Su-25UTGs. These aircraft being distinguished by the alternative designation Su-25UBP (Uchebno-Boyevoy Palubny)—the adjective

palubnyy meaning "deck", indicating that these aircraft have a naval function. Approximately 10 of these aircraft are currently operational in the Russian Navy as part of the 279th Naval Aviation Regiment.

- **Su-25BM:** The Su-25BM (Buksirovshchik Misheney) is a target-towing variant of the Su-25 whose development began in 1986. The prototype, designated T-8BM1, successfully flew for the first time on 22 March 1990, at Tbilisi. After completion of the test phase, the aircraft was put into production. The Su-25BM target-tower was designed to provide towed target facilities for training ground forces and naval personnel in ground-to-air or naval surface-to-air missile systems. It is powered by an R-195 engine and equipped with an RSDN-10 long-range navigation system, an analogue of the Western LORAN system.
- **Su-25T:** The Su-25T (Tankovy) is a dedicated antitank version, which has been combat-tested with notable success in Chechnya. The design of the aircraft is similar to the Su-25UB. The variant was converted to one-seater, with the rear seat replaced by additional avionics. It has all-weather and night attack capability. In addition to the full arsenal of weapons of the standard Su-25, the Su-25T can employ the KAB-500Kr TV-guided bomb and the semi-active laser-guided Kh-25ML. Its enlarged nosecone houses the Shkval optical TV and aiming system with the Prichal laser rangefinder and target designator. It can also carry Vikhr laser-guided, tube-launched missiles, which is its main antitank armament. For night operations, the low-light TV Merkuriy pod system can be carried under the fuselage. Three Su-25Ts prototypes were built in 1983–86 and 8 production aircraft were built in 1990. With the introduction of a definitive Russian Air Force Su-25 upgrade programme, in the form of Stroyevoy Modernizirovannyi, the Su-25T programme was officially canceled in 2000.
- **Su-25TM (Su-39):** A second-generation Su-25T, the Su-25TM (also designated Su-39), has been developed with improved navigation and attack systems, and better survivability. While retaining the built-in Shkval of Su-25T, it may carry Kopyo (rus. "Spear") radar in the container under fuselage, which is used for engaging air targets (with RVV-AE/R-77 missiles) as well as ships (with Kh-31 and Kh-35 antiship missiles). The Russian Air Force has received 8 aircraft as of 2008. Some of the improved avionics systems designed for T and TM variants have been included in the Su-25SM, an interim upgrade of the operational Russian Air Force Su-25, for improved survivability and combat capability. The Su-25TM, as an all-inclusive upgrade programme has been replaced with the "affordable" Su-25SM programme.
- **Su-25SM:** The Su-25SM (Stroyevoy Modernizirovannyi) is an "affordable" upgrade programme for the Su-25, conceived by the Russian Air Force in 2000. The programme stems from the attempted Su-25T and Su-25TM upgrades, which were evaluated and labeled as over-sophisticated and expensive. The SM upgrade incorporates avionics enhancements and airframe refurbishment to extend the Frogfoot's service life by up to 500 flight hours or 5 years. The Su-25SM's all-new PRnK-25SM "Bars" navigation/attack suite is built around the BTsVM-90 digital computer system, originally planned for the Su-25TM upgrade programme. Navigation and attack precision provided by the new suite is three times better of the baseline Su-25 and is reported to be within 15 m (49 ft) using satellite correction and 200 m (660 ft) without it.
- **Su-25KM:** The Su-25KM (Kommercheskiy Modernizirovannyy), nicknamed "Scorpion", is an Su-25 upgrade programme announced in early 2001 by the original manufacturer, Tbilisi Aircraft Manufacturing in Georgia, in partnership with Elbit Systems of Israel. The prototype aircraft made its maiden flight on 18 April 2001 at Tbilisi in full Georgian Air Force markings. The aircraft uses a standard Su-25 airframe, enhanced with advanced avionics including a glass cockpit, digital map generator, helmet-mounted display, computerised weapons system, complete mission pre-plan capability, and fully redundant backup modes. Performance enhancements include a highly accurate navigation system, pinpoint weapon delivery systems, all-weather and day/night performance, NATO compatibility, state-of-the art safety and survivability features, and advanced onboard debriefing capabilities complying with international requirements. It has the ability to use Mark 82 and Mark 83 laser-guided bombs and air-to-air missiles, the short-range Vympel R-73.
- **Su-28:** The Sukhoi Su-28 (also designated Su-25UT – Uchebno-Trenirovochnyy) is an advanced basic jet trainer, built on the basis of the Su-25UB as a private initiative by the Sukhoi Design Bureau. The Su-28 is a light aircraft designed to replace the Czechoslovak Aero L-39 Albatros. Unlike the basic Su-25UB, it lacks a weapons-control system, built-in cannon, weapons hardpoints, and engine armour.
- **Su-25R (Razvedchik):** a tactical reconnaissance variant designed in 1978, but never built.
- **Su-25U3:** also known as the "Russian Troika", was a three-seat basic trainer aircraft. The project was suspended in 1991 due to lack of funding.
- **Su-25U (Uchebnyy):** a trainer variant of Su-25s produced in Georgia between 1996 and 1998. Three aircraft were built in total, all for the Georgian Air Force.
- **Su-25M1/Su-25UBM1:** Su-25 and Su-25UB exemplars slightly modernized by Ukrainian Air Force, at least nine modernized (eight single-seat and one two-seat). Upgrades include a new navigation system, enhanced survivability, more accurate weapon delivery and other minor changes
- **Ge-31:** is an ongoing Georgian program of Tbilisi Aircraft Manufacturing aiming at producing a renewed version of Su-25 without Russian components and parts.

System

Alternate Designation(s): Su-25 Grach; NATO: Frogfoot

Primary Function / Type: Close Air Support Attack Aircraft

Manufacturer: Sukhoi

Crew: 1

Number of Engines: 2

Number of Hard Points: 11 hardpoints with a capacity of up to 4,400 kg (9,700 lb) of stores

:

Dimensions

Length: 15.53 m

Height: 4.80 m

Wingspan: 14.36 m

Wing Area: 33.70 m sq

Weight, Empty: 9,500 kg

Weight, Normal Takeoff: 14,600 kg

Weight, Maximum Takeoff: 17,600 kg

Weight, Maximum Overload: 19,200 kg

Maximum Weapon Load: 4,400 kg

Automotive

Engine Name: 2 x Ryzhov (Tumansky) R-95

Number of Engines: 2

Engine Type: Turbojet

Engine Power: 9,039 lb (4,100 kg) static thrust each

Fuel Capacity: 6,415 liters

Speed, Maximum Low Level: 970 km/h

Speed, Landing: 220 km/h

Takeoff Roll: 930 m with max payload

Landing Roll: 600 m

Rate of Climb: 4,320 m/min

Ceiling: 7,000 m

Turn Radius: 570 m with 3,307-lb (1,500-kg) payload at 4,921 ft (1,500 m) at 248 knots (286 mph, 460 km/h)

Maximum Range at Low Level: 405 nm (466 mi, 740 km) with 9,700-lb (4,400-kg) weapons load

Maximum Range at Altitude: 675 nm (777 mi, 1,250 km) with same load as above

Main Gun System

↳***System***

Name: Gryazev-Shipunov GSh-30-2

Type: Autocannon

Caliber: 30mm

Quantity: 1

Length: 2,044 mm

Weight: 105 kg

Barrels: 2

Action: Recoil operated

Rate of Fire: 1,000-3,000 rpm

Muzzle Velocity: 870 m/s

Maximum Firing Range: 1,800m

↳*Ammunition*

Type: Rifle

Caliber: 30mm

Shell: 30×165mm

Basic Load: 250 rounds

Main Missile Systems

Maximum Weapons Load: 4,400 kg

↳*Main Missile System #1*

Name: Kh-23 Grom; NATO: A S-7 Kerry

Type: Air-to-Air Missile

Manufacturer: Zvezda-Strela

Length: 3.525 m

Diameter: 27.5 cm

Wingspan: 78.5 cm

Weight: 287 kg

Warhead Weight: 111 kg

Engine: Solid fuel rocket

Operational Range: 2–10 km

Maximum Speed: 2,160–2,700 km/h

Guidance System: Radio command guidance

↳*Main Missile System #2*

Name: Kh-25; NATO: AS-10 Karen

Type: Air-to-Ground Missile

Manufacturer: Zvezda-Strela

Length: 370.5 cm

Diameter: 27.5 cm

Wingspan: 75.5 cm

Warhead: High explosive, shell-forming

Warhead Weight: 89.6 kg

Operational Range: 11 km

Maximum Speed: 1,370–2,410 km/h

Guidance System: Laser guidance, passive radar, TV guidance, IIR, Satellite guidance, active radar homing depending on varian

Rocket Weapon Systems

↳*Rocket Weapon System #1*

Name: S-8

Type: HEAT Rocket

Manufacturer: INA

Length: 1.56 m

Diameter: INA

Weight: 11.5 kg

Warhead Weight: 3.6 kg (0.9 kg of Hecphol-5/A-IX-10 explosive)

Effective Range: 1.3 to 4 km

Note: Basic variant. 350 mm versus RHA. Velocity 692 m/s. N-26A fuze. BIK-2D motor powder. During launch of this model may have black smoke.

Bomb Weapon Systems

↳*Bomb #1*

Name: BETAB-500

Type: Concrete-Piercing Bomb

Length: 2,200 mm

Diameter: 350 mm

Weight: 477 kg

Explosive Weight: 98 kg

Release Altitude: 30–5,000 m

Release Speed: 600–1,200 km/h

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

IFF: Yes

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Su-25, which is no longer in serial production, made its first flight in 1979. This single seat ground attack aircraft is a very durable airplane - it is fairly heavily armored -- and easy to service - all service equipment can be stored in a container and transported by the airplane itself. It is armed with one twin barrel 30mm gun in the bottom of the fuselage with 250 rounds. There are 8 pylons under the wings which can carry about 4,000 kg of air-to-ground weapons, including 57mm to 330mm rockets. There are two small outboard pylons for AA-2D/ATOLL or AA-8/APHID AAMs. The wings are high-mounted and back-tapered with straight trailing edges. There are pods mounted at the square tips. There are two turbojets mounted alongside the body under the wings. There are semicircular air intakes forward of the wings' leading edges. There are exhausts to the rear of the wings' trailing edges. The fuselage is long, and slender and has a rounded nose. The body tapers to the rear section that overhangs the exhausts. There is a stepped canopy. The tail is swept-back and fin is tapered with a square tip. The flats mid-mounted on the fuselage, unequally tapered with blunt tips. The Sukhoi Su-25 Grach (Russian: Грач (rook); NATO reporting name: Frogfoot) is a single-seat, twin-engine jet aircraft developed in the Soviet Union by Sukhoi. It was designed to provide close air support for the Soviet Ground Forces. The first prototype made its maiden flight on 22 February 1975. After testing, the aircraft went into series production in 1978 at Tbilisi in the Georgian Soviet Socialist Republic. Early variants included the Su-25UB two-seat trainer, the Su-25BM for target-towing, and the Su-25K for export customers. Some aircraft were being upgraded to Su-25SM standard in 2012. The Su-25T and the Su-25TM (also known as the Su-39) were further developments, not produced in significant numbers. The Su-25, and the Su-34, were the only armoured, fixed-wing aircraft in production in 2007. Su-25s are in service with Russia, other CIS members, and export customers. The type has seen combat in several conflicts during its more than 30 years in service. It was heavily involved in the Soviet–Afghan War, flying counter-insurgency missions against the Mujahideen. The Iraqi Air Force employed Su-25s against Iran during the 1980–88 Iran–Iraq War. Most were later destroyed or flown to Iran in the 1991 Persian Gulf War. The Georgian Air Force used Su-25s during the Abkhazia War from 1992 to 1993. The Macedonian Air Force used Su-25s against Albanian insurgents in the 2001 Macedonia conflict and, in 2008, Georgia and Russia both used Su-25s in the Russo-Georgian War. African states, including the Ivory Coast, Chad, and Sudan have used the Su-25 in local insurgencies and civil wars. Recently the Su-25 has seen service in the Russian intervention in the Syrian Civil War.

Q-5/A-5 (Fantan) Chinese Ground-Attack Aircraft









Tiers:



Variants:

- **Q-5:** Original production version with a total of 6 pylons, two under each wing and two under the fuselage, and was superseded by the Q-5A.
- **Q-5Jia:** Q-5 modified to carry nuclear bombs, only a very limited number were built. 317Jia radar was tested as improvement program. One of such aircraft is currently on display at the aviation museum in Beijing.
- **Q-5Yi:** Torpedo attacker for navy, only few manufactured. YJ-8 anti-ship missile was also being considered, but the program was cancelled due to budget problem even though the missile was well developed, and afterwards missile test launches were conducted from Type 24 missile boat. In eighties, YJ-81 was once mounted for test, but this proposition was soon rejected when it was decided to let JH-7 take the role.
- **Q-5I(Q-5A):** Q-5 with the internal weapon bay replaced by internal fuel tank, increasing fuel capacity over 70%. Like all previous Q-5 variants, navigation was still a bottle neck with the result being that aircraft must fly longer times in more complex search patterns in long range strikes. However, this problem is somewhat reduced by the increased fuel capacity. An indigenous Type 79Y4 laser rangefinder developed by No. 613 Institute was fitted.
- **Q-5IA(Q-5B):** Improved Q-5I, radar warning receiver and flare dispensers added, the original weapon aiming sight of the Q-5 was developed by No. 5311 Factory, and named as SH-1, short for She – Hong (Shoot-Bomb-1 / □□-1), which only had limited capability because attacks could only be carried out at a fixed angle. No. 5311 Factory developed an improved version SH-1I (□□-1□) to allow the attack to be carried out at different angles. Extra outer pylon under each wing added for PL-2/PL-5 air-to-air missiles, bombs or rocket launchers.
- **Q-5II(Q-5C):** Q-5I with omnidirectional radar warning receivers. Later, Type 205 pulse doppler navigation radar was installed on several planes to solve the navigation problem.
- **Q-5III:** Foreign trade variant, export name A-5III/A-5C□ Project Long6(Dragon Six). Total 10 pylons, with 1 extra pylon under each wing for R-550/AIM-9 air-to-air missiles. See also Export variants.
- **Q-5 with indigenous nav/attack system:** Project CC, Q-5I with indigenous Type 205 doppler navigation system, Q5HK-15 laser rangefinder and SH-1IIA sight. One year later, head-up display and air data computer were incorporated into system. The whole system finally got approved in 1992, and relevant technology was applied to Q-5D several years later.
- **Q-5IV(Q-5M, Q-5D(old):** Project CI. Joint Chinese-Italian project to upgrade the Q-5II with Italian avionics from the AMX International AMX attack fighter. Avionics would include a ranging radar, head-up display, inertial navigation system, air data computer and dual central computers all integrated via dual-redundant MIL-STD-1553B databus.
- **Q-5D(C):** Composite material demonstrator for Q-5D(old).
- **Q-5IIGai(Q-5K, Q-5E(old):** Project CF, joint Chinese-French project to upgrade Q-5II with French avionics, such as VE110 head-Up Display, ULIS91 inertial navigation system, TMV630 laser rangefinder and other electro-optics. Like the Q-5M/A-5M, the project was cancelled after the Tiananmen Square protest of 1989. So some indigenous equipment such as doppler radar, jammer etc., were used to achieve further progress. It was terminated in 1993.

- **Q-5D:** Interim attack aircraft introduced during the 1996 Taiwan Strait Crisis, the separate doppler navigation system and GPS of the Q-5C was replaced by the DG-1 integrated doppler navigation/GPS system. Other systems included the ALR-1 Laser rangefinder/Marked Target seeker and QHK-10 Head-Up Display. A new weapon aiming sight, the SH-1II (□□-1□), replaced the older SH-1I (□□-1□), and No. 5311 Factory managed to successfully integrate this sight with the new laser rangefinder and Type 205 navigation radar.
- **Q-5E:** New pylon with ability to mount laser-guided bombs such as LS-500J LGB, fire control system also improved. Laser pod is absent from the plane due to weight issue.
- **Q-5F:** Laser designator pod carrier, special large belly right pylon mounted for laser targeting pod, which is always false recognized as semi-buried electro-optical targeting pod.
- **Q-5G:** Q-5E with belly conformal fuel tank to solve the range problem.
- **JQ-5J:** Tandem two seater of Q-5. The manufacturer claimed that it can be used as forward air control like the OA-10A, and providing targeting information via data links. The rear seat is 286 millimetres higher than the front seat, enables the back-seat pilot to have a 5 degree field of vision, and the canopy opens to the right. When used as a trainer, the rear cockpit control can override that of the front cockpit.
- **Q-5L:** Upgraded Q-5C, with LLLTV/FLIR vision systems for a day/night capability. Infrared imaging and television cameras were mounted on nose orb. Other improvements include Head Up Display, GPS Rx, INS, TACAN, and chaff/flare dispensers. Weapons capability include the Chinese LS-500J laser-guided glide bombs with a 12 km range. Optional belly conformal fuel tank.
- **Q-5N:** Upgraded Q-5D with same upgrade program as Q-5L, main difference is navigation system of Q-5D.
- **A-5:** Export designation for version of the Q-5 to North Korea in 70's that appeared in Chinese media. The designation contains more than one variant since the Chinese military aid to North Korea is protracted, but it's not clear whether this export version is derived from Q-5, Q-5A, Q-5I or Q-5IA.
- **A-5IIA:** Modified version of Q-5II, sold to Sudan.
- **A-5IIK:** Export version of Q-5II sold to Myanmar.
- **A-5III/A-5C:** Export version with western equipment upon customers' requests, such as flight instrumentation made by Rockwell Collins, and western ejection seat made by Martin-Baker. Added the capability to fire western missiles such as the R550 Magic or AIM-9 Sidewinder. Exported to Pakistan.
- **A-5IIIA:** Exported to Bangladesh. Bangladesh Air Force's A-5Cs have been upgraded in 2008 to fire LS-6 and LT-2 ground attack munitions giving them advanced strike capability.
- **A-5IV/A-5M:** Export version of Q-5M with more western equipment such as flight instrumentation made by Rockwell Collins, and western ejection seat made by Martin-Baker. Added the capability to fire western missiles such as the R550 Magic or AIM-9 Sidewinder. Myanmar ordered, but chose IIK instead after program extension. Evaluated by the Pakistan Air Force in 1990.

System

Alternate Designation(s): Q-5; A-5 (Export Version)
Primary Function / Type: Ground-Attack Aircraft
Manufacturer: Nanchang Aircraft Mfg. Co.
Crew: 1
Number of Engines: 2
Number of Hard Points: 10 (4× under-fuselage, 6× under-wing) with a capacity of 2,000 kg (4,400 lb),
Hardpoints External Maximum Load: 2,000 kg

Dimensions

Length: 15.65 m
Width (Wing Span): 9.68 m
Height: 4.33 m
Wing Area: 27.95 m2
Empty Weight: 6,375 kg
Gross Weight: 9,486 kg
Max Takeoff Weight: 11,830 kg

Automotive

Engine Name: 2 × Liming Wopen-6A aftertburning turbojet engines
Number of Engines: 2
Engine Power: 29.42 kN (6,610 lbf) thrust each dry, 36.78 kN (8,270 lbf) with afterburner
Maximum Range: 2,000 km
Maximum Speed: 1,210.23 km/h
Service Ceiling: 15,840 m
Internal Fuel Capacity: 3,648 liters
External Fuel Capacity: 760 liters

Communications

VHF Radio: AR-3201/CT-3 VHF
HF Radio: HF/SSB transceiver

Gun Weapon System

↳*System*

Name: 2 x Nudelman-Rikhter NR-23 Autocannons
Type: Autocannon
Location: 2 x internal Norinco 23-2K 23-mm, one per wing
Caliber: mm23
Length: 1,980 mm
Barrel Length: 1,450 mm
Width: 165 mm
Height: 136 mm
Weight: 39 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 800–850 rpm
Muzzle Velocity: 690 m/s
Maximum Firing Range: INA

↳*Ammunition*

Type: Autocannon
Caliber: 23
Shell: 23×115 mm
Basic Load: 100 rounds each

Rocket Weapon Systems

Rocket Pod (Option #1): 2 x 8-round 57-mm Rocket Pod

Rocket Pod (Option #2): 2 x 8-round 68-mm Rocket Pod

Rocket Pod (Option #3): 2 x 7-round 90-mm Rocket Pod

Missile Weapon Systems

↳*Missile System #1*

Name: PL-2

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)

Length: 2.15 to 2.99 meter

Diameter: 127 mm

Wingspan: 528 to 609 mm

Weight: 60 to 152.3 kg

Warhead: 11.3 kg high explosive

Detonation Mechanism: Impact / Proximity

Engine: rocket 2668dN

Propellant: solid fuel

Operational Range: 6 to 10 km

Flight Ceiling: 15 to 21.5 km

Maximum Speed: Mach 1.6 to 2.5

Guidance System: Nitrogen cooled passive InPb infrared seeker

↳*Missile System #2*

Name: PL-2B

Type: Air-to-Air Missile

Note: The PL-2B is a variant of the PL-2, which is the result of a 1976 improvement program. There is upgraded guidance and an early infrared fuze.

↳*Missile System #3*

Name: PL-7

Type: Air-to-Air Missile

Manufacturer: Factory 331 (Zhuzhou Aeroengine factory)

Length: 2.74 m

Diameter: 157 mm

Wingspan: 0.66 m

Weight: 89 kg

Warhead: 12.5 kg

Speed: Mach 2.5

Range: 0.5 to 14 km

Guidance: Infrared homing

Bombs Weapon Systems

Bomb (Option #1): Durandal anti-runway

Bomb (Option #2): BL755 cluster

Bomb (Option #3): 5-20 kiloton nuclear

Fire Control / Avionics

Navigation: Litton LN-39A inertial system

Computer: 2 x Singer digital

Databus: dual-redundant 1553B

Ranging Radar: Pointer 2500

HUD: Alenia

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: Yes

Anti-Threat Computer: RWR, ECM

Notes:

The Nanchang Q-5 (Chinese: □-5; pinyin: Qiang-5; NATO reporting name: Fantan), also known as the A-5 in its export versions, is a Chinese-built single seat, twin jet engine ground-attack aircraft based off of the Soviet MiG-19. However, the aircraft is primarily used for close air support. The PRC was an enthusiastic user of the MiG-19, which it manufactured locally as the Shenyang J-6 from 1958. In August 1958 the People's Liberation Army requested development of a jet attack aircraft for the air support role. Lu Xiaopeng was appointed chief designer of this project. Lu also designed the J-12 fighter jet. Although based on the MiG-19, the new design, designated Qiangjiji-5 (fifth attack aircraft design), had a longer fuselage, area ruled to reduce transonic drag and accommodate a 4 m (13-ft) long internal weapons bay. The air intakes were moved to the fuselage sides to make space in the nose for a planned target radar (which was never actually fitted). New wings with greater area and reduced sweep were incorporated. The Q-5 shares the J-6's Liming Wopen WP-6 A (Tumansky RD-9) turbojet engines. The redesign cost some high-altitude speed, but the Q-5 is as fast as the MiG-19/J-6 at low level, thanks largely to the area-ruled fuselage. Fixed armament of the Q-5 was reduced to two Type 23-1 23 mm cannon with 100 rounds per gun, mounted in the wing roots. Two pylons under each wing and two pairs of tandem pylons under the engines were provided in addition to the weapons bay. A total of 1,000 kg (2,205 lb) of ordnance could be carried internally, with an additional 1,000 kg externally. On many aircraft the weapons bay is now used primarily for an auxiliary fuel tank. Production drawings were completed in 1960 allowing construction of prototypes to begin, but the political climate in China resulted in the project being canceled in 1961. A small team kept the program alive until it work restarted in earnest at Nanchang.[4] The first flight finally occurred on 10 June 1965. Series production began in 1969, with squadron delivery starting in 1970. About 1,000 aircraft were produced, 600 of them being the updated Q-5A. A small number, perhaps a few dozen, Q-5As were modified to carry nuclear weapons; these are believed to retain their internal weapons bay. A long-range Q-5I, introduced in 1983, added a fuel tank instead of the internal

weapons bay, compensating for that with the provision of two additional underwing pylons. Some of these aircraft serve with the PLA Navy, and have apparently been equipped with radar to guide anti-ship missiles. Subsequent minor upgrades include the Q-5IA, with a new gun/bomb sighting system and avionics, and the Q-5II, with radar warning receiver (RWR). In the 1980s, the aircraft was exported to nations such as Pakistan, Bangladesh, Myanmar, and is often known as the A-5 in those nations. Plans for an upgraded Q-5/A-5 with Western equipment and new navigation and attack (nav/attack) systems were largely aborted following the Tiananmen Square protests of 1989, but the aircraft continues in service. It is a capable light attack aircraft, although its limited navigation and weapons-delivery systems are inferior to more modern aircraft. In more recent years, the PLAAF has begun to field newer models of the Q-5, that incorporate some of the technology developed during the canceled Q-5M and Q-5K projects. The Q-5 introduces a nose-mounted laser rangefinder, and a laser designator is also likely to be fitted since the aircraft is said to be able to deliver laser-guided bombs. The Q-5A variant is believed to be capable of delivering nuclear munitions. The Q-5D is an upgrade with new avionics, including a HUD and a new navigation system. The Q-5E and Q-5F models are reportedly being worked on, though little is known about them at this time. One of them could potentially be the new two-seater that has been seen in a few photographs, although the two-seater could bear the designation Q-5J.

MiG-31 (Foxhound) Russian Attack Aircraft





Tiers:



System

Alternative Designations: MiG-31;
Crew: 2
Takeoff Run/Landing Roll (m): 1,200/800
Max “G” Force (g): 5
Ceiling (m): 24,400
Vertical Climb Rate (m/s): 42
Standard Payload (pylons): 8

↳Engines

0,944 lbs. thrust Aviadvigatel D-30F-6 turbofan, 34,172 lbs. thrust with afterburner): 2

↳Weight (kg)

Maximum Gross: 46,200
Normal Takeoff: 41,000
Empty: 21,820

↳Speed (km/h)

Maximum (at altitude): 2,500
Maximum (sea level): 1,500
Maximum Attack Speed: 3,000
Cruise: 1,010

↳Fuel (liters)

Internal: 20,250
External: 5,000

↳*Range (km)*

Ferry without refueling: 3,300

↳*Combat Radius (km)*

4 x AA-9 Amos, 2 x drop tanks, 1 in-flight refuel at Mach 0.8: 2,200

4 x AA-9 Amos, 2 x drop tanks at Mach 0.85: 1,400

4 x AA-9 Amos, no drop tanks at Mach 0.85: 1,200

4 x AA-9 Amos, no drop tanks at Mach 2.35: 720

↳*Duration (hr.)*

internal and drop tanks only: 3.6

drop tanks and in-flight refueling: 6-7

↳*Dimensions (m)*

Length: 20.6

Wingspan: 13.5

Height: 6.2

↳*Survivability/Countermeasures*

Pilot and weapons system operator in tandem under individual rearward hinged canopies: Yes

Active infrared and electronic countermeasures: Yes

Radar warning receiver: Yes

Wingtip ECM/ECCM pod: Yes

ARMAMENT

GSh-23-6 23mm Gatling-type cannon: 1

↳*Weapon & Ammunition Types*

GSh-23-6 23mm Gatling-type cannon (rnds): 260

↳*Other Loading Options*

AVIONICS/SENSOR/OPTICS

N-007/S-800 Zaslon (Flash Dance) electronically scanned phased array lookdown shoot-down fire control radar: Yes

Long range nav system: Yes

Infrared search/track system: Yes

Night/Weather Capabilities: Yes

NOTES

Description: THE MIG-31 IS AN ALL-WEATHER, TWO-SEAT INTERCEPTOR WITH ADVANCED DIGITAL AVIONICS. IT WAS THE FIRST SOVIET FIGHTER TO HAVE A TRUE LOOK-DOWN, SHOOT-DOWN CAPABILITY.

↳*APPEARANCE*

VARIANTS

Description: THE MIG-31 FOXHOUND IS A SUBSTANTIALLY IMPROVED DERIVATIVE OF THE MIG-25 FOXBAT.

↳*MIG-31 FOXHOUND-A INTERCEPTOR*

Description: ORIGINAL PRODUCTION VERSION.

↳*MIG-31B/BS/E FOXHOUND-A INTERCEPTOR*

Description: THE MIG-31B HAS FLASH DANCE A RADAR AND IMPROVED AA-9 AMOS AAMS, IN-FLIGHT REFUELING PROBE, AND NEW NAVIGATION SYSTEM.

↳*MIG-31BS*

Description: SIMILAR TO THE MIG-31B, WITH RADAR ENHANCEMENT AND A-723 NAVIGATION.

↳*MIG-31E*

Description: EXPORT VARIANT OF MIG-31B AIMED AT CHINA, INDIA, AND IRAN. NONE WERE SOLD.

↳*MIG-31BM/FE FOXHOUND-A MULTIROLE FIGHTER*

Description: MID-LIFE UPGRADE FOR INTERCEPTORS. FITTED WITH ASMS, UPGRADED RADAR AND AA-11 AND AA-12 AAMS.MIG-31FE IS EXPORT VARIANT.

↳*MIG-31M FOXHOUND-B MULTIROLE FIGHTER*

Description: UPGRADED LONG RANGE NAVIGATION SYSTEM AND IMPROVED PHASED ARRAY RADAR.

Notes:

The Mikoyan MiG-31 (Russian: Микоян МиГ-31; NATO reporting name: Foxhound) is a supersonic interceptor aircraft developed for use by the Soviet Air Forces. The aircraft was designed by the Mikoyan design bureau as a replacement for the earlier MiG-25 "Foxbat"; the MiG-31 is based on and shares design elements with the MiG-25. The MiG-31 has the distinction of being one of the fastest combat jets in the world. It continues to be operated by the Russian Air Force and the Kazakhstan Air Force following the end of the Cold War and the collapse of the Soviet Union in 1991. The Russian Defence Ministry expects the MiG-31 to remain in service until 2030 or beyond. Like the MiG-25, the MiG-31 is a large twin-engine aircraft with side-mounted air intake ramps, a shoulder-mounted wing with an aspect ratio of 2.94, and twin vertical tail fins. Unlike the MiG-25, it has two seats, with the rear occupied by a dedicated weapon systems officer. The MiG-31 is limited to five g when travelling at supersonic speeds. While flying under combat weight, its wing loading is marginal and its thrust-to-weight ratio is favorable. The MiG-31 is not designed for close combat or rapid turning. The wings and airframe of the MiG-31 are stronger than those of the MiG-25, permitting supersonic flight at low altitudes. Like the MiG-25, its flight surfaces are built primarily of nickel-steel alloy, enabling the aircraft to tolerate kinetic heating at airspeeds approaching Mach 3. The MiG-31 airframe comprises 49% arc-welded nickel steel, 33% light metal alloy, 16% titanium and 2% composites. Its D30-F6 jet engines, each rated at 152 kN thrust, allow a maximum speed of Mach 1.23 at low altitude. High-altitude speed is temperature-redlined to Mach 2.83 – the thrust-to-drag ratio is sufficient for speeds in excess of Mach 3, but such speeds pose unacceptable hazards to engine and airframe life in routine use.

Aero Albatros L-39 Czechoslovakian Light-Ground Attack Aircraft





Tiers:



Variants:

- **L-39X-01 – X-07:** Five prototypes plus two static test airframes.
- **L-39C (C for Cvičná – training):** Standard basic trainer for Soviet Union, Czechoslovakia and export. Originally designated L-39, but renamed L-39C when later variants appeared. Two pylons under wing. Approximately 2,260 built.
- **L-39CM (CM for Cvičná modernizovaná – modernised training):** Slovak upgraded C version.
- **L-39M1:** Ukrainian upgraded C version with AI-25TLSh engines. The conversion is carried out by Odesaviaremservis and the first plane was ready in 2009. The upgrade of a further 7 L-39C's was planned. Only six L-39C were converted into L-39M1 by 2014
- **L-39V (V for Vlečná – tug):** Single-seat target tug version for Czechoslovakia. Equipped to tow KT-04 target on 1,700 m (5,600 ft) cable. Prototype plus eight production aircraft built
- **L-39ZO (Z for Zbraně – weapons):** Interim weapon trainer variant for export. Four pylons stressed for 500 kg (1,100 lb) (inboard) and 250 kg (550 lb) (outboard), with total external load of 1,150 kg (2,500 lb).[21] First flew 25 June 1975, with initial deliveries to Iraq in 1977. 337 built
- **L-39ZA:** Significantly upgraded L-39ZO for armed training and light attack, employing sturdier landing gear, a higher payload (total 1,290 kg (2,844 lb)) and notably provision for a GSh-23L 23-millimeter twin-barreled cannon attached in a conformal pod under the pilots' compartment, having a 150-round magazine within the airframe. Outer pylons wired to carry K-13 or R-60 air-to-air missiles. Two prototypes, with first flying on 29 September 1976. 208 aircraft delivered.
- **L-39ZAM:** Slovak upgraded ZA version.
- **L-39ZA/ART:** Thai version of L-39ZA with Elbit avionics. 40 built.
- **L-39MS/L-59:** The Aero L-39MS is a second generation military trainer aircraft developed from the firm's earlier L-39. Compared to its predecessor, it featured a strengthened fuselage, longer nose, a vastly updated cockpit, and a more powerful (21.6 kN (4,850 lbf)) Lotarev DV-2 engine, allowing operation at higher weights and speeds (max speed 872 km/h (542 mph)). First flight on 30 September 1986. It was later designated as the Aero L-59.[
- **L-139 Albatros 2000:** Revised version with western avionics and 17.99 kN (4,045 lbf) Garrett TFE731-4-1T engine. Single prototype built.
- **L-159:** Further modernised advanced trainer/combat aircraft with more modern, western avionics and Honeywell/ITEC F124 engine
- **L-39NG:** Modernised and upgraded version with Williams FJ44 engine, improved fuel system and avionics, planned to be introduced in 2018.
- **Skyleader UL-39 Albi:** A carbon-fibre ducted-fan powered scale variant first flown in the Czech Republic on 4 April 2016

System

Alternate Designation(s): Aero L-39 Albatros
Primary Function / Type: Light-Ground Attack Aircraft
Manufacturer: Aero Vodochody
In Service: Still in Service. Afghanistan Algeria Angola Armenia Azerbaijan Bangladesh Belarus Bulgaria 12 L-39ZA Cambodia Cuba Czech Republic East Germany Withdrawn from use in 1990. Egypt Equatorial Guinea Estonia Ethiopia France (The Breitling Jet Team currently uses nine L-39s) Georgia Ghana Iraq Kazakhstan Kyrgyzstan Libya Lithuania Latvia (The Baltic Bees Jet Team currently uses six L-39s) Mozambique Nigeria North Korea Romania Russia Slovakia South Sudan Syria

Tajikistan Thailand L-39ZA/ART (Westernized version, equipped with Israeli avionics Tunisia Turkmenistan Uganda Ukraine United States (The Patriots Jet Team currently uses six L-39s; The Black Diamond Jet Team currently uses six L-39s) Uzbekistan Vietnam Yemen

Crew: 2

Number of Engines: 1

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: 2

Dimensions

Length: 12.13 m

Width (Wing Span): 9.46 m

Height: 4.77 m

Wing Area: 18.8 m2

Empty Weight: 3,455 kg

Maximum Takeoff Weight: 4,700 kg

Automotive

Engine Name: 1 x Ivchenko AI-25TL turbofan engine

Number of Engines: 1

Engine Power: 16.87 kN (3,790 lbf) thrust

Maximum Range: 1,100 km

Ferry Range: 1,750 km

Maximum Speed: 750 km/h

Service Ceiling: 11,000 m

Endurance: 2 hours 30 minutes (internal fuel), 3 hours 50 minutes (internal and external fuel)

Rate of Climb: 21 m/s

Time to Altitude: 5,000 m in 5 minutes

Take-Off Roll: 530 m

Landing Roll: 650 m

Armament

Note: Up to 284 kg (626 lb) of stores on two external hardpoints

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Aero L-39 Albatros is a high-performance jet trainer developed in Czechoslovakia by Aero Vodochody. It was designed during the 1960s as a replacement for the Aero L-29 Delfín as a principal training aircraft. It was the first trainer aircraft to be equipped with a turbofan powerplant. The type was exported to a wide range of countries as a military trainer. The L-39 Albatros later served as the basis for the updated L-59 Super Albatros, as well as the L-139 (prototype L-39 with Garrett TFE731 engine). A further development of the design, designated as the L-159 ALCA, entered production in 1997. To date, more than 2,800 L-39s have served with over 30 air forces around the world. The Albatros is the most widely used jet trainer in the world; in addition to performing basic and advanced pilot training, it has also flown combat missions in a light-attack role. The design never received a NATO reporting name. At the Farnborough Airshow in July 2014, Aero Vodochody announced the launch of the L-39NG, an upgraded and modernised version of the L-39. The L-39 Albatros was designed to be a cost-effective jet-powered trainer aircraft, which is also capable of performing ground attack missions. For operational flexibility, simplicity, and affordability, the majority of onboard systems have been simplified to avoid incurring high levels of maintenance, as well as to minimize damage caused by mishandling when flown by inexperienced air crew. It could be readily flown from austere airstrips such as frozen lake beds, enabled through the rugged design of the landing gear and favourable low landing speeds. The aircraft's flying qualities are reportedly simple, which is made easier by way of a rapid throttle response, making it easier for students who had never previously flown a jet aircraft before to successfully control. As a training platform, the L-39 itself comprised part of a comprehensive system which also used flight simulators and mobile ground test equipment. The low-set, straight wing has a double-taper planform, 2½-deg dihedral from the roots, a relatively low aspect ratio, and 100 litres (26 US gal; 22 imp gal) fuel tanks permanently attached to the wingtips. The trailing edge has double-slotted trailing edge flaps inboard of mass-balanced ailerons; the flaps are separated from the ailerons by small wing fences. An automatic trimming system was present, the flaps and the trim system being connected in order to counteract the potentially large pitch changes that would otherwise be generated by vigorous movements of the flaps. The tall, swept vertical tail has an inset rudder. Variable-incidence horizontal stabilizers with inset elevators are mounted at the base of the rudder and over the exhaust nozzle. Side-by-side airbrakes are located under the fuselage ahead of the wing's leading edge. The flaps, landing gear, wheel brakes and air brakes are powered by a hydraulic system. Controls are pushrod-actuated and have electrically powered servo tabs on the ailerons and rudder. Operational g-force limits at 4,200 kilograms (9,300 lb) are +8/-4 g. A long, pointed nose leads back to the tandem cockpit, in which the student and instructor sit on Czech-built VS-1 ejection seats under individual canopies, which are opened manually and are hinged on the right. The rear seat, typically used by the instructor, is elevated slightly to readily enable observation and guidance of the student's actions in the forward position. The design of the cockpit, panel layout and many of its fittings resemble or are identical in function to those of other commonly-used Soviet aircraft; for example, the procedure for deploying the ejection seat is exactly the same as for the Mikoyan MiG-29. The cockpit is highly pressurized, requiring the air crew to wear oxygen masks only when flying in excess of 23,000 feet. A gyro gunsight for weapon-aiming purposes is typically present in the forward position only. A single turbofan engine, an Ivchenko AI-25TL (made in the Soviet Union) is positioned in the rear fuselage, fed through shoulder-mounted, semi-circular air intakes (fitted with splitter plates) just behind the cockpit and the tailpipe below the horizontal tailplane. The engine has a time between overhaul (TBO) of 1,000 flight hours; however, it is allegedly cheaper than the majority of turbine engines to overhaul. Five rubber bag fuel tanks are located in the fuselage behind the cockpit. Several heavy radio units are typically installed in an aft avionics bay; these are often removed on civilian-operated aircraft and replaced with a 70-gallon fuel tank. Additional fuel tanks can be fitted in the rear cockpit position and externally underneath the wings; the tip-tanks can also be expanded for a greater fuel capacity. The aircraft is fitted with a hydraulically-actuated retractable nose wheel undercarriage which is designed to allow operation from grass airfields. The main landing gear legs retract inward into wing bays while the nose gear retracts forward. The basic L-39C trainer has provision for two underwing pylons for drop tanks or practice weapons, but these are not usually fitted. It can be armed with a pair of K-13 missiles to provide a basic air defense capability. Light-attack variants have four underwing hardpoints for ground attack stores, while the ZA variant also has an under fuselage gun pod. Mock UB-16 rocket pods can also be installed for visual appearance only.

→→Multirole Aircraft

Kfir (Lion Cub) Israeli Multi-Role Fighter




Tiers:

1 2 **3** 4

Variants:

- **Kfir C1::** Initial production model, leased to the US Navy and Marine Corps and re-designated F21A.
- **F-21A::** Slightly modified C1, used to train us combat pilots in adversary tactics. Used by US Navy from 1985 to May 1988. Used by USMC from 1987 to Sep 1989.
- **Kfir C2::** Revised airframe with foreplanes and nose strake added.
- **Kfir C7::** Upgraded version with new avionics: wdns-391 weapons control system with stores management display, uprated GE J79-1JE engine and greater internal fuel capacity.
- **Kfir-2000::** Designed as a cost-effective multi-role aircraft.

System

Alternative Designations: See Variants
Crew: 1
Engines: General Electric J79-GE-1JE Turbojet. 17,750lbs thrust in the C2; 18,750lbs thrust in the C7.
Maximum take off weight: kg16,500
Empty weight: kg7,285
Ferry Range: C2: 2,991km C7: 3,232km
Combat Radius':: INA
Intercept Mission: C2: 347km C7: 776
Combat Air Patrol: C2: 699km C7: 882
Ground Attack: C2: 768 C7: 1,186
Takeoff Run / Landing Roll (With Max Load): C2: 1,455m C7: 1,555m
Wingspan: 8.2m
Height: 4.6m
Standard External Payload: C2: 4,277 C7: 5,775
Hardpoints: C2: 7 C7: 9
Max Speed at Altitude: 2,440; Mach 2.3
Max Speed at Sea Level: 1,389; Mach 1

Takeoff / Landing Speed: 220

Maximum G Forces: 7.5 g's

Ceiling: 17,680 m

Vertical Climb Rate: 233 m/s

Fuel: Internal: 3,243 liters; External: 4,700 liters

Cockpit pressurized, heated, and air conditioned: Yes

Martin-Baker zero / zero ejection seat: Yes

In-flight refueling: Yes

IFF, ECM pods: Yes

Radar warning reciever: Yes

Chaff and Flares: Yes

Weapons and Ammunition Types

Cannon: 2x internal 30mm cannons

Other payload options: Python / Shafrir / AIM-9: 2 each AGM-45 Shrike ARM: 2 each AGM-65 Maverick: 1 each Bombs: GBU-15 glide bomb: 1 each 227kg: 6 each 363kg or 454kg: 2 each 1,361kg: 1 each Fuel Tanks: Multiple options

Notes:

The Israel Aircraft Industries Kfir (Hebrew: כְּפִיר, "Lion Cub") is an Israeli-built all-weather multirole combat aircraft based on the French Dassault Mirage 5, with Israeli avionics and an Israeli-built version of the General Electric J79 turbojet engine. The Kfir programme originated in the quest to develop a more capable version of the IAI Nesher, which was already in series production. After General De Gaulle embargoed the sale of arms to Israel, the IAF feared that it might lose qualitative superiority over its adversaries in the future, which were receiving increasingly advanced Soviet aircraft. The main and most advanced type of aircraft available to the IAF was the Mirage, but a severe problem developed due to the Mirage fleet's depletion due to attrition after the Six-Day War. Domestic production would avoid the problem of the embargo completely; efforts to reverse engineer and reproduce components of the Mirage were aided by Israeli espionage efforts to obtain technical assistance and blueprints from third party Mirage operators. Two power plants were initially selected for trials, the General Electric J79 turbojet and the Rolls-Royce Spey turbofan. In the end, the J79 was selected, not least because it was the same engine used on the McDonnell Douglas F-4 Phantom II, which the Israelis began to acquire from the United States in 1969, along with a license to produce the J79 themselves. The J79 was clearly superior to the original French Atar 09, providing a dry thrust of 49 kN (11,000 lbf) and an afterburning thrust of 83.4 kN (18,750 lbf). In order to accommodate the new powerplant on the Mirage III's airframe, and to deliver the added cooling required by the J79, the aircraft's rear fuselage was slightly shortened and widened, its air intakes were enlarged, and a large air inlet was installed at the base of the vertical stabilizer, so as to supply the extra cooling needed for the afterburner. The engine itself was encased in a titanium heat shield. A two-seat Mirage IIIBJ fitted with the GE J79 made its first flight in September 1970, and was soon followed by a re-engined Nesher, which flew in September 1971. An improved prototype of the aircraft, with the name Ra'am B ("Ra'am" means "Thunder"; the "Ra'am A" was the Nesher),[6] made its first flight in June 1973. It had an extensively revised cockpit, a strengthened landing gear, and a considerable amount of Israeli-built avionics. The internal fuel tanks were slightly rearranged, their total capacity being increased to 713 US gal (2,700 l). There were unconfirmed reports that a number of the original Mirage IIICs, re-engined with the J79 and given the name Barak ("Lightning"), took part in the Yom Kippur War of 1973, but some sources point out that there is no evidence that these aircraft ever existed.

FTC-2000G Chinese Multi-Role Aircraft



Tiers:



Variants:

- **JL-9:** The JL-9 Shanying (Mountain Eagle) is a trainer aircraft based on the J-7 fighter. The aircraft has been competing against the JL-15 for China's next-generation trainer program.

System

Alternate Designation(s): FTC-2000G
Primary Function / Type: Multi-Role Aircraft
Manufacturer: Guizhou Aviation Industry Import/Export Company (GAIEC)
Crew: 2
Number of Engines: 1
Number of Hard Points: seven hard-points with a maximum payload of 3,000 kg.
Night-Flying Capabilities: Yes
Note: The jet can be equipped with reconnaissance or electronic warfare pods

Dimensions

Length: 14.555 m
Height: 4.105 m
Width (Wing Span): 8.32 m
Wing Area: 26.15 m2
Gross Weight: 7,800 kg
Maximum Takeoff Weight: 11,000 kg

Automotive

Engine Name: 1 x WP-13F(C)
Number of Engines: 1
Engine Type: Turbojet
Engine Power: Maximum thrust 4,400 kg Afterburner 6,450 kg

Fuel Capacity: Internal 2,660 liters, The aircraft can carry up to three fuel drop tanks under its wings.

Ferry Range: 2,500 km

Maximum Speed: Mach 1.6

Service Ceiling: 16,000 m

Maximum Climb: 260 m/s

G Limit: +8/-3

Main Gun System

Note: 23-mm cannon; Name: INA

Main Missile Systems

Note: typically 2x PL-8 AAMs on inboard pylons + 2x PL-9 AAMs on outboard pylons

Fire Control / Avionics

Fire Control Radar Name: Italian Grifo S-7 pulse-Doppler fire-control radar

Fire Control System Type: The aircraft is equipped with a Chinese pulse-Doppler fire-control radar

HUD: XPS-2 head-up display (HUD

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The FTC-2000 is a JJ-7/FT-7 with a new wing, a forward fuselage with side air intakes, and a glass cockpit. The engine, management, and mechanical controls of the JJ-7/FT-7 are retained. The FTC-2000G is a multi-role combat fighter aircraft and one of the cheapest multi role fighters on the market with the aim to replace old legacy fighters like the J-7/F-7. It has 7 hard-points. It also features a diverterless supersonic inlet. It made its first flight in September 2018. Compared to the FTC-2000 trainer variant, the FTC-2000G is heavier, slower due to new wing design, and has less endurance than the FTC-2000.

Su-30K Russian Multirole Fighter Aircraft







Tiers:



System

Alternative Designations: Su-30K
Description: Multirole Fighter Aircraft
Crew Su-30MK: 3
Takeoff /Landing Roll (m): 550/670
Max “G” Force (g): +8
Ceiling (m): 17,500

↳*Engines*

16,755 lbs. thrust Saturn AL-31F turbofans, 27,558 lbs. thrust with afterburner: 2

↳*Weight*

Maximum Takeoff: kg38,000
Normal Takeoff: kg24,140
Empty: kg17,900

↳*Speed*

Maximum (at altitude): km/h2,125, Mach 2.0
Maximum (sea level): km/h1,350

↳*Fuel (liters)*

Internal: liters9,400

↳*Range (km)*

Unrefueled: km3,000

One refueling: km5,200

With Aux Fuel: km4,390 (SM)

Combat Radius: km1,500

↳*Dimensions*

Length: m21.9

Wingspan: m14.7

Height: m6.4

↳*Standard Payload*

External: kg8,000

Hardpoints pylons: 12

↳*Survivability/Countermeasures*

Zero/zero ejection seat: Yes

Infrared and radar jammer: Yes

Radar and missile warning receivers: Yes

Chaff and flares: Yes

Gaseous oxygen for 10 hours of flight: Yes

ARMAMENT

30-mm gun mounted in the right wing: Yes

↳*30-mm gun, Gsh-30-1*

Range (m): m(practical) 4,000

Elevation/Traverse: None (rigidly mounted)

Ammo Type: HEFI, APT, CC

Rate of Fire (rpm): 1,500 rounds per minute

↳*Weapon & Ammunition Types*

30-mm Gsh-30-1 cannon (rnds): 150 Rounds

Other Loading Options: 2

AA-10A-D/ALAMOAAM: 6

AA-11/ARCHER AAM: 6

AA-12 ADDER AAMs: 6

AS-14/KEDGE ASM: 6

AS-17/KRYPTON ASM: 6

AS-18/KAZOO ASM: 2

Gun pods: 3

420-mm S-25 rockets (1 each):

80-mm S-8 rocket pod (20 ea.):

122-mm S-13 rocket pod (5 each):

250-kg, or 500-kg unguided and guided bombs:

KAB-500Kr Bombs: 6

KAB-1500Kr Bombs: 2

AVIONICS/SENSOR/OPTICS

↳*Pulse-Doppler look-down/ shoot-down radar*

Search range (km): km240

Track range (km): km185

Multi Target Capability: Yes

IR Sensor: Yes

Laser Designator: yes

Heads Up Display: Yes

NOTES

Description: A SMALL NUMBER OF THE AIR SUPERIORITY FIGHTERS HAVE BEEN PRODUCED. THE GREATER EXPORT MARKET IS FOR MULTI-ROLE VERSIONS

↳*APPEARANCE*

VARIANTS

Description: TWO-SEATER AIRCRAFT IS SIGNIFICANTLY UPGRADED AND DERIVED FROM SU-27 SINGLE-SEAT AIRCRAFT.

↳*SU-30M*

Description: THE FIRST REAL MULTI-ROLE AIRCRAFT IN THE SU-27 FAMILY, WITH ALL NECESSARY SUB-SYSTEMS. THESE WERE CONVERTED INTO DEMONSTRATORS FOR EXPORTS.

↳*SU-30MK*

Description: EXPORT SERIES VERSION. THE SU-30MK2 ANTI-SHIP UPGRADE VERSION HAS BEEN EXPORTED.

↳*SU-30MKK/FLANKER-G*

Description: MULTI-ROLE UPGRADE UTILIZING AIR-TO-GROUND WEAPONS TO A MORE ADVANCED VERSION INCORPORATING NEW RADAR, CANARDS AND THRUST VECTORING.

↳*JJ-11*

Description: CHINESE LICENSE-BUILT VERSION.

↳*SU-30MKI/FLANKER-H*

Description: VERSION OF THE SU-30MK MADE FOR INDIA. MOST WILL BE PRODUCED BY AN INDIAN FIRM. SOME WESTERN EQUIPMENT REPLACED MUCH OF THE RUSSIAN SYSTEMS.

↳*SU-30MKM*

Description: VERSION FOR USE BY MALAYSIA.

Notes:

Su-30K Export version of the Russian Su-30. India and Irkut renegotiated a deal that would have upgraded the first 18 Su-30K fighters to the Su-30MKI standard. The proposed agreement would limit the modernization to a replacement of the N-001Mech radar with the N-011M Bars and the addition of a glass cockpit with improved avionics. The Sukhoi Su-30 (Russian: Сухой Су-30; NATO reporting name: Flanker-C) is a twin-engine, two-seat supermaneuverable fighter aircraft developed in the Soviet Union by Russia's Sukhoi Aviation Corporation. It is a multirole fighter for all-weather, air-to-air and air-to-surface deep interdiction missions. The Su-30 started out as an internal development project in the Sukhoi Su-27 family by Sukhoi. The design plan was revamped and the name was made official by the Russian Defense Ministry in 1996. Of the Flanker family, the Su-27, Su-30, Su-33, Su-34 and Su-35 have been ordered into limited or serial production by the Defense Ministry. The Su-30 has two distinct version branches, manufactured by competing organisations: KnAAPO and the Irkut Corporation, both of which come under the Sukhoi group's umbrella. KnAAPO manufactures the Su-30MKK and the Su-30MK2, which were designed for and sold to China, and later Indonesia, Uganda, Venezuela, and Vietnam. Due to KnAAPO's involvement from the early stages of developing Su-35, these are basically a two-seat version of the mid-1990s Su-35. The Chinese chose an older but lighter radar so the canards could be omitted in return for increased payload. It is a fighter with both air supremacy and attack capabilities, generally similar to the U.S. F-15E Strike Eagle. Irkut traditionally served the Soviet Air Defense and, in the early years of Flanker development, was given the responsibility of manufacturing the Su-27UB, the two-seat trainer version. When India showed interests in the Su-30, Irkut offered the multirole Su-30MKI, which originated as the Su-27UB modified with avionics appropriate for fighters. Along with its ground-attack capabilities, the series adds features for the air-superiority role, such as canards, thrust-vectoring, and a long-range phased-array radar. Its derivatives include the Su-30MKM, MKA, and SM for Malaysia, Algeria, and Russia, respectively. The Russian Air Force operates several Su-30s and has ordered the Su-30SM version. The integrated aerodynamic configuration, combined with the thrust vectoring control ability, results in high manoeuvrability and unique takeoff and landing characteristics. Equipped with a digital fly-by-wire system, the Su-30 is able to perform some very advanced manoeuvres, including the Pugachev's Cobra and the tailslide. These manoeuvers quickly decelerate the aircraft, causing a pursuing fighter to overshoot, as well as breaking a Doppler radar-lock, as the relative speed of the aircraft drops below the threshold where the signal registers to the radar. The aircraft's powerplant incorporates two Saturn AL-31F afterburning low-bypass turbofan engines, fed through intake ramps. Two AL-31Fs, each rated at 123 kN (28,000 lbf) of full afterburning thrust ensures Mach 2 in level flight, 1,350 km/h speed at low altitude, and a 230 m/s climbing rate. With a normal fuel reserve of 5,270 kg, the Su-30MK is capable of performing a 4.5-hour combat mission with a range of 3,000 km. An aerial refueling system increases the range to 5,200 km (3,200 mi) or flight duration up to 10 hours at cruise altitudes. The aircraft features autopilot ability at all flight stages including low-altitude flight in terrain-following radar mode, and individual and group combat employment against air and ground/sea-surface targets. Automatic control system interconnected with the navigation system ensures route flight, target approach, recovery to airfield and landing approach in automatic mode.

J-16 Chinese Multirole Strike Fighter Aircraft






Tiers:



Variants:

- **J-16:** Strike variant.
- **J-16D:** Electronic warfare variant. Equipped with wingtip electronic warfare pods, and no IRST or 30 mm cannon. It reportedly made its first flight in December 2015.

System

Alternate Designation(s): J-16
Primary Function / Type: Multirole Strike Fighter
Manufacturer: Shenyang Aircraft Corporation
Crew: 2
Number of Engines: 2
Number of Hard Points: Munitions on twelve external hardpoints

Dimensions

Length: 21.9 m
Width (Wing Span): 14.7 m
Height: 6.36 m
Wing Area: 62.04 m2
Empty Weight: 17,700 kg
Gross Weight: 26,000 kg
Maximum Takeoff Weight: 35,000 kg

Automotive

Engine Name: 2 × Shenyang WS-10B afterburning turbofans
Number of Engines: 2
Engine Type: Afterburning turbofans
Engine Power: 96 kN (22,000 lbf) thrust each dry, 145 kN (33,000 lbf) with afterburner
Maximum Speed: Mach 2.4
Maximum Range: 3,000 km
Combat Range: 1,500 km
Ferry Range: 4,500 km
Service Ceiling: 20,000 m
Rate of Climb: 325 m/s

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: 30mm
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of FIre: 1,800 rounds/min
Muzzle Velocity: 900 m/s
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Rifle, Autocannon
Caliber: 30mm
Shell: 30×165mm
Basic Load: 150 Rounds

Main Missile Systems

↳*Main Missile System #1*

Name: PL-12

Type: Air-to-Air Missile

Operational Range: 70–100 km

Guidance System: Active radar

Basic Load: 8 x PL-12 Air-to-Air Missiles

↳*Main Missile System #2*

Name: PL-9

Type: Air-to-Air Missile

Operational Range: 22km

Guidance System: multi-element infrared

Basic Load: 4 x PL-9 Air-to-Air Missiles

Bomb Weapon Systems

Note: Various bombs and rockets including BeiDou satellite-guided bombs and laser-guided bombs

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Stealth Properties: Yes

Heat Signature Reduction: Yes

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: Electronic countermeasure (ECM) pods

Chaffs/Flares: Yes

Notes:

The J-16 is a twin-engine, twin-seat multi-role fighter jet that is also capable of air-to-air combat. It made its debut during the Army Day parade on July 30, 2017 at the Zhurihe military training base in North China's Inner Mongolia Autonomous Region, Before the 30 July 2017 parade, the J-16 was never shown to the public. Developed by the Shenyang Aircraft Corporation, it is based on the J-11B, a modification of Russia’s Sukhoi-30MKK. Almost half of the equipment seen at the parade to mark the PLA’s 90th birthday was being displayed for the first time, and all of it was indigenously made, according to the Ministry of Defence. The fighter is designed for a naval role, and will carry “stand-off” missiles that can attack ships from beyond visual range. Contracry to initial reports, it has a conventional layout, and does nto incorporate notable stealth features. The J-16, built by the Shenyang Aircraft Corporation (SAC), is reportedly a stealthy dedicated attack version of the J-11B (Su-27) multirole fighter featuring active electronically scanned array [AESA] radar and an internal weapons bay. Chinese authorities had not formally released informtion on these developments. It was rumored in November 2010 that SAC was developing a 4.5th generation heavy multi-role fighter with a conventional layout based on J-11B. First flight of this reportedly "Silent Flanker" was rumored at that time to be within 2011. According to Hui Tong, the J-16 is a version of the J-11BS comparable to American

F-15E. Sort of a 'strike flanker'. "The aircraft can be viewed as an upgraded version of Su-30MKK based on its mission and capability, which is comparable to American F-15E. First flight was rumored to be between 2011-2012. J-16 has tandem seats with a WSO sitting in the backseat. It features an enhanced fire-control system with additional AG modes. Besides PL-8 and PL-12 AAMs, it could also carry the same precision guided weapons being carried by JH-7A, such as KD-88 ASM and LS-500J LGB. Compared to JH-7A, J-16 is expected to have a more powerful radar, a greater weapon load (8t) and a longer range (4,000km). " In May 2011 China Military Report stated that "China's new 4.5 generation heavy fighter (Chinese name "Red Eagle"). August 2008 had been officially off the assembly line in Shenyang Aircraft Factory, in October 2008 in Beijing, an Air Force base in the outskirts of the first flight, October 12, 2009 conducted a second test, a complete success. J-18 is the 4.5 generation fighter aircraft are air superiority fighter heavy. Forward-swept wing fighter design using ultra-stealth characteristics, and install a laser active phased array radar, built-in weapons bay and two large thrust-vectoring engines. Service time is expected around 2015. So far there is no any official information about the machine, nor any information to prove the real existence of the aircraft. Only some information from some people speculate, and speculation of official news." In fact, the J-16 fighter's first flight had been pushed and pushed again. The main reason is that the weight of the design is overweight, but the greater headache was the funding constraints.

JF-17 Thunder Pakistani Multirole Combat Aircraft





Tiers:



Variants:

- **JF-17A Block 1:** Single-seat variant. Production in China began in June 2006. The first three Chinese weapons to be integrated are the PL-5E II AAM, the SD-10 AAM, and the C-802A anti-shipping missile. Block 1 aircraft had performed "better than expected" according to PAF Air Commodore Junaid. Production of Block 1 was completed on 18 December when the fiftieth aircraft—58% of which was produced in Pakistan—was delivered. A Block 1 JF-17 had cost approximately US$15 million per unit.
- **JF-17A Block 2:** Single-seat variant. Production began on 18 December 2013 and initial testing began on 9 February 2015. These aircraft have air-to-air refuelling capability, improved avionics, enhanced load carrying capacity, data link, and electronic warfare capabilities. The construction will continue until 2016, after which the manufacture of Block 3 is planned. A Block 2 JF-17 costs approximately US$25 million per unit. Chairman of PAC, Air Marshal Javaid Ahmed said: "We will hand over 16 Block-II JF-17s to the PAF every year", and that the manufacturing plant has the capacity to produce 25 units in a year. According to local media, PAC rolled out the 16th Block 2 aircraft in December 2015 enabling the JF-17's 4th squadron formation. The JF-17B is a tandem two seat version would start testing in September 2016.
- **JF-17A Block 3:** Single-seat variant. Projected to feature further avionics advancements such as helmet-mounted display and sight (HMD/S) system, a new single panel multi-functional display (MFD), an active electronically-scanned array (AESA) radar paired with an infrared search and track (IRST) system, and a cockpit with a flight-control stick on the side, an NRIET KLJ-7A AESA radar, more use of composites, a new engine, and a two-seater cockpit option, with a top speed of 2.0+ Mach. Pakistani Air Force officials have described it as a "fourth generation plus" fighter jet. According to unconfirmed media reports the induction is expected to start around 2019. As of September 2016, the design of the JF-17 Block III has been finalized. The PAF is expected to place an order for 50 JF-17 Block-III fighter jets in the first half of 2017.
- **JF-17B Block 2:** Dual-seat variant, 8 of which were rolled out at PAC Kamra in December 2019. Its multi-roles include use as a (i) JF-17 conversion trainer; (ii) Lead-In Fighter Trainer (LIFT); (iii) ground-attack aircraft; and (iv) reconnaissance aircraft. The production of the first JF-17B was initiated by Pakistan and China in 2016. On 28 April 2017, the JF-17B took its maiden test flight in Chengdu

System

Alternate Designation(s): JF-17 THunder
Primary Function / Type: Multirole Combat Aircraft
Manufacturer: Pakistan Aeronautical Complex
Crew: 1 (single-seat) or 2 (dual-seat)
Number of Engines: 1
Number of Hard Points: 7 (2 × wing-tip, 4 × under-wing, 1 × under-fuselage) with capacity for dual ejector racks on each under-wing hardpoint

Dimensions

Length: 14.93 m

Width (Wing Span): 9.44 m

Height: 4.77 m

Wing Area: 24.43 m2

Empty Weight: 6,586 kg

Max Takeoff Weight: 12,700 kg

Payload: 4,600 kg

Automotive

Engine Name: 1 × Klimov RD-93MA afterburning turbofan with digital electronic engine control (DEEC)

Number of Engines: 1

Engine Type: Afterburning Turbofan

Engine Power: 50.4 kN (11,300 lbf) thrust [197] dry, 85.6 kN (19,200 lbf) with afterburner

Maximum Speed: Mach 1.6

Cruise Speed: 1,359 km/h

Stall Speed: 150 km/h

Maximum Range: 2,500 km

Combat Range: 1,352 km

Ferry Range: 3,500 km

Service Ceiling: 16,930 m

G Limits: +8/-3 (limited by flight control system)

Rate of Climb: 300 m/s

Main Gun System

↳ ***System***

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: mm23

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gas principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

Ammunition

Type: Rifle, Autocannon

Caliber: mm23

Cartridge: 23x115 mm

Basic Load: INA

Main Missile Systems

↳*Main Missile System #1*

Name: PL-5EII

Type: Short-Range Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factor

Length: 2.893m

Diameter: 0.127m

Wingspan: 0.617m

Weight: 83kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 16~18km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector

↳*Main Missile System #2*

Name: PL-9C

Type: Infrared-Homing Air-to-Air Missile

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Weight: 115kg

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km (PL-9C, air-to-air), > 8km (surface-to-air)

Flight Altitude: 4.5km (surface-to-air)

Maximum Speed: Mach 2+

↳

Guidance System: multi-element infrared

↳*Main Missile System #3*

Name: AIM-9L
Type: Short-Range Air-to-Air Missile
Manufacturer: Raytheon Company Ford Aerospace Loral Corp.
Length: 3.02 m
Diameter: 127.0 mm
Wingspan: 279.4 mm
Weight: 85.3 kg
Warhead Type: WDU-17/B annular blast-frag
Warhead Weight: 9.4 kg
Detonation Mechanism: IR proximity fuze
Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket
Operational Range: 1.0 to 35.4 km
Maximum Speed: Mach 2.5+
Guidance System: Infrared homing

Bomb Weapon Systems

↳*Bomb #1*

Name: Mark 82
Type: Unguided General-Purpose Bomb
Length: 2.22 m
Diameter: 273 mm
Weight: 227 kg
Filling: Tritonal, Minol (explosive) or Composition H6
Filling Weight: 87 kg
Cook Off Time: approximately 2 minutes 30 seconds.

↳*Bomb #2*

Name: Mark 83
Type: Unguided General-Purpose Bomb
Length: 3000 mm
Diameter: 357 mm
Weight: 459 kg
Filling: Tritonal, Minol or Composition H6
Filling Weight: 202 kg
Note: The Mk 83 is a streamlined steel casing containing 445 lb (202 kg) of tritonal high explosive. When filled with

PBXN-109 thermally insensitive explosive, the bomb is designated BLU-110.

↳***Bomb #3***

Name: Mark 84

Type: General-Purpose Bomb

Length: 3280 mm

Diameter: 458 mm

Weight: 925 kg

Filling: Tritonal, Minol or Composition H6

Filling Weight: 429 kg

Note: It is a streamlined steel casing filled with 945 lb (429 kg) of Tritonal high explosive.

Fire Control / Avionics

Fire Control Radar: KLJ-7 v2 Airborne Pulse Doppler Fire-Control Radar (Range-150 km for 3m2 RCS aircraft.)

Radar Warning Receiver: Northrop Grumman ALR-67 Rader Warning Recever (RWR)

Airborne Missile Approach Warning System: S740 Airborne Missile Approach Warning System (MAWS)

Tactical Data Link: Link-17 Tactical Data Link and the MIL-STD-1760 data-bus

Advanced Targeting Pod Electro-Optical Reconnaissance, Surveillance, and Targeting System: Aselsan ASELPOD Advanced Targeting Pod Electro-Optical Reconnaissance, Surveillance, and Targeting System

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

EW Counter Measures: Indra ALQ-500P Electronic Countermeasure (ECM)

Chaffs/Flares: Yes

Jamming Pod: KG300G Airborne Self-Protection Jamming Pod and KG600 Airborne Self-Protection Jamming Pod

Notes:

The PAC JF-17 Thunder (Urdu: جے ایف-۱۷ گرج), or CAC FC-1 Xiaolong (pinyin: Xiāo Lóng; lit.: 'Fierce Dragon'), is a lightweight, single-engine, multi-role combat aircraft developed jointly by the Pakistan Aeronautical Complex (PAC) and the Chengdu Aircraft Corporation (CAC) of China. It was designed to replace the A-5C, F-7P/PG, Mirage III, and Mirage V combat aircraft in the Pakistan Air Force. The JF-17 can be used for multiple roles, including interception, ground attack, anti-ship, and aerial reconnaissance. Its designation "JF-17" by Pakistan is short for "Joint Fighter-17", while the designation and name "FC-1 Xiaolong" by China means "Fighter China-1 Fierce Dragon". The JF-17 can deploy diverse ordnance, including air-to-air and air-to-surface missiles, and a 23 mm GSh-23-2 twin-barrel autocannon. Powered by a Guizhou WS-13 or Klimov RD-93 afterburning turbofan, it has a top speed of Mach 1.8. The JF-17 is to become the backbone of the Pakistan Air Force (PAF), complementing the General Dynamics F-16 Fighting Falcon at half the cost. The PAF inducted its first JF-17 squadron in February 2010. In 2015 Pakistan produced 16 JF-17s. As of 2016, Pakistan is believed to have the capacity to produce 25 JF-17 per year. 58% of the airframe is Pakistani and 42% Chinese/Russian-origin. As of December 2016 Pakistan Aeronautical Complex has manufactured 70 jets in the country for use by the Pakistan Air Force of the Block 1 type,and 33 jets of the Block 2 type. The Pakistan Air Force plans, by 2017, to induct a twin-seater version known as the JF-17B for both enhanced operational capability and training. Preparations for a more advanced and technologically sophisticated block III version of the aircraft are underway and the AESA radar, KJ-7A, has been developed, which can track 15 targets and engage 4 targets simultaneously. Since its induction in 2011, the JF-17 Thunder has accumulated 19,000 hours of operational flight. The JF-17 has seen active military service as it is used by

the Pakistan Air Force to bomb militant positions in North Waziristan, using both unguided munitions and guided missiles for precision strike capability. The air frame is of semi-monocoque structure constructed primarily of aluminum alloys. High strength steel and titanium alloys are partially adopted in some critical areas. The air frame is designed for a service life of 4,000 flight hours or 25 years, the first overhaul being due at 1,200 flight hours. Block 2 JF-17s incorporate greater use of composite materials in the air frame to reduce weight. The retractable undercarriage has a tricycle arrangement with a single steerable nose-wheel and two main undercarriages. The hydraulic brakes have an automatic anti-skid system. The position and shape of the inlets is designed to give the required airflow to the jet engine during maneuvers involving high angles of attack. The mid-mounted wings are of cropped-delta configuration. Near the wing root are the LERX, which generate a vortex that provides extra lift to the wing at high angles of attack encountered during combat maneuvers. A conventional tri-plane empennage arrangement is incorporated, with all-moving stabilators, single vertical stabiliser, rudder, and twin ventral fins. The flight control system (FCS) comprises conventional controls with stability augmentation in the yaw and roll axis and a digital fly-by-wire (FBW) system in the pitch axis. The leading edge slats/flaps and trailing edge flaps are automatically adjusted during manoeuvring to increase turning performance. The FCS of serial production aircraft reportedly have a digital quadruplex (quad-redundant) FBW system in the pitch axis and a duplex (dual-redundant) FBW system in the roll and yaw axis. The glass cockpit is covered by a transparent, acrylic canopy that provides the pilot with a good, all-round field of view. It has three large Multifunction Colour Displays (MFD) and smart Heads-Up Display (HUD) with built-in symbol generation capability. A centre stick is used for pitch and roll control while rudder pedals control yaw. A throttle is located to the left of the pilot. The cockpit incorporates hands-on-throttle-and-stick (HOTAS) controls. The pilot sits on a Martin-Baker Mk-16LE zero-zero ejection seat. The cockpit incorporates an electronic flight instrument system (EFIS) and a wide-angle, holographic head-up display (HUD), which has a minimum total field of view of 25 degrees. The EFIS comprises three colour multi-function displays, providing basic flight information, tactical information, and information on the engine, fuel, electrical, hydraulics, flight control, and environment control systems. The HUD and MFD can be configured to show any available information. Each MFD is 20.3 cm (8.0 in) wide and 30.5 cm (12.0 in) tall and is arranged side by side in portrait orientation. The central MFD is placed lowest to accommodate a control panel between it and the HUD. Up to 3,629 kg (8,001 lb) of ordnance, equipment, and fuel can be mounted under the hard points, two of which are on the wing-tips, four are under the wings and one is under the fuselage.

An-2 (Colt) Russian Single-Engine Biplane







Tiers:



Variants:

- **Soviet / Polish production:** Izdeliye F – The in-house designation for the An-2NAK observation aircraft which was later re-designated An-2K and/or An-2F. Izdeliye K – A prototype weather reconnaissance/research aircraft with an observers cockpit immediately forward of the fin above the rear fuselage. First flown on 21 March 1948 'Izdeliye K' was found to be under-powered and unable to carry out its intended mission at high altitude, the aircraft was abandoned after a landing accident in October 1948. The concept was resurrected in 1954 as the 'An-2ZA' / 'An-6 Meteo'. Izdeliye T – The original design concept originated at OKB-153 in Novosibirsk. Izdeliye Sh – The in-house designation for the 'Izdeliye T' (presumably to confuse spies or infiltrators) design project at Novosibirsk. SKh-1 – the original designation of the An-2 used during the design phase of the project before the OKB had been named after Antonov. An-2A – Developed from the An-2A for use as a Balloon interceptor to intercept reconnaissance balloons from, US intelligence assets, over-flying the USSR. The prototype was converted from a Kiev built An-2 (c/n 110347315) using the Turbo-charged Ash-62IR/TK of the 'An-6 Meteo' and a combined searchlight/gun turret mounted on top of the rear fuselage, which mounted either a single Gryazev-Shipunov GSh-23 23 mm calibre twin-barrelled cannon or a single Afanas'yev A-12.7 12.7 mm calibre heavy machine-gun. An-2E (Ekranoplan – wing in ground effect) (first use of the designation) – One of a series of projects from the early 1970s for WIG (Wing In Ground effect) derivatives of the An-2, designed at the TsLST (Tsentral'naya Laboratoriya Spasatel'noy Techniki – central laboratory for new types of rescue equipment). An-2E (second use of the designation) – An Ekranoplan conversion (Russian: Ан-2Э) of an An-2P (RA-84692). The fuselage was retained and a large trapezoidal monoplane wing having extended wingtips with approx 45° dihedral, attached to the lower wing attachment points. The prototype conversion was intended to be a floatplane; however, its first public appearance was as a landplane with the standard An-2 undercarriage. Jointly developed by the Moscow Aviation Institute, MARZ (Moskovskiy Aviaremontnyy Zavod – Moscow Aircraft Overhaul Plant) and The TSZP-Saturn research institute the An-2E was also known as EA-00078. Power was supplied by the standard ASh-62IR radial engine with AV-2 propeller, but production versions were intended to be powered by automotive diesel engines of around 430 kilowatts (580 hp). An-2F – Developed concurrently with the An-2 prototype, 'Izdeliye F' was an experimental artillery-observation aircraft with a twin-tail, ventral observer's position and dorsal defensive machine-gun position. The initial service designation of An-2NAK was changed to An-2F once post test flight modifications had been carried out. Two prototypes were built, with the first completed in the summer of 1948, but flight testing was delayed to April 1949 due to the need to incorporate modifications called up from the standard An-2 flight test programme. The flight test of the An-2F showed that the aircraft met all the requirements of the specification, but helicopters were demonstrating that they could perform the artillery correction role without the need to provide fixed base airstrip for them to operate from, thus the An-2F was not proceeded with and the two prototypes were retained by the Antonov bureau for hack duties with one later serving as a flying wind tunnel to investigate para-dropping from the Antonov An-8 twin-turboprop transport. An-2F (second use of designation) – A VTOL project with vertical thrust to be provided by a Mikulin AM-9 turbojet in the rear fuselage. An-2F (third use of the designation) – A proposed photo-mapping aircraft project, from the early 1990s, similar to the An-2PF

equipped with one of five alternate cameras. Overall control was to have been by IBM 286 computer and the camera could be augmented or replaced by a thermal imaging system, Infra-Red imaging system, AP-6E autopilot,LDI-3 laser rangefinder and/or a GPS global positioning system. An-2G (a.k.a. An-2Geo) – During 1974 WSK-Mielec developed a geo-physical survey aircraft for the Polish State Geophysical Survey Agency (Państwowe Przedsiębiorstwo Poszukiwań Geofizycznych), with equipment for measuring magnetic fields, radiation and other instruments for prospecting. Adapted to fly in tropical latitudes at low altitude the 'An-2G' could fly for six hours and two were used for survey work in Nigeria in 1974. An-2L (Lesozashchita – forestry protection) – A fire bomber variant with three cassettes each holding 120 ampoules, containing 1litre (34 fl.oz.) of fire-retardant which were dropped as required. Trials revealed that this system was inefficient and further work was abandoned. An-2LL (Letayuschaya Laboratoriya – flying laboratory) – Any of a number of An-2s used as testbeds for various equipment. One An-2SKh (RA-70547), modified by the State Research Institute of Aircraft Systems. (GosNII AS – Gosudarstvennyy Nauchno-Issledovatel'skiy Institut Aviatsionnykh Sistem), for environmental research, had a lateral observation blister which has often caused the aircraft to be misidentified as an An-2PF. An-2LP (Lesopozharnyy – forest firefighter) – A single prototype converted from an An-2V floatplane, with 630 litre(139 Imp.Gal.) water tanks in each float for dropping on fires. The water tanks could be re-filled in flight, as the aircraft skimmed the surface of suitable bodies of water. Prior to dropping an alkaline wetting agent (NP-1 Sulphanol) was added to the water which was released through the scoops which also picked up the water to refill the tanks. Ten production aircraft were built seeing service in the Siberian and Far East regions of the USSR. An-2LV (Lesnoj Vodnyj – forest hydroplane) – A firefighting waterbomber. An-2M (Polish:[samolot] Morski – seaplane) – Polish production of the An-2V floatplane, designated An-2M, (not to be confused with the Soviet designation An-2M). Also known as the An-2W. An-2M (Modifitsirovannyy – modified) – The designation An-2M was also used in the USSR for a much improved agricultural crop-sprayer/duster. The An-2M featured an all-duralumin welded and bonded fuselage, lockable tailwheel, enlarged fibre-glass hopper, Shvetsov ASh-62 radial engine with power take off to an auxiliary gearbox to drive the dusting/sprayignequipment, an angular fin of increased area and a hermetically sealed cockpit with no access to the cabin/hopper area. The hopper capacity was increased 42% to 2,000 litres (440 Imp.gal.) delivering product through an outlet enlarged to 400 mm (15 1⁄2 in) with dry product being fed to two dusting outlets at the tips of the lower wings. Due to lack of capacity at the Kiev factory and WSK-Mielec the An-2M was manufactured at DMZ N0.464 (Dolgoproodnyy Machinery Factory No.464) to the north of Moscow. An-2P (Polish: Pasażerski – passenger) (Russian: Passazhirskiy – passenger) – Soviet and Polish production of a standard passenger variant. Soviet production An-2P's had 10 permanently installed seats in a heated insulated cabin. Polish production aircraft had 12–14 seats, two jump seats for children and a baby cot. A total of 837 An-2P's were built. An-2P (Protivopozharnij – fire-fighting with water) – A fire-fighting aircraft with a dumpable hopper filled with water and/or retardant. An-2PD-5 (Polish: Pasażerski [samolot] Dyspozycyjny – executive aircraft's) – The production version of the 'An-2PD-6', featuring almost identical interior furnishings with a work table and reading light replacing one of the chairs. An-2PD-6 (Polish: Pasażerski [samolot] Dyspozycyjny – executive aircraft's) – A prototype six seat VIP variant of the An-2P produced at WSK-Mielec in 1970, featuring a folding table, mini-bar, pantry and toilet. An-2PF – Soviet production An-2 aircraft configured for photo-mapping/survey tasks with camera hatches protected by sliding hatches on the undersurface of the fuselage. An-2PF – A joint request from the Polish State mapping Agency (Państwowe Przedsiębiorstwo Kartografii) led to Polish production of eight 'An-2PF' aircraft configured for photo-mapping/survey tasks with camera hatches protected by sliding hatches on the undersurface of the fuselage. An-2PK – A polar research aircraft developed by WSK-Mielec with heated skis, insulated cabin and an additional cabin heater. An-2PRTV – A single Polish production An-2, (SP-TVN, c/n1G 15944), modified as a television broadcast relay aircraft for the Polish Radio and Television Co. (Polskie Radio i Telewizja). An-2R (Polish: Rolniczy – agricultural) – WSK-Mielec manufactured agricultural variant with tank for 1.300 kg of liquid or powdered chemicals. An-2RA – A projected up-graded Agriculural aircraft, based on the An-2R, developed at WSK-Mielec. An-2RT (ReTranslyator – relay installation) – A single An-2 was converted to a telemetry relay station, for missile development work, relaying telemetry from test missiles to a ground station. An-2TPS (Transportno-Passazhirskiy Sanitarnyy – cargo/passenger medical) – Polish production of ambulance aircraft derived from An-2TP aircraft with three stretchers each side and two medical attendants. An-2S (Sanitarnyy – medical) – The An-2S was an adaptation of the standard An-2T cargo plane with up to six stretcher patients or three stretchers and six walking wounded along with attendants and support equipment. An-2SKh (Sel'skoKhozyaistvennyy – agricultural) – The agricultural version optimised for crop-spraying and crop-dusting. A metal construction chemical hopper was installed in the cabin near the centre of gravity, feeding a spreader through a 300mm orifice. The original spreader was replaced in 1975 by a standardised RTSh-1 three channel spreader which increased distribution width from 18–22 m (59–72 ft) to 34–36 m (112–118 ft). Liquid chemicals could be sprayed using an interchangeable system which delivered chemical to spraybars via a ram air turbine driven regulator pump to give coverage 30 m (98 ft) wide. Powdered or granulated chemicals were loaded through a hatch in the roof of the cabin and liquid chemical through a special connector on the port side of the fuselage. Early An-2SKh's were typically limited to a 6,000-hour life, as opposed to a normal life of 12,000 hours, due to the corrosive effects of the chemicals. The introduction of epoxy based corrosion protection systems partly alleviated the situation, allowing the agricultural An-2s to continue flying for much longer. Five An-2SKh aircraft were converted to firefighters, from 1954, by pressurising the hopper filled with water and/or retardant and ejecting it from a nozzle in place of the dusting/spraying equipment, single aircraft were allocated to Civil Air Directorates across the country but proved relatively ineffectual. An-2T (Transportno – cargo) – The baseline first production model for cargo and mail carriage. An-2TP (Transportno-Passazhirskiy – cargo/passenger) – A convertible passenger/cargo version, with tip-up seats for ten, released in 1949. An-2TD (Transportno-Desantnyy – cargo/paratrooper) – paratrooper version with 12 seats, static line attachment cables and drop signalling lights. An-2V (Vodnyy – water-based) – A seaplane version of the

baseline An-2 fitted with twin floats supported on wire-braced struts at the undercarriage attachment points and rear fuselage. Floatplane An-2s manufactured in Kiev were designated An-4 but there is little evidence that this designation was widely used. At least one An-2V. AN-2V Video An-2V (Vysotnyy – high altitude) – Six aircraft were built, at the Kiev factory, as weather reconnaissance An-2V's for use at high altitude. Powered by the ASh-62IR/TK turbo-charged engine, they differed from the 'An-6 Meteo' by not having the observers cockpit forward of the fin.

System

Alternate Designation(s): Antonov An-2 (Colt); Type 22

Primary Function / Type: Single-engine biplane utility/agricultural aircraft

Manufacturer: Antonov

Crew: 1-2

Number of Engines: 1

Dimensions

Length: 12.4 m

Upper Wingspan: 18.2 m

Lower Wingspan: 14.2 m

Height: 4.1 m

Wing Area: 71.52 m2 (769.8 sq ft)

Airfoil: TsAGI R-11 (14%)

Empty Weight: 3,300 kg

Gross Weight: 5,440 kg

Fuel Capacity: 1,200 l (320 US gal; 260 imp gal)

Automotive

Engine Name: 1 × Shvetsov ASh-62IR

Number of Engines: 1

Engine Type: 9-cylinder air-cooled supercharge radial piston engine

Engine Power: 1,010 hp

Maximum Range: 845 km (525 mi, 456 nmi)

Maximum Speed: 258 km/h (160 mph, 139 kn)

Cruise Speed: 190 km/h (120 mph, 100 kn)

Stall Speed: 50 km/h (31 mph, 27 kn) circa

Service Ceiling: 4,500 m (14,800 ft)

Rate of Climb: 3.5 m/s (690 ft/min)

Fuel Consumption: 185–200 l/h (49–53 gal/h; 41–44 imp gal/h)

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Antonov An-2 (Russian nickname: "Annushka" or "Annie"; "kukuruznik"—corn crop duster; USAF/DoD reporting name Type 22, NATO reporting name Colt) is a Soviet mass-produced single-engine biplane utility/agricultural aircraft designed and manufactured by the Antonov Design Bureau beginning in 1946. Its remarkable durability, high lifting power, and ability to take off and land from poor runways have given it a long service life. The An-2 was produced up to 2001 and remains in service with military and civilian operators around the world. The An-2 was designed as a utility aircraft for use in forestry and agriculture. However, the basic airframe is highly adaptable and numerous variants of the type have been developed; these include hopper-equipped versions for crop-dusting, scientific versions for atmospheric sampling, water-bombers for fighting forest-fires, flying ambulances, float-equipped seaplane versions and lightly armed combat versions for dropping paratroops. The most common version is the An-2T 12-seater passenger aircraft. All versions (other than the An-3) are powered by a 750 kW (1,010 hp) nine-cylinder Shvetsov ASh-62 radial engine, which was developed from the Wright R-1820. The An-2 typically consumes 2.5 l/min (0.66 US gal/min; 0.55 imp gal/min). The Antonov An-2 is a mass-produced single-engine biplane that has been commonly used as a utility and agricultural aircraft. It is deliberately furnished with a minimum of complex systems. The crucial wing leading edge slats that give the aircraft its slow flight ability are fully automatic, being held closed by the airflow over the wings. Once the airspeed drops below 64 km/h (40 mph), the slats will extend because they are on elastic rubber springs. Under typical conditions, the take-off is complete within 170 m (560 ft) while the landing run requires 215 m (705 ft); these figures will vary dependent upon various factors, such as the aircraft's take-off/landing weight, the external air temperature, surface roughness, and headwind. The An-2 is equipped with various design features which make it suitable for operation in remote areas with unsurfaced airstrips. It is fitted with a pneumatic brake system (similar to those used on heavy road vehicles) to stop on short runways, along with an air line attached to the compressor, so the pressure in the tires and shock absorbers can be adjusted without the need for installing specialised equipment. The batteries, while sizable, are relatively easy to remove, so the aircraft does not need a ground power unit to supply power for starting the engine. Likewise, there is no need for an external fuel pump to refuel the aircraft as it is provided with an inbuilt onboard pump, which allows the tanks to be filled from simple fuel drums. The An-2 has no stall speed, a fact which is quoted in the operating handbook. A note from the pilot's handbook reads: "If the engine quits in instrument conditions or at night, the pilot should pull the control column full aft and keep the wings level. The leading-edge slats will snap out at about 64 km/h (40 mph) and when the airplane slows to a forward speed of about 40 km/h (25 mph), the airplane will sink at about a parachute descent rate until the aircraft hits the ground." As such, pilots of the An-2 have stated that they are capable of flying the aircraft in full control at 48 km/h (30 mph) (as a contrast, a modern Cessna four-seater light aircraft has a stall speed of around 80 km/h (50 mph)). This slow stall speed makes it possible for the aircraft to fly backwards relative to the ground (if the aircraft is pointed into a headwind of roughly 56 km/h (35 mph), it will travel backwards at 8.0 km/h (5 mph) whilst under full control). The An-2's ability, looks and flying characteristics, and its status as one of the world's biggest single-engined production biplanes, mean that demand for the An-2 is increasing in Western Europe and the United States, where they are prized by collectors of classic aircraft, making it an increasingly common sight at airshows. Many western countries prohibit the use of the An-2 commercially because the aircraft has not been certified by the relevant national aviation authorities. These restrictions vary by country, but all prevent the An-2 being used for any 'for profit' purpose, with the exception of the United States, where An-2s imported since 1993 are limited to experimental certification, but PZL-built An-2s are exempt from this restriction due to a bilateral agreement with Poland.

Su-30MKK (Flanker-G) Russian Multirole Fighter Aircraft



Tiers:



Variants:

- **Su-30MK:** Commercial version of Su-30M first revealed in 1993. Export versions include navigation and communication equipment from Hindustan Aeronautics Limited.
- **Su-30MKI:** MKI for Modernizirovannyi Kommercheskiy Indiski - "Modernized Commercial Indian". An export version for India, jointly developed with Hindustan Aeronautics Limited (HAL). It is the first Su-30 family member to feature thrust vectoring control (TVC) and canards. Equipped with a multinational avionics complex sourced from Russia, India, France and Israel
- **Su-30MKA:** A version of the Su-30MKI, except with French and Russian avionics for Algeria.
- **Su-30MKM:** A derivative of the Russian-Indian Su-30MKI, the MKM is a highly specialised version for Royal Malaysian Air Force. It includes thrust vectoring control (TVC) and canards but with avionics from various countries. It will feature head-up displays (HUD), navigational forward-looking IR system (NAVFLIR) and Damocles Laser Designation pod (LDP) from Thales Group of France, MAW-300 missile approach warning sensor (MAWS), RWS-50 RWR and laser warning sensor (LWS) from SAAB AVITRONICS (South Africa) as well as the Russian NIIP N011M Bars Passive electronically scanned array radar, electronic warfare (EW) system, optical-location system (OLS) and a glass cockpit.
- **Su-30SM:** SM for Serijnyi Modernizirovannyi - "Serial Modernized". A specialised version of the thrust-vectoring Su-30MKI for the Russian Air Force, produced by the Irkut Corporation.
- **Su-30MKK:** MKK for Modernizirovanniy Kommercheskiy Kitayskiy - "Modernized Commercial for China". An export version for China. NATO reporting name Flanker-G
- **Su-30MK2:** Modernized Su-30MKK for China, Indonesia and Uganda with advanced avionics and weapons.
- **Su-30MK2V:** Su-30MK2 variant for Vietnam with minor modifications.
- **Su-30MKV:** Export version of Su-30MK2 for Venezuela.
- **Su-30M2:** A Su-30MK2 version developed by KnAAPO. The Russian Air Force placed an initial order for the variant in 2009. Factory tests were completed in September 2010. Twenty aircraft have been ordered; 4 in 2009 and 16 in 2012. At least 12 have been produced as of August 2014, all four from the first contract in 2009, and eight from the second contract of 2012. They are mostly to be used as combat training aircraft for Su-30SM and Su-35S fighters.
- **Su-30MK3:** A proposed version with Phazotron Zhuk-MSF radar.

System

Alternative Designations: Su-30MKK
Description: Multirole Fighter Aircraft
Crew: 2

Manufacturer: Sukhoi

Dimensions

Length: 21.9 m

Wingspan: 14.7 m

Height: 6.36 m

Gross Weight: 24,900 kg

Max Takeoff Weight: 34,500 kg

Automotive

Engine Name: 2 × Lyulka AL-31F afterburning turbofan engines

Engine Power: 123 kN (28,000 lbf) with afterburner

Maximum Speed: Mach 2

Range: 3,000 km

Service Ceiling: 17,300 m

G Limits: +9g

Rate of Climb: 5.083 m/s

Take-Off Run: 550 m

Fuel Capacity: In addition to the newly added fuel tanks in the rudders capacity totaling 280 kg, there are four main fuel tanks. No. 1 tank with capacity totaling 3,150 kg is in the front, No. 2 tank with capacity totaling 4,150 kg is in the middle, No. 3 tank with capacity totaling 1,053 kg is in the rear, and No. 4 tank with capacity totaling 1,552 kg is located in the wings. During aerial refueling, the maximum capacity of Su-30MKK is receiving up to 2,300 liters per minute. The altitude of refueling is limited to 2 km to 6 km, and the speed is limited to 450–550 km/h. Aerial refueling probe is located in front of cockpit on the left, and the design is capable of night refueling.

Communications

Note: The encrypted VHF/UHF communication radio of Su-30MKK has a maximum range in excess of 400 km, while the encrypted HF communication radio of Su-30MKK has a maximum range in excess of 1,500 km, and all can be used for both air-to-air or air-to-ground two-way communications. Su-30MKK is the first of Flanker family to be equipped with TKS-2 C3 system, which is capable of simultaneously commanding and controlling up to 15 aircraft with such system, and the air-to-air missiles launched by these aircraft. According to the developer of the system, Russkaya Avionika JSC, the encrypted two-way communication Command, control, and communications system can be either commanded or controlled by ground stations, or act as the command/control center for other aircraft. The system is claimed by the Russian developer as a huge leap forward in comparison to the similar rudimentary system on Su-27, which is only capable of one way communication. The new system is also the first among Russian system that is capable of forming a local area network like similar system on American Grumman F-14 Tomcat.

Gun Weapon System

↳*System*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: mm30

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: INA

Rocket Weapon System

Note: Various unguided rockets

Missile Weapon Systems

↳*Missile Weapon System #1*

Name: R-27

Type: Air-to-Air Missile

Manufacturer: Vympel

Length: 4.08 m

Diameter: 230 mm

Wingspan: 772 mm

Weight: 253 kg

Warhead Type: blast/fragmentation, or continuous rod

Warhead Weight: 39 kg

Detonation Mechanism: radar-proximity and impact fuzes

Engine: High performance, w. directed-rocket motor Solid-fuel rocket motor

Operational Range: up to 40 km

Flight Altitude: INA

Maximum Speed: Mach 4.5

Guidance System: semi-active radar homing (A/C), active-radar-homing (R-27EA), infrared homing (B/D), passive radar

(E/F)

↳*Missile Weapon System #2*

Name: R-77

Type: Air-to-Air Missile

Manufacturer: Vympel

Length: 3.6 m

Diameter: 200 mm

Wingspan: 700 mm

Weight: 175 kg

Warhead Type: HE fragmenting

Warhead Weight: 22.5 kg

Detonation Mechanism: laser proximity fuse

Engine: Solid fuel rocket motor

Operational Range: 80–100 km

Flight Altitude: 5–25 km

Maximum Speed: Mach 4

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

↳*Missile Weapon System #3*

Name: Kh-29

Type: Air-to-Surface Missile

Manufacturer: Vympel / Tactical Missiles Corporation

Length: 390 cm

Diameter: 38.0 cm

Wingspan: 110 cm

Weight: 660 kg

Warhead Type: HE armour-piercing

Warhead Weight: 320 kg

Detonation Mechanism: Impact

Engine: Fixed thrust solid fuel rocket

Operational Range: 10 km

Maximum Speed: 1,470 km/h

Guidance System: semi-active laser guidance

Bombs Weapon Systems

Bomb Weapon System #1

Name: KAB-500L

Type: Laser-Guided Bomb

Length: 3.05 m

Diameter: INA

Weight: Its warhead makes up 450 kg (990 lb) of the total weight, of which roughly 50% is blast-effect high explosive.

Warhead Type: INA

Warhead Weight: 450 kg

Guidance Sytem: semi-active laser seeker and guidance fins, turning it into an unpowered guided bomb.

CEP: 7 meters

↳*Bomb Weapon System #2*

Name: KAB-1500L

Type: Precision Guided Bomb

Manufacturer: Tactical Missiles Corporation

Length: 4,280 mm

Diameter: 820 mm

Wingspan: 0.58 m

Weight: about 1500 kg

Warhead Type: high explosive (LG-F-E), penetrating (LG-Pr-E), fuel-air (LG-OD-E)

Warhead Weight: INA

Flight Ceiling: 8-10 km

Guidance System: Laser-guided

Accuracy: 4 to 7 m

Avionics

Electronic Warhare System: Russian sources have claimed that the electronic warfare systems of Su-30MKK utilizes the latest technologies available in Russia and the radar warning receivers are so effective that the information provided by RWR alone would be enough to provide targeting information for Kh-31P anti-radiation missile without using other detection systems on board, though information can also be provided by L-150 ELINT system, which can be used in conjunction with Kh-31P. The maximum range of the RWR is termed at several hundred kilometers, and based on the 200 km maximum range of the Kh-31P anti-radiation missile, the maximum should be at least that much. The threat information obtained from RWRs can be either provided on the LCD MFDs (showing the most dangerous four targets) for the pilot in the manual mode, or be used automatically. The active jamming pods are mounted on the wing tips, and the APP-50 decoy launcher is mounted near the tail cone with 96 decoys of different kinds. Domestic Chinese electronic warfare systems including BM/KG300G and KZ900 can also be carried after modification of onboard system, but such modification was neither part of the original deal nor the upgrade deal with Russians, instead, this was implemented indigenously by Chinese themselves during the incremental upgrades.

Flight Control: The fly by wire (FBW) control with quadruple redundancy designed by Russkaya Avionika is the same system used for the Su-30MKI. Russian sources have confirmed the claims of domestic Chinese sources that an indigenous Chinese system developed is near its completion and it will be used to replace the original Russian system. However, this has yet to be confirmed by western sources and official Chinese governmental sources, which only acknowledged in the 6th Zhuhai Airshow that domestic fly-by-wire (FBW) control with quadruple redundancy is developed to accommodate domestic engines, but nothing was mentioned about whether the domestic system and engines would be used on future Su-30MKK

↳

upgrades.

Flight Instruments: The Su-30MKK features a glass cockpit of Russkaya Avionika JSC, with each pilot having two large multi-function displays, rear pilot displays arranged in a rather unconventional way: one atop of the other. Two 178 mm × 127 mm (7.0 in × 5.0 in) MFI-9 colour LCD MFDs are located in the front seat, a single MFI-9 and a 204 mm × 152 mm (8.0 in × 6.0 in) MFI-10 color LCD MFDs are located in the rear seat. The head-up display (HUD) is also developed by Russkaya Avonika JSC, designated as SILS-30.

Helmet Mounted Sight: The original ASP-PVD-21 series helmet mounted sight (HMS) with only limited field of view (FoV) was replaced by more advanced Sura-K HMS system, but Chinese have been replacing the Russian HMS with more advanced domestic system. Publicized photos and video clips from the official Chinese governmental sources such as CCTV-7 in 2007 and PLA pictorial magazine have confirmed the western claims of Chinese is replacing the original Russian helmet mounted sights (HMS) with more capable domestic ones.

Mission Computer: The new mission computer was jointly developed by the Russian National Aeronautical System Science Research Academy and Russkaya Avionika JSC, designated as MVK, capable of performing ten billion FLOPS. All avionics on board is built to MIL-STD-1553 standard. There are four computers based on Baguet-55 series processor, one for central avionics control, two for information display, and one for fire control.

Navigation: The integrated navigational systems designated as PNS-10, incorporating the A737 subsystem. The system is capable of utilizing both the GPS and GLONASS, but it is rumored that Chinese is developing a similar system to add the capability to utilize domestic BeiDou Navigation Satellite System

Airborne Radar: Airborne radar on board Su-30MKK has been continuously upgraded and a total of three were confirmed so far, all of which are controlled by the RLPK-27VE integrated radar targeting system, developed from the RLPK-27 system of the single seat Su-27. Both systems are designed by Viktor Grishin of the Tikhomirov Scientific Research Institute of Instrument Design (NIIP), and is compatible with various radar and weaponry systems. N001VEP radar: The first 20 Su-30MKK have an N001VEP Passive electronically scanned array (PESA) fire-control radar by the Chief designer Viktor Grishin of the Tikhomirov Scientific Research Institute of Instrument Design (NIIP) with a range up to 100 km, able to concurrently track 10 targets, and engage four air targets or two ground targets of the 10 tracked. The N001VEP is developed from the earlier N001VE radar designed by the same designer, which was used on the Chinese J-11A. The original Baguet series processor of the N001VE radar is replaced by its successor Baguet-55 series. Like its predecessor, the new radar has incorporated the moving target indication (MTI) and mapping capabilities, and the capability to detect low flying or hovering helicopters. The scan sector of it is 120 degrees while the elevation is 110 degrees. Zhuk (radar)-MS radar: From the 21st Su-30MKK on, the N001VEP radar is replaced by the Zhuk-MS (Beetle-MS) fire control radar of Tikhomirov (NIIP)'s competitor, Phazotron (NIIR), which also adopts a slotted planar array antenna like N001VEP radar. The new radar has longer range coverage (up to 150 km) and is able to guide a greater variety of weapons systems. The number of targets that can be engaged is identical to that of the N001VEP radar, but the number that can be simultaneously tracked has been doubled to 20. The Zhuk (Beetle)-MS radar is an improvement of the earlier Zhuk (Beetle) radar designed for Su-27 and MiG-29 upgrades, and in comparison to the original Zhuk radar, the Zhuk-MS has the following improvements in addition to increased range and number of targets tracked/engaged: The antenna diameter is increased to 960 mm from the original 680 mm of Zhuk (Beetle) radar The peak power is increased to 6 kW from the original 5 kW of Zhuk (Beetle) radar The average power is increased to 1.5 kW from the original 1 kW of Zhuk (Beetle) radar Contrary to many erroneous claims, Zhuk-MS is not a phased array radar, but a slotted planar array antenna. Zhuk-MSE radar: The Zhuk-MS has been replaced by its successor, Zhuk-MSE in the incremental upgrades of Su-30MKK, and previous Zhuk-MS are being upgraded to the Zhuk-MSE level. In comparison to the predecessor most performance parameters remain the same, but the number of ground targets that can be simultaneously engaged is increased to four from the original two. Like Zhuk-MS, this radar has also been erroneously reported to be a phased array radar when in fact, it utilizes a slotted planar array antenna. The designer Phazotron has claimed the new radar has better ECCM capabilities than earlier models.

FIre Control System: The fire control system on board integrates the radar, optronics, helmet-mounted sight, electronic warfare gears including radar warning receivers, and data links. The system consists of two subsystems: the SUV-VEP air-to-air subsystem and the SUV-P air-to-ground subsystem. SUV-VEP: this air-to-air subsystem is capable of controlling six air-to-air missiles, which is greater than the maximum number of targets the airborne radar on board Su-30MKK can simultaneously engage, thus leaving rooms for radar improvement, which would be later exploited when the new passive electronically scanned array radars have been installed on Su-30MK2. The SUV-VEP subsystem is also capable of controlling air-to-sea missions, and the fire control of Kh-31A and Kh-35 anti-ship missiles are usually provided by SUV-VEP air-to-air subsystem instead of SUV-P air-to-ground subsystem. The subsystem of SUV-VEP system includes four major portions: SEI-31-10 Integrated Display system: Used to control LCD MFDs. OEPS-30 optronic (electro-optical) detection system: Chinese call this system optronic radar system, and it consists of two major components: OLS-30 (52Sh) Infra-red search and track weighing 200 kg includes laser and IR sensors. In comparison to its predecessor OLS-27 (Izdeliye 36Sh) on Su-27, the IR detection range nearly doubled to > 90 km from the original 50 km. The range of laser range finder is increased to > 10 km from the original 6 km. Sura-K helmet mounted system (HMS): The field of view (FoV) is greatly increased to +/- 60 degrees in comparison to the +/- 8 degrees of the ASP-PVD-21 HMS originally used on Su-27. IFF and airborne radar are also controlled by SUV-VEP system. SUV-P: this air-to-ground subsystem utilizes identical hardware of SUV-VEP air-to-air

subsystem, but with a different processing requirement. This subsystem is mainly used for air-to-surface missiles such as Kh-59, and acts as an interface between the system on board the aircraft and the designated targeting pods of the air-to-surface missiles that can not be controlled directly by the onboard avionics. The primary subsystem of SUV-P system is SUO-30PK subsystem and A-737 satellite navigational subsystem. SUO-30PK weaponry control subsystem: though Kh-31 is often controlled by SUV-VEP air-to-air system, it can also be controlled via SUV-P system via SUO-30PK subsystem, which can also control L-150 ELINT system. SUO-30PK system also controls other missiles such as Kh-59, an air-to-ground missiles that is controlled via Tekon targeting system in the APK-9E pod. Other SUO-30PK subsystem is developed by Aviation Automation Design bureau at Kursk, and it can be used to control unguided air-to-ground weaponry. Both the SUV-VEP and SUV-P systems were adopted to upgrade the single seat Su-27SK in Chinese inventory, and a joint team of Tikhomirov Scientific Research Institute of Instrument Design (NIIP) and State Instrumentation Plant at Ryazan was named as the primary contractor. The modified SUV-VEP system adopted to upgrade Chinese Su-27SK was designated as SUV-VE, while the modified SUV-P system adopted to upgrade Chinese Su-27SK was designated as SUV-PE. The original analog dial indicator on flight dashboard of Su-27SK were replaced by two 6 in x 6 in MFI-10-6M and a MFIP-6 LCD MFDs. According to Russian claim, over 60 Chinese Su-27SK have been upgraded by the end of 2006.

Notes:

The Sukhoi Su-30MKK (NATO reporting name: Flanker-G) is a modification of the Sukhoi Su-30, incorporating advanced technology from the Sukhoi Su-35 variant. The Su-30MKK was developed by Sukhoi in 1997, as a result of a direct Request for tender between the Russian Federation and China. It is a heavy class, all-weather, long-range strike fighter, and like the Sukhoi Su-30, comparable to the American McDonnell Douglas F-15E Strike Eagle. Su-30MK2 is a further improvement to Su-30MKK with upgraded avionics and maritime strike capabilities. The MKK and MK2 are currently operated by the People's Liberation Army Air Force, Indonesian Air Force, Vietnam People's Air Force, Venezuelan Air Force and the Ugandan Air Force. Su-30MKK shares compatibility with Su-35 in terms of hardware, but in terms of software, Su-30MKK differs from Su-35 (Flanker-E) on a much greater scale in comparison to Indian Su-30MKI because of different mission requirements by China. The Flanker family aircraft has the problem of the reduction of maximum g-force level being decreased to 7g from the 9g at speed between Mach 0.7 to Mach 0.9, and this problem was completely solved on Su-30MKK by adopting new measures. According to the Sukhoi Design Bureau, Su-30MKK is the first of the Flanker family to achieve it after Su-35 / 37 (Flanker-E/F) and Sukhoi Su-30MKI. Higher percentage of composite material is used for Su-30MKK in comparison to the original Su-30MK. In addition, new aluminum alloy were used to replace the old type used on Su-30MK for weight reduction. The twin rudders mainly made of carbon fiber composite material were larger on Su-30MKK in comparison to that of the original Su-30MK, but contrary to what was once erroneously claimed by some western sources, Sukhoi Design Bureau revealed later that the increased space in the rudders were used for additional fuel tanks, instead of larger communication UHF antenna. The capacity of the fuel tanks in the wings is also increased. A twin nose landing gear of size 620 mm x 180 mm has replaced the single nose landing gear of size 680 mm x 260 mm used on Su-30MK to accommodate the increased weight. The maximum take-off weight and weapon load are increased to 38 tons and 12 tons respectively, but this extreme limit is often avoided by taking off at lighter weight. It was rumored that the Chinese pilots were not as experienced as Russian test pilots when operating at this extreme limits, which contributed to the crashes at least partially. The original K-36 ejection seat on Su-30MK is replaced by K-36M ejection seat for Su-30MKK.

Rafale French Multirole Fighter Aircraft





Tiers:



Variants:

- **Variants:** Rafale A Technology demonstrator, first flew in 1986. Rafale D Dassault used this designation (D for discrète) in the early 1990s to emphasise the new semi-stealthy design features. Rafale B F3-R Two-seater version for the French Air Force.[39] "It can operate with the Talios targeting pod (45 ordered by French army will delivered between 2019 and 2023)." Rafale C F3-R Same as Rafale B F3-R but Single-seat version for the French Air Force. Rafale M F3-R Same as Rafale C F3-R but Carrier-borne version for the French Naval Aviation, which entered service in 2001. For carrier operations, the M model has a strengthened airframe, longer nose gear leg to provide a more nose-up attitude, larger tailhook between the engines, and a built-in boarding ladder. Consequently, the Rafale M weighs about 500 kg (1,100 lb) more than the Rafale C. It is the only non-US fighter type cleared to operate from the decks of US carriers, using catapults and their arresting gear, as demonstrated in 2008 when six Rafales from Flottille 12F integrated into the USS Theodore Roosevelt Carrier Air Wing interoperability exercise. Rafale N Originally called the Rafale BM, was a planned missile-only two-seater version for the Aéronavale. Budgetary and technical constraints have been cited as grounds for its cancellation. Rafale R Proposed reconnaissance-oriented variant. Rafale DM Two-seater version for the Egyptian Air Force. Rafale EM Single-seat version for the Egyptian Air Force. Rafale DH Two-seater version for the Indian Air Force. Rafale EH Single-seat version for the Indian Air Force. Rafale B, C, M F4 (first step 4.1, second step 4.2) It will upgrade radar (F4.1), as well as improved capabilities in the Helmet-Mounted Display and AASM 1000 kg, OSF (long range optoelectronics system) will be receive an IRST(Infrared Search and Track) for detecting and identifying airborne stealth targets at long range (F4.1), it will be more effective in network-centric warfare, more data exchange and satellite communication and will launch small (F4.2) . It as be ordered in 2019.:All 180 French Rafale B,C,M will be upgraded to F4.1 in 2022 and F4.2 in 2027, moreover a further 30 aircraft at the full F4 standard (F4.2) will be ordered in 2023 and delivered between 2027 and 2030.

System

Alternative Designations: INA
Takeoff Run/Landing Roll (m): 400-1000/450
Max “G” Force (g): +9/-3.6
Ceiling (m): 16,765
Vertical Climb Rate (m/s): 305

↳*Date of Introduction*

M: 2001
B/C: 2006

↳*Crew*

M/C: 1

B: 2

↳***Engines***

19, 955 lbs. thrust SNECMA M-88-3 turbofans with afterburner: 2

↳***Weight (kg)***

Maximum Gross: 24,500

Maximum Takeoff: 20,000

↳***Speed (km/h)***

High-Altitude: 2,125

Low-level: 1,853

Maximum: 2,390

↳***Fuel (liters)***

Internal: 5,325

External: 6,000

↳***Range (km)***

Maximum Load: 2,110

With Aux Fuel (3 tanks): 3,520

Combat Radius: 1,882

↳***Dimensions (m)***

Length: 115.3

Wingspan: 10.9

Height: 5.4

↳***Standard Payload (kg)***

External: 9,500

↳***Hardpoints***

Rafale B/C: 14

Rafale M: 13

Survivability/Countermeasures

Martin-Baker zero/zero ejection seat: Yes

Canopy gold coated to reduce radar reflections: Yes

ARMAMENT

DEFA 791B 30-mm cannon: 1

↳*Weapon & Ammunition Types*

30-mm DFEA 791B Cannons (rnds): 300

↳*Other Loading Options*

Magic: 6

Mica: 10

Sidewinder: 6

ASRAAM: 6

AMRAAM: 5

Exocet: 4

Penguin 3: 4

Harpoon: 4

AS30L: 4

Apache: 3

Alarm: 5

Harm: 5

Maverick: 4

NOTES

Description: RAFALE IS A TWIN-JET COMBAT AIRCRAFT CAPABLE OF CARRYING OUT A WIDE RANGE OF SHORT- AND LONG-RANGE MISSIONS INCLUDING GROUND AND SEA ATTACK, AIR DEFENSE AND AIR SUPERIORITY, RECONNAISSANCE, AND HIGH-ACCURACY STRIKE OR NUCLEAR STRIKE DETERRENCE.

↳*APPEARANCE*

Notes:

The Dassault Rafale (French pronunciation: [ʁafal], literally meaning "gust of wind", and "burst of fire" in a more military sense) is a French twin-engine, canard delta wing, multirole fighter aircraft designed and built by Dassault Aviation. Equipped with a wide range of weapons, the Rafale is intended to perform air supremacy, interdiction, aerial reconnaissance, ground support, in-depth strike, anti-ship strike and nuclear deterrence missions. The Rafale is referred to as an "omnirole" aircraft by Dassault. In the late 1970s, the French Air Force and Navy were seeking to replace and consolidate their current fleets of aircraft. In order to reduce development costs and boost prospective sales, France entered into an arrangement with UK, Germany, Italy and Spain to produce an agile multi-purpose fighter, the Eurofighter Typhoon. Subsequent disagreements over workshare and differing requirements led to France's pursuit of its own development programme. Dassault built a technology demonstrator which first flew in July 1986 as part of an eight-year flight-test programme, paving the way for the go-ahead of the project. The Rafale is distinct from other European fighters of its era in that it is almost entirely built by one country, involving most of France's major defence contractors, such as Dassault, Thales and Safran. Many of the aircraft's avionics and features, such as direct voice input, the RBE2 AA active electronically scanned array (AESA) radar and the optronique secteur frontal infra-red search and track (IRST) sensor, were domestically developed and produced for the Rafale programme. Originally scheduled to enter service in 1996, the Rafale suffered significant delays due to post-Cold War budget cuts and changes in priorities. The aircraft is available in three main variants: Rafale C single-seat land-based version, Rafale B twin-seat land-based version, and Rafale M single-seat carrier-based version. Introduced in 2001, the Rafale is being produced for both the French Air Force and for carrier-based operations in the French Navy. The Rafale has been marketed for export to several countries, and was

selected for purchase by the Indian Air Force, the Egyptian Air Force, and the Qatar Air Force. The Rafale has been used in combat over Afghanistan, Libya, Mali, Iraq and Syria. Several upgrades to the weapons and avionics of the Rafale are planned to be introduced by 2018. The Rafale was developed as a modern jet fighter with a very high level of agility; Dassault chose to combine a delta wing with active close-coupled canard to maximize manoeuvrability. The aircraft is capable of withstanding from −3.6g to 9g (10.5g on Rafale solo display and a maximum of 11g can be reached in case of emergency. The Rafale is an aerodynamically unstable aircraft and uses digital fly-by-wire flight controls to artificially enforce and maintain stability.[N 2] The aircraft's canards also act to reduce the minimum landing speed to 115 knots (213 km/h; 132 mph); while in flight, airspeeds as low as 15 knots (28 km/h; 17 mph) have been observed during training missions.[64] According to simulations by Dassault, the Rafale has sufficient low speed performance to operate from STOBAR-configured aircraft carriers, and can take off using a ski-jump with no modifications. The Rafale M features a greatly reinforced undercarriage to cope with the additional stresses of naval landings, an arrestor hook, and "jump strut" nosewheel, which only extends during short takeoffs, including catapult launches. It also features a built-in ladder, carrier-based microwave landing system, and the new fin-tip Telemir system for syncing the inertial navigation system to external equipment. Altogether, the naval modifications of the Rafale M increase its weight by 500 kilograms (1,100 lb) compared to other variants. The Rafale M retains about 95 percent commonality with Air Force variants including, although unusual for carrier-based aircraft, being unable to fold its multi-spar wings to reduce storage space. The size constraints were offset by the introduction of Charles de Gaulle, France's first nuclear-powered carrier, which was considerably larger than previous carriers, Foch and Clemenceau.

Su-27SK (Flanker-B) Russian Multirole Fighter



Tiers:



Variants:

- **T10 ("Flanker-A"):** Initial prototype configuration.
- **T10S:** Improved prototype configuration, more similar to production spec.
- **P-42:** Special version built to beat climb time records. The aircraft had all armament, radar and paint removed, which reduced weight to 14,100 kg. It also had improved engines. Similar to the US F-15 Streak Eagle project. Between 1986–1988, it established and took several climb records from the Streak Eagle. Several of these records (such as time to climb to 3000m, 6000m, 9000m, 12000m) still stands current as of 2019.
- **Su-27:** Pre-production series built in small numbers with AL-31 engine.
- **Su-27S (Su-27 / "Flanker-B"):** Initial production single-seater with improved AL-31F engine. The "T10P".
- **Su-27P (Su-27 / "Flanker-B"):** Standard version but without air-to-ground weapons control system and wiring and assigned to Soviet Air Defence Forces units. Often designated Su-27 without -P.
- **Su-27UB ("Flanker-C"):** Initial production two-seat operational conversion trainer.
- **Su-27SK:** Export Su-27S single-seater. Exported to China in 1992-1996 and developed into Shenyang J-11.
- **Su-27UBK:** Export Su-27UB two-seater.
- **Su-27K (Su-33 / "Flanker-D"):** Carrier-based single-seater with folding wings, high-lift devices, and arresting gear, built in small numbers. They followed the "T10K" prototypes and demonstrators.
- **Su-27KUB (Su-33UB):** Two-seat training-and-combat version based on the Su-27K and Su-27KU, with a side-by-side seating same as Su-34. One prototype built.
- **Su-27M (Su-35/Su-37 / "Flanker-E/F"):** Improved demonstrators for an advanced single-seat multi-role Su-27S derivative. These also included a two-seat "Su-35UB" demonstrator.
- **Su-27PU (Su-30):** Two-seat version of the Su-27P interceptor, designed to support with tactical data other single-seat Su-27P, MiG-31 and other interceptor aircraft in PVO service. The model was later renamed to Su-30, and modified into a multi-role fighter mainly for export market, moving away from the original purpose of the aircraft.
- **Su-32 (Su-27IB):** Two-seat dedicated long-range strike variant with side-by-side seating in "platypus" nose. Prototype of Su-32FN and Su-34.

System

Alternate Designation(s): Su-27SK;l NATO: Flanker-B

Primary Function / Type: Multirole Fighter

Manufacturer: Sukhoi

Crew: 1

Number of Engines: 2

Number of Hard Points: 10 external pylons with a capacity of up to 4,430 kg (9,770 lb)

Dimensions

Length: 21.9 m

Width (Wing Span): 14.7 m
Height: 5.92 m
Wing Area: 62 m2
Empty Weight: 16,380 kg
Gross Weight: 23,430 kg
Maximum Takeoff Weight: 30,450 kg

Automotive

Engine Name: 2 × Saturn AL-31F afterburning turbofan engines
Number of Engines: 2
Engine Type: afterburning turbofan engines
Engine Power: 75.22 kN (16,910 lbf) thrust each dry, 122.6 kN (27,600 lbf) with afterburner
Maximum Speed: 2,500 km/h
Range, at Altitude: 3,530 km
Range, at Sea Level: 1,340 km
Service Ceiling: 19,000 m
G Limits: +9
Rate of Climb: 300 m/s
Thrust/Weight: 1.07 with 56% internal fuel; 0.91 with full fuel

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: 30mm
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

Ammunition

Type: Rifle, Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: 150 Rounds

Main Missile Systems

↳*Main Missile System #1*

Name: Vympel R-27 (AA-10 Alamo)

Type: Air-to-Air Missile

Basic Load: 6 × R-27R/ER/T/ET/P/EP air-to-air missiles

↳*Main Missile System #2*

Name: R-73E

Type: Air-to-Air Missile

Basic Load: 4 × R-73E AAMs

Rocket Weapon Systems

↳*Rocket Weapon System #1*

Name: S-8KOM

Type: HEAT Rocket

Length: 1.57 m

Diameter: INA

Weight: 11.3 kg

Warhead Weight: 3.6 kg (1.1 kg of Hecphol-5/A-IX-10 explosive)

Engine: low smoke motor with powder BN-K.

Range: 1.3 to 4 km

Velocity: 400 mm versus RHA.

Armor Penetration: Velocity 610 m/s.

↳*Rocket Weapon System #2*

Name: S-13T

Type: Tandem HEAT

Length: 2.99 m

Diameter: INA

↳

Weight: 75 kg

Warhead Weight: 21 kg and 16.3 kg (1.8 kg and 2.7 kg of explosives)

Range: 1.1 – 4 km

Velocity: Velocity 500 m/s

Armor Penetration: Combined penetration of 6 m of earth and 1 m of reinforced concrete.

Bomb Weapon Systems

↳*Bomb #1*

Name: RBK-250

Type: Cluster Bomb

Basic Load: INA

↳*Bomb #2*

Name: RBK-500

Type: Cluster Bomb

Basic Load: INA

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: Phazotron Zhuk-MSE radar

Navigation Radar: N001E radar

Targeting System: OEPS-27 electro-optical targeting system

Radar Warning Receiver: SPO-15 Radar Warning Receiver

IRST: OEPS-27 IRST

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Su-27SK Export Su-27S single-seater. Exported to China in 1992-1996 and developed into Shenyang J-11.

37 Viggen Swedish Multirole Aircraft





Tiers:



Variants:

- **AJ37:** ALL-WEATHER ATTACK AIRCRAFT WITH INTERCEPT CAPABILITY.
- **AJS37:** VIGGENS REFITTED FOR MULTI-ROLE SERVICE WITH UPGRADED CENTRAL COMPUTER AND ESM/ECM PYLON JAMMING POD DEVELOPED FOR THE JAS 39.
- **JA37::** AIR SUPERIORITY FIGHTER WITH STRIKE CAPABILITY; UPRATED RM8B ENGINE AND AVIONICS.
- **SF37::** ARMED PHOTO RECONNAISSANCE VERSION. EXTENSIVE IR AND ESM FIT INCLUDING RWR AND ELINT DATA RECORDERS. SH37: MARITIME RECONNAISSANCE/STRIKE VERSION HAS 2 SIDEWINDER AAM ON OUTER WING PYLONS.
- **SK37::** TWO-SEAT TRAINER VERSION.

System

crew: 1.0

Weight, Empty : kg12250.0

Weight, Maximum Gross : kg20500.0

Weight, Normal Takeoff : kg16000.0

↳*Dimensions*

Height : m5.6

Length : m16.3

Width, Wingspan : m10.6

↳*Fuel and Load*

Fuel Capacity, Internal : liters5700.0

Power Plant/Engine: (1)14,750 lbs. thrust Svenska Flygmotor RM8A turbofan, 25,970 lbs. thrust with afterburner:

Weight, Standard Payload, External : kg6000.0

↳*Hardpoint/Weapon*

Quantity : ea7 to 9

↳*Survivability/Countermeasures*

Type 1: Survivability/Countermeasures

Type 2: 0-75 km/hr. ejection seat.

Type 3: ECM system:

Type 4: Chaff dispenser

Type 5: Deception jammer:

Armament

↳*Mixed Ordnance 1*

Combat Load : rds7 to 9

Name: RB28 Falcon AAM

Type: AAM

↳*Mixed Ordnance 2*

Combat Load : rds7 to 9

Name: RB24 or RB74 Sidewinder

↳*Mixed Ordnance 3*

Combat Load : rds7 to 9

Name: RB75 Maverick AGM

Type: ASM

↳*Mixed Ordnance 4*

Caliber/Length : mm75.0

Combat Load : rds19.0

Type: rocket pods

↳*Mixed Ordnance 5*

Caliber/Length : mm135.0

Quantity : ea4.0

Type: 6 round rocket pods

↳*Mixed Ordnance 6*

Caliber/Length : mm30.0

Name: ADEN

Type: gun pods

↳*Mixed Ordnance 7*

Combat Load : rds2.0

Name: RB 71 Skyflash

Type: AAM

↳*Weapon 1*

Caliber/Length : mm30.0

Name: Oerlikon KCA (JA37)

Type: automatic cannon

↳*Weapon 1*

Combat Load : rds150.0

Performance

Ceiling : m18300.0

Combat Radius : kmgreater than 1000 (hi-lo-hi:; greater than 500 (lo-lo-lo)

Combat Range, with External Fuel : km2000.0

Ferry Range : km2250.0

Speed, Maximum “G” Force : g+7 g

Speed, Maximum, at altitude : km/h2135.0

Speed, Maximum, low or sea level : km/h1469.0

Takeoff Run/Landing Roll : m400/500

Vertical Climb Rate : m/s203.0

Notes:

The Sssn 37 Viggen ("Thunderbolt")[Nb 1] is a retired Swedish single-seat, single-engine, short-medium range combat aircraft. Development work on the type was initiated at Saab in 1952 and, following the selection of a radical delta wing configuration, the resulting aircraft performed its first flight on 8 February 1967 and entered service in 21 June 1971. It was the first canard design produced in quantity. The Viggen was also the most advanced[vague] fighter jet in Europe until the introduction of the Panavia Tornado into operational service in 1981. Several distinct variants of the Viggen were produced to perform the roles of strike fighter (AJ 37), aerial reconnaissance (SF 37), maritime patrol aircraft (SH 37) and a two-seat trainer (SK 37). In the late 1970s, the all-weather fighter-interceptor aircraft JA 37 variant was introduced. In November 2005, the Viggen was retired from service by the Swedish Air Force, the only operator, having been replaced by the newer Saab JAS 39 Gripen. The Viggen was powered by a single Volvo RM8 turbofan This was essentially a licence-built variant of the Pratt & Whitney JT8D engine that powered commercial airliners of the 1960s, with an afterburner added for the Viggen. The airframe also incorporated a thrust reverser to use during landings and land manoeuvres, which, combined with the aircraft having flight capabilities approaching a limited STOL-like performance, enabled operations from 500 m airstrips with minimal support. The thrust reverser could be pre-selected in the air to engage when the nose-wheel strut was compressed after touchdown via a pneumatic trigger. The requirements from the Swedish Air Force dictated Mach 2 capability at high altitude and Mach 1 at low altitude. At the same time, short-field take-off and landing performance was also required. Since the Viggen was developed initially as an attack aircraft instead of an interceptor (the Saab 35 Draken fulfilled this role), some emphasis was given to low fuel consumption at high subsonic speeds at low level for good range. With turbofan engines just emerging and indicating better fuel economy for cruise than turbojet engines, the former was favoured, since the latter were mainly limited by metallurgy development resulting from limitations in turbine temperature. Mechanical simplicity was also favoured, so the air intakes were simple D-section types with boundary layer splitter plates, while the fixed inlet had no adjustable geometry for improved pressure recovery. The disadvantage was that the required engine would be very large. In fact, at the time of introduction, it was the second largest fighter engine, with a length of 6.1 m and 1.35 m diameter; only the Tumansky R-15 was bigger. Saab had originally wanted the Rolls-Royce Medway as the Viggen's power plant. Owing to the cancellation of the Medway, the JT8D was instead chosen as the basis for modification. The RM8 became the second operational afterburning turbofan in the world, and also the first equipped with a thrust reverser. According to aviation author Christopher Chant, the RM8 has the distinction of being the first engine to be fitted with both an afterburner and a thrust reverser. It had a bypass ratio of around 1.07:1 in the RM8A, which reduced to 0.97:1 in the RM8B. The RM8A was the most powerful fighter engine in the late 1960s. The AJ, SF, SH

and SK 37 models of the Viggen had the first version of the RM8A engine with uprated internal components from the JT8D that it was based on. Thrust was 65.6 kN dry and 115.6 kN with afterburner. For the JA 37, the RM8A was developed into the RM8B, achieved by adding a third low-pressure compressor stage over the preceding model, increasing the turbine inlet temperature and fuel diffusion within the combustion chamber. Thrust is 72.1 kN dry and 125.0 kN with afterburner. Owing to the increased length and weight of the RM8B engine over its predecessor, the airframe of the JA 37 was stretched in order to accommodate it. Onboard electrical power was provided by a 60 kVA generator. In the event of an in-flight engine failure, emergency power was provided by an automatically deploying ram air turbine (RAT), capable of generating 6 kVA

Eurofighter Typhoon EF-2000 European Multirole Fighter Aircraft







Tiers:



Variants:

- **Note:** The Eurofighter is produced in single-seat and twin-seat variants. The twin-seat variant is not used operationally, but only for training, though it is combat capable. The aircraft has been manufactured in three major standards; seven Development Aircraft (DA), seven production standard Instrumented Production Aircraft (IPA) for further system development and a continuing number of Series Production Aircraft. The production aircraft are now operational with the partner nation's air forces. The Tranche 1 aircraft were produced from 2000 onwards. Aircraft capabilities are being increased incrementally, with each software upgrade resulting in a different standard, known as blocks. With the introduction of the block 5 standard, the R2 retrofit programme began to bring all Tranche 1 aircraft to that standard.

System

Alternative Designations: Typhoon
Takeoff Run (m): 300-700
Max “G” Force (g): +9/-3 g
Vertical Climb Rate (m/s): INA

↳*Engines*

13,500 lbs. thrust Eurojet EJ turbofans, 20,250 with afterburner: 2

↳*Weight (kg)*

Maximum Takeoff: 23,000
Normal Takeoff:
Empty: 9,750

Speed (km/h)

Maximum (at altitude): 2,130, Mach 2.0

↳*Fuel (liters)*

Internal:

External: 4,000

↳*Dimensions (m)*

Length: 16

Wingspan: 11

Height: 5.3

↳*Hardpoints*

Total: 13

Fuselage: 5

Wing (ea.): 4

↳*Combat Radius (km)*

Ground attack, lo-lo-lo: 601

Ground attack, hi-lo-hi: 1,389

Air defense with 3 hr. CAP: 185

AD with 10-min loiter: 1389

↳*Dimensions (m)*

Length: 16

Wingspan: 11

Height: 5.3

↳*Standard Payload (kg)*

External: 6,500

Hardpoints: 13

Fuselage: 5

Wing (ea.): 4

↳*Survivability/Countermeasures*

Martin-Baker zero/zero ejection seat: Yes

DAAS (defensive aids sub-system) with electronic countermeasures/ support measures system (ECM/ ESM): Yes

↳**Front and rear missile warning:** Yes

Supersonic capable towed decoy system: Yes

Laser warning receivers: Yes

Chaff and flare dispensing system: Yes

ARMAMENT

Internal Mauser BK 27-mm revolver cannon: Yes

↳*Weapon & Ammunition Types*

Mauser BK 27-mm revolver cannon (rnds): 150

↳*Air Superiority Packages*

BVRAAM: 6

ASRAAM: 6

↳*Air Interdiction Package*

Storm Shadow: 2

AMRAAM: 4

ASRAAM: 2

Alarm: 2

↳*Suppression of Enemy Air Defense*

Alarm: 6

AMRAAMs: 4

ASRAAM: 4

↳*Close Air Support Package*

Brimstone: 18

AMRAAMs: 4

ASRAAM: 4

↳*Maritime Attack Package*

Penguin: 6

AMRAAM: 4

ASRAAM: 2

AVIONICS/SENSOR/OPTICS

Helmet Mounted Symbology System (HMS): Yes

↳*Heads-up-display*

Flight reference data: Yes

Weapons Aiming and Cueing: Yes

FLIR Imaging: Yes

↳***Head Down Display***

Tactical Situation: Yes

System Status: Yes

Map Display: Yes

Multimode X-Pulse Doppler Radar: Yes

Infrared Search and Track System (IRST): Yes

Night / Weather Capabilities: Yes

NOTES

Description: EUROFIGHTER IS A SINGLE-SEAT, TWIN-ENGINE, AGILE COMBAT AIRCRAFT WHICH WILL BE USED IN THE AIR-TO-AIR, AIR-TO-GROUND, AND TACTICAL RECONNAISSANCE ROLES. THE DESIGN OF THE EUROFIGHTER IS OPTIMIZED FOR AIR DOMINANCE PERFORMANCE WITH HIGH INSTANTANEOUS AND SUSTAINED TURN RATES, AND SPECIFIC EXCESS POWER. SPECIAL EMPHASIS HAS BEEN PLACED ON LOW WING LOADING, HIGH THRUST TO WEIGHT RATIO, EXCELLENT ALL ROUND VISION AND CAREFREE HANDLING. THE USE OF STEALTH TECHNOLOGY IS INCORPORATED THROUGHOUT THE AIRCRAFT'S BASIC DESIGN.

Notes:

The Eurofighter Typhoon is a twin-engine, canard–delta wing, multirole fighter. The Typhoon was designed originally as an air superiority fighter and is manufactured by a consortium of Airbus, BAE Systems and Leonardo that conducts the majority of the project through a joint holding company, Eurofighter Jagdflugzeug GmbH formed in 1986. NATO Eurofighter and Tornado Management Agency manages the project and is the prime customer. The aircraft's development effectively began in 1983 with the Future European Fighter Aircraft programme, a multinational collaboration among the UK, Germany, France, Italy and Spain. Disagreements over design authority and operational requirements led France to leave the consortium to develop the Dassault Rafale independently. A technology demonstration aircraft, the British Aerospace EAP, first took flight on 6 August 1986; the first prototype of the finalised Eurofighter made its first flight on 27 March 1994. The aircraft's name, Typhoon, was adopted in September 1998; the first production contracts were also signed that year. Political issues in the partner nations significantly protracted the Typhoon's development: the sudden end of the Cold War, reduced European demand for fighter aircraft, and the debate over the aircraft's cost and work share. The Typhoon entered operational service in 2003; it has entered service with the air forces of Austria, Italy, Germany, the United Kingdom, Spain and Saudi Arabia. The air forces of Oman, Kuwait and Qatar are export customers, bringing the procurement total to 623 aircraft as of 2019. The Eurofighter Typhoon is a highly agile aircraft, designed to be a supremely effective dogfighter in combat. Later production aircraft have been increasingly better equipped to undertake air-to-surface strike missions and to be compatible with an increasing number of different armaments and equipment, including Storm Shadow and the RAF's Brimstone. The Typhoon had its combat debut during the 2011 military intervention in Libya with the UK's Royal Air Force and the Italian Air Force, performing aerial reconnaissance and ground-strike missions. The type has also taken primary responsibility for air-defence duties for the majority of customer nations. The Typhoon is a highly agile aircraft both at supersonic and at low speeds, achieved through having an intentionally relaxed stability design. It has a quadruplex digital fly-by-wire control system providing artificial stability, as manual operation alone could not compensate for the inherent instability. The fly-by-wire system is described as "carefree", and prevents the pilot from exceeding the permitted manoeuvre envelope. Roll control is primarily achieved by use of the ailerons. Pitch control is by operation of the canards and ailerons, because canards disturbs airflow to inner elevons (flaps). The yaw control is done by big single rudder. Control surfaces are moved through two independent hydraulic systems, which also supply various other items, such as the canopy, brakes and undercarriage; powered by a 4,000 psi engine-driven pumps. Engines are fed by a chin double intake ramp situated below a splitter plate. The Typhoon features lightweight construction (82% composites consisting of 70% carbon fibre composite materials and 12% glass fibre reinforced composites) with an estimated lifespan of 6,000 flying hours. The permitted lifespan, as opposed to the estimated lifespan, was 3,000 hours.

Mirage 2000 French Multirole Fighter Aircraft





Tiers:



Variants:

- **Mirage 2000C:** Upgrades include the addition of the Non-Cooperative Target Recognition (NCTR) mode to the RDI Radar to allow identification of airborne targets not responding on identification friend or foe (IFF), and the ability to carry air-to-ground stores such as rocket pods, iron bombs and cluster bombs. Some variants, especially those equipped with the RDM radar (mainly used in export models) have the capability to use the Exocet anti-ship missile.
- **Mirage 2000B:** The Mirage 2000B is a two-seat operational conversion trainer variant which first flew on 11 October 1980. The French Air Force acquired 30 Mirage 2000Bs, and all three AdA fighter wings each obtained several of them for conversion training.
- **Mirage 2000N:** The Mirage 2000N is the nuclear strike variant which was intended to carry the Air-Sol Moyenne Portée nuclear stand-off missile. The variant was retired on 21 June 2018.
- **Mirage 2000D:** The Mirage 2000D is a dedicated conventional attack variant developed from the Mirage 2000N.
- **Mirage 2000-5F:** First major upgrade over the Mirage 2000C. Replaces most cockpit displays with several large multi-function displays, and upgrading the stores-to-aircraft interface for the use of targeting pods and a wide variety of guided air-to-ground weapons, as well as a radar upgrade to provide guidance information for MICA missiles.
- **Mirage 2000-5 Mark 2:** Dassault further improved the Mirage 2000-5, creating the Mirage 2000-5 Mark 2 which is currently the most advanced variant of the Mirage 2000.
- **Mirage 2000E:** "Mirage 2000E" was a blanket designation for a series of export variants of the Mirage 2000. These aircraft were fitted the M53-P2 engine and an enhanced "RDM+" radar, and all can carry the day-only ATLIS II laser targeting pod.
- **Mirage 2000M:** The Mirage 2000M is the version purchased by Egypt. Two-seat Mirage 2000BM trainers were also ordered.
- **Mirage 2000H, 2000TH:** Designation of two-seat trainers and single-seat fighters for India. Indian Mirage 2000s have been integrated to carry the Russian R-73AE Archer missile as of 2007. The Mirage 2000TH is a twin-seat trainer version.
- **Mirage 2000I, 2000TI:** It is an Indian specific version single/twin-seater fighter for Indian Air Force similar to Mirage 2000-5 Mk2 equipped with Indian French and Israeli avionics and weapon packages. Its contract was signed in 2011 and first upgraded aircraft was delivered in 2015. Dassault aviation will upgrade initial few planes Mirage 2000H, 2000TH to 2000I, 2000TI later by Hindustan Aeronautics Limited.
- **Mirage 2000P:** Peru placed an order for 10 single-seat Mirage 2000Ps and 2 Mirage 2000DP trainers.
- **Mirage 2000-5EI:** Of the 60 Mirage 2000s Taiwan ordered in 1992, the Republic of China Air Force (ROCAF) would receive 48 single-seat Mirage 2000-5EI interceptors and 12 Mirage 2000-5DI trainers. This version of Mirage 2000-5 had the mid-air refuel ability as well as its ground attack ability deleted.
- **Mirage 2000-5EDA:** In 1994, Qatar ordered nine single-seat Mirage 2000-5EDAs and three Mirage 2000-5DDA trainers, with initial deliveries starting in late 1997.

- **Mirage 2000EAD/RAD:** In 1983, the United Arab Emirates (UAE) purchased 22 single-seat Mirage 2000EADs, 8 unique single-seat Mirage 2000RAD reconnaissance variants, and 6 Mirage 2000DAD trainers, for a total order of 36 aircraft. The Mirage 2000RAD reconnaissance variant does not have any built-in cameras or sensors, and the aircraft can still be operated in air combat or strike roles. The reconnaissance systems are implemented in pods produced by Thales and Dassault. The UAE is the only nation operating such a specialised reconnaissance variant of the Mirage 2000 at this time.[
- **Mirage 2000EG:** n March 1985, Greece ordered 30 single-seat Mirage 2000EGs and 10 Mirage 2000BG two-seat trainers, equipped with RDM radars and M53P2 engines, mainly for interception/air defence roles, although the ability to use air-to-ground armaments was retained. After the Talos modernisation project, during which variant aircraft received updated sensors and avionics, as well as new anti-ship and air-to-air weapons, and were redesignated Mirage 2000EGM
- **Mirage 2000BR:** A variant of the Mirage 2000-9 for Brazil that did not materialise.
- **Mirage 2000-9:** Mirage 2000-9 is the export variant of Mirage 2000-5 Mk.2. The UAE was the launch customer, ordering 32 new-build aircraft, comprising 20 Mirage 2000-9 single-seaters and 12 Mirage 2000-9D two-seaters. A further 30 of Abu Dhabi's older Mirage 2000s will also be upgraded to Mirage 2000-9 standard.

System

Alternate Designation(s): Mirage 2000

Primary Function / Type: Multirole fighter

Manufacturer: Dassault Aviation

In Service: 1984-Present

Crew: 1 (2 in trainer version)

Number of Engines: 1

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: 2 x 661 lb (300 kg) outboard wing pylons for various weapons and stores

Dimensions

Length: 14.36 m

Width (Wing Span): 9.13 m

Wing Area: 40.97 m sq

Height: 5.20 m

Weight, Empty: 16,534 lbs (7,500 kg) (C, E and -5) 16,755 lbs (7,616 kg) (B, N, D, S)

Payload: 6,300 kg

Takeoff, Clean: 10,860 kg

Takeoff, Air-to-Air: 13,000 kg

Takeoff, Ground-Attack: 16,200 kg

Takeoff, Max: 17,000 kg

Automotive

Engine Name: 1 x SNECMA M53-P2 after-burning turbofan or 1 x SNECMA M53-P20 (later aircraft)

Number of Engines: 1

Power, Dry: 14,462 lbs (6,560 kg) static thrust 14,991 lbs (6,800 kg) static thrust for the P20

Afterburner: 9,700 kg

Fuel Capacity: 3,978 liters

Speed, High Altitude: 2,630 km/h, Mach 2.2

Speed, Low Altitude: 1,100 km/h), assuming no afterburner, 8 x 250 kg bombs and 2 x Magic AAM or (2000N) 1 x ASMP cruise missile

Minimum Speed: 185 km/h

Brake Release: 4 min (to 49,200 ft/15,000 m and Mach 2)

Rate of Climb: 17,060 m/min

Ceiling: 18,000 m

Communications

Radio: INA

Cannon Weapon System

↳*System*

Name: DEFA 554 30mm Cannon

Type: Cannon

Caliber: 30mm

In Service: 1954-Present

Manufacturer: CASA, Dassault Aviation, Matra, AEi Systems.

Length: m1.66

Weight: kg85

Barrels: 1

Action: Five-chamber revolver

Rate of Fire: 1,300 rpm

Muzzle Velocity: m/s815

↳*Ammunition*

Type: Rifle, Cannon

Caliber: 30mm

Cartridge: 30 × 113 mm

Basic Load: 125

Weapon Stations

Capacity: 4 x 882 lb (400 kg) capacity; 2 x 3,960 lb (1,800 kg) capacity fuselage (only one in 2000-5)

Pylons: 2 x 661 lb (300 kg) outboard wing pylons for various weapons and stores

Compatible Weapons, Air-to-Air: 2-4 x R550 Magic 2; 2-4 x AIM-9 Sidewinder; 2 x Super 530; 4-6 x MICA (2000-5);

Compatible Weapons, Air-to-Ground: 2 x AS30L; 1-2 x BGL laser-guided rocket/gun pods; 4 x 18-round 68-mm rocket pods; 2 x 100-mm rocket packs; 1 x CC630 twin 30-mm cannon pack

Compatible Weapons, Bombs: 18 x 79 lb (35 kg) BAP-100 anti-runway; 18 x 551 lb (250 kg) conventional; 16 x 441 lb (200 kg) Durandal anti-runway; 5-6 x Belouga cluster; 5-6 x 882 lb (400 kg) BM 400 modular; 1-2 x 2,205 lb (1,000 kg) BGL laser-guided

Compatible Weapons, Anti-Radar: 2 x Armat

Compatible Weapons, Anti-Ship: 2 x AM 39 Exocet

Compatible Weapons, Nuclear: 1 x ASMP cruise missile (2000N)

↳*Missile System (Option 1)*

Name: R550 Magic 2

Type: Short-Range Air-to-Air Missile

Basic Load: 2-4

Manufacturer: Matra, MBDA

In Service: 1986-Present

Proliferation: Brazil India France Greece Jordan Qatar Romania Taiwan

Length: 2.75 m

Diameter: 160 mm

Span, Foreplanes: 0.47 m

Span, Tailplanes: 0.66 m

Weight: 89 kg

Warhead: pre-fragmented with controlled splintering

Warhead Weight: 13 kg

Configuration: thin cylinder with rounded nose 2 sets of cruciform foreplanes, front "cropped delta" non-steering, rear compound sweep steerable rear cruciform "cropped delta" fins mounted on slip ring and rotating freely

Propulsion: Richard single-stage butylene solid-propellant rocket

Speed: Mach 3+

Effective Range: km3

Minimum Distance to Launch: m500

Altitude: 20,000 m

Guidance System: All-aspect, cooled IR seeker proximity fuze detonation

Platforms: Attack Attack A-4 Skyhawk Alpha Jet Jaguar Mirage V Mirage F1 Sea Harrier Super Etendard Fighters F-5 Tiger MiG-21 MiG-23 Mirage III Mirage 2000 Rafale F-16 Trainers Hawk Note: Users may employ the Magic on other aircraft that are capable of firing the AIM-9 Sidewinder

↳*Missile System (Option 2)*

Name: AS-30L

Type: MCLOS with radio command link / laser guided short-to-medium range air-to-ground missile

Basic Load: 2

In Service: 1985-Present

Manufacturer: Aérospatiale

Length: 3.7 m

Diameter: mm340

Weight: kg520

Warhead Type: Impact-fuzed SAPHE (Semi-Armor-Piercing High-Explosive)

Warhead Weight: kg240

Detonation Mechanism: Delayed AP impact fuse (2 m ferroconcrete)

Engine: Two-stage solid propellant rocket motors, composite booster, double-based sustainer

Wingspan: m1

Operational Range: km3-11

Flight Ceiling: m10,000

Speed: 1,700 km/h

Guidance System: semi-active laser homing

Launch Platforms: Mirage 2000D, Mirage 2000-5, F-16, Jaguar, Mirage F1, upgraded Super Etendard, Rafale

↳*Missile System (Option 3)*

Name: AM 39 Exocet

Type: Anti-Ship Missile

Basic Load: 2

In Service: 1974-Present

Manufacturer: 1979–1999: Aérospatiale 1999–2001: Aérospatiale-Matra 2001–present: MBDA

Length: m4.69

Diameter: mm348

Wingspan: m1.10

Weight: kg655

Configuration: slim, pointed cylinder cruciform cropped and swept delta mainplanes indexed in line with small cruciform tail planes

Propulsion: 2 SNPE double-base Nitramite smokeless solid-propellant rockets 1 Dondor booster with 2 sec burn 1 Helios sustainer with 130-150 sec burn

Speed: 1,100 km/h or Mach 0.93

Maximum Range: 50-70 km

Warhead Type: Hexolite blast-fragmentation

Warhead Weight: kg165

Senors /Fire Control: "fire-and-forget" TRT AHV-7 radio altimeter inertial navigation during first part of flight Electronique Marcel Dassault ADAC or Super ADAC I/J-band active radar homing in terminal phase that begins search approximately 5.4 nm (6.2 mi.; 10 km) from target's estimated position

Fire Control / Avionics

Fire Control System Type: INA

Navigation Radar: Thomson-CST RDI pulse Doppler, or Thomson-CSF RDM multi mode, or Thomson-CSF Antilope V ground-

scan (2000N), or Thales RDY multi-mode (2000-5/-5 Mk 2/-9)

Targeting: Atlis laser designator/marked target-seeker.

Note: The Mirage 2000 is available as a single-seat or two-seat multi-role fighter. The pilot flies the aircraft by means of a centre stick and left-hand throttles, with both incorporating hands-on-throttle-and-stick (HOTAS) controls. The pilot sits on a SEM MB Mk10 zero-zero ejection seat (a license-built version of the British Martin-Baker Mark 10). The instrument panel (in the Mirage 2000 C) is dominated by a Sextant VE-130 head-up display which presents data relating to flight control, navigation, target engagement and weapon firing, and a radar screen located centrally below it.

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: Jammer 1 x Caiman noise/deception and 2 x Remora noise pods

Chaffs/Flares: INA

Notes:

The Mirage 2000 is very similar to the Mirage III/5 and 50, though it is not a variant of the Mirage III/5 or 50 but an entirely new aircraft with advanced interceptor controls. In its secondary ground-attack role, the Mirage 2000 carries laser guided missiles rockets and bombs. There is a two-seat version of this aircraft, the 2000N (Penetration) which has nuclear standoff capability. The wings are low-mounted delta with clipped tips. There is one turbofan engine mounted in the fuselage. There are semicircular air intakes alongside the fuselage forward of the wings. There is a large, single exhaust which protrudes past the tail. The fuselage is tube-shaped with a pointed nose and a bubble canopy. There are no tail flats. The fin is swept-back and tapered with a clipped tip. The Mirage 2000-5 is a multi-role single-seater or two seater fighter. It differs from its predecessors mainly in its avionics; its new multiple target air-to-ground and air-to-air firing procedures linked to the use of RDY radar and its new visualization and control system. As a multi-role combat aircraft with versatile air-to-air mission capabilities, the Mirage 2000-5 integrates the state-of-the-art of the know-how based on the experience gained from the previous Mirage 2000 versions (Mirage 2000 DA, Mirage 2000 E, Mirage 2000 D) and is designed for the most-advanced armaments. The Mirage 2000 D, derived from the Mirage 2000N operated by the French Air Force, is a two-seater air-to-ground attack aircraft. The Mirage 2000D tactical penetration two-seater fighter carries air-to-ground high precision weapons which can be fired at a safe distance, by day or by night. Its navigation and attack system enable it to fly in any weather conditions, hugging the terrain at a very low altitude. Beyond the nuclear-weapons capabilities adopted for the Mirage 2000 N, the Mirage 2000 D armament includes laser-guided weapons, low-drag bombs, and the aircraft can also carry the APACHE cruise missile. The Mirage 2000 D geometrical characteristics and the main performance data are the same as those of the Mirage 2000-5.

Su-30 Russian Multirole Fighter Aircraft





Tiers:



System

Alternative Designations: Su-27PU
Description: Multirole Fighter Aircraft
Crew Su-30MK: 3
Takeoff /Landing Roll: 550/670
Max “G” Force: g+8
Ceiling: m17,500

↳Engines

16,755 lbs. thrust Saturn AL-31F turbofans, 27,558 lbs. thrust with afterburner: 2

↳Weight

Maximum Takeoff: kg38,000
Normal Takeoff: kg24,140
Empty: kg17,900

↳Speed

Maximum (at altitude): km/h2,125, Mach 2.0
Maximum (sea level): km/h1,350

↳Fuel

Internal: liters9,400

↳Range

Unrefueled: km3,000
One refueling: km5,200
With Aux Fuel: km4,390 (SM)

Combat Radius: km1,500

↳*Dimensions*

Length: m21.9

Wingspan: m14.7

Height: m6.4

↳*Standard Payload*

External: kg8,000

Hardpoints pylons: 12

↳*Survivability/Countermeasures*

Zero/zero ejection seat: Yes

Infrared and radar jammer: Yes

Radar and missile warning receivers: Yes

Chaff and flares: Yes

Gaseous oxygen for 10 hours of flight: Yes

ARMAMENT

30-mm gun mounted in the right wing: Yes

↳*30-mm gun, Gsh-30-1*

Range: m(practical) 4,000

Elevation/Traverse: None (rigidly mounted)

Ammo Type: HEFI, APT, CC

Rate of Fire: 1,500 rounds per minute

↳*Weapon & Ammunition Types*

30-mm Gsh-30-1 cannon: 150 rounds

Other Loading Options: 2

AA-10A-D/ALAMOAAM: 6

AA-11/ARCHER AAM: 6

AA-12 ADDER AAMs: 6

AS-14/KEDGE ASM: 6

AS-17/KRYPTON ASM: 6

AS-18/KAZOO ASM: 2

Gun pods: 3

420-mm S-25 rockets (1 each): Yes

80-mm S-8 rocket pod (20 ea.): Yes

122-mm S-13 rocket pod (5 each): Yes

250-kg, or 500-kg unguided and guided bombs: Yes

KAB-500Kr Bombs: 6

KAB-1500Kr Bombs: 2

AVIONICS/SENSOR/OPTICS

↳*Pulse-Doppler look-down/ shoot-down radar*

Search range: km240

Track range: km185

Multi Target Capability: Yes

IR Sensor: Yes

Laser Designator: yes

Heads Up Display: Yes

NOTES

Description: A SMALL NUMBER OF THE AIR SUPERIORITY FIGHTERS HAVE BEEN PRODUCED. THE GREATER EXPORT MARKET IS FOR MULTI-ROLE VERSIONS

↳*APPEARANCE*

VARIANTS

Description: TWO-SEATER AIRCRAFT IS SIGNIFICANTLY UPGRADED AND DERIVED FROM SU-27 SINGLE-SEAT AIRCRAFT.

↳*SU-30M*

Description: THE FIRST REAL MULTI-ROLE AIRCRAFT IN THE SU-27 FAMILY, WITH ALL NECESSARY SUB-SYSTEMS. THESE WERE CONVERTED INTO DEMONSTRATORS FOR EXPORTS.

↳*SU-30MK*

Description: EXPORT SERIES VERSION. THE SU-30MK2 ANTI-SHIP UPGRADE VERSION HAS BEEN EXPORTED.

↳*SU-30MKK/FLANKER-G*

Description: MULTI-ROLE UPGRADE UTILIZING AIR-TO-GROUND WEAPONS TO A MORE ADVANCED VERSION INCORPORATING NEW RADAR, CANARDS AND THRUST VECTORING.

↳*JJ-11*

Description: CHINESE LICENSE-BUILT VERSION.

↳*SU-30MKI/FLANKER-H*

Description: VERSION OF THE SU-30MK MADE FOR INDIA. MOST WILL BE PRODUCED BY AN INDIAN FIRM. SOME

WESTERN EQUIPMENT REPLACED MUCH OF THE RUSSIAN SYSTEMS.

↳*SU-30MKM*

Description: VERSION FOR USE BY MALAYSIA.

Notes:

The Sukhoi Su-30 (Russian: Сухой Су-30; NATO reporting name: Flanker-C) is a twin-engine, two-seat supermaneuverable fighter aircraft developed in the Soviet Union by Russia's Sukhoi Aviation Corporation. It is a multirole fighter for all-weather, air-to-air and air-to-surface deep interdiction missions. The Su-30 started out as an internal development project in the Sukhoi Su-27 family by Sukhoi. The design plan was revamped and the name was made official by the Russian Defense Ministry in 1996. Of the Flanker family, the Su-27, Su-30, Su-33, Su-34 and Su-35 have been ordered into limited or serial production by the Defense Ministry. The Su-30 has two distinct version branches, manufactured by competing organisations: KnAAPO and the Irkut Corporation, both of which come under the Sukhoi group's umbrella. KnAAPO manufactures the Su-30MKK and the Su-30MK2, which were designed for and sold to China, and later Indonesia, Uganda, Venezuela, and Vietnam. Due to KnAAPO's involvement from the early stages of developing Su-35, these are basically a two-seat version of the mid-1990s Su-35. The Chinese chose an older but lighter radar so the canards could be omitted in return for increased payload. It is a fighter with both air supremacy and attack capabilities, generally similar to the U.S. F-15E Strike Eagle. Irkut traditionally served the Soviet Air Defense and, in the early years of Flanker development, was given the responsibility of manufacturing the Su-27UB, the two-seat trainer version. When India showed interests in the Su-30, Irkut offered the multirole Su-30MKI, which originated as the Su-27UB modified with avionics appropriate for fighters. Along with its ground-attack capabilities, the series adds features for the air-superiority role, such as canards, thrust-vectoring, and a long-range phased-array radar. Its derivatives include the Su-30MKM, MKA, and SM for Malaysia, Algeria, and Russia, respectively. The Russian Air Force operates several Su-30s and has ordered the Su-30SM version. The integrated aerodynamic configuration, combined with the thrust vectoring control ability, results in high manoeuvrability and unique takeoff and landing characteristics. Equipped with a digital fly-by-wire system, the Su-30 is able to perform some very advanced manoeuvres, including the Pugachev's Cobra and the tailslide. These manoeuvers quickly decelerate the aircraft, causing a pursuing fighter to overshoot, as well as breaking a Doppler radar-lock, as the relative speed of the aircraft drops below the threshold where the signal registers to the radar. The aircraft's powerplant incorporates two Saturn AL-31F afterburning low-bypass turbofan engines, fed through intake ramps. Two AL-31Fs, each rated at 123 kN (28,000 lbf) of full afterburning thrust ensures Mach 2 in level flight, 1,350 km/h speed at low altitude, and a 230 m/s climbing rate. With a normal fuel reserve of 5,270 kg, the Su-30MK is capable of performing a 4.5-hour combat mission with a range of 3,000 km. An aerial refueling system increases the range to 5,200 km (3,200 mi) or flight duration up to 10 hours at cruise altitudes. The aircraft features autopilot ability at all flight stages including low-altitude flight in terrain-following radar mode, and individual and group combat employment against air and ground/sea-surface targets. Automatic control system interconnected with the navigation system ensures route flight, target approach, recovery to airfield and landing approach in automatic mode.

JH-7 (Flounder) Chinese Fighter/Bomber







Tiers:



Variants:

- **JH-7:** Initial production version of the PLANAF anti-shipping fighter-bomber.
- **JH-7A:** Later production utilising composite structure to reduce weight, improved flying control system and improved avionics including the JL10A Shan Ying J-band pulse-Doppler radar. Weapon loads increased by the addition of two more wing hardpoints and two hardpoints under the intake trunking for mission pods such as targeting pods.
- **JH-7E:** Possibly export variant, shown at 2018 Zhuhai Airshow.
- **FBC-1 Flying Leopard:** Export version of the JH-7.
- **FBC-1A Flying Leopard II:** Export version of the JH-7A.

System

Alternate Designation(s): Xi'an JH-7; Flounder; FBC-1 Flying Leopard.
Primary Function / Type: Fighter-Bomber
Manufacturer: Xi'an Aircraft Industry Corporation
Crew: 2
Number of Engines: 2
Number of Hard Points: 9 in total (6× under-wing, 2× wing-tip, 1× under-fuselage) with a capacity of 9,000 kg (20,000 lb) external fuel and ordnance,

Dimensions

Length: 21.00 m
Height: 6.22 m
Wingspan: 12.80 m
Wing Area: 52.3 m sq
Wheel Base: 7.80 m

Wheel Track: 3.06 m

Empty Weight: INA

Takeoff Weight: 27,415 kg

Automotive

Engine Name: 2 x Xian WS9 turbofan

Number of Engines: 2

Engine Type: licensed Rolls Royce Spey Mk 202

Engine Power, Dry: 55.83 kN each

Engine Power, Afterburner: 91.26 kN each

Maximum Speed at Altitude: 1,808 km/h at 1,000 m max

Cruise Speed: 903 km/h

Maximum Range: 3,100 km w/full internal fuel, full external fuel, no weapons

Radius: 900 km

Ceiling: 16,000 m

Takeoff Roll: 920 m

Landing Roll: 1,050 m

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: 23mm

Length: 1,537 mm

Barrel Length: 1,000 mm

Weight: 50 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Autocannon

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 1,500 Rounds

Main Missile Systems

Air-to-Air Missiles (Options): PL-5; PL-8' PL-9; PL-12

Anti-Ship Missiles (Options): Yingji-8K; Yingji-82K

Air-to-Surface Missiles (Options): CM-802A; KD-88; C-705; C-704

Anti-Radiation Missiles (Options): Yingji-91; LD-10; CM-102

↳*Main Missile System #1*

Name: C-802

Type: Anti-Ship Cruise Missile

Manufacturer: China Aerospace Science and Industry Corporation

Length: INA

Diameter: INA

Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: French TRI 60-2 turbojet

Operational Range: 125 km

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Main Missile System #2*

Name: C-801

Type: Anti-Ship Cruise Missile

Length: 5.81 m

Diameter: INA

Weight: 815 kg

Warhead Weight: 165 kg

Engine: Rocket

Propellant: solid rocket

Operational Range: 42 km

Flight Altitude: 5-7 m

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Bomb Weapon Systems

Laser Guided Bombs (Options): GB1; GB5

Satellite Guided Bombs: LS-6; FT-12; GB6; FT-2; FT-3; FT-6

Fire Control / Avionics

Radar: Eagle Eye 232H multi-role pulse-Doppler
Fire Control Radar:
Laser Desingator: INA
Autopilot: triplex digital-analog
Air Data Computer: Type 8145
Radio Altimeter: WG-5A
Navigation: 210 Doppler
EW Radar Warning: RW1045 receiver
Active Jamming: 960-2 noise system
Passive Jamming: 914-4G system

Protection

Stealth Properties: INA
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: Yes
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Xi'an JH-7 (Jianjiji Hongzhaji – fighter-bomber; NATO reporting name Flounder), also known as the FBC-1 (Fighter/Bomber China-1) Flying Leopard, is a tandem two-seat, twin-engine fighter-bomber in service with the People's Liberation Army Naval Air Force (PLANAF), and the People's Liberation Army Air Force (PLAAF). The main contractors are Xi'an Aircraft Industrial Corporation (XAC) and the 603rd Aircraft Design Institute (later named the First Aircraft Institute of AVIC-I). The first JH-7s were delivered to the PLANAF in the mid-1990s for evaluation, with the improved JH-7A entering service in 2004. In the early 1970s, the PLAAF required a new fighter-bomber to replace the Harbin H-5 and Nanchang Q-5. A request was duly submitted to the Ministry of Aviation Industry (later renamed to the Aviation Industry Corporation of China), which organized a domestic development program when efforts to secure a joint venture with foreign partners failed. The program was authorized on 19 April 1983 by then-paramount leader Deng Xiaoping. The program was also aiming to make use of newly imported British Rolls-Royce Spey turbofan engines at the time. The PLANAF required a similar aircraft and the program set out to develop a variant for each set of requirements. The PLAAF variant would be a two-man all-weather deep strike bomber, with side-by-side cockpit seating, electronic countermeasures (ECM), and terrain following capabilities similar to the General Dynamics F-111. The PLANAF would receive a two-man all-weather, tandem cockpit, strike and reconnaissance aircraft. The PLAAF variant was dropped in the early 1980s, with the PLANAF variant becoming the JH-7. Six prototypes were built by December 1988, and the PLANAF received 12 to 18 aircraft in the early 1990s for evaluation. The first aircraft used imported Rolls-Royce Spey Mk.202 engines, later replaced by a license-built copy, the WS-9. They were equipped with the Type 243H multifunction radar, which could detect ships at a maximum of 175 kilometres (109 mi), and MiG-21-sized aerial targets at 75 kilometres (47 mi). The JH-7 was designed as an anti-shipping fighter-bomber. As with the later JH-7A, its aerial combat capability was insignificant given the large number of specialist aircraft for that role.

JH-7A (Flounder) Chinese Fighter/Bomber







Tiers:



Variants:

- **JH-7:** Initial production version of the PLANAF anti-shipping fighter-bomber.
- **JH-7A:** Later production utilising composite structure to reduce weight, improved flying control system and improved avionics including the JL10A Shan Ying J-band pulse-Doppler radar. Weapon loads increased by the addition of two more wing hardpoints and two hardpoints under the intake trunking for mission pods such as targeting pods.
- **JH-7E:** Possibly export variant, shown at 2018 Zhuhai Airshow.
- **FBC-1 Flying Leopard:** Export version of the JH-7.
- **FBC-1A Flying Leopard II:** Export version of the JH-7A.

System

Alternate Designation(s): JH-7A; FBC-1 Flying Leopard II
Primary Function / Type: Fighter-Bomber
Manufacturer: Xi'an Aircraft Industry Corporation
Crew: 2
Number of Engines: 2
Number of Hard Points: 11 in total (8× under-wing, 2× wing-tip, 1× under-fuselage) with a capacity of 9,000 kg (20,000 lb) external fuel and ordnance,

Dimensions

Length: 21.00 m
Height: 6.22 m
Wingspan: 12.80 m
Wing Area: 52.3 m sq
Wheel Base: 7.80 m

Wheel Track: 3.06 m

Empty Weight: INA

Takeoff Weight: 27,415 kg

Automotive

Engine Name: 2 x Xian WS9 turbofan

Number of Engines: 2

Engine Type: licensed Rolls Royce Spey Mk 202

Engine Power, Dry: 55.83 kN each

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Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 1,500 Rounds

Main Missile Systems

Air-to-Air Missiles (Options): PL-5; PL-8' PL-9; PL-12

Anti-Ship Missiles (Options): Yingji-8K; Yingji-82K

Air-to-Surface Missiles (Options): CM-802A; KD-88; C-705; C-704

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Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: French TRI 60-2 turbojet

Operational Range: 125 km

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Main Missile System #2*

Name: C-801

Type: Anti-Ship Cruise Missile

Length: 5.81 m

Diameter: INA

Weight: 815 kg

Warhead Weight: 165 kg

Engine: Rocket

Propellant: solid rocket

Operational Range: 42 km

Flight Altitude: 5-7 m

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Bomb Weapon Systems

Laser Guided Bombs (Options): GB1; GB5

Satellite Guided Bombs: LS-6; FT-12; GB6; FT-2; FT-3; FT-6

Fire Control / Avionics

Radar: L-10A multi-mode pulse-Doppler radar

Fire Control Radar: Upgraded Fire Control Radar System, name: INA.

Laser Desingator: INA

Autopilot: triplex digital-analog

Air Data Computer: Type 8145

Radio Altimeter: WG-5A

Navigation: the Blue Sky low-altitude navigational pod (similar to LANTIRN)

EW Radar Warning: RW1045 receiver

Active Jamming: 960-2 noise system

Passive Jamming: 914-4G system

Fly-By-Wire Controls: digital fly-by-wire (FBW) controls

Combat Avionics Detection Range: The combat avionics can reportedly detect targets at a range of 54 nm (62 mi, 100 km), simultaneously track 14 targets and attack four to six.

Note: A laser designation pod may be under the port engine intake to pain targets for LGBs.

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

When the PLA examined the future role of air forces, it identified a need for precision air-to-surface capability. An improved JH-7, the JH-7A, was designed to meet this requirement. The JH-7A's general and deputy general designers were Tang Changhong (□□□) and Wu Jieqin (□□□) respectively. The JH-7A had a lighter and stronger airframe than the JH-7, allowing the newer aircraft to carry a maximum ordnance load of 9,000 kg. In PLANAF, this allowed four YJ-82 anti-ship missiles to be carried, compared to the two on the JH-7. The JH-7A is equipped with domestic Chinese helmet mounted sight (HMS) for evaluation, and this HMS currently being tested is developed by Xi'an Optronics Group (Xi Guang Ji Tuan □□□□), a member of Northern Electro-Optic Co. Ltd (□□□□□□□□□□), the wholly owned subsidiary of Norinco, and the HMS on JH-7A was developed from the helicopter HMS manufactured by the same company, thus both share many common components. HMS tested on JH-7A is compatible with air-to-air/surface missiles, and it is also compatible with airborne sensors such as radars and electro-optics so that the sensors are slaved to HMS, enabling the fast tracking and aiming of the weaponry. The cockpit of JH-7A still retains some traditional single function dial indicators, but there are two large color liquid crystal display multi-function displays which can be monochrome if pilots choose. Other avionic upgrades of JH-7 include: replacing Type 960-2 noise jammer with BM/KJ-8605, replacing Type 265A radar altimeter with Type 271 radar altimeter, fully digitized fly-by-wire flight control system, and in addition, Type 232H airborne radar is replaced by JL-10A pulse-Doppler radar, enabling JH-7A to fire laser-guided bombs and Kh-31P anti-radiation missiles. The existing JH-7s were upgraded with JH-7A electronics. Two additional hardpoints increased the total to 6 from the original 4, and one-piece windscreen replaced the original three-piece windscreen. The JH-7A was the first Chinese aircraft to use paperless design, and the software used was CATIA V5.

Su-17 (Fitter) Russian Fighter-Bomber Aircraft





Tiers:

1 2 3 **4**

System

Alternative Designations: Su-20, Su-22, Strizh or Martlet
Crew: 1
Max “G” Force (g): +7.0
Vertical Climb Rate (m/s): 230
Hardpoints: 8

↳*Engines*

28,660-hp Lyulka AL- 21F-3(Su-17/20)/ or 1x 25,335- shp Tumansky: 1
R-29BS-300 (Su-22) turbojet with afterburner: 1

↳*Weight (kg)*

↳*Ceiling (m)*

↳*Speed (km/h)*

Max (at altitude): Mach 2.1
Max (sea level): Mach 1.1
Takeoff/Landing Speed: 265

↳*Fuel (liters)*

Internal: 4,550
External 800 liter tanks: ≤ 4

↳*Range (km)*

Max Load: 1,500
With Aux Fuel: INA
Combat Radius: 330 to 685

↳*Takeoff Run/Landing Roll (m)*

Prepared Surface: 900/950

↳*Dimensions (m)*

Length: 18.8

Wingspan: 13.8 extended, 10.6 swept

Height: 4.8

↳*Standard Payload (kg)*

External: 4,000

M4: 4,250

↳*Survivability/Countermeasures*

Radar warning receiver: Yes

chaff and flares: Yes

ARMAMENT

30-mm machinegun: 2

Range (practical) (m): 2,500

Elevation/Traverse (rigidly mounted): None

Rate of Fire (rpm): 850

↳*Ammo Type*

HEFI: Yes

APT: Yes

CC: Yes

↳*Weapon & Ammunition Types*

2x 30-mm NR-30 guns (rnds): 160

↳*Other Loading Options*

325-mm S-25 rockets: 1

80-mm S-8 rocket pods: 20

57-mm S-5 rocket pods: 32

AS-7/KERRY ASM: 1

AS-9/KYLE ASM:

AS-10/KAREN ASM:

AS-12/KEGLER ASM:

AS-14/KEDGE ASM:

AA-2 ATOLL AAM: 2

AA-8/APHID AAM: 2

AA-11/ARCHER AAM launchers: 2

23-mm SPPU-22 Gun Pods:

External fuel tanks (liters): 800

AVIONICS/SENSOR/OPTICS

Description: Simple

NOTES

Description: THE MID-WING PIVOT POINT OF THE SWEEP WINGS ALLOWS FOR POSITIONS OF 28, 45 OR 62 DEGREES. UP TO FOUR EXTERNAL FUEL TANKS CAN BE CARRIED ON WING PYLONS AND UNDER THE FUSELAGE. WHEN UNDER-FUSELAGE TANKS ARE CARRIED, ONLY THE TWO INBOARD WING PYLONS MAY BE USED FOR ORDNANCE. AVAILABLE MUNITIONS ARE SHOWN ABOVE; NOT ALL MAY BE EMPLOYED AT ONE TIME. MISSION DICTATES WEAPONS CONFIGURATION. EXTERNAL STORES ARE MOUNTED ON UNDERWING AND UNDERBODY HARDPOINTS. EACH WING HAS TWO POINTS, AND THE FUSELAGE HAS FOUR ATTACHMENT POINTS FOR A TOTAL OF EIGHT STATIONS. GUN PODS CAN BE MOUNTED TO FIRE REARWARD.

↳*APPEARANCE*

VARIANTS

Description: AIRCRAFT WAS DERIVED FROM SU-7 FITTER A BY INCORPORATING VARIABLE WINGS. MANY VARIANTS ARE IN USE; HOWEVER, THE M3 AND M4 ARE THE MOST PROLIFERATED VERSIONS. DOMESTIC AIRCRAFT USE NOMENCLATURE SU-17. EXPORT VERSIONS USE SU-20 AND SU-22.

↳*SU-17/-17MK/-20/FITTER C*

Description: THE FIRST PRODUCTION VERSION. EXPORT IS CALLED SU-20.

↳*SU-17M/ -17M2/ -17M2D FITTER D*

Description: EXTERNAL DOPPLER-NAV AND INTERNAL LASER RANGEFINDER. RECONNAISSANCE VERSION CALLED SU-17R.

↳*SU-17UM/-22U/FITTER E*

Description: TWO-SEAT TRAINER WITH COMPONENTS OF SU-17M.

↳*SU-17/FITTER G*

Description: COMBAT-READY TWO-SEAT TRAINER VARIANT OF FITTER H. EXPORT VERSION IS SU-22, WITH TUMANSKY ENGINE.

↳*SU-17/-17M3/FITTER H*

Description: INCREASED PILOT VISIBILITY BY DROOPING THE AIRCRAFT NOSE, AND INCORPORATED AN INTERNAL DOPPLER-NAV AND LASER RANGEFINDER. RECONNAISSANCE VERSION CALLED SU-17M3R.

↳*SU-17M4/-22M4/FITTER K*

Description: FIGHTER-BOMBER. ESSENTIALLY SAME AS ABOVE, BUT WITH AN ADDITIONAL AIR INTAKE. EMPLOYS

DIGITAL NAVIGATION AND ATTACK AVIONICS.

↳***SU-22/FITTER F***

Description: EXPORT VERSION OF FITTER D WITH TUMANSKY ENGINE.

↳***SU-22/-22M3/FITTER J***

Description: SIMILAR TO FITTER H, BUT WITH INCREASED INTERNAL FUEL CAPACITY.

Notes:

The Sukhoi Su-17 (NATO reporting name: Fitter) is a Soviet variable-sweep wing fighter-bomber developed from the Sukhoi Su-7. It enjoyed a long career in Soviet, later Russian, service and was widely exported to Eastern Bloc, Arab air forces, Angola and Peru as the Su-20 and Su-22. It is the first variable-sweep wing of Russian/Soviet origin. Seeking to improve low-speed and take-off/landing performance of the Su-7B fighter-bomber, in 1963 the Sukhoi OKB with input from TsAGI created a variable-sweep wing technology demonstrator. The Su-7IG (internal designation S-22I, NATO designation "Fitter-B"), converted from a production Su-7BM, had fixed inner portions of the wing with movable outer segments which could be swept to 28°, 45°, or 62°.

Su-27 (Flanker) Russian Multirole Fighter Aircraft





Tiers:



Variants:

- **Soviet era:** T10 ("Flanker-A") Initial prototype configuration. T10S Improved prototype configuration, more similar to production spec. P-42 Special version built to beat climb time records. The aircraft had all armament, radar and paint removed, which reduced weight to 14,100 kg. It also had improved engines. Similar to the US F-15 Streak Eagle project. Between 1986-1988, it established and took several climb records from the Streak Eagle. Several of these records (such as time to climb to 3000m, 6000m, 9000m, 12000m) still stands current as of 2019. Su-27 Pre-production series built in small numbers with AL-31 engine. Su-27S (Su-27 / "Flanker-B") Initial production single-seater with improved AL-31F engine. The "T10P". Su-27P (Su-27 / "Flanker-B") Standard version but without air-to-ground weapons control system and wiring and assigned to Soviet Air Defence Forces units. Often designated Su-27 without -P. Su-27UB ("Flanker-C") Initial production two-seat operational conversion trainer. Su-27SK Export Su-27S single-seater. Exported to China in 1992-1996 and developed into Shenyang J-11. Su-27UBK Export Su-27UB two-seater. Su-27K (Su-33 / "Flanker-D") Carrier-based single-seater with folding wings, high-lift devices, and arresting gear, built in small numbers. They followed the "T10K" prototypes and demonstrators. Su-27KUB (Su-33UB) Two-seat training-and-combat version based on the Su-27K and Su-27KU, with a side-by-side seating same as Su-34. One prototype built. Su-27M (Su-35/Su-37 / "Flanker-E/F") Improved demonstrators for an advanced single-seat multi-role Su-27S derivative. These also included a two-seat "Su-35UB" demonstrator. Su-27PU (Su-30) Two-seat version of the Su-27P interceptor, designed to support with tactical data other single-seat Su-27P, MiG-31 and other interceptor aircraft in PVO service. The model was later renamed to Su-30, and modified into a multi-role fighter mainly for export market, moving away from the original purpose of the aircraft. Su-32 (Su-27IB) Two-seat dedicated long-range strike variant with side-by-side seating in "platypus" nose. Prototype of Su-32FN and Su-34.
- **Post-Soviet era:** Su-27PD Single-seat demonstrator with improvements such as inflight refuelling probe. Su-30M/MK Next-generation multi-role two-seater. A few Su-30Ms were built for Russian evaluation in the mid-1990s, though little came of the effort. The Su-30MK export variant was embodied as a series of two demonstrators of different levels of capability. Versions include Su-30MKA for Algeria, Su-30MKI for India, Su-30MKK for the People's Republic of China, and Su-30MKM for Malaysia. Shenyang J-11 Chinese version of Su-27SK. Su-27SM (Flanker-B Mod. 1) Mid-life upgraded Russian Su-27S, featuring technology evaluated in the Su-27M demonstrators. Su-27SKM Single-seat multi-role fighter for export. It is a derivative of the Su-27SK but includes upgrades such as advanced cockpit, more sophisticated self-defense electronic countermeasures (ECM) and an in-flight refuelling system.[61] Su-27UBM Comparable upgraded Su-27UB two-seater. Su-27SM2 4+ gen block upgrade for Russian Su-27, featuring some technology of the Su-35BM; it includes Irbis-E radar, and upgraded engines and avionics. Su-27SM3 The same as the Su-27SM but is built new rather than a mid-life upgrade. Su-27KUB Essentially an Su-27K carrier-based twin-seater with a side-by-side cockpit, for use as a naval carrier trainer or multi-role aircraft. Su-35BM/Su-35S Also named the "Last Flanker" is latest development from Sukhoi Flanker family. It features improved thrust vectoring AL-41F1S engines, new avionics, N035 Irbis-E radar and reduced radar cross-section. Su-27UB1M Ukrainian modernized version of the Su-27UB. Su-27UP1M Ukrainian modernized version of the Su-27UP. Su-27S1M Ukrainian modernized version of the Su-27S. Su-27P1M Ukrainian modernized version of the Su-27P.

System

Alternative Designations: Chinese J-11

Description: Variants in ( )

Crew: 1

Max “G” Force (g) Control limited: 9

Vertical Climb Rate (m/s): 305

↳*Engines*

27,557-shp Lyluka AL-31F turbojet with afterburner: 2

↳*Weight (kg)*

Max Gross (B/SM): 28,300/33,000

Normal Takeoff (B/SM): 23,000/23,700

Empty: 17,690

↳*Speed (km/h)*

Max (at altitude): Mach 2.35

Max (sea level): Mach 1.1

Takeoff/Landing Speed: 250/231

↳*Ceiling (m)*

Service (clean): 18000

With External Stores: INA

↳*Fuel (liters)*

Internal (B/SM): 6,600/11,775

External: no provision

↳*Range (km)*

Max Load: 3,790

With Aux Fuel (B/SM): 4,390

Combat Radius: 1,500

↳*Hardpoints*

FLANKER-B: 10

C: 12

↳*Takeoff Run/Landing Roll (m)*

Prepared Surface (variant dependent): 500 to 650/600

Su-35: 720 / 1,200/1,200

↳*Dimensions (m)*

Length: 21.9

Wingspan: 14.7

Height: 5.5

↳*Standard Payload (kg)*

External: 6,000

↳*AVIONICS/SENSOR/OPTICS*

External: 8,000

Hardpoints underwing: 9

↳*Survivability/Countermeasures*

Zero/zero ejection seat: Yes

Infrared and radar jammer (SPS-171): Yes

Radar and missile warning receivers: Yes

Chaff and flares: Yes

Pressurized cockpit with zero/zero ejection seats: Yes

Infrared and radar jammer: Yes

Radar and missile warning Receivers: Yes

ARMAMENT

30-mm gun mounted in the right wing: Yes

↳*30-mm gun, Gsh-30-1*

Range (m) (practical): 4,000

Elevation/Traverse (rigidly mounted): None

Ammo Type HEFI, APT, CC: Yes

Rate of Fire (rpm): 1,500

↳*23-mm 6x barrel Gatling gun, Gsh-6-23*

Range (m) (practical): 2,500

Elevation/Traverse (rigid mount): None

Ammo Type HEFI: Yes

Rate of Fire (rpm): 9,000

↳*Weapon & Ammunition Types*

30-mm Gsh-30-1 cannon (rnds): 150

Other Loading Options: 2

AA-10A-D/ALAMOAAM: 10

AA-8/APHID AAM:

AA-9/AMOS AAM:
AA-11/ARCHER AAM:
AA-12 ADDER AAMs:
AS-7/KERRY ASM:
AS-10/KAREN ASM: 8
AS-12/KEGLER ASM:
AS-13/KINGBOLT ASM:
AS-14/KEDGE ASM: 6
AS-17/KRYPTON ASM:
AS-18/KAZOO ASM: 2
Gun pods: 3
AA-8/APHID or AA-11 AAM: 2
420-mm S-25 rockets (1 each): 4
80-mm S-8 rocket pod (20 ea.): 4
122-mm S-13 rocket pod (5 each): 4
250-kg, or 500-kg unguided and guided bombs:

AVIONICS/SENSOR/OPTICS

↳***Pulse-Doppler look-down/ shoot-down radar***

Search range (km): 240
Track range (km): 185
Multi Target Capability: Yes
IR Sensor: Yes
Laser Designator: Yes
Heads Up Display: Yes

NOTES

Description: THE SU-27 IS PRIMARILY AN ALL-WEATHER INTERCEPTOR/FIGHTER AIRCRAFT USED FOR AIR DEFENSE. LATER VERSIONS ARE CAPABLE OF ALSO PERFORMING GROUND ATTACK MISSIONS. IT IS HIGHLY MANEUVERABLE BECAUSE OF A FLY-BY-WIRE CONTROL SYSTEM, WHICH AUTOMATICALLY RESTRICTS AIRCRAFT ANGLES OF ATTACK AND MAXIMUM G-LOADS DURING FLIGHT. EXTERNAL FUEL TANKS CAN BE CARRIED ON SOME VARIANTS, AND SOME ARE FITTED FOR AERIAL REFUELING, BUT THESE ARE GENERALLY NAVAL VERSIONS RATHER THAN AIR DEFENSE OR STRIKE VERSIONS. AVAILABLE MUNITIONS ARE SHOWN ABOVE--NOT ALL MAY BE EMPLOYED AT ONE TIME. MISSION DICTATES WEAPONS CONFIGURATION. EXTERNAL STORES ARE MOUNTED ON UNDERWING AND UNDERBODY HARDPOINTS. EACH WING HAS TWO POINTS AND AN ADDITIONAL RAIL ON THE WINGTIP. TWO POINTS ARE UNDER THE INTAKES ALONG THE FUSELAGE, AND TWO ARE CENTRALLY LOCATED UNDERNEATH THE FUSELAGE NEAR THE CENTERLINE AND BETWEEN THE INTAKES FOR A TOTAL OF TEN STATIONS.

↳***APPEARANCE***

VARIANTS

↳*SU-27/FLANKER B*

Description: PRODUCTION SINGLE-SEAT AIR SUPERIORITY FIGHTER USED IN RUSSIAN UNITS. THERE ARE DOZENS OF UPGRADE PROGRAMS, MORE THAN A DOZEN FIELDED VARIANTS, AND SEVERAL DEVELOPED AIRCRAFT WITH DIFFERENT DESIGNATORS (SU-30, SU-34, SU-35, AND SU-37).

↳*SU-27SK/-27P/FLANKER B*

Description: VARIANT EXPORTED TO CHINA WITH GROUND ATTACK CAPABILITY.

↳*J-11*

Description: CHINESE BUILT VERSION.

↳*SU-27SM*

Description: MULTI-ROLE VERSION, WITH 12 HARDPOINTS, GREATER INTERNAL FUEL AND PAYLOAD CAPACITY, AND AIR REFUEL CAPABILITY.

↳*SU-27UB/FLANKER C*

Description: TWO-SEAT MODEL (EXPORT -UBK), AS COMMAND AIRCRAFT, TRAINER AND INTERCEPTOR.

↳*JJ-11*

Description: CHINESE BUILT VERSION

↳*SU-27K/FLANKER D*

Description: NAVAL VARIANT, READILY NOTICEABLE BY CANARDS FORWARD OF THE WINGS.

↳*SU-27M/FLANKER E*

Description: MULTI-ROLE UPGRADE WITH HIGHER FINS, UPGRADED AVIONICS, ETC., DEVELOPED IN LATE 1980S. AN EXPORT VERSION CALLED SU-35 WAS MARKETED. IT HAD MORE POWERFUL 28,218-SHP LYLUKA AL-31FM ENGINES, THRUST-VECTORING NOZZLES FOR HIGHER GROSS WEIGHT AND GREATER RANGE. IT ALSO FEATURED BETTER RADAR AND TARGETING SYSTEMS FOR MULTIPLE ENGAGEMENTS. DIMENSIONS SLIGHTLY INCREASED, NOTICEABLE BY CANARDS FORWARD OF WINGS. FIELDING WAS MINIMAL, AND NONE WERE SOLD.SU-35UB WAS A TWO-SEATER UPGRADE VERSION.

↳*SU-37/"SUPER FLANKER"*

Description: SINGLE-SEAT MULTI-ROLE FIGHTER WITH THRUST VECTORING CAPABILITY AND SUFFICIENT MOBILITY FOR THE KULBIT PITCH-UP MANEUVER INTO A TIGHT 360 DEGREE SOMERSAULT, AS WELL AS IMPROVED LONG-RANGE WEAPONS AND FIRE CONTROL. EXPECTED FUTURE PRODUCTION VERSION IS SU-37MR. HOWEVER, AFTER THE ONE SU-27M CONVERSION TO SU-37 CRASHED DURING A FERRY FLIGHT, ALL WORK ON THE AIRCRAFT ENDED IN 2002. PRODUCTION IS UNLIKELY.

↳*SU-27/SU-30 MAJOR/MINOR MODERNIZATION*

Description: UPGRADE PROGRAMS ARE BEING IMPLEMENTED TO BRING SU-27S UP TO SU-30 STANDARD, AND SOME SINGLE-SEAT UPGRADES TO THE STANDARD.

↳*SU-30/FLANKER-F*

Description: PRODUCTION TWO-SEATER AIRCRAFT DEVELOPED FROM SU-27.

↳*SU-34/FULLBACK*

Description: THIS 2-SEAT BOMBER VERSION HAS A SIDE-BY-SIDE COCKPIT, HIGH PAYLOAD FOR USE IN BOMBER MISSIONS AND MANEUVERABILITY SIMILAR TO FIGHTERS. EARLIER DESIGNATIONS INCLUDE: SU-27IB, SU-32, SU-32FN, AND SU-32MF.PRODUCTION AND EARLY FIELDING IS NOW UNDERWAY. THIS AIRCRAFT IS SCHEDULED TO GENERALLY REPLACE SU-24S IN RUSSIAN FORCES FOR THE STRIKE ROLE.

↳*SU-35/SU-27BM*

Description: THIS NEW SINGLE-SEATER MULTI-ROLE FIGHTER IS DEVELOPED TO REPLACE SU-27M. THE 4+++ GENERATION PROTOTYPE FIRST FLEW IN 2008.IT INCLUDES A NEW AIRFRAME, WITH LARGER WINGS AND INTAKES, BUT NO CANARDS. IT HAS BIGGER ENGINES, NEW IRBIS-E PHASED-ARRAY RADAR, NEW IRST, AND 12 HARD POINTS FOR THE LATEST WEAPONS ARE INCLUDED. THE SU-35 EXPORT VERSION IS COMPLETELY DIFFERENT FROM THE PREVIOUS AIRCRAFT WITH THE SAME DESIGNATION. THE AIRCRAFT IS DUE TO BEGIN PRODUCTION IN 2010, WITH FOCUS ON EXPORT CUSTOMERS. AN ATTRACTIVE FEATURE IS NO USE OF WESTERN TECHNOLOGY, WHICH IS VULNERABLE TO EXPLOITATION OR EXPORT RESTRICTIONS. THE RUSSIAN DOMESTIC VERSION IS SU-35S.

Notes:

The Sukhoi Su-27 (Russian: Сухой Су-27; NATO reporting name: Flanker) is a Soviet-origin twin-engine supermaneuverable fighter aircraft designed by Sukhoi. It was intended as a direct competitor for the large United States fourth-generation fighters such as the Grumman F-14 Tomcat and F-15 Eagle, with 3,530-kilometre (1,910 nmi) range, heavy aircraft ordnance, sophisticated avionics and high maneuverability. The Su-27 was designed for air superiority missions, and subsequent variants are able to perform almost all aerial warfare operations. It was designed with the Mikoyan MiG-29 as its complement. The Su-27 entered service with the Soviet Air Forces in 1985. The primary role was long range air defence against American SAC B-1B and B-52G/H bombers, protecting the Soviet coast from aircraft carriers and flying long range fighter escort for Soviet heavy bombers such as the Tu-95 "Bear", Tu-22M "Backfire" and Tu-160 "Blackjack". There are several related developments of the Su-27 design. The Su-30 is a two-seat, dual-role fighter for all-weather, air-to-air and air-to-surface deep interdiction missions. The Su-33 'Flanker-D' is a naval fleet defense interceptor for use on aircraft carriers. Further versions include the side-by-side two-seat Su-34 'Fullback' strike/fighter-bomber variant, and the Su-35 'Flanker-E' improved air superiority and multi-role fighter. The Shenyang J-11 is a Chinese licence-built version of the Su-27. The Su-27's basic design is aerodynamically similar to the MiG-29, but it is substantially larger. The wing blends into the fuselage at the leading edge extensions and is essentially a cross between a swept wing and a cropped delta (the delta wing with tips cropped for missile rails or ECM pods). The fighter is also an example of a tailed delta wing configuration, retaining conventional horizontal tailplanes. The Su-27 had the Soviet Union's first operational fly-by-wire control system, based on the Sukhoi OKB's experience with the T-4 bomber project. Combined with relatively low wing loading and powerful basic flight controls, it makes for an exceptionally agile aircraft, controllable even at very low speeds and high angle of attack. In airshows the aircraft has demonstrated its maneuverability with a Cobra (Pugachev’s Cobra) or dynamic deceleration – briefly sustained level flight at a 120° angle of attack. The naval version of the 'Flanker', the Su-27K (or Su-33), incorporates canards for additional lift, reducing takeoff distances. These canards have also been incorporated in some Su-30s, the Su-35, and the Su-37. The Su-27 is equipped with a Phazotron N001 Myech coherent Pulse-Doppler radar with track while scan and look-down/shoot-down capability. The fighter also has an OLS-27 infrared search and track (IRST) system in the nose just forward of the cockpit with an 80–100 km range. The Su-27 is armed with a single 30 mm Gryazev-Shipunov GSh-30-1 cannon in the starboard wingroot, and has up to 10 hardpoints for missiles and other weapons. Its standard missile armament for air-to-air combat is a mixture of R-73 (AA-11 Archer) and R-27 (AA-10 'Alamo') missiles, the latter including extended range and infrared homing models.

Y-5 (Colt) Chinese Single-Engine Biplane







Tiers:

1 2 3 4

System

Alternate Designation(s):	Y-5
Primary Function / Type:	Single-engine biplane utility/agricultural aircraft
Manufacturer:	Antonov
Crew:	1-2
Number of Engines:	1

Dimensions

Length:	12.4 m
Upper Wingspan:	18.2 m
Lower Wingspan:	14.2 m
Height:	4.1 m
Wing Area:	71.52 m2 (769.8 sq ft)
Airfoil:	TsAGI R-11 (14%)
Empty Weight:	3,300 kg
Gross Weight:	5,440 kg
Fuel Capacity:	1,200 l (320 US gal; 260 imp gal)

Automotive

Engine Name:	1 × Shvetsov ASh-62IR

Number of Engines: 1

Engine Type: 9-cylinder air-cooled supercharge radial piston engine

Engine Power: 1,010 hp

Maximum Range: 845 km (525 mi, 456 nmi)

Maximum Speed: 258 km/h (160 mph, 139 kn)

Cruise Speed: 190 km/h (120 mph, 100 kn)

Stall Speed: 50 km/h (31 mph, 27 kn) circa

Service Ceiling: 4,500 m (14,800 ft)

Rate of Climb: 3.5 m/s (690 ft/min)

Fuel Consumption: 185–200 l/h (49–53 gal/h; 41–44 imp gal/h)

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-5 Colt small general purpose transport Due to the need of domestic airline industry and the actual possibility in production, the aviation industry made a decision of license production of the An-2 aircraft in October 1956. The An-2 is a small general purpose transport developed by the Soviet Union. it is good in flying performance and economics, easy to operate and maintain, safe and reliable. It is a conventional biplane with tail wheel type landing gear. A piston engine drives a four blades metal propeller. It can operate from an airstrip. The Chinese designation of the An-2 is Y-5 [the Y-4 designation for the Douglas/Lisunov C-47 or Li-2 is questionable]. Its prototype production was decided to be undertaken by the Nanchang Aircraft Factory. Although the factory had experience in production of the CJ-5 trainer, it was the first time to build a transport. Prior to the arrival of drawings from the Soviet Union an An-2 transport was borrowed from the Chinese airline for familiarization of its structural and manufacturing features by engineers. They made a plan for prototype production and set up rules for manufacture. After the Soviet drawings arrived at the factory in January 1957, the technical people were organized to study these drawings and documents in Russian. Based on these drawings and their own practice in the prototype production of a new aircraft, engineers in the Nanchang Aircraft Factory prepared themselves 6,960 manufacturing processes and designed and manufactured 3,000 pieces of production tooling. To improve the efficiency in the prototype production they boldly used some new techniques such as a coordination method which used both standard parts and reference holes, and standardization of production tooling designs. It was particularly commendable that the Nanchang Aircraft Factory fulfilled the task of prototype production without expanding its factory floor area and only by addition of seven machines. In October 1957 first Y-5 completed its final assembly and successfully passed static test. On December 7 another Y-5 made its first flight. In March 1958 the Military Products Certification Commission of the State Council certificated Y7-5's design for serial production. In May of the same year the Y-5 was exhibited at a National Farm Tools Exhibition in Beijing. The basic Y-5 was a transport. Based on it a number of derivatives were developed in the process of mass production according to user's different requirements. An agricultural version was produced in 1958 according to the Soviet drawings and 229 aircraft were produced. A passenger version was derived in 1959 and 114 aircraft were produced and were used on regional air lines. Afterwards, the versions for training of navigator-bomber, parachuting and aerial photography were successively produced. A total of 727 Y-5s of all versions were produced by the Nanchang Aircraft Factory from 1958 to 1968. The continued production of the Y-5 was transferred to the Shijiazhuang Aircraft Factory in 1970 and 221 Y-5s were produced there by the end of 1986. In all, 948 Y-5s were turned out. The Y-5 is the first transport produced in China. It is also a transport which was produced in largest quantity and in the longest period of time. Its various versions played remarkable roles in many areas of national economy. It flew over all the places in our motherland. The Y-5s were also supplied to some countries in Asia and Europe and have been a witness to the exchange between China and foreign countries. The long lasting production and operation of the Y-5s showed the existence of a broad market for small transport in China. In the Chinese newspaper Shijiazhuang Daily, information appeared that China

will supply to Russia a batch of Y5B aircraft, which are essentially a licensed copy of the Soviet An-2 aircraft. Judging by the sources of the publication, aircraft are purchased for use by an unnamed company from the Ural region of the Russian Federation. So, back in mid-October 2019, at a general aviation exhibition in China, preliminary agreements were signed between Tupolev PAO and AVIC Tongfei North China Aircraft Industry Company, Ltd. According to the agreement, the Chinese side will have to supply an unknown operator from Russia with a batch of ten Y5B aircraft, which are a licensed copy of the Soviet An-2 aircraft. Russian engineers intend to develop a completely new light multi-functional aircraft, designed to replace the legendary An-2. The development of the aircraft should be undertaken by the Baikal-Engineering company, which was selected as a result of an open tender. According to reports, the first prototype of the new aircraft should be ready by December 2020.

J-10 (Firebird) Chinese Multirole Combat Aircraft





Tiers:



Variants:

- **J-10A:** Single seat multi-role variant. The export designation is F-10A.
- **J-10S:** Tandem-seated trainer variant of J-10A.
- **J-10B:** An upgraded J-10, initially identified as "Super-10". It features a lighter and stealthier diverterless supersonic inlet, a longer nose radome possibly housing an active electronically scanned array radar, an electro-optic targeting sensor (IRST, and laser rangefinder,) and a new electronic warning or countermeasures pod atop the vertical stabiliser. The aircraft is powered by the AL-31FN M1; one unit was flown with a WS-10A in July 2011 but that engine was not selected for the initial production batch. The aircraft's first flight occurred no later than December 2008.
- **J-10C:** An upgraded version of J-10B, it is equipped with an indigenous Active electronically scanned array (AESA) fire-control radar and is equipped with infrared-homing PL-10 and new long range PL-15 air-to-air missile (AAM).
- **FC-20:** Single seat multi-role fighter jet, the export version of the J-10.
- **J-10B TVC Demonstrator:** A prototype fighter based on J-10B that is equipped with WS-10B thrust-vectoring control engine. The fighter has supermaneuverability, capable of performing Pugachev's Cobra.

System

Alternate Designation(s): Chengdu J-10; Firebird

Primary Function / Type: Multirole Combat Aircraft

Manufacturer: Chengdu Aircraft Industry Group

Crew: 1

Number of Engines: 1

Number of Hard Points: 11 in total (6× under-wing, 2× under-intake and 3× under-fuselage) with a capacity of 7,000 kg (15,400 lb) external fuel and ordnance

Dimensions

Length: 16.43 m

Height: 5.43 m

Width (Wing Span): 11.30 m

Wing Area: 45.5 m sq

Canard Span: 5.30 m

Canard Area: 4.7 m sq

Empty Weight: 9,730 kg

Maximum Takeoff Weight: 24,650 kg

Payload: 9,500 kg

Automotive

Engine Name: 1 x Saturn Lyulka AL-31F

Number of Engines: 1

Engine Power: 27,558 lb (12,500 kg) static thrust

Maximum Range: 1,853 km

Maximum Speed: Mach 1.85-2.0 max

Service Ceiling: 18,000 m

Fuel Capacity, Internal: 4,470 kg

Fuel Capacity, External: 5,650 kg

Radius, Hi-Lo-Hi: 2,540 km

Radius, Lo-Lo-Lo: 1,310 km

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: 23mm

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Autocannon

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: 1,500 Rounds

Missile Weapon System

↳*Missile System #1*

Name: PL-10 (ASR)

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)

Length: 3.0 m

Weight: 89 kg

Diameter: INA

Warhead: Blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Laser proximity fuse and impact

Engine: Solid-propellant rocket

Guidance System: Multi-element imaging infrared

Maximum Range: 60 km

Note: The missile is fitted with a multi-element IIR seeker capable of +/-90 degree off boresight angles. The missile seeker can be slaved to a helmet-mounted display (HMD),allowing the pilot to track a target beyond the aircraft's radar scan envelope using the missile's high off-boresight capability, achieved by the pilot turning his head towards the target to lock-on, better known as "look and shoot". Flight is controlled by a thrust-vector controlled solid rocket motor and free-moving type control wings on the missile's tail. The central portion of the missile has long, thin strakes, which help maintain missile maneuverability in the terminal homing stage after the rocket motor stops firing.

↳*Missile System #2*

Name: PL-11

Type: Air-to-Air Missile

Manufacturer: Shanghai Aerospace Bureau

Length: 3.89 m

Diameter: 0.286 m

Wingspan: 0.68 m

Weight: 310 kg (Some sources claim 220 kg)

Speed: Mach 4

Maximum Range: 40 – 75 km, depending on the size, speed, and heading of the target

Note: PL-11 did not enter Chinese service in very large numbers because it was only used as a stopgap measure until the more advanced PL-12 became available, and there is no confirmed export either.

↳*Missile System #3*

Name: PL-12

Type: Air-to-Air Missile

Manufacturer: People's Republic of China

Length: INA

Diameter: INA

Wingspan: INA

Weight: 180 kg

Operational Range: 100 km

Guidance System: Active Radar

Rocket Weapon System

Note: 90 mm unguided rocket pods

Bomb Weapon System

Fire Control / Avionics

Fire Control Radar: Type 1473H pulse-doppler fire control radar

Laser Desingator: INA

Externally Mounted Avionic Pods: *Type Hongguang-I infra-red search and track pod *BM/KG300G self-protection jamming pod *KZ900 electronic reconnaissance pod *Blue Sky navigation/attack pod *FILAT (Forward-looking Infra-red Laser Attack Targeting) pod

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Chengdu J-10 (simplified Chinese: □-10; traditional Chinese: □-10; NATO reporting name: Firebird[dubious – discuss], also known as Vigorous Dragon (Chinese: □□; pinyin: Měnglóng), is a single-engine, lightweight multirole fighter aircraft capable of all-weather operation, configured with a delta wing and canard design, with fly-by-wire flight controls, and produced by the Chengdu Aircraft Corporation (CAC) for the People's Liberation Army Air Force (PLAAF). J-10 was designed and developed by the Chengdu Aircraft Design Institute (CADI), a subsidiary of Chengdu Aircraft Corporation. The airframe is constructed from metal alloys and composite materials for high strength and low weight, the airframe aerodynamic layout adopts a "tail-less canard delta" wing configuration. A large delta wing is mid-mounted towards the rear of the fuselage, while a pair of canards (or foreplanes) are mounted higher up and towards the front of the fuselage, behind and below the cockpit. This configuration provides very high agility, especially at low speeds, and also reduces stall speed, allowing for a lower airspeed during instrument approaches. A large vertical tail is present on top of the fuselage and small ventral fins underneath the fuselage provide further stability. A rectangular air intake ramp and a Splitter plate (only on J-10A) are located underneath the fuselage, providing the air supply to the engine. Newer variants use a diverterless intake that does not require a splitter plate, and may reduce radar cross signature. Also under the fuselage and wings are 11 hardpoints, used for carrying various types of weaponry and drop-tanks containing extra fuel. The retractable undercarriage comprises a steerable pair of nose-wheels underneath the air intake and two main gear wheels towards the rear of the fuselage. The cockpit is covered by a two-piece bubble canopy providing 360 degrees of visual coverage for the pilot. The canopy lifts upwards to permit cockpit entry and exit. The Controls take the form of a conventional centre stick and a throttle stick located to the left of the pilot. These also incorporate "hands on throttle and stick" (HOTAS) controls. A zero-zero ejection seat is provided for the pilot, permitting safe ejection in an emergency even at zero altitude and zero speed. Due to the J-10's aerodynamically unstable design, a digital quadruplex-redundant fly-by-wire (FBW) flight control system (FCS) aids the pilot in flying the aircraft. The FCS typically monitors pilot control inputs, preventing the pilot from accidentally exiting the flight envelope from applying too much control input during high performance flight situations. This is critical in canard wing aircraft, as they are capable of turning in a much tighter radius than conventional aircraft. The massive control surfaces are capable of moving so far that they can completely destroy the aircraft in flight at high airspeeds if not kept in check by the FCS.

Tornado European Multirole Aircraft





Tiers:

1 2 **3** 4

Variants:

- **TORNADO IDS :** TORNADO IDS: DESIGNATED GR1 IN RAF SERVICE. GROUND ATTACK/ INTERDICTION VERSION. SOME HAVE BEEN ADAPTED FOR THE ANTI-SHIPPING ROLE.
- **TAC-R TORNADO GR1A:** TAC-R TORNADO GR1A: RAF GR1S MODIFIED AS DEDICATED TACTICAL RECONNAISSANCE AIRCRAFT. FITTED WITH A MARCONI DEFENSIVE SYSTEMS EMITTER LOCATION SYSTEM. BOTH 27-MM CANNONS WERE REMOVED.
- **TORNADO GR1B :** TORNADO GR1B: MODIFIED FOR MARITIME STRIKE MISSIONS WITH SEA EAGLE ANTI-SHIP MISSILES. RAF DISCARDED GR1B DESIGNATION IN JULY 2001.
- **TORNADO ADVAIR DEFENSE VARIAN:** INA
- **TORNADO ECR:** TORNADO ECR: ELECTRONIC COMBAT AND RECONNAISSANCE VARIANT FOR GERMAN AND ITALIAN SERVICE

System

Crew: 2.0
Weight, Empty : kg14091.0
Weight, Maximim Takeoff : kg20411.0

↳*Avionics/Sensor/Optics*

Night/Weather Capabilities: All-weather close air support/battlefield interdiction; interdiction/counter-air strike; naval strike and all weather day and night recon capable
Type 1: Raptor EO/IR Recon Pod
Type 2: Multi-mode, ground-mapping and terrain- following radar)
Type 3: Digital Inertial Navigation System (INS)
Type 4: Heads-up-display
Type 5: Doppler radar with Kalman filter

Type 6: Laser Ranger and Marked Target Seeker (LRMTS)

↳*Dimensions*

Height : m5.6

Length : m16.7

Width, Wingspan : m13.9

↳*Fuel and Load*

Fuel Capacity, Internal : liters6393/5842

Weight, Maximum Weapon : kgless than 9000

Weight, Standard Payload, External : kg9000.0

↳*Survivability/Countermeasures*

Type 1: Martin-Baker MK-10A zero/zero ejection seat (2ea)

Type 2: Active ECM pod

Type 2: Radar Homing and Warning (RHAW)

Type 3: Chaff and flare dispensing system

Type 4: IFF

Performance

Ceiling : m15000.0

Ferry Range : km3890.0

Power Plant/Engine: Engines 9,000 lbs. thrust Turbo- Union RB199-34R turbofans, 16,000 lbs. thrust with afterburner (2 ea)

Speed, Maximum "G" Force : g7.5

Speed, Maximum, at altitude : km/h2340.0

Takeoff Run/Landing Roll : m900/370

Armament

↳*Hardpoint/Weapon Station 1*

Location: under fuselage

Quantity : ea3.0

↳*Hardpoint/Weapon Station 2*

Location: underwings

Quantity : ea4.0

↳*Mixed Ordnance 1*

Combat Load : rds7 or less

Type: AAM

↳*Mixed Ordnance 2*

Combat Load : rds1.0

Name: storm shadow

Type: cruise missile

↳*Mixed Ordnance 3*

Combat Load : rds4.0

Name: sea eagle

Type: antiship missile

↳*Weapon 1*

Caliber/Length : mm27.0

Name: integral IWKA-Mauser

Quantity : ea2.0

Type: gun

↳*Weapon 1*

Combat Load : rds180.0

Notes:

The Panavia Tornado is a family of twin-engine, variable-sweep wing multirole combat aircraft, jointly developed and manufactured by Italy, the United Kingdom, and West Germany. There are three primary Tornado variants: the Tornado IDS (interdictor/strike) fighter-bomber, the suppression of enemy air defences Tornado ECR (electronic combat/reconnaissance) and the Tornado ADV (air defence variant) interceptor aircraft. The Tornado was developed and built by Panavia Aircraft GmbH, a tri-national consortium consisting of British Aerospace (previously British Aircraft Corporation), MBB of West Germany, and Aeritalia of Italy. It first flew on 14 August 1974 and was introduced into service in 1979–1980. Due to its multirole design, it was able to replace several different fleets of aircraft in the adopting air forces. The Royal Saudi Air Force (RSAF) became the only export operator of the Tornado in addition to the three original partner nations. A tri-nation training and evaluation unit operating from RAF Cottesmore, the Tri-National Tornado Training Establishment, maintained a level of international co-operation beyond the production stage. The Tornado was operated by the Royal Air Force (RAF), Italian Air Force, and RSAF during the Gulf War of 1991, in which the Tornado conducted many low-altitude penetrating strike missions. The Tornados of various services were also used in conflicts in the former Yugoslavia during the Bosnian War and Kosovo War, the Iraq War, Libya during the Libyan civil war, as well as smaller roles in Afghanistan, Yemen, and Syria. Including all variants, 992 aircraft were built. The Panavia Tornado is a multirole, twin-engined aircraft designed to excel at low-level penetration of enemy defences. The mission envisaged during the Cold War was the delivery of conventional and nuclear ordnance on the invading forces of the Warsaw Pact countries of Eastern Europe; this dictated several significant features of the design. Variable wing geometry, allowing for minimal drag during the critical low-level dash towards a well-prepared enemy, had been desired from the project's start. Advanced navigation and flight computers, including the then-innovative fly-by-wire system, greatly reduced the workload of the pilot during low-level flight and eased control of the aircraft. For long range bombing missions, the Tornado has a retractable refuelling probe. As a multirole aircraft, the Tornado is capable of undertaking more mission profiles than the anticipated strike mission; various operators replaced multiple aircraft types with the Tornado as a common type – the use of dedicated single role aircraft for specialist purposes such as battlefield reconnaissance, maritime patrol duties, or dedicated electronic countermeasures (ECM) were phased out – either by standard Tornados or modified variants, such as the Tornado ECR. The most extensive modification from the base Tornado design was the Tornado ADV, which was stretched and armed with long range anti-aircraft missiles to serve in the interceptor role. The Tornado operators have chosen to undertake various life extension and upgrade programmes to keep their Tornado fleets as viable frontline aircraft for the foreseeable future. The RAF and RSAF have upgraded their Tornados to the GR4 standard to increase combat effectiveness, while German Tornados have been undergoing periodic upgrades under the multi-stage ASSTA (Avionics System Software Tornado in Ada) programme.

With these upgrades, as of 2011, it is projected that the Tornado shall be in service until 2025, more than 50 years after the first prototype took flight

MiG-29 (Fulcrum) Russian Multirole Fighter Aircraft





Tiers:



Variants:

- **MIG-29/FULCRUM A :** SINGLE SEAT TACTICAL FIGHTER DESIGNED TO OPERATE UNDER GROUND CONTROL.
- **MIG-29UB/FULCRUM B :** OPERATIONAL CONVERSION TRAINER; TWO-SEAT CONFIGURATION. AIR-DEFENSE ROLE.
- **MIG-29S/FULCRUM C :** PRODUCTION MULTI-ROLE VARIANT FITTED WITH DORSAL HUMP HOUSING UPGRADED AVIONICS, AND UPRATED FLIGHT-CONTROL SYSTEM WITH SOME AERODYNAMIC TWEAKING. PRINCIPAL UPGRADE WAS NO-19 FIRE CONTROL RADAR, WHICH CAN ENGAGE TWO TARGETS SIMULTANEOUSLY.
- **MIG-29SD:** FULCRUM AN EXPORT UPGRADE VERSION OF MIG-29 TO FULCRUM C STANDARD. MIG-29SM: CURRENT PRODUCTION UPGRADE WITH ASM CAPABILITY.
- **MIG-29K/FULCRUM D:** A CARRIER BORNE VERSION OF THE FULCRUM.
- **BAAZ (FALCON) :** NAME GIVEN TO THE MIG-29 INDIAN AIR FORCE, WHICH BEGAN OPERATING THE AIRCRAFT IN 1987.
- **MIG-30 :** PROPOSED GROUND-ATTACK VARIANT OFFERED TO INDIA IN 1991 AS SUBSTITUTE FOR THE LIGHT COMBAT AIRCRAFT (LCA). MIG-29SMT: ADVANCED MULTI-ROLE DESIGN, WITH CAPABILITY FOR IMPROVED ASMS, SUCH AS AS-14 AND AS-17.

System

Crew: 1.0
Weight, Maximim Takeoff : kg10900.0
Weight, Maximum Gross : kg22000.0
Weight, Normal Takeoff : kg16800.0

↳*Avionics/Sensor/Optics*

Night/Weather Capabilities: Yes
Type 1: Coherent pulse-Doppler look-down/ shoot- down radar range 9km). Search range 70 km, tracking range 35 km, targets tracked 10, targets engaged 2
Type 2: Heads-Up-Display (HUD)
Type 3: infrared search and track system (IRST):

↳*Dimensions*

Height : m4.8
Length : m17.3
Width, Wingspan : m11.4

↳*Fuel and Load*

Drop Tank, Quantity : ea3.0

Fuel Capacity, External : liters4150.0

Fuel Capacity, Internal : liters4300.0

Weight, Standard Payload : kg3000-4000

↳*Survivability/Countermeasures*

Type 1: Zero/zero ejection seat

Type 2: Radar warning receiver

Type 3: Radar jammer

Type 4: Chaff and flares

Armament

↳*Hardpoint/Weapon Station 1*

Quantity : ea6.0

↳*Mixed Ordnance 1*

Combat Load : rds6.0

Name: AA-8 APHID

Type: AAM

↳*Mixed Ordnance 10*

Combat Load : rds4.0

Type: bomb

Weight : kg500.0

↳*Mixed Ordnance 11*

Caliber/Length : mm130 and 240

Combat Load : rds4.0

Type: rockets

↳*Mixed Ordnance 12*

Type: rocket pack

↳*Mixed Ordnance 13*

Caliber/Length : mm80.0

Combat Load : rds4.0

Name: B-8M1

↳*Mixed Ordnance 2*

Combat Load : rds4.0

Name: AA-10 ALAMO

Type: AAM

↳*Mixed Ordnance 3*

Combat Load : rds4.0

Name: AA-11 ARCHER

Type: AAM

↳*Mixed Ordnance 4*

Combat Load : rds4.0

Name: AA-12 ADDER

Type: AAM

↳*Mixed Ordnance 5*

Combat Load : rds2.0

Name: AS-14 KEDGE

Type: ASM

↳*Mixed Ordnance 6*

Name: AS-17 KRYPTON

Type: ASM

↳*Mixed Ordnance 7*

Combat Load : rds4.0

Name: ZB-500

Type: napalm tank

↳*Mixed Ordnance 8*

Combat Load : rds4.0

Name: KMGU-2 (sub munition dispensers)

Type: submunition dispensers

↳*Mixed Ordnance 9*

Combat Load : rds4.0

Type: bomb

Weight : kg250.0

↳*Weapon 1*

Caliber/Length : mm30.0

Name: Gsh-30-1

Type: canon

↳*Weapon 2*

Combat Load : rds150.0

Performance

Ceiling : m18000.0

Combat Range, with External Fuel : km1500.0

Combat Range, with Internal Fuel : km710.0

Ferry Range : km2900.0

Power Plant/Engine: Kimov/Sakisov RD-33 Turbofans (18,300 lbs.) (2 ea); 14,550 lbs. thrust Wopen-13 turbofan (J-8) (1 ea)

Speed, Maximum “G” Force : g9.0

Speed, Maximum, at altitude : km/h2400.0

Speed, Maximum, low or sea level : km/h1500.0

Takeoff Run/Landing Roll : m550/900

Vertical Climb Rate : m/s330.0

Notes:

The Mikoyan MiG-29 (Russian: Микоян МиГ-29; NATO reporting name: Fulcrum) is a twin-engine jet fighter aircraft designed in the Soviet Union. Developed by the Mikoyan design bureau as an air superiority fighter during the 1970s, the MiG-29, along with the larger Sukhoi Su-27, was developed to counter new U.S. fighters such as the McDonnell Douglas F-15 Eagle and the General Dynamics F-16 Fighting Falcon. The MiG-29 entered service with the Soviet Air Forces in 1982. While originally oriented towards combat against any enemy aircraft, many MiG-29s have been furnished as multirole fighters capable of performing a number of different operations, and are commonly outfitted to use a range of air-to-surface armaments and precision munitions. The MiG-29 has been manufactured in several major variants, including the multirole Mikoyan MiG-29M and the navalised Mikoyan MiG-29K; the most advanced member of the family to date is the Mikoyan MiG-35. Later models frequently feature improved engines, glass cockpits with HOTAS-compatible flight controls, modern radar and IRST sensors, and considerably increased fuel capacity; some aircraft have also been equipped for aerial refuelling. Following the dissolution of the Soviet Union, the militaries of a number of former Soviet republics have continued to operate the MiG-29, the largest of which is the Russian Air Force. The Russian Air Force wanted to upgrade its existing fleet to the modernised MiG-29SMT configuration, but financial difficulties have limited deliveries. The MiG-29 has also been a popular export aircraft; more than 30 nations either operate or have operated the aircraft to date, India being one of the largest export operators of the type. In 2013 the MiG-29 was still in production by Mikoyan, a subsidiary of United Aircraft Corporation (UAC) since 2006. Sharing its origins in the original PFI requirements issued by TsAGI, the MiG-29 has broad aerodynamic similarities to the Sukhoi Su-27, however, there are some notable differences. The MiG-29 has a mid-mounted swept wing with blended leading-edge root extensions (LERXs) swept at around 40°; there are swept tailplanes and two vertical fins, mounted on booms outboard of the engines. Automatic slats are mounted on the leading edges of the wings; they are four-segment on early models and five-segment on some later variants. On the trailing edge, there are maneuvering flaps and wingtip ailerons. The MiG-29 has hydraulic controls and a SAU-451 three-axis autopilot but, unlike the Su-27, no fly-by-wire control system. Nonetheless, it is very agile, with excellent instantaneous and sustained turn performance, high-alpha capability, and a general resistance to spins. The airframe consists primarily of aluminum with some composite materials,[specify] and is stressed for up to 9 g (88 m/s²) maneuvers. The controls have "soft" limiters to prevent the pilot from exceeding g and alpha limits, but the limiters can be disabled manually.

FC-1 Xiaolong Chinese Multirole Combat Aircraft







Tiers:

1 **2** 3 4

System

Alternate Designation(s): FC-1 Xiaolong
Primary Function / Type: Multirole Combat Aircraft
Manufacturer: Chengdu Aircraft Industry Group
Crew: 1 (single-seat) or 2 (dual-seat)
Number of Engines: 1
Number of Hard Points: 7 (2 × wing-tip, 4 × under-wing, 1 × under-fuselage) with capacity for dual ejector racks on each under-wing hardpoint

Dimensions

Length: 14.93 m
Width (Wing Span): 9.44 m
Height: 4.77 m
Wing Area: 24.43 m2
Empty Weight: 6,586 kg
Max Takeoff Weight: 12,700 kg
Payload: 4,600 kg

Automotive

Engine Name: 1 × Klimov RD-93MA afterburning turbofan with digital electronic engine control (DEEC)
Number of Engines: 1

Engine Type: Afterburning Turbofan

Engine Power: 50.4 kN (11,300 lbf) thrust [197] dry, 85.6 kN (19,200 lbf) with afterburner

Maximum Speed: Mach 1.6

Cruise Speed: 1,359 km/h

Stall Speed: 150 km/h

Maximum Range: 2,500 km

Combat Range: 1,352 km

Ferry Range: 3,500 km

Service Ceiling: 16,930 m

G Limits: +8/-3 (limited by flight control system)

Rate of Climb: 300 m/s

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: mm23

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gas principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm23

Cartridge: 23x115 mm

Basic Load: INA

Main Missile Systems

↳*Main Missile System #1*

Name: PL-5EII

Type: Short-Range Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factor

Length: 2.893m

Diameter: 0.127m

Wingspan: 0.617m

Weight: 83kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 16~18km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector

↳*Main Missile System #2*

Name: PL-9C

Type: Infrared-Homing Air-to-Air Missile

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Weight: 115kg

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km (PL-9C, air-to-air), > 8km (surface-to-air)

Flight Altitude: 4.5km (surface-to-air)

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

↳*Main Missile System #3*

Name: AIM-9L

Type: Short-Range Air-to-Air Missile

Manufacturer: Raytheon Company Ford Aerospace Loral Corp.

Length: 3.02 m

Diameter: 127.0 mm

Wingspan: 279.4 mm

Weight: 85.3 kg

Warhead Type: WDU-17/B annular blast-frag

Warhead Weight: 9.4 kg

Detonation Mechanism: IR proximity fuze

Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket

Operational Range: 1.0 to 35.4 km

Maximum Speed: Mach 2.5+

Guidance System: Infrared homing

Bomb Weapon Systems

↳*Bomb #1*

Name: Mark 82

Type: Unguided General-Purpose Bomb

Length: 2.22 m

Diameter: 273 mm

Weight: 227 kg

Filling: Tritonal, Minol (explosive) or Composition H6

Filling Weight: 87 kg

Cook Off Time: approximately 2 minutes 30 seconds.

↳*Bomb #2*

Name: Mark 83

Type: Unguided General-Purpose Bomb

Length: 3000 mm

Diameter: 357 mm

Weight: 459 kg

Filling: Tritonal, Minol or Composition H6

Filling Weight: 202 kg

Note: The Mk 83 is a streamlined steel casing containing 445 lb (202 kg) of tritonal high explosive. When filled with PBXN-109 thermally insensitive explosive, the bomb is designated BLU-110.

↳*Bomb #3*

Name: Mark 84

Type: General-Purpose Bomb

Length: 3280 mm

Diameter: 458 mm

Weight: 925 kg

Filling: Tritonal, Minol or Composition H6

Filling Weight: 429 kg

Note: It is a streamlined steel casing filled with 945 lb (429 kg) of Tritonal high explosive.

Fire Control / Avionics

Fire Control Radar: KLJ-7 v2 Airborne Pulse Doppler Fire-Control Radar (Range-150 km for 3m2 RCS aircraft.)

Radar Warning Receiver: Northrop Grumman ALR-67 Rader Warning Recever (RWR)

Airborne Missile Approach Warning System: S740 Airborne Missile Approach Warning System (MAWS)

Tactical Data Link: Link-17 Tactical Data Link and the MIL-STD-1760 data-bus

Advanced Targeting Pod Electro-Optical Reconnaissance, Surveillance, and Targeting System: Aselsan ASELPOD Advanced Targeting Pod Electro-Optical Reconnaissance, Surveillance, and Targeting System

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

EW Counter Measures: Indra ALQ-500P Electronic Countermeasure (ECM)

Chaffs/Flares: Yes

Jamming Pod: KG300G Airborne Self-Protection Jamming Pod and KG600 Airborne Self-Protection Jamming Pod

Notes:

The PAC JF-17 Thunder (Urdu: جے ایف-۱۷ گرج), or CAC FC-1 Xiaolong (pinyin: Xiāo Lóng; lit.: 'Fierce Dragon'), is a lightweight, single-engine, multi-role combat aircraft developed jointly by the Pakistan Aeronautical Complex (PAC) and the Chengdu Aircraft Corporation (CAC) of China. It was designed to replace the A-5C, F-7P/PG, Mirage III, and Mirage V combat aircraft in the Pakistan Air Force. The JF-17 can be used for multiple roles, including interception, ground attack, anti-ship, and aerial reconnaissance. Its designation "JF-17" by Pakistan is short for "Joint Fighter-17", while the designation and name "FC-1 Xiaolong" by China means "Fighter China-1 Fierce Dragon". The JF-17 can deploy diverse ordnance, including air-to-air and air-to-surface missiles, and a 23 mm GSh-23-2 twin-barrel autocannon. Powered by a Guizhou WS-13 or Klimov RD-93 afterburning turbofan, it has a top speed of Mach 1.8. The JF-17 is to become the backbone of the Pakistan Air Force (PAF), complementing the General Dynamics F-16 Fighting Falcon at half the cost. The PAF inducted its first JF-17 squadron in February 2010. In 2015 Pakistan produced 16 JF-17s. As of 2016, Pakistan is believed to have the capacity to produce 25 JF-17 per year. 58% of the airframe is Pakistani and 42% Chinese/Russian-origin. As of December 2016 Pakistan Aeronautical Complex has manufactured 70 jets in the country for use by the Pakistan Air Force of the Block 1 type,and 33 jets of the Block 2 type. The Pakistan Air Force plans, by 2017, to induct a twin-seater version known as the JF-17B for both enhanced operational capability and training. Preparations for a more advanced and technologically sophisticated block III version of the aircraft are underway and the AESA radar, KJ-7A, has been developed, which can track 15 targets and engage 4 targets simultaneously. Since its induction in 2011, the JF-17 Thunder has accumulated 19,000 hours of operational flight. The JF-17 has seen active military service as it is used by the Pakistan Air Force to bomb militant positions in North Waziristan, using both unguided munitions and guided missiles for precision strike capability. The air frame is of semi-monocoque structure constructed primarily of aluminum alloys. High strength steel and titanium alloys are partially adopted in some critical areas. The air frame is designed for a service life of 4,000 flight hours or 25 years, the first overhaul being due at 1,200 flight hours. Block 2 JF-17s incorporate greater use of composite materials in the air frame to reduce weight. The retractable undercarriage has a tricycle arrangement with a single steerable nose-wheel and two main undercarriages. The hydraulic brakes have an automatic anti-skid system. The position and shape of the inlets is designed to give the required airflow to the jet engine during maneuvers involving high angles of attack. The mid-mounted wings are of cropped-delta configuration. Near the wing root are the LERX, which generate a vortex that provides extra lift to the wing at high angles of attack encountered during combat maneuvers. A conventional tri-plane empennage arrangement is incorporated, with all-moving stabilators, single vertical stabiliser, rudder, and twin ventral fins. The flight control system (FCS) comprises conventional controls with stability augmentation in the yaw and roll axis and a digital fly-by-wire (FBW) system in the pitch axis. The leading edge slats/flaps and trailing edge flaps are automatically adjusted during manoeuvring to increase turning performance. The FCS of serial production aircraft reportedly have a digital quadruplex (quad-redundant) FBW system in the pitch axis and a duplex (dual-redundant) FBW system in the roll and yaw axis. The glass cockpit is covered by a transparent, acrylic canopy that provides the pilot with a good, all-round field of view. It has three large Multifunction Colour Displays (MFD) and smart Heads-Up Display (HUD) with built-in symbol generation capability. A centre stick is used for pitch and roll control while rudder pedals control yaw. A throttle is located to the left of the pilot. The cockpit incorporates hands-on-throttle-and-stick (HOTAS) controls. The pilot sits on a Martin-Baker Mk-16LE zero-zero ejection seat. The cockpit incorporates an electronic flight instrument system (EFIS) and a wide-angle, holographic head-up display (HUD), which has a minimum total field of view of 25 degrees. The EFIS comprises three colour multi-function displays, providing basic flight

information, tactical information, and information on the engine, fuel, electrical, hydraulics, flight control, and environment control systems. The HUD and MFD can be configured to show any available information. Each MFD is 20.3 cm (8.0 in) wide and 30.5 cm (12.0 in) tall and is arranged side by side in portrait orientation. The central MFD is placed lowest to accommodate a control panel between it and the HUD. Up to 3,629 kg (8,001 lb) of ordnance, equipment, and fuel can be mounted under the hard points, two of which are on the wing-tips, four are under the wings and one is under the fuselage.

→→Bomber Aircraft

Tu-22M (Backfire) Russian Long-Range Strategic Bomber







Tiers:



Variants:

- **FURTHER UPGRADES ARE EXPECTED FOR DELIVERY OF ADDITIONAL PRECISION MUNITIONS.:** FURTHER UPGRADES ARE EXPECTED FOR DELIVERY OF ADDITIONAL PRECISION MUNITIONS.
- **TU-22M2 BACKFIRE-B :** THE INITIAL PRODUCTION MODEL. A REFUELING PROBE CAN BE FITTED, HOWEVER MOST HAVE BEEN REMOVED. DEVELOPED FOR THE LONG-RANGE STRATEGIC BOMBING ROLE.
- **TU-22M2YE BACKFIRE-B:** THIS VARIANT HAS THE NEW NK-55 ENGINES AND ADVANCED FLIGHT CONTROL SYSTEM. FLIGHT CHARACTERISTICS WERE NOT IMPROVED.
- **TU-22M3 BACKFIRE-C:** UPGRADES RESULTED IN NEW RADAR, ENGINE INTAKES, AND ENGINES. THE AIRCRAFT HAS AN IMPROVED WEAPONS CAPABILITY, INCREASING THE BOMB AND CRUISE MISSILE PAYLOADS.
- **TU-22MR:** 1985 RECON VARIANT WITH SHOMPOL SLAR AND ELINT EQUIPMENT. TU-22MP: IW VARIANT, CURRENTLY UNFIELDED

System

Crew: 4.0
Weight, Empty : kg49500.0
Weight, Maximim Takeoff : kg126000.0

↳Avionics/Sensor/Optics

Type 1: Automatic high- and low-altitude preprogrammed flight control, with automatic approach
Type 2: Secure SATCOM datalink receiver and comms
Type 3: Missile targeting and navigation radar
Type 3: Video camera to provide visual assistance for weapons aiming at high altitude
Type 4: TV remote gun and bomb sights

Type 5: PRS-3/Argon-2 ranging radar

Type 6: PNA-D attack radar

↳*Dimensions*

Height : m10.8

Length : m42.4

Width, Wingspan : m34.3/23.4

↳*Fuel and Load*

Fuel Capacity, Internal : liters16500.0

Weight, Standard Payload : kg24000.0

Performance

Ceiling : m17000.0

Combat Radius : km4000.0

Night/Weather Capabilities: Good

Power Plant/Engine: Engines 50,000 lbs. thrust NK-25 turbofans (2 ea)

Speed, Cruising : km/h800.0

Speed, Maximum “G” Force : g2.5

Speed, Maximum, at altitude : km/h2327.0

Takeoff Run/Landing Roll : m2000-2100/12000-1300

Weight, Standard Payload, External : kg12000.0

Weight, Standard Payload, Internal : kg12000.0

Armament

↳*Mixed Ordnance 1*

Combat Load : rds1 to 3

Type: ASM

↳*Mixed Ordnance 2*

Combat Load : rds6.0

Name: AS-16

Type: short attack missile

↳*Mixed Ordnance 3*

Combat Load : rds2.0

Type: bomb

Weight : kg3000.0

↳*Mixed Ordnance 4*

Combat Load : rds42.0

Type: bomb

Weight : kg500.0

↳*Mixed Ordnance 5*

Combat Load : rds69.0

Type: bomb

Weight : kg250.0

↳*Mixed Ordnance 6*

Combat Load : rds69.0

Type: bomb

Weight : kg100.0

↳*Mixed Ordnance 7*

Combat Load : rds8.0

Type: mine

Weight : kg15000.0

↳*Weapon 1*

Caliber/Length : mm23.0

Quantity : ea1.0

Type: twin barrel gun

Notes:

The Tupolev Tu-22M (also known as Backfire) is a long-range strategic and maritime strike bomber developed by Tupolev for the Soviet Air Force. The aircraft is currently in service with the Russian Air Force and Russian Naval Aviation. The Tu-22M was based on the design of the Tu-22 aircraft. The first Tu-22M-0 prototype completed its maiden flight in August 1969. The Tu-22M-1 first flew in July 1971 and the Tu-22M was first deployed in combat missions in Afghanistan between 1987 and 1989. The Tu-22M3 was used by Russia for combat operations in Chechnya in 1995. The aircraft is primarily used to conduct nuclear strike and conventional attack operations. It can also be deployed in anti-ship and maritime reconnaissance missions. The earliest pre-production aircraft produced was the Tu-22M0. Its production was limited to small numbers due to inadequate performance. It was followed by the Tu-22M1 pilot-production aircraft for the Soviet Naval Aviation. Production on the first major production version, Tu-22M2 began in 1972. It was equipped with extended wings and a redesigned fuselage, twin engines and a new undercarriage. The Tu-22M3 was introduced with upgraded features to overcome the shortfalls of its predecessor. The aircraft completed its first flight in June 1977 and was inducted into the inventory in 1983. Some of the Tu-22Ms were also modified to Tu-22MR and Tu-22ME standard. The Tupolev Tu-22M incorporates a long variable sweep wing fuselage design. The aircraft features a stepped cockpit and variable-geometry outer wing panels. The tail fin is swept-back and tapered with a square tip. The flats mounted on the centre of body are pointed with blunt tips and each wing includes a centre section and two outer panels. The outer wings are attached to the centre section through hinged joints. Tu-22M3 has a length of 42.4m, maximum wing span of 34.2m, and a height of 11.05m. The empty weight and maximum takeoff weights of the aircraft are 53,500kg and 126,400kg respectively. The semi-glass cockpit accommodates a crew of four on upward-firing ejection seats. It is equipped with dedicated panels for pilots, navigator-operator and commander, with entry provided through individual doors. The pressurised cockpit is equipped with climate control systems. The aircraft is provided with hard points to carry Kh-22 stand-off missiles, Kh-15 nuclear or Kh-15P anti-radar missiles and FAB-250 or FAB-1500 free fall bombs. The wing and fuselage pylons and internal weapons bay are provided with a capacity to carry 24,000kg of weapons payload. The aircraft

is also armed with a double-barrelled GSH-23 (23mm) gun in remotely controlled tail turret. The aircraft is fitted with PN-A/PN-AD bombing-navigation radar system, Argon-2 radar fire-control system and a TV-based backup optical bomb sight. The countermeasures are provided by a radar warning receiver, radio-frequency jammers, and updated defensive countermeasures gear. The Tu-22M3 is powered by two Kuznetsov NK-25 turbofan engines installed in the body with large air intakes and dual exhausts. Each engine produces a maximum thrust of 25,000kg and delivers an improved fuel economy. The aircraft is equipped with tricycle landing gear to support operations on unprepared runways. The nose gear includes backward retractable twin wheels. Each main landing gear unit consists of six wheels in a 2×3 bogie arrangement. These are retracted straight in to the fuselage. The Tu-22M2 was equipped with twin brake slides and a runway arresting hook. Performance of the Tu-22M3 The Tu-22M3 can fly at a maximum altitude of 14,000m and the rate of climb of the aircraft is 15m/s. The aircraft has a cruise speed of 900km/h and maximum speed of 2,300km/h. The operational range of the aircraft is 7,000km. The aircraft can be equipped with refuelling probes to allow in-flight refuelling for extended range.

H-6 Chinese Strategic Bomber





Tiers:



Variants:

- **Production Variants:** Xian H-6 – Conventional bomber. Tupolev Tu-16 produced under license in China, first flew in 1959. A prototype conducted China's first aerial nuclear weapon test at Lop Nor on 14 May 1965. Xian H-6A – Nuclear bomber. Xian H-6B – Aerial reconnaissance variant. Xian H-6C – Conventional bomber with improved counter-measures suite. Initially designated H-6III. Xian H-6D – Anti-ship missile carrier introduced in early 1980s, armed with two air-launched C-601 missiles, one mounted under each wing. Fitted with larger radome under the nose and various improved systems. Later upgraded to either two C-301 supersonic anti-ship missiles, or four C-101 supersonic anti-ship missiles. An upgraded version, capable of carrying four YJ-8 (C-801) anti-ship missiles is currently under development. Initially designated H-6IV. Xian H-6E – Strategic nuclear bomber with improved counter-measures suite, entered service in 1980s. Xian H-6F – New designation for upgraded H-6A and H-6C. Many aircraft upgraded in the 1990s with new inertial navigation systems, doppler navigation radar and GPS receiver. Xian H-6G – Provides targeting data to ground-launched cruise missiles, built in the 1990s. No internal bomb bay or defensive armament. Electronic-warfare aircraft with underwing electronic countermeasures pods.[28] Xian H-6H – Land-attack cruise missile carrier armed with two missiles, built in the 1990s. No internal bomb bay or defensive armament. Xian H-6K – Latest H-6 variant, re-engined with D-30KP turbofan engines of 12,000 kg thrust replacing the original Chinese turbojets. Other modifications include larger air intakes, re-designed flight deck with smaller/fewer transparencies and large dielectric nose radome. Xian H-6J – Version of H-6K for use by the People's Liberation Army Navy Air Force (PLANAF) to replace the H-6G; has greater payload and range with performance similar to H-6K. Xian H-6M – Cruise missile carrier, fitted with terrain-following system and four under-wing hardpoints for weapons carriage. No internal bomb bay or defensive armament. Production of this variant is believed to have resumed in early 2006. Xian H-6N/H-6X1 – Air-launched ballistic missile carrier in service as of 2019. This variant has a semi-recessed area hard point underneath its fuselage. It is capable of mounting an air-derivative of the Dongfeng-21D anti-ship ballistic missile or the CJ-100 supersonic cruise missile, with an added 3,700 mile range including aerial refueling or a variety of other oversized payloads - including those with nuclear warheads.[36] It may be also possible that the modification is to enable carriage of the WZ-8 high-speed, high-altitude reconnaissance unmanned aerial vehicle. Xian HD-6 (Hongzhaji Dian-6) – Electronic warfare version with solid nose and canoe fairing believed to contain electronic counter-measures equipment.
- **Aerial refuelling versions:** Xian HY-6 (Hongzhaji You-6) – First successful in-flight refuelling tanker variant in Chinese service. Retained PV-23 fire control system of H-6 and thus can still be deployed as a missile launcher. Xian HY-6U – Modified HY-6 tanker in service with the PLAAF, with PV-23 fire control system and Type 244 radar deleted, and thus a dedicated refueling aircraft Also referred as H-6U Xian HY-6D – First aerial refueling tanker for PLANAF, converted from H-6D. The most distinct difference between HY-6U and HY-6D is that HY-6U has a metal nose cone, while HY-6D still has the transparent class nose. Like the original HY-6, PV-23 fire control system is also retained on HY-6D, which enables the aircraft also to serve as a missile carrying and launching platform. Xian HY-6DU – Aerial refuelling tanker for the PLANAF, modified HY-6D, also referred as H-6DU. Similar to HY-6U, HY-6DU is a dedicated aerial refueling tanker when its PV-23 fire control system is removed from the aircraft.

System

Alternate Designation(s): Xian H-6
Primary Function / Type: Strategic Bomber
Manufacturer: Xi'an Aircraft Industrial Corporation

Crew: 4

Number of Engines: 2

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: INA

Dimensions

Length: 34.8 m

Width (Wing Span): 33 m

Height: 10.36 m

Wing Area: 165 m2

Weight, Empty: 37,200 kg

Gross Weight: 76,000 kg

Max Takeoff Weight: 79,000 kg

Automotive

Engine Name: 2 × Xian WP-8 turbojet engines

Number of Engines: 2

Engine Power: Thrust/weight: 0.24

Range: 6,000 km (3,700 mi, 3,200 nmi)

Combat Range: 6,000 km (3,700 mi, 3,200 nmi)

Maximum Speed: 1,050 km/h (650 mph, 570 kn)

Cruise Speed: 768 km/h (477 mph, 415 kn) / 0.75M

Service Ceiling: 12,800 m (42,000 ft)

Wing Loading: 460 kg/m2 (94 lb/sq ft)

Communications

Radio: INA

Cannon Weapon System

Note: The X-6 has a total of 7 Nudelman-Rikhter NR-23 Cannons located throughout the aircraft. * 2× 23 mm (0.906 in) Nudelman-Rikhter NR-23 cannons in remote dorsal turret * 2× NR-23 cannons in remote ventral turret * 2× NR-23 cannons in manned tail turret * 1× NR-23 cannons in nose (occasional addition)

↳*System*

Name: Nudelman-Rikhter NR-23

Type: Single-barrel, short recoil-operated 23 mm (0.90 in) cannon.

Caliber: 23mm

Length: 1,980 mm

Barrel Length: 1,450 mm

Width: 165 mm

Height: 136 mm

Weight: 39 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 800–850 rpm

Muzzle Velocity: 690 m/s

↳*Ammunition*

Type: Rifle, Cannon

Caliber: 23mm

Cartridge: 23×115 mm (0.90 in)

Basic Load: INA

Missile Weapon Systems

Available Missiles: *6 or 7 KD-88 missile (anti-ship or air- to-surface) *YJ-100 (CJ-10) anti-ship missile *C-601 anti-ship missile *YJ-62 (C-602) anti-ship missile *C-301 anti-ship missile *C-101 anti-ship missile *CM-802A *YJ-12 anti-ship missile *DF-21D (H-6N)

↳*Missile System (Option 1)*

Name: SY-1 (Silkworm)

Type: Anti-Ship Missile

Basic Load: INA

Manufactuer: Nanchang Aircraft Factory (Chinese)

Proliferation: INA

Length: 6.55 m

Diameter: 0.76 m

Wingspan: 2.4 m

Warhead Type: Shaped charge high explosive

Warhead Weight: 513 kg

Weight, Total: 2,095 kg

Propulsion: One liquid rocket engine and one solid rocket booster

Speed: Mach 0.8

Range: 150 km

Cruising Altitude: < 20 metres

Guidanc System: Inertial guidance + active conical scanning terminal guidance radar (SY-1); or inertial + active monopulse radar (SY-1A)

Single-Shot Kill Probability: 70%

Bombs

Bomb Bay Capacity: 9,000 kg (20,000 lb) of free-fall weapons

Available Bombs: *GB6 *CS/BBC5 *GB2A *GB5

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Protection

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Xian H-6 (Chinese: □-6; pinyin: Hōng-6) is a licence-built version of the Soviet Tupolev Tu-16 twin-engine jet bomber, built for China's People's Liberation Army Air Force (PLAAF). Delivery of the Tu-16 to China began in 1958, and the Xi'an Aircraft Industrial Corporation (XAC) signed a licence production agreement with the USSR to build the type in the late 1950s. The first Chinese Tu-16, or "H-6" as it was designated in Chinese service, flew in 1959. Production was performed by the plant at Xian, with at least 150 built into the 1990s. China is estimated to currently operate around 120 of the aircraft. The latest version is the H-6N, a heavily redesigned version capable of aerial refueling and carrying air-launched cruise missiles. According to United States Department of Defense, this will give the PLAAF a long-range standoff offensive air capability with precision-guided munitions. The first domestically produced H-6 was completed in 1968 and evidence of bombing training was recorded by U.S. spy satellites on August 13, 1971. By March of the following year, the CIA estimated that the PRC had 32 aircraft operational with an additional 19 awaiting completion. The H-6 was used to drop nine nuclear devices at the Lop Nur test site. However, with the increased development in ballistic missile technology, the nuclear delivery capabilities that the H-6 offered diminished in importance. The CIA estimated in 1976 that the H-6 had moved over to a dual nuclear/conventional bombing role. Along with the H-6 free-fall bomber, an "H-6A" nuclear bomber was built, as well as an "H-6B" reconnaissance variant, "H-6C" conventional bomber and "H-6E" nuclear bomber with improved countermeasures, the "H-6D" anti ship missile carrier, and the "HY-6" series capable of acting as an in-flight fuel tanker. The H-6D was introduced in the early 1980s and carried a C-601 anti shipping missile (NATO codename "Silkworm"), an air-launched derivative of the Soviet P-15 Termit ("Styx") under each wing. The H-6D featured various modernized systems and sports an enlarged radome with a Type 245 Kobalt I-band surveillance radar under the nose. The Type 245 radar was based on the Soviet PSBN-M-8 NATO codename Mushroom radar used on the Tupolev Tu-16. Earlier versions (Type 241, 242 and 244) were installed on the early models of the H-6. The H-6 has also been used as a tanker and drone launcher. Later H-6 production featured extended curved wingtips. Many H-6A and H-6C aircraft were updated in the 1990s to the "H-6F" configuration, the main improvement being a modern navigation system, with a Global Positioning System (GPS) satellite constellation receiver, Doppler navigation radar, and inertial navigation system. New production began in the 1990s as well, with Xian building the "H-6G", which is a director for ground-launched cruise missiles; the "H-6H", which carries two land-attack cruise missiles. In terms of land attack cruise missiles five immediate possibilities were considered by PLAAF - the indigenous HN-1, HN-2 and HN-3, DH-10/CJ-10, and a variant of Russian designed cruise missile. It is believed CJ-10 is chosen to be the main land attack missile for H-6 bombers, and now the "H-6M" cruise missile carrier, which has four pylons for improved cruise missiles and is fitted with a terrain-following system. Apparently these variants have no internal bomb capability, and most or all of their defensive armament has been deleted.

H-5 (Hongzhaji-5) Chinese Twin-Engine Light Bomber







Tiers:



Variants:

- **Il-28 Beagle:** This was the original Soviet light bomber from which the H-5 is derived. See separate database entry.
- **H-5:** This is the basic bomber in a three-seat configuration.
- **HD-5 electronic warfare aircraft:** This variant was designed for electronic warfare missions. The twin 23-mm cannon turret was removed to make room for the electronic warfare/electronic countermeasures suite. The EW/ECM suite, which reportedly utilized only analog technology, could intercept, identify and jam hostile land-based or shipborne radar emitters. The HD-5 usually operated in groups of three to cover all frequency spectrums. Despite its aging technology, the powerful jammer onboard the aircraft was said to be very effective. The HD-5 was replaced by a more capable EW/electronic intelligence platform based on the Y-8 airframe.
- **HJ-5 Mascot:** This was a two-seat trainer version. First flight occurred in December 1970, and it entered service in 1972. The type was retired in 1986.
- **HZ-5:** This was a three-seat reconnaissance version.

System

Alternate Designation(s): H-5 (Hongzhaji-5)
Primary Function / Type: Light Bomber Aircraft
Manufacturer: Harbin Aircraft Manufacturing Corp., Harbin, China
Crew: 3 (pilot, navigator/bombardier, radio operator/gunner)
Number of Engines: 2
Number of Hard Points: 4

Dimensions

Length: 17.65 m
Height: 6.68 m
Width (Wing Span): 21.45 m

Wing Area: 60.87 m sq

Weight, Empty: 12,890 kg

Weight, Maximum Takeoff: 21,200 kg

Weight, Maximum Weapons Load: 3,000 kg

Weight, Normal Weapons Load: 1,000 kg

Automotive

Engine Name: 2 x Wopen-5

Number of Engines: 2

Engine Type: Turbojet

Engine Power: 5,952 lb (2,700 kg) static thrust each

Fuel Capacity: 7,910 liters

Maximum Speed: 900 km/h

Cruising Speed: 769 km/h

Ceiling: 12,500 m

Rate of Climb: 900 m/min

Maximum Range: 3,550 km

Radius: 1,100 km

Main Gun System

↳*System*

Name: Nudelman-Rikhter NR-23

Type: Autocannon

Caliber: 23mm

Quantity: 4 x 23-mm NR-23 cannon (2 fixed in nose and two in tail position)

Length: 1,980 mm

Barrel Length: 1,450 mm

Width: 165 mm

Height: 136 mm

Weight: 39 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 800–850 rpm

Muzzle Velocity: 690 m/s

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: INA

Basic Load: 650 Rounds

Bombing System

Weapons Bay Maximum Capacity: 3,000 kg of bombs or torpedoes in internal weapons bay, including combinations of 1,100 lb (500 kg) bombs, 53VA torpedoes, Type 1 550 lb (250 kg) bombs or a single FAB-3000 (on overload)

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

H-5 Light Bomber The reports of the demise of the H-5 seem somewhat exaggerated. It was asserted without citation in 1995 that the H-5 had been withdrawn from service, but the continued presence of the H-5 in the PLAAF inventory is widely attested by subsequent sources. The light bomber is a kind of tactical bomber and is used for close air support to the ground troop operations. Its bomb load is small but it is light, manoeuvrable and agile and has some peculiarities which make it irreplaceable by medium bombers. The Il 28 was the Soviet Union's standard light bomber, and was in use in all air forces of the Soviet Bloc. The 11-28 aircraft is a light bomber designed and produced in the Soviet Union. It flew for its first time in 1947 and entered into service in 1950. It was put into production in large quantities and was widely used in 1950s and 1960s because of its simple structure and low price. This aircraft was produced in China under the nomenclature H-5. The H-5 was a light subsonic bomber with a cantilever high set wing. The high-mounted wings have a straight leading edge and forward-tapered trailing edge with blunt tips. Two turbojets are mounted beneath the wings in pods. Pods extend beyond wings' leading and trailing edges. The fuselage is tubular and cigar-shaped tapering to the rear with a rounded, glassed-in nose and bubble canopy. The tail fin is swept-back and tapered with a blunt tip. Flats are low-mounted on the fin, swept-back, and tapered with blunt tips. A glassed-in tail gunner compartment is to the rear of the tail. The prototype production of the H-5 was different from that of the H-6. It was not a complete licenced production, because a great number of design modifications were incorporated according to the military Services' operational requirements. The design modifications were made possible by the following: China imported a number of 11-28 bombers and a lot of suggestions were made by the military Services based on a long period of operation; the Harbin Aircraft Factory had repaired the I1-28s since the mid-1950s, manufactured main parts and components for the purpose of repairing and, therefore, mastered necessary manufacturing techniques, the factory was expanded and reconstructed on a large-scale for purpose of the H-6's prototype production and had capabilities for manufacturing production tooling, assembling a complete aircraft and then testing it in flight; and finally the factory had experienced prototype productions of the Z-5 helicopter and the H-6 medium bomber. The Chinese built H-5 light bomber is an equivalent of the 11-28 aircraft but with some local improvement in design. Forty per cent of the original I1-28 design was modified. Main modifications were: A conventional structure wing was used to replace the wing which was spliced at the central line and, therefore, 110 kg of weight was saved. Major airborne equipment were in common with that of the H-6. One example was use of H-6's tail turret. Of course it introduced corresponding structure changes. The operational performance was remarkably improved by use of a great number of new airborne equipment: a new radar with significantly increased operational range, a new sight which increased aiming angle and observation angle and hence bombing precision, the new turrent with an electrical control system which was good in the follow-up behavior, an increased ammunition capacity, higher rate of fire and longer effective firing range; and a new and

improved friend-or-foe identification. The Harbin Aircraft Factory initiated their preparation for the trial-production of the H-5 in 1963. They first corrected the drawings used for aircraft repair, and then supplemented with some drawings and data of stress analysis and aerodynamic computation and prepared a complete set of processing documents. The manufacturing of production tooling and aircraft parts began in 1964. Two prototype aircraft were completed in 1966 and one of them was used for static test. The static test was carried out from July to September and it proved that the structure strength was in conformity with the technical requirement. Another prototype flew for its first time on September 25, 1966. The H-5 aircraft was formally put into production in April, 1967. Hu Xichuan, chief engineer, Qi Zhikun, vice chief engineer, Xiong Wenjie and Li Guangshu who were in charge of the design work, made active contributions to the development of the H-5. Sun Zhaoqing who was in charge of manufacturing techniques and his colleagues made bold innovations in managing manufacturing techniques. They applied some new techniques such as the plastic molds, combined fixtures and explosive forming, etc. so that the product quality was improved and the prototype production was completed in a shorter period of time. With support from various departments and agencies all over the country most of the necessary 3,200 materials and 334 vendor furnished equipment could be manufactured in China. The success in partial redesign of the H-5 marked the breaking away from the yoke of pure licenced production in area of bomber technology and the beginning of transition from modification and derivation to independent development. Several derivatives were developed on the basis of the requirement of the military Services after the H-5 aircraft was certified and put into production. The PLA Air Force is equipped with several dozen of special-purpose electronic aircraft, including a few specially modified Hongdian-5 light bombers which have been equipped to support electronic warfare operations. However, the PLAAF remains some 15 years behind world standards in this field.

Il-28 (Beagle) Russian Twin-Engine Light Bomber







Tiers:



Variants:

- **Il-28:** Basic three-seat bomber version, powered by two VK-1 engines.
- **Il-28U:** Unarmed training version fitted with new nose housing cockpit for instructor, while the trainee sat in the normal cockpit. First flown 18 March 1950.
- **Il-28R:** Three-seat tactical photo reconnaissance version, with extra fuel in bomb bay and tip-tanks, and with one forward firing cannon removed. Fitted with revised undercarriage to deal with heavier weights. First flew 19 April 1950.
- **Il-28RTR:** ELINT version of Il-28R
- **Il-28REB:** Electronic warfare, electronic jamming version, fitted with wingtip electronic pods, that were in the former wing tanks.
- **Il-28T:** Torpedo bomber version for the Soviet Naval Aviation able to accommodate two small or one large torpedo (including RAT-52 rocket propelled torpedoes) in a lengthened weapons bay.
- **Il-28N:** Nuclear bomber for the Soviet Air Force with modified bomb-bay and revised avionics. (N - Nositel - carrier, also known as Il-28A - Atomnyy - atomic).
- **Il-28P:** Unarmed civil conversion for Aeroflot, used as jet conversion trainer and to carry high priority cargo (i.e. newspaper matrices to allow simultaneous printing of Pravda and Izvestia in Moscow, Sverdlovsk and Novosibirsk). Also designated Ilyushin Il-20.
- **Il-28S:** Proposed swept-wing version with more powerful Klimov VK-5 engines. Unbuilt.
- **Il-28RM:** Modified Il-28R with VK-5 engine. One prototype built plus two similarly converted bombers (which carried no special designation) but no production.
- **Il-28TM:** Il-28T with VK-5. One converted, no production.
- **Il-28PL:** High-speed anti-submarine conversion of Il-28 bomber or Il-28T torpedo bomber. Capable of carrying dropping sonobuoys or acoustic homing torpedoes on direction of other anti-submarine assets.
- **Il-28Sh:** Ground attack (Shturmovik) conversion of Il-28 with 12 underwing pylons for rocket pods. Small number converted which saw limited service.
- **Il-28ZA:** Atmospheric sampling version.
- **Il-28M:** Target drone conversion of Il-28. Also known as M-28.

System

Alternate Designation(s): Il-28; NATO: Beagle
Primary Function / Type: Light Bomber Aircraft
Manufacturer: Ilyushin

Crew: 3 (pilot, navigator/bombardier, radio operator/gunner)

Number of Engines: 2

Number of Hard Points: 4

Dimensions

Length: 17.65 m

Height: 6.68 m

Width (Wing Span): 21.45 m

Wing Area: 60.87 m sq

Weight, Empty: 12,890 kg

Weight, Maximum Takeoff: 21,200 kg

Weight, Maximum Weapons Load: 3,000 kg

Weight, Normal Weapons Load: 1,000 kg

Automotive

Engine Name: 2 x Klimov VK-1A (Rolls Royce Nene) turbojet

Number of Engines: 2

Engine Type: Turbojet

Engine Power: 5,952 lb (2,700 kg) static thrust each

Fuel Capacity: 7,908 liters

Maximum Speed: 900 km/h

Cruising Speed: 769 km/h

Ceiling: 12,500 m

Rate of Climb: 900 m/min

Maximum Range: 3,550 km

Radius: 1,100 km

Main Gun System

↳*System*

Name: Nudelman-Rikhter NR-23

Type: Autocannon

Caliber: 23mm

Quantity: 4 x 23-mm NR-23 cannon (2 fixed in nose and two in tail position)

Length: 1,980 mm

Barrel Length: 1,450 mm

Width: 165 mm

Height: 136 mm

Weight: 39 kg

Barrels: 1

Action: Short recoil

Rate of Fire: 800–850 rpm

Muzzle Velocity: 690 m/s

↳***Ammunition***

Type: Rifle

Caliber: 23mm

Cartridge: INA

Basic Load: INA

Bombing System

Weapons Bay Maximum Capacity: 3,000 kg) of bombs or torpedoes in internal weapons bay

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Ilyushin Il-28 (Russian: Ильюшин Ил-28; NATO reporting name: Beagle) is a jet bomber of the immediate postwar period that was originally manufactured for the Soviet Air Forces. It was the Soviet Union's first such aircraft to enter large-scale production. It was also licence-built in China as the Harbin H-5. Total production in the USSR was 6,316 aircraft, and over 319 H-5s were built. Only 187 examples of the HJ-5 training variant were manufactured. In the 1990s hundreds remained in service with various air forces over 50 years after the Il-28 first appeared. The only H-5s in service currently are approximately 80 aircraft which operate with the Korean People's Air Force. The Il-28 has the USAF/DoD reporting name "Type 27" and NATO reporting name "Beagle", while the Il-28U trainer variant has the USAF/DoD reporting name "Type 30" and NATO reporting name Mascot. After a number of attempts at a four-engined bomber (the Lyulka TR-1 powered Ilyushin Il-22 and the unbuilt Rolls-Royce Derwent powered Ilyushin Il-24), the Ilyushin Design Bureau began development of a new jet-powered tactical bomber in late 1947. Western Intelligence focused on the four-engine developments while the twin-engine Ilyushin Il-28 was created to meet a requirement for a bomber to carry a 3,000 kilograms (6,600 lb) bombload at 800 kilometres per hour (500 mph). The new design took advantage of the sale of a number of Rolls-Royce Nene jet engines by Great Britain to the Soviet Union, which allowed Soviet engineers to quickly produce an unlicensed copy of the Nene, the RD-45, with Ilyushin designing the new bomber around two RD-45s. The Il-28 was smaller than the previous designs and carried a crew of only three (pilot, navigator and gunner). It was also smaller than the competing design from the Tupolev design bureau, the three-engined (i.e. two Nenes and a Rolls-Royce Derwent) Tupolev Tu-73, which had been started long before the Ilyushin project, and flew before

the design of the Il-28 was approved. The Il-28 design was conventional in layout, with high, unswept wings and a swept horizontal tail and fin. The engines were carried in bulky nacelles slung directly under the wings. The nosewheel retracted rearwards, while the main wheels retracted forwards into the engine nacelles. The crew of three were accommodated in separate, pressurised compartments. The navigator, who also acted as bombardier, was accommodated in the glazed nose compartment and was provided with an OPB-5 bombsight based on the American Norden bombsight of the Second World War, while the pilot sat under a sideways opening bubble canopy with an armoured windscreen. The gunner sat in a separate compartment at the rear of the fuselage, operating a power driven turret armed with two Nudelman-Suranov NS-23 23 mm cannons with 250 rounds each. In service, the turret was sometimes removed as a weight saving measure. While the pilot and navigator sat on ejector seats, the gunner had to parachute out of a hatch in the floor in the event of an emergency. Two more fixed, forward-firing 23 mm cannon with 100 rounds each were mounted under the nose and fired by the pilot, while a bomb bay was located in the fuselage, capable of holding four 100 kg (220 lb) bombs in individual containers, or single large bombs of up to 3,000 kg (6,600 lb) slung from a beam in the bomb bay. One unusual design feature of the Il-28 was that the wings and tail were split horizontally through the centre of the wing, while the fuselage was split vertically at the centreline, allowing the separate parts to be built individually and fitted out with systems before being bolted together to complete assembly of the aircraft. This slightly increased the weight of the aircraft structure, but eased manufacture and proved to be more economical. The first prototype, powered by two imported Nenes, made its maiden flight on 8 July 1948, with Vladimir Kokkinaki at the controls. Testing was successful, with the Il-28 demonstrating good handling and reaching a speed of 833 km/h (518 mph). It was followed on 30 December 1948 by the second prototype, with Soviet built RD-45 engines replacing the Nenes. After the completion of state tests in early 1949 the aircraft was ordered into large scale production on 14 May 1949, with the Klimov VK-1, an improved version of the RD-45 to be used in order to improve the aircraft's performance. The first pre-production aircraft with VK-1 engines flew on 8 August 1949, and featured reshaped engine nacelles to reduce drag, while the radome for the navigation radar was moved from the rear fuselage to just aft of the nosewheel. Full production in three factories started in September 1949, with service deliveries starting in early 1950, allowing 25 Il-28s to be displayed at the Moscow May Day parade of 1950 (as ordered by Joseph Stalin when it was ordered into production in 1949). The Il-28 soon became the standard tactical bomber in the Soviet forces and was widely exported.

Tu-95 (Bear) Russian Strategic Bomber Aircraft





Tiers:



Variants:

- **Tu-95/1:** The first prototype powered by Kuznetsov 2TV-2F coupled turboprop engines.
- **Tu-95/2:** The second prototype powered by Kuznetsov NK-12 turboprops.
- **Tu-95:** Basic variant of the long-range strategic bomber and the only model of the aircraft never fitted with a nose refuelling probe. Known to NATO as the Bear-A.
- **Tu-95K:** Experimental version for air-dropping a MiG-19 SM-20 jet aircraft.
- **Tu-95K22:** Conversions of the older Bear bombers, reconfigured to carry the Raduga Kh-22 missile and incorporating modern avionics. Known to NATO as the Bear-G.
- **Tu-95K/Tu-95KD:** Designed to carry the Kh-20 air-to-surface missile. The Tu-95KD aircraft were the first to be outfitted with nose probes. Known to NATO as the Bear-B.
- **Tu-95KM:** Modified and upgraded versions of the Tu-95K, most notable for their enhanced reconnaissance systems. These were in turn converted into the Bear-G configuration. Known to NATO as the Bear-C.
- **Tu-95LAL:** Experimental nuclear-powered aircraft project.
- **Tu-95M:** Modification of the serial Tu-95 with the NK-12M engines. 19 were built.
- **Tu-95M-55:** Missile carrier.
- **Tu-95MR:** Bear-A modified for photo-reconnaissance and produced for Naval Aviation. Known to NATO as the Bear-E.
- **Tu-95MS/Tu-95MS6/Tu-95MS16:** Completely new cruise missile carrier platform based on the Tu-142 airframe. This variant became the launch platform of the Raduga Kh-55 cruise missile and put into serial production in 1981. Known to NATO as the Bear-H and was referred to by the U.S. military as a Tu-142 for some time in the 1980s before its true designation became known. Currently being modernized to carry the Kh-101/102 stealth cruise missiles. 21 aircraft have been modernized as of April 2019.
- **Tu-95MS6:** Capable of carrying six Kh-55, Kh-55SM or Kh-555 cruise missiles on a rotary launcher in the aircraft's weapons bay. 32 were built.
- **Tu-95MS16:** Fitted with four underwing pylons in addition to the rotary launcher in the fuselage, giving a maximum load of 16 Kh-55s or 14 Kh-55SMs. 56 were built.
- **Tu-95MSM:** Modernization of the "Tu-95MS16" bombers, equipped with the new Novella-NV1.021 radar, SOI-021 information display system, Meteor-NM2 airborne defense complex and upgraded Kuznetsov NK-12MPM turboprop engines. First flight scheduled for end of 2019.
- **Tu-95N:** Experimental version for air-dropping an RS ramjet powered aircraft.
- **Tu-95RT:** Variant of the basic Bear-A configuration, redesigned for maritime reconnaissance and targeting as well as electronic intelligence for service in the Soviet Naval Aviation. Known to NATO as the Bear-D.
- **Tu-95U:** Training variant, modified from surviving Bear-As but now all have been retired. Known to NATO as the Bear-T.
- **Tu-95V:** Special carrier aircraft to test-drop the largest thermonuclear weapon ever designed, the Tsar Bomba.
- **Tu-96:** Long-range intercontinental high-altitude strategic bomber prototype, designed to climb up to 16,000–17,000

m.[51] It was a high-altitude version of the Tupolev Tu-95 aircraft with high-altitude augmented turboprop TV-16 engines and with a new, enlarged-area wing. Plant tests of the aircraft were performed with non-high altitude TV-12 engines in 1955–1956.

- **Tu-95 derivatives:** Tu-114 Airliner derivative of Tu-95. Tu-116 Tu-95 fitted with passenger cabins as a stop-gap while the Tu-114 was being developed. 2 were converted.[53] Tu-126 AEW&C derivative of Tu-114, itself derived from the Tu-95. Tu-142 Maritime reconnaissance/anti-submarine warfare derivative of Tu-95. Known to NATO as the Bear-F. Several other modifications of the basic Tu-95/Tu-142 airframe have existed, but these were largely unrecognized by Western intelligence or else never reached operational status within the Soviet military.

System

Alternate Designation(s): Tupolev Tu-95; Bear

Primary Function / Type: Strategic Bomber

Manufacturer: Tupolev

In Service: 1956-Present

Crew: ea7 (pilot, copilot, navigator, navigator/weapons officer, defense systems operator, flight engineer, tail gunner)

Number of Engines: 4

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Pylons: None (Tu-95MS Bear H) 4 (Tu-95MS16 Bear H); two inner pylons on fuselage, one outer pylon on each wing between engines)

:

Dimensions

Length: m49.13

Width (Wing Span): m50.04

Height: m13.30

Weight, Combat (Maximum Take Off): tons185

Weight, Empty: tons91.8

Weight, In-Flight: 187,000 kg, Max after refueling

Weight, Landing: 135,000 kg Max

Fuselage Diameter: 2.90 m

Wheel Base: 14.83 m

Wheel Track: 12.55 m

Wing Area: 289.9 m sq

Automotive

Engine Name: 4 x KKBM (Kuznetsov) NK-12MA turboprops

Number of Engines: 4

Engine Power: 4 x 14 795 hp

Maximum Range: 11 500 km

Service Ceiling: km12

Combat Radius: 6 400 km

Propeller: 8-blade AV-60 K propeller units each with 2 x 4-blade co-axial contra-rotating reversible-pitch props

Fuel, Internal: 84,000 kg

Maximum Speed at Altitude: 830 km/h

Maximum Speed at Sea-Level: 550 km/h

Cruising Speed: 735 km/h

Takeoff Speed: 300 km/h at max weight

Landing Speed: 275 km/h at max weight

Takeoff Roll: 2,450 m

Load Limit: +2 G

Range, No Refueling: 5,670 nm (6,524 mi, 10,500 km) normal combat load. 3,507 nm (4,039 mi, 6,500 km) max combat load.

Range, one Refueling: 7,613 nm (8,761 mi, 14,100 km)

Communications

Cannon System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: 23mm Autocannon

Caliber: mm23

Basic Load: INA

Location: Tail Turret

Length: GSh-23: 1,387 mm (4 ft 7 in) GSh-23L: 1,537 mm (5 ft 1 in)

Barrel Length: 1,000 mm

Barrels: 2

Weight: GSh-23: 49.2 kg (108 lb) GSh-23L: 50 kg (110 lb)

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min (alleged)

Muzzle Velocity: 715 m/s

Effective Firing Range: INA

↳*Ammunition*

Type: Rifle

Caliber: mm23

Cartridge: 23x115 mm

Missile System

↳*Missile System (Option 1)*

Name: Kh-101 / Kh-102

Type: Air-Launched Cruise Missile

Basic Load: 10

Country: Russia

Proliferation: Widely Proliferated

In Service: 2012-Present

Basing: Tu-160 Blackjack, Tu-22M3/5 Backfire C, Tu-95MS16 Bear-H, and Su-27IB

Length: 7.45 m

Diameter: 0.51 m

Payload: 450 kg

Warhead: HE, fragmentation, submunition (Kh-101), 250 kt nuclear (Kh-102)

Propulsion: Turbofan

Range: 2,500-2800 km

↳*Missile System (Option 2)*

Name: AS-15 Kent (Also known as the Kh-55)

Type: Transonic air-launched Long-Range Cruise Missile

Country: Russia

Basic Load: 8

Length: 7.00 m

Diameter: 510 mm

Span: 3.25 m

Weight: 1,700 kg

Configuration: Similar to the U.S. Tomahawk with a torpedo- shaped body, pop-out unswept wings and tail group, probably a dorsal engine intake.

Propulsion: 1 turbofan

Speed: Mach 0.7

Maximum Range: 1,350 nm

Warhead: 200 kt nuclear (information on warhead yield varies from Russian sources, which claim a 100 kt warhead, and Western sources, which has the AS-15 Russian designated Kh-55A with a 250-kt warhead)

CEP: 0.08 nm (152 m; 500 ft) est.

Flight: Inertial

Launch: Terrain contour matching (TERCOM) until impact

↳*Missile System (Option 3)*

Name: Kh-65 missiles

Type: Transonic air-launched Long-Range Cruise Missile

Basic Load: 14

Note: The Kh-65 missiles, which are believed to be derivatives of the AS-15 Kent.

Internal Bay

Normal Load: 9,000 kg

Maximum Load: 20,000 kg

Rotary Launcher: MKU-6, containing 6 x AS-15 Kent missiles

Fire Control / Avionics

Fire Control System Type: PRS-4 box tail gun warning and fire control radar

Fire Control Radar: Clam Pipe (Obozor-MS) navigation/attack

Navigation Radar: Toadstool terrain following. BAND I (8-10 GHz)

Laser Desingator: INA

Radar Warning: Beryoza system at nose and tail

Infrared Warning: Mak system under nose

Protection

Defense System: Meteor-NM system

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: Jammer, Geran at nose and rear fuselage

Chaffs/Flares: APP-50 50-mm dispensers in undercarriage fairings

Notes:

The Tupolev Tu-95 (Russian: Туполев Ту-95; NATO reporting name: "Bear") is a large, four-engine turboprop-powered strategic bomber and missile platform. First flown in 1952, the Tu-95 entered service with the Soviet Union in 1956 and is expected to serve the Russian Aerospace Forces until at least 2040. A development of the bomber for maritime patrol is designated Tu-142, while a passenger airliner derivative was called Tu-114. The aircraft has four Kuznetsov NK-12 engines with contra-rotating propellers. It is the only propeller-powered strategic bomber still in operational use today. The Tu-95 is one of the loudest military aircraft, particularly because the tips of the propeller blades move faster than the speed of sound. Its distinctive swept-back wings are set at an angle of 35°. The Tu-95 is unique as a propeller-driven aircraft with swept wings that has been built in large numbers. The design bureau, led by Andrei Tupolev, designed the Soviet Union's first intercontinental bomber, the 1949 Tu-85, a scaled-up version of the Tu-4, a Boeing B-29 Superfortress copy. A new requirement was issued to both Tupolev and Myasishchev design bureaus in 1950: the proposed bomber had to have an un-refueled range of 8,000 km (4,970 mi)—far enough to threaten key targets in the United States. Other goals included the ability to carry an 11,000 kg (24,200 pounds) load over the target. Tupolev was faced with selecting a suitable type of powerplant: the Tu-4 showed that piston engines were not powerful enough for such a large aircraft, and the AM-3 jet engines for the proposed T-4 intercontinental jet bomber used too much fuel to give the required range. Turboprop engines were more powerful than piston engines and gave better range than the turbojets available at the time, and gave a top speed between the two. Turboprops were also initially selected for the Boeing B-52 Stratofortress to meet its long range requirement,[6] and for the British long-range transport aircraft, the Saunders-Roe Princess, the Bristol Brabazon and the Bristol Britannia. Tupolev proposed a turboprop installation and Tu-95

design with this configuration was officially approved by the government on 11 July 1951. It used four Kuznetsov coupled turboprops, each fitted with two contra-rotating propellers with four blades each, with a nominal 8,948 kW (12,000 effective shaft horse power [eshp]) power rating. The engine, advanced for its time, was designed by a German team of ex-Junkers prisoner-engineers under Ferdinand Brandner. The fuselage was conventional with a mid-mounted wing with 35 degrees of sweep, an angle which ensured that the main wing spar passed through the fuselage in front of the bomb bay. Retractable tricycle landing gear was fitted, with all three gear strut units retracting rearwards, with the main gear units retracting rearwards into extensions of the inner engine nacelles. The Tu-95/I, with 2TV-2F engines, first flew in November 1952 with test pilot Alexey Perelet at the controls.After six months of test flights this aircraft suffered a propeller gearbox failure and crashed, killing Perelet. The second aircraft, Tu-95/II used four 12,000 eshp Kuznetsov NK-12 turboprops which proved more reliable than the coupled 2TV-2F. After a successful flight testing phase, series production of the Tu-95 started in January 1956. For a long time, the Tu-95 was known to U.S./NATO intelligence as the Tu-20. While this was the original Soviet Air Force designation for the aircraft, by the time it was being supplied to operational units it was already better known under the Tu-95 designation used internally by Tupolev, and the Tu-20 designation quickly fell out of use in the USSR. Since the Tu-20 designation was used on many documents acquired by U.S. intelligence agents, the name continued to be used outside the Soviet Union. Initially the United States Department of Defense evaluated the Tu-95 as having a maximum speed of 644 km/h (400 mph) with a range of 12,500 km (7,800 mi). These numbers had to be revised upward numerous times. Like its American counterpart, the Boeing B-52 Stratofortress, the Tu-95 has continued to operate in the Russian Air Force while several subsequent iterations of bomber design have come and gone. Part of the reason for this longevity was its suitability, like the B-52, for modification to different missions. Whereas the Tu-95 was originally intended to drop free-falling nuclear weapons, it was subsequently modified to perform a wide range of roles, such as the deployment of cruise missiles, maritime patrol (Tu-142), and even civilian airliner (Tu-114). An AWACS platform (Tu-126) was developed from the Tu-114. An icon of the Cold War, the Tu-95 has served, not only as a weapons platform, but as a symbol of Soviet and later Russian national prestige. Russia's air force has received the first examples of a number of modernised strategic bombers in Tu-95MSs following upgrade work. Enhancements have been confined to the bomber's electronic weapons and targeting systems. Modernization Currently ongoing modernization of the Russia's Tu-95MS bombers is aimed primarily on the aircraft armament, namely adaptation of the new Kh-101/102 stealth cruise missile. The modernization includes installation of four underwing pylons for up to 8 Kh-101/102 cruise missiles as well as adjusting aircraft's main weapons bay for cruise missiles of size the Kh-101/102 (7.5 meters). Besides, the modernized Tu-95MS aircraft use radio-radar equipment and target-acquiring/navigation system based on GLONASS. The first Tu-95 modernized to carry the Kh-101/102 missiles was the Tu-95MS Saratov, rolled out at the Beriev aircraft plant in Taganrog in early 2015. It was transferred to the Russian Air Force in March 2015. Since 2015, the serial modernization is carried out also by the Aviakor aircraft plant in Samara at a rate of three aircraft per year. The first Tu-95 modernized by the Aviakor was the Tu-95MS Dubna, transferred to the Russian Air Force on 18 November 2015. In the future, Tu-95MSs are to be upgraded also with the new Kuznetsov NK-12MPM turboprop engines for increased flight range, combat load and reduced noise and vibrations and with the SVP-24 sighting and computing system from the Russian company Gefest & T. More complex modernization of the Tu-95MS16 bombers, known as "Tu-95MSM", is currently under development by Tupolev under a contract issued by the Russian Defence Ministry on 23 December 2009. This modernization is to include installation of the new Novella-NV1.021 radar, instead of the current Obzor-MS, installation of the SOI-021 information display system and the Meteor-NM2 airborne defense complex. In addition, the aircraft modernized to the "MSM" variant will be equipped with the upgraded Kuznetsov NK-12MPM turboprop engines. A contract for first modernized aircraft was signed in February 2018 with first flight scheduled for end of 2019.

→→Cargo and Transport Aircraft

Tu-134 (Crusty) Russian Jet Airliner






Tiers:



System

Alternate Designation(s): Tu-134; NATO: Crusty
Primary Function / Type: Jet Airliner
Manufacturer: Tupolev
Crew: 3
Passengers: 76
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 37.05 m
Height: 9.14 m
Wingspan: 29.00 m
Wing Area: 127.30 sq m
Weight, Maximum Takeoff: 47,000 kg
Weight, Empty: 29,000 kg
Maximum Payload Weight: 8,200 kg

Automotive

Engine Name: 2 x Soloviev D-30-II
Number of Engines: 2
Engine Type: Turbofan
Engine Power: 6,800 kg static thrust each
Fuel Capacity: 13,200 liters
Maximum Cruise Speed: 900 km/h

Maximum Economy Speed: 750 km/h

Ceiling: 12,110 m

Range, with Maximum Payload: 3,020 km

Fire Control / Avionics

Fire Control System Type: No

Fire Control Radar: No

Laser Desingator: INA

Navigation Radar: INA

IFF: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Tupolev Tu-134 (NATO reporting name: Crusty) is a twin-engined, narrow-body, jet airliner built in the Soviet Union from 1966 to 1989. It is the world's most-produced twinjet of its class. The original version featured a glazed-nose design and, like certain other Russian airliners (including its sister model the Tu-154), it can operate from unpaved airfields. One of the most widely used aircraft in former Comecon countries, the number in active service is decreasing because of operational safety concerns and noise restrictions. The model has seen long-term service with some 42 countries, with some European airlines having scheduled as many as 12 daily takeoffs and landings per plane. In addition to regular passenger service, it has also been used in various air force, army and navy support roles; for pilot and navigator training; and for aviation research and test projects. In recent years, a number of Tu-134s have been converted for use as VIP transports and business jets. A total of 854 Tu-134s were built of all versions (including test bed examples) with Aeroflot as the largest user; by 1995, the Tu-134 had carried 360 million passengers for that airline. Following the introduction of engines mounted on pylons on the rear fuselage by the French Sud Aviation Caravelle, airliner manufacturers around the world rushed to adopt the new layout. Its advantages included clean wing airflow without disruption by nacelles or pylons and decreased cabin noise. At the same time, placing heavy engines that far back created challenges with the location of the centre of gravity in relation to the centre of lift, which was at the wings. To make room for the engines, the tailplanes had to be relocated to the tail fin, which had to be stronger and therefore heavier, further compounding the tail-heavy arrangement. During a 1960 visit to France, Soviet leader Nikita Khrushchev was so impressed by the quiet cabin of the Caravelle, that on 1 August 1960 the Tupolev OKB received an official directive to create the Tu-124A with a similar engine arrangement. The requirement was also driven by the need to replace slow, aging piston-engined Il-14s on domestic routes. In 1961, the Soviet state airline, Aeroflot, updated its requirement specifications to include greater payload and passenger capacity. The first Tu-124A prototype, SSSR-45075, first flew on 29 July 1963. On 22 October 1963, the prototype British BAC One-Eleven, which had a similar layout, crashed with the loss of all crew while testing its stalling properties. The aircraft had entered pitch-up: the high-mounted tailplane became trapped in the turbulent wake produced by the wings (deep stall), which prevented recovery from the stall. As a result, the tailplane on Tu-124A was enlarged by 30% for greater control authority. Since Aeroflot's requirements dictated a larger aircraft than initially planned, the Soloviev Design Bureau developed the more powerful D-30 low-bypass turbofan engines. On 20 November 1963, the new airliner was designated Tu-134. Design curiosities of the Tu-134 included a sharp wing sweepback of 35 degrees, compared to 25–28 degrees in its counterparts. The engines on early production Tu-134s lacked thrust reversers, which made the aircraft one of the few airliners to use a brake parachute for landing. The majority of onboard electronics operated on direct current. The lineage of early Soviet airliners could be traced directly to the Tupolev Tu-16 strategic bomber, and the Tu-134 carried over the glass nose for the navigator and the landing gear fitted with low-pressure tires to permit operation from unpaved airfields. Serial production began in 1966 at the Kharkov Aviation Production Association, and production of the Tu-124 was discontinued. The Tu-134 was designed for short-haul lines with low passenger traffic. Originally the aircraft had 56 seats

in a single class configuration, or 50 seats in a two-class configuration. In 1968, Tupolev began work on an improved Tu-134 variant with a 72-seat capacity. The fuselage received a 2.1-meter (6 ft 11 in) plug for greater passenger capacity and an auxiliary power unit in the tail. As a result, the maximum range was reduced from 3,100 kilometers to 2,770 kilometers. The upgraded D-30 engines now featured thrust reversers, replacing the parachute. The first Tu-134A, converted from a production Tu-134, flew on 22 April 1969. The first airline flight was on 9 November 1970. An upgraded version, the Tu-134B began production in 1980, with the navigator position abandoned, and seating capacity increased to 96 seats. Efforts subsequently began to develop a Tu-134D with increased engine thrust, but the project was cancelled.

An-24 (Coke) Russian Transport/Passenger Aircraft



Tiers:



Variants:

- **Variants:** An-24 Original design and prototypes. Twin-engined 44-seat transport aircraft. An-24A (first use) Airliner project powered by Kuznetsov NK-4 turboprops, discontinued when the NK-4 was cancelled. An-24A (second use) Production 50-seat airliners built at Kiev with the APU exhaust moved to the tip of the starboard nacelle. An-24ALK (Avtomatizeerovannaya [sistema] Lyotnovo Kontrolya – automatic flight check system) Several An-24s were converted for navaids calibration tasks, with one An-24LR 'Toros' re-designated An-24ALK after conversion. This aircraft was fitted with a photo-theodolite and powerful light sources for the optical sensors. An-24AT A 1962 project for a Tactical transport with rear loading ramp and powered by Isotov TV2-117DS coupled turboprops.[1] An-24AT-RD (RD – Reaktivnyye Dvigateli – jet engines) The An-24AT tactical transport project with two turbojet boosters pod-mounted under the outer wings and a wider loading ramp. An-24AT-U (Uskoriteli – boosters) A projected Tactical transport from 1966 with three or five PRD-63 (Porokhovoy Raketnyy Dvigatel – gunpowder rocket engine) JATO bottles, wider cargo ramp and provision for up to three brake parachutes. An-24B The second 50-seat airliner version with one extra window each side, single-slotted flaps replacing the double-slotted flaps and extended chord of the centre-section to compensate for the lower performance flaps. Some aircraft were delivered with four extra fuel bladders in the wing centre-section. An-24D A projected long-range airliner version of the An-24B with a single RU-19 booster jet engine in the starboard nacelle, stretched fuselage with seating for 60, strengthened structure and increased fuel capacity. An-24LL (Letyushchaya Laboratoriya – flying laboratory) The generic suffix LL can be applied to any test-bed, but in the An-24's case seems to refer to a single aircraft equipped for metrology (science of measurement), to be used for checking the airworthiness of production aircraft. An-24LP (LesoPozharnyy – forest fire fighter) Three An-24RV aircraft converted into fire bombers/cloud seeders by installing a tank in the cabin, optical smoke and flame detectors, provision for a thermal imager, racks for carrying flare dispensers and the ability to carry firefighters for para-dropping. An-24LR 'Toros' (Ice Hummock)(Ledovyy Razvedchik – ice reconnaissance) At least two An-24Bs converted to carry the 'Toros' SLAR (sideways looking airborne radar) either side of the lower fuselage, for ice reconnaissance, guiding icebreakers, convoys and other shipping. An-24LR 'Nit' (Thread) One An-24B was converted to with 'Nit' SLAR in large pods along the lower fuselage sides. An-24PRT (Poiskovo-spasahtel'nyy Reaktivnyy [Uskoritel'] Transportnyy – SAR boosted transport) The production search and rescue aircraft based on the An-24RT, eleven built. An-24PS (Poiskovo-Spasahtel'nyy – SAR) A single An-24B aircraft converted for search and rescue duties, rejected after acceptance trials in favour of a derivative of the An-24RT. An-24RR ([samolyot] Radiotsionnyy Razvedchik – radiation reconnaissance [aircraft]) Four aircraft converted as Nuclear, biological and chemical warfare reconnaissance versions of the An-24B, carrying RR8311-100 air sampling pods low on the forward fuselage and a sensor pod on a pylon on the port fuselage side. An-24RT (Reaktivnyy [Uskoritel'] Transportnyy – boosted transport) Similar to the AN-24T, fitted with an auxiliary turbojet engine. An-24RT (Retranslyator – relay installation) A few An-24T and An-24RT aircraft converted to Communications relay aircraft. Sometimes referred to as An-24Rt to differentiate from the An-24RT. An-24RV (Reaktivnyy [Uskoritel'] V – boosted V) Turbojet boosted export version, similar to the An-24V but fitted with a 1,985-lb (8830 N) thrust auxiliary turbojet

engine in the starboard nacelle. An-24ShT (Shtabnoy Transportnyy – Staff/HQ transport) A tactical Airborne Command Post for use by commanders, also capable of forming ground-based communications and HQ. An-24T (Transportnyy – transport) (first use) Tactical transport version, rejected due to poor field performance during acceptance testing. An-24T (Transportnyy – transport) (second use) A tactical transport version with a ventral loading hatch, cargo winch and escape hatch aft of the nose landing gear. An-24T 'Troyanda' (Ukrainian – rose) From the 1960s the Soviet Union was faced with nuclear submarine threats that were virtually undetectable with the technology available. To assist in the development of advanced optical, chemical, sonic, infra-red and electromagnetic detection systems, several aircraft were built or modified as test-beds. One significant aircraft was the An-24T 'Troyanda' which was built new, for the development of sonobuoy and infra-red detection systems. As well as equipment inside the cabin, sensors could be mounted in large teardrop fairings either side of the lower forward fuselage, and extra equipment could be carried in extended wing centre-section fairings. An-24TV (Transportnyy V – transport V) The export cargo version of the An-24T. An-24USh (Uchebno-Shturmanskiy (samolyot) – Navigator training aircraft) Seven An-24Bs were converted to An-24USh navigator/air traffic controller trainers with five training stations and four standard rows of seats for trainees in waiting. Outwardly the USh was distinguishable by the bulged windows at each training station. An-24V-I The initial export version of the An-24B 50-seat airliner with the early narrow chord inner wings, double-slotted flaps, single ventral fin, powered by two 2,550 hp (1,902 kW) Ivchenko AI-24A turboprop engines. An-24V-II Export late production 50-seat mixed passenger, cargo and freight aircraft with extended chord inner wing, single-slotted flaps, twin ventral fins and powered by AI-24T(SrsII) engines. An-26 Tactical transport with cargo ramp. An-30 Survey/Photo-mapping aircraft. An-32 Designed to withstand adverse weather conditions better than the standard An-26. An-34 The initial designation of the An-24T production tactical transport, discarded shortly after production began. An-50 A mid-1960s project for a jet-powered An-24, with four Ivchenko AI-25 turbofan engines in podded pairs, pylon mounted forward of the wings. Not proceeded with due to competition from the Yak-40. Xian Y-7 The Y-7 is a Chinese reverse-engineered version of the An-24/An-26 family. MA60 Upgraded and Westernised Y-7. An-24 In the early 1990s, North Korea installed N-019 Topaz pulse-Doppler radars on at least one of its An-24 aircraft in an attempt to achieve a rudimentary Airborne Early Warning capability.

System

Alternate Designation(s): AN-24; NATO: Coke

Primary Function / Type: Transport/Cargo Aircraft

Manufacturer: Antonov

Crew: 2 (pilot, co-pilot)

Passengers: 50 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 23.53 m

Height: 8.32 m

Wingspan: 29.20 m

Cabin Length: 9.69 m

Cabin Width: 2.76 m

Cabin Height: 1.91 m

Wing Area: 74.98 sq m

Weight, Empty: 13,300 kg

Weight, Maximum Payload: 5,500 kg

Weight, Maximum Takeoff: 21,000 kg

Automotive

Engine Name: 2 x Ivchenko AI-24V

Number of Engines: 2

Engine Type: Turboprop

Engine Power: 2,550 equivalent shp each

Internal Fuel Capacity: 5,550 liters

Maximum Speed: 500 km/h

Cruise Speed: 450 km/h

Landing Speed: 165 km/h

Climb Rate: 114 m/min

Ceiling: 8,400 m

Range, Maximum Payload: 550 km

Range, Maximum Fuel, with 30 Passengers: 2,400 km

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

The Antonov An-24 (Russian/Ukrainian: Антонов Ан-24) (NATO reporting name: Coke) is a 44-seat twin turboprop transport/passenger aircraft designed in 1957 in the Soviet Union by the Antonov Design Bureau and manufactured by Kiev, Irkutsk and Ulan-Ude Aviation Factories. First flown in 1959, the An-24 was produced in some 1,000 units of various versions; in 2019 there are 109 still in service worldwide, mostly in the CIS and Africa. It was designed to replace the veteran piston Ilyushin Il-14 transport on short to medium haul trips, optimised for operating from rough strips and unprepared airports in remote locations. The high-wing layout protects engines and blades from debris, the power-to-weight ratio is higher than that of many comparable aircraft and the machine is rugged, requiring minimal ground support equipment. Due to its rugged airframe and good performance, the An-24 was adapted to perform many secondary missions such as ice reconnaissance and engine/propeller test-bed, as well as further development to produce the An-26 tactical transport, An-30 photo-mapping/survey aircraft and An-32 tactical transport with more powerful engines. Various projects were envisaged such as a four jet short/medium haul airliner and various iterations of power plant. The main production line was at the Kiev-Svyatoshino (now "Aviant") aircraft production plant which built 985, with 180 built at Ulan Ude and a further 197 An-24T tactical transport/freighters at Irkutsk. Production in the USSR was shut down by 1978. Production continues at China's Xi'an Aircraft Industrial Corporation which makes licensed, reverse-engineered and redesigned aircraft as the Xian Y-7, and its derivatives. Manufacture of the Y-7, in civil form, has now been supplanted by the MA60 derivative with western engines and avionics, to improve performance and economy, and widen the export appeal.

Il-76 (Candid) Russian Multi-Purpose Strategic Airlifter





Tiers:



Variants:

- **Prototypes and developmental variants:** Il-76TD-90 / Il-76MD-90 Engine upgrades to Perm PS-90s. Il-76 fire bomber Firefighting aircraft to drop exploding capsules filled with fire retardant. Il-76PSD SAR version of Il-76MF Il-96 Early development of convertible passenger/cargo aircraft, (project only, designation re-used later) Il-150 proposed Beriev A-50 with Perm PS-90 engines. Beriev A-60 Airborne laser weapon testbed. (Il-76 version 1A)
- **Special purpose / research variants:** Il-76LL with reinforced wing (at least 3 aircraft) to be used as test-bed aeroplane for engine prototypes flight testing in Gromov Flight Research Institute. Izdeliye-176 prototype Il-76PP. Izdeliye-576 Izdeliye-676 Telemetry and communications relay aircraft, for use during trial programmes (prototype). Izdeliye-776 Telemetry and communications relay aircraft, for use during trial programmes (prototype). Izdeliye-976 ("SKIP", Il-976, or Il-76SK) – (СКИП – Самолетный Контрольно-Измерительный Пункт, Airborne Check-Measure-and-Control Center) Il-76/A-50 based Range Control and Missile tracking platform. Initially built to support Raduga Kh-55 cruise missile tests. Izdeliye-1076 Special mission aircraft for unknown duties. Izdeliye-1176 ELINT electronic intelligence aircraft, or Il-76-11
- **Military variants:** Il-76-Tu160 tailplane transporter One-off temporary conversion to support Tu-160 emergency modification programme. Il-76D ('D' for "Desantnyi", Десантный – "Paratrooper transport") has a gun turret in the tail for defensive purposes. Il-76K/Il-76MDK/Il-76MDK-II Zero-g cosmonaut trainer (dlya podgotovki kosmonavtov), for Yuri Gagarin Cosmonauts Training Center. Il-76LL Engine testbed, (ooniversahl'naya letayuschchaya laboratoriya). Il-76M Military transport version, (modifitseerovannyy – modified). Il-76MD Improved military transport version, (modifitseerovannyy Dahl'ny – modified, long-range). Il-76MD Skal'pel-MT Mobile Hospital Il-76M / Il-76MD Built without military equipment but designated as Ms and MDs (Gordon – 'Falsies') Il-76MD-90 An Il-76MD with quieter and more economical Aviadvigatel PS-90 high-bypass turbofan engines. Il-76MF Stretched military version with a 6.6 m longer fuselage, PS-90A-76 engines, maximum takeoff weight of 210 tonnes and a lift capability of 60 tonnes. First flew in 1995, not built in series so far just built for Jordan. Il-76PP ECM aircraft, major problems with ECM equipment on the Izdeliye-176 only. Il-76MD-M Modernized Il-76MD for the Russian Air Force. Il-76MD-90A An upgraded version with a new glass cockpit, upgraded avionics, new internal wing structure and Aviadvigatel PS-90A-76 engines. It was also known as Il-476 while in development. Il-76T/Il-76TD Built as military aircraft but given civilian designations. (Gordon – 'Falsie') Ilyushin Il-78/Il-78M/Il-78MD-90A Aerial refuelling tanker. Il-78 MKI A customized version of the Il-78 developed for the Indian Air Force. Il-82 Airborne Command Post/communications relay aircraft, (alternative designation – Il-76VKP-'version65S'). Il-84 Maritime Search and Rescue aircraft, (alternative designation – Il-76PS-poiskovo-spasahtel'nyy), not produced. Beriev A-50/Beriev A-50M/Beriev A-50I/Beriev A-50E Airborne Early Warning & Control aircraft. Beriev given control over the program. Beriev A-100 An AEW&C version of the Il-76MD-90A.
- **Civil variants:** Il-76MGA Initial Commercial freighter. (two prototypes and 12 production) equipped with Soloviev D-30 Turbofan engines. Il-76MD to Il-76TD conversions Complete removal of military equipment, identified by crude cover over OBIGGS inlet in Starboard Sponson. Il-76P / Il-76TP / Il-76TDP / Il-76MDP Firefighting aircraft. The Il-76 waterbomber is a VAP-2 1.5-hour install/removal tanking kit conversion. The Il-76 can carry up to 13,000 U.S. gallons (49,000 liters) of water; 3.5 times the capacity of the C-130 Hercules. Since this kit can be installed on any Il-76, the designation Il-76TP, Il-76TDP are also used when those versions of the Il-76 are converted into water bombers. The Il-76P was first unveiled in 1990. Il-76T ('T' for Transport, Транспортный) unarmed civil cargo transport version. NATO code-name "Candid-A". It first flew on November 4, 1978. Il-76TD The civil equivalent of the Il-76MD, first flew in 1982, equipped with Soloviev D-30 Turbofan engines. Il-76TD-90 An Il-76TD with Aviadvigatel PS-90 engines and a partial glass cockpit. Il-76TD-90VD An Il-76TD with Aviadvigatel PS-90 engines and a partial glass cockpit. It was developed specially for Volga-Dnepr cargo company, which operates four aircraft as of 2012. Il-76TD-S Civilian mobile Hospital, similar to Il-76MD Skal'pel-MT. Il-76TF Civil transport stretched version with Aviadvigatel PS-90 engines. It is the civil version of the Il-76MF (none produced).

- **Foreign variants:** Beriev A-50E/I For the Indian Air Force. Hosts Israeli Phalcon radar for AEW&C and Aviadvigatel PS-90 engines. Il-76MD tanker Iraqi Air Force tanker conversions. KJ-2000 Domestic Chinese airborne early warning and control conversion of Il-76, developed after A-50I was cancelled and currently in service with the armed forces of China. CFTE engine testbed The China Flight Test Establishment (CFTE) currently operates a flying testbed converted from a Russian-made Il-76MD jet transport aircraft to serve as a flying testbed for future engine development programmes. The first engine to be tested on the aircraft is the WS-10A "Taihang" turbofan, currently being developed as the powerplant for China's indigenous J-10 and J-11 fighter aircraft. Il-76MD #76456, acquired by the AVIC 1 from Russia in the 1990s, is currently based at CFTE's flight test facility at Yanliang, Shaanxi Province. Baghdad-1 Iraqi development with a radar mounted in the cargo hold enabling it to serve as AEW&C, used in the Iran–Iraq War. Baghdad-2 Iraqi development (with French assistance) with fibreglass-reinforced plastic radome over the antenna of the Thomson-CSF Tiger G surveillance radar with a maximum detection range of 350 km (189 nmi, 217.5 mi). One was destroyed on the ground during the 1991 Persian Gulf War; two others were flown to Iran where they remained. At least one went into service with the IRIAF. One aircraft crashed following a midair collision with a HESA Saeqeh fighter, during the annual Iranian military parade in Teheran. It can be distinguished from the Beriev A-50 by having the Il-76 navigator windows in the nose, which the A-50 does not.

System

Alternate Designation(s): Il-76; NATO: Candid

Primary Function / Type: Multi-Purpose Strategic Airlifter

Manufacturer: Tashkent Aviation Production Association Aviastar-SP

Crew: 5

Number of Engines: 4

Number of Hard Points: Some military models have 2 hardpoints under each outer wing capable of supporting 500 kg bombs.

Dimensions

Length: 46.59 m

Width (Wing Span): 50.5 m

Height: 14.76 m

Wing Area: 300 m2

Cargo Capacity: 42,000 kg

Empty Weight: 92,500 kg

Maximum Takeoff Weight: 195,000 kg

Automotive

Engine Name: 4 × Soloviev D-30KP

Number of Engines: 4

Engine Type: Turbofans

Engine Power: 117.7 kN (26,500 lbf) thrust each

Maximum Range: 4,000 km with 60,000 kg (132,277 lb) payload.

Ferry Range: 9,300 km

Maximum Speed: 900 km/h

Service Ceiling: 13,000 m

Main Gun System

↳*System*

Name: INA

Type: 23mm Autocannon

Caliber: 23mm

Quantity: 2 x 23mm Autocannon in radar-directed manned turret at base of tail

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: INA

Basic Load: INA

Bomb Weapon Systems

Note: Some military models have 2 hardpoints under each outer wing capable of supporting 500 kg bombs.

Fire Control / Avionics

FCS Name: INA

Fire Control Radar: Yes

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Ilyushin Il-76 (Russian: Илью́шин Ил-76; NATO reporting name: Candid) is a multi-purpose four-engine turbofan strategic airlifter designed by the Soviet Union's Ilyushin design bureau. It was first planned as a commercial freighter in 1967, as a replacement for the Antonov An-12. It was designed to deliver heavy machinery to remote, poorly served areas. Military versions of the Il-76 have been widely used in Europe, Asia and Africa, including use as an aerial refueling tanker or command center. The Il-76 has seen extensive service as a commercial freighter for ramp-delivered cargo, especially for outsized or heavy items unable to be otherwise carried. It has also been used as an emergency response transport for civilian evacuations as well as for humanitarian aid and disaster relief around the world. Because of its ability to operate from unpaved runways, it has been useful in undeveloped areas. Specialized models have also been produced for aerial firefighting and zero-G training. The aircraft was first conceived by Ilyushin in 1967 to meet a requirement for a freighter able to carry a payload of 40 tons (88,000 lb) over a range of 5,000 km (2,700 nmi; 3,100 mi) in less than six hours, able to operate from short and unprepared airstrips, and capable of coping with the worst weather conditions likely to be experienced in Siberia and the Soviet Union's Arctic regions. It was intended to replace the Antonov An-12. Another intended version was a double-decked 250-passenger airliner but that project was cancelled. The Il-76 first flew in March 1971. Production of Il-76s was allocated to the Tashkent

Aviation Production Association in Tashkent, Uzbekistan, then a republic of the Soviet Union. Some 860 of the basic transport variants were manufactured. In the 1990s, modernized variants also equipped with Soloviev D-30 turbofan engines were developed (MF, TF), with a cargo compartment 20 m (66 ft) long by 3.4 m (11 ft) wide by 3.4 m (11 ft) tall; these larger variants were not produced in significant quantity due to the financial difficulties being experienced by the Russian Air Force, which was the primary operator of the type. The prototype of the Il-76MF, conducted its first flight on 1 August 1995. From 2004 onwards, a number of aircraft in commercial service were modernized to the Il-76TD-90VD version; this involved the adoption of the newly developed PS-90 engine to comply with European noise limitations. In 2005, the People's Republic of China placed an order for 34 new Il-76MDs and four Il-78 tankers. In June 2013, Russian military export agency Rosoboronexport announced an order by China for 12 Il-76MD aircraft. The Il-76 has also been modified into an airborne refuelling tanker, designated the Il-78, around 50 aircraft having been produced. A variant of the Il-76 also serves as a firefighting water bomber. Its airframe was used as a base for the Beriev A-50 'Mainstay' AEW&C (airborne early warning and control) aircraft; around 25 aircraft were made. Another application for the type was found in Antarctic support flights and for conducting simulated weightlessness training for cosmonauts (akin to the "Vomit Comet" used by NASA). Beriev and NPO Almaz also developed an airborne laser flying laboratory designated A-60, of which two were built, much of this project's details remaining classified.

CRJ100 Canadian Transport Aircraft



Tiers:

1 **2** 3 4

Variants:

- **CRJ100:** The CRJ100 is the original 50-seat version. It is equipped with General Electric CF34-3A1 engines. Operators include RwandAir, among others.
- **CRJ100SF:** Passenger-to-freighter conversion of CRJ100.
- **CRJ100LR:** Long range version of CRJ100.
- **CRJ100SE:** Executive passenger conversion of CRJ100.
- **CRJ200:** The CRJ200 is identical to the CRJ100 except for its engines, which were upgraded to the CF34-3B1 model, offering improved efficiency.
- **CRJ200PF:** Package freighter version of CRJ200.
- **CRJ200LR:** Long range version of CRJ200.
- **CRJ200SF:** Passenger-to-freighter conversion of CRJ200.
- **CRJ440:** Certified up to 44-seat, this version was designed with fewer seats in order to meet the needs of some major United States airlines.
- **Challenger 800/850:** A business jet variant of the CRJ200
- **CRJ500:** Proposed 50-seat version with wing and cabin improvements based on the CRJ700/900. Cancelled in 2001.

System

Alternate Designation(s): CRJ100

Primary Function / Type: Transport Aircraft

Manufacturer: Bombardier Aerospace

Crew: 3–4 : 2 Flight Crew + 1–2 cabin crew

Seating Capacity: 50

Number of Engines: 2

Number of Hard Points: INA

Maximum Payload: 6,124 kg

Dimensions

Length: 26.77 m

Width (Wing Span): 21.21 m

Height: 6.22 m

Wing area: 48.35 m²

Fuselage Diameter: 2.69 m

Operating Payload: 6,124 kg

Cabin Length: INA

Cabin Width: 2.53 m

Cabin Height: 1.85 m

Operating Empty Weight: 13,835 kg

Automotive

Engine Name: GE CF34-3A1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 8,729 lbf / 38.84 kN

Maximum Fuel Capacity: 8,081 L

Maximum Range with 50 Passengers: 3,056 km

Normal Cruise Range: 785 km/h

High-Speed Cruise Range: 860 km/h

Service Ceiling: 12,496 m

Takoff: 1,920 m

Landing: 1,480 m

Fire Control / Avionics

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Bombardier CRJ100 and CRJ200 (formerly known as the Canadair CRJ100 and CRJ200) is a family of regional airliners that was designed and manufactured by Bombardier Aerospace between 1991 and 2006. The CRJ was Canada's second civil jet airliner after the single prototype of the Avro Canada C102 Jetliner (which never entered commercial service). It was based on the Bombardier Challenger 600 series business jets. An initial effort to produce an enlarged 36-seat version of the aircraft, known as the Challenger 610E, was terminated during 1981. Shortly after Canadair's privatization and sale to Bombardier, work on a stretched derivative was reinvigorated; during early 1989, the Canadair Regional Jet program was formally launched. On 10 May 1991, the first of three CRJ100 prototypes conducted its maiden flight. The type first entered service during the following year with its launch customer, German airline Lufthansa. The initial variant, the CRJ100, was soon joined by another model, designated as the CRJ200. It was largely identical to the CRJ100, except for the installation of more efficient turbofan engines, which gave the aircraft lower fuel consumption, increased cruise altitude and cruise speed. During the 1990s, various additional versions and models of the type were developed and put into service. During the late 1990s, a substantially enlarged derivative of the airliner, referred to as the CRJ700, was developed; it was soon joined by the even larger CRJ900 and CRJ1000.

During 2006, production of both the CRJ100 and CRJ200 came to an end; the majority of produced airliners have remained in revenue service to date. Additionally, several airlines have modernized their fleets to support extended service. The Bombardier CRJ100 and CRJ200 are a family of jet-propelled regional airliners, based upon the design of the Challenger CL-600 business jet. Roughly, the CL-600 was stretched 5.92 metres (19 feet 5 inches), which was achieved using fuselage plugs fore and aft of the wing, and was matched with the adoption of a reinforced and modified wing, an expanded fuel capacity, improved landing gear to handle the higher weights, and an additional pair of emergency exit doors. When installed in a typical seating configuration, the CRJ100 would accommodate 50 passengers; while in a maximum configuration, 52 passengers could be accommodated. It was powered by a pair of General Electric CF34-3A1 turbofan engines, each of which was capable of generating up to 41.0 kN (4,180 kgp / 9,220 lbf) of thrust. The CRJ100 featured a Collins-built ProLine 4 avionics suite, including a weather radar.

CRJ1000 Canadian Regional Jet







Tiers:



Variants:

- **CRJ700:** Design work on the CRJ700 by Bombardier started in 1995 and the program was officially launched in January 1997. The CRJ700 is a stretched derivative of the CRJ200. The CRJ700 features a new wing with leading edge slats and a stretched and slightly widened fuselage, with a lowered floor. Its first flight took place on 27 May 1999. The aircraft's FAA Type Certificate designation is the CL-600-2C10. The CRJ700 first entered commercial service with Brit Air in 2001.
- **CRJ550:** On 6 February 2019, Bombardier launched the CRJ550, based on the CRJ700, with 50 seats in three classes. The launch customer, United Airlines, ordered 50 aircraft configured with 10 first class, 20 Economy Plus and 20 economy seats. The aircraft were to be operated under the United Express brand by regional partner GoJet Airlines. The CRJ550 has a lower maximum takeoff weight (MTOW) than the CRJ700, to comply with scope clauses in US pilot contracts, and a lower maximum landing weight (MLW). It received type certification in the second half of 2019. The initial 50 aircraft will be sourced from existing CRJ700s, rather than being newly constructed. On 7 August 2019, United Airlines' regional partner GoJet Airlines took delivery of the aircraft and began with a crew familiarization flight to Chicago-O'Hare International Airport (ORD).
- **CRJ900:** The CRJ900 is a stretched 76–90 seat version of the CRJ700. The first CRJ900 (C-FRJX) was modified from the prototype CRJ700 by adding longer fuselage plugs fore and aft of the wings. It was later converted into the prototype CRJ1000 by replacing the fuselage plugs with longer plugs. The CRJ900 also features strakes located at the rear of the plane. The CRJ900 competes with the Embraer 175, and is more efficient per seat-mile, according to Bombardier. Mesa Air Group was the launch customer for the CRJ900 painted in America West livery. The FAA Type Certificate designation of the CRJ900 is the CL-600-2D24.
- **CRJ705:** The CRJ700 Series 705 is based on the CRJ900, featuring a business class cabin and a reduced maximum seating capacity to allow operation with regional airlines. The Series 705 seats 75 passengers. Some regional airlines have scope clauses with their major airlines that limit the maximum passenger capacity of aircraft they operate. The Air Canada Pilots Association negotiated a scope agreement with Air Canada limiting the maximum seating capacity of any jet aircraft at Air Canada Express to 75 seats. Air Canada Jazz was the launch customer for this aircraft in 2005 with 10 Executive Class and 65 Economy Class seats, all fitted with personal audio/video-on-demand systems. The FAA Type Certificate designation of the CRJ705 is the CL-600-2D15. Jazz Aviation, a subsidiary of Chorus Aviation, operated 16 CRJ705s on behalf of Air Canada and was the only operator of this version. On 26 April 2016, Jazz Aviation announced that existing CRJ705 aircraft in operation will be converted to CRJ900 with 76 seats. As of late February 2018, all CRJ-705s have been reconfigured with 12 Executive Class and 64 Economy Class seats, which changed their FAA Type Certificate to CL-600-2D24.
- **CRJ1000:** On 19 February 2007, Bombardier launched the development of the CRJ1000, previously designated CRJ900X, as a stretched CRJ900, with up to 100 seats. The CRJ1000 completed its first production flight on 28 July 2009 in Montreal; the entry into service was planned then for the first quarter of 2010. A month after the first flight, however, a fault in the rudder controls forced the flight-test program to be grounded : the program was not resumed until

February 2010, and deliveries were projected to begin by January 2011. Brit Air and Air Nostrum were the launch customers for the CRJ1000.

System

Alternate Designation(s): CRJ1000

Primary Function / Type: Transport Aircraft

Manufacturer: Bombardier Aerospace

Crew: 3–4 : 2 Flight Crew + 1–2 cabin crew

Seating Capacity: 97 to 104

Number of Engines: 2

Number of Hard Points: INA

Maximum Payload: 11,966 kg

Dimensions

Length: 39.1 m

Width (Wing Span): 26.2 m

Height: 7.5 m

Wing area: 77.4 m2

Fuselage Diameter: 2.7 m

Maximum Payload: 11,966 kg

Cabin Capacity: 15.5 m3 / 2,438 kg

Operating Empty Weight: 23,188 kg

MTOE Weight: 41,640 kg

Automotive

Engine Name: GE CF34-8C5A1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 14,510 lbf / 64.5 kN

Maximum Fuel Capacity: 8,822 kg

Maximum Range: 3,004 km

Maximum Speed: 871 km/h

Normal Cruise Speed: 829 km/h

Service Ceiling: 12,496 m

Takoff: 2,120 m

Landing: 1,750 m

Fire Control / Avionics

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

On 19 February 2007, Bombardier launched the development of the CRJ1000, previously designated CRJ900X, as a stretched CRJ900, with up to 100 seats. The CRJ1000 completed its first production flight on 28 July 2009 in Montreal; the entry into service was planned then for the first quarter of 2010. A month after the first flight, however, a fault in the rudder controls forced the flight-test program to be grounded : the program was not resumed until February 2010, and deliveries were projected to begin by January 2011. Brit Air and Air Nostrum were the launch customers for the CRJ1000. Bombardier Aerospace announced on 10 November 2010 that its 100-seat CRJ1000 was awarded Aircraft Type Certificates from Transport Canada and European Aviation Safety Agency, allowing for deliveries to begin. On 14 December 2010, Bombardier began CRJ1000 deliveries to Brit Air and Air Nostrum. On 23 December 2010, it was announced that the Federal Aviation Administration had also awarded a type certificate, allowing the CRJ1000 to operate in US airspace. It has a separate type rating. Bombardier states that it offers better performance and a higher profit per seat than the competing Embraer E-190. The FAA Type Certificate designation of the CRJ1000 is the CL-600-2E25. In 2018, a new CRJ1000 discounted price is $24.8M, a 2015 model is valued $22.0M, a 2010 one is worth $15.5M for a $155,000 monthly lease, and it will be $12.0M in 2021 for a $145,000 monthly lease while its D Check costs $800,000 and its engine overhaul costs $0.9 to 2.4M. The Bombardier CRJ700, CRJ900, and CRJ1000 (after June 2020, the Mitsubishi CRJ) are a family of regional jet airliners designed and manufactured by Canadian transportation conglomerate Bombardier; this aircraft trio has been collectively marketed by the company as the CRJ Series. Their design was derived from the smaller CRJ100 and 200 airliners. During the 1990s, Bombardier initiated development on the CRJ-X, a program to produce enlarged derivatives of its popular CRJ100/200 family. Officially launched in 1997, the CRJ700's maiden flight took place on 27 May 1999; it was soon followed by the stretched CRJ900 variant. Several additional variants of the type were subsequently introduced, including the CRJ550 and the elongated CRJ1000. While production of the smaller CRJ100/200 range was discontinued during 2006, the larger CRJ Series models have continued to be produced into the 2010s. Competitors have included the Fokker 70/Fokker 100, the BAe 146 family, and the Embraer E-Jet family. In Bombardier's lineup, the CRJ Series was formerly marketed alongside a family of larger jets, the C Series (now majority-owned by Airbus and marketed as the Airbus A220) and a twin-turboprop, the Q Series (now owned by De Havilland Canada and marketed as the Dash 8). During the late 2010s, Bombardier sought to sell off several of its aircraft programs. The CRJ program was acquired by Japanese corporation Mitsubishi Heavy Industries in a deal that closed 1 June 2020. The CRJ900 is a stretched 76–90 seat version of the CRJ700. The first CRJ900 (C-FRJX) was modified from the prototype CRJ700 by adding longer fuselage plugs fore and aft of the wings. It was later converted into the prototype CRJ1000 by replacing the fuselage plugs with longer plugs. The CRJ900 also features strakes located at the rear of the plane. The CRJ900 competes with the Embraer 175, and is more efficient per seat-mile, according to Bombardier. Mesa Air Group was the launch customer for the CRJ900 painted in America West livery. The FAA Type Certificate designation of the CRJ900 is the CL-600-2D24. The wing is wider with added leading edge slats, the tail is redesigned. The cabin floor has been lowered 2 inches which gains outward visibility from the windows in the cabin as the windows become closer to eye level height. The cabin has a re-circulation fan which aids in cooling and heating. The environmental packs have a target temperature instead of a hot-cold knob. The APU is a Honeywell RE220 unit,[68] which supplies much more air to the AC packs and has higher limits for starting and altitude usage. The aircraft features two GE CF34-8C5 engines, 59.4 kN (13,400 lbf) thrust with APR. The engines are controlled by FADEC digital engine control instead of control cables and a fuel control unit. In typical service, the CRJ900 can cruise 8–10,000 ft higher with a slightly higher fuel burn and an average true airspeed of 450–500 knots, a significant improvement over its predecessor. Its maximum ground takeoff weight is 84,500 pounds. In 2018, the CRJ900's list price was $48 million while its market value was $24M; reportedly, most customers are paying around $20–22M and the American Airlines order for 15 was at below $20M. A 2012 aircraft was worth less than $14M and it was to fall by 30% in 2021.

Challenger 601 (CL-601) Canadian Transport Aircraft







Tiers:



Variants:

- **Challenger 600 (CL-600):** The was the initial production version with Avco Lycoming ALF 502L-2 engines and without winglets at the wingtips.
- **CE-144 Electronic Support and Training (EST):** Seven CL-600s were converted as EW simulators; fitted with radar, jamming systems, communications equipment; the first service entry was in 1990.
- **Challenger 601 (CL-601):** The 601 is a production version with uprated engines and winglets. At one point, there were 18 in military service, most as VIP transports: six in Canada, five in China and seven in Germany. One German aircraft was configured for combined passenger/cargo operations; another operated as an air ambulance with a 4-litter capacity.
- **Challenger 601-3A (CL-601-3A):** This is an improved 601 with flat-rated CF-34-3A engines for better hot-day performance; integrated digital flight management and guidance system including automatic flight control system (AFCS) and electronic flight instrumentation system (EFIS).
- **Challenger 604 (CL-604):** The CL-604 is the latest version of this type of aircraft by Bombardier Aerospace. It has a range of 4,077 nm (4,696 mi; 7,556 km). It also utilizes advanced transonic wing design, a damage-tolerant airframe (FAR 25), triple-redundant hydraulic systems and quadruple-redundant electrical systems.
- **CL-605:** Initial operating capability (IOC) of this version was reached in 2006. It upgrades the avionics and structure of the 604 design. Features include larger cabin windows, new avionics displays and "electronic flight bag" capability. The version can be identified by its new, rounded tailcone. See separate record for more information.

System

Alternate Designation(s): Challenger 601; CL-601
Primary Function / Type: Transport Aircraft
Manufacturer: Canadair, St Laurent, Quebec, Canada (part of Bombardier Aerospace)
Crew: 2 (pilot, co-pilot)
Passengers: 19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 20.85 m
Height: 6.30 m
Width (Wing Span): 19.61 m
Wing Area: 48.31 sq m
Cabin Length: 8.61 m
Cabin Width: 2.49 m
Cabin height: 1.85 m
Cabin Volume: 32.6 cu m
Empty Weight: 9,054 kg
Maximum Payload: 2,229 kg
Maximum Takeoff Weight: 19,550 kg

Automotive

Engine Name: 2 x General Electric CF-34-1A
Number of Engines: 2
Engine Type: Turbofan
Engine Power: 4,146 kg static thrust each
Maximum Cruise Speed: 851 kph
Normal Cruise Speed: 819 kph
Long-Range Cruise Speed: 743 kph
Climb Rate: 1,341 m/min
Ceiling, 2 Engines: 12,500 m
Ceiling, 1 Engine: 7,315 m
Maximum Range: 6,371 km

Protection

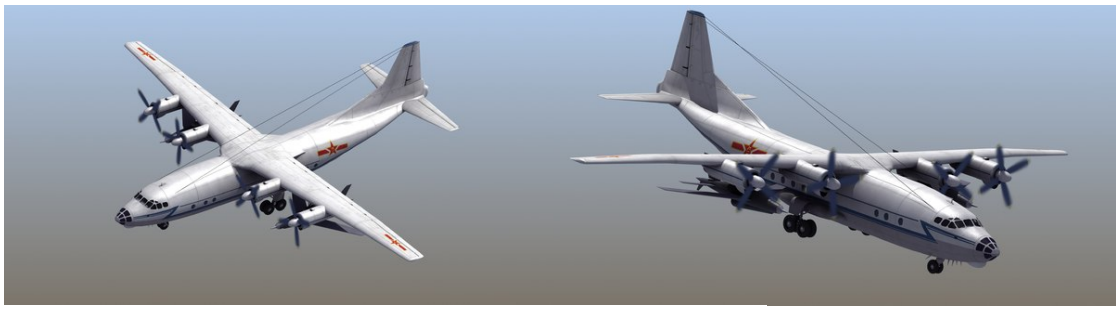
Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

Challenger 601 (CL-601) The 601 is a production version with updated engines and winglets. At one point, there were 18 in military service, most as VIP transports: six in Canada, five in China and seven in Germany. One German aircraft was configured for combined passenger/cargo operations; another operated as an air ambulance with a 4-litter capacity. The Bombardier Challenger 600 series is a family of business jets developed by Canadair and then produced from 1986 by its new

owner, Bombardier Aerospace. At the end of 1975, Canadair backed the LearStar 600 concept by Bill Lear, and acquired the large business jet or freighter project in April 1976. On 29 October, the program was launched, backed by the Canadian federal government, and designed to comply with new FAR part 25 standards. In March 1977, it was renamed the Challenger 600 after Bill Lear was phased out, as the original conventional tail was changed for a T-tail among other developments. The first prototype was rolled out on 25 May 1978, and performed its maiden flight on 8 November. The flight test program saw a deadly crash on 3 April 1980, but Transport Canada approved the CL-600 type certification on 10 August 1980. In 1986, Canadair was close to bankruptcy and was bought by Bombardier. The jet was stretched into the Bombardier CRJ regional airliner, introduced on 19 October 1992, and the longer range Global Express, introduced in July 1999. The 500th Challenger was rolled out in May 2000, and the 1000th was delivered to NetJets in December 2015. By October 2018, 1,066 aircraft have been built. The Challenger is a low-wing jet powered by two turbofans mounted in aft fuselage pods, it has a supercritical wing and a stand-up cabin with two seating sections. The original Lycoming ALF 502 turbofans were replaced by a pair of General Electric CF34s on the CL-601, which also gained winglets, and first flew on 10 April 1982. Subsequent variants have updated systems, avionics, and higher weights.

Y-8E Chinese Unmanned Aerial Vehicle (UAV) Launch and Control Aircraft





Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14,

2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft

engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8E

Primary Function / Type: Unmanned Aerial Vehicle (UAV) Launch and Control Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Range: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight

test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

Il-76MD (Candid-B) Russian Multi-Purpose Strategic Airlifter





Tiers:



Variants:

- **Prototypes and developmental variants:** Il-76TD-90 / Il-76MD-90 Engine upgrades to Perm PS-90s. Il-76 fire bomber Firefighting aircraft to drop exploding capsules filled with fire retardant. Il-76PSD SAR version of Il-76MF Il-96 Early development of convertible passenger/cargo aircraft, (project only, designation re-used later) Il-150 proposed Beriev A-50 with Perm PS-90 engines. Beriev A-60 Airborne laser weapon testbed. (Il-76 version 1A)
- **Special purpose / research variants:** Il-76LL with reinforced wing (at least 3 aircraft) to be used as test-bed aeroplane for engine prototypes flight testing in Gromov Flight Research Institute. Izdeliye-176 prototype Il-76PP. Izdeliye-576 Izdeliye-676 Telemetry and communications relay aircraft, for use during trial programmes (prototype). Izdeliye-776 Telemetry and communications relay aircraft, for use during trial programmes (prototype). Izdeliye-976 ("SKIP", Il-976, or Il-76SK) – (СКИП – Самолетный Контрольно-Измерительный Пункт, Airborne Check-Measure-and-Control Center) Il-76/A-50 based Range Control and Missile tracking platform. Initially built to support Raduga Kh-55 cruise missile tests. Izdeliye-1076 Special mission aircraft for unknown duties. Izdeliye-1176 ELINT electronic intelligence aircraft, or Il-76-11
- **Military variants:** Il-76-Tu160 tailplane transporter One-off temporary conversion to support Tu-160 emergency modification programme. Il-76D ('D' for "Desantnyi", Десантный – "Paratrooper transport") has a gun turret in the tail for defensive purposes. Il-76K/Il-76MDK/Il-76MDK-II Zero-g cosmonaut trainer (dlya podgotovki kosmonavtov), for Yuri Gagarin Cosmonauts Training Center. Il-76LL Engine testbed, (ooniversahl'naya letayuschchaya laboratoriya). Il-76M Military transport version, (modifitseerovannyy – modified). Il-76MD Improved military transport version, (modifitseerovannyy Dahl'ny – modified, long-range). Il-76MD Skal'pel-MT Mobile Hospital Il-76M / Il-76MD Built without military equipment but designated as Ms and MDs (Gordon – 'Falsies') Il-76MD-90 An Il-76MD with quieter and more economical Aviadvigatel PS-90 high-bypass turbofan engines. Il-76MF Stretched military version with a 6.6 m longer fuselage, PS-90A-76 engines, maximum takeoff weight of 210 tonnes and a lift capability of 60 tonnes. First flew in 1995, not built in series so far just built for Jordan. Il-76PP ECM aircraft, major problems with ECM equipment on the Izdeliye-176 only. Il-76MD-M Modernized Il-76MD for the Russian Air Force. Il-76MD-90A An upgraded version with a new glass cockpit, upgraded avionics, new internal wing structure and Aviadvigatel PS-90A-76 engines. It was also known as Il-476 while in development. Il-76T/Il-76TD Built as military aircraft but given civilian designations. (Gordon – 'Falsie') Ilyushin Il-78/Il-78M/Il-78MD-90A Aerial refuelling tanker. Il-78 MKI A customized version of the Il-78 developed for the Indian Air Force. Il-82 Airborne Command Post/communications relay aircraft, (alternative designation – Il-76VKP-'version65S'). Il-84 Maritime Search and Rescue aircraft, (alternative designation – Il-76PS-poiskovo-spasahtel'nyy), not produced. Beriev A-50/Beriev A-50M/Beriev A-50I/Beriev A-50E Airborne Early Warning & Control aircraft. Beriev given control over the program. Beriev A-100 An AEW&C version of the Il-76MD-90A.
- **Civil variants:** Il-76MGA Initial Commercial freighter. (two prototypes and 12 production) equipped with Soloviev D-30 Turbofan engines. Il-76MD to Il-76TD conversions Complete removal of military equipment, identified by crude cover over OBIGGS inlet in Starboard Sponson. Il-76P / Il-76TP / Il-76TDP / Il-76MDP Firefighting aircraft. The Il-76 waterbomber

is a VAP-2 1.5-hour install/removal tanking kit conversion. The Il-76 can carry up to 13,000 U.S. gallons (49,000 liters) of water; 3.5 times the capacity of the C-130 Hercules. Since this kit can be installed on any Il-76, the designation Il-76TP, Il-76TDP are also used when those versions of the Il-76 are converted into water bombers. The Il-76P was first unveiled in 1990. Il-76T ('T' for Transport, Транспортный) unarmed civil cargo transport version. NATO code-name "Candid-A". It first flew on November 4, 1978. Il-76TD The civil equivalent of the Il-76MD, first flew in 1982, equipped with Soloviev D-30 Turbofan engines. Il-76TD-90 An Il-76TD with Aviadvigatel PS-90 engines and a partial glass cockpit. Il-76TD-90VD An Il-76TD with Aviadvigatel PS-90 engines and a partial glass cockpit. It was developed specially for Volga-Dnepr cargo company, which operates four aircraft as of 2012. Il-76TD-S Civilian mobile Hospital, similar to Il-76MD Skal'pel-MT. Il-76TF Civil transport stretched version with Aviadvigatel PS-90 engines. It is the civil version of the Il-76MF (none produced).

- **Foreign variants:** Beriev A-50E/I For the Indian Air Force. Hosts Israeli Phalcon radar for AEW&C and Aviadvigatel PS-90 engines. Il-76MD tanker Iraqi Air Force tanker conversions. KJ-2000 Domestic Chinese airborne early warning and control conversion of Il-76, developed after A-50I was cancelled and currently in service with the armed forces of China. CFTE engine testbed The China Flight Test Establishment (CFTE) currently operates a flying testbed converted from a Russian-made Il-76MD jet transport aircraft to serve as a flying testbed for future engine development programmes. The first engine to be tested on the aircraft is the WS-10A "Taihang" turbofan, currently being developed as the powerplant for China's indigenous J-10 and J-11 fighter aircraft. Il-76MD #76456, acquired by the AVIC 1 from Russia in the 1990s, is currently based at CFTE's flight test facility at Yanliang, Shaanxi Province. Baghdad-1 Iraqi development with a radar mounted in the cargo hold enabling it to serve as AEW&C, used in the Iran–Iraq War. Baghdad-2 Iraqi development (with French assistance) with fibreglass-reinforced plastic radome over the antenna of the Thomson-CSF Tiger G surveillance radar with a maximum detection range of 350 km (189 nmi, 217.5 mi). One was destroyed on the ground during the 1991 Persian Gulf War; two others were flown to Iran where they remained. At least one went into service with the IRIAF. One aircraft crashed following a midair collision with a HESA Saeqeh fighter, during the annual Iranian military parade in Teheran. It can be distinguished from the Beriev A-50 by having the Il-76 navigator windows in the nose, which the A-50 does not.

System

Alternate Designation(s): Il-76MD; NATO: Candid-B

Primary Function / Type: Multi-Purpose Strategic Airlifter

Manufacturer: Tashkent Aviation Production Association Aviastar-SP

Crew: 7 (pilot, co-pilot, navigator, flight engineer, communications officer, 2 cargo handlers)

Passengers: 140 regular troops; or 125 paratroops

Number of Engines: 4

Number of Hard Points: Some military models have 2 hardpoints under each outer wing capable of supporting 500 kg bombs.

Dimensions

Length: 53.19 m

Width (Wing Span): 50.5 m

Height: 14.76 m

Wing Area: 300 m2

Tailplane Span: 17.40 m

Tailplane Area: 63.0 m sq

Fin Height: 7.25 m

Fin Area: 50.0 m sq

Wheelbase: 14.17 m

Wheel Track: 8.16 m

Hatch Height: 3.40 m

Hatch Width: 3.45 m

Cargo Hold, Length to Ramp: 20.00 m

Cargo Hold, Length with Ramp: 24.50 m

Cargo Hold, Height: 3.46 m

Cargo Hold, Width: 3.40 m

Empty Operating Weight: 89,000 kg

Maximum Payload Capacity: 48,000 kg

Maximum Takeoff Weight: 190,000 kg

Unprepared Runway Weight: 157,500 kg

Maximum Landing Weight: 155,000 kg

Automotive

Engine Name: 4 x Rybinsk D-30KP II

Number of Engines: 4

Engine Type: Turbofans

Engine Power: 26,455 lb (117.68 kN) each at takeoff

Fuel Capactiy: 28,922 gal (109,480 liters) max in 12 tanks

Maximum Speed: 496 knots (571 mph, 919 km/h)

Cruise Speed: 421 knots (485 mph, 780 km/h)

Ceiling: 12,100 m

Range with Maximum Fuel: 4,212 nm (4,847 mi, 7,800 km)

Range with a Small Load: 3,942 nm (4,536 mi, 7,300 km) with 44,092 lb (20,000 kg) payload

Range with a Medium Load: 2,270 nm (2,610mi, 4,200 km) with 88,184 lb (40,000 kg) payload

Range with Maximum Load: 2,052 nm (2,361 mi, 3,800 km)

Takeoff Run: 5,580 ft (1,700 m)

Landing Run: 3,050 ft (930 m)

Main Gun System

↳*System*

Name: GSh-23L

Type: Autocannon

Caliber: 23mm

Quantity: 2 x GSh-23L twin-barreled in manned tail turret on several military and some civilian planes

Length: 1,537 mm

Barrel Length: 1,000 mm

Weight: 50 kg

Barrels: 2

Action: Gast principle

Rate of Fire: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: INA

Bomb Weapon Systems

Note: Some military models have 2 hardpoints under each outer wing capable of supporting 500 kg bombs.

Fire Control / Avionics

FCS Name: INA

Fire Control Radar: Yes

Navigation Radar: Kupol-3-76

FLight Avionics: SAU-76 automatic control system

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: SPS-5 Fasol Electronic Jammers

Chaffs/Flares: 4 x 500 kg for illuminating landing area

Radar Warning: Receivers in large fairings on side of nose

Notes:

Il-76MD Candid-B This is the military version of the Il-76TD. The additional D designation stands for dal'niy, or long-range. It is covered in the main entry, above. Its max takeoff weight is increased from 170 tons to 190 tons when operating from concrete runways. The Ilyushin Il-76 (Russian: Ильюшин Ил-76; NATO reporting name: Candid) is a multi-purpose four-engine turbofan strategic airlifter designed by the Soviet Union's Ilyushin design bureau. It was first planned as a commercial freighter in 1967, as a replacement for the Antonov An-12. It was designed to deliver heavy machinery to remote, poorly served areas. Military versions of the Il-76 have been widely used in Europe, Asia and Africa, including use as an aerial refueling tanker or command center. The Il-76 has seen extensive service as a commercial freighter for ramp-delivered cargo, especially for outsized or heavy items unable to be otherwise carried. It has also been used as an emergency response transport for civilian evacuations as well as for humanitarian aid and disaster relief around the world. Because of its ability to operate from unpaved runways, it has been useful in undeveloped areas. Specialized models have also been produced for aerial firefighting and zero-G training. The aircraft was first conceived by Ilyushin in 1967 to meet a requirement for a freighter able to carry a payload of 40 tons (88,000 lb) over a range of 5,000 km (2,700 nmi; 3,100 mi) in less than six hours, able to operate from short and unprepared airstrips, and capable of coping with the worst weather conditions likely to be experienced in Siberia and the Soviet Union's Arctic regions. It was intended to replace the Antonov An-12. Another intended version was a double-decked 250-passenger airliner but that project was cancelled. The Il-76 first flew in March 1971. Production of Il-76s was allocated to the Tashkent Aviation Production Association in Tashkent, Uzbekistan, then a republic of the Soviet Union. Some 860 of the basic transport

variants were manufactured. In the 1990s, modernized variants also equipped with Soloviev D-30 turbofan engines were developed (MF, TF), with a cargo compartment 20 m (66 ft) long by 3.4 m (11 ft) wide by 3.4 m (11 ft) tall; these larger variants were not produced in significant quantity due to the financial difficulties being experienced by the Russian Air Force, which was the primary operator of the type. The prototype of the Il-76MF, conducted its first flight on 1 August 1995. From 2004 onwards, a number of aircraft in commercial service were modernized to the Il-76TD-90VD version; this involved the adoption of the newly developed PS-90 engine to comply with European noise limitations. In 2005, the People's Republic of China placed an order for 34 new Il-76MDs and four Il-78 tankers. In June 2013, Russian military export agency Rosoboronexport announced an order by China for 12 Il-76MD aircraft. The Il-76 has also been modified into an airborne refuelling tanker, designated the Il-78, around 50 aircraft having been produced. A variant of the Il-76 also serves as a firefighting water bomber. Its airframe was used as a base for the Beriev A-50 'Mainstay' AEW&C (airborne early warning and control) aircraft; around 25 aircraft were made. Another application for the type was found in Antarctic support flights and for conducting simulated weightlessness training for cosmonauts (akin to the "Vomit Comet" used by NASA). Beriev and NPO Almaz also developed an airborne laser flying laboratory designated A-60, of which two were built, much of this project's details remaining classified.

B737-200 (Boeing 737-200) American Cargo Transport Aircraft



Tiers:



Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders

have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.

- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-200; Boeing 737-200

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 130 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 30.53 m

Width (Wing Span): 28.35 m

Wing Area: 102.0 sq m

Height: 11.28 m

Cabin Length: 20.88 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 27,445 kg

Maximum Payload: 15,558 kg

Maximum Takeoff Weight: 52,390 kg

Automotive

Engine Name: 2 x Pratt & Whitney JT8D-15A

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 15,500 lb (7,031 kg) static thrust each

Standard Internal Fuel Capacity: 19,532 liters

Maximum Internal Fuel Capacity: 22,596 liters

Maximum Normal Operating Speed: 555 knots (639 mph, 1,027 km/h)

Maximum Cruise Speed: 485 knots (558 mph, 899 km/h)

Economical Cruise Speed: 412 knots (474 mph, 763 km/h)

Long Range Cruise Speed: 420 knots (484 mph, 778 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 147 knots (169 mph, 272 km/h)

Speed at Threshold at Maximum Landing Weight: 131 knots (151 mph, 243 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 1,550 nm (1,785 mi, 2,872 km)

Maximum Fuel at Long-Range Cruise Speed: w/20,400-lb (9,277-kg) payload 2,890 nm (3,328 mi, 5,355 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The 737-200 had its maiden flight on August 8, 1967. It was certified by the FAA on December 21, 1967, and the inaugural flight for United was on April 28, 1968, from Chicago to Grand Rapids, Michigan. The lengthened -200 was widely preferred over the -100 by airlines. The 737-200 was a 737-100 with an extended fuselage, launched by an order from United Airlines in 1965. The -200 was rolled out on June 29, 1967, and entered service with United in April 1968. The 737-200 Advanced is an improved version of the -200, introduced into service by All Nippon Airways on May 20, 1971. The -200 Advanced has improved aerodynamics, automatic wheel brakes, more powerful engines, more fuel capacity, and longer range than the -100.[35] Boeing also provided the 737-200C (Combi), which allowed for conversion between passenger and cargo use and the 737-200QC (Quick Change), which facilitated a rapid conversion between roles. The 1,095th and last delivery of a -200 series aircraft was in August 1988 to Xiamen Airlines. With a gravel kit modification (features preventing foreign object damage), the 737-200 can use unimproved or unpaved landing strips, such as gravel runways, that other similarly-sized jet aircraft cannot. Gravel-kitted 737-200 Combis are currently used by Canadian North, First Air, Air Inuit, Nolinor, and Air North in northern Canada where gravel runways are common. For many years, Alaska Airlines made use of gravel-kitted 737-200s to serve Alaska's many unimproved runways across the state. Nineteen 737-200s, designated T-43, were used to train aircraft navigators for the U.S. Air Force. Some were modified into CT-43s, which are used to transport passengers, and one was modified as the NT-43A Radar Test Bed. The first was delivered on July 31, 1973 and the last on July 19, 1974. The Indonesian Air Force ordered three modified 737-200s, designated Boeing 737-2x9 Surveiller. They were used as Maritime reconnaissance (MPA)/transport aircraft, fitted with SLAMMAR (Side-looking Multi-mission Airborne Radar). The aircraft were delivered between May 1982 and October 1983. Many 737-200s have been phased out or replaced by newer 737 versions. After 40 years, in March 2008, the final 737-200 aircraft in the U.S. flying scheduled passenger service were phased out, with the last flights of Aloha Airlines. The variant still sees regular service through North American charter operators such as Sierra Pacific. In July 2019, there were a combined 46 Boeing 737-200s in service, mostly with "second and third tier" airlines, and those of developing nations. In 1970, Boeing received only 37 orders. Facing financial difficulties, Boeing considered closing the 737 production-line and selling the design to Japanese aviation companies.[15] After the cancellation of the Boeing Supersonic Transport, and scaling back of 747 production, enough funds were freed up to continue the project. In a bid to increase sales by offering a variety of options, Boeing offered a 737C (Convertible) model in both -100 and -200 lengths. This model featured a 134 in × 87 in (340 cm × 221 cm) freight door just behind the cockpit, and a strengthened floor with rollers, which allowed for palletized cargo. A 737QC

(Quick Change) version with palletized seating allowed for faster configuration changes between cargo and passenger flights. With the improved short-field capabilities of the 737, Boeing offered the option on the -200 of the gravel kit, which enables this aircraft to operate on remote, unpaved runways. Until retiring its -200 fleet in 2007, Alaska Airlines used this option for some of its combi aircraft rural operations in Alaska. Northern Canadian operators Air Inuit, Air North, Canadian North, First Air and Nolinor Aviation still operate the gravel kit aircraft in Northern Canada, where gravel runways are common. In 1988, the initial production run of the -200 model ended after producing 1,114 aircraft. The last one was delivered to Xiamen Airlines on August 8, 1988.

Y-12G Chinese Utility Aircraft





Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12G

Primary Function / Type: Utility Aircraft

Manufacturer: Harbin Aircraft Industry Group

Crew: 2 (pilot, co-pilot)

Passengers: 19 passengers

Number of Engines: 2

Number of Hard Points: INA

Note: This is a freighter transport variant with a side cargo door and a windowless cabin. The aircraft can accommodate three LD3 standard containers.

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 19.20 m
Wing Area: 36.90 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-135
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 750-shp shp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 328 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 504 m/min
Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12G This is a freighter transport variant with a side cargo door and a windowless cabin. The aircraft can accommodate three LD3 standard containers. The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger

fuselage and bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

Challenger 600 (CL-600) Canadian Transport Aircraft







Tiers:



Variants:

- **Challenger 600 (CL-600):** The was the initial production version with Avco Lycoming ALF 502L-2 engines and without winglets at the wingtips.
- **CE-144 Electronic Support and Training (EST):** Seven CL-600s were converted as EW simulators; fitted with radar, jamming systems, communications equipment; the first service entry was in 1990.
- **Challenger 601 (CL-601):** The 601 is a production version with uprated engines and winglets. At one point, there were 18 in military service, most as VIP transports: six in Canada, five in China and seven in Germany. One German aircraft was configured for combined passenger/cargo operations; another operated as an air ambulance with a 4-litter capacity.
- **Challenger 601-3A (CL-601-3A):** This is an improved 601 with flat-rated CF-34-3A engines for better hot-day performance; integrated digital flight management and guidance system including automatic flight control system (AFCS) and electronic flight instrumentation system (EFIS).
- **Challenger 604 (CL-604):** The CL-604 is the latest version of this type of aircraft by Bombardier Aerospace. It has a range of 4,077 nm (4,696 mi; 7,556 km). It also utilizes advanced transonic wing design, a damage-tolerant airframe (FAR 25), triple-redundant hydraulic systems and quadruple-redundant electrical systems.
- **CL-605:** Initial operating capability (IOC) of this version was reached in 2006. It upgrades the avionics and structure of the 604 design. Features include larger cabin windows, new avionics displays and "electronic flight bag" capability. The version can be identified by its new, rounded tailcone. See separate record for more information.

System

Alternate Designation(s): Challenger 600; CL-600
Primary Function / Type: Transport Aircraft
Manufacturer: Canadair, St Laurent, Quebec, Canada (part of Bombardier Aerospace)
Crew: 2 (pilot, co-pilot)
Passengers: 19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 20.85 m
Height: 6.30 m
Width (Wing Span): 18.85 m
Wing Area: 48.31 sq m
Cabin Length: 8.61 m
Cabin Width: 2.49 m
Cabin height: 1.85 m
Cabin Volume: 32.6 cu m
Empty Weight: 8,464 kg
Maximum Payload: 2,365 kg
Maximum Takeoff Weight: 18,642 kg

Automotive

Engine Name: 2 x Avco Lycoming Textron ALF 502L-2
Number of Engines: 2
Engine Type: Turbofan
Engine Power: 3,402 kg static thrust each
Maximum Cruise Speed: 851 kph
Normal Cruise Speed: 819 kph
Long-Range Cruise Speed: 743 kph
Climb Rate: 1,097 m/min
Ceiling, 2 Engines: 12,500 m
Ceiling, 1 Engine: 7,315 m
Maximum Range: 5,186 km

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

CL-600 Original production version, powered by Lycoming ALF 502 turbofans of 7500 lbf (33.6 kN) thrust each. Built from 1978 to 1982 (81 built). The Bombardier Challenger 600 series is a family of business jets developed by Canadair and then produced from 1986 by its new owner, Bombardier Aerospace. At the end of 1975, Canadair backed the LearStar 600 concept by Bill Lear, and acquired the large business jet or freighter project in April 1976. On 29 October, the program was launched, backed

by the Canadian federal government, and designed to comply with new FAR part 25 standards. In March 1977, it was renamed the Challenger 600 after Bill Lear was phased out, as the original conventional tail was changed for a T-tail among other developments. The first prototype was rolled out on 25 May 1978, and performed its maiden flight on 8 November. The flight test program saw a deadly crash on 3 April 1980, but Transport Canada approved the CL-600 type certification on 10 August 1980. In 1986, Canadair was close to bankruptcy and was bought by Bombardier. The jet was stretched into the Bombardier CRJ regional airliner, introduced on 19 October 1992, and the longer range Global Express, introduced in July 1999. The 500th Challenger was rolled out in May 2000, and the 1000th was delivered to NetJets in December 2015. By October 2018, 1,066 aircraft have been built. The Challenger is a low-wing jet powered by two turbofans mounted in aft fuselage pods, it has a supercritical wing and a stand-up cabin with two seating sections. The original Lycoming ALF 502 turbofans were replaced by a pair of General Electric CF34s on the CL-601, which also gained winglets, and first flew on 10 April 1982. Subsequent variants have updated systems, avionics, and higher weights.

Y-7-100 (Yunshuji-7-100) Chinese Cargo Transport Aircraft



Tiers:

1 2 3 4

Variants:

- **Variants:** Xian Y-7E Speculative designation for a 'Hot and High" version with more powerful engines. Xian Y-7G A military variant of the MA60 produced for the PLAAF. Xian Y-7H (Huo -cargo) A reverse-engineered An-26 with rear loading ramp for the PLAAF, entering production in 1992. Xian Y7H-500 Civil variant of the Y-7H certified in 1994. Xian Y-14 The original designation for the An-26 copy/Y-7H. Xian Y-7-100 Improved version, developed in co-operation with HAECO (Hong Kong Aircraft Engineering Company), with redesigned cockpit and cabin, as well as winglets. This variation has an upgraded passenger cabin interior, with new avionics sourced from western providers. Flight crew reduced to three, it is capable of carrying 52 passengers. Xian Y-7-100C1 Five-crew variant with equipment changes. Xian Y-7-100C2 Five-crew variant with equipment changes. Xian Y-7-100C3 Five-crew variant with equipment changes. Xian Y-7-200 Fitted with new avionics; without winglets. Xian Y-7-200A Powered by two Pratt & Whitney PW127C turboprop engines. Xian Y-7-200B Stretched version (74cm (29in)) with WJ5A-1G engines, built for the Chinese domestic market. Xian HYJ-7 (Hongzhaji Yunshuji Jiaolianji - Bomber/transport/trainer) A pilot and crew trainer for H-6 heavy bombers fitted with a stabilised HM-1A bombsight, bomb-aiming radar and a TNL-7880 combined navigation system. Xian MA60 (Y-7-MA60) (Modern Ark 60 seats) A westernised variant of the Y-7 intended to attract more western customers and meet Joint Airworthiness Requirements. Xian JZY-01 experimental aircraft / Y-7 AWACS Carrier-based airborne early warning and control (AEW&C) variant. JZY stands for Jian (□) Zai (□) Yu (□), meaning carrier borne AEW&C, has 4 rudders like E-2 AEW It is being used as a testbed for Xian KJ-600.

System

Alternate Designation(s): Y-7-100; Yunshuji-7-100
Primary Function / Type: Cargo Transport Aircraft
Manufacturer: Xi'an Aircraft Industrial Corporation
Crew: 3 or 5
Passengers: 48-52 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 23.71 m
Width (Wing Span): 29.64 m
Height: 8.55 m
Wing Area: 74.98 sq m
Cabin Length: 10.50 m

Cabin Width: 2.80 m

Cabin Height: 1.90 m

Cabin Volume: 56 cu m

Empty Weight: 14,952 kg

Maximum Takeoff Weight: 21,800 kg

Maximum Payload Weight: 5,500 kg

Automotive

Engine Name: 2 x Shanghai WJ-5A-1

Number of Engines: 2

Engine Type: Turboprop

Engine Power: 2,790 shaft hp each

Standard Internal Fuel Capacity: 5,106 liters

Optional Internal Fuel Capacity: 6,192 liters

Maximum Speed: 518 km/h

Cruise Speed at 4,000 m: 487 km/h

Economical Speed: 423 km/h

Range with Maximum Payload: 910 km

Range with Maximum Fuel: 2,420 km

Climb Rate: 458 m/min

Ceiling: 8,750 m

Fire Control System / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-7-100 This is an improved version developed with the assistance of the Hong Kong Aircraft Engineering Co. (HAECO). This version has greater wing span and winglets, Hamilton Standard environmental control system, three-man flight deck, updated avionics and revised Noordam cabin layout with reclining seats. The Xian Y-7 (Chinese: □-7; pinyin: Yùn-qī) is a transport/passenger aircraft built in China. It is based on the Soviet-designed Antonov An-24 series. China imported the

Antonov An-24 from early in its production run and also negotiated licences for production of the aircraft and its engines. In 1966, Xi'an aircraft factory started the project of local production of An-24. The first Chinese-assembled An-24T had its maiden flight on 25 December 1970. Production was launched in 1977 at the Xi'an aircraft factory but progress was slow due to the deleterious effects of the Cultural Revolution, with a pre-production aircraft displayed to the public at Nanyuan air base, near Beijing, on 17 April 1982. The WJ-5A1 turboprop engine was chosen as the Y-7's power source. The first production aircraft was not flown until February 1984, illustrating the slow progress (eighteen years from licence to production). The Chinese aircraft equated to the An-24RV, having a full complement of windows and the booster jet engine. The majority of early deliveries were to the People's Liberation Army Air Force (PLAAF), mostly as transports, with a few in 52-seat airliner configuration for the Civil Aviation Administration of China (CAAC). After the initial licensed production run, the Y-7 was developed separately from the An-24 with a succession of upgrades culminating in the Xian MA60 (Modern Ark) series. A tactical transport derivative was copied, unlicensed, from the Antonov An-26 and emerged as the Y-7H, incorporating the cargo ramp door and military equipment of the An-26.

IL-62 (Classic) Russian Jet Airliner





Tiers:



Variants:

- **Il-62:** Initial production version, powered by four 23,150-lb (103.0 kN) Kuznetsov NK-8 turbofan engines, accommodation for a crew of five and 186 passengers.
- **Il-62M:** Improved version, powered by four 24,250-lb (107.9 kN) Soloviev D-30KU turbofan engines, accommodation for a crew of five and 174 passengers, equipped with containerised baggage and freight system, modified wing spoilers and a revised flight deck, plus increased fuel capacity.
- **Il-62MK:** Medium-range version, powered by four 24,250-lb (107.9 kN) Soloviev D-30KU turbofan engines, accommodation for a crew of five and 195 passengers, equipped with strengthened wings and landing gear for operations at higher gross weights.
- **Il-62MGr:** Cargo version of Il-62M

System

Alternate Designation(s): Il-62; NATO: Classic
Primary Function / Type: Narrow-Body Jet Airliner
Manufacturer: Ilyushin
Crew: 3 to 5 (a captain, a first officer, and a flight engineer, plus optionally a navigator and a radio officer on long overwater and/or VIP services to operator specification) plus a four to eight-person cabin crew to operator specifications
Passengers: 168-186 passengers
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 53.12 m
Wingspan: 43.2 m
Height: 12.35 m
Wing Area: 279.55 m2
Empty Weight: 23,000 kg
Gross Weight: 71,600 kg
Maximum Takeoff Weight: 165,000 kg

Automotive

Engine Name: 4 × Soloviev D-30KU
Number of Engines: 4
Engine Type: Turbofan Engines
Engine Power: 24,300 lbf thrust each
Fuel Capacity: 105,300 Liters
Maximum Speed: 900 km/h
Range: 10,000 km
Service Ceiling: 12,000 m
Rate of Climb: 18 m/s

Fire Control / Avionics

Fire Control System Type: No
Fire Control Radar: No
Laser Desingator: No

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: INA
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Ilyushin IL-62 (Russian: Илью́шин Ил-62; NATO reporting name: Classic) is a Soviet long-range narrow-body jetliner conceived in 1960 by Ilyushin. As successor to the popular turboprop Il-18 and with capacity for almost 200 passengers and crew, the Il-62 was the world's largest jet airliner when first flown in 1963. One of four pioneering long-range designs (the others being Boeing 707, Douglas DC-8, and Vickers VC10), it was the first such type to be operated by the Soviet Union and a number of allied nations. The Il-62 entered Aeroflot civilian service on 15 September 1967 with an inaugural passenger flight from Moscow to Montreal, and remained the standard long-range airliner for the Soviet Union (and later, Russia) for several decades. It was the first Soviet pressurised aircraft with non-circular cross-section fuselage and ergonomic passenger doors, and the first Soviet jet with six-abreast seating (the turboprop Tu-114 shared this arrangement) and international-standard position lights. Over 30 nations operated the Il-62 with over 80 examples exported and others having been leased by Soviet-sphere and several Western airlines. The Il-62M variant became the longest-serving model in its airliner class (average age of examples in service as of 2016 is over 32 years). Special VIP (salon) and other conversions were also developed and used as head-of-state transport by some 14 countries. However, because it is expensive to operate compared to newer generation airliners, the number in service was greatly reduced after the 2008 Great Recession. The Il-62's successors include the wide-bodied Il-86 and Il-96, both of which were made in much smaller numbers and neither of which was widely exported. The Il-62 is a conventional all-metal low-wing monoplane of riveted sectional semi-monocoque construction to fail-safe design principles (a structure designed so that failure of one major member does not cause immediate failure of the whole). Its service life was initially set at 30,000 flight hours and subject to extensions and curtailments according to the quality of service procedures, inspection and manufacturer's bulletins. The aircraft features pressurised cabin and freight holds (with fuselage dimensions of 3.8 m width x 4.1 m height), duplex all-mechanical flight controls, though with twin electric motors for tailplane incidence control; hydraulic nosewheel steering, landing gear and tail strut actuation, and wheel brakes. The Il-62M has spoilers and lift dumpers which extend automatically upon landing and are hydraulically operated. Control surfaces include a variable-incidence tailplane with dynamically and weight-compensated elevators with trim tabs, triple-section tabbed ailerons (outermost for low

speed and innermost for high speed) which are interlinked with a torsion bar, spoilerons (Il-62M), spoilers and lift dumpers, and pneumatically actuated thrust reversers on the two outboard engines (the reversers are flight-rated on the Il-62M). 27 V AC electrics are used throughout with a TA-6 auxiliary power unit (a turbine generator which supplies electric power and air conditioning on the ground) in the lower tailcone plus backup lead-zinc batteries. The aircraft uses conventional hot air de-icing using engine bleed air. Its sea level is equivalent to 2,400 m (8,000 ft) above mean sea level and thereafter reducing to the equivalent of 2,400 m (8,000 ft) to cruise altitude. It was originally built with no automatic oxygen masks; emergency supply comprises hatrack-housed oxygen bottles and masks for manual distribution to passengers by cabin crew. Since 1997, most aircraft have been retrofitted with automatic oxygen supply systems with drop-down masks. Its avionics include a Polyot-1 automatic flight control system (a "super autopilot," able to be programmed with a set route which it can fly without human intervention but under constant flight crew monitoring; ICAO Cat. 1 approaches standard, Cat. 2 optional), Doppler navigational radar replaced by triplex INSS (Inertial Navigation System Sets) on Il-62M after 1978 and by GPS (Global Positioning System) navigation sets on many aircraft after 1991, triple VHF and HF flightdeck radios, automatic direction finders, Soviet and Western instrument landing system receivers, vertical omnidirectional radio range and radio beacon receivers, duplex radio altimeters, automatic radio transponders, a full ICAO-standard navigation lights fit, cabin tannoy and intercom systems. Soviet/Russian and Warsaw Pact sovereign examples are additionally fitted with triplex "Odd Rods" (NATO code name) IFF (identification friend or foe) air defence transponders identifiable by three closely spaced short aerials. Emergency evacuation systems include inflatable life rafts and manually extendable canvas evacuation slides. Most aircraft are now retrospectively fitted with emergency floor lighting strips and some aircraft equipped with automatically inflatable evacuation slides. Fire extinguishers are sited in engine nacelles, flightdeck compartment, cabin crew rest areas and toilets. The Il-62 offers accommodation for up to 198 passengers in a single-class layout, seated six-abreast at 84 cm (33 in) seat pitch in two cabins separated by a vestibule, galley/pantry and cabin crew rest area. There are three toilets, forward, midships, and aft. It has a buffet/bar and a further cabin crew rest area in a vestibule forward, with a further optional cabin crew rest area aft. Typical mixed-class accommodation ranges between 128 and 144, seated four or six abreast, and a common single aisle configuration for long distance Aeroflot examples was first class (2-abreast) 3 rows, business class (3-abreast) 4 rows, economy class (3-abreast) 17 rows (Thiel, 2001). In this configuration, the central aisle in business and economy classes is quite narrow. A first class compartment is optionally sited aft of forward entry door or just forward of midships entry door, with an economy compartment further forward in the latter case. "Skycot" fitments are located in hatracks, while later Il-62Ms (1978 onwards) feature enclosed hatracks. Customer-optionable interior fitments. No in-flight entertainment systems are available except a public-address system that may be coupled to an open-reel or audio cassette player. Individual aircraft were experimentally fitted with television sets for Soviet-standard videotape entertainment during the 1970s. Some aircraft were retrospectively fitted with Western in-flight entertainment (solely audio) systems after 1991.

Y-11 (Chan) Chinese Utility Aircraft



Tiers:



Variants:

- **Y-11:** Twin-engined STOL utility transport aircraft, designed for agriculture and geological survey.
- **Y-11B:** (I) is Fitted with advanced avionics and powered by 350 hp Teledyne -Continental TSIO-550-B air-cooled flat six piston engines. Type (II) was canceled. Later, the only flyable one was used for geological survey.
- **Y-11 agricultural aircraft:** Fitted with a hopper or tank in the cabin on the center of gravity, dispensing chemicals through a dust spreader, spraybars or atomisers on the wing trailing edges.
- **Y-11 Geological Survey aircraft:** At least one aircraft fitted with a large toroidal sensor on the port wing-tip and a cigar shaped sensor on the starboard wing-tip.
- **Y-11T:** The initial designation of the Prototype Harbin Y-12, a redesigned plane fitted with Pratt & Whitney PT6A-11 turboprop engines driving three-bladed Hartzell HC-B3TN-3B propellers.

System

Alternate Designation(s): Y-11
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Manufacturing Corporation
Crew: 2
Passengers: 7
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 12.02 m
Height: 4.64 m
Width (Wing Span): 17.00 m
Wing Area: 34.00 sq m
Empty Weight: 2,050 kg
Payload Weight: 870 kg
Maximum Takeoff Weight: 3,500 kg

Automotive

Engine Name: 2 x Zhuzhou Huosai-6A

Number of Engines: 2

Engine Type: 9-cyl radial piston

Engine Power: 285 hp each

Internal Fuel Capacity: 530 liters

Maximum Speed: 220 km/h

Cruise Speed at 75% Power: 190 km/h

Cruise Speed at 57% Power: 165 km/h

Stall Speed: 105 km/h

Range, Maximum Payload with 322 Liters of Fuel: 400 km

Climb Rate: 246 m/min

Ceiling: 4,000 m

STOL Takeoff Run: 140 m

STOL Landing Run: 140 m

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Harbin Y-11 (NATO reporting name Chan) is a high wing twin-engine piston utility and geological survey aircraft built by Harbin Aircraft Manufacturing Corporation (HAMC). A requirement for a twin-engined light utility transport was issued by the Chinese government in November 1974. The Y-11 was proposed in April 1974, and the design was begun in January 1975. Design of the Y-11, under Xiong Wenjie, was completed at Harbin in June 1975 and prototype construction started immediately. The static test article completed its test cycle on 19 December 1975 and the first flight of the prototype followed soon after on 30 December 1975. Production started on 3 April 1977 with at least fifty aircraft known to have been built before production stopped in favour of the Harbin Y-12

Twin Panda Canadian Utility Aircraft



Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Twin Panda
Primary Function / Type: Utility Aircraft
Manufacturer: Canadian Aerospace Group
Crew: 2 (pilot, co-pilot)
Passengers: 19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 19.20 m
Wing Area: 36.90 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-34
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 750 shp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 328 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 504 m/min
Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

Twin Panda: Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with unrated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with. The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger fuselage

and bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

B737-400 (Boeing 737-400) American Cargo Transport Aircraft







Tiers:



Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders

have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.

- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-400; Boeing 737-400

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 146-168 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 36.45 m

Width (Wing Span): 28.88 m

Wing Area: 105.4 sq m

Height: 11.13 m

Cabin Length: 27.18 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 34,382 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 62,822 kg

Automotive

Engine Name: 2 x CFM International CFM56-3C-1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 20,000 lb (9,072 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 23,829 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 491 knots (565 mph, 910 km/h)

Economical Cruise Speed: 419 knots (482 mph, 776 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 2,075 nm (2,390 mi, 3,846 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

737-400 In June 1986, Boeing announced the development of the 737-400, which stretched the fuselage a further 10 ft (3.0 m), increasing the passenger load to 188. The -400s first flight was on February 19, 1988, and, after a seven-month/500-hour flight-testing run, entered service with Piedmont Airlines that October. The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the 727 on short and thin routes, the twinjet retains the 707 fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers. The -100/200 original variants were powered by Pratt & Whitney JT8D low-bypass engines and offered seating for 85 to 130 passengers. Launched in 1980 and introduced in 1984, the 737 Classic -300/400/500 variants were re-engined with CFM56-3 turbofans and offered 110 to 168 seats. Introduced in 1997, the 737 Next Generation (NG) -600/700/800/900 variants have updated CFM56-7s, a larger wing and an upgraded glass cockpit, and seat 108 to 215 passengers. The latest generation, the 737 MAX -7/8/9/10, powered by improved CFM LEAP high bypass turbofans and accommodating 138 to 204 people, entered service in 2017. Boeing Business Jet versions are produced since the 737NG, as well as military models. As of December 2019, 15,156 Boeing 737s have been ordered and 10,571 delivered. Actual backlog stands at 4,398 when including "additional criteria for recognizing contracted backlog with customers beyond the existence of a firm contract". Initially, its main competitor was the McDonnell Douglas DC-9, followed by its MD-80/MD-90 derivatives. It remained the highest-selling commercial jetliner until surpassed in total orders by the Airbus A320 family in October 2019. The current 737 MAX, designed to compete with the A320neo was grounded worldwide in March 2019 following two fatal crashes.

Y-8 Chinese Transport Aircraft







Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14,

2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft

engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8

Primary Function / Type: Transport Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that

China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

Tu-154M (Careless) Russian Jet Airliner







Tiers:



Variants:

- **Tu-154:** Tu-154 production started in 1970, and the first passenger flight was performed on 9 February 1972. Powered by Kuznetsov NK-8-2 turbofans, it carried 164 passengers. About 42 were built.
- **Tu-154A:** The first upgraded version of the original Tu-154, the A model, in production since 1974, added center-section fuel tanks and more emergency exits, while engines were upgraded to higher-thrust Kuznetsov NK-8-2U. Other upgrades include automatic flaps/slats and stabilizer controls and modified avionics. Max. takeoff weight – 94,000 kg (207,235 lb). There were 15 different interior layouts for the different domestic and international customers, seating between 144 and 152 passengers. To discern the A model from the base model note the spike at the junction of the fin and tail. This is a fat bullet on the A model, and a slender spike on the base model.
- **Tu-154B:** As the original Tu-154 and Tu-154A suffered wing cracks after a few years in service, a version with a new, stronger wing, designated Tu-154B, went into production in 1975. It also had an additional fuselage fuel tank, additional emergency exits in the tail. Also, the maximum takeoff weight increased to 98,000 kg (216,053 lb). Important to Aeroflot was the increased passenger capacity, hence lower operating costs. With the NK-8-2U engines the only way to improve the economics of the airplane was to spread costs across more seats. The autopilot was certified for ICAO Category II automatic approaches. Most previously built Tu-154 and Tu-154A were also modified into this variant, with the replacement of the wing. Maximum takeoff weight increased to 96,000 kg (211,644 lb). 111 were built.
- **Tu-154B-1:** Aeroflot wanted this version for increased revenue on domestic routes. It carried 160 passengers. This version also had some minor modifications to the fuel system, avionics, air conditioning, and landing gear. 64 were built from 1977 to 1978.
- **Tu-154B-2:** A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley. The procedure took about 2 1/2 hours. Some of the earlier Tu-154Bs were modified to that standard. Maximum takeoff weight increased to 98,000 kg (216,053 lb), later to 100,000 kg (220,462 lb). Some 311 aircraft were built, including VIP versions. A few remain in service.
- **Tu-154S:** The Tu-154S is an all-cargo or freighter version of the Tu-154B, using a strengthened floor, and adding a forward cargo door on the port side of the fuselage. The aircraft could carry nine Soviet PAV-3 pallets. Maximum payload – 20,000 kg (44,092 lb). There were plans for 20 aircraft, but only nine were converted, two from Tu-154 models and seven from Tu-154B models. Trials were held in the early 1980s and the aircraft was authorized regular operations in 1984. By 1997 all had been retired.
- **Tu-154M:** The Tu-154M and Tu-154M Lux are the most highly upgraded versions, which first flew in 1982 and entered mass production in 1984. It uses more fuel-efficient Soloviev D-30KU-154 turbofans. Together with significant aerodynamic refinement, this led to much lower fuel consumption hence longer range, as well as lower operating costs. The aircraft has new double-slotted (instead of triple-slotted) flaps, with an extra 36-degree position (in addition to existing 15, 28 and 45-degree positions on older versions), which allows reduction of noise on approach. It also has a relocated auxiliary power unit and numerous other improvements. Maximum takeoff weight increased first to 100,000

kg (220,462 lb), then to 102,000 kg (224,872 lb). Some aircraft are certified to 104,000 kg (229,281 lb). About 320 were manufactured. Mass production ended in 2006, though limited manufacturing continued as of January 2009. No new airframes have been built since the early 1990s, and production since then involved assembling aircraft from components on hand. Chinese Tu-154MD electronic intelligence aircraft carry a large-size synthetic aperture radar (SAR) under their mainframe.

- **Tu-154M-LK-1:** Cosmonaut trainer. This was a salon VIP aircraft modified to train cosmonauts to fly the Buran reusable spacecraft, the Soviet equivalent of the US Space Shuttle. The Tu-154 was used because the Buran required a steep descent, which the Tu-154 was capable of replicating. The cabin featured trainee workstations, one of which was identical to the Buran's flightdeck. The forward baggage compartment was converted into a camera bay, as the aircraft was used to train cosmonauts in observation and photographic techniques.
- **Tu-154M-ON monitoring aircraft:** Germany modified one of the Tu-154s it inherited from the former East German Air Force into an observation airplane. This aircraft was involved with the Open Skies inspection flights. It was converted at the Elbe Aircraft Plant (Elbe Flugzeugwerke) in Dresden, and flew in 1996. After 24 monitoring missions, it was lost in a mid-air collision in 1997. The Russians also converted a Tu-154M to serve as an Open Skies monitoring aircraft. They used the Tu-154M-LK-1, and converted it to a Tu-154M-ON. When not flying over North America, it is used to ferry cosmonauts. China is believed to have converted one Tu-154 to an electronic countermeasures aircraft.
- **Tu-154M-100:** Design of this variant started in 1994, but the first aircraft were not delivered until 1998. It is an upgraded version with Western avionics, including the Flight Management Computer, GPS, EGPWS, TCAS, and other modern systems. The airplane could carry up to 157 passengers. The cabin featured an automatic oxygen system and larger overhead bins. Three were produced, as payment of debts owed by Russia to Slovakia. Three aircraft were delivered in 1998 to Slovak Airlines, and sold back to Russia in 2003.
- **Tu-155:** A Tu-154 converted into a testbed for alternative fuels. It first flew in 1988 and was used until the fall of the Soviet Union, when it was placed in storage.
- **Tu-164:** Initial designation of the Tu-154M.
- **Tu-174:** Proposed stretched version of Tu-154.
- **Tu-194:** Proposed shortened version of Tu-154.

System

Alternate Designation(s): Tu-154M; NATO: Careless

Primary Function / Type: Jet Airliner

Manufacturer: Tupolev

Crew: 3 flight crew + 5 cabin crew

Passengers: 144-168 passengers

Number of Engines: 3

Number of Hard Points: INA

Dimensions

Length: 48.00 m

Height: 11.40 m

Wingspan: 37.55 m

Wing Area: 201.45 sq m

Cabin Volume: 163.2 cu m

Weight, Empty: 55,300 kg

Weight, Maximum Takeoff: 102,000 kg

Payload: 18,000 kg

Automotive

Engine Name: 3 x Soloviev D-30KU-154 Turbofans

Number of Engines: 3

Engine Type: Turbofan

Engine Power: 10,500 kg static thrust each

Maximum Internal Fuel Capacity: 47,000 liters

Maximum Speed: 950 km/h

Economical Speed: 900 km/h

Long-Range Speed: 850 km/h

Takeoff Safety Speed: 255 km/h

Landing at Threshold Speed: 225 km/h

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Tu-154M The Tu-154M and Tu-154M Lux are the most highly upgraded versions, which first flew in 1982 and entered mass production in 1984. It uses more fuel-efficient Soloviev D-30KU-154 turbofans. Together with significant aerodynamic refinement, this led to much lower fuel consumption hence longer range, as well as lower operating costs. The aircraft has new double-slotted (instead of triple-slotted) flaps, with an extra 36-degree position (in addition to existing 15, 28 and 45-degree positions on older versions), which allows reduction of noise on approach. It also has a relocated auxiliary power unit and numerous other improvements. Maximum takeoff weight increased first to 100,000 kg (220,462 lb), then to 102,000 kg (224,872 lb). Some aircraft are certified to 104,000 kg (229,281 lb). About 320 were manufactured. Mass production ended in 2006, though limited manufacturing continued as of January 2009. No new airframes have been built since the early 1990s, and production since then involved assembling aircraft from components on hand. Chinese Tu-154MD electronic intelligence aircraft carry a large-size synthetic aperture radar (SAR) under their mainframe. The Tupolev Tu-154 (Russian: Туполев Ту-154; NATO reporting name: "Careless") is a three-engine medium-range narrow-body airliner designed in the mid-1960s and manufactured by Tupolev. A workhorse of Soviet and (subsequently) Russian airlines for several decades, it carried half of all passengers flown by Aeroflot and its subsidiaries (137.5 million/year or 243.8 billion passenger km in 1990), remaining the standard domestic-route airliner of Russia and former Soviet states until the mid-2000s. It was exported to 17 non-Russian airlines and used as a head-of-state transport by the air forces of several countries. With a cruising speed of 850 kilometres per hour (530 mph) the Tu-154 is one of the fastest civilian aircraft in use and has a range of 5,280 kilometres (3,280 mi). Capable of operating from unpaved and gravel airfields with only basic facilities, it was widely used in the extreme Arctic conditions of Russia's northern/eastern regions where other airliners were unable to operate. Originally designed for a 45,000-hour service life (18,000 cycles) but capable of 80,000 hours with upgrades, it was expected to continue in service until 2016, although noise regulations have restricted flights to western Europe and other regions. Since 1968 there have been 39 fatal incidents involving the Tu-154, most of which were caused either by factors unrelated to the aircraft, incorrect maintenance, or by its extensive use in demanding conditions. Few of the Tu-154 accidents appear to have involved technical failure. The Tu-154 is

powered by three rear-mounted low-bypass turbofan engines arranged similarly to those of the Boeing 727, but it is slightly larger than its American counterpart. Both the 727 and the Tu-154 use an S-duct for the middle (Number 2) engine. The original model was equipped with Kuznetsov NK-8-2 engines, which were replaced with Soloviev D-30KU-154 in the Tu-154M. All Tu-154 aircraft models have a relatively high thrust-to-weight-ratio which give excellent performance, at the expense of lower fuel efficiency. This became an important factor in later decades as fuel costs grew. The cockpit is fitted with conventional dual yoke control columns. Flight control surfaces are hydraulically operated. The cabin of the Tu-154, although of the same six-abreast seating layout, gives the impression of an oval interior, with a lower ceiling than is common on Boeing and Airbus airliners. The passenger cabin accommodates 128 passengers in a two-class layout and 164 passengers in single-class layout, and up to 180 passengers in high-density layout. The layout can be modified to what is called a winter version where some seats are taken out and a wardrobe is installed for passenger coats. The passenger doors are smaller than on its Boeing and Airbus counterparts. Luggage space in the overhead compartments is very limited. Like the Tupolev Tu-134, the Tu-154 has a wing swept back at 35° at the quarter-chord line. The British Hawker Siddeley Trident has the same sweepback angle, while the Boeing 727 has a slightly smaller sweepback angle of 32°. The wing also has anhedral (downward sweep) which is a distinguishing feature of Russian low-wing airliners designed during this era. Most Western low-wing airliners such as the contemporary Boeing 727 have dihedral (upward sweep). The anhedral means that Russian airliners have poor lateral stability compared to their Western counterparts, but also are more resistant to Dutch roll tendencies. Considerably heavier than its predecessor Soviet-built airliner the Ilyushin Il-18, the Tu-154 was equipped with an oversized landing gear to reduce ground load, enabling it to operate from the same runways. The aircraft has two six-wheel main bogies fitted with large low-pressure tires that retract into pods extending from the trailing edges of the wings (a common Tupolev feature), plus a two-wheel nose gear unit. Soft oleo struts (shock absorbers) provide a much smoother ride on bumpy airfields than most airliners, which very rarely operate on such poor surfaces. The original requirement was to have a three-person flight crew – captain, first officer and flight engineer – as opposed to a four- or five-person crew, as on other Soviet airliners. It became evident that a fourth crew member, a navigator, was still needed, and a seat was added on production aircraft, although their workstation was compromised due to the limitations of the original design. Navigators are no longer trained and this profession is becoming obsolete with the retirement of the oldest Soviet-era planes. The latest variant (Tu-154M-100, introduced 1998) includes an NVU-B3 Doppler navigation system, a triple autopilot, which provides an automatic ILS approach according to ICAO category II weather minima, an autothrottle, a Doppler drift and speed measure system (DISS), and a "Kurs-MP" radio navigation suite. A stability and control augmentation system improves handling characteristics during manual flight. Modern upgrades normally include modernised TCAS, GPS, and other systems (mostly American-made or EU-made). Early versions of the Tu-154 cannot be modified to meet the current Stage III noise regulations and are no longer allowed to fly into airspace where such regulations are enforced, such as the European Union. However, the Tu-154M's D-30 engines can be fitted with hush kits, allowing them to meet noise regulations.

Il-18 (Coot-D) Russian Cargo Transport Aircraft







Tiers:

1 2 3 4

System

Alternate Designation(s): Il-18D; NATO: Coot-D
Primary Function / Type: Turboprop Airliner
Manufacturer: Ilyushin
Crew: 9
Passengers: 65-120 passengers
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 35.90 m
Height: 10.17 m
Wingspan: 37.40 m
Wing Area: 140 sq m
Cabin Length: 24.00 m
Cabin Width: 3.23 m
Cabin Height: 2.00 m
Volume, Main Cabin: 238.0 cu m
Volume, Additional Cargo Holds: 29.3 cu m
Weight, Empty: 35,000 kg

Weight, Maximum Takeoff: 34,610 kg

Payload: 13,500 kg

Automotive

Engine Name: 4 x Ivchenko AI-20M

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Internal Fuel Capacity: 30,000 liters, plus equipped with an extra center section fuel tank for increased range.

Maximum Speed: 675 km/h

Economy Speed: 625 km/h

Ceiling: 10,000 m

Range, Maximum payload: 4,000 km

Takeoff Run: 1,300 m

Landing Run: 850 m

Fire Control / Avionics

Fire Control System Type: No

Fire Control Radar: No

Laser Desingator: No

Weather Radar: RPSN-2AMG: or RPSN-2N Emblema weather radar

Navigation System: NAS-1B and Put'-4M

Doppler Sensor: DISS-1

Navigation Computer: ANU-1

Compass System: KS-6G

Celestial Compass: DAK-DB

SHORAN: RSBN-2S Svod

ILS: SP-50 Materik

Radio Altimeter: RV-UM

Navigation Display: NI-50BM-1

Automatic Direction Finder: ARK-11

Radio: RSB-5/1230

IFF: SR-2M Khrom

Flight Data Recorder: MSRP-12-96

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Il-18D This is a transport/cargo version with more powerful AI-20M engines, center-section fuel tank for greater range, lengthened pressurized section of fuselage. Some are still in military and civilian service. The "D" stands for dal'niy, Russian for long-range. The Ilyushin Il-18 (Russian: Илью́шин Ил-18; NATO reporting name: Coot) is a large turboprop airliner that first flew in 1957 and became one of the best known and durable Soviet aircraft of its era. The Il-18 was one of the world's principal airliners for several decades and was widely exported. Due to the aircraft's airframe durability, many examples achieved over 45,000 flight hours and the type remains operational in both military and (to a lesser extent) civilian capacities. The Il-18's successor was the long range Il-62 jet airliner. Two Soviet aircraft shared the designation Ilyushin Il-18. The first Il-18 was a propeller-driven airliner of 1946 but after a year of test flights that programme was abandoned. In the early 1950s with a need to replace older designs and increase the size of the Soviet civil transport fleet, a Soviet Council of Ministers directive was issued on 30 December 1955 to the chief designers Kuznetsov and Ivchenko to develop new turboprop engines and to Ilyushin and Antonov to design an aircraft to use these engines. The two aircraft designs were developed as the Ilyushin Il-18 and the Antonov An-10 and the engine chosen was the Kuznetsov NK-4 rather than the Ivchenko AI-20. The Il-18 design had started in 1954 before the directive was issued and experience with the piston-engined Il-18 was used although the aircraft was a new design. The design was for a four-engined low-wing monoplane with a circular pressurised fuselage and a conventional tail. The forward retracting tricycle landing gear had four wheels fitted on the main leg bogies, the main legs bogies rotated 90 degrees and retracted into the rear of the inboard engines. A new feature at the time was the fitting of a weather radar in the nose and it was the first Soviet airliner to have an automatic approach system. The aircraft has two entry doors on the port-side before and after the wing and two overwing emergency exits on each side. The prototype SSSR-L5811 was rolled out in June 1957 and after ground-testing it began taxi test and high-speed runs on 1 July 1957. On 4 July 1957 the prototype first flew from Khodynka. On 10 July 1957 the aircraft was flown to Moscow-Vnukovo Airport to be presented to a Soviet government commission; also present was the prototype Antonov An-10 and the Tupolev Tu-114. The Il-18 type was formally named Moskva and this was painted on the fuselage, although the name was not used when the aircraft entered production. The Moscow Machinery Plant No. 30 located at Khodynka, near where the Ilyushin design office and the prototype had been built, was chosen to manufacture the aircraft. During 1957 the plant began to reduce its production of the Ilyushin Il-14 and prepare to build the production aircraft designated IL-18A. The Il-18A was only different from the prototype in minor details, mainly internal configuration to increase the seating from 75 to 89. Malev Il-18 in Sweden, 1972 The first production aircraft were powered by the Kuznetsov NK-4 but the engines were plagued with problems so the Council of Ministers decreed in July 1958 that all production from November 1958 would use the Ivchenko AI-20 and earlier production would be re-engined. Only 20 IL-18As were built before production changed to the improved Il-18B, this new variant had a higher gross weight and the nose was re-designed with a larger radome which increased the length by 20 cm. The first Il-18B flew on 30 September 1958 powered by the AI-20; a VIP variant was also built as the IL-18S for the Soviet Air Force. From April 1961 a TG-18 Auxiliary Power Unit was fitted for ground starting rather than the bank of lead-acid batteries. Some aircraft were modified to allow the APU to be run in flight. With experience of the earlier aircraft a further improvement was the Il-18V variant. The Il-18V was structurally the same but the interior was re-designed including moving the galley and some minor system changes. The first Il-18V appeared in December 1959 and was to continue into production until 1965 after 334 had been built. Specialised variants of the aircraft also appeared, including aircraft modified for flight calibration and a long-range polar variant. Military variants also appeared including the anti-submarine Ilyushin Il-38.

Challenger 650 Canadian Transport Aircraft





Tiers:

1 **2** 3 4

System

Alternate Designation(s): Challenger 650

Primary Function / Type: Transport Aircraft

Manufacturer: Bombardier Aerospace (1986-present)

Crew: 2

Passengers: 12

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 20.90 m

Height: 6.30 m

Width (Wing Span): 19.60 m

Wing Area: 45.4 sq m

Cabin Length: 7.80 m

Cabin Width: 2.41 m

Cabin Height: 1.83 m

Cabin Volume: INA

Maximum Takeoff Weight: 21,863 kg

Maximum Landing Weight: 17,237 kg

Payload Capacity: 2,200 kg

Automotive

Engine Name: 2 x GE CF34-3B MTO

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 9,220 lb (41 kN) thrust

High-Speed Cruise Speed: Mach 0.82

Long-Range Cruise Speed: Mach 0.74

Maximum Range: 7,408 km

Takeoff Run: 1,720 m

Landing Distance: 846 m

Ceiling: 12,500 m

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Challenger 650 is the latest member of Bombardier's Challenger 600 family of business jets designed for executive transport and special missions. Spacious cabins provide excellent passenger comfort as well as sufficient space for operator consoles and mission system electronics. Numerous cabin configurations can be implemented. Our best-selling large aircraft platform combines world-class interior design with the ultimate value proposition. Widest-in-class cabin, worldwide reach, and the lowest direct operating costs make the Challenger 650 aircraft the winning choice.

Challenger 604 (CL-604) Canadian Transport Aircraft



Tiers:



Variants:

- **Challenger 600 (CL-600):** The was the initial production version with Avco Lycoming ALF 502L-2 engines and without winglets at the wingtips.
- **CE-144 Electronic Support and Training (EST):** Seven CL-600s were converted as EW simulators; fitted with radar, jamming systems, communications equipment; the first service entry was in 1990.
- **Challenger 601 (CL-601):** The 601 is a production version with uprated engines and winglets. At one point, there were 18 in military service, most as VIP transports: six in Canada, five in China and seven in Germany. One German aircraft was configured for combined passenger/cargo operations; another operated as an air ambulance with a 4-litter capacity.
- **Challenger 601-3A (CL-601-3A):** This is an improved 601 with flat-rated CF-34-3A engines for better hot-day performance; integrated digital flight management and guidance system including automatic flight control system (AFCS) and electronic flight instrumentation system (EFIS).
- **Challenger 604 (CL-604):** The CL-604 is the latest version of this type of aircraft by Bombardier Aerospace. It has a range of 4,077 nm (4,696 mi; 7,556 km). It also utilizes advanced transonic wing design, a damage-tolerant airframe (FAR 25), triple-redundant hydraulic systems and quadruple-redundant electrical systems.
- **CL-605:** Initial operating capability (IOC) of this version was reached in 2006. It upgrades the avionics and structure of the 604 design. Features include larger cabin windows, new avionics displays and "electronic flight bag" capability. The version can be identified by its new, rounded tailcone. See separate record for more information.

System

Alternate Designation(s): Challenger 604; CL-604

Primary Function / Type: Transport Aircraft

Manufacturer: Canadair, St Laurent, Quebec, Canada (part of Bombardier Aerospace)

Crew: 2 (pilot, co-pilot)

Passengers: 19 passengers

Number of Engines: 2

Number of Hard Points: INA

Avionics System: Rockwell Collins ProLine 4 avionics system.

Dimensions

Length: 20.85 m

Height: 6.30 m

Width (Wing Span): 19.61 m

Wing Area: 48.31 sq m

Cabin Length: 8.61 m

Cabin Width: 2.49 m

Cabin height: 1.85 m

Cabin Volume: 32.6 cu m

Empty Weight: 9,054 kg

Maximum Payload: 2,229 kg

Maximum Takeoff Weight: 19,550 kg

Automotive

Engine Name: 2 x General Electric CF34-3B

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 4,146 kg static thrust each

Maximum Cruise Speed: 851 kph

Normal Cruise Speed: 819 kph

Long-Range Cruise Speed: 743 kph

Climb Rate: 1,341 m/min

Ceiling, 2 Engines: 12,500 m

Ceiling, 1 Engine: 7,315 m

Maximum Range: 7,556 km

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

CL-604 advanced GE CF34-3B engines; increased fuel capacity including saddle tanks in the rear of the aircraft; new undercarriage for a higher takeoff and landing weight; structural improvements to wings and tail; and a new Rockwell Collins ProLine 4 avionics system.. The Bombardier Challenger 600 series is a family of business jets developed by Canadair and then produced from 1986 by its new owner, Bombardier Aerospace. At the end of 1975, Canadair backed the LearStar 600 concept by Bill Lear, and acquired the large business jet or freighter project in April 1976. On 29 October, the program was launched, backed by the Canadian federal government, and designed to comply with new FAR part 25 standards. In March 1977, it was renamed the Challenger 600 after Bill Lear was phased out, as the original conventional tail was changed for a T-tail among other developments. The first prototype was rolled out on 25 May 1978, and performed its maiden flight on 8 November. The flight test program saw a deadly crash on 3 April 1980, but Transport Canada approved the CL-600 type certification on 10 August 1980. In 1986, Canadair was close to bankruptcy and was bought by Bombardier. The jet was stretched into the Bombardier CRJ regional airliner, introduced on 19 October 1992, and the longer range Global Express, introduced in July 1999. The 500th Challenger was rolled out in May 2000, and the 1000th was delivered to NetJets in December 2015. By October

2018, 1,066 aircraft have been built. The Challenger is a low-wing jet powered by two turbofans mounted in aft fuselage pods, it has a supercritical wing and a stand-up cabin with two seating sections. The original Lycoming ALF 502 turbofans were replaced by a pair of General Electric CF34s on the CL-601, which also gained winglets, and first flew on 10 April 1982. Subsequent variants have updated systems, avionics, and higher weights.

CRJ200 Canadian Transport Aircraft







Tiers:



Variants:

- **CRJ100:** The CRJ100 is the original 50-seat version. It is equipped with General Electric CF34-3A1 engines. Operators include RwandAir, among others.
- **CRJ100SF:** Passenger-to-freighter conversion of CRJ100.
- **CRJ100LR:** Long range version of CRJ100.
- **CRJ100SE:** Executive passenger conversion of CRJ100.
- **CRJ200:** The CRJ200 is identical to the CRJ100 except for its engines, which were upgraded to the CF34-3B1 model, offering improved efficiency.
- **CRJ200PF:** Package freighter version of CRJ200.
- **CRJ200LR:** Long range version of CRJ200.
- **CRJ200SF:** Passenger-to-freighter conversion of CRJ200.
- **CRJ440:** Certified up to 44-seat, this version was designed with fewer seats in order to meet the needs of some major United States airlines.
- **Challenger 800/850:** A business jet variant of the CRJ200
- **CRJ500:** Proposed 50-seat version with wing and cabin improvements based on the CRJ700/900. Cancelled in 2001.

System

Alternate Designation(s): CRJ200
Primary Function / Type: Transport Aircraft
Manufacturer: Bombardier Aerospace
Crew: 3–4 : 2 Flight Crew + 1–2 cabin crew
Seating Capacity: 50
Number of Engines: 2
Number of Hard Points: INA
Maximum Payload: 6,124 kg

Dimensions

Length: 26.77 m

Width (Wing Span): 21.21 m

Height: 6.22 m

Wing area: 48.35 m²

Fuselage Diameter: 2.69 m

Operating Payload: 6,124 kg

Cabin Length: INA

Cabin Width: 2.53 m

Cabin Height: 1.85 m

Operating Empty Weight: 13,835 kg

Automotive

Engine Name: GE CF34-3B1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 8,729 lbf / 38.84 kN

Maximum Fuel Capacity: 8,081 L

Maximum Range with 50 Passengers: 3,148 km

Normal Cruise Range: 785 km/h

High-Speed Cruise Range: 860 km/h

Service Ceiling: 12,496 m

Takoff: 1,920 m

Landing: 1,480 m

Fire Control / Avionics

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Bombardier CRJ100 and CRJ200 (formerly known as the Canadair CRJ100 and CRJ200) is a family of regional airliners that was designed and manufactured by Bombardier Aerospace between 1991 and 2006. The CRJ was Canada's second civil jet

airliner after the single prototype of the Avro Canada C102 Jetliner (which never entered commercial service). It was based on the Bombardier Challenger 600 series business jets. An initial effort to produce an enlarged 36-seat version of the aircraft, known as the Challenger 610E, was terminated during 1981. Shortly after Canadair's privatization and sale to Bombardier, work on a stretched derivative was reinvigorated; during early 1989, the Canadair Regional Jet program was formally launched. On 10 May 1991, the first of three CRJ100 prototypes conducted its maiden flight. The type first entered service during the following year with its launch customer, German airline Lufthansa. The initial variant, the CRJ100, was soon joined by another model, designated as the CRJ200. It was largely identical to the CRJ100, except for the installation of more efficient turbofan engines, which gave the aircraft lower fuel consumption, increased cruise altitude and cruise speed. During the 1990s, various additional versions and models of the type were developed and put into service. During the late 1990s, a substantially enlarged derivative of the airliner, referred to as the CRJ700, was developed; it was soon joined by the even larger CRJ900 and CRJ1000. During 2006, production of both the CRJ100 and CRJ200 came to an end; the majority of produced airliners have remained in revenue service to date. Additionally, several airlines have modernized their fleets to support extended service. The Bombardier CRJ100 and CRJ200 are a family of jet-propelled regional airliners, based upon the design of the Challenger CL-600 business jet. Roughly, the CL-600 was stretched 5.92 metres (19 feet 5 inches), which was achieved using fuselage plugs fore and aft of the wing, and was matched with the adoption of a reinforced and modified wing, an expanded fuel capacity, improved landing gear to handle the higher weights, and an additional pair of emergency exit doors. When installed in a typical seating configuration, the CRJ100 would accommodate 50 passengers; while in a maximum configuration, 52 passengers could be accommodated. It was powered by a pair of General Electric CF34-3A1 turbofan engines, each of which was capable of generating up to 41.0 kN (4,180 kgp / 9,220 lbf) of thrust. The CRJ100 featured a Collins-built ProLine 4 avionics suite, including a weather radar.

CRJ900 Canadian Regional Jet



Tiers:



Variants:

- **CRJ700:** Design work on the CRJ700 by Bombardier started in 1995 and the program was officially launched in January 1997. The CRJ700 is a stretched derivative of the CRJ200. The CRJ700 features a new wing with leading edge slats and a stretched and slightly widened fuselage, with a lowered floor. Its first flight took place on 27 May 1999. The aircraft's FAA Type Certificate designation is the CL-600-2C10. The CRJ700 first entered commercial service with Brit Air in 2001.
- **CRJ550:** On 6 February 2019, Bombardier launched the CRJ550, based on the CRJ700, with 50 seats in three classes. The launch customer, United Airlines, ordered 50 aircraft configured with 10 first class, 20 Economy Plus and 20 economy seats. The aircraft were to be operated under the United Express brand by regional partner GoJet Airlines. The CRJ550 has a lower maximum takeoff weight (MTOW) than the CRJ700, to comply with scope clauses in US pilot contracts, and a lower maximum landing weight (MLW). It received type certification in the second half of 2019. The initial 50 aircraft will be sourced from existing CRJ700s, rather than being newly constructed. On 7 August 2019, United Airlines' regional partner GoJet Airlines took delivery of the aircraft and began with a crew familiarization flight to Chicago-O'Hare International Airport (ORD).
- **CRJ900:** The CRJ900 is a stretched 76–90 seat version of the CRJ700. The first CRJ900 (C-FRJX) was modified from the prototype CRJ700 by adding longer fuselage plugs fore and aft of the wings. It was later converted into the prototype CRJ1000 by replacing the fuselage plugs with longer plugs. The CRJ900 also features strakes located at the rear of the plane. The CRJ900 competes with the Embraer 175, and is more efficient per seat-mile, according to Bombardier. Mesa Air Group was the launch customer for the CRJ900 painted in America West livery. The FAA Type Certificate designation of the CRJ900 is the CL-600-2D24.
- **CRJ705:** The CRJ700 Series 705 is based on the CRJ900, featuring a business class cabin and a reduced maximum seating capacity to allow operation with regional airlines. The Series 705 seats 75 passengers. Some regional airlines have scope clauses with their major airlines that limit the maximum passenger capacity of aircraft they operate. The Air Canada Pilots Association negotiated a scope agreement with Air Canada limiting the maximum seating capacity of any jet aircraft at Air Canada Express to 75 seats. Air Canada Jazz was the launch customer for this aircraft in 2005 with 10 Executive Class and 65 Economy Class seats, all fitted with personal audio/video-on-demand systems. The FAA Type Certificate designation of the CRJ705 is the CL-600-2D15. Jazz Aviation, a subsidiary of Chorus Aviation, operated 16 CRJ705s on behalf of Air Canada and was the only operator of this version. On 26 April 2016, Jazz Aviation announced that existing CRJ705 aircraft in operation will be converted to CRJ900 with 76 seats. As of late February 2018, all CRJ-705s have been reconfigured with 12 Executive Class and 64 Economy Class seats, which changed their FAA Type Certificate to CL-600-2D24.
- **CRJ1000:** On 19 February 2007, Bombardier launched the development of the CRJ1000, previously designated CRJ900X, as a stretched CRJ900, with up to 100 seats. The CRJ1000 completed its first production flight on 28 July 2009 in Montreal; the entry into service was planned then for the first quarter of 2010. A month after the first flight, however, a fault in the rudder controls forced the flight-test program to be grounded : the program was not resumed until February 2010, and deliveries were projected to begin by January 2011. Brit Air and Air Nostrum were the launch customers for the CRJ1000.

System

Alternate Designation(s): CRJ900

Primary Function / Type: Transport Aircraft

Manufacturer: Bombardier Aerospace

Crew: 3–4 : 2 Flight Crew + 1–2 cabin crew

Seating Capacity: 76 to 90

Number of Engines: 2

Number of Hard Points: INA

Maximum Payload: 10,247 kg

Dimensions

Length: 36.2 m

Width (Wing Span): 24.9 m

Height: 7.5 m

Wing area: 71.1 m2

Fuselage Diameter: 2.7 m

Maximum Payload: 10,247 kg

Cabin Capacity: 15.5 m3 / 2,438 kg

Operating Empty Weight: 21,845 kg

MTOE Weight: 38,330 kg

Automotive

Engine Name: GE CF34-8C5

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 14,510 lbf / 64.5 kN

Maximum Fuel Capacity: 8,888 kg

Maximum Range: 2,876 km

Maximum Speed: 871 km/h

Normal Cruise Speed: 829 km/h

Service Ceiling: 12,496 m

Takoff: 1,939 m

Landing: 1,632 m

Fire Control / Avionics

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Bombardier CRJ700, CRJ900, and CRJ1000 (after June 2020, the Mitsubishi CRJ) are a family of regional jet airliners designed and manufactured by Canadian transportation conglomerate Bombardier; this aircraft trio has been collectively marketed by the company as the CRJ Series. Their design was derived from the smaller CRJ100 and 200 airliners. During the 1990s, Bombardier initiated development on the CRJ-X, a program to produce enlarged derivatives of its popular CRJ100/200 family. Officially launched in 1997, the CRJ700's maiden flight took place on 27 May 1999; it was soon followed by the stretched CRJ900 variant. Several additional variants of the type were subsequently introduced, including the CRJ550 and the elongated CRJ1000. While production of the smaller CRJ100/200 range was discontinued during 2006, the larger CRJ Series models have continued to be produced into the 2010s. Competitors have included the Fokker 70/Fokker 100, the BAe 146 family, and the Embraer E-Jet family. In Bombardier's lineup, the CRJ Series was formerly marketed alongside a family of larger jets, the C Series (now majority-owned by Airbus and marketed as the Airbus A220) and a twin-turboprop, the Q Series (now owned by De Havilland Canada and marketed as the Dash 8). During the late 2010s, Bombardier sought to sell off several of its aircraft programs. The CRJ program was acquired by Japanese corporation Mitsubishi Heavy Industries in a deal that closed 1 June 2020. The CRJ900 is a stretched 76–90 seat version of the CRJ700. The first CRJ900 (C-FRJX) was modified from the prototype CRJ700 by adding longer fuselage plugs fore and aft of the wings. It was later converted into the prototype CRJ1000 by replacing the fuselage plugs with longer plugs. The CRJ900 also features strakes located at the rear of the plane. The CRJ900 competes with the Embraer 175, and is more efficient per seat-mile, according to Bombardier. Mesa Air Group was the launch customer for the CRJ900 painted in America West livery. The FAA Type Certificate designation of the CRJ900 is the CL-600-2D24. The wing is wider with added leading edge slats, the tail is redesigned. The cabin floor has been lowered 2 inches which gains outward visibility from the windows in the cabin as the windows become closer to eye level height. The cabin has a re-circulation fan which aids in cooling and heating. The environmental packs have a target temperature instead of a hot-cold knob. The APU is a Honeywell RE220 unit,[68] which supplies much more air to the AC packs and has higher limits for starting and altitude usage. The aircraft features two GE CF34-8C5 engines, 59.4 kN (13,400 lbf) thrust with APR. The engines are controlled by FADEC digital engine control instead of control cables and a fuel control unit. In typical service, the CRJ900 can cruise 8–10,000 ft higher with a slightly higher fuel burn and an average true airspeed of 450–500 knots, a significant improvement over its predecessor. Its maximum ground takeoff weight is 84,500 pounds. In 2018, the CRJ900's list price was $48 million while its market value was $24M; reportedly, most customers are paying around $20–22M and the American Airlines order for 15 was at below $20M. A 2012 aircraft was worth less than $14M and it was to fall by 30% in 2021.

B737-500 (Boeing 737-500) American Cargo Transport Aircraft



Tiers:

1 2 3 4

Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.
- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-500; Boeing 737-500

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 102-132 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 31.01 m

Width (Wing Span): 28.88 m

Wing Area: 105.4 sq m

Height: 11.13 m

Cabin Length: 21.79 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 31,983 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 52,390 kg

Automotive

Engine Name: 2 x CFM International CFM56-3C-1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 20,000 lb (9,072 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 23,829 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 491 knots (565 mph, 910 km/h)

Economical Cruise Speed: 419 knots (482 mph, 776 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 2,401 nm (2,765 mi, 4,450 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

737-500 The -500 series was offered, due to customer demand, as a modern and direct replacement of the 737-200. It incorporated the improvements of the 737 Classic series, allowing longer routes with fewer passengers to be more economical than with the 737-300. The fuselage length of the -500 is 1 ft 7 in (48 cm) longer than the 737-200, accommodating up to 140 passengers. Both glass and older-style mechanical cockpits arrangements were available. Using the CFM56-3 engine also gave a 25% increase in fuel efficiency over the older -200s P&W engines. The 737-500 was launched in 1987 by Southwest Airlines, with an order for 20 aircraft, and flew for the first time on June 30, 1989.[58] A single prototype flew 375 hours for the certification process, and on February 28, 1990, Southwest Airlines received the first delivery. After the introduction of the −600/700/800/900 series, the −300/400/500 series was called the 737 Classic series. The price of jet fuel reached a peak in 2008, when airlines devoted 40% of the retail price of an air ticket to pay for fuel, versus 15% in 2000. Consequently, in that year carriers retired Classic 737 series aircraft to reduce fuel consumption; replacements consisted of more efficient Next Generation 737s or Airbus A320/A319/A318 series aircraft. On June 4, 2008, United Airlines announced it would retire all 94 of its Classic 737 aircraft (64 737-300 and 30 737-500 aircraft), replacing them with Airbus A320 jets taken from its Ted subsidiary, which has been shut down. The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the 727 on short and thin routes, the twinjet retains the 707 fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers. The -100/200 original variants were powered by Pratt & Whitney JT8D low-bypass engines and offered seating for 85 to 130 passengers. Launched in 1980 and introduced in 1984, the 737 Classic -300/400/500 variants were re-engined with CFM56-3 turbofans and offered 110 to 168 seats. Introduced in 1997, the 737 Next Generation (NG) -600/700/800/900 variants have updated CFM56-7s, a larger wing and an upgraded glass cockpit, and seat 108 to 215 passengers. The latest generation, the 737 MAX -7/8/9/10, powered by improved CFM LEAP high bypass turbofans and accommodating 138 to 204 people, entered service in 2017. Boeing Business Jet versions are produced since the 737NG, as well as military models. As of December 2019, 15,156 Boeing 737s have been ordered and 10,571 delivered. Actual backlog stands at 4,398 when including "additional criteria for recognizing contracted backlog with customers beyond the existence of a firm contract". Initially, its main competitor was the McDonnell Douglas DC-9, followed by its MD-80/MD-90 derivatives. It remained the highest-selling commercial jetliner until surpassed in total orders by the Airbus A320 family in October 2019. The current 737 MAX, designed to compete with the A320neo was grounded worldwide in March 2019 following two fatal crashes.

Y-12 (IV) Chinese Utility Aircraft







Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12 (IV)
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Industry Group

Crew: 2 (pilot, co-pilot)

Passengers: 19 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 14.86 m

Height: 5.58 m

Width (Wing Span): 19.20 m

Wing Area: 36.90 sq m

Cabin Length: 4.93 m

Cabin Width: 1.46 m

Cabin Height: 1.70 m

Volume: 12.9 cu m

Empty Weight: 3,000 kg

Payload Weight: 1,700 kg

Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-27

Number of Engines: 2

Engine Type: Turboprop

Engine Power: 620 shp each

Fuel Capacity: 1,616 liters

Maximum Cruise Speed: 328 km/h

Economy Cruise Speed: 271 km/h

Range with Maximum Payload at 146 knots: 189 km

Ceiling: 7,000 m

Climb Rate, Both Engines: 504 m/min

Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12(IV) This is a 19-passenger development of the Y-12(II) variant. "Shearing" wingtips increase takeoff weight to 12,500 lb (5,670 kg). The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger fuselage and bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

Y-7 (Yunshuji-7) Chinese Cargo Transport Aircraft







Tiers:



Variants:

- **Variants:** Xian Y-7E Speculative designation for a 'Hot and High" version with more powerful engines. Xian Y-7G A military variant of the MA60 produced for the PLAAF. Xian Y-7H (Huo -cargo) A reverse-engineered An-26 with rear loading ramp for the PLAAF, entering production in 1992. Xian Y7H-500 Civil variant of the Y-7H certified in 1994. Xian Y-14 The original designation for the An-26 copy/Y-7H. Xian Y-7-100 Improved version, developed in co-operation with HAECO (Hong Kong Aircraft Engineering Company), with redesigned cockpit and cabin, as well as winglets. This variation has an upgraded passenger cabin interior, with new avionics sourced from western providers. Flight crew reduced to three, it is capable of carrying 52 passengers. Xian Y-7-100C1 Five-crew variant with equipment changes. Xian Y-7-100C2 Five-crew variant with equipment changes. Xian Y-7-100C3 Five-crew variant with equipment changes. Xian Y-7-200 Fitted with new avionics; without winglets. Xian Y-7-200A Powered by two Pratt & Whitney PW127C turboprop engines. Xian Y-7-200B Stretched version (74cm (29in)) with WJ5A-1G engines, built for the Chinese domestic market. Xian HYJ-7 (Hongzhaji Yunshuji Jiaolianji - Bomber/transport/trainer) A pilot and crew trainer for H-6 heavy bombers fitted with a stabilised HM-1A bombsight, bomb-aiming radar and a TNL-7880 combined navigation system. Xian MA60 (Y-7-MA60) (Modern Ark 60 seats) A westernised variant of the Y-7 intended to attract more western customers and meet Joint Airworthiness Requirements. Xian JZY-01 experimental aircraft / Y-7 AWACS Carrier-based airborne early warning and control (AEW&C) variant. JZY stands for Jian (□) Zai (□) Yu (□), meaning carrier borne AEW&C, has 4 rudders like E-2 AEW It is being used as a testbed for Xian KJ-600.

System

Alternate Designation(s): Y-7; Yunshuji-7
Primary Function / Type: Cargo Transport Aircraft
Manufacturer: Xi'an Aircraft Industrial Corporation
Crew: 3 or 5
Passengers: 48-52 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 23.71 m

Width (Wing Span): 29.20 m

Height: 8.55 m

Wing Area: 74.98 sq m

Cabin Length: 9.90 m

Cabin Width: 2.80 m

Cabin Height: 1.90 m

Cabin Volume: 56 cu m

Empty Weight: 14,235 kg

Maximum Takeoff Weight: 21,800 kg

Maximum Payload Weight: 4,700 kg

Automotive

Engine Name: 2 x Shanghai WJ-5A-1

Number of Engines: 2

Engine Type: Turboprop

Engine Power: 2,790 shaft hp each

Standard Internal Fuel Capacity: 5,106 liters

Optional Internal Fuel Capacity: 6,192 liters

Maximum Speed: 518 km/h

Cruise Speed at 4,000 m: 478 km/h

Economical Speed: 423 km/h

Range with Maximum Payload: 910 km

Range with Maximum Fuel: 2,420 km

Climb Rate: 458 m/min

Ceiling: 8,750 m

Fire Control System / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Xian Y-7 (Chinese: □-7; pinyin: Yùn-qī) is a transport/passenger aircraft built in China. It is based on the Soviet-designed Antonov An-24 series. China imported the Antonov An-24 from early in its production run and also negotiated licences for production of the aircraft and its engines. In 1966, Xi'an aircraft factory started the project of local production of An-24. The first Chinese-assembled An-24T had its maiden flight on 25 December 1970. Production was launched in 1977 at the Xi'an aircraft factory but progress was slow due to the deleterious effects of the Cultural Revolution, with a pre-production aircraft displayed to the public at Nanyuan air base, near Beijing, on 17 April 1982. The WJ-5A1 turboprop engine was chosen as the Y-7's power source. The first production aircraft was not flown until February 1984, illustrating the slow progress (eighteen years from licence to production). The Chinese aircraft equated to the An-24RV, having a full complement of windows and the booster jet engine. The majority of early deliveries were to the People's Liberation Army Air Force (PLAAF), mostly as transports, with a few in 52-seat airliner configuration for the Civil Aviation Administration of China (CAAC). After the initial licensed production run, the Y-7 was developed separately from the An-24 with a succession of upgrades culminating in the Xian MA60 (Modern Ark) series. A tactical transport derivative was copied, unlicensed, from the Antonov An-26 and emerged as the Y-7H, incorporating the cargo ramp door and military equipment of the An-26.

An-26 (Curl) Russian Military Transport Aircraft





Tiers:



Variants:

- **Variants:** An-26 "Curl-A" : Twin-engine tactical transport aircraft. An-26-100 Convertible passenger/cargo aircraft modified from 'An-26' aircraft at the Kiev plant from 1999. An-26 Nel'mo An arctic surveillance and reconnaissance aircraft retrofitted with Nel'mo equipment. An-26 Pogoda (Weather) Another aircraft for weather control duties, similar to the 'An-26 Tsiklon ', with a simplified equipment test lab. An-26 Polyot (Flight) A single aircraft retrofitted for the purpose of research of unified air traffic control and monitoring system throughout the USSR, with a comprehensive navigation test lab including precision compasses and Doppler speed/shift sensors. An-26 Sfera (Sphere) A single production aircraft built as a laboratory for atmospheric research. An-26 Shtabnoy (Shtab: or Headquarters) some 'An-26's delivered to the Soviet and DDR air forces for use as staff transports/mobile command posts. An-26 Vitauk (Life) A single mobile operating room, surgery and intensive care unit ('25 Blue', c/n5406), for the Ukrainian Air Force. An-26A A one-off assault transport prototype with higher performance due to removal of some military equipment.[1] An-26ASLK (Avtomatizirovannaya sistema lyotnogo kontrolya – automated flight control and monitoring system) : A modern flight control and monitoring system equipped with automatic calibration and navigation systems. Recognizable by the distinctive pod low on the forward fuselage side. An-26B A civil cargo version equipped with roller gangsways which can be swung up against the cabin walls when not in use. It was also equipped with two ZMDB Progress (Ivchyenko) Al-24VT turboprop powerplants to deliver higher thrust. An-26B 'Mobile Hospital' : The prototype 'An-26B' retrofitted as a mobile civilian emergency hospital. An-26B Tsiklon (Cyclone) A weather research/control and cloud-seeding aircraft for the Central Aerologic Laboratory. This aircraft was used for rain induction and protection using cloud-seeding chemicals dropped from slab-sided pods hung from pylons. An-26B-100 Convertible passenger/cargo aircraft modified from 'An-26B' aircraft at the Kiev plant from 1999. An-26BL Alternative designation for the 'An-26L'. An-26BRL Alternative designation of the 'An-26RL' Arctic surveillance and reconnaissance aircraft. An-26D (Dal'niy – long-range) An extended range version with extra fuel in wing tanks and additional external tanks attached to the airframe of the fuselage. One aircraft ('21 Yellow', c/n 13806) was retrofitted and delivered, but no further orders were forthcoming. An-26K Kaira (Great Auk) A single An-26 aircraft converted to a Kaira test airframe for the development of airborne LASER guided systems. An-26K Kaplya (Drop [of liquid]) After completion of the LASER designator trials the 'An-26K Kaira' was retrofitted to search or optically guided weapons as the navigation systems. During a night test flight at low level, in March 1989, the An-26K Kaplya suffered a massive bird strike, which consequently destroyed the windshield and injured the pilot, who involuntarily downed the aircraft into the Azov Sea. An-26KPA (Kontrol'no-Poverochnaya Apparatura – Testing and calibration equipment) : A navigation aids inspecting aircraft with comprehensive navigation equipment and calibration equipment. An-26L A single 'An-26', (14 Orange, c/n 00607), used at Sperenberg Airfield near Berlin, for airfield and NAVAID calibration. An-26LL-PLO (Letayuschaya Laboratoriya – Protivolodochnoy Oborony – ASW (Anti-Submarine Warfare) testbed) : A single 'An-26A' aircraft, (c/n 0901), retrofitted and modified to accommodate range of sophisticated laboratory for surveillance systems, detecting and tracking stealthy nuclear submarines. An-26LP Firefighting version, for delivery of field equipment and para-dropping firefighters in lieu of water-bombing (any more info?). An-26M Spasatel (Rescue worker) Flying hospital with an emergency surgery facility and consultation conference room. An-26P (Protivopozharnyy – firefighting) : Aircraft fire engine fighter, retrofitted with water lifting vessels in pods on either side of the lower fuselage. An-26P Prozhektor (Projector or Searchlight) A single conversion of an An-26 as a guided missile system airframe. An-26REP (RadioElektronnoye Protivodeystviye – ECM (Electronic Counter-Measures) [aircraft]) : Electronic countermeasures aircraft fitted with active jammers in cylindrical pods on either side of the lower fuselage sides, as well as chaff and I/R flares for self-defense. An-26RL (Razvedchik Ledovyy – An arctic surveillance, reconnaissance and monitoring) : An arctic surveillance, reconnaissance and monitoring aircraft used to monitor the icebergs and ice formations at arctic circle fitted with SLAR (Sideways Looking Airborne Radar) in long pods on either side of the lower fuselage, extra fuel in a cargo hold fuel tank, provision for surveyors and radar operators. An-26RR Alternative unit designation of the 'An-26RT' ELINT(ELectronic

INTelligence) aircraft. An-26RT "Curl-B": (First use of the designation) A basic designation for a series of ELINT aircraft fitted with a wide range of electromagnetic surveillance equipment. At least one aircraft, (tactical code '152'), retrofitted with the Tarahn (Ramming Attack) ELINT suite for use in Afghanistan. An-26RT (ReTranslyator – Interpreter -Translator): (Substitute of designation) Battlefield communications relay aircraft, fitted with powerful Inzheer (Fig) radio relay system, for connecting forward units to headquarters units. An-26RTR Alternative unit designation of the 'An-26RT' ELINT aircraft. An-26S (Salon – [VIP] Lounge) : A new VIP Lounge aircraft for the Ukrainian Ministry of Defense delivered about 1997. An-26Sh (Shturmanskiy – Navigator) : Navigator trainer for the VVS, 36 built at Kiev. An-50 A proposed jet-powered variant of the An-26.

System

Alternate Designation(s): An-26; NATO: Curl

Primary Function / Type: Military Transport Aircraft

Manufacturer: Antonov

In Service: 1970-Present

Crew: 5 (pilot, co-pilot, navigator, flight engineer, radio operator)

Passengers: 38 to 40 seats in pressurized cargo bay; or 24 litters and attendants

Number of Engines: 2 x Ivchenko AI-24VT turboprop; and 1 x RU19A-300 auxiliary turbojet for takeoff assist

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: INA

Dimensions

Length: 23.80 m

Width (Wing Span): 29.20 m

Height: 8.58 m

Wing Area: 74.98 sq m

Cabin Length: 11.50 m

Cabin Width: 2.40 m

Cabin Height: 1.91 m

Weight, Empty: 15,020 kg

Weight, Max Takeoff: 5,500 kg

Payload, Normal: 4,500 kg

Payload, Maximum: 24,000 kg

Automotive

Engine Name: 2 x Ivchenko AI-24VT turboprop; and 1 x RU19A-300 auxiliary turbojet for takeoff assist

Number of Engines: 3

Engine Power: 2,820 equivalent hp each turboprop; plus 1,765-lb (800-kg) static thrust turbojet

Internal Fuel Capacity: 7,050 liters

Maximum Speed: 540 km/h

Cruise Speed: 440 km/h

Takeoff Speed: 200 km/h

Landing Speed: 190 km/h

Maximum Range, with Maximum Payload: 1,100 km

Maximum Range, with Maximum Fuel: 2,550 km

Climb Rate: 480 m/min

Ceiling: 7,500 m

Takeoff Run: 780 m

Landing Run: 730 m

Communications

Radio: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: Yes

EW Counter Measures: No

Chaffs/Flares: INA

Notes:

The Antonov An-26 (NATO reporting name: Curl) is a twin-engined turboprop civilian and military transport aircraft, designed and produced in the Soviet Union from 1969 to 1986. After successful operations of the An-24T tactical transport in austere locations, interest in a version with a retractable cargo ramp increased. Initial studies for the retractable ramp were carried out as part of the projected An-40 medium transport. When given the go-ahead for the An-26 in March 1968, the Antonov OKB adapted the ramp design of the An-40 to the An-24 fuselage, resulting in the An-26. Particular attention was given to the military mission, and the majority of early An-26 production was delivered to the VTA (voyenno-transportnaya aviatsiya). Using the majority of the An-24 airframe, with its high-set cantilevered wings, twin turboprops and stalky main undercarriage, the An-26 included military equipment, such as tip-up paratroop canvas seats, an overhead traveling hoist, bulged observation windows and parachute static line attachment cables. The An-26 made its public debut at the 27th Paris Air Show at Le Bourget where the second prototype, CCCP-26184 (c/n00202), was shown in the static aircraft park. The An-26 is also manufactured without a license agreement in China by the Xian Aircraft factory as the Y-14, later changed to be included in the Xian Y7 series. The Antonov An-26 was developed from the An-24 of 1962 for the airliner passenger / general transport role. First flight of the An-26 product was on May 21st, 1969 and production spanned from then until 1986 to which 1,403 examples were ultimately realized. A plethora of variants then emerged and operators have ranged the globe with many airframes still in active service today (2014). The original An-24 proved a design that was robust for the most harshest of conditions available across the vast Soviet empire - particularly in hard to reach areas of the frontier where few services were available. This propelled a new, modified form to gain traction, one in particular that included a powered loading ramp for ease of moving cargo pallets to and from the aircraft to awaiting bays or transport trucks. With a new ramp design finishing its testing phase, the installation commenced to produce the new working designation of An-26. As finalized, the An-26 carried over much of the same form and function of the preceding An-24 model including its high-wing design and twin engine layout. The tail unit remained a single vertical fin with low-set horizontal planes. The flight deck was held at the extreme front end of the fuselage aft of a short nose cone. The cargo hold then made up a bulk of the available internal space remaining. Initial production models were recognized simply as "An-26" and were identified in NATO nomenclature as "Curl-A". A combo passenger/cargo-hauler form then became the An-26-100. The local Chinese variant became the Xian Y-7H military transport. Other limited production variants followed including an Arctic reconnaissance platform with special mission equipment, an atmospheric air lab, an assault transport prototype, various testbeds, a fire-fighting platform, and other proposed (some unrealized) designs. Operators have gone on to range from Angola and Belarus to Yemen and Zambia. Many military operators have since abandoned the type including Afghanistan, Pakistan, Poland, and Somalia. The United States operated An-26s through the 6th Special Operations Squadron of the United States Air Force from the period of 2003 to 2007. Soviet An-26s were passed on to

the emerging states after the fall of the Soviet empire. Most current operators remain civilian in nature including fifteen operating in the Ukraine.

B737-800 (Boeing 737-800) American Cargo Transport Aircraft







Tiers:



Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.

- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.
- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-800; Boeing 737-800

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 162-189 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 39.47 m

Width (Wing Span): 34.32 m

Wing Area: 124.5 sq m

Height: 12.55 m

Cabin Length: 30.02 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 41,480 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 70,534 kg

Automotive

Engine Name: 2 x CFM International CFM56-7B

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 24,000 lb (10,676 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 26,036 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 542 knots (624 mph, 1,003 km/h)

Economical Cruise Speed: 523 knots (602 mph, 969 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 3,200 nm (3,685 mi, 5,926 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

B737-800 The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers. The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the 727 on short and thin routes, the twinjet retains the 707 fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers. The -100/200 original variants were powered by Pratt & Whitney JT8D low-bypass engines and offered seating for 85 to 130 passengers. Launched in 1980 and introduced in 1984, the 737 Classic -300/400/500 variants were re-engined with CFM56-3 turbofans and offered 110 to 168 seats. Introduced in 1997, the 737 Next Generation (NG) -600/700/800/900 variants have updated CFM56-7s, a larger wing and an upgraded glass cockpit, and seat 108 to 215 passengers. The latest generation, the 737 MAX -7/8/9/10, powered by improved CFM LEAP high bypass turbofans and accommodating 138 to 204 people, entered service in 2017. Boeing Business Jet versions are produced since the 737NG, as well as military models. As of December 2019, 15,156 Boeing 737s have been ordered and 10,571 delivered. Actual backlog stands at 4,398 when including "additional criteria for recognizing contracted backlog with customers beyond the existence of a firm contract". Initially, its main competitor was the McDonnell Douglas DC-9, followed by its MD-80/MD-90 derivatives. It remained the highest-selling commercial jetliner until surpassed in total orders by the Airbus A320 family in October 2019. The current 737 MAX, designed to compete with the A320neo was grounded worldwide in March 2019 following two fatal crashes.

CRJ700 Canadian Regional Jet







Tiers:



Variants:

- **CRJ700:** Design work on the CRJ700 by Bombardier started in 1995 and the program was officially launched in January 1997. The CRJ700 is a stretched derivative of the CRJ200. The CRJ700 features a new wing with leading edge slats and a stretched and slightly widened fuselage, with a lowered floor. Its first flight took place on 27 May 1999. The aircraft's FAA Type Certificate designation is the CL-600-2C10. The CRJ700 first entered commercial service with Brit Air in 2001.
- **CRJ550:** On 6 February 2019, Bombardier launched the CRJ550, based on the CRJ700, with 50 seats in three classes. The launch customer, United Airlines, ordered 50 aircraft configured with 10 first class, 20 Economy Plus and 20 economy seats. The aircraft were to be operated under the United Express brand by regional partner GoJet Airlines. The CRJ550 has a lower maximum takeoff weight (MTOW) than the CRJ700, to comply with scope clauses in US pilot contracts, and a lower maximum landing weight (MLW). It received type certification in the second half of 2019. The initial 50 aircraft will be sourced from existing CRJ700s, rather than being newly constructed. On 7 August 2019, United Airlines' regional partner GoJet Airlines took delivery of the aircraft and began with a crew familiarization flight to Chicago-O'Hare International Airport (ORD).
- **CRJ900:** The CRJ900 is a stretched 76–90 seat version of the CRJ700. The first CRJ900 (C-FRJX) was modified from the prototype CRJ700 by adding longer fuselage plugs fore and aft of the wings. It was later converted into the prototype CRJ1000 by replacing the fuselage plugs with longer plugs. The CRJ900 also features strakes located at the rear of the plane. The CRJ900 competes with the Embraer 175, and is more efficient per seat-mile, according to Bombardier. Mesa Air Group was the launch customer for the CRJ900 painted in America West livery. The FAA Type Certificate designation of the CRJ900 is the CL-600-2D24.
- **CRJ705:** The CRJ700 Series 705 is based on the CRJ900, featuring a business class cabin and a reduced maximum seating capacity to allow operation with regional airlines. The Series 705 seats 75 passengers. Some regional airlines have scope clauses with their major airlines that limit the maximum passenger capacity of aircraft they operate. The Air Canada Pilots Association negotiated a scope agreement with Air Canada limiting the maximum seating capacity of any jet aircraft at Air Canada Express to 75 seats. Air Canada Jazz was the launch customer for this aircraft in 2005 with 10 Executive Class and 65 Economy Class seats, all fitted with personal audio/video-on-demand systems. The FAA Type Certificate designation of the CRJ705 is the CL-600-2D15. Jazz Aviation, a subsidiary of Chorus Aviation, operated 16 CRJ705s on behalf of Air Canada and was the only operator of this version. On 26 April 2016, Jazz Aviation announced that existing CRJ705 aircraft in operation will be converted to CRJ900 with 76 seats. As of late February 2018, all CRJ-705s have been reconfigured with 12 Executive Class and 64 Economy Class seats, which changed their FAA Type Certificate to CL-600-2D24.
- **CRJ1000:** On 19 February 2007, Bombardier launched the development of the CRJ1000, previously designated CRJ900X, as a stretched CRJ900, with up to 100 seats. The CRJ1000 completed its first production flight on 28 July 2009 in Montreal; the entry into service was planned then for the first quarter of 2010. A month after the first flight, however, a fault in the rudder controls forced the flight-test program to be grounded : the program was not resumed until

February 2010, and deliveries were projected to begin by January 2011. Brit Air and Air Nostrum were the launch customers for the CRJ1000.

System

Alternate Designation(s): CRJ700

Primary Function / Type: Transport Aircraft

Manufacturer: Bombardier Aerospace

Crew: 3–4 : 2 Flight Crew + 1–2 cabin crew

Seating Capacity: 66 to 78

Number of Engines: 2

Number of Hard Points: INA

Maximum Payload: 8,190 kg

Dimensions

Length: 32.3 m

Width (Wing Span): 23.2 m

Height: 7.6 m

Wing area: 70.6 m2

Fuselage Diameter: 2.7 m

Maximum Payload: 8,190 kg

Cabin Capacity: 15.5 m3 / 2,438 kg

Operating Empty Weight: 20,069 kg

MTOE Weight: 34,019 kg

Automotive

Engine Name: GE CF34-8C5B1

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 13,790 lbf / 61.3 kN

Maximum Fuel Capacity: 8,888 kg

Maximum Range: 2,553 km

Maximum Speed: 876 km/h

Normal Cruise Speed: 829 km/h

Service Ceiling: 12,496 m

Takoff: 1,605 m

Landing: 1,536 m

Fire Control / Avionics

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Design work on the CRJ700 by Bombardier started in 1995 and the programe was officially launched in January 1997. The CRJ700 is a stretched derivative of the CRJ200. The CRJ700 features a new wing with leading edge slats and a stretched and slightly widened fuselage, with a lowered floor. Its first flight took place on 27 May 1999. The aircraft's FAA Type Certificate designation is the CL-600-2C10. The CRJ700 first entered commercial service with Brit Air in 2001. Seating ranges from 63 to 78. The CRJ700 comes in three versions: Series 700, Series 701, and Series 702. The Series 700 is limited to 68 passengers, the 701 to 70 passengers, and the 702 to 78 passengers. The CRJ700 also has three fuel/weight options: standard, ER, and LR. The ER version has an increase in fuel capacity as well as maximum weight, which in turn increases the range. The LR increases those values further. The executive version is marketed as the Challenger 870. The CRJ700 directly competes with the Embraer 170, which typically seats 70 passengers. The early build aircraft were equipped with two General Electric CF34-8C1 engines. However, later-build aircraft are now equipped as standard with the -8C5 model, which is essentially an uprated 8C1. Most airlines have replaced the older engines with the newer model, while a few have kept the older -8C1 in their fleet. Maximum speed is Mach 0.85 (903 km/h; 488 kn) at a maximum altitude of 12,500 m (41,000 ft). Depending upon payload, the CRJ700 has a range of up to 3,620 km (2,250 mi) with original engines, and a new variant with CF34-8C5 engines will have a range of up to 4,660 km (2,900 mi). The Bombardier CRJ700, CRJ900, and CRJ1000 (after June 2020, the Mitsubishi CRJ) are a family of regional jet airliners designed and manufactured by Canadian transportation conglomerate Bombardier; this aircraft trio has been collectively marketed by the company as the CRJ Series.[4] Their design was derived from the smaller CRJ100 and 200 airliners. During the 1990s, Bombardier initiated development on the CRJ-X, a program to produce enlarged derivatives of its popular CRJ100/200 family. Officially launched in 1997, the CRJ700's maiden flight took place on 27 May 1999; it was soon followed by the stretched CRJ900 variant. Several additional variants of the type were subsequently introduced, including the CRJ550 and the elongated CRJ1000. While production of the smaller CRJ100/200 range was discontinued during 2006, the larger CRJ Series models have continued to be produced into the 2010s. Competitors have included the Fokker 70/Fokker 100, the BAe 146 family, and the Embraer E-Jet family. In Bombardier's lineup, the CRJ Series was formerly marketed alongside a family of larger jets, the C Series (now majority-owned by Airbus and marketed as the Airbus A220) and a twin-turboprop, the Q Series (now owned by De Havilland Canada and marketed as the Dash 8). During the late 2010s, Bombardier sought to sell off several of its aircraft programs. The CRJ program was acquired by Japanese corporation Mitsubishi Heavy Industries in a deal that closed 1 June 2020.

Challenger 605 (CL-605) Canadian Transport Aircraft





Tiers:



System

Alternate Designation(s): Challenger 605
Primary Function / Type: Transport Aircraft
Manufacturer: Bombardier Aerospace (1986-present)
Crew: 2
Passengers: 12
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 20.90 m
Height: 6.30 m
Width (Wing Span): 19.60 m
Wing Area: 45.4 sq m
Cabin Length: 7.80 m
Cabin Width: 2.41 m
Cabin Height: 1.85 m
Cabin Volume: INA
Maximum Takeoff Weight: 21,910 kg
Maximum Landing Weight: 17,237 kg
Payload Capacity: 2,200 kg

Automotive

Engine Name: 2 x GE CF34-3B
Number of Engines: 2
Engine Type: Turbofan

Engine Power: 8,730 lb (38.8 kN) thrust

High-Speed Cruise Speed: Mach 0.82

Maximum Range: 7,470 km

Takeoff Run: 1,780 m

Landing Distance: 720 m

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

CL-605 Introduced in early 2006, air frame updated with larger cabin windows and a new tailcone, cockpit updated with the Collins Proline 21 avionics and "electronic flight bag" capability.

Y-12E Chinese Utility Aircraft





Tiers:

1 2 **3** 4

Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12E
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Industry Group
Crew: 2 (pilot, co-pilot)
Passengers: 19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 19.20 m
Wing Area: 36.90 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-135
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 750-shp shp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 328 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 504 m/min
Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12E This development of the Y-12(IV) has 750-shp Pratt & Whitney Canada PT6A-135 turboprops with four-blade Hartzell propellers. Cruise rating is 700 shp at 1,900 rpm. This aircraft offers slightly lower specific fuel consumption and better "hot and high" performance with the single-engine ceiling rising to 4,900 meters (16,076 ft). The Y-12 started as a

development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger fuselage and bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

Y-9 Chinese Medium Transport Aircraft





Tiers:



Variants:

- **Y-9:** The Shaanxi Y-9 (Chinese: □-9; pinyin: Yùn-9) is a medium military transport aircraft produced by Shaanxi Aircraft Company in China. It is a stretched and upgraded development of the Shaanxi Y-8F.
- **Y-9E:** Export version
- **Y-9G (GX-11):** Electronic warfare variant
- **GX-8:** Electronic intelligence variant
- **KJ-500:** Airborne early warning and control variant. Five hour endurance, and fitted with lighter version of KJ-2000 AESA radar.

System

Alternate Designation(s): Y-9
Primary Function / Type: Medium Transport Aircraft
Manufacturer: Shaanxi Aircraft Company
Crew: 4
Troops: 132
Number of Engines: 3
Number of Hard Points: INA

Dimensions

Length: 36.065 m
Width (Wing Span): 38 m
Height: 11.3 m
Wing Area: 121.9 m2
Cabin Length: 16.2 m
Cabin Width: 3.2 m
Cabin Height: 2.4 m
Empty Weight: 39,000 kg
Maximum Takeoff Weight: 77,000 kg
Overload Takeoff Weight: 81,000 kg

Normal Payload: 25,000 kg

Maximum Payload: 30,000 kg

Automotive

Engine Name: 4 x WJ-6C

Number of Engines: 4

Engine Type: Turboprop

Engine Power: INA

Maximum Speed: INA

Cruise Speed: 600-650 km/h

Ceiling: 9,000 m

Maximum Range with Maximum Payload: 7,900 km

Operational Range: 5,800 km

Endurance: 12 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

The Shaanxi Y-9 (Chinese: □-9; pinyin: Yùn-9) is a medium military transport aircraft produced by Shaanxi Aircraft Company in China. It is a stretched and upgraded development of the Shaanxi Y-8F. Development of the Y-9 may have begun as early as 2002 as the Y-8X program. The program was a collaborative effort with Antonov - the designers of the An-12 that it was ultimately derived from - and was aimed at competing with the Lockheed Martin C-130J Super Hercules. By September 2005, the Y-9 designation was being used. The Y-9 received design features originally intended for the Y-8F600; the Y-8F600 was cancelled in 2008. Shaanxi had hoped to conduct the first flight as early as 2006, but it was delayed. Design changes were made in 2006,[3] with the design being frozen by January 2010. After the design freeze, it was suggested that the first flight would depend on securing a launch customer; construction had also not yet commenced. The aircraft finally flew in November 2010. The Y-9 entered People's Liberation Army Air Force (PLAAF) service in 2012, with full operating capability being announced in December 2017. The Y-9 is powered by four WoJiang WJ-6C turboprop engines. The propellers are six-bladed and made with Chinese JL-4 composites, and closely resemble the Dowty R406. The WJ-6C is replaced by the Pratt & Whitney Canada PW150B in the Y-9E export variant. The cruise speed is 300 knots (560 km/h; 350 mph) with an endurance of around 10.5 hours. The Y-9 may carry 25 tons of cargo or about 100 paratroopers.

Y-8A Chinese Helicopter Transport Aircraft







Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14,

2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft

engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8A

Primary Function / Type: Helicopter Transport Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Range: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production. Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-200. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later

for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

Y-12C North Korean Utility Aircraft



Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12C
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Industry Group
Crew: 2 (pilot, co-pilot)
Passengers: 19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 19.20 m
Wing Area: 36.90 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-27
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 620 shp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 328 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 504 m/min
Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12C This military variant is primarily in service with the People's Liberation Army and PLA Air Force. It is powered by a WJ-9 turboprop engine). The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger fuselage and

bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

Tu-154-2 (Careless) Chinese Jet Airliner



Tiers:



Variants:

- **Tu-154:** Tu-154 production started in 1970, and the first passenger flight was performed on 9 February 1972. Powered by Kuznetsov NK-8-2 turbofans, it carried 164 passengers. About 42 were built.
- **Tu-154A:** The first upgraded version of the original Tu-154, the A model, in production since 1974, added center-section fuel tanks and more emergency exits, while engines were upgraded to higher-thrust Kuznetsov NK-8-2U. Other upgrades include automatic flaps/slats and stabilizer controls and modified avionics. Max. takeoff weight – 94,000 kg (207,235 lb). There were 15 different interior layouts for the different domestic and international customers, seating between 144 and 152 passengers. To discern the A model from the base model note the spike at the junction of the fin and tail. This is a fat bullet on the A model, and a slender spike on the base model.
- **Tu-154B:** As the original Tu-154 and Tu-154A suffered wing cracks after a few years in service, a version with a new, stronger wing, designated Tu-154B, went into production in 1975. It also had an additional fuselage fuel tank, additional emergency exits in the tail. Also, the maximum takeoff weight increased to 98,000 kg (216,053 lb). Important to Aeroflot was the increased passenger capacity, hence lower operating costs. With the NK-8-2U engines the only way to improve the economics of the airplane was to spread costs across more seats. The autopilot was certified for ICAO Category II automatic approaches. Most previously built Tu-154 and Tu-154A were also modified into this variant, with the replacement of the wing. Maximum takeoff weight increased to 96,000 kg (211,644 lb). 111 were built.
- **Tu-154B-1:** Aeroflot wanted this version for increased revenue on domestic routes. It carried 160 passengers. This version also had some minor modifications to the fuel system, avionics, air conditioning, and landing gear. 64 were built from 1977 to 1978.
- **Tu-154B-2:** A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley. The procedure took about 2 1/2 hours. Some of the earlier Tu-154Bs were modified to that standard. Maximum takeoff weight increased to 98,000 kg (216,053 lb), later to 100,000 kg (220,462 lb). Some 311 aircraft were built, including VIP versions. A few remain in service.
- **Tu-154S:** The Tu-154S is an all-cargo or freighter version of the Tu-154B, using a strengthened floor, and adding a forward cargo door on the port side of the fuselage. The aircraft could carry nine Soviet PAV-3 pallets. Maximum payload – 20,000 kg (44,092 lb). There were plans for 20 aircraft, but only nine were converted, two from Tu-154 models and seven from Tu-154B models. Trials were held in the early 1980s and the aircraft was authorized regular operations in 1984. By 1997 all had been retired.
- **Tu-154M:** The Tu-154M and Tu-154M Lux are the most highly upgraded versions, which first flew in 1982 and entered mass production in 1984. It uses more fuel-efficient Soloviev D-30KU-154 turbofans. Together with significant aerodynamic refinement, this led to much lower fuel consumption hence longer range, as well as lower operating costs. The aircraft has new double-slotted (instead of triple-slotted) flaps, with an extra 36-degree position (in addition to existing 15, 28 and 45-degree positions on older versions), which allows reduction of noise on approach. It also has a relocated auxiliary power unit and numerous other improvements. Maximum takeoff weight increased first to 100,000 kg (220,462 lb), then to 102,000 kg (224,872 lb). Some aircraft are certified to 104,000 kg (229,281 lb). About 320 were manufactured. Mass production ended in 2006, though limited manufacturing continued as of January 2009. No new airframes have been built since the early 1990s, and production since then involved assembling aircraft from components on hand. Chinese Tu-154MD electronic intelligence aircraft carry a large-size synthetic aperture radar (SAR) under their mainframe.
- **Tu-154M-LK-1:** Cosmonaut trainer. This was a salon VIP aircraft modified to train cosmonauts to fly the Buran reusable spacecraft, the Soviet equivalent of the US Space Shuttle. The Tu-154 was used because the Buran required a steep descent, which the Tu-154 was capable of replicating. The cabin featured trainee workstations, one of which was identical to the Buran's flightdeck. The forward baggage compartment was converted into a camera bay, as the aircraft was used to train cosmonauts in observation and photographic techniques.

- **Tu-154M-ON monitoring aircraft:** Germany modified one of the Tu-154s it inherited from the former East German Air Force into an observation airplane. This aircraft was involved with the Open Skies inspection flights. It was converted at the Elbe Aircraft Plant (Elbe Flugzeugwerke) in Dresden, and flew in 1996. After 24 monitoring missions, it was lost in a mid-air collision in 1997. The Russians also converted a Tu-154M to serve as an Open Skies monitoring aircraft. They used the Tu-154M-LK-1, and converted it to a Tu-154M-ON. When not flying over North America, it is used to ferry cosmonauts. China is believed to have converted one Tu-154 to an electronic countermeasures aircraft.
- **Tu-154M-100:** Design of this variant started in 1994, but the first aircraft were not delivered until 1998. It is an upgraded version with Western avionics, including the Flight Management Computer, GPS, EGPWS, TCAS, and other modern systems. The airplane could carry up to 157 passengers. The cabin featured an automatic oxygen system and larger overhead bins. Three were produced, as payment of debts owed by Russia to Slovakia. Three aircraft were delivered in 1998 to Slovak Airlines, and sold back to Russia in 2003.
- **Tu-155:** A Tu-154 converted into a testbed for alternative fuels. It first flew in 1988 and was used until the fall of the Soviet Union, when it was placed in storage.
- **Tu-164:** Initial designation of the Tu-154M.
- **Tu-174:** Proposed stretched version of Tu-154.
- **Tu-194:** Proposed shortened version of Tu-154.

System

Alternate Designation(s): Tu-154-2; NATO: Careless

Primary Function / Type: Jet Airliner

Manufacturer: Tupolev

Crew: 3 flight crew + 5 cabin crew

Passengers: 180 passengers

Number of Engines: 3

Number of Hard Points: INA

Note: A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley. The procedure took about 2 1/2 hours.

Dimensions

Length: 48.00 m

Height: 11.40 m

Wingspan: 37.55 m

Wing Area: 201.45 sq m

Cabin Volume: 163.2 cu m

Weight, Empty: 55,300 kg

Weight, Maximum Takeoff: 100,000 kg

Payload: 18,000 kg

Automotive

Engine Name: 3 x Kuznetsov NK-8-2

Number of Engines: 3

Engine Type: Turbofan

Engine Power: 10,500 kg static thrust each

Maximum Internal Fuel Capacity: 47,000 liters

Maximum Speed: 950 km/h

Economical Speed: 900 km/h

Long-Range Speed: 850 km/h

Takeoff Safety Speed: 255 km/h

Landing at Threshold Speed: 225 km/h

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Tu-154B-2 A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley.[13] The procedure took about 2 1/2 hours. Some of the earlier Tu-154Bs were modified to that standard. Maximum takeoff weight increased to 98,000 kg (216,053 lb), later to 100,000 kg (220,462 lb). Some 311 aircraft were built, including VIP versions. A few remain in service. The Tupolev Tu-154 (Russian: Туполев Ту-154; NATO reporting name: "Careless") is a three-engine medium-range narrow-body airliner designed in the mid-1960s and manufactured by Tupolev. A workhorse of Soviet and (subsequently) Russian airlines for several decades, it carried half of all passengers flown by Aeroflot and its subsidiaries (137.5 million/year or 243.8 billion passenger km in 1990), remaining the standard domestic-route airliner of Russia and former Soviet states until the mid-2000s. It was exported to 17 non-Russian airlines and used as a head-of-state transport by the air forces of several countries. With a cruising speed of 850 kilometres per hour (530 mph) the Tu-154 is one of the fastest civilian aircraft in use and has a range of 5,280 kilometres (3,280 mi). Capable of operating from unpaved and gravel airfields with only basic facilities, it was widely used in the extreme Arctic conditions of Russia's northern/eastern regions where other airliners were unable to operate. Originally designed for a 45,000-hour service life (18,000 cycles) but capable of 80,000 hours with upgrades, it was expected to continue in service until 2016, although noise regulations have restricted flights to western Europe and other regions. Since 1968 there have been 39 fatal incidents involving the Tu-154, most of which were caused either by factors unrelated to the aircraft, incorrect maintenance, or by its extensive use in demanding conditions. Few of the Tu-154 accidents appear to have involved technical failure. The Tu-154 is powered by three rear-mounted low-bypass turbofan engines arranged similarly to those of the Boeing 727, but it is slightly larger than its American counterpart. Both the 727 and the Tu-154 use an S-duct for the middle (Number 2) engine. The original model was equipped with Kuznetsov NK-8-2 engines, which were replaced with Soloviev D-30KU-154 in the Tu-154M. All Tu-154 aircraft models have a relatively high thrust-to-weight-ratio which give excellent performance, at the expense of lower fuel efficiency. This became an important factor in later decades as fuel costs grew. The cockpit is fitted with conventional dual yoke control columns. Flight control surfaces are hydraulically operated. The cabin of the Tu-154, although of the same six-abreast seating layout, gives the impression of an oval interior, with a lower ceiling than is common on Boeing and Airbus airliners. The passenger cabin accommodates 128 passengers in a two-class layout and 164 passengers in single-class layout, and up to 180 passengers in high-density layout. The layout can be modified to what is called a winter version where some seats are taken out and a wardrobe is installed for passenger coats. The passenger doors are smaller than on its Boeing and Airbus counterparts. Luggage space in the overhead compartments is very limited. Like the Tupolev Tu-134, the Tu-154 has a wing swept back at 35° at the quarter-chord line. The British Hawker Siddeley Trident has the same sweepback angle, while the Boeing 727 has a slightly smaller sweepback angle of 32°. The wing also has anhedral (downward sweep) which is a

distinguishing feature of Russian low-wing airliners designed during this era. Most Western low-wing airliners such as the contemporary Boeing 727 have dihedral (upward sweep). The anhedral means that Russian airliners have poor lateral stability compared to their Western counterparts, but also are more resistant to Dutch roll tendencies. Considerably heavier than its predecessor Soviet-built airliner the Ilyushin Il-18, the Tu-154 was equipped with an oversized landing gear to reduce ground load, enabling it to operate from the same runways. The aircraft has two six-wheel main bogies fitted with large low-pressure tires that retract into pods extending from the trailing edges of the wings (a common Tupolev feature), plus a two-wheel nose gear unit. Soft oleo struts (shock absorbers) provide a much smoother ride on bumpy airfields than most airliners, which very rarely operate on such poor surfaces. The original requirement was to have a three-person flight crew – captain, first officer and flight engineer – as opposed to a four- or five-person crew, as on other Soviet airliners. It became evident that a fourth crew member, a navigator, was still needed, and a seat was added on production aircraft, although their workstation was compromised due to the limitations of the original design. Navigators are no longer trained and this profession is becoming obsolete with the retirement of the oldest Soviet-era planes. The latest variant (Tu-154M-100, introduced 1998) includes an NVU-B3 Doppler navigation system, a triple autopilot, which provides an automatic ILS approach according to ICAO category II weather minima, an autothrottle, a Doppler drift and speed measure system (DISS), and a "Kurs-MP" radio navigation suite. A stability and control augmentation system improves handling characteristics during manual flight. Modern upgrades normally include modernised TCAS, GPS, and other systems (mostly American-made or EU-made). Early versions of the Tu-154 cannot be modified to meet the current Stage III noise regulations and are no longer allowed to fly into airspace where such regulations are enforced, such as the European Union. However, the Tu-154M's D-30 engines can be fitted with hush kits, allowing them to meet noise regulations.

Y-8F600 Chinese Transport Aircraft



Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport

noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8F600

Primary Function / Type: Transport Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 39,000 kg

Maximum Payload Weight: 30,000 kg

Maximum Takeoff Weight: 77,000 kg

Overload Takeoff Weight: 81,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 7,800 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 12 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system. The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8

factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

Tu-204 Russian Jet Airliner



Tiers:



Variants:

- **Tu-204/204C:** The Tu-204 is the basic passenger airline model, and the Tu-204C is the basic freight or cargo model. The most-used models are the -100C and the -120C.
- **Tu-204-100/200:** Certified in January 1995, this initial version is powered by Soloviev (now Aviadvigatel) PS90 turbofans with 157 kN (35,300 lbf) of thrust, and uses Russian avionics in addition to its Russian engines. The Tu-204-200 is a heavier version with extra fuel for more range. Only one was built by Aviastar-SP in Ulyanovsk but has not yet been delivered (RA-64036). Now this version is only produced by KAPO in Kazan, marketed under the designation Tu-214. The Tu-204-100C and Tu-204-200C are cargo versions of the −100 and −200 respectively, fitted with a forward main deck freight door. Currently, the Tu-204-100/200 is offered with the option of an up-rated Aviadvigatel PS90A2 turbofan, which promises 40% more service between overhauls.
- **Tu-204-120/220/120C/220C:** To broaden product appeal, the Tu-204-120/220 offers non-Russian avionics and engines. It is powered by two Rolls-Royce RB211-535 engines, each with thrust of 192 kN (43,100 lbf). Egypt's Cairo Aviation became the debut operator in November 1998 when it took delivery of a Tu-204-120 and its cargo version the Tu-204-120C. The Tu-204-220 and Tu-204-220C cargo version, are a higher gross weight variants of the basic Tu-204-120.
- **Tu-204-300:** A shortened, longer-range and more efficient derivative of the Tu-204, the Tu-204-300 is also known as Tu-234. About six meters (20 ft) shorter than the basic Tu-204, this variant is available in two versions: the longer-ranged, heavier version, powered by Aviadvigatel PS 90-A2 turbofans, has a maximum take-off weight of 107.5 metric tons and range (with 166 passengers) increased to 9,300 kilometres (5,000 nmi); and the lighter, shorter-ranged version, with a maximum take-off weight of 89 metric tons and range of 3,500 kilometres (1,900 nmi) with 166 passengers. The Russian airline Vladivostok Air is the debut customer. This airline's aircraft are in a two-class seating configuration, with a 142-passenger capacity. Average numbers of flight hours during each 24-hour period is 9.35 hours, for year 2009. It is also operated by Air Koryo which currently operates one Tu-204-100B and one Tu-204-300. The Tu-204s operate on the Pyongyang-Beijing, Bangkok, Vladivostok, Shenyang and Kuala Lumpur routes.
- **Tu-204-500:** This is a version of the Tu-204-300 optimized for shorter routes, featuring smaller wings and an increased cruising speed (to Mach 0.84), which makes it a competitor to the Next Generation Boeing 737. It is ETOPS rated, and fitted with a Honeywell 331-200ER APU.
- **Tu-206:** This variant is a company-funded testbed for alternative fuels, flying on liquefied natural gas.[
- **Tu-214:** The Tu-214 is also a variation of the Tu-204 first flown on 21 March 1996. It is technically a Tu-204-200, one of the differences being that it is built by a different factory. Planes designated Tu-204 are produced in Ulyanovsk by Aviastar-SP; Tu-214 in Kazan by the Kazan Aircraft Production Association (KAPO).[17][18] Both factories are independent from the Tupolev design bureau and have some control over the design of the variant they produce.
- **Tu-214ON:** The Tu-214ON is an observation version of the Tu-204-200, equipped for Treaty on Open Skies missions and built by Kazan Aircraft Production Association. Vega Radio Engineering Corporation was contracted for the development of airborne surveillance system, ground-based complex and other mission equipment for the aircraft. It is equipped with one A-84ON panoramic camera, one AK-111 topographic camera and two perspective AK-112 digital aerial cameras to capture high-resolution aerial photography. Two video cameras, a Raduga infrared thermographic camera and Ronsard Side looking airborne radar are also fitted
- **Tu-214PU:** Airborne command post version. Two operated for the Russian President.
- **Tu-214SR:** Communications relay version. 5 operated by Special Flight Unit Rossiya for the Russian government.
- **Tu-214SUS:** Communications relay version for the Russian President. Two delivered.
- **Tu-214R:** Special-mission versions of the Tu-214 commercial transport aircraft, developed under the codename 'Project 141', to replace the Il-20 Coot ELINT platform. The aircraft are configured to carry the MRC-411 multi-intelligence payload, to include electronic intelligence (ELINT) sensors, side-looking Synthetic Aperture Radar (SAR) and other

Signals Intelligence (SIGINT). In addition, the aircraft will carry multi-spectral electro-optical systems. The aircraft has conducted test flights over the Sea of Japan but the programme experienced problems in January 2013. (Jane's Defence Weekly 16 January 2013)

- **Tu-214PU-SBUS:** Special-purpose aircraft-control point equipped with a special onboard communication unit SBUS-214 intended for the Ministry of Defence of Russia. The aircraft is built with Russian-made components only, meeting the requirements of the state customers and has a range of at least 7,200 km (4,500 mi). The main purpose of the aircraft is to provide additional communication capabilities to the user. The Russian MoD placed an order for two aircraft in November 2015. The first aircraft was delivered in March 2018 while the second in June the same year.
- **Tu-214LMK:** A flying laboratory based on a serial Tu-214 passenger plane (registration number RA-64507) equipped with a multifunctional flight complex LMK-214. The aircraft is intended for an in-flight testing of a new radar complex and other on-board aviation equipment for the modernized Tupolev Tu-160M2 and the future Tupolev PAK DA strategic bombers. It began flight testing on 29 December 2018.
- **Tu-204SM:** The Tu-204SM, alternatively Tu-204CM, a medium-range airliner, is an upgraded version of the Tu-204-100/300. While the Tu-204SM will retain key design and aerodynamic features of the Tu-204-100/100E/100V series, there are numerous upgrades, largely aimed at meeting the current and near-future Russian and international standards, including those of ICAO and Eurocontrol. The new cockpit features allow the Tu-204SM to be flown by a two-pilot crew (as compared with the three-pilot arrangement of the original Tu-204 series). These features include a new computer (VSUPT-85-2040), a new flight management system (ASO-204/FMS), wide LCD displays (KSEIS-204E), head-up displays (HUD), and an automated board system maintenance and diagnostic system. The electronic flight bag concept will be implemented and all controls and displays will be in English.
- **Tu-204SM orders:** Red Wings Airlines was the first airline to operate the Tu-204SM. Ilyushin Finance Co. (IFC) said it would complete negotiations with Red Wings for 44 Tu-204SM aircraft in February, to sign a firm order in March 2011. Red Wings already operates a fleet of Tu-204-100 and Tu-204-100V jetliners, to which it added one airframe in 2010. Russia's largest aircraft lessor, Ilyushin Finance, has previously placed Tu-204-100 aircraft with Cubana, Air Koryo and Red Wings, and Tu-204-300s with Vladivostok Avia and Air Koryo. Additionally, IFC leases three Tu-214s (Tu-204-200s) to Transaero. Faced with low production rates for the Tu-204 models, Tupolev asked component providers to lower their prices in order to cut the plane's overall price by 27–30%. These suppliers agreed, on condition that 44 more firm orders be secured for the Tu-204SM through 2016.

System

Alternate Designation(s): Tu-204

Primary Function / Type: Jet Airliner

Manufacturer: Tupolev

Crew: 3

Passengers: 190

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 46.14 m

Wingspan: 41.8 m

Wing Area: 184.2 square metres

Height: 13.9 m

Fuselage Width: 3.8 m

Fuselage Height: 4.1 m

Cabin Width: 3.57 m

Cabin Height: 2.16 m

Maximum Take-Off Weight: 105,000 kg

Maximum landing Weight: 88,000 kg

Maximum payload: 21,000 kg

Automotive

Engine Name: 2 x Aviadvigatel PS-90A

Number of Engines: 2

Engine Type: Turbojet

Engine Power: INA

Fuel Capacity: 35,700 kg

Maximum Range: 4,300 km

Maximum Speed: 900 km/h

Cruising Speed: 810 to 850 km/h

Service Ceiling: 12,100 m

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Laser Desingator: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

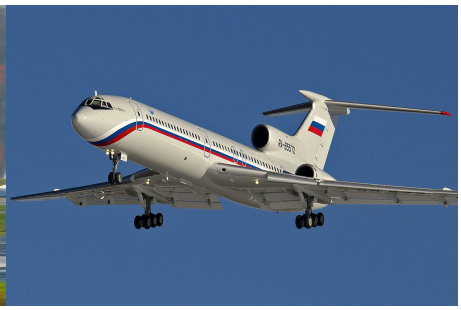
Chaffs/Flares: No

Notes:

The Tupolev Tu-204 (Russian: Туполев Ту-204) is a twin-engined medium-range jet airliner capable of carrying 210 passengers, designed by Tupolev and produced by Aviastar-SP and Kazan Aircraft Production Association. First introduced in 1989, it is intended to be broadly equivalent to the Boeing 757, with slightly lower range and payload, and has competitive performance and fuel efficiency in its class. It was developed for Aeroflot as a replacement for the medium-range Tupolev Tu-154 trijet. The latest version, with significant upgrades and improvements, is the Tu-204SM, which made its maiden flight on 29 December 2010. The Tu-204 was designed as a family of aircraft incorporating passenger, cargo, combi and quick-change variants. It is powered by either two Aviadvigatel PS-90 or Rolls-Royce RB211 engines. The Tu-204 is produced at two of the largest Russian aircraft manufacturing plants in Ulyanovsk (Tu-204 series) and Kazan (Tu-214). The Tu-204 cabin is available in several layouts, including the baseline single-class layout seating for 210 passengers and a two- or three-class layout designed for 164–193 passengers. A cargo version of the Tu-204 is being successfully operated by several airlines in Europe and Egypt. Seating configuration is 3–3 in economy and 2–2 in Business class. The business class cabin has a seat pitch of 810 millimetres (31.9 in). The passenger cabin can be divided into compartments according to class with removable bulkheads and curtains. Compartments are illuminated by reflected light. Overhead bins for passenger baggage and coats are of the closed type. The volume of baggage per passenger is 0.052 cubic metres (1.8 cu ft). In 1994, the first certificate for Tu-204 aircraft (with PS-90A engines) was issued. Subsequently, issued certificates have extended estimated operational conditions. The Tu-204-120 variant, certified with Rolls-Royce RB211-535E4 engines, complies with noise regulations described in Chapter 3 of Supplement 16 to ICAO, hence meeting all current European and ICAO requirements.[6] It is currently undergoing the certification process with JAA. The Tu-204-100 variant, certified with PS-90A engines, complies with noise regulations described in Chapter 4 of

Supplement 16 to ICAO which means it is quieter. The aircraft was certified to Russian standards AP-25 (harmonized with FAR-25 and JAR-25). The Tu-204 is part of a new generation of Russian aircraft, including other recent developments such as the Ilyushin Il-96. The Tu-204 features many technological innovations such as fly-by-wire control systems, a glass cockpit, supercritical wings with winglets, and is available with Russian or foreign avionics. The wings and tails are relatively resistant to ice build-up, and as such anti-icing systems are not equipped. Among today's airliners the Tu-204 is the only one which does not require wing anti-icing systems. During the test flight safety has been confirmed without the anti-icing system on the bearing surfaces and the aircraft obtained Russian and European certificates.

Tu-154 (Careless) Russian Jet Airliner


Tiers:



Variants:

- **Tu-154:** Tu-154 production started in 1970, and the first passenger flight was performed on 9 February 1972. Powered by Kuznetsov NK-8-2 turbofans, it carried 164 passengers. About 42 were built.
- **Tu-154A:** The first upgraded version of the original Tu-154, the A model, in production since 1974, added center-section fuel tanks and more emergency exits, while engines were upgraded to higher-thrust Kuznetsov NK-8-2U. Other upgrades include automatic flaps/slats and stabilizer controls and modified avionics. Max. takeoff weight – 94,000 kg (207,235 lb). There were 15 different interior layouts for the different domestic and international customers, seating between 144 and 152 passengers. To discern the A model from the base model note the spike at the junction of the fin and tail. This is a fat bullet on the A model, and a slender spike on the base model.
- **Tu-154B:** As the original Tu-154 and Tu-154A suffered wing cracks after a few years in service, a version with a new, stronger wing, designated Tu-154B, went into production in 1975. It also had an additional fuselage fuel tank, additional emergency exits in the tail. Also, the maximum takeoff weight increased to 98,000 kg (216,053 lb). Important to Aeroflot was the increased passenger capacity, hence lower operating costs. With the NK-8-2U engines the only way to improve the economics of the airplane was to spread costs across more seats. The autopilot was certified for ICAO Category II automatic approaches. Most previously built Tu-154 and Tu-154A were also modified into this variant, with the replacement of the wing. Maximum takeoff weight increased to 96,000 kg (211,644 lb). 111 were built.
- **Tu-154B-1:** Aeroflot wanted this version for increased revenue on domestic routes. It carried 160 passengers. This version also had some minor modifications to the fuel system, avionics, air conditioning, and landing gear. 64 were built from 1977 to 1978.
- **Tu-154B-2:** A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley. The procedure took about 2 1/2 hours. Some of the earlier Tu-154Bs were modified to that standard. Maximum takeoff weight increased to 98,000 kg (216,053 lb), later to 100,000 kg (220,462 lb). Some 311 aircraft were built, including VIP versions. A few remain in service.
- **Tu-154S:** The Tu-154S is an all-cargo or freighter version of the Tu-154B, using a strengthened floor, and adding a forward cargo door on the port side of the fuselage. The aircraft could carry nine Soviet PAV-3 pallets. Maximum payload – 20,000 kg (44,092 lb). There were plans for 20 aircraft, but only nine were converted, two from Tu-154 models and seven from Tu-154B models. Trials were held in the early 1980s and the aircraft was authorized regular operations in 1984. By 1997 all had been retired.
- **Tu-154M:** The Tu-154M and Tu-154M Lux are the most highly upgraded versions, which first flew in 1982 and entered mass production in 1984. It uses more fuel-efficient Soloviev D-30KU-154 turbofans. Together with significant aerodynamic refinement, this led to much lower fuel consumption hence longer range, as well as lower operating costs. The aircraft has new double-slotted (instead of triple-slotted) flaps, with an extra 36-degree position (in addition to existing 15, 28 and 45-degree positions on older versions), which allows reduction of noise on approach. It also has a relocated auxiliary power unit and numerous other improvements. Maximum takeoff weight increased first to 100,000

kg (220,462 lb), then to 102,000 kg (224,872 lb). Some aircraft are certified to 104,000 kg (229,281 lb). About 320 were manufactured. Mass production ended in 2006, though limited manufacturing continued as of January 2009. No new airframes have been built since the early 1990s, and production since then involved assembling aircraft from components on hand. Chinese Tu-154MD electronic intelligence aircraft carry a large-size synthetic aperture radar (SAR) under their mainframe.

- **Tu-154M-LK-1:** Cosmonaut trainer. This was a salon VIP aircraft modified to train cosmonauts to fly the Buran reusable spacecraft, the Soviet equivalent of the US Space Shuttle. The Tu-154 was used because the Buran required a steep descent, which the Tu-154 was capable of replicating. The cabin featured trainee workstations, one of which was identical to the Buran's flightdeck. The forward baggage compartment was converted into a camera bay, as the aircraft was used to train cosmonauts in observation and photographic techniques.
- **Tu-154M-ON monitoring aircraft:** Germany modified one of the Tu-154s it inherited from the former East German Air Force into an observation airplane. This aircraft was involved with the Open Skies inspection flights. It was converted at the Elbe Aircraft Plant (Elbe Flugzeugwerke) in Dresden, and flew in 1996. After 24 monitoring missions, it was lost in a mid-air collision in 1997. The Russians also converted a Tu-154M to serve as an Open Skies monitoring aircraft. They used the Tu-154M-LK-1, and converted it to a Tu-154M-ON. When not flying over North America, it is used to ferry cosmonauts. China is believed to have converted one Tu-154 to an electronic countermeasures aircraft.
- **Tu-154M-100:** Design of this variant started in 1994, but the first aircraft were not delivered until 1998. It is an upgraded version with Western avionics, including the Flight Management Computer, GPS, EGPWS, TCAS, and other modern systems. The airplane could carry up to 157 passengers. The cabin featured an automatic oxygen system and larger overhead bins. Three were produced, as payment of debts owed by Russia to Slovakia. Three aircraft were delivered in 1998 to Slovak Airlines, and sold back to Russia in 2003.
- **Tu-155:** A Tu-154 converted into a testbed for alternative fuels. It first flew in 1988 and was used until the fall of the Soviet Union, when it was placed in storage.
- **Tu-164:** Initial designation of the Tu-154M.
- **Tu-174:** Proposed stretched version of Tu-154.
- **Tu-194:** Proposed shortened version of Tu-154.

System

Alternate Designation(s): Tu-154; NATO: Careless

Primary Function / Type: Jet Airliner

Manufacturer: Tupolev

Crew: 3 flight crew + 5 cabin crew

Passengers: 144-168 passengers

Number of Engines: 3

Number of Hard Points: INA

Dimensions

Length: 48.00 m

Height: 11.40 m

Wingspan: 37.55 m

Wing Area: 201.45 sq m

Cabin Volume: 163.2 cu m

Weight, Empty: 55,300 kg

Weight, Maximum Takeoff: 100,000 kg

Payload: 18,000 kg

Automotive

Engine Name: 3 x Kuznetsov NK-8-2

Number of Engines: 3

Engine Type: Turbofan

Engine Power: 10,500 kg static thrust each

Maximum Internal Fuel Capacity: 47,000 liters

Maximum Speed: 950 km/h

Economical Speed: 900 km/h

Long-Range Speed: 850 km/h

Takeoff Safety Speed: 255 km/h

Landing at Threshold Speed: 225 km/h

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Tupolev Tu-154 (Russian: Туполев Ту-154; NATO reporting name: "Careless") is a three-engine medium-range narrow-body airliner designed in the mid-1960s and manufactured by Tupolev. A workhorse of Soviet and (subsequently) Russian airlines for several decades, it carried half of all passengers flown by Aeroflot and its subsidiaries (137.5 million/year or 243.8 billion passenger km in 1990), remaining the standard domestic-route airliner of Russia and former Soviet states until the mid-2000s. It was exported to 17 non-Russian airlines and used as a head-of-state transport by the air forces of several countries. With a cruising speed of 850 kilometres per hour (530 mph) the Tu-154 is one of the fastest civilian aircraft in use and has a range of 5,280 kilometres (3,280 mi). Capable of operating from unpaved and gravel airfields with only basic facilities, it was widely used in the extreme Arctic conditions of Russia's northern/eastern regions where other airliners were unable to operate. Originally designed for a 45,000-hour service life (18,000 cycles) but capable of 80,000 hours with upgrades, it was expected to continue in service until 2016, although noise regulations have restricted flights to western Europe and other regions. Since 1968 there have been 39 fatal incidents involving the Tu-154, most of which were caused either by factors unrelated to the aircraft, incorrect maintenance, or by its extensive use in demanding conditions. Few of the Tu-154 accidents appear to have involved technical failure. The Tu-154 is powered by three rear-mounted low-bypass turbofan engines arranged similarly to those of the Boeing 727, but it is slightly larger than its American counterpart. Both the 727 and the Tu-154 use an S-duct for the middle (Number 2) engine. The original model was equipped with Kuznetsov NK-8-2 engines, which were replaced with Soloviev D-30KU-154 in the Tu-154M. All Tu-154 aircraft models have a relatively high thrust-to-weight-ratio which give excellent performance, at the expense of lower fuel efficiency. This became an important factor in later decades as fuel costs grew. The cockpit is fitted with conventional dual yoke control columns. Flight control surfaces are hydraulically operated. The cabin of the Tu-154, although of the same six-abreast seating layout, gives the impression of an oval interior, with a lower ceiling than is common on Boeing and Airbus airliners. The passenger cabin accommodates 128 passengers in a two-class layout and 164 passengers in single-class layout, and up to 180 passengers in high-density layout. The layout can be modified to what is called a winter version where some seats are taken out and a wardrobe is installed for passenger coats. The

passenger doors are smaller than on its Boeing and Airbus counterparts. Luggage space in the overhead compartments is very limited. Like the Tupolev Tu-134, the Tu-154 has a wing swept back at 35° at the quarter-chord line. The British Hawker Siddeley Trident has the same sweepback angle, while the Boeing 727 has a slightly smaller sweepback angle of 32°. The wing also has anhedral (downward sweep) which is a distinguishing feature of Russian low-wing airliners designed during this era. Most Western low-wing airliners such as the contemporary Boeing 727 have dihedral (upward sweep). The anhedral means that Russian airliners have poor lateral stability compared to their Western counterparts, but also are more resistant to Dutch roll tendencies. Considerably heavier than its predecessor Soviet-built airliner the Ilyushin Il-18, the Tu-154 was equipped with an oversized landing gear to reduce ground load, enabling it to operate from the same runways. The aircraft has two six-wheel main bogies fitted with large low-pressure tires that retract into pods extending from the trailing edges of the wings (a common Tupolev feature), plus a two-wheel nose gear unit. Soft oleo struts (shock absorbers) provide a much smoother ride on bumpy airfields than most airliners, which very rarely operate on such poor surfaces. The original requirement was to have a three-person flight crew – captain, first officer and flight engineer – as opposed to a four- or five-person crew, as on other Soviet airliners. It became evident that a fourth crew member, a navigator, was still needed, and a seat was added on production aircraft, although their workstation was compromised due to the limitations of the original design. Navigators are no longer trained and this profession is becoming obsolete with the retirement of the oldest Soviet-era planes. The latest variant (Tu-154M-100, introduced 1998) includes an NVU-B3 Doppler navigation system, a triple autopilot, which provides an automatic ILS approach according to ICAO category II weather minima, an autothrottle, a Doppler drift and speed measure system (DISS), and a "Kurs-MP" radio navigation suite. A stability and control augmentation system improves handling characteristics during manual flight. Modern upgrades normally include modernised TCAS, GPS, and other systems (mostly American-made or EU-made). Early versions of the Tu-154 cannot be modified to meet the current Stage III noise regulations and are no longer allowed to fly into airspace where such regulations are enforced, such as the European Union. However, the Tu-154M's D-30 engines can be fitted with hush kits, allowing them to meet noise regulations.

IL-62M (Classic-M) Russian Jet Airliner







Tiers:



Variants:

- **Il-62:** Initial production version, powered by four 23,150-lb (103.0 kN) Kuznetsov NK-8 turbofan engines, accommodation for a crew of five and 186 passengers.
- **Il-62M:** Improved version, powered by four 24,250-lb (107.9 kN) Soloviev D-30KU turbofan engines, accommodation for a crew of five and 174 passengers, equipped with containerised baggage and freight system, modified wing spoilers and a revised flight deck, plus increased fuel capacity.
- **Il-62MK:** Medium-range version, powered by four 24,250-lb (107.9 kN) Soloviev D-30KU turbofan engines, accommodation for a crew of five and 195 passengers, equipped with strengthened wings and landing gear for operations at higher gross weights.
- **Il-62MGr:** Cargo version of Il-62M

System

Alternate Designation(s): Il-62M; NATO: Classic-M

Primary Function / Type: Narrow-Body Jet Airliner

Manufacturer: Ilyushin

Crew: 3 to 5 (a captain, a first officer, and a flight engineer, plus optionally a navigator and a radio officer on long overwater and/or VIP services to operator specification) plus a four to eight-person cabin crew to operator specifications

Passengers: 168-186 passengers

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 53.12 m

Wingspan: 43.2 m

Height: 12.35 m

Wing Area: 280.0 sq m

Empty Weight: 71,600 kg

Weigh, Payload: 23,000 kg

Maximum Takeoff Weight: 165,000 kg

Automotive

Engine Name: 4 x Perm (formerly Soloviev) D-30-KU

Number of Engines: 4

Engine Type: Turbofan Engines

Engine Power: 11,000 kg static thrust each

Fuel Capacity: 105,300 Liters

Maximum Speed: 920 km/h

Speed, Long Range: 860 km/h

Ceiling Range, with Maximum Payload: 7,800 km

Range, Long-Range Cruise with 10,000 kg Payload: 10,000 km

Fire Control / Avionics

Fire Control System Type: No

Fire Control Radar: No

Laser Desingator: No

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

IL-62M Improved version, powered by four 24,250-lb (107.9 kN) Soloviev D-30KU turbofan engines, accommodation for a crew of five and 174 passengers, equipped with containerised baggage and freight system, modified wing spoilers and a revised flight deck, plus increased fuel capacity. The Ilyushin IL-62 (Russian: Ильюшин Ил-62; NATO reporting name: Classic) is a Soviet long-range narrow-body jetliner conceived in 1960 by Ilyushin. As successor to the popular turboprop Il-18 and with capacity for almost 200 passengers and crew, the Il-62 was the world's largest jet airliner when first flown in 1963. One of four pioneering long-range designs (the others being Boeing 707, Douglas DC-8, and Vickers VC10), it was the first such type to be operated by the Soviet Union and a number of allied nations. The Il-62 entered Aeroflot civilian service on 15 September 1967 with an inaugural passenger flight from Moscow to Montreal, and remained the standard long-range airliner for the Soviet Union (and later, Russia) for several decades. It was the first Soviet pressurised aircraft with non-circular cross-section fuselage and ergonomic passenger doors, and the first Soviet jet with six-abreast seating (the turboprop Tu-114 shared this arrangement) and international-standard position lights. Over 30 nations operated the Il-62 with over 80 examples exported and others having been leased by Soviet-sphere and several Western airlines. The Il-62M variant became the longest-serving model in its

airliner class (average age of examples in service as of 2016 is over 32 years). Special VIP (salon) and other conversions were also developed and used as head-of-state transport by some 14 countries. However, because it is expensive to operate compared to newer generation airliners, the number in service was greatly reduced after the 2008 Great Recession. The Il-62's successors include the wide-bodied Il-86 and Il-96, both of which were made in much smaller numbers and neither of which was widely exported. The Il-62 is a conventional all-metal low-wing monoplane of riveted sectional semi-monocoque construction to fail-safe design principles (a structure designed so that failure of one major member does not cause immediate failure of the whole). Its service life was initially set at 30,000 flight hours and subject to extensions and curtailments according to the quality of service procedures, inspection and manufacturer's bulletins. The aircraft features pressurised cabin and freight holds (with fuselage dimensions of 3.8 m width x 4.1 m height), duplex all-mechanical flight controls, though with twin electric motors for tailplane incidence control; hydraulic nosewheel steering, landing gear and tail strut actuation, and wheel brakes. The Il-62M has spoilers and lift dumpers which extend automatically upon landing and are hydraulically operated. Control surfaces include a variable-incidence tailplane with dynamically and weight-compensated elevators with trim tabs, triple-section tabbed ailerons (outermost for low speed and innermost for high speed) which are interlinked with a torsion bar, spoilerons (Il-62M), spoilers and lift dumpers, and pneumatically actuated thrust reversers on the two outboard engines (the reversers are flight-rated on the Il-62M). 27 V AC electrics are used throughout with a TA-6 auxiliary power unit (a turbine generator which supplies electric power and air conditioning on the ground) in the lower tailcone plus backup lead-zinc batteries. The aircraft uses conventional hot air de-icing using engine bleed air. Its sea level is equivalent to 2,400 m (8,000 ft) above mean sea level and thereafter reducing to the equivalent of 2,400 m (8,000 ft) to cruise altitude. It was originally built with no automatic oxygen masks; emergency supply comprises hatrack-housed oxygen bottles and masks for manual distribution to passengers by cabin crew. Since 1997, most aircraft have been retrofitted with automatic oxygen supply systems with drop-down masks. Its avionics include a Polyot-1 automatic flight control system (a "super autopilot," able to be programmed with a set route which it can fly without human intervention but under constant flight crew monitoring; ICAO Cat. 1 approaches standard, Cat. 2 optional), Doppler navigational radar replaced by triplex INSS (Inertial Navigation System Sets) on Il-62M after 1978 and by GPS (Global Positioning System) navigation sets on many aircraft after 1991, triple VHF and HF flightdeck radios, automatic direction finders, Soviet and Western instrument landing system receivers, vertical omnidirectional radio range and radio beacon receivers, duplex radio altimeters, automatic radio transponders, a full ICAO-standard navigation lights fit, cabin tannoy and intercom systems. Soviet/Russian and Warsaw Pact sovereign examples are additionally fitted with triplex "Odd Rods" (NATO code name) IFF (identification friend or foe) air defence transponders identifiable by three closely spaced short aerials. Emergency evacuation systems include inflatable life rafts and manually extendable canvas evacuation slides. Most aircraft are now retrospectively fitted with emergency floor lighting strips and some aircraft equipped with automatically inflatable evacuation slides. Fire extinguishers are sited in engine nacelles, flightdeck compartment, cabin crew rest areas and toilets. The Il-62 offers accommodation for up to 198 passengers in a single-class layout, seated six-abreast at 84 cm (33 in) seat pitch in two cabins separated by a vestibule, galley/pantry and cabin crew rest area. There are three toilets, forward, midships, and aft. It has a buffet/bar and a further cabin crew rest area in a vestibule forward, with a further optional cabin crew rest area aft. Typical mixed-class accommodation ranges between 128 and 144, seated four or six abreast, and a common single aisle configuration for long distance Aeroflot examples was first class (2-abreast) 3 rows, business class (3-abreast) 4 rows, economy class (3-abreast) 17 rows (Thiel, 2001). In this configuration, the central aisle in business and economy classes is quite narrow. A first class compartment is optionally sited aft of forward entry door or just forward of midships entry door, with an economy compartment further forward in the latter case. "Skycot" fitments are located in hatracks, while later Il-62Ms (1978 onwards) feature enclosed hatracks. Customer-optionable interior fitments. No in-flight entertainment systems are available except a public-address system that may be coupled to an open-reel or audio cassette player. Individual aircraft were experimentally fitted with television sets for Soviet-standard videotape entertainment during the 1970s. Some aircraft were retrospectively fitted with Western in-flight entertainment (solely audio) systems after 1991.

IL-76 (Candid) Russian Cargo Transport Aircraft





Tiers:



Variants:

- **IL-76 Candid-A::** First production model.
- **IL-76M Candid-B::** Added rear turret with two 23-mm NR-23 guns and small ECM fairings each side of navigator's windows.
- **IL-76MD Candid-B::** Military version of IL-76T.
- **IL-76MF::** Military variant with stretched fuselage and more powerful engine.
- **IL-76MF-100::** A derivative of the IL-76M with CFM56-5C turbofans. Range increased to 7,000 km with 40,000 kg load.
- **IL-76PP::** Electronic countermeasures aircraft
- **IL-76PS/IL-84::** Search and rescue capable of 3-hour patrol with radius of 3,000 km.
- **IL-76VPK/IL-82 airborne command post::** Variant of IL-76MD. Fitted with specialized communications equipment.
- **A-50 Mainstay::** AWACS version.
- **Midas::** Aerial tanker version.
- **IL-76: A-60 ASAT Aircraft:** A-60 Anti-Satellite Direct Energy Weapon System.

System

Alternative Designations: See Variants

Crew: 2 pilots, 1 navigator, 1 radio operator, 1 flight engineer

Engines: Rybinsk D-30KP II turbofan with thrust reversers; 4 each

Max Ceiling: m10,500

↳*Speed*

Maximum: km/h919

Cruise: km/h780

↳*Fuel*

Internal Tanks: 109,480 liters in 12 tanks

External Tanks: litersNone

↳*Dimensions*

Length: m46.6

Wingspan: m50.5

Height: m14.5

Weight: Empty: 89,000kg General Max: 190,000kg Allowable Max: 210,000kg Unprepared runway max weight: 157,500

Width: m3.45

↳*Flight Range*

With 20 ton payload: km6,100

With 47 ton payload: km3,000

Cargo Hold

↳*Dimensions*

Length to Ramp: m20

Length with Ramp: m24.5

Width: m3.5

Height: m3.4

Standard Payload

Internal: kg47,000

Troops: 140

Paratroopers: 125

Survivability / Countermeasures

Entire Aircraft Pressurized: Yes

Crew Emergency Escape Hatch Forward of Main Entry Door: Yes

Flares for Illuminating Landing Area: Yes

Radar Warning Receiver: Yes

Electronic Jammers: Yes

Chaff and Flares: Yes

Armament

GSh-23L twin-barreled cannon in tail turret: Yes

↳*1LK222 Anti-Satellite Laser (A-60E variant)*

Max Effective Range: km1500

Target Set: LEO Satellites

Notes: Used to dazzle adversary satellites or burn through sensitive optics and sensors using intensive energy laser bursts.

Avionics / Sensor / Optics

Standard FIlight Controls: Yes

Weather Radar in Nose: Yes

Navigation and Ground Mapping Radar in Radome: Yes

Night / Weather Capabilities: Yes

Notes:

The Ilyushin Il-76 (Russian: Илью́шин Ил-76; NATO reporting name: Candid) is a multi-purpose four-engine turbofan strategic airlifter designed by the Soviet Union's Ilyushin design bureau. It was first planned as a commercial freighter in 1967, as a replacement for the Antonov An-12. It was designed to deliver heavy machinery to remote, poorly served areas. Military versions of the Il-76 have been widely used in Europe, Asia and Africa, including use as an aerial refueling tanker or command center. The Il-76 has seen extensive service as a commercial freighter for ramp-delivered cargo, especially for outsized or heavy items unable to be otherwise carried. It has also been used as an emergency response transport for civilian evacuations as well as for humanitarian aid and disaster relief around the world. Because of its ability to operate from unpaved runways, it has been useful in undeveloped areas. Specialized models have also been produced for aerial firefighting and zero-G training. The aircraft was first conceived by Ilyushin in 1967 to meet a requirement for a freighter able to carry a payload of 40 tons (88,000 lb) over a range of 5,000 km (2,700 nmi; 3,100 mi) in less than six hours, able to operate from short and unprepared airstrips, and capable of coping with the worst weather conditions likely to be experienced in Siberia and the Soviet Union's Arctic regions. It was intended to replace the Antonov An-12. Another intended version was a double-decked 250-passenger airliner but that project was cancelled. The Il-76 first flew in March 1971. Production of Il-76s was allocated to the Tashkent Aviation Production Association in Tashkent, Uzbekistan, then a republic of the Soviet Union. Some 860 of the basic transport variants were manufactured.[6] In the 1990s, modernized variants also equipped with Soloviev D-30 turbofan engines were developed (MF, TF), with a cargo compartment 20 m (66 ft) long by 3.4 m (11 ft) wide by 3.4 m (11 ft) tall; these larger variants were not produced in significant quantity due to the financial difficulties being experienced by the Russian Air Force, which was the primary operator of the type. The prototype of the Il-76MF, conducted its first flight on 1 August 1995.

Il-18 (Coot) Russian Cargo Transport Aircraft





ILYUSHIN IL-18 (SERGEY RIABSEV / GFDL)



Tiers:

1 2 3 **4**

System

Alternate Designation(s): Il-18; NATO: Coot
Primary Function / Type: Turboprop Airliner
Manufacturer: Ilyushin
Crew: 5
Passengers: 122 passengers or 20 ELINT operators
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 35.90 m
Height: 10.17 m
Wingspan: 37.40 m
Wing Area: 140 sq m
Cabin Length: 24.00 m
Cabin Width: 3.23 m
Cabin Height: 2.00 m
Volume, Main Cabin: 238.0 cu m
Volume, Additional Cargo Holds: 29.3 cu m
Weight, Empty: 35,000 kg

Weight, Maximum Takeoff: 34,610 kg

Payload: 13,500 kg

Automotive

Engine Name: 4 x Ivchenko AI-20M

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Internal Fuel Capacity: 30,000 liters

Maximum Speed: 675 km/h

Economy Speed: 625 km/h

Ceiling: 10,000 m

Range, Maximum payload: 4,000 km

Takeoff Run: 1,300 m

Landing Run: 850 m

Fire Control / Avionics

Fire Control System Type: No

Fire Control Radar: No

Laser Desingator: No

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Ilyushin Il-18 (Russian: Илью́шин Ил-18; NATO reporting name: Coot) is a large turboprop airliner that first flew in 1957 and became one of the best known and durable Soviet aircraft of its era. The Il-18 was one of the world's principal airliners for several decades and was widely exported. Due to the aircraft's airframe durability, many examples achieved over 45,000 flight hours and the type remains operational in both military and (to a lesser extent) civilian capacities. The Il-18's successor was the long range Il-62 jet airliner. Two Soviet aircraft shared the designation Ilyushin Il-18. The first Il-18 was a propeller-driven airliner of 1946 but after a year of test flights that programme was abandoned. In the early 1950s with a need to replace older designs and increase the size of the Soviet civil transport fleet, a Soviet Council of Ministers directive was issued on 30 December 1955 to the chief designers Kuznetsov and Ivchenko to develop new turboprop engines and to Ilyushin and Antonov to design an aircraft to use these engines. The two aircraft designs were developed as the Ilyushin Il-18 and the Antonov An-10 and the engine chosen was the Kuznetsov NK-4 rather than the Ivchenko AI-20. The Il-18 design had started in 1954 before the directive was issued and experience with the piston-engined Il-18 was used although the aircraft was a new design. The design was for a four-engined low-wing monoplane with a circular pressurised fuselage and a conventional tail. The forward retracting tricycle landing gear had four wheels fitted on the main leg bogies, the main legs bogies rotated 90 degrees and retracted into the rear of the inboard engines. A new feature at the time was the fitting of a weather radar in the nose and it was the first

Soviet airliner to have an automatic approach system. The aircraft has two entry doors on the port-side before and after the wing and two overwing emergency exits on each side. The prototype SSSR-L5811 was rolled out in June 1957 and after ground-testing it began taxi test and high-speed runs on 1 July 1957. On 4 July 1957 the prototype first flew from Khodynka. On 10 July 1957 the aircraft was flown to Moscow-Vnukovo Airport to be presented to a Soviet government commission; also present was the prototype Antonov An-10 and the Tupolev Tu-114. The Il-18 type was formally named Moskva and this was painted on the fuselage, although the name was not used when the aircraft entered production. The Moscow Machinery Plant No. 30 located at Khodynka, near where the Ilyushin design office and the prototype had been built, was chosen to manufacture the aircraft. During 1957 the plant began to reduce its production of the Ilyushin Il-14 and prepare to build the production aircraft designated IL-18A. The Il-18A was only different from the prototype in minor details, mainly internal configuration to increase the seating from 75 to 89. Malev Il-18 in Sweden, 1972 The first production aircraft were powered by the Kuznetsov NK-4 but the engines were plagued with problems so the Council of Ministers decreed in July 1958 that all production from November 1958 would use the Ivchenko AI-20 and earlier production would be re-engined. Only 20 IL-18As were built before production changed to the improved Il-18B, this new variant had a higher gross weight and the nose was re-designed with a larger radome which increased the length by 20 cm. The first Il-18B flew on 30 September 1958 powered by the AI-20; a VIP variant was also built as the IL-18S for the Soviet Air Force. From April 1961 a TG-18 Auxiliary Power Unit was fitted for ground starting rather than the bank of lead-acid batteries. Some aircraft were modified to allow the APU to be run in flight. With experience of the earlier aircraft a further improvement was the Il-18V variant. The Il-18V was structurally the same but the interior was re-designed including moving the galley and some minor system changes. The first Il-18V appeared in December 1959 and was to continue into production until 1965 after 334 had been built. Specialised variants of the aircraft also appeared, including aircraft modified for flight calibration and a long-range polar variant. Military variants also appeared including the anti-submarine Ilyushin Il-38.

An-12 (Cub) Russian Transport Aircraft




Tiers:

1 2 3 4

Variants:

- **CUB (AN-12BP):** STANDARD TRANSPORT/CARGO VERSION; SEVERAL ELECTRONIC BLISTERS FITTED. CUB-A: ELINT VERSION: BLADE AERIALS FITTED ON FRONT OF FUSELAGE, AFT OF FLIGHT DECK.
- **CUB-B :** NAVAL ELINT VERSION. PALLETIZED PASSIVE RECEIVERS, FREQUENCY ANALYZERS, RECORDING EQUIPMENT AND ACCOMMODATION FOR EW PERSONNEL IN MAIN CARGO COMPARTMENT.
- **CUB-C :** ECM VERSION. VENTRAL ANTENNA HOUSINGS, JAMMERS ON PALLETS, AND OTHER FEATURES INDICATE THE CAPABILITY OF ELINT COLLECTION.
- **CUB-D:** UPGRADED CUB-C WITH ADDITIONAL ECM EQUIPMENT NAVAL ELECTRONIC WARFARE VERSION. SHAANXI Y-8: CHINESE MANUFACTURED.

System

Crew: 6.0

Weight, Maximim Takeoff : kg28000.0

Weight, Maximum Gross : kg61000.0

Weight, Normal Takeoff : kg55100.0

↳*Fuel and Load*

Fuel Capacity, Internal : liters13900-19100

Performance

Ceiling : m10200.0

Combat Range, with External Fuel : km5700.0

Combat Range, with Internal Fuel : km3600.0

Power Plant/Engine: Engines 4,000-shp Ivchenko AI-20K with 4-blade reversible pitch propellers

Speed, Maximum, at altitude : km/h777.0

Takeoff Run/Landing Roll : m700/500

Vertical Climb Rate : m/s10.0

Notes:

The Antonov An-12 (Russian: Антонов Ан-12; NATO reporting name: Cub) is a four-engined turboprop transport aircraft

designed in the Soviet Union. It is the military version of the Antonov An-10 and has many variants. For more than three decades the An-12 was the standard medium-range cargo and paratroop transport aircraft of the Soviet air forces. A total of 1,234 were eventually built. Developed from the Antonov An-8, the An-12 was a military version of the An-10 passenger transport. The first prototype An-12 flew in December 1957 and entered Soviet military service in 1959. Initially, the aircraft was produced at the State Aviation Factory in Irkutsk. From 1962, production was transferred to Tashkent, where 830 were built. Later, production moved to Voronezh and Kazan. In military use, the An-12 has capacity for up to 100 fully equipped paratroopers or 20,000 kg (44,090 lb) of cargo, which is loaded through the rear loading ramp/door. In terms of configuration, size, and capability, the aircraft is similar to the United States-built Lockheed C-130 Hercules. Soviet military and former-Soviet An-12s have a defensive tail gun turret. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with a license to assemble the aircraft locally. Due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance and the first flight of a Chinese-assembled An-12 was delayed until 1974. After USSR ceased production in 1973, the Xi'an Aircraft Company and Xi'an Aircraft Design Institute reverse-engineered the An-12 for local production. In 1981, the Chinese version of the An-12, designated Y-8, entered production. Since then, the Y-8 has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. A Tu-16/H-6 bomber navigator cockpit design was chosen for the Y-8 instead of the original An-12 shorter navigator cockpit design, as the H-6 bomber had been in serial production for some time. Although the An-12 is no longer in use either in Russia or in Ukraine, the Y-8 is upgraded and produced in China. The latest Y8-F600 is a joint venture between the Shaanxi Aircraft Company, Antonov Aeronautical Scientific Technical Complex (ASTC), and Pratt & Whitney Canada. The Y8-F600 has a redesigned fuselage, western avionics, PW150B turboprop engines with an R-408 propeller system, and a two-crew glass cockpit.

B737-600 (Boeing 737-600) American Cargo Transport Aircraft



Tiers:



Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.
- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-600; Boeing 737-600

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 108-140 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 31.24 m

Width (Wing Span): 34.32 m

Wing Area: 124.5 sq m

Height: 12.57 m

Cabin Length: 21.79 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 36,870 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 56,700 kg

Automotive

Engine Name: 2 x CFM International CFM56-7B

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 22,000 lb (9,786 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 26,036 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 542 knots (624 mph, 1,003 km/h)

Economical Cruise Speed: 523 knots (602 mph, 969 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 3,195 nm (3,679 mi, 5,917 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

B737-600 The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range. The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the 727 on short and thin routes, the twinjet retains the 707 fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers. The -100/200 original variants were powered by Pratt & Whitney JT8D low-bypass engines and offered seating for 85 to 130 passengers. Launched in 1980 and introduced in 1984, the 737 Classic -300/400/500 variants were re-engined with CFM56-3 turbofans and offered 110 to 168 seats. Introduced in 1997, the 737 Next Generation (NG) -600/700/800/900 variants have updated CFM56-7s, a larger wing and an upgraded glass cockpit, and seat 108 to 215 passengers. The latest generation, the 737 MAX -7/8/9/10, powered by improved CFM LEAP high bypass turbofans and accommodating 138 to 204 people, entered service in 2017. Boeing Business Jet versions are produced since the 737NG, as well as military models. As of December 2019, 15,156 Boeing 737s have been ordered and 10,571 delivered. Actual backlog stands at 4,398 when including "additional criteria for recognizing contracted backlog with customers beyond the existence of a firm contract". Initially, its main competitor was the McDonnell Douglas DC-9, followed by its MD-80/MD-90 derivatives. It remained the highest-selling commercial jetliner until surpassed in total orders by the Airbus A320 family in October 2019. The current 737 MAX, designed to compete with the A320neo was grounded worldwide in March 2019 following two fatal crashes.

Y-20 Kunpeng (Chubby Girl) Chinese Strategic Transport Aircraft



Tiers:

1 2 3 4

System

Alternate Designation(s): Y-20 Kunpeng; Nickname: Chubby Girl
Primary Function / Type: Strategic Airlift Aircraft
Manufacturer: Xi'an Aircraft Industrial Corporation
Crew: 3 (pilot, co-pilot, loadmaster)
Troops: 140
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 47 m
Height: 15 m
Width (Wing Span): 50 m
Wing Area: 310 sq m
Empty Weight: 100,000 kg
Maximum Takeoff Weight: 220,000 kg
Payload Weight: 66,000 kg

Automotive

Engine Name: 4 x Soloviev D-30KP-2

Number of Engines: 4

Engine Type: Turbofans

Engine Power: 26,455 lb (12,000 kg) static thrust

Maximum Speed: 800 km/h

Service Ceiling: 13,000 m

Maximum Range, w/51-ton payload: 5,200 km

Maximum Range, w/55-ton payload: 4,500 km

Maximum Range, w/66-ton payload: 3,700 k

Ferry Range: 8,000 km

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Xi'an Y-20 (Chinese: □-20; pinyin: Yùn-20; lit.: 'transport-20') is a large military transport aircraft. The project is being developed by Xi'an Aircraft Industrial Corporation and was officially launched in 2006. The official codename of the aircraft is Kunpeng (Chinese: □□), After the mythical bird that can fly for thousands of miles described in the ancient Chinese Taoist classic Zhuangzi. However, within the Chinese aviation industry itself, the aircraft is more commonly known by its nickname Chubby Girl (Chinese: □□), because its fuselage is much wider compared to other Chinese aircraft previously developed in China. The Y-20 uses components made of composite materials. The composites are produced in China, whereas in the past they had to be imported. The Y-20's cabin incorporates flame-retardant composites developed by the 703 Institute of the China Aerospace Science and Technology Corporation (CASC). The 703 Institute was created in March 2009 with development taking three years. The performance of the composites is reportedly comparable to those that fulfill FAR Part 25.835. The 703 Institute achieved another milestone by establishing a comprehensive Chinese evaluation and certification system for aircraft composite materials based on international standards. The Y-20 is the first cargo aircraft to use 3D printing technology to speed up its development and to lower its manufacturing cost. Model-based definition (MBD) is also used, and it's the third aircraft to utilize MBD technology in the world, after Airbus A380 (2000) and Boeing 787 (2005). A project team to implement MBD for Y-20 program was formally formed in October 2009, and after the initial success in application on the main landing gear, MBD application was expanded to the entire aircraft and became mandatory for all contractors and sub contractors of the Y-20 program. The implementation of MBD was initially met with strong resistance, with only a third of suppliers agreeing to implement MBD. However, the general designer of Y-20 declared that those who refused to implement MBD will be banned from participating in the Y-20 program, thus forcing everyone to comply, resulting in increases in productivity. The implementation of MBD greatly shortened the time required, for example, without MBD, installation of wings takes a month or two, but with MBD adopted, the time is drastically shortened to just a few hours, and in general, the design work reduced by 40%, preparation for production reduced by 75%, and manufacturing cycle reduced by 30%. In addition to 3D printing, the Y-20 is also the first aircraft in China adopting associative design technology (ADT) in its development. Headed by the deputy general designer of structural design, Mr. Feng Jun (□□), the initial attempt to implement ADT actually failed after two months spent on application on the nose section. It was only after the second attempt that took another three months on the application on wings did ADT became successful. The adaptation of ADT greatly shortened the development time by at least eight months, and modification of wing design that previously took a week is shortened to half a day. Cargo is loaded through a large aft ramp that accommodates rolling stock. The Y-20 incorporates a shoulder wing, T-tail, rear cargo-loading assembly and heavy-duty retractable landing gear, consists of three rows, with a pair of wheels for each row, totaling six wheels for each side. The structural test was completed in 194 days as opposed to the 300 days originally planned, thanks to the successful development and application of an automated structural strength analysis system. In comparison, similar work for the Xian JH-7 took a year. According to the deputy general designer, the shortest take-off distance of the Y-20 is 600 to 700 meters. Y-20 incorporates a total of four LCD EFIS, and the development of EFIS for Y-20 utilizes virtual reality via helmet mounted display.

Eight types of different relays used on Y-20 are developed by Guilin Aerospace Co., Ltd. a wholly own subsidiary of China Tri-River Aerospace Group Co., Ltd.(□□□□□□□□), which is also known as the 9th Academy of the China Aerospace Science and Industry Corporation (CASIC). It was reported that the Y-20 started ground testing in December 2012, including runway taxi tests. The aircraft made its maiden flight lasting one hour on January 26, 2013. During landing in first flight, it was reported that the Y-20 prototype bounced once before finally settling on runway due to high landing speed. In December 2013, a new Y-20 prototype took to the sky. On 6 February 2016 the Y-20 was flown for the first time and pictures of the fifth prototype (serial number 788) in flight appeared on Chinese military web pages. Other known prototypes carry identification numbers 781, 783 and 785. On 27 January 2016, former Chinese test pilot, Xu Yongling, had reported in a Xinhua article that Chinese aviation industry officials had stated that the Y-20 "had completed development" at the end of 2015. In June 2016, the first two Xian Y-20 aircraft were delivered to the People's Liberation Army Air Force (PLAAF)

Y-12 (II) Chinese Utility Aircraft





Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12 (II); Export: Turbo Panda
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Industry Group
Crew: 2 (pilot, co-pilot)
Passengers: 17-19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 17.24 m
Wing Area: 34.27 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-27
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 620 shp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 328 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 504 m/min
Climb Rate, One Engine: 101 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12(II) This variant features PT6A-27 engines; a Nordam interior; Western avionics options; and a Hamilton Standard environmental control system. The Y-12(II) entered production in 1984. The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing

with a new low drag section, a larger fuselage and bonded rather than riveted construction. It also replaced the radial piston engines with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

Y-12 (I) Chinese Utility Aircraft





Tiers:



Variants:

- **Y-12 (I):** Twin-engined STOL utility transport aircraft, powered by two 500-shp (373-kW) Pratt & Whitney Canada PT6A-11 turboprop engines. Prototype version.
- **Y-12 (II):** Fitted with more powerful PT6A-27 engines.
- **Y-12 (III):** Planned version to be fitted with WJ-9 turboprop. Evolved to Y-12C because of IV's success when WJ-9 development was completed.
- **Y-12 (IV):** Improved version. Revised wingtips (span increased to 19.2 m (63 ft)) and increased takeoff weight. 19 passenger seats. This version is the first aircraft in the series certified by the FAA in 1995.
- **Y-12C:** Basically a (IV) version with WJ-9 turboprop, used by PLAAF for aerial survey.
- **Y-12D:** Domestically deployed military version with upgraded engines driving four-bladed propellers, used by PLA Airborne Corps for parachute training.
- **Y-12E:** Variant with 18 passenger seats. PT6A-135A engines of equal horsepower but increased torque driving four-bladed propellers. This version was certified by the FAA in 2006.
- **Y-12F:** The latest development with almost everything redesigned: wider fuselage, new wings, retractable landing gear and more powerful PT6A-65B engines. The Y-12F has higher cruise speed, longer range and can accommodate 19 passengers or 3x LD3 containers. Design started in April 2005 and the maiden flight was on 29 December 2010. CAAC type certification was received on 10 December 2015 and FAA certification on 22 February 2016. The Y-12F passed flight tests for its automatic flight control system by the FAA on 30 June 2018. It was demonstrated during the 2012 Zhuhai Airshow.
- **Y-12G:** Proposed cargo version of Y-12F.
- **Turbo Panda:** Export name for (II) version, marketed by England and Japanese companies. No real order due to airworthiness certification.
- **Twin Panda:** Originally (II) version for export. Later a modified Y-12 (IV) powered by two Pratt & Whitney Canada PT6A-34 turboprop engines and fitted with uprated undercarriage, upgraded avionics and interior. Thirty-five orders reportedly received by 2000 but production not proceeded with.

System

Alternate Designation(s): Y-12 (I)
Primary Function / Type: Utility Aircraft
Manufacturer: Harbin Aircraft Industry Group
Crew: 2 (pilot, co-pilot)
Passengers: 17-19 passengers
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 14.86 m
Height: 5.58 m
Width (Wing Span): 17.24 m
Wing Area: 34.27 sq m
Cabin Length: 4.93 m
Cabin Width: 1.46 m
Cabin Height: 1.70 m
Volume: 12.9 cu m
Empty Weight: 3,000 kg
Payload Weight: 1,700 kg
Maximum Takeoff Weight: 5,300 kg

Automotive

Engine Name: 2 x Pratt & Whitney Canada PT6A-11
Number of Engines: 2
Engine Type: Turboprop
Engine Power: 500 shaft hp each
Fuel Capacity: 1,616 liters
Maximum Cruise Speed: 320 km/h
Economy Cruise Speed: 271 km/h
Range with Maximum Payload at 146 knots: 189 km
Ceiling: 7,000 m
Climb Rate, Both Engines: 390 m/min
Climb Rate, One Engine: 36 m/min

Protection

Stealth Properties: None
Heat Signature Reduction: No
Add on Armor: No
NBC Protection: INA
EW Counter Measures: INA
Chaffs/Flares: INA

Notes:

The Harbin Y-12 (Chinese: □-12; pinyin: Yùn-12) is a high wing twin-engine turboprop utility aircraft built by Harbin Aircraft Industry Group (HAIG). Y-12(I) This is the initial production version with PT6A-11 engines. The Y-12 started as a development of the Harbin Y-11 airframe called Y-11T in 1980. The design featured numerous improvements including a redesigned wing with a new low drag section, a larger fuselage and bonded rather than riveted construction. It also replaced the radial piston engines

with turboprops. The prototype was followed by about 30 production Y-12 (I) aircraft before a revised version was produced. This was designated the Y-12 (II), which featured more powerful engines and removal of leading edge slats, first flying on 16 August 1984 and receiving Chinese certification in December of the following year. The power plants are two Pratt & Whitney Canada PT6A-27 turboprops with Hartzell propellers. The Y-12 has a maximum takeoff weight of 5,700 kg (12,600 lb) with seating for 17 passengers and two crew. The aircraft is operated as a light commuter and transport aircraft. The latest development is the Y-12F, which is almost a new design with many improvements: new wings, new landing gear, new fuselage, with more powerful engines from Pratt & Whitney Canada and extended payload and range. The Y-12F made its maiden flight on December 29, 2010, received CAAC type certification on December 10, 2015, and FAA type certification on February 22, 2016. In 2015 Kenmore Air announced that they would begin development of floats for the Y-12 for FAA certification. The Y-12 completed the FAA evaluation flight tests for its automatic flight control system on June 30, 2018, with its performance meeting the requirements, said AVIC Harbin Aircraft Industry Company Ltd (AVIC HAFEI).

B737-700 (Boeing 737-700) American Cargo Transport Aircraft







Tiers:



Variants:

- **B737-100:** This is the initial production civil airliner version, with a 94-ft (28.65-m) long fuselage and a maximum passenger capacity of 115. First flight took place on April 9, 1967. Only 30 were built, all of which entered commercial service. One was later acquired by the Mexican air force as a VIP transport.
- **B737-200:** This version features a 6-ft (1.82-m) fuselage stretch and more powerful JT8D engines. There were 1,095 aircraft built.
- **B737-2X9 Surveiller:** This version is a 737-200 with 14 first-class and 88 coach passenger seats as well as a Motorola side-looking airborne modular multi-mission radar (SLAMMR) -- a variant of the AN/APS-131/135 radar -- and two associated 16-ft (5-m) long slotted waveguide antennas on the upper rear fuselage sides. At 30,000 ft (9,144 m), the detection range for small ships is 100 nm (115 mi; 185 km). Three improved Surveillers are in service in Indonesia. Modifications to the Indonesian versions include enhanced side-looking airborne modular radar; a new nose-mounted IR-detection system; as well as radar and GPS. Also installed on the improved version is the Boeing-developed data processing and display system (DPDS).
- **B737-300:** The B737-300 is the extended-range version with stretched fuselage and quieter, more fuel-efficient CFM56-3-B engines. First flight occurred on Aug. 24, 1984; it entered service on Dec. 7, 1984. More than 850 were ordered. One each has been in VIP service with the South Korean and Thai air forces.
- **B737-400:** This variant is similar to the B737-30, but with additional 10-ft (3.05-m) stretch to fuselage, 168-passenger capacity and higher rated engines. First flight occurred on Feb. 19, 1988; the first was delivered on Sept. 15, 1988. More than 170 were ordered.
- **B737-500:** The B737-500 is a short-fuselage (101 ft 9 in/31.01 m) version of the B737-300 with a passenger capacity of 132. First flight took place on June 30, 1989. More than 165 were ordered.
- **B737-600:** The B737-600 was known as the 737-500X prior to 1995. It accommodates 108-140 passengers. It is part of the Next Generation series -- the smallest model. The wings have increased chord and span lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700:** Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range.
- **B737-700 Increased Gross Weight Quick Change:** This variant was chosen by the U.S. Navy to replace the C-98s in the Reserves. Its features include continuous double-slotted flaps, new leading-edge slats and a large cargo door fitted to the front fuselage. Two were ordered for delivery by the end of 2001. A commercial version has not been made available.
- **B737-800:** The B737-800 was launched on Sept. 5, 1994. It is the longest variant of this series; it has a seating accommodation of 162-189 passengers.
- **B737-900:** This is a stretched version that can accommodate 18 more passengers than the 737-800. At least 10 orders

have been placed for this aircraft. The eyebrow windows located above the cockpit windscreen were removed in January 2005. Kits are available to remove the eyebrow windows from earlier 737-900s. An increased range version, the 737-900ER, was launched on July 18, 2005. Its maximum takeoff weight rose to 187,800 lb (85,185 kg); maximum zero-fuel weight, 149,500 lb (67,812 kg); maximum landing weight, 157,400 lb (71,395 kg); and range, 3,200 nautical miles (3,682 mi, 5,926 km) with 180 passengers.

- **Boeing Business Jet:** The business jet was launched on July 2, 1996, as a joint venture between Boeing and General Electric. It is a corporate version of the 737-700. While between eight and 63 passengers will be typically accommodated, the plane can be configured to seat as many as 100. There is an integrated GPS and SATCOM. The range is 6,200 nautical mile (nm) (7,139 mi, 4,437 km). Three auxiliary tanks offer an increase in range of 4,830 nm (5,562 mi, 3,456 km).

System

Alternate Designation(s): B737-700; Boeing 737-700

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 128-149 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 33.63 m

Width (Wing Span): 34.32 m

Wing Area: 124.5 sq m

Height: 12.55 m

Cabin Length: 24.13 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 37,920 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 60,700 kg

Automotive

Engine Name: 2 x CFM International CFM56-7B

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 24,000 lb (10,676 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 26,036 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 542 knots (624 mph, 1,003 km/h)

Economical Cruise Speed: 523 knots (602 mph, 969 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 3,200 nm (3,685 mi, 5,926 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

B737-700 Launched in November 1993, this was the first of the Next Generation series to enter service. It accommodates 128-149 passengers. The aircraft is similar to the B737-600, though the wings have increased chord and span, lending more fuel capacity, better fuel efficiency and a longer range. The Boeing 737 is a narrow-body aircraft produced by Boeing Commercial Airplanes at its Renton Factory in Washington. Developed to supplement the 727 on short and thin routes, the twinjet retains the 707 fuselage cross-section and nose with two underwing turbofans. Envisioned in 1964, the initial 737-100 made its first flight in April 1967 and entered service in February 1968 with Lufthansa. The lengthened 737-200 entered service in April 1968. It evolved through four generations, offering several variants for 85 to 215 passengers. The -100/200 original variants were powered by Pratt & Whitney JT8D low-bypass engines and offered seating for 85 to 130 passengers. Launched in 1980 and introduced in 1984, the 737 Classic -300/400/500 variants were re-engined with CFM56-3 turbofans and offered 110 to 168 seats. Introduced in 1997, the 737 Next Generation (NG) -600/700/800/900 variants have updated CFM56-7s, a larger wing and an upgraded glass cockpit, and seat 108 to 215 passengers. The latest generation, the 737 MAX -7/8/9/10, powered by improved CFM LEAP high bypass turbofans and accommodating 138 to 204 people, entered service in 2017. Boeing Business Jet versions are produced since the 737NG, as well as military models. As of December 2019, 15,156 Boeing 737s have been ordered and 10,571 delivered. Actual backlog stands at 4,398 when including "additional criteria for recognizing contracted backlog with customers beyond the existence of a firm contract". Initially, its main competitor was the McDonnell Douglas DC-9, followed by its MD-80/MD-90 derivatives. It remained the highest-selling commercial jetliner until surpassed in total orders by the Airbus A320 family in October 2019. The current 737 MAX, designed to compete with the A320neo was grounded worldwide in March 2019 following two fatal crashes.

B737-300 (Boeing 737-300) American Cargo Transport Aircraft







Tiers:



Variants:

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System

Alternate Designation(s): B737-300; Boeing 737-300

Primary Function / Type: Cargo/Passenger Aircraft

Manufacturer: Boeing Commercial Airplanes

Crew: 2 (pilot, co-pilot)

Passengers: 149 passengers

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 33.40 m

Width (Wing Span): 28.88 m

Wing Area: 105.4 sq m

Height: 11.13 m

Cabin Length: 23.52 m

Cabin Width: 3.53 m

Cabin Height: 2.13 m

Cabin Volume: 131.28 cu m

Empty Weight: 31,630 kg

Maximum Payload: 15,998 kg

Maximum Takeoff Weight: 56,472 kg

Automotive

Engine Name: 2 x CFM International CFM56-3B-1 turbofan

Number of Engines: 2

Engine Type: Turbofan

Engine Power: 20,000 lb (9,072 kg) static thrust each

Standard Internal Fuel Capacity: 20,104 liters

Maximum Internal Fuel Capacity: 23,829 liters

Maximum Normal Operating Speed: 542 knots (624 mph, 1,003 km/h)

Maximum Cruise Speed: 491 knots (565 mph, 910 km/h)

Economical Cruise Speed: 419 knots (482 mph, 776 km/h)

Long Range Cruise Speed: 429 nokts (494 mph, 795 km/h)

Takeoff Safety Speed at Max Takeoff Weight: 148 knots (170 mph, 274 km/h)

Speed at Threshold at Maximum Landing Weight: 133 knots (153 mph, 246 km/h)

Climb Rate: at 100,000 lb (43,359 kg) 3,760 ft/min (1,146 m/min)

Maximum Range at Economical Cruise Speed: 1,580 nm (1,819 mi, 2,928 km)

Maximum Fuel at Long-Range Cruise Speed: w/19,150-lb (8,705-kg) payload 3,190 nm (3,673 mi, 5,911 km)

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Boeing engineer Mark Gregoire led a design team, which cooperated with CFM International to select, modify and deploy a new engine and nacelle that would make the 737-300 into a viable aircraft. They chose the CFM56-3B-1 high-bypass turbofan engine to power the aircraft, which yielded significant gains in fuel economy and a reduction in noise, but also posed an engineering challenge, given the low ground clearance of the 737 and the larger diameter of the engine over the original Pratt & Whitney engines. Gregoire's team and CFM solved the problem by reducing the size of the fan (which made the engine slightly less efficient than it had been forecast to be), placing the engine ahead of the wing, and by moving engine accessories to the sides of the engine pod, giving the engine a distinctive non-circular "hamster pouch" air intake. Earlier customers for the CFM56 included the U.S. Air Force with its program to re-engine KC-135 tankers. The passenger capacity of the aircraft was increased to 149 by extending the fuselage around the wing by 9 feet 5 inches (2.87 m). The wing incorporated several changes for improved aerodynamics. The wingtip was extended 9 in (23 cm), and the wingspan by 1 ft 9 in (53 cm). The leading-edge slats and trailing-edge flaps were adjusted. The tailfin was redesigned, the flight deck was improved with the optional EFIS (Electronic Flight Instrumentation System), and the passenger cabin incorporated improvements similar to those developed on the Boeing 757. The prototype −300, the 1,001st 737 built, first flew on February 24, 1984 with pilot Jim McRoberts. It and two production aircraft flew a nine-month-long certification program.

Tu-154B (Careless-B) Russian Jet Airliner







Tiers:



Variants:

- **Tu-154:** Tu-154 production started in 1970, and the first passenger flight was performed on 9 February 1972. Powered by Kuznetsov NK-8-2 turbofans, it carried 164 passengers. About 42 were built.
- **Tu-154A:** The first upgraded version of the original Tu-154, the A model, in production since 1974, added center-section fuel tanks and more emergency exits, while engines were upgraded to higher-thrust Kuznetsov NK-8-2U. Other upgrades include automatic flaps/slats and stabilizer controls and modified avionics. Max. takeoff weight – 94,000 kg (207,235 lb). There were 15 different interior layouts for the different domestic and international customers, seating between 144 and 152 passengers. To discern the A model from the base model note the spike at the junction of the fin and tail. This is a fat bullet on the A model, and a slender spike on the base model.
- **Tu-154B:** As the original Tu-154 and Tu-154A suffered wing cracks after a few years in service, a version with a new, stronger wing, designated Tu-154B, went into production in 1975. It also had an additional fuselage fuel tank, additional emergency exits in the tail. Also, the maximum takeoff weight increased to 98,000 kg (216,053 lb). Important to Aeroflot was the increased passenger capacity, hence lower operating costs. With the NK-8-2U engines the only way to improve the economics of the airplane was to spread costs across more seats. The autopilot was certified for ICAO Category II automatic approaches. Most previously built Tu-154 and Tu-154A were also modified into this variant, with the replacement of the wing. Maximum takeoff weight increased to 96,000 kg (211,644 lb). 111 were built.
- **Tu-154B-1:** Aeroflot wanted this version for increased revenue on domestic routes. It carried 160 passengers. This version also had some minor modifications to the fuel system, avionics, air conditioning, and landing gear. 64 were built from 1977 to 1978.
- **Tu-154B-2:** A minor modernization of Tu-154B-1. The airplane was designed to be converted from the 160 passenger version to a 180 passenger version by removing the galley. The procedure took about 2 1/2 hours. Some of the earlier Tu-154Bs were modified to that standard. Maximum takeoff weight increased to 98,000 kg (216,053 lb), later to 100,000 kg (220,462 lb). Some 311 aircraft were built, including VIP versions. A few remain in service.
- **Tu-154S:** The Tu-154S is an all-cargo or freighter version of the Tu-154B, using a strengthened floor, and adding a forward cargo door on the port side of the fuselage. The aircraft could carry nine Soviet PAV-3 pallets. Maximum payload – 20,000 kg (44,092 lb). There were plans for 20 aircraft, but only nine were converted, two from Tu-154 models and seven from Tu-154B models. Trials were held in the early 1980s and the aircraft was authorized regular operations in 1984. By 1997 all had been retired.
- **Tu-154M:** The Tu-154M and Tu-154M Lux are the most highly upgraded versions, which first flew in 1982 and entered mass production in 1984. It uses more fuel-efficient Soloviev D-30KU-154 turbofans. Together with significant aerodynamic refinement, this led to much lower fuel consumption hence longer range, as well as lower operating costs. The aircraft has new double-slotted (instead of triple-slotted) flaps, with an extra 36-degree position (in addition to existing 15, 28 and 45-degree positions on older versions), which allows reduction of noise on approach. It also has a relocated auxiliary power unit and numerous other improvements. Maximum takeoff weight increased first to 100,000 kg (220,462 lb), then to 102,000 kg (224,872 lb). Some aircraft are certified to 104,000 kg (229,281 lb). About 320 were manufactured. Mass production ended in 2006, though limited manufacturing continued as of January 2009. No new airframes have been built since the early 1990s, and production since then involved assembling aircraft from components on hand. Chinese Tu-154MD electronic intelligence aircraft carry a large-size synthetic aperture radar (SAR) under their mainframe.
- **Tu-154M-LK-1:** Cosmonaut trainer. This was a salon VIP aircraft modified to train cosmonauts to fly the Buran reusable spacecraft, the Soviet equivalent of the US Space Shuttle. The Tu-154 was used because the Buran required a steep descent, which the Tu-154 was capable of replicating. The cabin featured trainee workstations, one of which was identical to the Buran's flightdeck. The forward baggage compartment was converted into a camera bay, as the aircraft was used to train cosmonauts in observation and photographic techniques.

- **Tu-154M-ON monitoring aircraft:** Germany modified one of the Tu-154s it inherited from the former East German Air Force into an observation airplane. This aircraft was involved with the Open Skies inspection flights. It was converted at the Elbe Aircraft Plant (Elbe Flugzeugwerke) in Dresden, and flew in 1996. After 24 monitoring missions, it was lost in a mid-air collision in 1997. The Russians also converted a Tu-154M to serve as an Open Skies monitoring aircraft. They used the Tu-154M-LK-1, and converted it to a Tu-154M-ON. When not flying over North America, it is used to ferry cosmonauts. China is believed to have converted one Tu-154 to an electronic countermeasures aircraft.
- **Tu-154M-100:** Design of this variant started in 1994, but the first aircraft were not delivered until 1998. It is an upgraded version with Western avionics, including the Flight Management Computer, GPS, EGPWS, TCAS, and other modern systems. The airplane could carry up to 157 passengers. The cabin featured an automatic oxygen system and larger overhead bins. Three were produced, as payment of debts owed by Russia to Slovakia. Three aircraft were delivered in 1998 to Slovak Airlines, and sold back to Russia in 2003.
- **Tu-155:** A Tu-154 converted into a testbed for alternative fuels. It first flew in 1988 and was used until the fall of the Soviet Union, when it was placed in storage.
- **Tu-164:** Initial designation of the Tu-154M.
- **Tu-174:** Proposed stretched version of Tu-154.
- **Tu-194:** Proposed shortened version of Tu-154.

System

Alternate Designation(s): Tu-154B; NATO: Careless-B

Primary Function / Type: Jet Airliner

Manufacturer: Tupolev

Crew: 3 flight crew + 5 cabin crew

Passengers: 144-168 passengers

Number of Engines: 3

Number of Hard Points: INA

Dimensions

Length: 48.00 m

Height: 11.40 m

Wingspan: 37.55 m

Wing Area: 201.45 sq m

Cabin Volume: 163.2 cu m

Weight, Empty: 55,300 kg

Weight, Maximum Takeoff: 100,000 kg

Payload: 18,000 kg

Automotive

Engine Name: 3 x Kuznetsov NK-8-2U

Number of Engines: 3

Engine Type: Turbofan

Engine Power: 10,500 kg static thrust each

Maximum Internal Fuel Capacity: 47,000 liters

Maximum Speed: 950 km/h

Economical Speed: 900 km/h

Long-Range Speed: 850 km/h

Takeoff Safety Speed: 255 km/h

Landing at Threshold Speed: 225 km/h

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Tu-154B As the original Tu-154 and Tu-154A suffered wing cracks after a few years in service, a version with a new, stronger wing, designated Tu-154B, went into production in 1975. It also had an additional fuselage fuel tank, additional emergency exits in the tail. Also, the maximum takeoff weight increased to 98,000 kg (216,053 lb). Important to Aeroflot was the increased passenger capacity, hence lower operating costs. With the NK-8-2U engines the only way to improve the economics of the airplane was to spread costs across more seats. The autopilot was certified for ICAO Category II automatic approaches. Most previously built Tu-154 and Tu-154A were also modified into this variant, with the replacement of the wing. Maximum takeoff weight increased to 96,000 kg (211,644 lb). 111 were built. The Tupolev Tu-154 (Russian: Туполев Ту-154; NATO reporting name: "Careless") is a three-engine medium-range narrow-body airliner designed in the mid-1960s and manufactured by Tupolev. A workhorse of Soviet and (subsequently) Russian airlines for several decades, it carried half of all passengers flown by Aeroflot and its subsidiaries (137.5 million/year or 243.8 billion passenger km in 1990), remaining the standard domestic-route airliner of Russia and former Soviet states until the mid-2000s. It was exported to 17 non-Russian airlines and used as a head-of-state transport by the air forces of several countries. With a cruising speed of 850 kilometres per hour (530 mph) the Tu-154 is one of the fastest civilian aircraft in use and has a range of 5,280 kilometres (3,280 mi). Capable of operating from unpaved and gravel airfields with only basic facilities, it was widely used in the extreme Arctic conditions of Russia's northern/eastern regions where other airliners were unable to operate. Originally designed for a 45,000-hour service life (18,000 cycles) but capable of 80,000 hours with upgrades, it was expected to continue in service until 2016, although noise regulations have restricted flights to western Europe and other regions. Since 1968 there have been 39 fatal incidents involving the Tu-154, most of which were caused either by factors unrelated to the aircraft, incorrect maintenance, or by its extensive use in demanding conditions. Few of the Tu-154 accidents appear to have involved technical failure. The Tu-154 is powered by three rear-mounted low-bypass turbofan engines arranged similarly to those of the Boeing 727, but it is slightly larger than its American counterpart. Both the 727 and the Tu-154 use an S-duct for the middle (Number 2) engine. The original model was equipped with Kuznetsov NK-8-2 engines, which were replaced with Soloviev D-30KU-154 in the Tu-154M. All Tu-154 aircraft models have a relatively high thrust-to-weight-ratio which give excellent performance, at the expense of lower fuel efficiency. This became an important factor in later decades as fuel costs grew. The cockpit is fitted with conventional dual yoke control columns. Flight control surfaces are hydraulically operated. The cabin of the Tu-154, although of the same six-abreast seating layout, gives the impression of an oval interior, with a lower ceiling than is common on Boeing and Airbus airliners. The passenger cabin accommodates 128 passengers in a two-class layout and 164 passengers in single-class layout, and up to 180 passengers in high-density layout. The layout can be modified to what is called a winter version where some seats are taken out and a wardrobe is installed for passenger coats. The passenger doors are smaller than on its Boeing and Airbus counterparts. Luggage space in the overhead compartments is very limited. Like the Tupolev Tu-134, the Tu-154 has a wing swept back at 35° at the quarter-chord line. The British Hawker Siddeley Trident has the same sweepback angle, while the Boeing 727 has a slightly smaller sweepback angle of 32°. The wing also has anhedral (downward sweep) which is a distinguishing feature of Russian low-wing airliners designed during this era. Most Western low-wing airliners such as the

contemporary Boeing 727 have dihedral (upward sweep). The anhedral means that Russian airliners have poor lateral stability compared to their Western counterparts, but also are more resistant to Dutch roll tendencies. Considerably heavier than its predecessor Soviet-built airliner the Ilyushin Il-18, the Tu-154 was equipped with an oversized landing gear to reduce ground load, enabling it to operate from the same runways. The aircraft has two six-wheel main bogies fitted with large low-pressure tires that retract into pods extending from the trailing edges of the wings (a common Tupolev feature), plus a two-wheel nose gear unit. Soft oleo struts (shock absorbers) provide a much smoother ride on bumpy airfields than most airliners, which very rarely operate on such poor surfaces. The original requirement was to have a three-person flight crew – captain, first officer and flight engineer – as opposed to a four- or five-person crew, as on other Soviet airliners. It became evident that a fourth crew member, a navigator, was still needed, and a seat was added on production aircraft, although their workstation was compromised due to the limitations of the original design. Navigators are no longer trained and this profession is becoming obsolete with the retirement of the oldest Soviet-era planes. The latest variant (Tu-154M-100, introduced 1998) includes an NVU-B3 Doppler navigation system, a triple autopilot, which provides an automatic ILS approach according to ICAO category II weather minima, an autothrottle, a Doppler drift and speed measure system (DISS), and a "Kurs-MP" radio navigation suite. A stability and control augmentation system improves handling characteristics during manual flight. Modern upgrades normally include modernised TCAS, GPS, and other systems (mostly American-made or EU-made). Early versions of the Tu-154 cannot be modified to meet the current Stage III noise regulations and are no longer allowed to fly into airspace where such regulations are enforced, such as the European Union. However, the Tu-154M's D-30 engines can be fitted with hush kits, allowing them to meet noise regulations.

→→Reconnaissance Aircraft

JZ-6 Chinese Reconnaissance Fighter Aircraft







Tiers:

1 2 3 4

System

Alternative Designations: JZ-6
Crew: 1 (pilot)
Vertical Climb Rate (m/s): 152+
Max “G” Force (g): 8
Ceiling (m): 19870
Note: Dedicated reconnaissance version with fuselage camera pack replacing cannon.

↳*Engines*

5,732 lbs. thrust Shenyang Wopen-6 turbojets (7,165 lbs. thrust with afterburner): 2

↳*Weight (kg)*

↳*Speed (km/h)*

Cruise: 950

↳*Fuel (liters)*

Internal: 2170
External (2 drop tanks): 800 or 1,520

↳*Range (km)*

Normal: 1390
With 2 x 760 L drop tanks: 2200

↳*Dimensions (m)*

Wingspan: 9.2
Height: 3.9

↳*Hardpoints*

Underwing: 6

↳*Survivability/Countermeasures*

Martin-Baker zero/zero ejection seats: Yes
Cockpit is pressurized: Yes
Fluid anti-icing system for windscreen: Yes
Tail warning system: Yes

ARMAMENT

30-mm automatic cannons: 3
250 kg Bombs, or: 2
400-L drop tanks, or: 2
760-L drop tanks, or: 2
CAA-1B AAM: 2

↳*Inboard Stations*

8 x 57-mm rockets, or: 4
16 x 57-mm rockets, or: 4
7 x 90-mm rockets, or: 4
Gun pods, or: 4
Practice bomb: 4

AVIONICS/SENSOR/OPTICS

Airborne interception radar: Yes
VHF transceiver: Yes
Blind-flying equipment,: Yes
Radio compass: Yes
Radio altimeter: Yes
Night/Weather Capabilities: No

VARIANTS

↳*J-6*

Description: EQUIVALENT OF THE MIG-19S/SF DAYTIME FIGHTER WITH 3 X 30 MM GUNS, ONE AT EACH WING ROOT AND ONE ON THE FUSELAGE.

↳*J-6A*

Description: EQUIVALENT OF THE MIG-19PF ALL-WEATHER FIGHTER. ARMED WITH STANDARD J-6 GUNS AND ROCKETS.

↳*J-6B*

Description: EQUIVALENT OF THE MIG-19PM ALL-WEATHER FIGHTER. ARMED WITH THE AA-1 ALKALI RADAR HOMING MISSILES, NO GUNS.

↳*J-6C*

Description: SIMILAR TO THE J-6, BUT WITH BRAKE CHUTE HOUSED IN BULLET-FARING AT THE BASE OF TAILFIN. SAME GUNS AS THE J-6A. EXPORT VARIANT WITH MARTIN-BAKER EJECTION SEATS AND AIM-9 SIDEWINDER MISSILES.

↳*J-6XIN*

Description: SIMILAR TO J-6A, BUT WITH NOSE-MOUNTED INTERCEPTION RADAR. SAME GUNS AS THE J-6A.

↳*JJ-6*

Description: TRAINER VERSION WITH TANDEM TWO-SEAT COCKPIT. EXPORT VERSIONS ARE FT-6. ARMED WITH ONLY THE FUSELAGE GUN.

↳*JZ-6*

Description: A TACTICAL PHOTO-RECONNAISSANCE VERSION, ARMED WITH WING ROOT GUNS ONLY.

↳*F-6*

Description: EXPORT VERSIONS.

Notes:

Shenyang JZ-6 – (Jianjiji Zhenchaji – reconnaissance fighter) Dedicated reconnaissance version with fuselage camera pack replacing cannon. As of April 2006, it was reported that the PLAAF 3rd Recon Regiment, 26 Air Division based in Nanjing MR, is the last regiment to actively fly the JZ-6 refusing to convert to JZ-8F. Exported as the Shenyang FR-6. The Shenyang J-6 (Chinese: □-6; designated F-6 for export versions; NATO reporting name: Farmer) is the Chinese-built version of the Soviet MiG-19 'Farmer' fighter aircraft, the world's first mass-produced supersonic aircraft. Although the MiG-19 had a comparatively short life in Soviet service, the Chinese came to value its agility, turning performance, and powerful cannon armament, and produced it for their own use between 1958 and 1981. While the basic Soviet-built MiG-19 has been retired from all nations, the Shenyang J-6 still flies for nine of its original 15 operators, however, in a very limited capacity. The J-6 airframe contributed to the Chinese ground attack version, the Q-5, which still flies for numerous nations. The J-6 was considered "disposable" and was intended to be operated for only 100 flight hours (or approximately 100 sorties) before being overhauled. The Pakistan Air Force was often able to extend this to 130 hours with diligent maintenance. The J-6 has a maximum speed at altitude of 1,540 km/h (960 mph), Mach 1.45. Service ceiling is 17,900 m (58,700 ft). Combat radius with two drop tanks is about 640 km (400 mi). Powerplant is two Liming Wopen-6A (Tumansky R-9) turbojet engines. In addition to the internal cannon armament, most have provision for four wing pylons for up to 250 kg (550 lb) each, with a maximum ordnance load of 500 kg (1,100 lb). Typical stores include unguided bombs, 55 mm rocket pods, or PL-2/PL-5 (Chinese versions of Soviet K-13 (NATO AA-2 'Atoll') air-to-air missiles.

JZ-8F (Finback-B) Chinese Reconnaissance Fighter Aircraft



Tiers:

1 2 3 4

Variants:

- **J-8 (Finback-A) Series:** J-8 First flew on 5 July 1969. Initial day fighter variant, resembles an enlarged MiG-21. Equipped with 2 x WP-7A turbojet engines, SR-4 ranging radar 2 x Type 30-I 30mm cannon (200 rounds each), and 2 x PL-2 IR-guided AAMs. Limited production. J-8I First flew on 24 April 1981. Improved all-weather version with SL-7A fire-control radar (40 km range), twin-barrel Type 23-III 23 mm cannon, & up to 4 AAMs (or rockets/bombs). Limited production. J-8E Final version of the J-8I series. J-8E is equipped with a type 204 (JL-7) mono-pulse fire-control radar with look down shot down capability, SM-8A aeronautical optical gun-sight, onboard computer, new cockpit panel, and redesign ejection escape system and oxygen supply system. The original two Type 30-I 30mm cannons were replaced by two Type 23-III 23mm cannons. The four under-wing stores stations are capable of carrying the more advanced PL-5 series short-range AAM. These aircraft were also fitted with an improved electronic countermeasures (ECM) suite including KJ-8602B all-aspect radar warning receiver (RWR). JZ-8 (J-8R) Reconnaissance version of J-8 or J-8I. J-8ACT First flew on 24 June 1990, fly-by-wire testbed aircraft.
- **J-8II (Finback-B) Series:** J-8II (Finback-B) First flown on 12 June 1984, the improved J-8I prototype with redesigned nose/front section and fuselage. replacing the nose air inlet with a solid nose and lateral air intakes, similar to those of the MiG-23. China received several MiG-23s in the late 1970s from Egypt and the hinged ventral fin and lateral intakes indicate probable reverse engineering from the MiG-23. Equipped with Type 208 (SL-4A) monopulse radar (40 km range). J-8II Batch 02 (J-8IIB) First flew in November 1989, improved J-8II with SL-8A (Type 208?) PD radar (70 km range). Powered by 2 x WP-13AII turbojet engines. Armed with twin-barrel 23mm Type 23-III cannon (copy of GSh-23L) and up to 4 PL-5 or PL-8 AAMs (or rockets/bombs). No BVR capability. Peace Pearl J-8 (J-8II) During the Sino-US cooperation era, up to 50 J-8IIs were to be delivered to the US for upgrades and installation of AN/APG-66(v) radar and fire control system for US$500 million, under the Peace Pearl programme. However, the project was cancelled and only about 24 J-8II were produced. USAF Air Force Flight Test Center (6510 Squadron) took the task of test flight of modified J-8II. -8IIACT (J-8II-BW2. First flew in 1988, fly-by-wire testbed and technology demonstrator. J-8IID (J-8D) First flew on 21 November 1990, modified J-8B with fixed refuelling probe and updated avionics such as TACAN navigation system. F-8IIM Unveiled in Zhuhai Air Show 1996, export version of J-8B with Russian Phazotron Zhuk-8II PD radar (75 km range, and able to track up to ten airborne targets and attack two of them simultaneously), R-27R1 (AA-10) AAM and Kh-31P anti-radiation missile. The F-8IIM was to be powered by two, more powerful WP-13B turbojet engines. This aircraft is often mistakenly referred to as the "J-8IIM" with Kh-31A anti-ship missile (ASM) capability, but its radar lacked sea search mode for anti-shipping role. The F-8IIM failed to attract any export customers and no domestic orders. Conversion from older airframe was reportedly much fewer than the 100 units of Zhuk-8II radar delivered, and the conversion might have only been an experimental programme with none entering service. The F-8IIM fighter will probably be equipped with Russia's or China's helmet sight and advanced PL-9 and P-73 missiles. Phazotron, a Russian firm, has signed contracts with China to provide 150–200 improved Zhuk radars mainly in support of China's new F-8II fighter. J-8III (J-8C) Upgraded J-8II with FBW system and 2 x WP-14 power plants. Compared to the J-8II, the J-8C had a number of improvements including a new multi-mode pulse Doppler radar which was reportedly based on the Israeli Elta EL/M 2035 radar technology. The aircraft was also equipped with a digital fire-control system and a new 'glass' cockpit with multifunctional displays (MFD). The J-8C programme entered full scale development around 1991 and the aircraft first flew successfully on 12 December 1993. Development halted in favour of other version described below, but was used to test new radars such as Type 1471 (KLJ-1) and other avionics associated with FBW system. From this version on, electronic warfare pods such as BM/KG300G and KZ900, as well as navigational / targeting pods including Blue Sky navigation pod and FILAT become operational on J-8II. Canceled after 2nd testbed had crashed. J-8IIF (J-8F) It is reported that during 2006–2008, J-8II production suffered major setback due to engine problem. J-8IIG Modified J-8II with tail hook and other improvements for developmental work on ship-borne aircraft for carrier operations, such as in April 1987, evaluating & testing the Chinese reverse-engineered steam catapult from that of HMAS Melbourne (R21), which

was finally confirmed 27 years later in April 2014 by CCTV-13. Both the take-off and landing were conducted on land with the reverse engineered steam catapult installed on the beach, and the test pot was PLANAF pilot Li Guoqiang (□□□). Experience gained was applied to Shenyang J-15. J-8G An advanced modified variant of the J-8II tasked with the suppression of enemy air defence (SEAD) mission was said to have been developed by the SAC in the 2000s. The aircraft, reportedly designated J-8G, was said to be capable of carrying two indigenous YJ-91 anti-radiation missile and electronic warfare suite to attack enemy radar stations. J-8IIM (2006) At Zhuhai Air Show 2006, a new variant "J-8IIM" was put on display with upgraded systems similar to the J-8H. The most significant improvement is the radar upgrade with a new Type 1471 domestic radar used by the J-8H. In comparison to F-8IIM's Russian Zhuk-8II radar, the Type 1471 radar has a number of performance enhancements: Type 1471 radar has 75 km maximum range for targets with 3 square meters RCS, in comparison to Zhuk-8II's 70 km maximum range against target of 5 square meters RCS. Additional ability to handle sea-borne targets that Zhuk-8II does not have. For sea targets with 50 square metres RCS, the max range is greater than 100/80 km for sea state 1/2. Simultaneously tracking 10 targets and display 8 most threatening ones out of the 10 on displays, engaging 2 out the 8. Air-to-Air modes: VS (Velocity Search), RWS (Recon./Search while Scan), TWS (Track While Scan), STT (Single Target Tracking), Air Combat Mode (ACM). AMTI, (aerial moving target indication) mode which is used to discover hovering helicopters can be added upon customer request, though this does not come as standard feature. Air-to-Ground modes: Mapping (Real Beam Mapping RBM), Mapping Expansion/Freezing (EXP/FRZ), Doppler Beam Sharpening (DBS), Ground Moving Target Indication (GMTI), Sea Single Target Tracking (SSTT), Air-to-Ground Ranging (AGR). An improved beacon navigation (BCN) and weather (WX) capability. JZ-8F A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon. J-8T Upgraded J-8 with JL-10A X-band radar. Export variant, F-8T, has WP-13B-II engines. China National Aero-Technology Import & Export Corporation claims J-8T is equipped with improved integrate avionic and various guided weapons. J-8T can carry out air-to-air BVR intercepting mission, air-to-ground precise attacking mission and stand-off attacking mission. J-8DF J-8D upgraded to J-8F standard. Lack of cooling duct below intake. Can fire PL-12 and PL-8 missiles.

System

Alternate Designation(s): JZ-8F; NATO: Finback-B

Primary Function / Type: Reconnaissance Fighter Aircraft

Manufacturer: Shenyang Aircraft Corporation

Crew: 1

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 21.39 m

Width (Wing Span): 9.344 m

Height: 5.41 m

Wing Area: 42.2 m2

Airfoil: TsAGI S-12 (4.2%) ; tip: TsAGI S-12 (5%)

Empty Weight: 10,371 kg

Gross Weight: 15,288 kg

Maximum Takeoff Weight: 18,879 kg

Automotive

Engine Name: 2 × Guizhou WP-13B afterburning turbojet engines

Number of Engines: 2

Engine Type: Afterburning Turbojet Engine

Engine Power: 47.1 kN (10,580 lbf) thrust each dry, 68.6 kN (15,430 lbf) with afterburner

Maximum Speed: 2,300 km/h

Combat Range: 1,000 km (620 mi, 540 nmi) radius with 3x drop tanks

Combat Radius: 900 km

Service Ceiling: 18,000 m

G LImits: +4.7 sustained at 5,000 m

Unstick Speed: 330 km/h

Take-Off Run: 630 m

Touchdown Speed: 224 km/h

Landing Speed: 900 m

Main Gun System

Note: A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon.

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

JZ-8F A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon. The Shenyang J-8 (Chinese: □-8; NATO reporting name: Finback) is a high-speed, high-altitude Chinese-built single-seat interceptor fighter aircraft. The effort to develop an all-weather interceptor began in full in 1964 and this produced the first Chinese-designed and built jet fighter to combat new, high altitude threats such as the B-58 Hustler bomber, F-105 Thunderchief fighter-bomber and Lockheed U-2 spy plane. In 1964 the People's Liberation Army Air Force requested an aircraft from Shenyang Aircraft Corporation and the 601 Institute to develop a fighter/interceptor to counter bombers and spy planes as the newly introduced Chengdu J-7 (a reverse-engineered MiG-21) was incapable of doing so. The prototype took its maiden flight in 1969. Despite the mid-1960s origins of the J-8, due to the political turmoil of the Great Proletarian Cultural Revolution, the J-8 was not produced until 1979 and entered service in 1980. Its basic configuration resembles an enlargement of the delta-winged J-7, utilizes two Liyang (LMC) Wopen-7A turbojet engines, and features a maximum speed of Mach 2.2. The twin-engined J-8 competed with rival Chengdu Aircraft Industry Group's single turbofan engine, canard-delta J-9 project and ultimately emerged as the victor largely due to the existing availability of the former's MiG-21 based powerplant and proven layout, while the J-9 project was cancelled in 1980 due to difficulty in creating a suitably powerful engine. In order to house a large radar set, the design called for a solid nose and variable geometry side air intakes. However, the lack of familiarity with this type of intake meant the J-8 had to settle for a MiG-21 style nose intake. The solid nose J-8 was finally realized in the J-8II (Finback-B), which was based on the layout of the J-8I (same improvement is like the J-6 to Q-5). The radar chosen for the J-8 was the Type 204 mono-pulse fire-control radar, a primitive ranging radar for daylight within-visual-range operations. The performance of the radar fell well short of the PLAAF's requirements as research into a more capable fire control radar and power source proved difficult and time-

consuming. The aircraft was originally armed with cannons and seven hardpoints for missiles, bombs, rockets or fuel tanks. The original weapons layout of the J-8 was two 30 mm Type 30-1 cannons after initial problems with the 30 mm Type 30-II four-barrel Gatling gun. The J-8 was also planned to be armed with the experimental PL-4 medium ranged missile but technical issues and political upheavals prevented any in-depth development and the project was cancelled in 1985 citing unsatisfactory performance. Therefore, the PL-2 IR-homing short-range air-to-air missile (SRAAM) was used instead. Unguided bombs and rockets can also be carried on the J-8. And nowadays with the development of light-weight military nuclear weaponry, the J-8II will now be able to carry missiles with nuclear warheads. Despite entering service relatively recently, it was comparable to many older Soviet fighter designs, with limited maneuverability. The original combat avionics package was soon replaced with an all-weather capability in aircraft designated J-8I (Finback-A). The J-8I (later redesignated as the J-8A) received a new gun sight, onboard computer, new cockpit design and redesigned ejection escape system and oxygen supply system. The gun armament was also changed from two 30 mm cannons to a single 23 mm twin-barreled cannon and the PL-5 short ranged AAM was also equipped. The later J-8E featured improved electronic warfare systems. The unsatisfactory performance of the J-8I led to a very short production run of 20–50 aircraft and the J-8I has slowly began being phased out as early as the 1990s. A tactical reconnaissance variant of the J-8, known as the JZ-8 was developed in the mid 1980s to take advantage of the J-8s few favourable qualities, most notably its capability of reaching high speeds and altitudes to replace the Shenyang JZ-6 in the tactical reconnaissance role. Using an under-fuselage reconnaissance pod with a KA-112A long focal-length optical camera, the JZ-8 usually operates at heights ranging from ~9,500m-15,000m during reconnaissance missions. By 1982 work began to replace the unimpressive J-8I type with a new design known as the J-8II. The new 1982 requirements from the PLAAF demanded being capable of beyond visual range combat (BVR) with the use medium ranged missiles (MRAAM) and secondary ground attack capabilities. In terms of performance, the aircraft was expected to have better aerodynamic performance at medium to low altitudes and at transonic speeds.

HZ-5 Chinese Reconnaissance Aircraft



Tiers:



Variants:

- **Il-28 Beagle:** This was the original Soviet light bomber from which the H-5 is derived. See separate database entry.
- **H-5:** This is the basic bomber in a three-seat configuration.
- **HD-5 electronic warfare aircraft:** This variant was designed for electronic warfare missions. The twin 23-mm cannon turret was removed to make room for the electronic warfare/electronic countermeasures suite. The EW/ECM suite, which reportedly utilized only analog technology, could intercept, identify and jam hostile land-based or shipborne radar emitters. The HD-5 usually operated in groups of three to cover all frequency spectrums. Despite its aging technology, the powerful jammer onboard the aircraft was said to be very effective. The HD-5 was replaced by a more capable EW/electronic intelligence platform based on the Y-8 airframe.
- **HJ-5 Mascot:** This was a two-seat trainer version. First flight occurred in December 1970, and it entered service in 1972. The type was retired in 1986.
- **HZ-5:** This was a three-seat reconnaissance version.

System

Alternate Designation(s): HZ-5
Primary Function / Type: Photographic Reconnaissance Aircraft
Manufacturer: Harbin Aircraft Manufacturing Corp., Harbin, China
Crew: 3 (pilot, navigator, radio operator/gunner)
Number of Engines: 2
Number of Hard Points: 4

Dimensions

Length: 17.65 m
Height: 6.68 m
Width (Wing Span): 21.45 m
Wing Area: 60.87 m sq
Weight, Empty: 12,890 kg
Weight, Maximum Takeoff: 21,200 kg
Weight, Maximum Weapons Load: 3,000 kg
Weight, Normal Weapons Load: 1,000 kg

Automotive

Engine Name: 2 x Wopen-5
Number of Engines: 2
Engine Type: Turbojet
Engine Power: 5,952 lb (2,700 kg) static thrust each
Fuel Capacity: 7,910 liters
Maximum Speed: 900 km/h
Cruising Speed: 769 km/h
Ceiling: 12,500 m
Rate of Climb: 900 m/min
Maximum Range: 3,550 km
Radius: 1,100 km

Main Gun System

↳*System*

Name: Nudelman-Rikhter NR-23
Type: Autocannon
Caliber: 23mm
Quantity: 4 x 23-mm NR-23 cannon (2 fixed in nose and two in tail position)
Length: 1,980 mm
Barrel Length: 1,450 mm
Width: 165 mm
Height: 136 mm
Weight: 39 kg
Barrels: 1
Action: Short recoil
Rate of Fire: 800–850 rpm
Muzzle Velocity: 690 m/s

↳*Ammunition*

Type: Rifle
Caliber: 23mm
Cartridge: INA
Basic Load: 650 Rounds

Bombing System

Note: The fuselage Bomb Bay has been modified to support 2 large medium-High Altitude day and night aerial cameras.

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Laser Desingator: INA

Photo Reconnaissance System: The main modifications were the addition of 2 large medium-high altitude day and night, aerial cameras inside the fuselage bomb bay and wing integral fuel tanks.

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

HZ-5 This was a photographic reconnaissance aircraft retrofitted from a H-5 prototype aircraft. Its design was started in December 1970 and was certificated in 1977. The main modifications were the addition of 2 large medium-high altitude day and night, aerial cameras inside the fuselage bomb bay and wing integral fuel tanks. Compared with the prototype aircraft its range was increased by 47 per cent, combat radius by 50 per cent and endurance by 1 hour and 23 minutes. The success of the HZ-5 filled a gap in the field of short / medium reconnaissance aircraft.

MiG-25 (Foxbat) Russian Supersonic Interceptor and Reconnaissance Aircraft





Tiers:



Variants:

- **MIG-25 FOXBAT-A:** STANDARD INTERCEPTOR VERSION. WITHDRAWN FROM SERVICE IN RUSSIA IN THE 1990S.
- **MIG-25R FOXBAT-B:** RECONNAISSANCE VERSION.
- **MIG-25RB FOXBAT-B:** RECONNAISSANCE-BOMBER VERSION BUILT IN 1970.
- **MIG-25U FOXBAT-C:** TWO-SEAT TRAINER VERSION.
- **MIG-25RBK FOXBAT-D::** RECONNAISSANCE-BOMBER VERSION WITH SLAR.
- **MIG-25P/PD FOXBAT-E:** INTERCEPTOR WITH IMPROVED RADAR THAT HAS LIMITED LOOK-DOWN/SHOOT-DOWN CAPABILITY, IR SENSOR UNDER THE NOSE, AND UPGRADED ENGINE.
- **MIG-25BM FOXBAT-F:** FIGHTER/ATTACK VERSION WITH AS-11 KILTER ANT-RADAR MISSILES AND FREE-FALL BOMBS TO ATTACK GROUND BASED AIR DEFENSE FROM HIGH ALTITUDES.

System

Alternative Designation: Mig-25 RB FOXBAT-B/ MiG-25PD FOXBAT-E
Crew: 1.0
Weight, Empty : kg20000.0
Weight, Maximum Gross : kg4120 (R Series version); 36720 (P Series version)
Weight, Normal Takeoff : kg35060.0

↳*Avionics/Sensor/Optics*

Type 1: Fire control radar in the nose, range 100 km, tracking 75 km

↳*Dimensions*

Height : m6 (R Series version); 6.1 P Series version)
Length : m21.6 (R Series version); 23.8 (P Series version)
Width, Wingspan : m13.4 (R Series version); 14 (P Series version)

↳*Fuel and Load*

Fuel Capacity, External : liters5300.0
Fuel Capacity, Internal : liters17470.0
Weight, Standard Payload, External : kg2000-5000

↳*Survivability/Countermeasures*

Type 1: pressurized cockpit with zero/130 – 1,250 km hour ejection seats

Type 2: Decoys:

Type 3: Radar jammer:

Type 4: radar and missile warning receivers:

Performance

Ceiling : m2300 (R Series version); 20700 (P Series version)

Power Plant/Engine: 19,400 lbs (2 ea.) thrust Soyuz/ Tumansky R-15BD-300 turbojet (24,692 lbs. thrust with afterburner)

Speed, Cruising : km/h2500 (R Series version); 3000 (P Series version)

Speed, Landing : km/h360 (R Series version); 290 (P Series version)

Speed, Maximum "G" Force : g4.5

Speed, Maximum, at altitude : km/h3000 (R Series version); 3390 (P Series version)

Speed, Maximum, low or sea level : km/h1200 (R Series version); 1050 (P Series version)

Takeoff Run/Landing Roll : m1250/800 (P Series)

Vertical Climb Rate : m/s208 (P Series version)

Armament

↳*Hardpoint/Weapon Station 1*

Location: wing

Quantity : ea4.0

↳*Hardpoint/Weapon Station 2*

Location: fuselage

Quantity : ea6.0

↳*Mixed Ordnance 1*

Combat Load : rds4.0

Name: AA-6 ACRID

Type: AAM

↳*Mixed Ordnance 2*

Combat Load : rds4.0

Name: AA-7

Type: AAM

↳*Mixed Ordnance 3*

Combat Load : rds2 and 4

Name: AA-6 ACRID w/ AA-8 APHID/AA- 11 ARCHER

Type: AAM

↳***Mixed Ordnance 4***

Combat Load : rds2 and 4

Name: AA-7 APEX w/ AA-8 APHID/AA-11 ARCHER

Type: AAM

Notes:

The Mikoyan-Gurevich MiG-25 (Russian: Микоян и Гуревич МиГ-25; NATO reporting name: Foxbat) is a supersonic interceptor and reconnaissance aircraft that was among the fastest military aircraft to enter service. It was designed by the Soviet Union's Mikoyan-Gurevich bureau and is one of the few combat aircraft built primarily using stainless steel. It was the last plane designed by Mikhail Gurevich before his retirement. The first prototype flew in 1964, and the aircraft entered service in 1970. It has an operational top speed of Mach 2.83 (Mach 3.2 is possible but at risk of significant damage to the engines) and features a powerful radar and four air-to-air missiles. When first seen in reconnaissance photography, the large wing suggested an enormous and highly maneuverable fighter, at a time when U.S. design theories were also evolving towards higher maneuverability due to combat performance in the Vietnam War. The appearance of the MiG-25 sparked serious concern in the West and prompted dramatic increases in performance for the McDonnell Douglas F-15 Eagle then under development in the late 1960s. The capabilities of the MiG-25 were better understood in 1976 when Soviet pilot Viktor Belenko defected in a MiG-25 to the United States via Japan. It turned out that the aircraft's weight necessitated its large wings. Production of the MiG-25 series ended in 1984 after completion of 1,186 aircraft. A symbol of the Cold War, the MiG-25 flew with Soviet allies and former Soviet republics, remaining in limited service in several export customers. It is one of the highest-flying military aircraft, one of the fastest serially produced interceptor aircraft, and the second-fastest serially produced aircraft after the SR-71 reconnaissance aircraft that was built in very small series compared to the MiG-25. As of 2018, the MiG-25 remains the fastest manned serially produced aircraft in operational use and the fastest plane that was offered for supersonic flights and edge-of-space flights to civilian customers.

Y-8H1 Chinese Reconnaissance Aircraft





Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport

noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8H1

Primary Function / Type: Reconnaissance Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8H This is an aerial survey and photography variant. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

JZ-8 (J-8R) Chinese Reconnaissance Fighter Aircraft







Tiers:



Variants:

- **J-8 (Finback-A) Series:** J-8 First flew on 5 July 1969. Initial day fighter variant, resembles an enlarged MiG-21. Equipped with 2 x WP-7A turbojet engines, SR-4 ranging radar 2 x Type 30-I 30mm cannon (200 rounds each), and 2 x PL-2 IR-guided AAMs. Limited production. J-8I First flew on 24 April 1981. Improved all-weather version with SL-7A fire-control radar (40 km range), twin-barrel Type 23-III 23 mm cannon, & up to 4 AAMs (or rockets/bombs). Limited production. J-8E Final version of the J-8I series. J-8E is equipped with a type 204 (JL-7) mono-pulse fire-control radar with look down shot down capability, SM-8A aeronautical optical gun-sight, onboard computer, new cockpit panel, and redesign ejection escape system and oxygen supply system. The original two Type 30-I 30mm cannons were replaced by two Type 23-III 23mm cannons. The four under-wing stores stations are capable of carrying the more advanced PL-5 series short-range AAM. These aircraft were also fitted with an improved electronic countermeasures (ECM) suite including KJ-8602B all-aspect radar warning receiver (RWR). JZ-8 (J-8R) Reconnaissance version of J-8 or J-8I. J-8ACT First flew on 24 June 1990, fly-by-wire testbed aircraft.
- **J-8II (Finback-B) Series:** J-8II (Finback-B) First flown on 12 June 1984, the improved J-8I prototype with redesigned nose/front section and fuselage. replacing the nose air inlet with a solid nose and lateral air intakes, similar to those of the MiG-23. China received several MiG-23s in the late 1970s from Egypt and the hinged ventral fin and lateral intakes indicate probable reverse engineering from the MiG-23. Equipped with Type 208 (SL-4A) monopulse radar (40 km range). J-8II Batch 02 (J-8IIB) First flew in November 1989, improved J-8II with SL-8A (Type 208?) PD radar (70 km range). Powered by 2 x WP-13AII turbojet engines. Armed with twin-barrel 23mm Type 23-III cannon (copy of GSh-23L) and up to 4 PL-5 or PL-8 AAMs (or rockets/bombs). No BVR capability. Peace Pearl J-8 (J-8II) During the Sino-US cooperation era, up to 50 J-8IIs were to be delivered to the US for upgrades and installation of AN/APG-66(v) radar and fire control system for US$500 million, under the Peace Pearl programme. However, the project was cancelled and only about 24 J-8II were produced. USAF Air Force Flight Test Center (6510 Squadron) took the task of test flight of modified J-8II. -8IIACT (J-8II-BW2. First flew in 1988, fly-by-wire testbed and technology demonstrator. J-8IID (J-8D) First flew on 21 November 1990, modified J-8B with fixed refuelling probe and updated avionics such as TACAN navigation system. F-8IIM Unveiled in Zhuhai Air Show 1996, export version of J-8B with Russian Phazotron Zhuk-8II PD radar (75 km range, and able to track up to ten airborne targets and attack two of them simultaneously), R-27R1 (AA-10) AAM and Kh-31P anti-radiation missile. The F-8IIM was to be powered by two, more powerful WP-13B turbojet engines. This aircraft is often mistakenly referred to as the "J-8IIM" with Kh-31A anti-ship missile (ASM) capability, but its radar lacked sea search mode for anti-shipping role. The F-8IIM failed to attract any export customers and no domestic orders. Conversion from older airframe was reportedly much fewer than the 100 units of Zhuk-8II radar delivered, and the conversion might have only been an experimental programme with none entering service. The F-8IIM fighter will probably be equipped with Russia's or China's helmet sight and advanced PL-9 and P-73 missiles. Phazotron, a Russian firm, has signed contracts with China to provide 150–200 improved Zhuk radars mainly in support of China's new F-8II fighter. J-8III (J-8C) Upgraded J-8II with FBW system and 2 x WP-14 power plants. Compared to the J-8II, the J-8C had a

number of improvements including a new multi-mode pulse Doppler radar which was reportedly based on the Israeli Elta EL/M 2035 radar technology. The aircraft was also equipped with a digital fire-control system and a new 'glass' cockpit with multifunctional displays (MFD). The J-8C programme entered full scale development around 1991 and the aircraft first flew successfully on 12 December 1993. Development halted in favour of other version described below, but was used to test new radars such as Type 1471 (KLJ-1) and other avionics associated with FBW system. From this version on, electronic warfare pods such as BM/KG300G and KZ900, as well as navigational / targeting pods including Blue Sky navigation pod and FILAT become operational on J-8II. Canceled after 2nd testbed had crashed. J-8IIF (J-8F) It is reported that during 2006–2008, J-8II production suffered major setback due to engine problem. J-8IIG Modified J-8II with tail hook and other improvements for developmental work on ship-borne aircraft for carrier operations, such as in April 1987, evaluating & testing the Chinese reverse-engineered steam catapult from that of HMAS Melbourne (R21), which was finally confirmed 27 years later in April 2014 by CCTV-13. Both the take-off and landing were conducted on land with the reverse engineered steam catapult installed on the beach, and the test pot was PLANAF pilot Li Guoqiang (□□□). Experience gained was applied to Shenyang J-15. J-8G An advanced modified variant of the J-8II tasked with the suppression of enemy air defence (SEAD) mission was said to have been developed by the SAC in the 2000s. The aircraft, reportedly designated J-8G, was said to be capable of carrying two indigenous YJ-91 anti-radiation missile and electronic warfare suite to attack enemy radar stations. J-8IIM (2006) At Zhuhai Air Show 2006, a new variant "J-8IIM" was put on display with upgraded systems similar to the J-8H. The most significant improvement is the radar upgrade with a new Type 1471 domestic radar used by the J-8H. In comparison to F-8IIM's Russian Zhuk-8II radar, the Type 1471 radar has a number of performance enhancements: Type 1471 radar has 75 km maximum range for targets with 3 square meters RCS, in comparison to Zhuk-8II's 70 km maximum range against target of 5 square meters RCS. Additional ability to handle sea-borne targets that Zhuk-8II does not have. For sea targets with 50 square metres RCS, the max range is greater than 100/80 km for sea state 1/2. Simultaneously tracking 10 targets and display 8 most threatening ones out of the 10 on displays, engaging 2 out the 8. Air-to-Air modes: VS (Velocity Search), RWS (Recon./Search while Scan), TWS (Track While Scan), STT (Single Target Tracking), Air Combat Mode (ACM). AMTI, (aerial moving target indication) mode which is used to discover hovering helicopters can be added upon customer request, though this does not come as standard feature. Air-to-Ground modes: Mapping (Real Beam Mapping RBM), Mapping Expansion/Freezing (EXP/FRZ), Doppler Beam Sharpening (DBS), Ground Moving Target Indication (GMTI), Sea Single Target Tracking (SSTT), Air-to-Ground Ranging (AGR). An improved beacon navigation (BCN) and weather (WX) capability. JZ-8F A reconnaissance version of the J-8F with internal camera in the forward fuselage replacing the cannon. J-8T Upgraded J-8 with JL-10A X-band radar. Export variant, F-8T, has WP-13B-II engines. China National Aero-Technology Import & Export Corporation claims J-8T is equipped with improved integrate avionic and various guided weapons. J-8T can carry out air-to-air BVR intercepting mission, air-to-ground precise attacking mission and stand-off attacking mission. J-8DF J-8D upgraded to J-8F standard. Lack of cooling duct below intake. Can fire PL-12 and PL-8 missiles.

System

Alternate Designation(s): JZ-8; J-8R

Primary Function / Type: Reconnaissance Fighter Aircraft

Manufacturer: Shenyang Aircraft Corporation

Crew: 1

Number of Engines: 2

Number of Hard Points: INA

Dimensions

Length: 21.39 m

Width (Wing Span): 9.344 m

Height: 5.41 m

Wing Area: 42.2 m2

Airfoil: TsAGI S-12 (4.2%) ; tip: TsAGI S-12 (5%)

Empty Weight: 10,371 kg

Gross Weight: 15,288 kg

Maximum Takeoff Weight: 18,879 kg

Automotive

Engine Name: 2 × Guizhou WP-13B afterburning turbojet engines

Number of Engines: 2

Engine Type: Afterburning Turbojet Engine

Engine Power: 47.1 kN (10,580 lbf) thrust each dry, 68.6 kN (15,430 lbf) with afterburner

Maximum Speed: 2,300 km/h

Combat Range: 1,000 km (620 mi, 540 nmi) radius with 3x drop tanks

Combat Radius: 900 km

Service Ceiling: 18,000 m

G LImits: +4.7 sustained at 5,000 m

Unstick Speed: 330 km/h

Take-Off Run: 630 m

Touchdown Speed: 224 km/h

Landing Speed: 900 m

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: Autocannon

Caliber: mm23

Length: 1,387 mm

Barrel Length: 1,000 mm

Weight: 49.2 kg

Barrels: 2

Action: Gast principle

Rate of FIre: 3,400–3,600 rounds/min

Muzzle Velocity: 715 m/s

↳*Ammunition*

Type: Rifle

Caliber: 23mm

Cartridge: 23x115 mm

Basic Load: INA

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

JZ-8 (J-8R) Reconnaissance version of J-8 or J-8I. The Shenyang J-8 (Chinese: □-8; NATO reporting name: Finback) is a high-speed, high-altitude Chinese-built single-seat interceptor fighter aircraft. The effort to develop an all-weather interceptor began in full in 1964 and this produced the first Chinese-designed and built jet fighter to combat new, high altitude threats such as the B-58 Hustler bomber, F-105 Thunderchief fighter-bomber and Lockheed U-2 spy plane. In 1964 the People's Liberation Army Air Force requested an aircraft from Shenyang Aircraft Corporation and the 601 Institute to develop a fighter/interceptor to counter bombers and spy planes as the newly introduced Chengdu J-7 (a reverse-engineered MiG-21) was incapable of doing so. The prototype took its maiden flight in 1969. Despite the mid-1960s origins of the J-8, due to the political turmoil of the Great Proletarian Cultural Revolution, the J-8 was not produced until 1979 and entered service in 1980. Its basic configuration resembles an enlargement of the delta-winged J-7, utilizes two Liyang (LMC) Wopen-7A turbojet engines, and features a maximum speed of Mach 2.2. The twin-engined J-8 competed with rival Chengdu Aircraft Industry Group's single turbofan engine, canard-delta J-9 project and ultimately emerged as the victor largely due to the existing availability of the former's MiG-21 based powerplant and proven layout, while the J-9 project was cancelled in 1980 due to difficulty in creating a suitably powerful engine. In order to house a large radar set, the design called for a solid nose and variable geometry side air intakes. However, the lack of familiarity with this type of intake meant the J-8 had to settle for a MiG-21 style nose intake. The solid nose J-8 was finally realized in the J-8II (Finback-B), which was based on the layout of the J-8I (same improvement is like the J-6 to Q-5). The radar chosen for the J-8 was the Type 204 mono-pulse fire-control radar, a primitive ranging radar for daylight within-visual-range operations. The performance of the radar fell well short of the PLAAF's requirements as research into a more capable fire control radar and power source proved difficult and time-consuming. The aircraft was originally armed with cannons and seven hardpoints for missiles, bombs, rockets or fuel tanks. The original weapons layout of the J-8 was two 30 mm Type 30-1 cannons after initial problems with the 30 mm Type 30-II four-barrel Gatling gun. The J-8 was also planned to be armed with the experimental PL-4 medium ranged missile but technical issues and political upheavals prevented any in-depth development and the project was cancelled in 1985 citing unsatisfactory performance. Therefore, the PL-2 IR-homing short-range air-to-air missile (SRAAM) was used instead. Unguided bombs and rockets can also be carried on the J-8. And nowadays with the development of light-weight military nuclear weaponry, the J-8II will now be able to carry missiles with nuclear warheads. Despite entering service relatively recently, it was comparable to many older Soviet fighter designs, with limited maneuverability. The original combat avionics package was soon replaced with an all-weather capability in aircraft designated J-8I (Finback-A). The J-8I (later redesignated as the J-8A) received a new gun sight, onboard computer, new cockpit design and redesigned ejection escape system and oxygen supply system. The gun armament was also changed from two 30 mm cannons to a single 23 mm twin-barreled cannon and the PL-5 short ranged AAM was also equipped. The later J-8E featured improved electronic warfare systems. The unsatisfactory performance of the J-8I led to a very short production run of 20–50 aircraft and the J-8I has slowly began being phased out as early as the 1990s. A tactical reconnaissance variant of the J-8, known as the JZ-8 was developed in the mid 1980s to take advantage of the J-8s few favourable qualities, most notably its capability of reaching high speeds and altitudes to replace the Shenyang JZ-6 in the tactical reconnaissance role. Using an under-fuselage reconnaissance pod with a KA-112A long focal-length optical camera, the JZ-8 usually operates at heights ranging from ~9,500m-15,000m during reconnaissance missions. By 1982 work began to replace the unimpressive J-8I type with a new design known as the J-8II. The new 1982 requirements from the PLAAF demanded being capable of beyond visual range combat (BVR) with the use medium ranged missiles (MRAAM) and secondary ground attack capabilities. In terms of performance, the aircraft was expected to have better aerodynamic performance at medium to low altitudes and at transonic speeds.

Skylark IV British Single Seat Sailplane






Tiers:



System

Alternate Designation: Skylark IV

Type: Single Seat Sailplane

Manufacturer: Slingsby Sailplanes Ltd

Crew: 1

Dimensions

Length: 7.62 m

Width (Wingspan): 18.2 m

Height: 1.04 m at cockpit

Wing Area: 16.07 m2

Empty Weight: 258 kg

Gross Weight: 376 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Stall Speed: 60 km/h

Never Exceed Speed: 228 km/h

Rough Air Speed Maximum: 131.5 km/h

Aerotow Speed: 131.5 km/h

Winch Launch Speed: 131.5 km/h

G Limits: 222.2 km/h

Rate of Sink: 69.0 km/h

Lift-to-Drag: 75.9 km/h

Wing Loading: 23.35 kg/m2

Armament

Note: There is no armament onboard the Skylark IV.

Notes:

The Slingsby T.50 Skylark 4 was a British single seat competition glider built by Slingsby Sailplanes in the early 1960s. It sold in numbers and had success at national, though not world level competition. The Slingsby Skylark 4 is the final development of the Skylark series of gliders and was first manufactured in 1961 using a wing similar to that of the Skylark 3. About 30 Skylark 4s are still flying today (2010). Slingsby had introduced double curvature fuselage panels made of glass reinforced plastic (GRP) into their previous design, the T.49 Capstan and they remodelled the front of the wooden fuselage of the Skylark 3 in this material for the Skylark 4, introducing a reclining pilot's position and smoother canopy line. Though the previous wing planform, span and area was retained, its ailerons were extended to increase the rate of roll and the outer panels used a different airfoil section, the more cambered NACA 6415, to give a better lift distribution. The Skylark 4 has a high wing with a single inner section of parallel chord extending out almost to mid span, followed by outer sections with taper on the trailing edges. Ailerons filled almost all of the outer sections and airbrakes, operating in pairs above and below the wings, are mounted on the main spar in the inboard section. The wing is wooden, built around a main spar of Spruce and a lighter rear spar and Gaboon ply covered from this rear spar forward. Behind this spar the wing was fabric covered, though the ailerons were ply skinned. The Gaboon ply was applied diagonally across the ribs, which produced a very smooth wing-surface that is claimed to generate a laminar airflow. This in turn gives a best-glide ratio of 1:36 which is comparable with early fibreglass gliders. Behind the cockpit the fuselage is a semi-monocoque, elliptical in cross section and built around spruce frames with a plywood skin. The fuselage line no longer fell away rapidly behind the trailing edge, but continued straight to the tail, where tapered and clipped tailplane and elevators were mounted on top, far enough forward that the rudder hinge was behind the elevators. These surfaces were plywood covered. Fin and rudder together are tapered and flat topped; the fin is also ply-skinned, but the unbalanced rudder is fabric covered. Skylark 4 fuselage prepared for rigging at Borders Gliding Club, The undercarriage was conventional, with a nose skid, fixed monowheel and tail bumper. A simple-friction wheel brake is applied to the mainwheel by pulling on the air brake lever at the end of its furthest travel. The cockpit is immediately ahead of the wing leading-edge, enclosed with a lengthened perspex canopy, and the Skylark 4 was 80 mm (4 in) longer than its predecessor

Pathfinder MK1 British Single-Seat Single-Engine High-Wing Monoplane







Tiers:

1 2 3 4

System

Alternate Designation(s): Pathfinder MK1 British Single-Seat Single-Engine High-Wing Monoplane

Type: Single-Seat Single-Engine High-Wing Monoplane

Manufacturer: Huntair

Crew: 1

Number of Engines: 1

Number of Hard Points: None

Dimensions

Length: 7.01 m

Height: 3.05m

Wingspan: 9.75m

Wing Area: 148 sq.ft, 13.7 sq.m.

Main Wheels Diameter: 33 cm

Empty Weight: 133 kg

Maximum Take-Off Weight: 233 kg

Payload: 100 kg

Automotive

Engine Name: Robin EC34PM

Number of Engines: 1

Engine Power: 28hp, at 6500 rpm

Max Static Thrust: 200 lb, 91 kg.

Fuel Capacity: 5.4 US gal, 4.5 Imp gal, 20.4 litre

Maximum Speed: 88 kph

Never Exceed Speed: 113kph

Maximum Cruising Speed: 80 kph

Stalling Speed: 40 kph

Max Climb Rate as Sea Level: 400ft/min, 2.0m/s

Service Ceiling: 3660 m

Range at Average Cruising Speed: 201 km

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: No

Laser Desingator: No

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: No

EW Counter Measures: No

Chaffs/Flares: No

Notes:

Single-seat single-engine high-wing monoplane with conventional three-axis control. Wing has upswept leading edge, swept forward trailing edge and tapering chord cruciform tail. Pitch control by elevator on tail; yaw control by fully flying rudder with additional fin; roll control by half-span ailerons; control inputs through stick for pitch/roll and pedals for yaw. Wing braced from above by kingpost and cables, from below by cables; wing profile 80% double-surface. Undercarriage has three wheels in tricycle formation with additional tailwheel; no suspension on nose wheel and steel-spring suspension on main wheels. Push-right go-right nose wheel steering connected to yaw control. No brakes. Aluminium-tube framework, with optional pod. Engine mounted below wing driving pusher propeller. Aluminium tubing to British HT3OTF specification. Polyester sailcloth. At the end of 1981, the Pathfinder appeared, and as the first 'fully conventional' British-designed three-axis microlight in quantity production, it found a ready market. By the time production ended in early 1983, some 70 aircraft had been built and the Pathfinder had gained a reputation for durability and good performance, qualities which were underlined by its performance in the 1982 London-Paris, in which nine started and nine finished, seven of them in the first ten. In addition, a Pathfinder piloted by Gerry Breen was joint winner of the speed award. The Pathfinder was normally sold with a 330 cc Robin EC34PM engine, but a number were built with a 440 cc Robin EC44. The 440 version was not intended as a high-performance option (though it was indeed faster) but was designed to provide good take-off and climb characteristics for pilots whose weight was close to the Pathfinder's 220 lb (100 kg) payload. Both versions of the Pathfinder were replaced by the Pathfinder II in early 1983, and as a result the earlier aircraft is now called Pathfinder I.

→→Airborne Early Warning and Control Aircraft

KJ-2000 (Mainring) Chinese Airborne Early Warning and Control Aircraft



Tiers:



Variants:

- **KJ-3000:** A new variant with a claimed fixed next generation radar was spotted in 2013.
- **KJ-200:** The KongJing-200 (KJ-200) is an airborne early warning and control aircraft based on the Y-8F600 airframe. It features a linear active electronically scanned array (AESA) radar similar to the Swedish PS-890 Erieye.

System

Alternate Designation(s): KJ-2000; NATO: Mainring
Primary Function / Type: Airborne Early Warning and Control Aircraft
Manufacturer: INA
Flight Crew: 5
Mission Crew: 10-15
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 46.6m
Width (Wing Span): 50.5m
Height: 14.8m
Empty Weight: 92,500kg
Maximum Take-Off Weight: 190,000kg.

Automotive

Engine Name: 4 x PS-90A

Number of Engines: 4

Engine Type: Turbofan Engine

Engine Power: Each engine generates a thrust of 16,000 kilogram-force (kgf).

Maximum Range: maximum flight range of approximately 5,000km.

Maximum Speed: 900km/h

Service Ceiling: Service ceiling of the aircraft is 10,200m

Endurance: 8 hours

Fire Control System / Avionics

FCS Name: INA

Computerized FCS: No

Radar System

Name: Type 88

Type: KJ-2000 early warning aircraft is equipped with an advanced, non-rotating, three-sided active electronically scanned array (AESA) radar system on top of the fuselage at the rear.

Frequency: 1,200 MHz to 1,400 MHz

Band: J-Band

Maximum Range: 479 km

Note: Three flat radar antennas are mounted in a triangular configuration and are enclosed in a disc-shaped, fixed round radar dome for protection against wind and other aerodynamic forces. Each radar antenna is steered electronically to provide 120° scan coverage in both azimuth and elevation angles.

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The KJ-2000 (Chinese: □□-2000; pinyin: Kōngjǐng Liǎngqiān; lit.: 'Airwarn-2000'), NATO reporting name: Mainring is a Chinese Airborne early warning and control system comprising domestically designed electronics and radars installed on a modified Ilyushin Il-76 airframe. The KJ-2000 development program started after the cancellation of the A-50I deal with Israel and Russia in July 2000, due to strong U.S. pressure regarding the Israeli radar that was to be mounted. China then went on to develop a domestic AWACS and the first aircraft made its maiden flight in 2003. Four KJ-2000 aircraft have been identified so far, but production of new aircraft will likely be delayed, dependent on the acquisition of IL-76 airframes. Currently, the Russian defense exporter Rosoboronexport has imposed a significant price hike on all future IL-76s delivered to China and India despite previous contracts. Both countries are currently in negotiation with Russia regarding this matter as of early 2008. In March 2011, Russia/China negotiations reached a new agreement to move production of IL-76s to Chinese owned companies, in this way it is

expected production can be run smoothly to supply China with new IL-76 airframes, while delivery of Soloviev D-30KP-2 engines is not affected by recent issues. Due to unreliable external supplier sources, China has developed a backup known as the KJ-200 by installing a simplified system on board the Shaanxi Y-8. This aircraft has a similar configuration to that of the KJ-2000 and is characterized by the triple tail-fin configuration (one large and two small). The Chinese AWACS has a phased array radar (PAR) carried in a round radome. Unlike the US AWACS aircraft, which rotate their rotodomes to give a 360-degree coverage, the radar antenna of the Chinese AWACS does not rotate. Instead, three PAR antenna modules are placed in a triangular configuration inside the round radome to provide a 360-degree coverage. The multi-function, three-dimensional pulse-Doppler radar was developed by NII (Nanjing Electronic Technology Research Institute), and is designed to detect and track airborne and surface targets. It operates in the frequency range of 1200–1400 MHz. The antenna system consists of three phased arrays, located in a 14-metre-diameter (46 ft) disc. In contrast, the Russian Beriev A-50 and American Boeing E-3 Sentry use a 9-metre-diameter (30 ft) disc. Each phased array has a 120-degree field of view. Maximum range of detection of air targets is 470 km (290 mi). A-50I of India made by Israel adopted its design and entered service later than KJ-2000(service 2004) in 2009.

A-50 (Mainstay) Russian Airborne Early Warning and Control Aircraft



Tiers:

1 2 **3** 4

Variants:

- **Earlier versions included a-50 with Shmel radar. The a-50u/mainstay b has a Shmel-m radar variant.:**
- **A-50M:** VARIANT HAS SHMEL-2 RADAR, RESISTS MOST CM, SIMILAR TO US AN/APY-1/-2.
- **A-50E:** : HAS BEEN EXPORTED. AN ISRAELI MODIFIED VARIANT WITH NEW ENGINES AND PHALCON RADAR WILL BE EXPORTED TO INDIA.

System

Crew: ea5.0

Weight, Empty : kg61000.0

Weight, Maximim Takeoff : kg170000 (IL-76M); 190000 (IL-75MD)

↳*Dimensions*

Height : m14.76

Length : m46.6

Width, Wingspan : m50.6

↳*Fuel and Load*

Fuel Capacity, Internal : liters81830.0

Weight, Standard Payload, Maximum : kg5000.0

Performance

Ceiling : m15500.0

Power Plant/Engine: Engines 26,455 lbs. thrust Soloview D-30KP turbofans (4 ea.)

Speed, Cruising : km/h775.0

Speed, Maximum, at altitude : km/h850.0

Takeoff Run: m850.0

Landing Roll : m450.0

Notes:

The Beriev A-50 (NATO reporting name: Mainstay) is a Soviet airborne early warning and control (AEW&C) aircraft based on the Ilyushin Il-76 transport. The existence of the A-50 was revealed to the Western Bloc in 1980 by Adolf Tolkachev. Developed to replace the Tupolev Tu-126 "Moss", the A-50 first flew in 1978. It entered service in 1984, with about 40 produced by 1992. The mission personnel of the 15-man crew derive data from the large Liana surveillance radar with its antenna in an over-fuselage rotodome, which has a diameter of 9 metres (30 ft). Detection range is 650 kilometres (400 mi) for air targets and 300 kilometres (190 mi) for ground targets. The A-50 can control up to ten fighter aircraft for either air-to-air intercept or air-to-ground attack missions. The A-50 is capable of flying four hours at 1,000 kilometres (620 mi) from its base at a maximum takeoff weight of 190 metric tons (420,000 lb). The aircraft can be refuelled by Il-78 tankers. The radar "Vega-M" is designed by MNIIP, Moscow, and produced by NPO Vega. The "Vega-M" is capable of tracking up to 150 targets simultaneously within 230 kilometres (140 mi). Large targets, like surface ships, can be tracked at a distance of 400 kilometres (250 mi). Development work on the A-50U began in 2003 and state tests started on 10 September 2008, using a Russian Air Force A-50 '37 Krasnyy' as a prototype. The main element of the modernisation involves replacing the outdated analogue equipment with a new, digital avionics suite supplied by Vega Radio Engineering Corporation. Notable improvements include faster data processing, enhanced signal tracking, and improved target detection. Crew rest, toilet and galley facilities are also included in the upgrade. After completing the joint state tests, Beriev has delivered the first A-50U to the Russian Air Force. The aircraft, '47 Krasnyy'/RF-92957, was handed over at Beriev's facility in Taganrog on 31 October 2011.[7] It was accepted by an aircrew serving with the 2457th Aviation Base for Combat Operation of Airborne Early Warning Aircraft (Aviabaza Boevogo Primeneniya Samolyotov Dal'nego Radiolokatsionnogo Obnaruzheniya) at Ivanovo Severny, which is the only base using the A-50 operationally (it operates 16 aircraft). The fourth A-50U, '41 Taganrog', was delivered to the Russian Aerospace Forces on 7 March 2017. The fifth A-50U, '45 Krasnyy', was delivered on 6 December 2018. The A-50U upgrade forms the basis of the concept for Beriev A-100 AEW&C. Its configuration will be similar, but with a new Vega Premier active electronically scanned array radar. In late December 2015, the A-50 started operations over Syria, flying from Russia, in support of the Russian military intervention in the Syrian Civil War. In December 2018, it was deployed to Crimea.

KJ-500 Chinese Airborne Early Warning and Control Aircraft



Tiers:

1 **2** 3 4

System

Alternate Designation(s): KJ-500

Primary Function / Type: Airborne Early Warning and Control Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 24

Number of Engines: 4

Number of Hard Points: INA

Note #1: this aircraft has the inherent capability to haul up to 106 passengers, 132 airborne troopers or nine complete palettes of cargo

Note #2: The KJ-500 was also required to the core force of the informatized combat system, its equipped technology has four major characteristics which are networking, multi-functionality, high-integration and light weight.

Dimensions

Length: 36 m

Width (Wing Span): 40 m

Height: 11.5 m

Empty Weight: 40,000 kg

Combat Weight: 70,000 kg

Automotive

Engine Name: 4 x Zhuzhou WoJiang-6C (FWJ-6C)

Number of Engines: 4

Engine Type: Turboprop Engines

Engine Power: 5,100 horsepower each and driving six-bladed propeller units.

Maximum Range: 5,700 km

Maximum Speed: 550 kph

Service Ceiling: 10,500 m

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Battle Management System (BMS): Yes, Coupled with other current Chinese Air Force capabilities, the KJ-500 series platform certainly adds a much-needed modern potent tracking solution for the service. The onboard systems are completely networked into the Chinese Battle Management System (BMS) and reportedly offers good identification, multi-function, and responsiveness qualities.

Radar

Name: INA

Type: Active Electronically Scanned Array (AESA) Radar

Quantity: The aircraft carries a fixed dorsal radome containing three AESA radar arrays for 360 degree coverage, and is said to be more efficient than the two-planar 'balance beam' array design used on the earlier KJ-200.

Coverage: 360 deg

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The KJ-500 (Chinese: □□-500; pinyin: Kōngjǐng Wǔbǎi; literally: "Air Warning 500") is a third-generation airborne early warning and control (AEW&C) aircraft used by the Chinese People's Liberation Army Air Force. It was built by Shaanxi Aircraft Corporation., and is based on the Y-9 airframe. Since the beginning of the 21st century, the detection range and the accuracy of airborne radars has been increasing, fighters equipped with various types of air-to-air missiles and low-altitude cruise missiles continue to improve in performance, creating a demand for a more capable AEW&C. To address the above issues, China started the development of the KJ-500, its third AEW&C, in the late 2000s. The KJ-500 was required to have three important features, which are good detection capability, good identification ability, and quick responsiveness. The KJ-500 was also required to the core force of the informatized combat system, its equipped technology has four major characteristics which are networking, multi-functionality, high-integration and light weight. The aircraft carries a fixed dorsal radome containing three AESA radar arrays for 360 degree coverage, and is said to be more efficient than the two-planar 'balance beam' array design used on the earlier KJ-200. Production of older AEW&C types have reported ceased in 2018 in response to the KJ-500 reaching full operational capability.

KJ-200 (Moth) Chinese Airborne Early Warning and Control Aircraft






Tiers:



Variants:

- **KJ-2000 (Mainring) Airborne Early Warning and Control (AEW&C) Aircraft:** KJ-2000 (Mainring) is an airborne early warning and control (AEW&C) aircraft designed and developed by AVIC Xi'an Aircraft Industry Company for the People's Liberation Army Air Force (PLAAF). The aircraft can detect, identify and track enemy targets flying at low altitudes and at long ranges. It can also be used to carry out command and control, battle management and airborne surveillance missions in all weather conditions. The aircraft was developed based on the airframe of A-50I (Mainstay) AEW&C aircraft. The first prototype of KJ-2000 performed its maiden flight in November 2003 and the first production aircraft entered into service with the PLAAF in 2004. An additional three aircrafts were delivered by the end of 2007. The aircrafts are operated by the 26th Air Division of the PLAAF. The KJ-2000 aircraft was displayed at the China International Aviation and Aerospace Exhibition 2014 (Airshow China 2014) held in Zhuhai.

System

Alternate Designation(s): KJ-200; NATO:Moth or Y-8 Balance Beam
Primary Function / Type: Airborne Early Warning and Control Aircraft
Manufacturer: Shaanxi Aircraft Corp., Hanzhong, China 14th Electronic Institute, Nanjing, China (radar, electronics)
Crew: 2
Number of Engines: 4
Number of Hard Points: INA

Dimensions

Length: 34.02 m
Width (Wing Span): 38.00 m
Height: 11.60 m
Wing Area: 122 sq m
Empty Weight: 35,500 kg
Maximum Takeoff Weight: 65,000 kg
Payload Weight: 20,000 kg

Automotive

Engine Name: 4 x Pratt & Whitney Canada PW150B

Number of Engines: 4

Engine Type: Turboprops

Engine Power: INA

Maximum Range: 5,560 km

Maximum Speed: 661 km/h

Cruise Speed: 550 km/h

Service Ceiling: 6,100 m

Endurance: 10 hours

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The KJ-200 (Chinese: □□-200; pinyin: Kōngjǐng Liǎngběi; literally: "Airwarn-200") NATO reporting name: Moth or Y-8 Balance Beam system, is an Airborne early warning and control (AEW&C) program developed by Shaanxi Aircraft Corporation. (KJ is from the first characters of the Pinyin spelling of □□, (Kōng Jǐng), short for □□□□ (Kōng Zhōng Yù Jǐng), which means Airborne Early Warning). The key component of this aircraft is an AESA radar system, visually similar to the Saab Erieye system, mounted on struts above the rear fuselage, as well as ventral sensor domes. The platform of this aircraft is based on the Shaanxi Y-8F-600 and it has been reported that Pratt & Whitney Canada PW150B turboprops and Honeywell avionics have been incorporated. The general designer of the KJ-200 is Ouyang Shaoxiu (□□□□), the same general designer of the Y-8. According to Ouyang the KJ-200 has been significantly modified (around 80%) from the original Y-8. including the adoption of a glass cockpit.

→→Command and Control Aircraft

Y-8T Chinese Command Post Aircraft



Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by

four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8T

Primary Function / Type: Command Post Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting

arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

→→Training Aircraft

Su-27UB (Flanker-C) Russian Two Seat Combat Trainer Aircraft





Tiers:



Variants:

- **T10 ("Flanker-A"):** Initial prototype configuration.
- **T10S:** Improved prototype configuration, more similar to production spec.
- **P-42:** Special version built to beat climb time records. The aircraft had all armament, radar and paint removed, which reduced weight to 14,100 kg. It also had improved engines. Similar to the US F-15 Streak Eagle project. Between 1986–1988, it established and took several climb records from the Streak Eagle. Several of these records (such as time to climb to 3000m, 6000m, 9000m, 12000m) still stands current as of 2019.
- **Su-27:** Pre-production series built in small numbers with AL-31 engine.
- **Su-27S (Su-27 / "Flanker-B"):** Initial production single-seater with improved AL-31F engine. The "T10P".
- **Su-27P (Su-27 / "Flanker-B"):** Standard version but without air-to-ground weapons control system and wiring and assigned to Soviet Air Defence Forces units. Often designated Su-27 without -P.
- **Su-27UB ("Flanker-C"):** Initial production two-seat operational conversion trainer.
- **Su-27SK:** Export Su-27S single-seater. Exported to China in 1992-1996 and developed into Shenyang J-11.
- **Su-27UBK:** Export Su-27UB two-seater.
- **Su-27K (Su-33 / "Flanker-D"):** Carrier-based single-seater with folding wings, high-lift devices, and arresting gear, built in small numbers. They followed the "T10K" prototypes and demonstrators.
- **Su-27KUB (Su-33UB):** Two-seat training-and-combat version based on the Su-27K and Su-27KU, with a side-by-side seating same as Su-34. One prototype built.
- **Su-27M (Su-35/Su-37 / "Flanker-E/F"):** Improved demonstrators for an advanced single-seat multi-role Su-27S derivative. These also included a two-seat "Su-35UB" demonstrator.
- **Su-27PU (Su-30):** Two-seat version of the Su-27P interceptor, designed to support with tactical data other single-seat Su-27P, MiG-31 and other interceptor aircraft in PVO service. The model was later renamed to Su-30, and modified into a multi-role fighter mainly for export market, moving away from the original purpose of the aircraft.
- **Su-32 (Su-27IB):** Two-seat dedicated long-range strike variant with side-by-side seating in "platypus" nose. Prototype of Su-32FN and Su-34.

System

Alternate Designation(s): Su-27UB; NATO: Flanker-C
Primary Function / Type: Two Seat Trainer Aircraft

Manufacturer: Sukhoi

Crew: 2

Number of Engines: 2

Number of Hard Points: 10 external pylons with a capacity of up to 4,430 kg (9,770 lb)

Dimensions

Length: 21.9 m

Width (Wing Span): 14.7 m

Height: 5.92 m

Wing Area: 62 m2

Empty Weight: 16,380 kg

Gross Weight: 23,430 kg

Maximum Takeoff Weight: 30,450 kg

Automotive

Engine Name: 2 × Saturn AL-31F afterburning turbofan engines

Number of Engines: 2

Engine Type: afterburning turbofan engines

Engine Power: 75.22 kN (16,910 lbf) thrust each dry, 122.6 kN (27,600 lbf) with afterburner

Maximum Speed: 2,500 km/h

Range, at Altitude: 3,530 km

Range, at Sea Level: 1,340 km

Service Ceiling: 19,000 m

G Limits: +9

Rate of Climb: 300 m/s

Thrust/Weight: 1.07 with 56% internal fuel; 0.91 with full fuel

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: 30mm

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: 150 Rounds

Main Missile Systems

↳*Main Missile System #1*

Name: Vympel R-27 (AA-10 Alamo)

Type: Air-to-Air Missile

Basic Load: 6 × R-27R/ER/T/ET/P/EP air-to-air missiles

↳*Main Missile System #2*

Name: R-73E

Type: Air-to-Air Missile

Basic Load: 4 × R-73E AAMs

Rocket Weapon Systems

↳*Rocket Weapon System #1*

Name: S-8KOM

Type: HEAT Rocket

Length: 1.57 m

Diameter: INA

Weight: 11.3 kg

Warhead Weight: 3.6 kg (1.1 kg of Hecphol-5/A-IX-10 explosive)

Engine: low smoke motor with powder BN-K.

Range: 1.3 to 4 km

Velocity: 400 mm versus RHA.

Armor Penetration: Velocity 610 m/s.

↳*Rocket Weapon System #2*

Name: S-13T
Type: Tandem HEAT
Length: 2.99 m
Diameter: INA
Weight: 75 kg
Warhead Weight: 21 kg and 16.3 kg (1.8 kg and 2.7 kg of explosives)
Range: 1.1 – 4 km
Velocity: Velocity 500 m/s
Armor Penetration: Combined penetration of 6 m of earth and 1 m of reinforced concrete.

Bomb Weapon Systems

↳*Bomb #1*

Name: RBK-250
Type: Cluster Bomb
Basic Load: INA

↳*Bomb #2*

Name: RBK-500
Type: Cluster Bomb
Basic Load: INA

Fire Control / Avionics

Fire Control System Type: INA
Fire Control Radar: Phazotron Zhuk-MSE radar
Navigation Radar: N001E radar
Targeting System: OEPS-27 electro-optical targeting system
Radar Warning Receiver: SPO-15 Radar Warning Receiver
IRST: OEPS-27 IRST

Protection

Stealth Properties: No
Heat Signature Reduction: INA
Add on Armor: INA
NBC Protection: Yes
EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Su-27UB ("Flanker-C") Initial production two-seat operational conversion trainer. The Sukhoi Su-27 (Russian: Сухой Су-27; NATO reporting name: Flanker) is a Soviet-origin twin-engine supermaneuverable fighter aircraft designed by Sukhoi. It was intended as a direct competitor for the large United States fourth-generation fighters such as the Grumman F-14 Tomcat and F-15 Eagle, with 3,530-kilometre (1,910 nmi) range, heavy aircraft ordnance, sophisticated avionics and high maneuverability. The Su-27 was designed for air superiority missions, and subsequent variants are able to perform almost all aerial warfare operations. It was designed with the Mikoyan MiG-29 as its complement. The Su-27 entered service with the Soviet Air Forces in 1985. The primary role was long range air defence against American SAC B-1B and B-52G/H bombers, protecting the Soviet coast from aircraft carriers and flying long range fighter escort for Soviet heavy bombers such as the Tu-95 "Bear", Tu-22M "Backfire" and Tu-160 "Blackjack". There are several related developments of the Su-27 design. The Su-30 is a two-seat, dual-role fighter for all-weather, air-to-air and air-to-surface deep interdiction missions. The Su-33 'Flanker-D' is a naval fleet defense interceptor for use on aircraft carriers. Further versions include the side-by-side two-seat Su-34 'Fullback' strike/fighter-bomber variant, and the Su-35 'Flanker-E' improved air superiority and multi-role fighter. The Shenyang J-11 is a Chinese licence-built version of the Su-27.

CJ-5 Chinese Trainer Aircraft







Tiers:



Variants:

- **Yak-18:** The original production version. Retractable main undercarriage, fixed tailwheel.
- **Yak-18U:** This version was built in small numbers. It had retractable tricycle landing gear.
- **Yak-18A:** Cleaned up version of the Yak-18U, powered by a 194 kW (260 hp) Ivchenko AI-14 FR engine. Built in large numbers.
- **Yak-18P (NATO reporting name Mouse):** Single-seat aerobatic aircraft for use by flying clubs. Adaptation of Yak-18 two-seat trainer.
- **Yak-18PM:** Single-seat aerobatic aircraft with retractable tricycle landing gear.
- **Yak-18PS:** Aerobatic aircraft with retractable tailwheel.
- **Hongzhuan-501 (Red Craftsman):** Probable original designation for early CJ-5 production aircraft.
- **Nanchang CJ-5:** The Yak-18 was built under licence in China as the CJ-5 for use by the PLAAF, PLANAF and civilian flying clubs; 379 CJ-5s had been built when production ended in 1958.

System

Alternate Designation(s): CJ-5
Primary Function / Type: Training Aircraft
Manufacturer: The Nanchang Aircraft Factory
Crew: 2 (pilot, student)
Number of Engines: 1
Number of Hard Points: INA

Dimensions

Length: 8.53 m
Height: 3.35 m
Wingspan: 10.60 m
Wing Area: 17.00 sq m
Weight, Empty: 1,025 kg
Weight, Maximum Takeoff: 1,316 kg
Payload: 306 kg

Automotive

Engine Name: M-11 engine

Number of Engines: 1

Engine Type: INA

Engine Power: 260 hp

Maximum Speed: 262 km/h

Cruise Speed: 227 km/h

Range: 750 km

Climb Rate: 318 m/min

Ceiling: 5,060 m

Takeoff Run: 200 m

Landing Run: 200 m

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: None

Laser Desingator: None

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

CJ-5 Trainer Aircraft A primary trainer is used for training potential trainees to master primary flying techniques because of its low speed, good controllability and stability. These factors make the task of learning simpler. The CJ-5, manufactured by Nanchang Aircraft Factory, was a licence production of the Soviet primary trainer Yak-18 developed in 1946. It had a frame type fuselage, a wing with one rectangular center panel and two tapered outer panels and a tailwheel type landing gear. A piston engine drove a wooden propeller. The flying instruments, engine instruments, a transceiver, a directional gyro and an interior communication system, etc. were installed to enable the trainees to learn the operational skills of the aircraft after they had finished the primary training program. The Nanchang Aircraft Factory started to repair the Yak-18 aircraft early in 1951 and, the aircraft assembly and test techniques were grasped during the repair period. In 1952, the factory started to expand the scope of repair, and to produce spare parts and to get themselves familiarized with the techniques of producing aircraft parts and assemblies. 1953 was the year of more active preparation for the transition from repair to manufacture. The factory set up the goal of mastering manufacturing techniques of Yak-18 parts and components which could be interchanged and matched on the aircraft. 44 main assemblies of outer wings, flaps, empennages and landing gears etc. were manufactured according to the repair documentation and sample parts. These parts were assembled on one aircraft for test and checkout and good result was witnessed after the aircraft underwent 50 sorties and 78 hours of flying. The method of using lofting, templates and master parts was adopted for the manufacture of aircraft parts from the second half of 1952. With this method correct aircraft configuration, and interchangeability and matching of parts could be ensured, hence the first and most important step was taken towards the manufacture of a complete aircraft. In early 1954 when the factory was formally set to trial produce the primary trainer CJ-5, 235 aircraft had already been repaired. People in the Nanchang Aircraft Factory made all aircraft parts

with the only exception of control system. In accordance with the First Five-year Plan of the aviation industry approved by the government, the trial production of the CJ-5 was to be completed in September, 1955. But it was decided to cut this by 1 year as the Chinese Air Force was in urgent need of a primary trainer and the Nanchang Aircraft Factory had already mastered aircraft repair techniques, and techniques for manufacture of parts and components for 5 types of aircraft including the Yak-18. After the visit to the factory by Minister Zhao Erlu of the Second Ministry of Machine Building at the end of 1953, he believed that the conditions for manufacturing complete aircraft was matured ahead of schedule. An order was issued to the factory after the approval of the State Council, by which the time for formal successful trial production of the CJ-5 primary trainer was changed from the third quarter of 1955 to an earlier time of the third quarter of 1954. After the order had reached the factory, the people of the factory were mobilized immediately and the trial production was carried out day and night. The factory proceeded rapidly under the instruction of some Soviet experts and the organization of chief engineer Li Shaoan and chief technologist Gao Yongshou. First CJ-5 was delivered to the flight test station in June for flight test on June 30 and second full size airframe began its static destructive test on May 12. The first aircraft successfully completed its test flight on July 11, 1954. The State Certification Committee arrived at the conclusion: The performance of the primary trainer CJ-5 manufactured by the Nanchang Aircraft Factory met the requirement of the specification and it could be used by the Air Force as a trainer aircraft. On August 26, the Defence Minister Peng Dehuai approved the batch production of the aircraft. Only more than half a year was used from trial production to batch production. The power-plant of the aircraft M-11 engine was also trial-produced successfully by the Zhuzhou Aero Engine Factory in August of the same year. Aircraft static destructive tests were totally new to the factory at that time and this was the first of its kind ever carried out even in China. There were no Soviet experts for consultation. A project engineer, Zhang Azhou who studied in the United Kingdom and had just returned to China, was put in charge of the test. Zhang Azhou asked all his staff members to study all available Soviet data on static testing and made careful preparation for the test. Under his orderly command load applying, instrument reading and data measuring and recording were carried out as planned. When the load was increased to 105-110 per cent of the ultimate load, a sudden thundering sound came out and the airframe broke at the front spar of outer wing panel. This was a proof that the strength of airframe was in conformity with design criteria and this first destructive static test of a full size airframe was a complete success. Later on the static tests were also successively carried out in 57 design cases on 14 major components, e.g. central wing panel, aileron and fuselage, showing that their strength was in compliance with design criteria. All static tests of CJ-5 had been thus completed and the strength of the aircraft was proven. Zhang Azhou made an outstanding contribution to the static test programme and, therefore, was awarded a special-class merit. The first flight of the first aircraft made in new China, the CJ-5, took place on July 3, 1954. Piloted by Duan Xianglu, the aircraft had a successful flight and made a safe landing. On July 20 the State Flight Test Commission came to the conclusion that the performance of CJ-5 was in conformity with its specification and therefore it was agreed that the aircraft should be put into mass production and be delivered to the Air Force for use in training. A celebration of the successful production of the first CJ-5 was held at the factory on July 26. Zhao Erlu, minister of the Second Ministry of Machine Building, Shao Shiping, the governer of Jiangxi province, Duan Zijun, deputy head of the Aircraft Industry Bureau, and other leaders from the Air Force came to the celebration. Three CJ-5s made a flight demonstration. A telegram reporting the success to Chairman Mao Zedong from all staff and workers of the Nanchang Aircraft Factory was passed during the celebration. After the mass production of CJ-5 was approved in August 1954 a total of 379 CJ-5s were produced from 1954 to 1958 and delivered to the Air Force, the Navy air force and CAAC. The CJ-5 made a great contribution to the training of pilots in the early days of new China. The success in manufacturing CJ-5 Aircraft marked a good start for aircraft manufacture in new China. The Chinese aviation industry had entered a new stage. To celebrate this achievement, Chairman Mao Zedong signed two letters of praise and encouragement to the Nanchang Aircraft Factory and Zhuzhou Aero Engine Factory on August 1 and August 10 of 1954 respectively. In his letter of praise and encouragement to the Nanchang Aircraft Factory, Chairman Mao Zedong said: "Your report of July 26 had been received. Congratulations to the successful trial production of the first Yak-18 aircraft. This is a good start in establishing both aircraft industry and strengthening the national defence of China. I hope the factory will continue their efforts to further master technology and improve quality under the guidance of the Soviet experts and ensure the fulfilment of regular production task." Zhu De, Commander in Chief of PLA, also wrote words of encouragement to the Nanchang Aircraft Factory saying: "Carry on the enthusiasm and creativeness of the working class; strengthen national defence and defend the motherland."

Su-27UBK (Flanker-C) Russian Two Seat Combat Trainer Aircraft



Tiers:



Variants:

- **T10 ("Flanker-A"):** Initial prototype configuration.
- **T10S:** Improved prototype configuration, more similar to production spec.
- **P-42:** Special version built to beat climb time records. The aircraft had all armament, radar and paint removed, which reduced weight to 14,100 kg. It also had improved engines. Similar to the US F-15 Streak Eagle project. Between 1986–1988, it established and took several climb records from the Streak Eagle. Several of these records (such as time to climb to 3000m, 6000m, 9000m, 12000m) still stands current as of 2019.
- **Su-27:** Pre-production series built in small numbers with AL-31 engine.
- **Su-27S (Su-27 / "Flanker-B"):** Initial production single-seater with improved AL-31F engine. The "T10P".
- **Su-27P (Su-27 / "Flanker-B"):** Standard version but without air-to-ground weapons control system and wiring and assigned to Soviet Air Defence Forces units. Often designated Su-27 without -P.
- **Su-27UB ("Flanker-C"):** Initial production two-seat operational conversion trainer.
- **Su-27SK:** Export Su-27S single-seater. Exported to China in 1992-1996 and developed into Shenyang J-11.
- **Su-27UBK:** Export Su-27UB two-seater.
- **Su-27K (Su-33 / "Flanker-D"):** Carrier-based single-seater with folding wings, high-lift devices, and arresting gear, built in small numbers. They followed the "T10K" prototypes and demonstrators.
- **Su-27KUB (Su-33UB):** Two-seat training-and-combat version based on the Su-27K and Su-27KU, with a side-by-side seating same as Su-34. One prototype built.
- **Su-27M (Su-35/Su-37 / "Flanker-E/F"):** Improved demonstrators for an advanced single-seat multi-role Su-27S derivative. These also included a two-seat "Su-35UB" demonstrator.
- **Su-27PU (Su-30):** Two-seat version of the Su-27P interceptor, designed to support with tactical data other single-seat Su-27P, MiG-31 and other interceptor aircraft in PVO service. The model was later renamed to Su-30, and modified into a multi-role fighter mainly for export market, moving away from the original purpose of the aircraft.
- **Su-32 (Su-27IB):** Two-seat dedicated long-range strike variant with side-by-side seating in "platypus" nose. Prototype of Su-32FN and Su-34.

System

Alternate Designation(s): Su-27UBK; NATO: Flanker-C

Primary Function / Type: Two Seat Trainer Aircraft (Export)

Manufacturer: Sukhoi

Crew: 2

Number of Engines: 2

Number of Hard Points: 10 external pylons with a capacity of up to 4,430 kg (9,770 lb)

Dimensions

Length: 21.9 m

Width (Wing Span): 14.7 m
Height: 5.92 m
Wing Area: 62 m2
Empty Weight: 16,380 kg
Gross Weight: 23,430 kg
Maximum Takeoff Weight: 30,450 kg

Automotive

Engine Name: 2 × Saturn AL-31F afterburning turbofan engines
Number of Engines: 2
Engine Type: afterburning turbofan engines
Engine Power: 75.22 kN (16,910 lbf) thrust each dry, 122.6 kN (27,600 lbf) with afterburner
Maximum Speed: 2,500 km/h
Range, at Altitude: 3,530 km
Range, at Sea Level: 1,340 km
Service Ceiling: 19,000 m
G Limits: +9
Rate of Climb: 300 m/s
Thrust/Weight: 1.07 with 56% internal fuel; 0.91 with full fuel

Main Gun System

↳*System*

Name: Gryazev-Shipunov GSh-30-1
Type: Autocannon
Caliber: 30mm
Length: 1,978 mm
Barrel Length: 1,500 mm
Width: 156 mm
Height: 185 mm
Weight: 46 kg
Barrels: 1
Action: Short recoil operated
Rate of Fire: 1,800 rounds/min
Maximum Firing Range: 1,800m
Effective Firing Range: 200-1,800m

Ammunition

Type: Rifle, Autocannon

Caliber: 30mm

Shell: 30×165mm

Basic Load: 150 Rounds

Main Missile Systems

↳*Main Missile System #1*

Name: Vympel R-27 (AA-10 Alamo)

Type: Air-to-Air Missile

Basic Load: 6 × R-27R/ER/T/ET/P/EP air-to-air missiles

↳*Main Missile System #2*

Name: R-73E

Type: Air-to-Air Missile

Basic Load: 4 × R-73E AAMs

Rocket Weapon Systems

↳*Rocket Weapon System #1*

Name: S-8KOM

Type: HEAT Rocket

Length: 1.57 m

Diameter: INA

Weight: 11.3 kg

Warhead Weight: 3.6 kg (1.1 kg of Hecphol-5/A-IX-10 explosive)

Engine: low smoke motor with powder BN-K.

Range: 1.3 to 4 km

Velocity: 400 mm versus RHA.

Armor Penetration: Velocity 610 m/s.

↳*Rocket Weapon System #2*

Name: S-13T

Type: Tandem HEAT

Length: 2.99 m

Diameter: INA

↳

Weight: 75 kg

Warhead Weight: 21 kg and 16.3 kg (1.8 kg and 2.7 kg of explosives)

Range: 1.1 – 4 km

Velocity: Velocity 500 m/s

Armor Penetration: Combined penetration of 6 m of earth and 1 m of reinforced concrete.

Bomb Weapon Systems

↳*Bomb #1*

Name: RBK-250

Type: Cluster Bomb

Basic Load: INA

↳*Bomb #2*

Name: RBK-500

Type: Cluster Bomb

Basic Load: INA

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: Phazotron Zhuk-MSE radar

Navigation Radar: N001E radar

Targeting System: OEPS-27 electro-optical targeting system

Radar Warning Receiver: SPO-15 Radar Warning Receiver

IRST: OEPS-27 IRST

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Su-27UBK Export Su-27UB two-seater. Su-27UB ("Flanker-C") Initial production two-seat operational conversion trainer. The Sukhoi Su-27 (Russian: Сухой Су-27; NATO reporting name: Flanker) is a Soviet-origin twin-engine supermaneuverable fighter aircraft designed by Sukhoi. It was intended as a direct competitor for the large United States fourth-generation fighters such as the Grumman F-14 Tomcat and F-15 Eagle, with 3,530-kilometre (1,910 nmi) range, heavy aircraft ordnance, sophisticated avionics and high maneuverability. The Su-27 was designed for air superiority missions, and subsequent variants are able to perform almost all aerial warfare operations. It was designed with the Mikoyan MiG-29 as its complement. The Su-27 entered service with the Soviet Air Forces in 1985. The primary role was long range air defence against American SAC B-1B and

B-52G/H bombers, protecting the Soviet coast from aircraft carriers and flying long range fighter escort for Soviet heavy bombers such as the Tu-95 "Bear", Tu-22M "Backfire" and Tu-160 "Blackjack". There are several related developments of the Su-27 design. The Su-30 is a two-seat, dual-role fighter for all-weather, air-to-air and air-to-surface deep interdiction missions. The Su-33 'Flanker-D' is a naval fleet defense interceptor for use on aircraft carriers. Further versions include the side-by-side two-seat Su-34 'Fullback' strike/fighter-bomber variant, and the Su-35 'Flanker-E' improved air superiority and multi-role fighter. The Shenyang J-11 is a Chinese licence-built version of the Su-27.

JL-8 (K-8) Chinese Jet Trainer







Tiers:

1 **2** 3 4

System

Alternate Designation(s): The Hongdu JL-8 (Nanchang JL-8), also known as the Karakorum-8 or K-8 for short.
Primary Function / Type: Jet Trainer
Manufacturer: Hongdu Aviation Industry Corporation Pakistan Aeronautical Complex
Crew: 2 (pilot, student)
Number of Engines: 1
Number of Hard Points: 1 x center line hard point for 23-mm cannon pod or fuel tank and 4 wing hard points

Dimensions

Length: 11.60 m
Height: 4.21 m
Width (Wing Span): 9.63 m
Wing Area: 17.02 sq m
Empty Weight: 2,687 kg
Combat Weight: 700 kg
Payload: 950 kg
Takeoff Clean: 3,557 kg
Takeoff with Stores: 4,235 kg

Automotive

Engine Name: 1 x Garrett TFE-731-2A turbofan; or 1 x Progress AI-25TL turbofan

Number of Engines: 1

Engine Type: Turbofan

Engine Power: 3,500 lb (1,588 kg) static thrust (TFE-731-2A)

Internal Fuel Capacity: 780 kg

Total Fuel Capacity: 1,168 kg

Cruise Speed: 800 km/h

Takeoff Speed: 185 km/h

Landing Speed: 165 km/h

Takeoff Roll: 443 m

Standing Run: 533 m

Load Factor: +7.33/-3.0 g

Rate of Climb: 1,811 m/min

Ceiling: 13,370 m

Range: 2,138 km

Endurance: 4.2 hours

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: INA

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Hongdu JL-8 (Nanchang JL-8), also known as the Karakorum-8 or K-8 for short, is a two-seat intermediate jet trainer and a light attack aircraft designed in the People's Republic of China by China Nanchang Aircraft Manufacturing Corporation. Pakistan is also the co-Partner of this project. The primary contractor is the Hongdu Aviation Industry Corporation. Its export variant, K-8 Karakorum is co-produced by the Pakistan Aeronautical Complex for the Pakistan Air Force. The JL-8 / K-8 has a multi-role capability for training and, with little modification, can also be used for airfield defense. The aircraft is supposed to be as cost-effective as possible, with a short turn-around time and low maintenance requirements. The JL-8 for the domestic Chinese market and its export variants, K-8E and K-8P, have different power plants and avionics.

JJ-7 Chinese Two Seat Combat Trainer Aircraft



Tiers:

1 2 **3** 4

Variants:

- **Note:** The Following is a list of the J-7 Variants: Type 1962/62 series J-7 series J-7I series J-7II series J/F-7M Air Guard series F-7MP/P Sky Bolt series J-7III series F-7C series J-7E series J/F-7F series MiG-21 upgrade subcontract J/F-7MG series J/F-7PG series J/F-7G series F-7BGI JJ-7 trainer series FT-7 trainer series

System

Alternative Designations: JJ-7
Manufacturer: Chengdu Aircraft Corporation/Guizhou Aircraft Industry Corporation
Crew: 2
Seat Capacity: Two seats, one for the student and one from the instructor.
Harpoints: 5 in total – 4× under-wing, 1× centreline under-fuselage with a capacity of 2,000 kg maximum (up to 500 kg each

Dimensions

Length: 14.86 m
Height: 4.10 m
Wingspan: 7.15 m
Wing Area: 23 sq m
Empty Weight: 5,145 kg
Maximum Payload: 1,800 kg
Maximum Takeoff: 7,372 kg

Automotive

Engine Name: 1 x Liyang Wopen 7 turbojet
Engine Power, Dry: 9,700 lb (4,400 kg) static thrust
Engine Power, with Afterburner: 13,500 lb (6,124 kg) static thrust
Internal Fuel Capacity: 2,385 liters
Maximum Speed: 2,175 km/h

Touchdown Speed: 310-330 km/h

Ceiling: 18,800 m

Climb Rate: 9,000 m/min

Radius: 370 km

Main Gun System

↳*Main Gun System #1*

Name: Gryazev-Shipunov GSh-30-1

Type: Autocannon

Caliber: mm30

Length: 1,978 mm

Barrel Length: 1,500 mm

Width: 156 mm

Height: 185 mm

Weight: 46 kg

Barrels: 1

Action: Short recoil operated

Rate of Fire: 1,800 rounds/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 1,800m

Effective Firing Range: 200-1,800m

↳*Main Gun System #1 Ammunition*

Type: Autocannon

Caliber: 30

Shell: 30×165mm

Basic Load: 1,000 Rounds

Missile Weapon Systems

↳*Missile Weapon System (Option #1)*

Name: PL-5

Type: Air-to-Air Missile

Length: 3.128 m

Diameter: 0.127m

Wingspan: 0.657m

Weight: 148 kg

Warhead: 6kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)

Engine: Solid-fuel rocket

Operational Range: 1.3–16km

Maximum Speed: Mach 2.5

Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

↳*Missile Weapon System (Option #2)*

Name: PL-8

Type: Air-to-Air Missile

Manufacturer: Xi'an Eastern Machinery Factory and CATIC

Length: 2.95 m

Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

↳*Missile Weapon System (Option #3)*

Name: PL-9

Type: Air-to-Air Missile

Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory

Length: 2.9m

Diameter: 0.157m

Wingspan: 0.856m

Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)

Detonation Mechanism: laser proximity fuse

Engine: Solid-fuel rocket

Operational Range: 22km

Flight Altitude: 4.5km

Maximum Speed: Mach 2+

Guidance System: multi-element infrared

Rocket Weapon Systems

Rocket Weapon System (Option #1): 55 mm rocket pod (12 rounds)

Rocket Weapon System (Option #2): 90 mm rocket pod (7 rounds)

Bomb Weapon System

Bomb Capacity: 50 kg to 500 kg unguided bombs

Avionics / Fire Control System

FCS Name: INA

Computerized FCS: Yes

Radar: 1 x Skyranger

Notes:

JJ-7/FT-7 This tandem two-seat trainer version was developed well after the single-seat fighters. It has an additional vertical fin to improve stability. An enlarged dorsal spine carries additional fuel. First flight took place on July 5, 1985. The export model is known as the FT-7. Production of the JJ-7 was launched in late 1987.

Yak-18 (Max) Russian Trainer Aircraft







Tiers:



Variants:

- **Yak-18:** The original production version. Retractable main undercarriage, fixed tailwheel.
- **Yak-18U:** This version was built in small numbers. It had retractable tricycle landing gear.
- **Yak-18A:** Cleaned up version of the Yak-18U, powered by a 194 kW (260 hp) Ivchenko AI-14 FR engine. Built in large numbers.
- **Yak-18P (NATO reporting name Mouse):** Single-seat aerobatic aircraft for use by flying clubs. Adaptation of Yak-18 two-seat trainer.
- **Yak-18PM:** Single-seat aerobatic aircraft with retractable tricycle landing gear.
- **Yak-18PS:** Aerobatic aircraft with retractable tailwheel.
- **Hongzhuan-501 (Red Craftsman):** Probable original designation for early CJ-5 production aircraft.
- **Nanchang CJ-5:** The Yak-18 was built under licence in China as the CJ-5 for use by the PLAAF, PLANAF and civilian flying clubs; 379 CJ-5s had been built when production ended in 1958.

System

Alternate Designation(s): Yak-18; NATO: Max
Primary Function / Type: Training Aircraft
Manufacturer: Yakovlev
Crew: 2 (pilot, student)
Number of Engines: 1
Number of Hard Points: INA

Dimensions

Length: 8.53 m
Height: 3.35 m
Wingspan: 10.60 m

Wing Area: 17.00 sq m

Weight, Empty: 1,025 kg

Weight, Maximum Takeoff: 1,316 kg

Payload: 306 kg

Automotive

Engine Name: 1 x Ivchenko AI-14R

Number of Engines: 1

Engine Type: 9-cylinder radial piston

Engine Power: 260 hp

Maximum Speed: 262 km/h

Cruise Speed: 227 km/h

Range: 750 km

Climb Rate: 318 m/min

Ceiling: 5,060 m

Takeoff Run: 200 m

Landing Run: 200 m

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: None

Laser Desingator: None

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

The Yakovlev Yak-18 (NATO reporting name Max) is a tandem two-seat military primary trainer aircraft manufactured in the Soviet Union. Originally powered by one 119 kW (160 hp) Shvetsov M-11FR-1 radial piston engine, it entered service in 1946. It was also produced in China as the Nanchang CJ-5. A member of the second generation of Russian aircraft designers, and best known for fighter designs, Alexander Sergeyevich Yakovlev always retained a light aircraft design section. In May 1945, Yakovlev initiated design of the Yak-18 two-seat primary trainer. He designed it to replace the earlier Yakovlev UT-2 and Yakovlev Yak-5 in service with the Soviet Air Forces and DOSAAF (Voluntary Society for Collaboration with the Army, Air Force and Navy, which sponsored aero clubs throughout the USSR). In 1944, an advanced version of the UT-2 had been built with many of the features of the new Yak-18. The new aircraft flew a year later, powered by a 119 kW (160 hp) Shvetsov M-11 five-cylinder radial engine and featuring pneumatically operated retractable main landing gear and a fixed tailwheel. It entered service as a trainer later that year and was built by Yakovlev up until 1956. Examples were exported to China in kit form beginning in 1950. The Chinese began producing license built copies in 1954 with the designation CJ-5. The Yak-18's greatest

claim to fame is its use as a night bomber by the North Korean Air Force during the Korean War. The aircraft were modified with bomb racks on the wing center section and flew over UN troop locations at night to drop bombs and harass UN forces. The single most successful attack of the North Korean aviation during the war was the destruction of a fuel dump with nearly 5.5 million US gallons (21 million l; 4.6 million imp gal) of fuel in the Inchon area in June 1953 by four or five Yak-18s. The five-cylinder engine reminded many of the US troops of the sound made by early gasoline powered washing machines, earning them the name: "Washing Machine Charlie". The name "Bed Check Charlie" was also used for these night intruders. The Yak-18s, along with Polikarpov Po-2s, became quite a nuisance until US night fighters began shooting them down. One night fighter crashed shooting down a Bed Check Charlie and another night fighter rammed its target. Other claims to fame for the Yak-18 are an international speed record for its class in 1951 as well as being the aircraft used for initial flight training by Yuri Gagarin (1st human in space) and Ken Rowe (No Kum-Sok, who defected from North Korea with a Mikoyan-Gurevich MiG-15 jet fighter during the Korean War). Later, as the need for conventional landing gear trainers abated, Yakovlev re-designed the Yak-18 with retractable tricycle landing gear and an Ivchenko AI-14RF radial engine of 224 kW (300 hp); this was designated the Yak-18A. The design proved exceptionally easy to build and maintain. There are an estimated 40 original Yak-18s in existence worldwide. Five are currently flyable in the US, three are flyable in Europe, and the Chinese Air Force has one flyable with several other airframes in storage. Approximately four other aircraft worldwide are currently being restored for flight. Many are found in major aviation museums worldwide including the National Air and Space Museum in the USA. The Nanchang CJ-6, produced in China, is sometimes quoted as a variant but is a completely different aircraft designed in China by Bushi Cheng and built by Nanchang Aircraft Company.

JL-10 (L-15 Falcon) Chinese Supersonic Lead-In Fighter Trainer Aircraft




Tiers:



Variants:

- **L-15B:** This is a more capable lead-in fighter trainer variant of the L-15. It is powered by two afterburning turbofan engines with full authority digital engine control (FADEC), likely the Russian Ivchenko-Progress AI-222-25F, providing a top speed of 750 mph (1,200 kph, Mach 0.98) at sea level.

System

Alternate Designation(s): JL-10; L-15 Falcon
Primary Function / Type: Lead-In Fighter Trainer
Manufacturer: Hongdu Aviation Industry Corporation
Crew: 2
Number of Engines: 2
Number of Hard Points: INA

Dimensions

Length: 12.27 m
Height: 4.81 m
Width (Wing Span): 9.48 m
Wing area: INA
Empty Weight: 4,500 kg
Gross Weight: 6,500 kg
Maximum Takeoff Weight: 9,800 kg

Automotive

Engine Name: 2 × Ivchenko-Progress AI-222K-25
Number of Engines: 2
Engine Type: Turbofan
Engine Power: INA

Maximum Range: 550 km

Maximum Speed: 1,729 km/h

Service Ceiling: 16,000 m

Ferry Range: 3,100 km

Rate of Climb: 200 m/s

Main Gun System

Note: This is a training aircraft

Fire Control / Avionics

Fire Control Radar Name:

Fire Control System Type: INA

Navigation Radar: Unknown type PESA radar, Likely with AESA radars for further updates.

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

The Hongdu JL-10 also known as the L-15 Falcon (□□) is a supersonic advanced training and light combat aircraft being developed by Nanchang-based Hongdu Aviation Industry Corporation (HAIC) to meet the Chinese People's Liberation Army Air Force (PLAAF) and People's Liberation Army Naval Air Force (PLANAF) lead-in fighter trainer (LIFT) requirements, as well as next-generation training and light combat needs for foreign customers. The JL-10 is an advanced trainer aircraft developed by Nanchang based Hongdu Aviation Industry Corporation. The aircraft made its maiden flight on 13 March 2006. The aircraft's general designer is Mr. Zhang Hong (□□), and development had reportedly been completed alongside Yakovlev OKB of Russia. The JL-10 is a direct rival to the Guizhou Aircraft Industry Corporation (GAIC) JL-9/FTC-2000 Mountain Eagle in competition for the People's Liberation Army Air Force's (PLAAF) next-generation advanced trainer aircraft program. HAIG unveiled a full-scale mock-up of its early prototype the L-15 advanced lead-in fighter trainer (LIFT) in the 2004 Zhuhai Airshow. The two-seat, two-engine L-15 featured the latest advanced technologies developed by China, such as the digital quadruple fly-by-wire (FBW), glass cockpit (two multi-color head down displays for both the front and rear cockpit, and an additional head-up display for the front cockpit) and hands-on-throttle-and-stick (HOTAS) flight control. The look-down field of view for the front cockpit is 18°, and 6° for the rear cockpit, exceeding the US requirement. The aerodynamic performance of the aircraft is enhanced by its large leading edge extensions (LEX) design, which gives a maximum angle of attack of 30°. This is very useful when trying to simulate the maneuvers of advanced fourth-generation fighters such as J-10, JF-17 and J-11, as well as for newest fifth generation fighter like J-20 and J-31. JL-9/FTC-2000 Mountain Eagle trainer jet from Guizhou Aircraft Industry Corporation (GAIC) is a direct competitor of the JL-10. JL-10 has a wide range of more advanced features comparing JL-9, but JL-9 is significant cheaper and its development and production would be fully indigenous, while early batches of JL-10 still rely on AI-222 series turbofan engine from Ukraine before an indigenous update is ready. With the JL-10, student pilots will be able to complete mission flight training and advanced combat training, as well as complete all basic jet flight training courses. The aircraft also has six (four under-wing and two wingtip) pylons to carry various air-to-air and air-to-ground weapons. If necessary, it can serve in the lightweight attack role with minor modifications, carrying up to 3.5 tons of armament. Each of the first two units (#01 & #02) are powered by two Ivchenko-Progress DV-2 engines, which do not have afterburners, and these two aircraft thus do not have the capability to reach supersonic speed. The third unit (#03) is powered by a pair of an improved version of the DV-2, the DV-2F, that has afterburners, so that it can attain supersonic speed. The subsequent production units are expected to be powered by Ukraine's Ivchenko-Progress AI-222K-25F turbofan engines with afterburners once a co-production license is

obtained by the 608 Institute. Ivchenko-Progress was able to increase the thrust of the AI-222-28F (thrust 4500 kg afterburning) and AI-222-30F (5000 kg thrust afterburning) engines. The latter two engines may be used to equip the JL-10 or other Chinese aircraft. Meanwhile, according to various Chinese reports, JL-10s with updated Guizhou FWS-17 engines had already undergone test flights. In June 2013, the AJT condition of L-15 finalized the design and would be operated by PLAAF with a formal name JL-10. On July 1, 2013, the first batch of JL-10 began delivery to the PLAAF. Chinese Air Force and later Naval Air Force are highly satisfied with the aircraft's all-around performance, high reliability, cost-effectiveness, as well as its great multi-role update potentials, easy maintainability, and a service life of over 10,000 flying hours.

→Unmanned Aerial Vehicles (UAVs)

→→Very Low-Cost, Close-Range UAVs (Less than 5 km Range)

Raven RQ-11B American Unmanned Aerial Vehicle (UAV)







Tiers:



System

Alternate Designation: Raven RQ-11B
Type: Unmanned Aerial Vehicle (UAV)
Manufacturer: AeroVironment
Endurance: 60-90 minutes
Payloads: EO/IR Gimbal with IR pointer
GCS: Common GCS with Puma and Wasp® AE
Launch and Recovery Method: Hand-Launched, Deep Stall Landing

Dimensions

Length: 0.9 m
Wingspan: 1.4 m
Weight: 1.9 kg

Automotive

Engine Name: INA
Engine Type: INA

Engine Power: INA
Maximum Speed: 32-81 km/h, 17-44 knots
Maximum Range: 10 km
Maximum Altitude: 100-500 ft (30-152 m) AGL, 14,000 ft MSL max launch altitude
Endurance: 60-90 minutes

Notes:

The Raven system is the most widely deployed unmanned aircraft system in the world, ideal for low-altitude intelligence, surveillance, and reconnaissance missions that depend on rapid deployment and pinpoint maneuverability. Lightweight and simple to operate, the Raven is rucksack portable and can be hand-launched for day or night observation. The Raven has an optional stabilized gimbaled payload, and delivers real-time color and/or infrared imagery to the ground control and remote viewing stations. Thanks to its advanced avionics, Raven can be operated manually or programmed for autonomous navigation. AeroVironment’s common GCS interfaces with all of its tactical ISR air vehicles reducing the level of training required and decreasing the time and cost involved. The Raven® is the most widely used military, small unmanned aircraft system in the world today. The Raven B DDL® system is a lightweight solution designed for rapid deployment and high mobility for military applications requiring low-altitude surveillance and reconnaissance intelligence.

Bird-Eye 400 Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Bird Eye 650:** This is a larger version of the Bird Eye featuring additional batteries for an endurance of 12 hours. The system can be carried in three backpacks and operated by two crewmembers. It provides wide coverage with a stabilized day/night sensor payload and moving target tracker. The Bird Eye 650, as does its predecessor, is capable of fully automated and autonomous flight and has an electrical or fuel cell propulsion system. The air vehicle takes off from a folding mini-launcher or bungee system. It utilizes a flip-over recovery concept with parachute descent. The ground-control station is ruggedized and portable. The Bird Eye 650 is powered by an Aeropak integrated hydrogen proton exchange membrane fuel-cell system developed by Hydrogen Energy Systems in Singapore. The system delivers 600 watts of peak power and 900 watt/hour of net usable energy at less than 4.4 lb (2 kg) of weight. It uses hot-swappable cartridges that eliminate the need for battery chargers in the field. Payload options include Tamam's MicroPOP or Controp's Stabilized Miniature Payloads (STAMP). Potential missions include reconnaissance, urban, counterterrorism, law enforcement, patrol and convoy escort.
- **Bird Eye 650D:** Bird Eye 650D This is the latest variant. It is designed for military and paramilitary intelligence, surveillance and reconnaissance missions. Commercial applications include mapping, monitoring oil, gas and electrical distribution lines, water and pollution management and rapid surveillance of disaster areas. The UAV can conduct autonomous missions, including point takeoff and point recovery, at ranges of up to 90 mi (150 km) and with a maximum endurance of 15 hours. The air vehicle has a maximum takeoff weight of 66 lb (30 kg) and can carry a 12-lb (5.5-kg) payload, including an electro-optical infrared sensor. It is powered by a standard fuel engine. The Bird Eye 650D can be integrated with a variety of payloads, including gimbaled electro-optical sensors, passive electronic countermeasures and electronic warfare systems.

System

Alternative Designation: Bird Eye 400
Type of UAV: designed for urban and "over the hill" intelligence, surveillance and damage-assessment operations.
Manufacturer: IAI Malat division.
Primary Function: Reconnaissance UAV
Day/Night Capable:
All Weather Capable:
Man-Portable: Yes, The man-portable system is carried in two backpacks and can be deployed by two crewmembers in 30 minutes.
Takeoff or Landing Limitations: None, the Bird Eye 400 can be launched by hand or with a gungee System
Ground Crew:
Automatic Launch: Yes
Navigation: Yes

Return to Base Capable: Yes

Hold and Auto-Recovery Capable: Yes

Real-Time Imagery: The air vehicle captures real-time imagery and transmits it back to the portable ground control system via a satellite communication data link.

Deployment Time: min30

Camera Type: underbelly camera for optimal coverage with a stabilized picture and high-resolution imagery.

System Package: Each system consists of three air vehicles; electro-optical/infrared payloads; portable ground-control station; data link; and a power source and repair kit.

Ground Control Station: The ground-control station features a portable remote video terminal and ground control equipment. The fitted computer monitor displays planned missions using digital maps and pre-programmed flight coordinates.

Note: The air vehicle utilizes a turn-over landing maneuver to protect the payload.

Proliferation: Israel, Russia and Singapore

Dimensions

Length: m0.8

Width (Wing Span): m2.2

Height: INA

Weight, Maximum Takeoff: kg5.6

Weight, Payload: kg1.2

Automotive

Engine Name: INA

Engine Type: 1 x electric (lithium batteries)

Engine Power: INA

Range: km15

Maximum Speed: km/h111

Loiter Speed: km/h59-93

Endurance: min90

Mission Radius: km10

Operational Altitude: m150-460

Communications

Radio: INA

Retrans Radio: INA

Protection

Fuselage: INA

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW Counter Measures / CCM: No

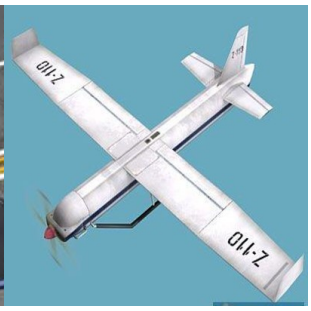
Counter Measures (Chaffs/Flares): No

Notes:

The Bird Eye 400 is a mini unmanned aerial vehicle (UAV) designed for urban and "over the hill" intelligence, surveillance and damage-assessment operations. The air vehicle captures real-time imagery and transmits it back to the portable ground control system via a satellite communication data link. Flight modes include automatic launch, navigation, return to base, hold and auto-recovery. The man-portable system is carried in two backpacks and can be deployed by two crewmembers in 30 minutes. The air vehicle has an underbelly camera for optimal coverage with a stabilized picture and high-resolution imagery. The Bird Eye 400 can be launched by hand or with a bungee system. The air vehicle utilizes a turn-over landing maneuver to protect the payload. The Bird Eye 400 has a flap system that lowers the aircraft's nose into a deep stall before landing on its back. Two elastic "shock absorbers" on the upper part of the UAV hit the ground first and reduce its impact, while its electric motor drives a hinged propeller, which also helps to avoid damage. The electrical propulsion system also minimizes its acoustic signature. Each system consists of three air vehicles; electro-optical/infrared payloads; portable ground-control station; data link; and a power source and repair kit. The ground-control station features a portable remote video terminal and ground control equipment. The fitted computer monitor displays planned missions using digital maps and pre-programmed flight coordinates. The Bird Eye's gimbaled MicroPOP sensor turret features color TV and infrared cameras

ASN-105 Chinese Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Panghyon-2:** This North Korean variant is based on the ASN-105. It is capable of carrying a combat load of 44 to 55 lb (20 to 25 kg) and reaching an altitude of nearly 9,900 ft (3,000 m).

System

Alternate Designation: ASN 105

Type: UAV

Dimensions

Length: m3.32

Height: m.9

Wingspan: m4.30

Wing Area: 1.85 sq m

Takeoff Weight: kg140

Payload: 30 kg

Automotive

Engine Name: INA

Engine Type: 1 x HS-510 4-cyl, air-cooled piston

Engine Power: 30 hp

Maximum Speed: 250 km/h

Cruise Speed: 150 km/h

Maximum Altitude: 3,200 m

Endurance: 2 hours

Remote Control Maximum Distance: 100 km

Armament

Note: None

Protection

Note: None

Notes:

The ASN-105 is a medium tactical unmanned aerial vehicle (UAV) in service with the Chinese People's Liberation Army. It is designed to perform real-time battlefield surveillance and intelligence collection. Guided by GPS navigation, the ASN-105B is launched by rocket boost and lands with a parachute. An ASN-105 system is made up of six UAVs, a main ground-control station, a mobile ground-control station, an image-processing shelter, a TV/infrared image interpreting shelter and a launcher. The ASN-105B may have a redesigned fuselage and changes to the engine. Models displayed in 2004 had a more square-shaped fuselage, increased wing chord and modified engine exhaust. It has a maximum takeoff weight of 350 lb (160 kg) and a ceiling of 19,700 ft (6,000 m). Status The ASN-105A was first delivered to the PLA in the mid-1990s; the ASN-105B is also in service with China. The ASN-105A also serves with Pakistan.

Vapor 35 American All-Electric Helicopter UAS





Tiers:



Variants:

- **Vapor 55:** INA

System

Alternate Designation: Vapor 35
Type: Unmanned Aircraft Systems (UAS)
Manufacturer: AeroVironment
Payload Capacity: 5 lbs (2.27 kg) – 10 lbs (4.5 kg)
Payload Options: EO/IR, LiDAR, Hyperspectral, PPK Mapping, Drop Mechanism
Data Links: 900 MHz, 2.4 GHz, 5.8 GHz, Satellite

Dimensions

Aircraft Length: 1,941 mm
Aircraft Width: 625 mm
Aircraft Height: 493 mm
Rotor Diameter: 1,704 mm
Gross Weight: 14.5 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Range: 56 km
Operating Altitude: INA
Max Cruise Endurance: 60 minutes with full payload
Max Hover Endurance: 45 minutes with full payload
Max Wind Peak: 20 kts (23 MPH); Gusts 40 kts (45 MPH)

Operating Altitude: 0-12,000 MSL

Notes:

With advanced autopilot and a variety of available sensors, the all-electric VAPOR 35 Helicopter UAS provides the operational flexibility to meet your most demanding missions. Featuring military-grade components, intelligent HW/SW system design, and high energy density lithium-polymer battery, VAPOR delivers enhanced flight stability and up to one hour of flight time on a single battery charge. Multi-mission capable, VAPOR 35’s modular payload bay provides access to a variety of available integrated sensors and third party payloads including gimbaled EO/IR, survey grade PPK mapping, LiDAR and hyperspectral sensors. VAPOR 35’s economical packout and single case mission configuration enables one-man lift operation. Every VAPOR Helicopter UAS incorporates proprietary HeliSynth™ technology for system level optimization including advanced autopilot, payload control & operation, and mission performance efficiency.

Barracuda European Unmanned Aerial Vehicle (UAV)





Tiers:



System

Alternate Designation: Barracuda

Type: UAV

Dimensions

Length: m8.0

Wingspan: m7.0

Empty Vehicle Weight: kg3,000

Payload: kg300

Max Takeoff Weight: kg3,250

Automotive

Engine Name: 1 P&W Canada JT15D-5C

Engine Type: turbofan engine

Engine Power: 3,190 lb (14.2 kN) static thrust

Maximum Speed: Mach 0.8

Maximum Distance: km200

Maximum Altitude: 40,000 ft (12,200 m)

Armament

Note: None

Protection

Note: The Barracuda uses a specially shaped fuselage, including S-duct air inlet and V-tail, to scatter deflected radar, rendering the UCAV stealthy.

Notes:

The EADS Barracuda is a jet powered European unmanned aerial vehicle (UAV) currently under development by EADS, intended for the role of aerial reconnaissance and also combat (UCAV). The aircraft is a joint venture between Germany and Spain.

Development of the project was stopped after the first prototype crashed at sea while approaching for landing during a test flight. The program was resumed in 2008, with a second prototype being completed in November 2008. The rebuilt Barracuda underwent a series of successful flight tests in Goose Bay, Canada during July 2009, followed by further flight campaigns in 2010 and 2012. The Barracuda is primarily in competition with the Dassault nEUROn for strategic and defensive contracts. Both are stealthy and have a maximum air speed of around Mach 0.85. While Germany and Spain are behind the Barracuda, France, Italy, Sweden, Switzerland, Greece, and Spain are funding the nEUROn. Not much is known about the Barracuda as it is still in development; however, it is thought to have an operating ceiling of around 20,000 ft (6,096 m) and carries a maximum payload of 300 kg. The Barracuda is based on commercially available 'off the shelf' components, but also many refined systems. Its fuselage is constructed entirely from carbon fibre, but also has a greater strength to weight ratio than traditional aircraft materials such as Aluminum (the structure of the Eurofighter Typhoon and Boeing 787 Dreamliner are also made significantly out of it). The only significant metal component is the wing spar, running through the middle and reinforcing the wings. The wing spar allows for easy removal of the wings for transportation. The Barracuda uses a specially shaped fuselage, including S-duct air inlet and V-tail, to scatter deflected radar, rendering the UCAV stealthy.

CAC Fox French Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Fox-AT1:** Short range battlefield reconnaissance variant. The Fox-AT1 has a shorter wingspan of 3.6 metres (11 feet 10 inches); a deeper fuselage; and a sensor payload of 15 kilograms (33 pounds), consisting of day or night imaging systems, chemical sensors, or customer-specified payload. Unlike the Fox-TX, the Fox-AT1 has a skid to permit belly landings. It can carry four small underwing stores. Endurance is only an hour and a half. French forces have used the Fox-AT1 for tactical reconnaissance in the Balkans.
- **Fox-AT2:** Long range battlefield reconnaissance variant. The Fox-AT2 looks much like the Fox-AT1, but has the wider 4-meter wingspan. It can carry a heavier sensor payload of 30 kilograms (66 pounds), but only two wings stores, and uses a long-range radio communications link.
- **Fox-TS1:** Expendable target, with the short 3.6 meter wingspan. It can carry chaff, flares, radar enhancement devices, and other target gear.

System

Alternative designations: None
Engine: Limbach 22 hp L 275 E, 2 cylinder, 2 stroke, air-cooled
Propulsion: 2 blade push propeller
Take-off Weight (kg): kg135
Fuel and Payload (kg): kg60
Maximum (level)(km/h): (km/h216
Cruising Speed (km/h): (km/h145
Endurance (hrs): hours5
Max Ceiling, normal (m): m3,000
Min Ceiling (m): m30
RPV Mode Range (km): km50, 100, 150 (200 as an option)
Programed Mode Range (km): km350
Wing Span (m): m4
Overall Length (m): m2.75
Overall Height (m): m0.25

Flight Control

Launch Method: Hydraulic or sandow ramp

Recovery Method: Parachute

Landing Method: Airbag

PAYLOAD TYPES

Description: Panoramic CCD color camera, low light television (with zoom), IR linescan CAMELIA camera, SAR camera, FLIR, multi-sensor gimball platform (IR and visible), etc.

NOTES

Description: THE FOX AT2 UAV IS ONE OF A FAMILY OF LOW-COST UAVS DESIGNED BY THE FRENCH FIRM CAC SYSTEMES. EACH UAV SYSTEM IS COMPOSED OF A TRANSPORT AND LAUNCHING SYSTEM, A GROUND CONTROL STATION (GCS) MOUNTED ON A 4X4 TRUCK FRAME, AND FOUR UAVS. THE FOX AT2 (LIKE THE FOX AT1) IS LAUNCHED FROM A MOBILE LAUNCHING CATAPULT (TRANSPORTATION AND LAUNCHING SYSTEM) THAT IS MOUNTED ON A TRAILER WITH TRANSPORTATION COMPARTMENTS FOR 4 UAVS. NORMALLY TWO OF THE FOUR UAVS ARE EQUIPPED WITH CCD CAMERAS FOR DAYTIME MISSIONS AND THE REMAINING TWO ARE FLIR EQUIPPED FOR NIGHTTIME MISSIONS. UPON MISSION COMPLETION THE UAV CAN BE RESERVICED AND AVAILABLE FOR ANOTHER MISSION IN LESS THAN 30 MINUTES. THE FOX AT2 IS CAPABLE OF CARRYING 30 KILOGRAMS OF VARIOUS PAYLOADS. ADDITIONALLY, TWO UNDER-WING PODS ALLOW FOR TWO LOADS TO BE CARRIED AND DROPPED. NORMALLY THE GCS CONSIST OF A CREW OF THREE PERSONNEL: PILOT, OBSERVER, AND A TECHNICIAN. HOWEVER, TWO PEOPLE CAN DEPLOY THE UAV SYSTEM AND HAVE IT AVAILABLE FOR OPERATION IN LESS THAN 20 MINUTES. THE GUIDANCE AND CONTROL CONSISTS OF AN UHF DATA LINK WITH FOUR PROPORTIONAL AND EIGHT NUMERIC CHANNELS, OF WHICH FOUR CONTROL THE AUTOPILOT. TELEMETRY IS THROUGH A 12-CHANNEL DATA LINK.

Notes:

The CAC Fox is a small UAV developed in France for use as a reconnaissance aircraft and for electronic warfare. About a thousand have been sold in a number of variants, with generally similar appearance and specifications. The Fox-TX can carry a variety of payloads for radar or radio communications jamming; radar identification and location; communications intercept; or, when fitted with a warhead and a radar-homing seeker, anti-radar attack. The Fox-TX can also carry two small under wing stores.

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Aerosky Israeli Unmanned Aerial Vehicle







Tiers:



Variants:

- **Aerosky 2:** The Aerosky 2 variant was designed with a hybrid battery/piston engine developed by Zanzottera Technologies, Italy. The first flight took place on June 2, 2008. Its maximum takeoff weight is 176 lb (80 kg), with a flight endurance of 10 hours. It has a small noise signature at a low-altitude while operating with electrical propulsion, according to Flight International (April 22, 2008).

System

Alternate Designation: Aerosky

Type: UAV

Dimensions

Length: m3.05

Wingspan: m4.50

Takeoff Weight: kg70

Payload Weight: kg40

Automotive

Engine Name: INA

Engine Type: Combustion

Engine Power: hp10

Maximum Speed: 185 km/h

Maximum Distance: 200 km

Maximum Altitude: 3,050 m

Armament

INA:

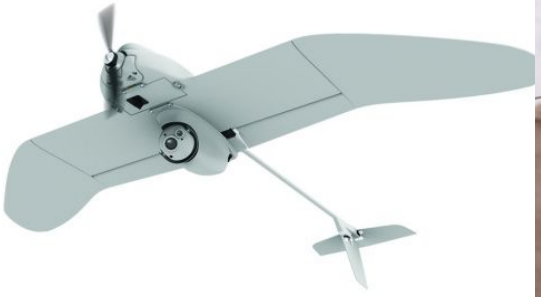
Protection

INA:

Notes:

Description The Aerosky is a short-range Israel-made unmanned aerial vehicle (UAV) that has served with the United States and Israel. It is used for tactical reconnaissance, surveillance and target acquisition. The UAV is used as the baseline vehicle for other Aeronoautics aircraft; the Aerosky has a twin tail-boom and a pusher-propeller. It has two radio frequency command uplinks and a real-time imagery downlink. It carries Tamam's POP 200 EO/IR payload and is controlled by UMAS avionics, including full autonomous navigation, camera-guided navigation and MCS ground enhancement. Status The Aerosky was marketed internationally through IAI and obtained by the U.S. Navy and the Israel Defense Forces. The IDF began operating it in March 2002 on "pay-by-the-hour" basis over the Gaza Strip and West Bank. While the vehicle may still be operational, as suggested in Armada International’s Compendium UAVs: Time to Get Real (2015), there has been little unclassified information regarding the Aerosky since 2008. As of 2017, there was no open-source information available about its status with the U.S. Navy or the IDF. The manufacturer did not respond to inquiries by the time of this update.

Wasp AE (RQ-12A) American Unmanned Aerial Vehicle (UAV)





Tiers:



System

Alternate Designation: Wasp AE RQ-12A
Type: Unmanned Aerial Vehicle (UAV)
Manufactuer: AeroVironment
Payload: Gimbaled payload with pan and tilt stabilized high resolution EO & IR camera in a compact aerodynamic modular payload.
GCS: Common GCS with Raven® and Puma
Launch Method: Hand-launched in a confined area with remote launch capability
Recovery Method: Deep-stall landing in a confined area

Dimensions

Length: 2.5 ft (76 cm)
Wingspan: 3.3 ft (102 cm)
Weight: 2.85 lbs; 1.3 kg

Automotive

Engine Name: INA
Engine Type: 1 × Electric motor, rechargeable lithium ion batteries
Engine Power: INA
Range: 5 km Line-of-Sight, 5+km with DDL relay
Maximum Speed: 20 knots cruise, 45+ knots dash
Endurance: 50 min
Operating Altitude: 500 ft (152 m) AGL

Notes:

Weighing in at just over a kilogram, the Wasp AE delivers best-in-class capabilities for an unmanned aircraft system of its size, including stealth-like maneuverability, superior imagery, encrypted video and exceptional ease of use. Wasp’s gimbaled payload is mechanically stabilized, enabling it to transmit advanced imagery in high-wind conditions, while its advanced avionics allow operators the option of manual or autonomous navigation. The all-environment Wasp combines hand-launch

capabilities with deep-stall landing for operations in confined areas on land or water. The aircraft also includes an integrated landing camera that provides operators with exceptional situational awareness as the aircraft approaches the ground.

RQ-7B Shadow American Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **RQ-7A Shadow:** The RQ-7A was the initial version of the Shadow 200 UAS developed by AAI. The first low-rate initial-production systems were delivered to the US Army in 2002 with the first full-scale production systems being delivered in September 2003. The RQ-7A was 11 ft 2 in (3.40 m) long and had a wingspan of 12 ft 9 in (3.89 m) with a 327 lb (148 kg) max takeoff weight. The aircraft's endurance ranged between 4 and 5.5 hours depending on mission. The "A" model aircraft also had the AR741-1100 engine which could use either 87 octane automotive gasoline or 100LL aviation fuel. The "A" model also featured IAI's POP200 payload.
- **RQ-7B Shadow:** Production of Shadow aircraft shifted to a generally improved RQ-7B variant in the summer of 2004. The RQ-7B features new wings increased in length to 14 ft (4.3 m). The new wings are not only more aerodynamically efficient, they are "wet" to increase fuel storage up to 44 liters for an endurance of up to 6 hours. The payload capability has been increased to 45 kilograms (99 pounds). After reports from Iraq that engines were failing, in 2005, the Army's UAV project manager called for the use of 100LL, an aviation fuel, rather than the conventional 87 octane mogas. Avionics systems have been generally improved, and the new wing is designed to accommodate a communications relay package, which allows the aircraft to act as a relay station. This allows commanders or even the aircraft operators themselves to communicate via radio to the troops on ground in locations that would otherwise be "dead" to radio traffic.
- **Armed Shadow:** On 19 April 2010 the Army issued a "solicitation for sources sought" from defense contractors for a munition for the Shadow system with a deadline for proposals due no later than 10 May 2010. Although no specific munition has been chosen yet, some possible munitions include the Raytheon Pyros bomb, the General Dynamics 81 mm 4.5 kg (10-pound) air-dropped guided mortar, as well as the QuickMEDS system for delivering medical supplies to remote and stranded troops. The Army subsequently slowed work, and the Marine Corps then took the lead on arming the RQ-7 Shadow. Raytheon has conducted successful flight tests with the Small Tactical Munition, and Lockheed Martin has tested the Shadow Hawk glide weapon from an RQ-7. On 1 November 2012, General Dynamics successfully demonstrated their guided 81 mm Air Dropped Mortar, with three launches at 7,000 ft hitting within seven meters of the target grid. As of August 2011, the Marine Corps has received official clearance to experiment with armed RQ-7s, and requires AAI to select a precision munition ready for deployment. AAI was awarded $10 million for this in December 2011, and claims a weapon has already been fielded by the Shadow. In 2014, Textron launched the Fury precision weapon from a Shadow 200. By May 2015, the Marine Corps had run out of funding for weaponizing the RQ-7, and the Army had shown little interest in continuing the effort. The Army's stance is that the Shadow's primary capability is persistent surveillance, while there are many other ways to drop bombs on targets and adding that to the Shadow would add weight and decrease endurance.
- **Nightwarden:** A test version called STTB flew in summer 2011. AAI is developing a bigger version called M2 with a blended wing to include a 3-cylinder 60 hp Lycoming heavy fuel engine, and began flight testing in August 2012. The Shadow M2 has a conformal blended body that reduces drag, wingspan increased to 25 ft (7.6 m), and is 120 lb (54 kg) heavier. It can fly for 16 hours at altitudes up to 18,000–20,000 ft (5,500–6,100 m); its endurance and service ceiling are comparable to Group 4 UASs like the MQ-1 Predator, so the company is pitching the M2 as a budget-conscious alternative to larger unmanned aircraft. It has a greater payload to carry synthetic aperture radar (SAR), wide-area surveillance, navigation, signals intelligence, and electronic warfare packages. It also has the ability to be controlled beyond line-of-sight through a SATCOM link. Although the M2 uses the same internal components as the RQ-7B Shadow 200 and is compatible with existing support equipment and ground infrastructure, its greater weight necessitates changes to the existing launcher. The Shadow M2 uses 80-85 percent of the components of the Shadow V2, while allowing for an additional 100 lb (45 kg) of capability with total airframe weight increased to 720 lb (330 kg).
- **Shadow 600:** AAI has also built a scaled-up Pioneer derivative known as the "Shadow 600". It also resembles a Pioneer, except that the outer panels of the wings are distinctively swept back, and it has a stronger Wankel engine, the UAV EL

801, with 52 hp (39 kW). A number of Shadow 600s are in service in several nations, including Romania.
- **SR/C Shadow:** AAI, in conjunction with Textron sister company Bell Helicopter, intends to modify two Shadows with a Carter rotor on top for vertical take-off and landing, eliminating the need for the recovery and pneumatic launcher systems, while increasing payload and endurance. As of August 2011, it is expected to fly in 2012. AAI also expected to use the SR/C technology for the Shadow Knight, a powered-rotor two-propeller surveillance aircraft for the US Navy MRMUAS program; however, the MRMUAS program was cancelled in 2012.

System

Alternate Designation: RQ-7B Shadow

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: AAI Corporation

Mission: Tactical reconnaissance UAS for ground maneuver forces Unmanned combat aerial vehicle (optionally)

Payload Capability: 45 kg

Endurance: 9 hours

Communications: Avionics systems have been generally improved, and the new wing is designed to accommodate a communications relay package, which allows the aircraft to act as a relay station. This allows commanders or even the aircraft operators themselves to communicate via radio to the troops on ground in locations that would otherwise be "dead" to radio traffic.

Note: The Shadow can operate up to 125 km (78 mi) from its brigade tactical operations center, and recognize tactical vehicles up to 8,000 ft (2,400 m) above the ground at more than 3.5 km (2.2 mi) slant range.

Dimensions

Length: 3.41 m

Wingspan: 6.1 m

Height: 1.0 m

Airfoil: NACA 4415

Empty Weight: 77 kg

Gross Weight: 170 kg

Automotive

Engine Name: 1 × AR741-1101

Engine Type: INA

Engine Power: 38 hp

Maximum Speed: 200 km/h

Cruise Speed: 130 km/h

Maximum Range: 125 km

Service Ceiling: 4,600 m ELOS (Electronic Line Of Sight)

Endurance: 9 hours

Note: When outfitted with IE (Increased Endurance) Wings, the CRP (Communications Relay Package) and the 1102 engine, endurance time is increased to 9 hours, wing span is increased to approx. 22 feet (6.7 m), and the service ceiling is 18,000 ft (only with authorization).

Notes:

The AAI RQ-7 Shadow is an American unmanned aerial vehicle (UAV) used by the United States Army, Australian Army and Swedish Army for reconnaissance, surveillance, target acquisition and battle damage assessment. Launched from a trailer-mounted pneumatic catapult, it is recovered with the aid of arresting gear similar to jets on an aircraft carrier. Its gimbal-mounted, digitally stabilized, liquid nitrogen-cooled electro-optical/infrared (EO/IR) camera relays video in real time via a C-band line-of-sight data link to the ground control station (GCS). The US Army's 2nd Battalion, 13th Aviation Regiment at Fort Huachuca, Arizona, trains soldiers, Marines, and civilians in the operation and maintenance of the Shadow UAS. The Shadow is operated in the U.S. Army at brigade-level. Production of Shadow aircraft shifted to a generally improved RQ-7B variant in the summer of 2004. The RQ-7B features new wings increased in length to 14 ft (4.3 m). The new wings are not only more aerodynamically efficient, they are "wet" to increase fuel storage up to 44 liters for an endurance of up to 6 hours. The payload capability has been increased to 45 kilograms (99 pounds).[5] After reports from Iraq that engines were failing, in 2005, the Army's UAV project manager called for the use of 100LL, an aviation fuel, rather than the conventional 87 octane mogas. Avionics systems have been generally improved, and the new wing is designed to accommodate a communications relay package, which allows the aircraft to act as a relay station. This allows commanders or even the aircraft operators themselves to communicate via radio to the troops on ground in locations that would otherwise be "dead" to radio traffic. The Shadow can operate up to 125 km (78 mi) from its brigade tactical operations center, and recognize tactical vehicles up to 8,000 ft (2,400 m) above the ground at more than 3.5 km (2.2 mi) slant range. Other incremental improvements to the system include replacing the AR741-1100 engine with the AR741-1101 which increases reliability through the use of dual spark plugs as well as limiting the fuel to 100LL. Also, the older POP200 payload was replaced with the newer POP300 system. In February 2010, AAI began a fleet update program to improve the Shadow system. The improvements include installing the wiring harnesses and software updates for IAI's POP300D payload which includes a designator for guiding laser-guided bombs. Other improvements in the program will include an electronic fuel injection engine and fuel system to replace the AR741-1101's carburetted engine. The most visible improvement to the system will be a wider wing of 20 feet (6.1 m) in span which is designed to increase fuel capacity and allow for mission endurance of almost 9 hours. The new wings will also include hardpoints for external munitions. A joint Army-Marine program is testing IED jamming on a Shadow at MCAS Yuma. Another joint effort is to view a 4 km × 4 km (2.5 mi × 2.5 mi) ground area from 3,650 m (12,000 feet). The Army is now proposing the upgraded Shadow 152A, which includes Soldier Radio Waveform software, which allows both the command post and their troops to see the images that the UAV is projecting, as long as they are on the same frequency. It also increases the distance and area of communication. Preliminary TCDL testing conducted at Dugway Proving Ground was a success. This led to an estimated fielding date of May 2010 for TCDL. In March 2015, the first Shadow unit was equipped with the upgraded RQ-7BV2 Shadow version. New capabilities for the BV2 include the TCDL, encryption of video and control data-links, software that allows interoperability between other UAS platforms, integration of a common control station and control terminal for all Army UAS platforms, an electronic fuel-injection engine, and increased endurance to nine hours through a lengthened wingspan of 20 ft (6.1 m), with weight increased to 204 kg (450 lb). Shadow systems are being upgraded at a rate of 2-3 per month, with all Army Shadows planned to become BV2s by 2019.

Skylark II Israeli Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Skylark II LE:**

System

Alternative Designation : None
Ground Crew: 2

Dimensions

Length, Overall: m3.2
Length, Wing Span: m4.2
Weight, Takeoff: kg35
Weight, Maximum Launch: kg65

Automotive / Performance

Altitude, Operating : m150-1,525
Ceiling, Service : m4,875
Endurance : hr6
Range of Operation: km50
Speed, Cruising : km/h65
Speed, Maximum : km/h129
Engine Name: Bental Industries electric motor
Engine Power: 5.4hp, 4kW
Engine Type: Electric, battery
Ground Control: Skylark dual station ground control, color console
Propulsion: Two blade propeller

Launch and Recovery

Launch Method: HMMWV class vehicle with mounted rail launcher, or can use optional rail launcher trailer

Recovery/Landing Method: Parachute and airbag cushion

Payload

Payload User Image Capabilities: All images can be overlaid on a downlinked integrated map

Notes: Range Finder (optional)

↳*Payload 1*

Description: HD Color CCD 10x zoom lens

Type: Optical Camera

↳*Payload 2*

Description: Night FLIR thermal imaging

Type: IR Camera

↳*Payload 3*

Description: Marker

Type: Laser

Notes:

The Skylark II was unveiled in 2006. It has a range of 60 km and is designed to be operated by a two-person crew and to be deployed using HMMWV class field vehicles. In December 2007, South Korea decided to purchase the Skylark II system. Israel planned to bring the Skylark II into service by mid-2013. Skylark II is designed to support brigades and divisions. The guidance system is a Starlink air terminal with secure digital data links, redundant avionics, and autonomous flight modes. They are interoperable with other Skylarks with real-time video transfer rate of 1.5 mb per second, encrypted UHF uplink, D/E band downlink. Uses a triple sensor payload that provides high definition optical, thermal imager, and laser capabilities.

Puma LE American Unmanned Aerial Vehicle (UAV)



Tiers:

1 2 3 4

System

Alternate Designation: Puma LE

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: AeroVironment

Endurance: 5.5 hours

Payload Capacity: 2.5 kg

Payloads: Mantis i45 Gimbaled payload with dual 15mp EO cameras, 50xf zoom, IR camera and low light camera for night operations, and high power illuminator. Secondary Payload Bay: integrates multi-mission payloads including Electronic Warfare, Communications Relay and others.

GCS: Common GCS with Puma, Raven and Wasp AE

Launch and Recovery Method: Hand-launched, bungee launch (optional) Autonomous or manual skid landing

Dimensions

Length: 2.1 m

Wingspan: 4.6 m

Weight: 11.8 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Speed: 46-76 km/h, 25 knots cruise, 41 knots dash

Range: 20 km, up to 60 km with LRTA

Maximum Altitude: 500 ft (152 ml) AGL Max Launch Alt 10,000 (3048 ml)

Notes:

Puma LE (Long Endurance) reflects AeroVironment’s deep recognition of the features warfighters require from an extended-mission unmanned aircraft system. At just 22.5 pounds, this ultra-lightweight Group 2 aircraft is launchable by hand or bungee and provides up to 5.5 hours flight endurance, delivering Group 2 capabilities in a Group 1 footprint. Puma LE is All

Environment, and provides an operational range of 60 kilometers in land and maritime environments when used with AeroVironment's Long-Range Tracking Antenna. The secondary payload bay contains dedicated power and ethernet, providing 3.4 pounds of payload capacity in addition to the integrated Mantis i45 gimbaled EO/IR sensor and NVG-visible laser illuminator for expanded mission capabilities. Equally important, Puma LE has been designed to maximize our customers' investment. Its plug-and-play, interoperable LRU components can be shared across other AeroVironment Puma AE aircraft, reducing logistical and training costs and enabling customers to optimize their fielded systems. Puma LE joins the Puma All Environment Family to deliver Group 2 capabilities in a Group 1 optimized, two-case mission packout. This ultra-lightweight Group 2 aircraft nearly doubles the time on station of Puma 3, featuring 5.5 hours of flight endurance and a 60+ km range when used with the Long Range Tracking Antenna (LRTA). Puma LE comes equipped with AeroVironment's Mantis™ i45 gimbaled payload featuring dual Electro-Optical (EO) cameras, an Infrared (IR) camera, a low-light camera, and an NVG-visible laser illuminator. The aircraft is multi-mission capable, with a total payload capacity of 5.5 lb. and a secondary payload bay with dedicated power supply and Ethernet. The system was built for the integration of multi-mission payloads such as Electronic Warfare, RF Geolocation or Communications Relay. Puma LE utilizes a precise, waypoint-controlled skid landing and does not require additional equipment for recovery.

DJI-Phantom Chinese Micro Unmanned Aerial Vehicle





Tiers:



System

Alternative Designation: Phantom
Ground Crew: 1
Propulsion: 4 two blade propeller, Vertical Take Off and Landing (VTOL), Electric
Motor: V15.2
Gross Takeoff Weight: kg1.28
Maximum Speed: km/h57
Max Ascent Speed: m/s5
Max Descent: m/s3
Ceiling, max: m6,000
Operational Ceiling: m300
Default Ceiling from Takeoff Point: m120
Endurance: min23
Range LOS CONUS: km5
Range LOS OCONUS: km3.5
Launch Method: Surface Launched
Launcher: No
Operating Temperature: F32-104
Power CONUS: dBm20
Weight: kg365

Payload

Gimbal Stabilized: Yes
Camera Mega Pixel: MP12.4
Camera Range Video: m100-3200
Camera Range Still: m100-1600

Photography Modes:: INA

Single Shot: Yes

3 Burst: Yes

5 Burst: Yes

7 Burst: Yes

Time Lapse: Yes

Video Modes:: INA

Ultra High Def: Yes

Full High Def: Yes

High Def: Yes

Secure Digital Card Max: GB64

Video Bitrate Max: Mbps60

File Formats:: INA

FAT 32: Yes

esFAT: Yes

Photo Format: JPG, DNG

Video Format: MP4, MOV

Wind speed at launch: INA

GPS / GLONASS Enabled: Yes/Yes

Recovery Method: INA

Dimensions: cm35

Height: INA

Controller

Operating Frequency: GHz2.400-2.483

Power CONUS: dBm20

Power OCONUS: dBm16

Endurance: btry pwr10%

Mobile Application

Name: DJI Go

EIRP: mW100

Third Party Applications: Yes

Live View Working Frequency: GHz24

Latency: ms220

Required Operating System:: INA

iOS 8.0 or later: Yes

Android 4.1.2 or later: Yes

Notes:

DJI Phantom and associated applications are compatible with Apple, Samsung, Google, Ascend, Huawei, Nubia, Sony, and MI wireless devices. Thermal imaging can be achieved by adding a separate camera to the UAV payload. The increase in weight can be offset with modifications to the power supply.

Mohajer-1 Iranian Tactical Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance.[13] The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: Qods Mohajer; Mohajer-1
Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)
Manufacturer: Qods Aviation, Tehran
Family: Mohajer family
In Service: 1986-no longer in service
Flight Control Method: controlled by hobby-class radio, which was easily jammed
Day/Night Capable: INA
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: INA
Autopilot: No

Ceiling, Normal Operations: kmINA

Endurance: houors1.5

Range: km30

Date Transmit Distance: INA

Location Positioning System: INA

Launch System: Runway

Recovery System: Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: Horizontal stabilizer

Note: Used during the Iran–Iraq War.

Proliferation: Iran, Syria, Venezuela, Hezbollah

Dimensions

Length: m2.43

Width (Wing Span): m3.04

Height: INA

Weight, Maximum Takeoff: kg83

Weight, Payload: INA

Tailbooms: Twin

Wing Type: straight wings mounted high and to the rear of the body

Automotive

Engine Name: INA

Engine Type: Single Engine

Engine Power: INA

Cruising Range: km30

Speed, Maximum: km/h180

Speed, Average: INA

Endurance: hours1.5

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: RPG-7

Type: Rocket-propelled grenade launcher[

In Service: 1961-Present

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Proliferation: + 9 Million

Length: mm950

Cartridge: mm85

Caliber: mm40

Weight: kg6.3

Muzzle Velocity, Boost: m/s115

Muzzle Velocity, Flight: m/s300

Effective Firing Range: m300

Maximum Firing Range: 700 m (OG-7V) (self detonates at ≈920 m (1,000 yd))

Sights: PGO-7 (2.7×), UP-7V Telescopic sight and 1PN51/1PN58 night vision sights Red dot reflex sight

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: No

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: INA

Electro Optical Pod: INA

SAR/GMTI: No

SIGINT: No

ELINT: No

Protection

Fuselage: Narrow cylindrical fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed. The Mohajer-1 had a narrow cylindrical fuselage, twin tailbooms, and straight wings mounted high and to the rear of the body. It had a single engine (unknown model) in a pusher configuration, and was guided by ailerons on the wings, an elevator on the horizontal stabilizer, and rudders on the tailbooms. The Mohajer-1 had three fixed landing gear for launch and recovery. It could also be recovered by parachute.The Mohajer-1 was about 8 feet long and had a wingspan of about 10 feet. The Mohajer-1 carried a single still camera, probably carrying photographic film developed after the drone landed. It was controlled by hobby-class radio, which was easily jammed. In addition, Iran attempted to arm it with six RPG-7 rockets, three under each wing, though this was not very successful. This initial variant was used during the later stages of the Iran-Iraq war. It was typically launched from speedboats to provide battlefield surveillance. Unlike later models, the Mohajer-1 featured tricycle landing gear. It had a range of up to 19 mi (30 km) and carried a static nose-mounted camera. The air vehicle could be armed with up to six PG-7 rockets, with three under each wing.

Panghyon-2 North Korean Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **ASN 105:** ASN-105 is a fixed wing UAV in conventional layout with high wing configuration, and propulsion is provided by a two-blade fixed pitch propeller driven two-stroke engine mounted in the nose. ASN-105 is a development of ASN-104, and thus having identical layout. The main improvement of ASN-105 over its predecessor ASN-104 is that its remote control range is increased by two third, from the original 60 km to 100 km. Another improvement of ASN-105 over its predecessor ASN-104 is that its ground control station is fully computerized.

System

Alternate Designation: Panghyon-2

Type: UAV

Dimensions

Length: m3.32

Height: m.9

Wingspan: m4.30

Wing Area: 1.85 sq m

Takeoff Weight: kg140

Payload: 25 kg

Automotive

Engine Name: INA

Engine Type: 1 x HS-510 4-cyl, air-cooled piston

Engine Power: 30 hp

Maximum Speed: 250 km/h

Cruise Speed: 150 km/h

Maximum Altitude: 3,000 m

Endurance: 2 hours

Remote Control Maximum Distance: 100 km

Armament

Note: None

Protection

Note: None

Notes:

This North Korean variant is based on the ASN-105. It is capable of carrying a combat load of 44 to 55 lb (20 to 25 kg) and reaching an altitude of nearly 9,900 ft (3,000 m). The ASN-105 is a medium tactical unmanned aerial vehicle (UAV) in service with the Chinese People's Liberation Army. It is designed to perform real-time battlefield surveillance and intelligence collection. Guided by GPS navigation, the ASN-105B is launched by rocket boost and lands with a parachute. An ASN-105 system is made up of six UAVs, a main ground-control station, a mobile ground-control station, an image-processing shelter, a TV/infrared image interpreting shelter and a launcher. The ASN-105B may have a redesigned fuselage and changes to the engine. Models displayed in 2004 had a more square-shaped fuselage, increased wing chord and modified engine exhaust. It has a maximum takeoff weight of 350 lb (160 kg) and a ceiling of 19,700 ft (6,000 m). Status The ASN-105A was first delivered to the PLA in the mid-1990s; the ASN-105B is also in service with China. The ASN-105A also serves with Pakistan.

Tu-143 Russian Unmanned Reconnaissance Aircraft



Tiers:



Variants:

- **M-143 variant:** A target drone version, the M-143, was introduced in the mid-1980s.
- **Tu-243 variant:** The Tu-143 was followed into service in the late 1990s by the similar but improved "Tu-243 Reys-D", with a 25 cm (10 inch) fuselage stretch, to provide greater fuel capacity and about twice the range; it had an uprated TR3-117 engine with 6.28 kN (640 kgf, 1,410 lbf) thrust; and improved low-altitude guidance.
- **Tu-300 variant:** Since 1995, Tupolev began promoting the further refined "Tu-300 Korshun", which resembles its predecessors but is fitted with a nose antenna dome and nose fairings for modern sensors and electronic systems. It also features a centerline pylon for a sensor pod or munitions. Financial issues forced a halt to development at the end of the 1990s, but work was resumed in 2007.

System

Alternate Designation(s): Tupolev Tu-143

Primary Function / Type: Unmanned Reconnaissance Aircraft

Manufacturer: Tupolev

Status: 1976-Present

Dimensions

Length: 8.06 m

Wingspan: 2.24 m

Height: 1.54 m

Launch Weight: 1,230 kg

Automotive

Engine Name: INA

Engine Type: INA
Engine Power: INA
Maximum Speed: 950 km/h
Maximum Range: 200 km
Service Ceiling: 5,000 m

Notes:

The Tupolev Tu-143 Reys (Flight or Trip, Russian: Рейс) was a Soviet unmanned reconnaissance aircraft in service with the Soviet Army and a number of its Warsaw Pact and Middle East allies during the late 1970s and 1980s. It contained a reconnaissance pod that was retrieved after flight, and from which imagery was contained. The Tu-143 was introduced in 1976 and strongly resembled the Tu-141, but was substantially scaled-down. It was a short-range (60–70 kilometer) tactical reconnaissance system and had low-level flight capability. The Tu-143 was truck-launched with JATO boosting, recovered by parachute, and powered by a TR3-117 turbojet with 5.8 kN (590 kgf, 267 lbf) thrust. The initial version carried film cameras, but later versions carried a TV or radiation detection payload, with data relayed to a ground station over a datalink. Some 950 units were produced in the 1970s and 1980s. The Tu-143 was used by Syria in reconnaissance missions over Israel and Lebanon during the 1982 Lebanon War, as well as by Soviet forces in Afghanistan during the Soviet–Afghan War.

Puma 3 American Unmanned Aerial Vehicle (UAV)







Tiers:



System

Alternate Designation: Puma 3
Type: Unmanned Aerial Vehicle (UAV)
Manufacturer: AeroVironment
Endurance: 2.5 hour flight endurance with an LE battery
Payloads: Mantis i45 Gimbaled Payload with Dual 15mp EO cameras, 50x zoom, IR camera and Low Light camera for night operations, and High Power Illuminator
GCS: Common GCS with Raven® and Wasp® AE
Launch Method: Hand-launched, rail launch (optional)
Recovery Method: Autonomous or manual deep-stall landing

Dimensions

Length: 1.4 m
Wingspan: 2.8 m
Weight: 6.8 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Maximum Speed: 47–83 km/h, 25–45 knots

Maximum Distance: 20 km standard antenna, 60 km with LRTA
Maximum Altitude: 300–500 ft (91–152 m) AGL
Endurance: 2.5 hour flight endurance with an LE battery

Notes:

AeroVironment’s expertise in UAS technology is epitomized by our third-generation Puma 3 AE (All Environment). We have equipped the Puma 3 AE with the powerful Mantis i45 gimbaled payload for use in day, night, or low-light environments, an array of communication frequencies (M1/M2/M3/M4/M5/M6), all protected with powerful AES-256 bit encryption, and a reinforced airframe with optional under wing transit bay for secondary payloads and third party applications. With both manual and autonomous navigation capability, Puma 3 AE’s newly enhanced propulsion system makes it significantly more efficient and easier to hand-launch. Deep- stall lading capability makes aircraft recovery simple and precise. All these advanced features can be used in land or maritime operations.

Vapor 55 American All-Electric Helicopter UAS





Tiers:



Variants:

- **Vapor 35:** INA

System

Alternate Designation: Vapor 55
Type: Unmanned Aircraft Systems (UAS)
Manufacturer: AeroVironment
Payload Capacity: 10 lbs (4.5 kg)
Payload Options: EO/IR, LiDAR, Hyperspectral, PPK Mapping, Drop Mechanism
Data Links: 900 MHz, 2.4 GHz, 5.8 GHz, Satellite

Dimensions

Aircraft Length: 1,941 mm
Aircraft Width: 672 mm
Aircraft Height: 583 mm
Rotor Diameter: 2,291 mm
Gross Weight: 24.9 kg

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Range: 56 km
Operating Altitude: INA
Max Cruise Endurance: 60 minutes with full payload
Max Hover Endurance: 45 minutes with full payload
Max Wind Peak: 20 kts (23 MPH); Gusts 40 kts (45 MPH)

Operating Altitude: 0-12,000 MSL

Notes:

The all-electric VAPOR 55 Helicopter UAS delivers flight control performance, endurance, and payload flexibility. Featuring military-grade components, intelligent HW/SW system design, and high energy density lithium-polymer battery, VAPOR delivers enhanced flight stability and up to one hour of flight time on a single battery charge. With an expansive modular payload bay, and up to 10 lbs. useable payload capacity, VAPOR is multi-mission capable, with access to a variety of available integrated sensors and third party payloads including EO/IR, survey grade PPK mapping, LiDAR and hyperspectral sensors, and Drop/Delivery Mechanism. Every VAPOR Helicopter UAS incorporates proprietary HeliSynth™ technology for system level optimization including advanced autopilot, payload control & operation, and mission performance efficiency.

→→Close-Range UAVs (6-50 km Range)

Skylark I Israeli Unmanned Aerial Vehicle (UAV)



Tiers:

1 **2** 3 4

Variants:

- **Skylark I LE Block II:** Hydrogen fueld cell propulstion engine, 7 hrs or greater endurance.
- **Skylark I-LEX Mini Unmanned Aircraft System (UAS):** Skylark I-LEX is a new generation, man-portable, electric-propelled, mini unmanned aircraft system (UAS) manufactured by Elbit Systems.

System

Alternative Designation : None
Engine Type: Electric, battery powered
Flight Control: GPS positioning, autonomous preprogrammed flight
Flight Control Method: Sprectralink data link
Ground Control: Handheld, Mini Ground Control Unit, color console
Ground Crew: 2, backpack (30-40 kg each)
Propulsion: Two blade propeller

Dimensions

Length, Overall: m2.2
Length, Wing Span: m2.4
Weight, Maximum Launch: kg5.5

Launch and Recovery

Launch Method: Hand or bungee launched

Recovery/Landing Method:: One button auto return, steep stall, inflatable cushion

Performance

Ceiling, Maximum (normal) : m455

Ceiling, Service : km5

Endurance : 1 hr, 30 min

Radius of Operation : km10

Speed, Cruising : km/h65

Speed, Maximum : km/h111

Maximum Range: 40 km

Payload

Description: Color CCD 10x zoom lens

Payload Downlink: D/E-band telemetry/video

Payload Uplink: Analog, encrypted, UHF

Payload User Image Capabilities: All images can be overlaid on a downlinked integrated map

Type: Optical Camera

Type: User Image Capabilities

Notes:

The Skylark I is designed as a man-packed system for tactical surveillance and reconnaissance. The Skylark is launched by hand. The payload consists of a daylight CCD or optional FLIR for night operations. During operation, it sends real-time video to a portable ground station. Recovery involves a deep stall maneuver, landing on a small inflatable cushion. It has a range of 40 km. It has been deployed in Afghanistan and Iraq. The Skylark I has also been selected by France's Special Forces in March 2008. Previous operators, who have now retired the system, include Australia and Canada. In total, it has been selected by more than 20 operators worldwide.

Zala 421-12 Russian Unmanned Aerial Vehicle (UAV)







Tiers:

1 2 3 4

System

Alternative designations: 421-4M
Proliferation: INA
Ground Crew: Two

Dimensions

Wing Span: m1.6
Length (fuselage): m0.62
Takeoff Weight: kg3.9
Max Takeoff Weight: kg4.8
Max Payload: kg1

Automotive

Engine: Electric, battery powered
Propulsion: 2-blade propeller
Max Speed: km/h130
Cruise Speed: km/h65-120
Maximum Ceiling: 3,600m Above Sea Level
Minimum Ceiling: m15
Operating Ceiling: m100-700

Endurance: min130

RPV Mode Range: km25

Pre-programmed Mode Range: km40

Launch Method: Elastic or pneumatic catapult

Wind speed at launch: 10 m/s

Recovery Method: Parachute (non-steerable)

Payload

Photo camera: 10 Mpx

Color Video Camera: 550 TVL

Infrared Camera: 320x240 px

Hazard Gas Analysis Module: Hazardous Gas (Optional)

System Components

Number of UAVs: 2 UAVs

Number of transport cases: 2 transport cases

Ground Control Station (GCS): 1 man-pack, ruggedized

GCS Power Supply: 120/220 V, 6 hour battery

Setup Time (min): 5-10 min.

Control Capability: UAV and payload controlled independently by GCS

Video roll-stabilized cameras: 2 Video cameras

Infrared Camera (optional): 1 IR Camera

Elastic or Pneumatic Launcher: 1 (optional)

Notes:

ZALA 421-12 is a micro, miniature, UAV developed and produced by the Izhevsk-based company ZALA Aero. It is a small, portable and reliable UAV platform. ZALA 421-12 is designed for front-line reconnaissance, overground and oversea surveillance. It takes 3 minutes to prepare ZALA for launching. The UAV is operated in the autonomous or semi-autonomous mode. Payloads fit in the standard mounting block that is interchangeable with other payloads and is a dual axis, gyro-stabilized payload. GLONASS/GPS satellite navigation with capability of autonomous operation.

Arpia Venezuela Tactical Unmanned Aerial Vehicle (UAV)








Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance. The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: CAVIM Arpia, Arpia
Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)
Manufacturer: Qods Aviation, Tehran
Family: Mohajer family

In Service: 2009-Present

Flight Control Method: controlled by hobby-class radio, which was easily jammed

Day/Night Capable: INA

All Weather Capable: INA

Takeoff or Landing Limitations: INA

Ground Crew: Capable of being controlled via land crew or autopilot

Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 90 min

Range: km30

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: PL3 pneumatic catapult

Recovery System: Skid Landing or Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: Horizontal stabilizer

Antenna Type: two stub antenna in the under 10 GHz range, one on each wing, for real-time control.

Note #1: Designed for surveillance use

Note #2: the Arpia lacks over-the-horizon guidance

Proliferation: Valenzuela

Dimensions

Length: m2.9

Width (Wing Span): m3.8

Height: INA

Weight, Maximum Takeoff: kg83

Weight, Empty: kg70

Tailbooms: Twin

Wing Type: Mid-mounted, untapered wings

Tail Type: Horizontal tail

Automotive

Engine Name: WAE-342 Engine

Engine Type: Single Engine

Engine Power: hp25

Cruising Range: km30

Speed, Maximum: km/h200

Speed, Average: INA

Endurance: 90 min

Maximum Ceiling: m4,820

Radius: km50

Cargo Capacity (Payload): kg15

Propellers: 2-bladed

Rudders: Twin Rudders

Belly Skid: Yes, The belly skids are non-retractable, but can compress on landing to reduce shock

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: RPG-7

Type: Rocket-propelled grenade launcher[

In Service: 1961-Present

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Proliferation: + 9 Million

Length: mm950

Cartridge: mm85

Caliber: mm40

Weight: kg6.3

Muzzle Velocity, Boost: m/s115

Muzzle Velocity, Flight: m/s300

Effective Firing Range: m300

Maximum Firing Range: 700 m (OG-7V) (self detonates at ≈920 m (1,000 yd))

Sights: PGO-7 (2.7×), UP-7V Telescopic sight and 1PN51/1PN58 night vision sights Red dot reflex sight

Basic Load: ea12

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: No infrared camera installed

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: fixed forwards-facing camera for navigation

Guidance System: GPS Guidance System

Note: A line-scanner is provided, which reportedly can provide 3-ft (1-m) resolution at an altitude of 16,400 ft (5,000 m)

Protection

Fuselage: Bullet-shaped fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

In 2007, Venezuela signed an agreement with Iran to assemble 12 Mohajer-2 UAVs from knock-down kits supplied by Quds. Venezuelan state-owned defense contractor CAVIM began assembling the drones by 2009. US satellite imagery revealed the facility manufacturing the drones in 2010, and they were unveiled to the public as the CAVIM Arpia in 2012.

Zala 421-08 Russian Micro Unmanned Aerial Vehicle (UAV)



Tiers:



System

Engine Type: 1 x Electric

Ground Crew: 2, backpack

Propulsion: 2-blade propeller

Weight, Empty : kg1.7

Weight, Maximum Payload : kg2.55

Weight, Maximum Take: 1.9

↳*Dimensions*

Height : m0.25

Length, Fuselage : m0.41

Length, Wing Span : m0.80

↳*Payload 2*

Description: Resolution Not Less Than 160?120

↳*System Components*

Ground Control Station (GCS), Control Capability: UAV and payload controlled independently by GCS

Ground Control Station (GCS), GCS Power Supply: 120/220 V, 6 hr battery

Ground Control Station (GCS), Setup Time : min5 to 10

Ground Control Station (GCS), Transport Case: Ruggedized and Man Portable

↳*System Composition*

Catapult: 1 (optional)

Infrared Camera (optional): 1.0

Quantity, Transport Cases: ea2.0

Quantity, UAVs: ea2.0

Video roll: 2.0

Performance

Ceiling, Maximum : m3,600 Above Sea

Ceiling, Minimal : m15.0

Ceiling, Operating : m3600.0

Endurance : min60.0

Range, RPV Mode : km10.0

Range,Pre-programmed Mode: km40.0

Speed, Cruising : km/h65.0

Speed, Maximum : km/h150.0

Launch and Recovery

Launch Method: Hand Launched, Self-powered

Recovery Method: Parachute or Auto Return

Wind speed at launch : m/s15.0

Payload

↳*Payload 1*

Description: 10 (MPX) stabilized video

Type: Color Camera (550TVL)

↳*Payload 2*

Type: Infrared Camera

↳*Payload 3*

Description: Chemical/Hazardous Emission

Type: Gas Detection module

Notes:

The ZALA-421-08 is a small, hand-launched unmanned aerial vehicle (UAV) designed for short-range surveillance and reconnaissance operations. The air vehicle is of a flying-wing design, propelled by a single electric pusher propeller. The aircraft is equipped with a GPS-based navigation system. Swarming tactics with multiple UAVs can be employed through automatic and ground control systems. Voice-based mission reporting and planning capabilities are also under development. A standard ZALA-421-08 system includes two air vehicles and a portable ground control station, as well as two sets of spare batteries. The ground station offers video resolution of 720 x 756 pixels in an MPEG2 format. Payload includes two cameras. Color, monochrome and infrared cameras can be fitted. The standard layout is a high-resolution monochrome camera facing forward and down, while a color camera faces down and to the side. The air vehicle is launched by hand and recovered by parachute.

Apid 55 Swedish Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Apid 60:** This is a further development of basic Apid design.
- **Skeldar V-150:** This version is a modified Apid 55.
- **Pelicano:** This is a maritime variant of the Apid 60
- **Apid One:** This is the latest variant of the Apid family of UAVs and builds off of the Apid 60 platform.
- **Tanan rotary-wing UAV:** Developed by Airbus, the Tanan Block 1 UAV is a modified Apid 60.

System

Alternate Designation: Apid 55

Type: Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle (UAV)

Manufacturer: Leonardo(since 2017)

Crew: Unmanned

Dimensions

Length, Fuselage: 4.0 m including rotor disc

Length, Airframe: 3.2 m excluding rotor disc

Width: 0.9 m

Rotor Diameter: 3.3 m

Height: 1.2 m

Weight, Empty: 95 kg

Weight, Maximum Takeoff: 150 kg

Weight Payload and Fuel: 55 kg

Automotive

Engine Name: 1 x Hirith E18H

Engine Type: water-cooled 2-cylinder, 2-stroke fuel-injected starter

Engine Power: 55 hp

Fuel Consumption: 8-12 L/hour

Fuel Capacity: 60 L
Electric Power: 700 W
Maximum Speed: 90 km/h
Cruising Speed: 60 km/h
Radius: 50 km
Endurance: 3-6 hours
Ceiling: 3,000 m
Launch/Recovery: automatic VTOL

Sensors and Electronics

Guidance System: autonomous stabilization and waypoint control
Flight Control Computer: APID FCS-52
Data Link: 380-470 mHz
Data Flow Rate: 19,200 bits/s

Notes:

The Apid 55 is a miniature vertical take-off and landing (VTOL) unmanned aerial vehicle (UAV) system designed and manufactured by CybAero (formerly known as Scandicraft Systems) for the United Arab Emirates Defence Agency (UAEDA). Each system incorporates three major components: Apid 55 aerial vehicle, a ground control station (GCS) and a payload control system. The vehicle can perform intelligence, surveillance, target acquisition and reconnaissance operations in hostile environments even in adverse sight conditions. It captures the real time imagery or videos of the battlefield and transmits to the GCS through a satellite communication data link with in a range of up to 50km. Flying at a maximum altitude of 3,000m, the UAV can provide its operators with real time intelligence data by executing surveillance and reconnaissance missions over a large area. The aircraft can be transported on a pick up transport vehicle. An improved version, the Apid 60 was also built by CybAero. The Apid 60 can fly at a maximum speed of 110km/h. Its cruise speed is 90km/h. It can loiter in air for a maximum of three to six hours. The variant is fitted with a skid type landing gear.

Mohajer-4 (Hodhod) Iranian Tactical Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance. The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army. The Mohajer-6 has a rectangular fuselage, an upwards-sloping nose, twin tailbooms, a top-mounted horizontal stabilizer, uncanted wingtips, straight wings mounted high and to the rear of the body, and air intakes on the top and bottom of the engine. The Mohajer-6 is controlled by two elevators on the horizontal stabilizer, rudders on the vertical stabilizers, and two flaps per wing. Unlike other Mohajer variants, it has a three-bladed propeller. The Mohajer-6 has a wingspan of 10 meters and is 5.67 meters long. It is similar in shape to the Selex ES Falco. The Mohajer-6 has fixed tricycle landing gear, which underwent changes between the unveiling ceremony in 2017 and mass production in 2018, perhaps to accommodate more weight. It is launched and recovered via runway takeoff/landing. It has a fixed, forward facing camera for navigation and a gimbal on the chin for a laser range finder and multispectral IR and visible light electro-optical imagery. The Mohajer-6 has three antennas, two on its left wing and one on its right, and a pitot tube on its nose. The Mohajer-6 has two hardpoints, one under each wing, which can each carry one Qaem TV/IR-guided missile. It has an autopilot system capable of automatic takeoff and landing. In addition, Iran describes it as capable of being fitted with electronic support measures, communications jamming, or electronic warfare payloads.

System

Alternative Designation: Mohajer-4; Hodhod

Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)

Manufacturer: Qods Aviation, Tehran

Family: Mohajer family

In Service: 1997-Present

Flight Control Method: The Mohajer-4 has a Hyarat 3 guidance and control system, which includes GPS navigation

Day/Night Capable: INA

All Weather Capable: INA

Takeoff or Landing Limitations: INA

Ground Crew: Crew of 5-7 men, including two operators. Capable of being controlled via land crew or autopilot

Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 7 hours

Range: km150

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: PL3 pneumatic catapult

Recovery System: Skid Landing or Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: Horizontal stabilizer

Antenna Type: two stub antenna in the under 10 GHz range, one on each wing, for real-time control.

Note #1: Designed for surveillance use

Proliferation: Iran: IRGC, Islamic Republic Ground Forces, Syria. Non-state Actors: Hezbolla and libyan National Army.

Dimensions

Length: m3.64

Width (Wing Span): m5.3

Height: INA

Weight, Maximum Takeoff: kg175

Weight, Empty: kg70

Tailbooms: Twin

Wing Type: low-mounted trapezoidal wings with upward-canted wingtips to lessen drag

Tail Type: Horizontal tail

Note: The Mohajer-4 has a modular design, and components such as the body, wings, and tailbooms can be detached and

recombined.

Automotive

Engine Name: Limbach L550E four-cylinder, two-stroke 50 hp engine

Engine Type: Four-cylinder, two-stroke 50 hp engine

Engine Power: hp50

Cruising Range: km150

Speed, Maximum: km/h200

Speed, Average: INA

Endurance: 7 hours

Maximum Ceiling: m5,486

Radius: km50

Cargo Capacity (Payload): kg15

Propellers: 2-bladed

Rudders: Twin Rudders

Belly Skid: Yes, The belly skids are non-retractable, but can compress on landing to reduce shock

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: Hydra 70

Type: Unguided Rocket

In Service: INA

Manufacturer: INA

Proliferation: WIdely Proliferated. The Hydra is widely used by US and allied forces, competing with the Canadian CRV-7, with which it is physically interchangeable.

Guidance System: Unguided Rocket

Length: mm1,060

Diameter: mm70

Weight: kg6.2

Muzzle Velocity: m/s700

Effective Firing Range: m8,000

Maximum Firing Range: m10,500

Speed: m/s739

Basic Load: ea2

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: INA

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: Fixed forward-facing camera for navigation

Surveillanc Camera: Either a downward-facing camera for aerial surveying or a gimbal-mounted video camera for surveillance

GPS Enabled: Yes

Guidance System: Hyarat 3 guidance and control system

Data Link: Yes, data link that can downlink imagery in real time

Note: A line-scanner is provided, which reportedly can provide 3-ft (1-m) resolution at an altitude of 16,400 ft (5,000 m)

Protection

Fuselage: Larger box-like fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Mohajer-4 is another evolutionary improvement over the Mohajer-1 and the Mohajer-2. with again improved range, endurance, and surveillance. Also known as the Hodhod, the Mohajer-4 has a larger box-like fuselage. The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997. The wings are tapered with an upward cranked tip. The static skids of the Mohajer-2 are replaced with flexible ones in a tricycle configuration. Composite materials are used in its construction. The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997. It may have entered mass production in 1999. It was first documented in 2003. Sources differ slightly on how many have been built; one sources says that 40 have been built as of 2006, while another says that as of the mid-2000s, 34 had been built. Design The Mohajer-4 features a squarish body and low-mounted trapezoidal wings with upward-canted wingtips to lessen drag. It is powered by a two-bladed Limbach L550E four-cylinder, two-stroke 50 hp engine in a pusher configuration. The Mohajer-4 is constructed of composite material. It is 3.64 m long and has a wingspan of 5.3 m. The Mohajer-4 has a modular design, and components such as the body, wings, and tailbooms can be detached and recombined. It has three landing skids.

The Mohajer-4 can land via landing gear or a parachute. The Mohajer-4 has a Hyarat 3 guidance and control system, which includes GPS navigation. It normally follows a preprogrammed flight path, but its mission profile can also be updated in flight via radio uplink. The Mohajer-4 has a fixed forward-facing camera for navigation and either a downward-facing camera for aerial surveying or a gimbal-mounted video camera for surveillance. Sources disagree on whether the Mojajer-4 can carry an infrared camera. Like the Mohajer-2, it has an onboard digital processor and can downlink sensor imagery. The Mohajer-4 is also reportedly capable of being fitted for communications relay and has an 'impressive' electronic warfare capability. Operational History: On November 7, 2004, Hezbollah flew a UAV over northern Israel for about 5 minutes. The UAV entered Israeli airspace at more than 100 knots and an altitude of about 1,000 feet, flew briefly over the seaside city of Nahariya, and fell into the sea. Some sources have identified the UAV as a Mohajer-4. There are reports that Iran sold eight Mohajer-4s to Hezbollah. Mohajer-4s have been used in the civil wars in Iraq and Syria. On 16 May 2015, the Turkish Air Force shot down a Mohajer-4 that violated its airspace. Mohajer-4s have also crashed, or been shot down, over Islamic State-held territories. A Mohajer-4 in Iraqi markings was downed over Iraq, but it is not clear if the UAV was actually being operated by the Iraqi Armed Forces. Mohajer-4s are located at Iran's Konorak Air Base and at Bandar Jask. There is a designation of the Mohajer-4 called "Shahin", which may be a sub-variant with unknown differences, or a designation for the Mohajer-4 in Iranian Army Ground service. There is also another sub-variant with unknown differences called the "Hodhod A/100". In addition, Mohajer-4s are used by Iran's border guard to interdict drug smuggling.

Zala 421-21 Russian Micro Unmanned Aerial Vehicle (UAV)





Tiers:



SYSTEM

Alternative designations: None

Ground Crew: Two, backpack

Engine: Electric, battery powered

Propulsion: 6-two blade propeller, Vertical Take-Off and Landing (VTOL)

Max Payload Takeoff weight: kg0.5

Ceiling, Operational: m10-1,000

Endurance: min130

Range: km15

Launch Method: Hand Launched

Wind speed at launch: INA

Recovery Method: Two fixed, skid landing gear

Launcher: (1x) (optional)

↳*Speed*

Maximum (level): km/h40

↳*Dimensions (cm)*

Wing Span: INA, See picture for est. scale

Length (fuselage): INA

Height: INA

PAYLOAD TYPES

Description: All imagery is real-time transfer to ground control

Photo camera: Single frame photo (color)

Color Video Camera: INA

Infrared Camera (Optional): INA

SYSTEM COMPONENTS

Number of UAVs: (2 X) UAVs

Number of transport cases: (2x) transport cases

Ground Control Station (GCS): (1x) hand-held, ruggedized

GCS Power Supply: Independent 6 hour battery

Setup Time: 5-10 min.

Control Capability: UAV and payload controlled independently by GCS

Roll-stabilized cameras: (2x) Video and photo camera

Infrared Camera (optional): (1X) IR Camera

NOTES

Description: PAYLOADS FIT IN THE STANDARD MOUNTING BLOCK THAT IS INTERCHANGEABLE WITH OTHER PAYLOADS. MULTI-SINGLE PHOTO/VIDEO/IR CAMERA SENSOR PAYLOAD IN DEVELOPMENT. 12/220 VOLT EXTERNAL CONNECTION FOR OPTIONAL POWER SOURCE FOR THE GCS.

Notes:

On Tuesday 8st June, 2010 ZALA AERO officially launched its new VTOL ZALA 421-21 with its unique six rotor design. The unmanned complex based on the helicopter UAV ZALA 421-21 is designed for remote landing and monitoring at altitude 10-1000m at a distance of 5km from the ground control station with maximum endurance of 25 minutes. The unique design permits the UAV to be extremely quiet in any environment. UAV transmits real-time video and photographs. The UAV is fully autonomous which requires minimal operator input for any mission and semi-autonomous without GPS mode is available for use inside buildings. The UAV can land on structures to preserve power while still monitoring and listening in on the target. Easy application and transportations are key elements that this platform offers. Payload capacity of 0.5 kilograms offers the VTOL ability to integrate payloads of small UAVs but at much closer range and zero movement. Infrared payloads are currently being implemented for night time reconnaissance. Future developments are being focused on increasing endurance to around 40 minutes and increasing the range to around 15km. Payload modification include combining day video camera and infrared camera for multi-purpose missions. New model is due to be released before the end of the year.

Mohajer-2 Iranian Tactical Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance.[13] The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR[3 UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: Qods Mohajer; Mohajer-2
Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)
Manufacturer: Qods Aviation, Tehran
Family: Mohajer family
In Service: 1996-Present
Flight Control Method: controlled by hobby-class radio, which was easily jammed
Day/Night Capable: INA
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: Capable of being controlled via land crew or autopilot
Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 90 min

Range: km31

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: PL3 pneumatic catapult

Recovery System: Skid Landing or Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: Horizontal stabilizer

Antenna Type: two stub antenna in the under 10 GHz range, one on each wing, for real-time control.

Note #1: Designed for surveillance use

Note #2: the Mohajer-2 lacks over-the-horizon guidance

Proliferation: Hezbollah, Iran, Syria and Venezuela

Dimensions

Length: m2.9

Width (Wing Span): m3.8

Height: INA

Weight, Maximum Takeoff: kg83

Weight, Empty: kg70

Tailbooms: Twin

Wing Type: Mid-mounted, untapered wings

Tail Type: Horizontal tail

Automotive

Engine Name: WAE-342 Engine

Engine Type: Single Engine

Engine Power: hp25

Cruising Range: km30

Speed, Maximum: km/h200

Speed, Average: INA

Endurance: 90 min

Maximum Ceiling: m4,820

Radius: km50

Cargo Capacity (Payload): kg15

Propellers: 2-bladed

Rudders: Twin Rudders

Belly Skid: Yes, The belly skids are non-retractable, but can compress on landing to reduce shock

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: RPG-7

Type: Rocket-propelled grenade launcher[

In Service: 1961-Present

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Proliferation: + 9 Million

Length: mm950

Cartridge: mm85

Caliber: mm40

Weight: kg6.3

Muzzle Velocity, Boost: m/s115

Muzzle Velocity, Flight: m/s300

Effective Firing Range: m300

Maximum Firing Range: 700 m (OG-7V) (self detonates at ≈920 m (1,000 yd))

Sights: PGO-7 (2.7×), UP-7V Telescopic sight and 1PN51/1PN58 night vision sights Red dot reflex sight

Basic Load: ea12

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: No infrared camera installed

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: fixed forwards-facing camera for navigation

Guidance System: GPS Guidance System

Note: A line-scanner is provided, which reportedly can provide 3-ft (1-m) resolution at an altitude of 16,400 ft (5,000 m)

Protection

Fuselage: Bullet-shaped fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center. The Mohajer-2 was developed in the 1990s and first seen in 1996. This variant is basically similar to the Mohajer-1, but has what are described as "carry handles" on either side of the fuselage just ahead and below of the leading edge of the wing. The landing gear is replaced with skids.

Outlaw Seahunter American Unmanned Aerial Vehicle (UAV)




Tiers:



Variants:

- **Outlaw G2E:** The Outlaw G2E, aka G2 UAV, is the entry level UAV system from Griffon Aerospace. This aircraft was designed with high value payloads in mind. The shape and size of the G2E was derived from the highly successful Griffon Outlaw G2 RPVT. This aircraft is intended to provide an open and customizable UAV platform for ISR missions, systems testing, and R&D. Griffon G2E uses a proven and reliable engine platform with an upgraded Electronic Fuel Injection (EFI) system. This gives the plane both efficiency and reliability at high altitudes. The G2E is also equipped with an on-board electrical generator that allows customers to provide power to their equipment without the need to add batteries. The aircraft utilizes a high aspect ratio wing to achieve both long duration flights and high aerodynamic efficiency. G2E is equipped with fixed steerable landing gear so it can be recovered more gently than a comparable belly-land, string capture, or net capture aircraft. Customers with access to improved runway surfaces can achieve even more landing finesse thanks to an optional Differential GPS (DGPS) receiver. With this top-level landing configuration, the G2E can be programmed for auto take-off, auto-pilot flight patterns, and auto landing at the end of the mission. The Outlaw G2E allows Griffon to offer exceptional peace of mind at a great value for customers flying very sensitive and highly valuable payloads.
- **Broadsword:** The Broadsword UAS is a much larger derivative of the MQM-170A Outlaw and is currently available for US military operations as the MQM-171A. The Broadsword is a 400-500 lbs. gross weight aircraft in contrast to the Outlaw G1, which is a 120 lbs. gross vehicle. It was developed as a research and test vehicle to evaluate new sensors, payloads, propulsion systems and other UAV components. Broadsword is a large capable aircraft ideal for emerging sensor or payload development missions. The Broadsword is very similar in shape and general layout to the Outlaw G1. Like the G1, it is primarily launched from a larger pneumatic launcher and then recovered by skid landing. Also like its little brother G1, the Broadsword can be equipped with optional landing gear for sensitive payloads. The Broadsword is also used as a test bed for new or upgraded high power propulsion systems. The increased size of the Broadsword allows customers to carry large, heavy payloads that would not have been achievable with the Outlaw G1.
- **Outlaw G1:** The Outlaw G1 was the aircraft that placed Griffon Aerospace on the map as a competitive Unmanned Aerial System manufacturer. The Outlaw was designed to satisfy a proposal for the US Army to produce a low-cost and versatile UAS platform. Griffon won the contract and in 2004 the Outlaw G1 became known to US military as the MQM-170A Remotely Piloted Vehicle Target (RPVT). Outlaw G1 has proven itself to be a tough, reliable, and low-cost platform through extensive operations with the US Army, US Navy, US Marine Corps, US Air Force, and even some Foreign Military Sales customers. Based on the great success as a target, the Outlaw G1 was developed further to fill various roles including ISR and flight training. The shape and material properties of the G1 yield low radar observability characteristics. Payload bays are available for integration of specialized payloads or the standard suite of EO/IR sensors. The bays can be configured interchangeably as fuel or sensor bays thereby exchanging mission endurance for payload capacity. The rugged composite airframe was designed for harsh field conditions and ease of repair. The airframe can be used with or without a landing gear. Outlaw G1 extensively uses readily available, off-the-shelf flight control and system components. The G1 is typically launched from a pneumatic launcher and then it is recovered by skid landing. If equipped with optional landing gear, the Outlaw can be operated from a runway to protect valuable or delicate payloads. Outlaw G1: the original affordable, multi-function UAS platform from Griffon Aerospace.
- **Outlaw G2:** The Outlaw G2, aka MQM-170C, is the successor to the Outlaw G1. It is currently the basic UAS platform for the US military RPVT contracts as well as development in the Griffon Outlaw family. The G2 uses the same reliable engine, radio and autopilot control systems, servos, and other key components from the G1. Griffon has integrated those components into a larger, and more aerodynamically efficient fuselage. The G2 also flies with a brand new, structurally superior wing design. The key benefits of the new aircraft are enhanced visual signature, a 50% increase in payload area, twice the endurance, added maneuverability, and a top speed increase of 20%. The G2 is operated from an inexpensive pneumatic launcher, similar to the launcher for the original Outlaw G1 RPVT. The Outlaw G2 was

designed for all types of customers. G2 can serve as a low-cost, reliable, target vehicle with an enhanced visual signature and increased hit area; or the G2 can be an inexpensive payload development platform offering great endurance, payload size, weight and power. Outlaw G2 is the affordable jack-of-all-trades from Griffon Aerospace.

- **Lionheart:** Lionheart began as the personal, passion-driven project of Larry French. Stemming from his admiration of the vintage Beechcraft Model 17 Staggerwing, Larry set himself on a journey to recreate the 1930's era legend by using modern aircraft production techniques. The maiden flight was on July 27, 1997. Just a few days later Lionheart made its public debut at EAA AirVenture Oshkosh. Within 9 months five kits were sold. A dream-turned-reality coincidentally seated Mr. French firmly in the owner's seat of a brand new company: Griffon Aerospace. Lionheart is a Cabin Class aircraft measuring about 20 feet from firewall to rudder. Due to the compact shape of the stagger wing, it can be constructed in a relatively small space. Interior cabin volume and seating is similar to a Piper Malibu, but wider at the shoulders. The primary structure is made of high-temperature carbon fiber composite molded in precision production tooling. Since the composite build offers so much rigidity Griffon was able to forgo wing uprights, which results in a very slick and eye-catching overall shape. The heartbeat comes from the well-proven and powerful Pratt & Whitney R-985 Wasp Jr. radial engine.

System

Alternate Designation: Outlaw Seahunter

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: Griffon Aerospace

Crew: Unmanned

Dimensions

Length: 3.0 m

Wingspan: 4.9 m

Weight: 86 kg

Automotive

Engine Name: 2 x 3W Model Engines

Engine Type: 2 x 3W Model 150i two-cylinder two-stroke Reciprocating engine

Engine Power: 17 hp

Maximum Speed: 241 km/h

Maximum Distance: INA

Ceiling: 5,500 m

Endurance: standard: 4 h; max: 8–9 h

Notes:

The newest and most advanced derivative of the Outlaw UAV program, the SeaHunter is the flagship UAV system from Griffon Aerospace. SeaHunter was designed as a larger, cost effective UAV platform for ISR missions, system testing, R&D efforts, and payload development studies. Placed in the 250-300 lbs. max take-off weight (MTOW) UAV class, this airplane offers customers a unique product in the world of UAV systems. SeaHunter is a twin engine design that offers a redundant propulsion and power generation system, as well as redundant aerodynamic controls. This can provide peace of mind to customers that want to fly payloads that are often much more valuable than the airframe itself. In the event of a catastrophic engine failure during flight, the second engine is sufficient to bring the aircraft back home safely. The on-board electrical generation from the twin engines can provide plenty of power for emerging small, but highly power dependent, payloads. SeaHunter is equipped with retractable landing gear for smooth take-off and landing. As with Outlaw G2E, SeaHunter can be configured for auto take-off and auto landing where improved runways are accessible. Reinforced hard points are located in the fuselage and both wings, giving customers the ability to add external payloads or auxiliary fuel pods. Griffon SeaHunter is aimed at a broad and diverse range of customers. It has been optimized for versatility, reliability, and toughness making it a flexible, tactical-class UAV workhorse.

Spylite (Skylite) Israeli Mini Unmanned Aerial Vehicle (UAV)







Tiers:



Variants:

- **SkyLite A:** Briefly called SkyLark, the SkyLite A was a vehicle or shoulder canister launched UAV for use in tactical units.
- **SkyLite B:** Variant upgrade has improved cameras, larger wings, longer endurance, and 1.5-kg added weight. Launched by catapult.

System

Alternative Designation : Skylite
Engine Type: Electric, battery powered
Propulsion: two blade pusher propeller
Weight, Maximum Payload : kg1.3
Weight, Maximum Take: 6.3-8.0
Weight, Total System : kg39.0

↳*Dimensions*

Length : m1.1
Length, Wing Span : m2.4
Width, Body : m0.25

↳*System Composition*

Ground Control Station (GCS): 1, hand-held, ruggedized
Quantity, Transport Cases: ea0.0

Quantity, UAVs: ea2 to 3

Performance

Altitude, Maximum : m0.3048

Ceiling, Operating : m3000.0

Endurance : hr4.0

Range : km50.0

Speed , Cruising : km/h70-100

Launch and Recovery

Launch Method: 4-kg catapult launch

Recovery Method: Combined parachute and inflatable bag

Payload

↳*Payload 1*

Description: Triple axis, gimballed, gyro-stabilized

Type: Combined sensor

↳*Payload 2*

Description: Provides day/night optical zoom lens with auto-tracker, infrared dual field of lens with auto zoom, and laser pointer

Type: Single sensor

↳*Survivability/Countermeasures*

Survivability/Countermeasures: Lightweight, composite structure. Small profile with low radar signature and very quiet engine. Excellent flight dynamics for use in all climates and severe weather, with winds of up to 35 knots, and gusts of up to 55.

Notes:

SpyLite is a multiconfiguration tactical mini unmanned aerial vehicle (UAV) produced by BlueBird Aero Systems. SpyLite is designed for Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) missions. It has been operational with Israel Defense Forces (IDF) and selected by the Israeli Air Force as well. SpyLite has been deployed in several operations and missions and accumulated thousands of flight hours in Israel and across the world. The UAV is fully automatic, from the time of catapult launch to its recovery. SpyLite international orders and design The Ethiopian Army placed an order with BlueBird Aero for an unspecified number of SpyLite mini UAV systems in April 2011. BlueBird Aero received a contract from an undisclosed African country for SpyLite UAVs in January 2013. The Chilean Army placed an order for six SpyLite UAVs in April 2013. SpyLite is an electrically-powered UAV system designed for covert, over-the-hill and ISTAR operations. The UAV delivers reliable performance in open areas as well as urban warfare scenarios. The compact UAV system measures 270cm from wing to wing. It weighs approximately 9kg and can carry a payload of up to 1.3kg. Unmanned aerial vehicle payloads The SpyLite UAV can carry a range of payloads, including Controp HD-STAMP, Controp M-STAMP, Controp UZ-Stamp and Photogrammetric payloads. The Controp HD-STAMP integrates a charge-coupled device (CCD) camera, providing high resolution images in daylight applications. The Controp M-STAMP payload includes a day camera, uncooled infrared (IR) camera with dual FOV (Field of Vision) and a laser pointer. The gimbaled and gyro stabilized payload can obtain high quality imagery in both day and night conditions. The Controp UZ-Stamp integrates a night uncooled IR thermal camera offering continuous zoom. SpyLite relays GPS-marked imagery by combining stabilised CCD and IR payloads, with advanced ground exploitation software, and provides reliable information to the user for better situational awareness. The sensor software enables the system to follow anything on

the ground as designated by the operator. The system provides users with real time video or tactical mapping of the area under surveillance. The SpyLite supports forces in real-time automatic targeting and tracking, motion detection and battle damage assessment. The SpyLite Photogrammetric payload includes a high resolution Canon EOS-M 18MP professional camera. The gimbaled and gyro stabilised camera is controlled by autopilot. The camera can collect images while transmitting real-time video to the ground control station (GCS). The images are stored in the inbuilt removable memory. Ground control station (GCS) for Israel's SpyLite UAV The SpyLite is controlled by a unified ground control station (GCS). The control station is commonly used for all UAVs of Bluebird as all of them share the same data links and command and control protocols. The GCS for SpyLite is very portable and can be carried by a single operator in a bag. The GCS consists of an integrated control unit (ICU), ground data terminal (GDT) and emergency control unit (ECU). The ICU is a rough compact control unit including control switches and personal computer (PC). The PC displays real-time video and a moving tactical map, while allowing the mission control with the help of external switches and stick. The external switches on the ICU are used in emergencies and in the event of mission termination. SpyLite can be completely controlled by the ICU without using the joystick. The ground data terminal (GDT) can be installed on a 2m tripod. The GDT is equipped with antenna revolving mechanism. The SpyLite can also controlled by using the ECU in case of an emergency. UAV remote video terminal (RVT) and performance The remote video terminal (RVT) provides UAV telemetry and displays real time imagery received from the UAV. It enhances the situational awareness of the front line forces and eliminates the continuous communication between field commanders and GCS staff for status updates. The front line forces can carry the terminal with them, while the flight control is carried out from the GCS. The SpyLite UAV is a stable platform for intelligence, surveillance and reconnaissance (ISR) as it is fully automatic from the launch to recovery. It can be launched in any area, as the system is equipped with parachute and an airbag for safe recovery. The SpyLite UAV can fly in almost any kind of weather, including strong winds of up to 75km/h (40kt) and in cloudy and rainy weathers. The SpyLite can perform operations lasting for four hours and can be controlled over a range of 50km. The range can be extended up to 80km. The system can be modified to support enhanced mission durations just by changing the battery and wing tips. The SpyLite UAV can reach a maximum altitude of 10,000m and stay safe from ground fire. It should, however, be operated at below 1,000m for best results. If the system runs out of battery, it takes just 15 minutes to land it, replace the battery and fly again into the air. The SpyLite can also be operated in maritime environment and can be launched from a boat. The SpyLite system can be used for secret operations as it features low acoustic and visual signatures. It is undetectable at 500m altitude.

→→Short-Range UAVs (51-150 km Range)

Orlan-10 Russian Unmanned Aerial Vehicle (UAV)





Tiers:



System

Alternative Designation: STC Orlan-10
Type of UAV: Medium-range, multi-purpose unmanned aerial vehicle (UAV)
Manufacturer: Special Technology Center LLC
Primary Function: Multi-purpose unmanned aerial vehicle (UAV)
Cost: US $87,000 and US $120,000
Day/Night Capable: Yes
All Weather Capable: Yes
Ground Crew: MP32M1 command and control vehicle. The ground segment can control up to four aerial vehicles simultaneously.
Endurance: hours16
Range: km150
Autopilot Capabile: Yes, operates autonomously based on pre-defined waypoints
Command and Control Modes: Both autonomous and remote control modes
Location Positioning System: Yes
Launch System: Folding catapult
Recovery System: Via Parachute Recovery
Number of Hard Points: INA
Manned-Unmanned Teaming (MUM-T) Capable: No
Automatic Landing and Takeoff Capability: No
Landing Gear: None
Transmit Telemetry Data Range: 120km and 600km from the launch station
Note: The Orlan-10 complex consists of unmanned aerial vehicles, launch and recovery systems, ground control segment, and swappable payloads.

Dimensions

Length (Fuselage): m2.0

Width (Wing Span): m3.1

Height: INA

Weight, Empty: kg12.5

Weight, Maximum Takeoff: kg16.5

Weight, Payload: kg6

Note: The UAV’s modular design is provided with a number of interchangeable payloads allowing for greater mission flexibility.

Automotive

Engine Name: 1 x A-95 Engine

Engine Type: Gasoline-Fueled Engine

Engine Power: INA

Cruising Range: km150

Speed, Maximum: km/h150

Speed, Cruising: km/h110

Ceiling: m5,000

Endurance: hours16

Number of Blades: ea2

Maximum Wind Speed at the Start: m/s10

Operating Temperatures: −30 to +40 °C

Communications

Radio: INA

Retrans Radio: INA

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Day Light Camera: Yes

Video Camera: Yes

Gyro Stabilized Camera Pod: Yes

Thermal Imaging Sensors: Yes

Thermal Imaging Camera: Yes

Real-time Intelligence Capable: Yes

3D Maps: Yes

Note: The imagery, video and other sensor data collected by the payloads is transmitted to the ground control station in real-time, through a data link.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

EW: Equipment Available

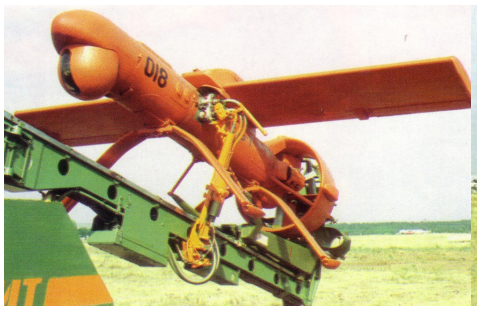
EW Counter Measures / CCM: Equipment Available

Counter Measures (Chaffs/Flares): INa

Notes:

Orlan-10 is a medium-range, multi-purpose unmanned aerial vehicle (UAV) developed by Russian firm Special Technology Center LLC in St Petersburg. The UAV is in service with the Ministry of Defense of the Russian Federation. It is intended for a variety of missions including aerial reconnaissance, observation, monitoring, search and rescue, combat training, jamming, detection of radio signals, and target tracking. The drone is usually used in a group of two or three, where the first one is used for reconnaissance in a height of 1-1.5 km, the second one for electronic warfare and the third one as a transponder that transmits intelligence information to the control center

Pchela-1T Russian Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Pchela-1IK:** The Pchela -1 with the "IK" designation is an infrared variant of the same system that also incorporates improved electronics and avionics.
- **Pchela-1K:** This variant is designed for round-the-clock operation and improved performance in mountainous terrain. It is fitted with a low-light-level TV camera
- **Pchela-1PP:** The –iPP is a jamming variant of the Pchela UAV. This variant is currently under development.
- **Pchela-1VM:** The Pchela-1VM is a target drone version.
- **Pchela-2:** This variant is designed to be powered by the British 60 hp AR-801 engine and to carry a different payload than the Pchela-1. It is expected to have a communications range of up to 62 miles (100 km).

System

Alternate Designation: Pchela-1T

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: Yakovlev

Launcher: The Pchela is launched using rocket assist by two solid-propellant booster rocket engines

Landing: Parachute

Time to Deployment: 20 min

Dimensions

Length: 2.78 m

Wingspan: 3.25 m

Takeoff Weight: 138 kg

Payload Weight: INA

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: 32-hp piston prop

Maximum Speed: 180 km/h

Cruise Speed: 120 km/h

Endurance: 2 hours

Rate of Turn: 3 grad/sec

Ceiling: 2,500 m

Optimum Altitude: 100-1,000 m

Uses: 5-10

Main Weapon System

Note: The Pchela-1T is a reconnaissance UAV and has no weapons.

Electronics

Flight Control: automatic flight, programmed; remote, manual

TV Camera Pitch: +5 to -65 deg

Measurement Error of Coordinates, Range: 150 m

Measurement Error of Coordinates, Azimuth: 1 deg

Notes:

The Yakovlev Pchela-1T ("Пчела" meaning bee) is an unmanned aerial vehicle (UAV) manufactured by the Russian Yakovlev Design Bureau. Its primary use is for surveillance and observation in battlefield environments with downlinked video. Other implementations and uses include target designation and as a training target. The Pchela is launched using rocket assist by two solid-propellant booster rocket engines, and it is recovered via parachute. The Pchela-1T has a range of 60 km (37 mi), flies at 100–2,500 m (330–8,200 ft) altitude at 120–180 km/h (75–112 mph). The maximum takeoff weight for the vehicle is 138 kg (304 lb). Yak lists the vehicle endurance at two hours.

DP-14 Hawk American Autonomous Unmanned Helicopter







Tiers:



Variants:

- **DP-6XT Whisper:** This upgraded variant, the present production model, features a most payload of fifteen pound (7 kg). The air vehicle will operate in crosswinds of up to forty knots (74 kmh). The DP-6XT has associate degree endurance of half-hour with a 15-lb payload and a 60-minute endurance with a two.2 pound (1 kg) payload. It may be deployed in quarter-hour. Batteries may be recharged in quarter-hour or swapped in three minutes. The air vehicle may be bound to associate degree surface power supply for constant 24/7 operation. A 200-ft (60-m) tether is out there as associate degree possibility. The air vehicle will give a mobile impromptu Wi-Fi network or close-range stable representational process. The system may be operated by one person and offers easy waypoint navigation. Payload options embody external hardpoints; directional mike and speaker; electro-optical/infrared day or night detector with three-axis stabilization with a optical device illuminator; and a high-bandwidth encrypted communication link. The DP-6XT options exactness management through autonomous flight path programming; nap of the world flight even in complicated terrain; non-line-of-sight flight, together with in GPS-denied environments; autonomous operation; and a little profile.
- **DP-12 Rhino:** This is a bigger version designed to hold payloads of as much as a hundred and fifty lb (70 kg) over distances of as much as 350 mi (560 km). It can fly in crosswinds of as much as 30 knots (fifty six kmh). The unmanned helicopter has an persistence of approximately 1 hour with a a hundred and fifty-lb payload or three hours with a 32-lb (15-kg) payload. The air car functions more than one hardpoints forward, aft, to the edges and at the stomach to hold quite a few payloads. Typical payloads consist of cameras; artificial aperture radar; ultra-wideband radar; LIDAR; electro-optical/infrared sensors; magnetometers; ground-penetrating radar; mapping packages; acoustic and ultrasonic sensors; and steady verbal exchange relays and links. The DP-12 may be released in 5 mins if organized at the touchdown pad and the flight route is already programmed. It can release in 10 mins from a chilly begin and the flight route is programmed. Launch from a chilly begin takes approximately 15 mins if a brand new flight route need to be programmed.
- **DP-14 Hawk:** This is a heavy-raise variation designed for missions inclusive of air deliver to ahead working bases. It is designed to hold as much as 430 lb (195 kg) of payload in its 26 cu ft (0.7 cu m) of shipment area or outside hardpoints. It can reportedly fly for approximately 2.4 hours with a 430-lb payload or four.three hours with a 100-lb (45-kg) payload. The DP-14 can perform in crosswinds of as much as forty knots (seventy four kmh). The air automobile could be powered with the aid of using both an 87-hp Solar T62 engine or a 133-hp Microturbo eAPU turbine and is designed to apply both JP-five or JP-eight heavy fuel. The power plant could generate four.2 kW of strength for avionics and sensors. The DP-14 Hawk makes use of onboard LIDAR and superior algorithms to navigate in complex, restrained environments, inclusive of superior intelligence for course planning, path corrections, perception, impediment avoidance and touchdown-webweb page selection. These competencies permit the air automobile to fly intelligent, self sustaining, non-line-of-sight, nap-of-the-earth missions and dynamically adapt to adjustments in flight situations and terrain, in accordance to Dragonfly Pictures. The machine employs IMU and GPS for takeoff and touchdown and an ultrasonic

sensor as a rangefinder to decide peak from the floor at some point of touchdown. These sensors allow landings even in brownouts or different degraded visible environments. The air automobile may be ready with side-established pods for over-sized items. The unmanned helicopter functions 1 ms autopilot biking and fast pitch correction at some point of self sustaining shipment offloading, which permits precision airdrops with accuracy of higher than 10 ft (three m). It calls for a touchdown webweb page measuring approximately 60 ft (18 m) x 60 ft (18 m). All-terrain touchdown tools helps landings on choppy floor; slopes of up to fifteen degrees; and heaving deliver decks. A relative positioning machine lets in the DP-14 to self-release and self-get better on pitching ships with an eight-in (203-mm) round mistakes probable. The machine may be assembled, readied and released inside 30 minutes.

System

Alternate Designation: DP-14 Hawk

Type: Autonomous Unmanned Helicopter

Manufacturer: Dragonfly Pictures, Essington, Pa.

Dimensions

Length: 4.11 m

Width: 0.61 m

Height: INA

Cargo Length: 1.83 m

Cargo Width: 0.51 m

Cargo Volume: 0.7 cu m

Combat Weight: INA

Payload Capacity: 195 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Speed: 190 km/h

Cruising Speed: 130 km/h

Maximum Range: 80 km

Ceiling: 4,570 m

Climb Rate: 150 m/min

Endurance Payload 195 kg: 2.4 Hours

Endurance payload 45.4 kg: 4.3 Hours

Notes:

The DP-14 Hawk is a heavy-lift variant of the DP-6 Whisper designed for missions such as air supply to forward in operation bases. it's designed to hold up to 430 lb (195 kg) of payload in its twenty six cu ft (0.7 copper m) of cargo area or external hardpoints. It will reportedly fly for about 2.4 hours with a 430-lb payload or 4.3 hours with a 100-lb (45-kg) payload. The DP-14 will operate in crosswinds of up to forty knots (74 kmh). The air vehicle would be powered by either AN 87-hp star T62 engine or a 133-hp Microturbo eAPU rotary engine and is intended to use either JP-5 or JP-8 significant fuel. The power plant would generate 4.2 kW of power for avionics and sensors. The DP-14 Hawk uses aboard measuring system and advanced algorithms to navigate in complicated, restricted environments, as well as advanced intelligence for path coming up with, course

corrections, perception, obstacle dodging and landing-site choice. These capabilities permit the air vehicle to fly intelligent, autonomous, non-line-of-sight, nap-of-the-earth missions and dynamically adapt to changes on the wing conditions and terrain, according to Dragonfly Pictures. The system employs imu and GPS for takeoff and landing and an supersonic sensing element as a measuring device to see height from the bottom throughout landing. These sensors allow landings even in brownouts or different degraded visual environments. The air vehicle is equipped with 2 side-mounted pods for over-sized things. The unmanned chopper features one ms autopilot cycling and speedy pitch correction throughout autonomous cargo offloading, that permits precision airdrops with accuracy of higher than 10 ft (3 m). It needs a landing site measurement regarding 60 ft (18 m) x 60 ft (18 m). All-terrain undercarriage supports landings on uneven ground; slopes of up to 15 degrees; and heaving ship decks. A relative positioning system permits the DP-14 to self-launch and self-recover on pitching ships with an 8-in (203-mm) circular error probable. The system is assembled, readied and launched inside half-hour.

Skylark III Israeli Unmanned Aerial Vehicle (UAV)





Tiers:

1 2 3 4

Variants:

- **Skylark 3A:** Skylark 3A first production subtype. 7 built.
- **Skylark 3B:** Skylark 3B cockpit moved forward 76 mm, overall length increase by 80 mm. 24 built
- **Skylark 3C 3A:** Skylark 3C 3A with strengthened spars to meet certification requirements. 2 built.
- **Skylark 3D 3B:** Skylark 3D 3B with strengthened spars to meet certification requirements. 2 built.
- **Skylark 3E modified 3B:** Skylark 3E modified 3B with wing a tip section of NACA 64,2,615 and narrower ailerons. 1 built.
- **Skylark 3F:** Skylark 3F tab assisted ailerons and an increase in tailplane span from 2.88 m to 3.23 m. 30 built including kits.
- **Skylark 3G modified F:** Skylark 3G modified F with increased span, narrower ailerons. 4 built.
- **Slingsby T.47A:** Slingsby T.47A proposed extended span version of the Skylark 3 with 20 metre wings Note:A retrospective alteration increasing the all up weight of the 3A and 3B to 830 lb was incorporated into the 3F and 3G.

System

Alternate Designation: Skylark 3

Manufacturer: Elbit Systems

Note: Skylark 3 enables performance of ongoing covert operations, providing real-time intelligence during day and night.

Dimensions

Length: INA

Width, Wingspan: m4.8 mounted under fuselage

Height: INA

Weight, Maximum Launch: kg45

Automotive / Performance

Engine Name: INA

Engine Type: Electric, battery, rechargeable, rear mounted pusher engine

Engine Power: INA

Propeller: blades2

Ceiling, Maximum: m6,400

Ceiling, Service: m4,600

Radius of Operation: km100

Time Required to Deploy: minutes20

Endurance: hours6

Launch and Recovery

Launch Method: Pneumatic launcher on Humvee class vehicle or launcher trailer

Recovery/Landing Method: Parachute and airbag cushion

Payloads

Note: #1: A payload pod mounted under the nose of the tactical aerial vehicle incorporates state-of-the-art electro optical / infrared (EO/IR) sensor for capturing high-definition imagery and videos under difficult field conditions. An advanced digital encrypted data link facilitates secure data transfer between the aerial vehicle and the ground control station. The real-time imagery, video and intelligence data acquired by the payloads are shown on a LCD screen display, enabling the operator to safely operate the UAV. A single ground control station can control two Skylark 3 unmanned aerial vehicles deployed in the same mission.

Note: #2: Skylark 3’s high-resolution, gimbaled and stabilized dual EO/IR payload facilitate a wide-range of applications including over-the-hill intelligence, force and convoy protection, strategic infrastructure protection, border patrol and security operations.

Notes:

SKYLARK 3 Delivering organic airborne ISTAR capabilities to the division, brigade and battalion levels, Skylark 3 is a tactical mini UAV system (UAS) optimized for both dismounted and vehicle-based operation. Based on the battle-proven Skylark I-LEX – with over 30 international customers and tens of thousands of operational sorties – Skylark 3 enables performance of ongoing covert operations, providing real-time intelligence during day and night. Its effective payload weight capabilities are industry-leading in its class. Skylark 3’s high-resolution, gimbaled and stabilized dual EO/IR payload facilitate a wide-range of applications including over-the-hill intelligence, force and convoy protection, strategic infrastructure protection, border patrol and security operations.

Mini Harpy Israeli Tactical Loitering Munition Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Cutlass:** This variant of the Harpy was evaluated in 1999 with Raytheon for search-and-destroy missions and the ability to attack a wider range of targets. It would have been a sea-launched weapon employing advanced sensors from Raytheon
- **Harop/Harpy 2:** This is a larger, upgraded variant. Designed as a fire-and-forget weapon, the Harop can fly more than 600 mi (1,000 km) to patrol a specific area and attack any hostile radars detected.
- **Harpy NG (new generation):** This is an upgraded variant that uses the Harop airframe. It was developed to counter newer air defense radar threats.
- **Mini-Harpy:** This tactical loitering munition combines the operating characteristics of the Harpy and Harop. It can lock onto radar and other emitting threats via person-in-the-loop electro-optical guidance. Fully autonomous operation is available as an option. It can attack emitting and non-emitting targets.
- **Maritime Harop:** This is a variant of the Harop optimized for operation from naval vessels, from patrol ships to frigates. It features a maritime-configured launcher and modified communications.
- **ASN-301:** This is a Chinese copy of the Harpy. It has a delta wing and pusher propeller configuration that appears virtually identical to the Israeli system. According to the China National Aero-Technology Import & Export Corp. (CATIC), the ASN-301 targets radar frequencies in the 2-16 GHz range and has a radar search range of 16 mi (25 km). The system is said to be able to target up to eight preset radar targets.

System

Alternate Designation: Mini-Harpy
Type: Tactical Loitering Munition Unmanned Aerial Vehicle (UAV)
Manufacturer: Israel Aerospace Industries, Ben Gurion International Airport, Israel
Based: Land and Sea Based
Performance: *Dual EO/IR and Anti-radiation seeker; *Canister launched from ground or naval platforms; *Man in the loop (MITL) or Fully Autonomous operation as an option; *Battle Damage Assessment (BDA); *Mission Execution Even Under Adverse Weather Conditions; *Full range from shallow to vertical attack angles; *Abort and re-attack capability; *Suppression / Destruction Enemy Air Defense Missions; *Silent using electrical propulsion
Note: The world’s only loitering munition with Dual EO/IR and Anti-Radiation seeker.

Dimensions

Length: INA
Wingspan: INA
Takeoff Weight: 40 kg
Warhead Weight: 8 kg

Automotive

Engine Name: INA
Engine Type: Rotary Engine
Engine Power: INA
Operational Range: up to 100 km
Operational Altitude: 305 m to 1,520 m
Loitering Speed: 102-157 kph
Maximum Speed: 370 kph
Endurance: 2 hours

Fire Control and Avionics

Communication Maximum Range: 100 km
Radar Name: INA
Radar Distance: INA
Radar Cross-Section: INA

Notes:

Mini-Harpy This tactical loitering munition combines the operating characteristics of the Harpy and Harop. It can lock onto radar and other emitting threats via person-in-the-loop electro-optical guidance. Fully autonomous operation is available as an option. It can attack emitting and non-emitting targets. Provides tactical forces with the ability to suppress the area of interest for long duration and to strike immediately emitting and non-emitting Targets. The ability to seek and to attack any target from any direction at any angle, gives the Mini HARPY significant advantage in any environment. In addition, long-range communication, long-endurance of loitering time and a deadly warhead enables it to deal with diverse targets in the modern warfare.

Mohajer-2N Iranian Unmanned Aerial Vehicle (UAV)




Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: Mohajer-2N
Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)
Manufacturer: Qods Aviation, Tehran
Family: Mohajer family
In Service: 2014-Present
Flight Control Method: controlled by hobby-class radio, which was easily jammed
Day/Night Capable: INA
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: Capable of being controlled via land crew or autopilot
Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 90 min

Range: km150

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: PL3 pneumatic catapult

Recovery System: Skid Landing or Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: Horizontal stabilizer

Antenna Type: two stub antenna in the under 10 GHz range, one on each wing, for real-time control.

Note #1: Designed for surveillance use

Note #2: the Mohajer-2N lacks over-the-horizon guidance

Note #3: The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics

Dimensions

Length: m3.0

Width (Wing Span): m3.9

Height: INA

Weight, Maximum Takeoff: kg88

Weight, Empty: kg75

Tailbooms: Twin

Wing Type: Mid-mounted, untapered wings

Tail Type: Horizontal tail

Automotive

Engine Name: WAE-342 Engine

Engine Type: Single Engine

Engine Power: hp25

Maximum Range: km180

Speed, Maximum: km/h200

Speed, Average: INA

Endurance: 6 hours

Maximum Ceiling: m4,820

Radius: km50

Cargo Capacity (Payload): kg15

Propellers: 2-bladed

Rudders: Twin Rudders

Belly Skid: Yes, The belly skids are non-retractable, but can compress on landing to reduce shock

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: RPG-7

Type: Rocket-propelled grenade launcher[

In Service: 1961-Present

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Proliferation: + 9 Million

Length: mm950

Cartridge: mm85

Caliber: mm40

Weight: kg6.3

Muzzle Velocity, Boost: m/s115

Muzzle Velocity, Flight: m/s300

Effective Firing Range: m300

Maximum Firing Range: 700 m (OG-7V) (self detonates at ≈920 m (1,000 yd))

Sights: PGO-7 (2.7×), UP-7V Telescopic sight and 1PN51/1PN58 night vision sights Red dot reflex sight

Basic Load: ea12

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: No infrared camera installed

Real Time Camera: Yes

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: fixed forwards-facing camera for navigation

Guidance System: GPS Guidance System

Note: the Mohajer-2N has two cameras; one under the nose for navigation, and a second on a gimbal under the body for surveillance

Protection

Fuselage: Bullet-shaped fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance. The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. The Mohajer-2N has a range of 150 km and flight endurance of 6 hours.

DP-6 Whisper American Autonomous Unmanned Helicopter




Tiers:



Variants:

- **DP-6XT Whisper:** This upgraded variant, the present production model, features a most payload of fifteen pound (7 kg). The air vehicle will operate in crosswinds of up to forty knots (74 kmh). The DP-6XT has associate degree endurance of half-hour with a 15-lb payload and a 60-minute endurance with a two.2 pound (1 kg) payload. It may be deployed in quarter-hour. Batteries may be recharged in quarter-hour or swapped in three minutes. The air vehicle may be bound to associate degree surface power supply for constant 24/7 operation. A 200-ft (60-m) tether is out there as associate degree possibility. The air vehicle will give a mobile impromptu Wi-Fi network or close-range stable representational process. The system may be operated by one person and offers easy waypoint navigation. Payload options embody external hardpoints; directional mike and speaker; electro-optical/infrared day or night detector with three-axis stabilization with a optical device illuminator; and a high-bandwidth encrypted communication link. The DP-6XT options exactness management through autonomous flight path programming; nap of the world flight even in complicated terrain; non-line-of-sight flight, together with in GPS-denied environments; autonomous operation; and a little profile.
- **DP-12 Rhino:** This is a bigger version designed to hold payloads of as much as a hundred and fifty lb (70 kg) over distances of as much as 350 mi (560 km). It can fly in crosswinds of as much as 30 knots (fifty six kmh). The unmanned helicopter has an persistence of approximately 1 hour with a a hundred and fifty-lb payload or three hours with a 32-lb (15-kg) payload. The air car functions more than one hardpoints forward, aft, to the edges and at the stomach to hold quite a few payloads. Typical payloads consist of cameras; artificial aperture radar; ultra-wideband radar; LIDAR; electro-optical/infrared sensors; magnetometers; ground-penetrating radar; mapping packages; acoustic and ultrasonic sensors; and steady verbal exchange relays and links. The DP-12 may be released in 5 mins if organized at the touchdown pad and the flight route is already programmed. It can release in 10 mins from a chilly begin and the flight route is programmed. Launch from a chilly begin takes approximately 15 mins if a brand new flight route need to be programmed.
- **DP-14 Hawk:** This is a heavy-raise variation designed for missions inclusive of air deliver to ahead working bases. It is designed to hold as much as 430 lb (195 kg) of payload in its 26 cu ft (0.7 cu m) of shipment area or outside hardpoints. It can reportedly fly for approximately 2.4 hours with a 430-lb payload or four.three hours with a 100-lb (45-kg) payload. The DP-14 can perform in crosswinds of as much as forty knots (seventy four kmh). The air automobile could be powered with the aid of using both an 87-hp Solar T62 engine or a 133-hp Microturbo eAPU turbine and is designed to apply both JP-five or JP-eight heavy fuel. The power plant could generate four.2 kW of strength for avionics and sensors. The DP-14 Hawk makes use of onboard LIDAR and superior algorithms to navigate in complex, restrained environments, inclusive of superior intelligence for course planning, path corrections, perception, impediment avoidance and touchdown-webweb page selection. These competencies permit the air automobile to fly intelligent, self sustaining, non-line-of-sight, nap-of-the-earth missions and dynamically adapt to adjustments in flight situations and terrain, in accordance to Dragonfly Pictures. The machine employs IMU and GPS for takeoff and touchdown and an ultrasonic sensor as a rangefinder to decide peak from the floor at some point of touchdown. These sensors allow landings even in brownouts or different degraded visible environments. The air automobile may be ready with side-established pods for over-sized items. The unmanned helicopter functions 1 ms autopilot biking and fast pitch correction at some point of self sustaining shipment offloading, which permits precision airdrops with accuracy of higher than 10 ft (three m). It calls for a touchdown webweb page measuring approximately 60 ft (18 m) x 60 ft (18 m). All-terrain touchdown tools helps landings on choppy floor; slopes of up to fifteen degrees; and heaving deliver decks. A relative positioning machine lets in the DP-14 to self-release and self-get better on pitching ships with an eight-in (203-mm) round mistakes probable. The machine may be assembled, readied and released inside 30 minutes.

System

Alternate Designation: DP-6 Whisper

Type: Autonomous Unmanned Helicopter

Manufacturer: Dragonfly Pictures, Essington, Pa.

Dimensions

Length: 1.80 m

Width: 0.49 m

Height: 0.76 m

Gross Weight: 23 kg

Empty Weight: 11 kg

Payload Weight: 12 kg

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Speed: 130 km/h

Maximum Range: 80 km

Ceiling: 260 m/min

Climb Rate: 260 m/min

Endurance Payload 1.0 kg: 1 Hour

Endurance payload 6.8 kg: 30 Min

Notes:

The DP-6 Whisper is a light-weight self sufficient unmanned helicopter designed for intelligence, surveillance and reconnaissance missions. The plane may be operated and deployed through a unmarried person. The layout is supposed to maximise payload inside a 50-lb (23-kg) gross weight limit. The helicopter has a tandem rotor configuration.

Ababil-2 Iranian Tactical Unmanned Aerial Vehicle (UAV)







Tiers:

1 2 3 4

Variants:

- **Ababil-B:** The Ababil-B is a target drone used for air defense unit training; it features a radar augmentation device.
- **Ababil-S:** This is the reconnaissance configuration, also known as the Ababil 5. It includes an electro-optical (EO) camera in the nose. It also has a real-time imagery downlink.
- **Ababil-T:** This is a strike variant. It comes with a daylight television camera, located underneath the fuselage. The variant can also carry a medium-sized high-explosive warhead. The night-time shootdown of an Ababil during the Israel-Hezbollah conflict in July-August of 2006 suggested that its sensor packag e had been modified to include an infrared system. The Ababil-T has a twin-tail configuration.
- **Ababil Jet/Hadaf 1:** This version was said to be in development in 2007. It is powered by a TEM Toloue-4 840-lb (3.7 kN) static thrust axial jet engine used on the C-802/Noor anti-ship missile and UAV/target drone.
- **Ababil-3:** This variant has a top speed of 124 mph (200 kmh) with a range of 60 mi (100 km), ceiling of 16,400 ft (5,000 m) and endurance of four hours. A night-vision capability is integrated.

System

Alternative Designation: Ababil-2; Ababil-II
Type of UAV: Long-range, low-technology drone
Manufacturer: Iran Aircraft Manufacturing Industrial Company (HESA).
Primary Function: Target Drone, Surveillance
Flight Control Method: INA
Day/Night Capable: INA
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: INA
Endurance: houors2
Date Transmit Distance: INA
Location Positioning System: INA
Launch System: A zero-length JATO platform or a Mercedes Benz 911 pneumatic truck launcher. Additionally, The rocket launch system can be used from a ship deck and can be assembled or broken down for portability.
Recovery System: a parachute provides a descent rate of 4 m/s, or skids can be used for conventional landings on a runway or field
Number of Hard Points: INA

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: INA

Landing Gear: Some variants have been seen with landing gear

Wars: The Ababil has been used in the 2006 Lebanon War, the Iraq War, and the Sudanese, Syrian, Iraqi, and Yemeni civil wars

Note: Rudimentary surveillance capabilities and can be used as a loitering munition, but is mainly used as a target drone

Dimensions

Length: m2.88

Width (Wing Span): m3.25

Height: m0.91

Wing Area: 1.76 m2

Empty Weight: kg30

Max Takeoff Weight: kg83

Payload Capacity: kg40

Automotive

Engine Name: 1 × WAE-342

Engine Type: Twin-cylinder piston engine

Engine Power: hp25

Maximum Range: km120

Speed, Maximum: km/h370

Speed, Cruise: km/h250–305

Endurance: hours2

Service Ceiling: m3,000

Fuel Capacity: 16 Liters

Propellers: 2-bladed

Communications

Radio: Data Link

Retrans Radio: INA

Fire Control

Fire Control System Type: No

Fire Control Radar: No

Radar Type: INA

Laser Rangefinder: INA

Full-Motion Video: INA

Still Camera: INA

Thermal Imaging Sensors: INA

Electro Optical Pod: No

SAR/GMTI: No

Protection

Fuselage: Cylindrical fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

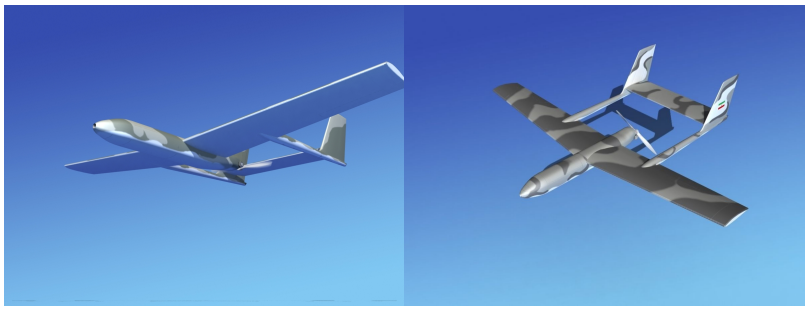
EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Ababil-2 has an improved flight-control system. Jane's reports that the Ababil-2 had its first flight in 1997 while Galen Wright writes that it entered production in 1992. Both sources agree the Ababil-2 was publicly revealed in 1999. Some sources also designate the Ababil-2 as the Ababil-II. The most common Ababil-2 variant is a target drone variant used for training air-defense crews. Rudimentary surveillance capabilities and can be used as a loitering munition, but is mainly used as a target drone.

Mohajer-3 (Dorna) Iranian Tactical Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance.[13] The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: Mohajer-3; Dorna
Type of UAV: Tactical Unmanned Aerial Vehicle (UAV)
Manufacturer: Qods Aviation, Tehran
Family: Mohajer family
In Service: 1999-No longer in service
Flight Control Method: controlled by hobby-class radio, which was easily jammed
Day/Night Capable: INA
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: Capable of being controlled via land crew or autopilot

Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 90 min

Range: km60

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: Wheels for a conventional launch capability or skids for a JATO launch

Recovery System: Wheels for a conventional landing capability or Parachute

Number of Hard Points: ea6

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: three fixed landing gear for launch and recovery

Stabilizer: low-mounted horizontal stabilizer flush with the main wing

Antenna Type: two stub antenna in the under 10 GHz range, one on each wing, for real-time control.

Autonomous Operation: Yes, for 80% of flight time

GPS Guidance System: No

Note #1: Designed for surveillance use

Note #2: the Mohajer-3 lacks over-the-horizon guidance

Dimensions

Length: m2.9

Width (Wing Span): m3.8

Height: INA

Weight, Maximum Takeoff: kg83

Weight, Empty: kg70

Tailbooms: Twin

Wing Type: Mid-mounted, untapered wings

Tail Type: Horizontal tail

Automotive

Engine Name: INA

Engine Type: Single Engine

Engine Power: hp25

Cruising Range: km100

Speed, Maximum: km/h180

Speed, Average: INA

Endurance: 2-3 hours

Maximum Ceiling: m4,820

Radius: km50

Cargo Capacity (Payload): kg15

Propellers: 2-bladed

Rudders: Twin Rudders

Belly Skid: Yes, The belly skids are non-retractable, but can compress on landing to reduce shock

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: RPG-7

Type: Rocket-propelled grenade launcher

In Service: 1961-Present

Manufacturer: Bazalt and Degtyarev plant (Russian Federation)

Proliferation: + 9 Million

Length: mm950

Cartridge: mm85

Caliber: mm40

Weight: kg6.3

Muzzle Velocity, Boost: m/s115

Muzzle Velocity, Flight: m/s300

Effective Firing Range: m300

Maximum Firing Range: 700 m (OG-7V) (self detonates at ≈920 m (1,000 yd))

Sights: PGO-7 (2.7×), UP-7V Telescopic sight and 1PN51/1PN58 night vision sights Red dot reflex sight

Basic Load: ea12

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: INA

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: color/monochrome still or video camera

Thermal Imaging Sensors: No infrared camera installed

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: fixed forwards-facing camera for navigation

Guidance System: GPS Guidance System

Real Time Images Capable: Yes

Note: A line-scanner is provided, which reportedly can provide 3-ft (1-m) resolution at an altitude of 16,400 ft (5,000 m)

Protection

Fuselage: Bullet-shaped fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way. The Mohajer-3 could be fitted with fixed landing gear, for a runway takeoff, or with skids for a JATO launch. It was recovered by parachute or skid landing. It was powered by an unidentified 25 hp (18.6 kW) piston engine. The Mohajer-3 was announced in 1999. The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.

Tipchak 1K133 Russian Unmanned Aerial Vehicle (UAV)





Tiers:

1 **2** 3 4

System

Alternative Designation: 1K133, 9M62, BLA-05

Type of UAV: Medium Altitude, Short Duration

Manufacturer: Design Deaurau Lutch, Russia; Electronics developed by Vega

Primary Function: Reconnaissance

Flight Control Method: INA

Day/Night Capable: Yes

All Weather Capable: Yes

Takeoff or Landing Limitations: INA

Ground Crew: INA

Ceiling, Maximum: kmINA

Ceiling, Minimum: kmINA

Ceiling, Normal Operations: kmINA

Endurance: hours4

Range: km70

Data Transmit Distance: INA

Location Positioning System: GLOSNASS / NAVSTAR

Launch System: Pneumatic catapult

Recovery System: Parachute

Number of Hard Points: 0

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: No

Landing Gear: Parachute

Dimensions

Length: m2.4

Width (Wing Span): m3.4

Height: mINA

Weight: kg70

Weight, Maximum Takeoff: kg/mINA

Weight, Payload: INA

Automotive

Engine Name: Hirth, piston

Engine Type: INA

Engine Power: hp12

Cruising Range (mission radius): km70

Speed: km/h90-190

Maximum Range: 70 km

Endurance: hours4

Communications

Radio: Digital uplink

Retrans Radio: No

Armament and Ammunition

Air to Air Missiles: No

Air to Ground Missiles: No

MIssile Types: NA

Bomb Types: NA

Armament Weight Total: NA

Targeting Capability: Can provide targeting for Iskander missiles at distances up to 350 km

Fire Control

Fire Control System Type: NA

Fire Control Radar: NA

Radar Type: NA

Radar Designator: NA

Laser Rangefinder: Yes

Laser Designator: Yes

Full-Motion Video: Yes

Still Camera: Yes

Thermal Imaging Sensors: Yes

Electro Optical Pod: No

SAR/GMTI: INA

SIGINT: INA

ELINT: INA

Digital Data Link: Yes, primarily used to communicate with artillery units for laser-guided targeting. Pairings include the 152mm Krasnopol howitzer shell and the Smerch multiple rocket system.

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

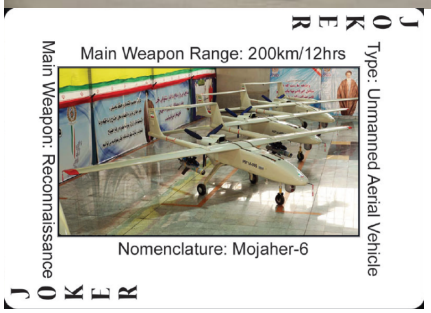
Notes:

The Tipchak 1K133 is a tactical reconnaissance system developed to replace the Kulon Stroi-P. The platform for the Tipchak is the Rybinsk-based Luch designed 9M62 (BLA-05). The 9M62 is launched by pneumatic catapult, is powered by a single 12hp Hirth piston engine, has an endurance of up to 4 hours, a maximum take off weight of 70kg, a top speed of 200km/h and has an entirely composite structure with a metal frame inside for higher strength and onboard camera protection. A parachute is used for recovery. Primary uses are search, detection, recognition, surface object coordinates determination, area surveillance, and adjustment of fires. The Tipchak system consists of a two-part, vehicle mounted command post, a UAV transport-launch vehicle, a technical maintenance vehicle and six 9M62 UAVs. The deployment time in field conditions is 15-20 minutes. The UAVs operate in pairs. Based upon the operations in South Ossetia, the Russian military has complained about the Tipchak's UAVs stating that they are too noisy and those that use rocket assisted take off give away their launch site. There is also concern about the quality of the reconnaissance as the images provided by the FMV were not of tactical value. A problem with the friend-or-foe system was also reported by the Russian army (Source: TASS-Defense; published May 02, 2017).

→→Mid-Range UAVs (151-300 km Range)

Mohajer-6 Iranian ISTAR Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Mohajer-1:** The Mohajer was Iran's first drone to enter series production and was used during the Iran–Iraq War. The Mohajer-1 was known simply as "Mohajer" through the 80s and 90s, when it was re-designated "Mohajer-1" as other Mohajer variants had been developed.
- **Mohajer-2:** Following the successful use of the Mohajer-1, Iran wanted a version with more range and endurance. This version, which would later be named the Mohajer-2, also had an auto pilot system to fly beyond the line-of-control of its command center.
- **Mohajer-2N:** In 2014, Iran introduced the Mohajer-2N, which shares the same design as the Mohajer-2 but has far improved performance. The Mohajer-2N replaces the electronics of the Mohajer-2 with more modern versions and has also has improved flight characteristics. T
- **Mohajer-3:** The Mohajer-3, also known as the Dorna, was designed with a new airframe for better performance. It had a square body and featured a low-mounted horizontal stabilizer flush with the main wing, the only member of the Mohajer family configured this way.
- **Mohajer-4:** The Mohajer-4 was designed for both the Iranian Army and the IRGC and entered service in late 1997.
- **Mohajer-4B:** Also known as the Sadiq, the Mohajer-4B is a significant evolution of the Mohajer-4 platform with a square fuselage, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, new landing skids, and straight wings mounted high and to the mid of the body
- **Sadegh-1:** The Sadegh-1 ("Honest-1"), also known as the QOM-1, is simply a Mohajer-4B with two MANPADS mounted on pylons.It was tested in late 2014
- **Mohajer-6:** The Qods Mohajer-6 is a persistent ISTAR UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy.The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army.

System

Alternative Designation: Mohajer-6
Type of UAV: Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) UAV
Manufacturer: Qods Aviation, Tehran

Units Manufactured: Total: +50

Family: Mohajer family

In Service: 2017-Present

Day/Night Capable: Yes

All Weather Capable: INA

Takeoff or Landing Limitations: INA

Ground Crew: Crew of 5-7 men, including two operators. Capable of being controlled via land crew or autopilot

Autopilot: Yes, which controls the aircraft via waypoints

Endurance: 12 hours

Range: km200 km

Date Transmit Distance: INA

Location Positioning System: Yes

Launch System: INA

Recovery System: Launched and recovered via runway takeoff/landing.

Number of Hard Points: ea2

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: Yes

Landing Gear: fixed tricycle landing gear

Stabilizer: Horizontal stabilizer

ISAR Capable: Yes

Proliferation: Iran, Syria, Venezuela, Hezbollah

Dimensions

Length: m5.67

Width (Wing Span): m10

Height: INA

Weight, Maximum Takeoff: kg600

Payload Capacity: kg40

Tailbooms: Twin tail booms

Wing Type: uncanted wingtips, straight wings mounted high and to the rear of the body

Stabilizer: top-mounted horizontal stabilizer

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Range: km200

Speed, Maximum: km/h200

Speed, Average: INA

Endurance: 12 hours

Maximum Ceiling: m5,486

Radius: INA

Cargo Capacity (Payload): kg40

Propellers: Three-bladed propeller

Rudders: Twin Rudders

Communications

Radio: INA

Retrans Radio: INA

Main Weapons System

Name: Qaem Air to Ground Bomb

Type: Qaem TV/IR-guided missile

Guidance System: TV/IR-guided

Length: INA

Diameter: INA

Weight: INA

Effective Firing Range: INA

Maximum Firing Range: INA

Speed: INA

Basic Load: ea2

Note: The Qaem A2G glide bomb is related to the Sadid-345 glide bomb, but has different wings and size

Fire Control

Fire Control System Type: INA

Fire Control Radar: No

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: Yes

Laser Designator: INA

Full-Motion Video: Yes, video and infrared with 1-m resolution mounted on the forward part of the fuselage

Still Camera: static nose-mounted camera

Thermal Imaging Sensors: Yes, multispectral IR and visible light electro-optical imagery

Electro Optical Pod: INA

Forward-Looking Infrared (FLIR) Sensors.: Yes

Onboard Digital Processor: Yes, which can downlink sensor imagery

Navigation Camera: Fixed forward-facing camera for navigation

Surveillanc Camera: Either a downward-facing camera for aerial surveying or a gimbal-mounted video camera for surveillance

GPS Enabled: Yes

Guidance System: Hyarat 3 guidance and control system

Data Link: Yes, data link that can downlink imagery in real time

Note: The Mohajer-6 has three antennas, two on its left wing and one on its right, and a pitot tube on its nose

Protection

Fuselage: Rectangular fuselage

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

EW: Yes

EW Counter Measures / CCM: Yes

Counter Measures (Chaffs/Flares): No

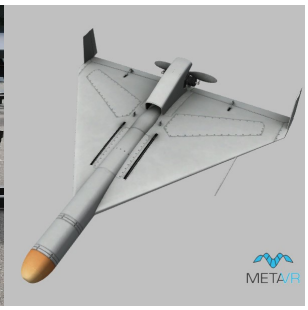
Communication Jamming: Yes

Notes:

The Qods Mohajer-6 is a Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) UAV capable of carrying a multispectral surveillance payload and/or up to two precision-guided munitions. Ten have been manufactured as of February 2018 for the IRGC Ground Forces, and 40 are planned for the IRGC Navy. The Mohajer-6 complements the larger Shahed 129 operated by the third IRGC branch, the IRGC-ASF. Three have also been delivered to the Iranian Army. The Mohajer-6 was unveiled in April 2017 and entered serial production in February 2018. As with other members of the Mohajer family, the Mohajer-6 is made of composite. The Mohajer-6 has a rectangular fuselage, an upwards-sloping nose, twin tail booms, a top-mounted horizontal stabilizer, uncanted wingtips, straight wings mounted high and to the rear of the body, and air intakes on the top and bottom of the engine. The Mohajer-6 is controlled by two elevators on the horizontal stabilizer, rudders on the vertical stabilizers, and two flaps per wing. Unlike other Mohajer variants, it has a three-bladed propeller. The Mohajer-6 has a wingspan of 10 meters and is 5.67 meters long. It is similar in shape to the Selex ES Falco. The Mohajer-6 has fixed tricycle landing gear, which underwent changes between the unveiling ceremony in 2017 and mass production in 2018, perhaps to accommodate more weight. It is launched and recovered via runway takeoff/landing. It has a fixed, forward facing camera for navigation and a gimbal on the chin for a laser range finder and multispectral IR and visible light electro-optical imagery. The Mohajer-6 has three antennas, two on its left wing and one on its right, and a pitot tube on its nose. The Mohajer-6 has two hardpoints, one under each wing, which can each carry one Qaem TV/IR-guided missile. It has an autopilot system capable of automatic takeoff and landing. In addition, Iran describes it as capable of being fitted with electronic support measures, communications jamming, or electronic warfare payloads.

ASN-301 Chinese Anti-Radiation Radar Loitering Munition Unmanned Aerial Vehicle (UAV)







Tiers:



Variants:

- **Cutlass:** This variant of the Harpy was evaluated in 1999 with Raytheon for search-and-destroy missions and the ability to attack a wider range of targets. It would have been a sea-launched weapon employing advanced sensors from Raytheon
- **Harop/Harpy 2:** This is a larger, upgraded variant. Designed as a fire-and-forget weapon, the Harop can fly more than 600 mi (1,000 km) to patrol a specific area and attack any hostile radars detected.
- **Harpy NG (new generation):** This is an upgraded variant that uses the Harop airframe. It was developed to counter newer air defense radar threats.
- **Mini-Harpy:** This tactical loitering munition combines the operating characteristics of the Harpy and Harop. It can lock onto radar and other emitting threats via person-in-the-loop electro-optical guidance. Fully autonomous operation is available as an option. It can attack emitting and non-emitting targets.
- **Maritime Harop:** This is a variant of the Harop optimized for operation from naval vessels, from patrol ships to frigates. It features a maritime-configured launcher and modified communications.
- **ASN-301:** This is a Chinese copy of the Harpy. It has a delta wing and pusher propeller configuration that appears virtually identical to the Israeli system. According to the China National Aero-Technology Import & Export Corp. (CATIC), the ASN-301 targets radar frequencies in the 2-16 GHz range and has a radar search range of 16 mi (25 km). The system is said to be able to target up to eight preset radar targets.

System

Alternate Designation: ASN-301

Type: Anti-Radiation Radar Loitering Munition Unmanned Aerial Vehicle (UAV)

Manufacturer: China; Company: INA

Dimensions

Length: 2.50 m

Wingspan: 2.41 m

Combat Weight: 135 kg

Warhead Weight: 18 kg

Automotive

Engine Name: 1 x UEL AR731

Engine Type: Rotary Engine

Engine Power: 37 hp (28 kW)

Maximum Speed: 220 kph

Maximum Range: 288 km

Ceiling: 4,570 m

Endurance: 4 hours

Fire Control and Avionics

Communication Maximum Range: 200 km

Radar Name: INA

Radar Distance: INA

Radar Cross-Section: <0.5 sq m

Notes:

The ASN-301uav seems to be a near-copy of the Israel Aerospace Industries (IAI) Harpy system that was purchased by China in the 1990s, according to foreign sources. The ASN-301uav is a delta-wing aircraft with a pusher propeller that looks virtually identical to the Harpy.It is designed to fly into hostile airspace and loiter until it detects a radar, at which point it homes in on the target and destroys it.

Hermes 450 Israeli Unmanned Aerial Vehicle (UAV)





Tiers:



System

Alternative Designation: 450S
Propulsion: 2 balde pusher propeller
Engine Power: hp70
Engine Type: Gasoline Rotary
Flight Control: Ground Control Station
Flight Control Method: Preprogrammed/in-flight reprogram
Ground Crew: 2
Weight: kg500
Weight, Fuel and Payload: kg150
Runway Requirements: Paved

↳Dimensions

Height: m2.36
Height, Overall: mINA
Length, Fuselage: m6.1
Length, Overall: mINA
Length, Wing Span: m10.5

↳Survivability/Countermeasures

Type:

↳System Components

Ground Control Station (GCS), Control Capability:
Ground Control Station (GCS), GCS Power Supply:
Ground Control Station (GCS), Setup Time: min

↳*System Composition*

Number of Transport Cases:

Number of UAVs:

Performance

Ceiling Maximum: m7000

Ceiling Maximum (normal): m6200

Ceiling Service: m5400

Ceiling Operating: INA

Ceiling Minimal: INA

Endurance Max: min30

Endurance Min: min24

Radius of Operation: km200

↳*Speed*

Speed, Cruising: km/h130

Speed, Maximum: km/h175

Launch and Recovery

Landing Method: Conventional landing

Launch Method: Wheeled take-off

Recovery Method: 3-wheeled, retractable landing gear.

Recovery/Landing Method: 3-wheeled, retractable landing gear.

Wind speed at launch: INA

Payload

Notes:

Payload User Image Capabilities:

Type:

↳*Gabbiano T200 - Synthetic Aperture Radar*

Description: long ranage surveillance radar, x band (8-12.5 GHz), 407km maritime range, MTI and SAr, >200 target Track-While Scan (TWS)

Moving Target Indication: Yes

Notes:

Type:

↳*DSP-1 Electro Optical Camera*

Description: Camera

Detection Range: km25

Recognition Range: km10

Swath: ha400

FLIR Enabled: Yes

Laser Designator: Yes

↳*Tadiran SKYFIX / SKYJAM EW Payload*

Intecept Freq. range: Mhz20-500

Direction Finding Freq. Range: MHz1.5-1000

Jammer Freq. Range: MHz20-500

↳*Emerald AES-210V*

Description: ELINT

Type:

↳*Elop DCoMPASS*

Description: (digital compact multi-purpose advanced stabilized system). stabilized turret incorporating thermal imager, color TV, dual-band laser designator rangefinder, inertial measurement unit and laser spot tracker

Notes:

The Elbit Hermes 450 is an Israeli medium-sized multi-payload unmanned aerial vehicle (UAV) designed for tactical long endurance missions. It has an endurance of over 20 hours, with a primary mission of reconnaissance, surveillance and communications relay. Payload options include electro-optical/infrared sensors, communications and electronic intelligence, synthetic-aperture radar/ground-moving target indication, electronic warfare, and hyperspectral sensors.

Wing Loong ID Chinese Medium-Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Pterosaur I:** First member of Wing Loong series, with program of Wing Loong begun in May 2005. Maiden flight was completed in October 2007 and payload evaluation flight was completed a year later in October 2008. This first model of Wing Loong series lacked the bulge at the nose tip of the fuselage due to the lack of a satellite antenna, and while the English name used by the developer differed from later models, the Chinese name remains the same, and so is the name Wing Loong for the entire series. he lack of satellite antenna results in cheaper cost, with the reduction of the maximum control range around to 200 km.This model is no longer actively marketed when Pterodactyl I appeared, but is still available as a cheaper alternative up on potential customers' request.
- **Pterodactyl I:** Sky Saker is a derivative of Wing Loong developed by Norinco mainly intended for export. The Chinese name is Rui Ying (□□), meaning Sharp Eagle, but the English name adopted by the developer is Sky Saker. Sky Saker / Rui Ying carries both a miniature synthetic aperture radar and an electro-optical pod to perform reconnaissance in both the visible light and radar spectra. The capability of Sky Saker / Rui Ying has been exaggerated by many Chinese internet sources claiming that it has both scout and strike capabilities at the same time, but this has been proven to the contrary. According to all info released by Norinco itself (as of 2015), the UAV can employ only a single capability at a time: when the UAV carries the reconnaissance payload, no weaponry is carried. Similarly, when weaponry is carried, the reconnaissance payload is absent.
- **WJ-1:** The first land attack version of Pterodactyl I, which is a weapon platform without the reconnaissance/targeting pod under the chin. The designation WJ stands for Wu-Zhuang Wu-Ren-Ji (□□□□□), meaning armed UAV. WJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin GJ-1.
- **GJ-1:** Another land attack version of Pterodactyl I that combines the capabilities of both Pterodactyl I and WJ-1 so that it can identify and engage targets on its own. GJ-1 can be distinguished from both Pterodactyl I and WJ-1 in that GJ-1 has both the reconnaissance/targeting pod under the chin as well as hardpoints to carry weapons. The designation GJ stands for Gong-Ji Wu-Ren-Ji (□□□□□), meaning "attack UAV." GJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin WJ-1.
- **Wing Loong II:** An upgraded variant of the Wing Loong, with provisions for up to twelve air-to-surface missiles. Officially entered service with the PLAAF in November 2018. Wing Loong II is known in PLAAF service as the Gongji-2 ('Attack 2' or GJ-2).

System

Alternative Designation: INA
Type UAV: Medium-Altitude Long-Endurance (MALE)
Expected out of Service Date: INA
Manufacturer: Chengdu Aircraft Industrial Group (CAIG)
Cost: INA
Primary Function: The Wing Loong ID can conduct intelligence, surveillance and reconnaissance; electronic warfare; search-and-rescue; strike; peacekeeping; and border patrol missions.

Flight Control Method: Wireless Communication or by Pilot on the ground

Day/Night Capable: Yes

All Weather Capable: INA

Takeoff or Landing Limitations: 1 km Runway needed for Launch

Ground Crew: 1

Complete System Includes: A complete Wing Loong ID system includes air vehicles, a ground-control station, mission payload and an integrated logistics system.

Ceiling, Maximum: m9,000

Ceiling, Minimum: mINA

Range: km200

Endurance: hours35

Data Transmit Distance: kmINA

Location Positioning System: BeiDou Navigation Satellite System (BDS)

Number of Hard Points: ea6 (3 on each wing)

Launch System: Runway,(1 km Runway needed for Launch)

Takeoff Roll: m600

Manned-Unmanned Teaming (MUM-T) Capable: INA

Automatic Landing and Takeoff Capability: Yes

Recovery System: Runway

Landing Gear: The landing gear consists of two main wheels under the fuselage and one single wheel under the nose, facilitates safe take-off and landing.

Dimensions

Length: m8.7

Height: m3.7

Width (Wing Span): m17.6

Gross Weight: kg330

Weight, Maximum Takeoff: kgINA (The Wing Loong II Maximum Takeoff Weight is 4,200 kg)

Weight, Payload: kg400

Automotive

Engine Name: INA. The Wing Loong ID has a updated engine from the engine in the Wing Loong II

Engine Type: Piston engine,

Engine Power: hpINA

Number of Engines: ea1

Cruising Range: INA (More than 1,500 km)

Speed, Maximum: km/h280

Speed, Average: km/h250

Endurance: hour35

Payload: kg400

Propellers Type: 3 Bladed Design

Communications

Radio: Satellite Communications Antenna

Encrypted Data Link: Yes

Armament & Ammunition

Air to Air Missiles: INA

Air to Ground Missiles: Yes, can carry the BA-7 air-to-ground missile, YZ-212 laser-guided bomb, YZ-102A anti-personnel bomb and 50-kilogram

Missile Type: BRM1, AKD-10

Bomb Type: FT-10, FT-9, FT-7, GB7, GB4

Armament Weight Total: kg1,000 (The Wing Loong ID can carry more than double the Armament Weight of the WIng Loong II).

Payload Types: EO/IR, SAR, laser-guided missiles

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Radar Type: Digital with Synthesized Antenna Aperture

Radar Designator: Yes

Laser Rangefinder: Yes

Laser Designator: Yes

Full-Motion Video: Yes

Still Camera: Yes

Thermal Imaging Sensors: Yes

Forward Looking Infrared Turret: Yes

Electro Optical Pod: Yes

Protection

Fuselage: Complete Composite Material used for the entire Fuselage

Stealth Properties: INA

Heat Signature Reduction: Yes

Add on Armor: INA

EW: INA

EW Counter Measures / CCM: Yes

Counter Measures (Chaffs/Flares): INA

Notes:

Wing Loong ID: Upgraded variant of the Wing Loong I, with improved aerodynamics and engine enabling greater takeoff weight, service ceiling, and endurance. Other upgrades include both internal and external stores, as well as communications equipment. The variant launched in 2018 with Egypt being the first buyer of 32 systems.The variant achieved its first flight on 23 December 2018

Camcopter S-100 Austrian Unmanned Aerial Vehicle (UAV)







Tiers:



Variants:

- **Unmanned Combat Aerial Vehicle (UCAV) attack version :** An Unmanned Combat Aerial Vehicle (UCAV) attack version was developed and displayed in 2008, with 2 x Lightweight Multi-role Missiles (LMMs, see Vol 2, pg6-55). Missiles can engage light armored vehicles, aircraft, and other ground targets. The UCAV version could also mount guided rockets, machineguns, rockets, or automatic grenade launchers as needed for attack roles or self-protection. Small launchers for aerial rockets with homing devices could fit on the S-100 with a LTD for deep attack.

System

Alternative Designation : Al-Saber
Type: Unmanned Aerial Vehicle (UAV)
Manufacturer: Schiebel
Flight Control: Ground Control Station (GCS) inside vehicle Image processing: Real-time UAV video feed can also be routed to other subscribers.
Flight Control Method: Pre-programmed or in-flight re- program.
Hover Capability: Yes
Hardpoints: 2

↳*Dimensions*

Height, Overall : m1.04
Length, Overall : m3.09
Length, Wing Span : m1.24
Weight, Payload: kg55
Weight, Takeoff: kg200

Main Rotor Diameter: m3.4

↳*Survivability/Countermeasures*

Survivability/Countermeasures: Light carbon fiber structure for low radar signature. It is very quiet, with narrow profile for low visual signature. It has auto-return and recovery mode for lost control signal. Inertial and GPS navigation: <1 meter accuracy.

Automotive

Engine Name: 1 × Austro Engine AE50R Wankel engine, 41 kW (55 hp) (basic). or

Engine Type: 1 × Schiebel heavy fuel engine (optional)

Engine Power: 55 hp

Ceiling, Maximum (normal) : m6000.0

Service Ceiling: m5,500

Endurance : hr6.0

Range, Relay/Programmed : km130.0

Range, RPV Mode : km130.0

Maximum Speed: 220 km/h

Cruise Speed: 190 km/h

Never Exceed Speed: 240 km/h

Range: 180 km

G Limits: +3.5 g to –1 g

Launch and Recovery

Landing Method: 3-Vertical to vehicle/ground

Launch Method: DGPS autonomous vertical launch from vehicle/ground base

Recovery Method: DGPS autonomous

Payload

↳*Payload*

Notes: Other options include laser target designator (LTD), CBRN monitors, laser imaging radar (LIDAR), ground-penetrating radar (GPR), and signals intelligence sensors.

↳*Payload 1*

Description: gimbaled ball with TV and FLIR for night use

Type: IAI/Elta POP-3000

↳*Payload 2*

Description: gimbaled ball with FLIR, 3km night acquisition range, (UAE version is projected with TV and high zoom for 20 km daytime acquisition)

Type: IAI/Tamam POP200

↳***Payload 3***

Description: Synthetic aperture radar for MTI surveillance and ground mapping

Type: PicoSAR

Notes:

The Schiebel Camcopter S-100 is an Austrian unmanned aerial vehicle (UAV) using a rotorcraft design. Produced by the Austrian company Schiebel, it was developed from 2003 to 2005. With a maximum take-off weight (MTOW) of 200 kilograms (440 lb), its endurance is 6 hours (extendable to over 10 hours with optional external AVGAS fuel tanks fitted). It has a maximum speed of 220 kilometres per hour (140 mph) and a ceiling of 5,500 metres (18,000 ft). It is powered by a 55 horsepower (41 kW) Diamond engine and can carry various payloads, such as electro-optics and infrared sensors. On 12 March 2012 Schiebel announced that it successfully tested a company-developed heavy-fuel engine interchangeable with the standard Diamond engine. This heavy-fuel engine allows for the use of JP-5, Jet A-1 or JP-8 jet fuels. These fuels, which are standard on marine vessels, are safer to store and handle than gasoline. On 7 February 2013, Schiebel flight tested a Thales Group I-Master surveillance radar system on the Camcopter at its Wiener Neustadt, Austria, facility. The I-Master system, weighing 30 kg (66 lb), provides ground moving target indication and synthetic-aperture radar operations. The launch customer for the S-100 was the UAE Army, which ordered 40 aircraft with an option for 40 more. The aircraft was ordered by three more undisclosed nations, with total orders reaching 200. The Camcopter underwent sea trials on the Indian Navy's INS Sujata (P56) during October 2007. Flight testing occurred aboard a Pakistan Navy Type 21 frigate in the Arabian Sea on 16 March 2008, with further naval testing on 14 April 2008 on the Spanish Guardia Civil vessel Rio Miño off Gran Canaria. The German Navy conducted testing during three weeks in August and September 2008 on the Braunschweig-class corvettes Braunschweig and Magdeburg, respectively. More than 130 takeoffs were conducted, and the UAV maintained unaided on-deck stability in greater than 15° flight deck roll conditions. The French Navy performed test flights during September and October 2008, with a Camcopter spending four days on a barge in the Atlantic Ocean and a further three days on the frigate Montcalm (D642). Libya ordered four Camcopters in 2009, which were placed under command of the Khamis Brigade. Jordan ordered two S-100s with L3Harris Wescam MX-10 EO-IR payloads in July 2010 and accepted delivery in February 2011. In November 2011 the Camcopter demonstrated flights from the French Gowind-class corvette L'Adroit.[12] At the same time, the Gorizont (Horizon) Air S-100, a Russian license-built version of the UAV was successfully tested aboard the Coast Guard patrol cutter Rubin. Russia intends to equip all Rubin-class patrol boats with these UAVs. In 2010 the Chinese Navy purchased 18 of these systems. Two years later, in May 2012, an unmanned UAV believed to be a Camcopter S-100 was photographed operating from the fantail of a Chinese Type 054A frigate by the People's Liberation Army Navy. In April 2012, the Camcopter became the first unmanned helicopter to fly from an Italian Navy vessel when it was flight tested from the MM Bersagliere (F-584). In February 2014, the Italian Navy chose the S-100 as its primary unmanned aerial system for shipboard operations, where it will be used for intelligence, surveillance and reconnaissance (ISR). It will additionally support other activities, such as search and rescue and natural disaster recovery. In December 2014, the Camcopter went through a series of trials in Bizerte, Tunisia, to serve within the Tunisian Army. Schiebel selected the Italian company Leonardo to supply AESA-based SAR radar for the systems which were to enter service in 2017. In February 2017, the Royal Australian Navy awarded a contract to provide an unrevealed number of Camcopter systems, plus three-years support. The type is operated by 822X Squadron RAN, which is responsible for trialling UAVs. In 2018, the Belgian Navy conducted a weeks-long testing of the Camcopter, assessing its utility for maritime surveillance and search and rescue.

ASN-209 Chinese Unmanned Aerial Vehicle (UAV)







Tiers:

1 2 3 4

Variants:

- **Silver Eagle:** Silver Eagle (Yin-Ying or Yinying, is a derivative of ASN-209 deployed by Chinese military. The most obvious visual difference between Silver Eagle and its predecessor ASN-209 is the addition of four vertically installed antenna, two of which are arranged in sequential order atop the fuselage, and one each on the wing, near the wingtip. Estimated range is around 150 km and the estimated endurance is several hours. Maiden flight of Silver Eagle took place in the coastal region of northeastern China on June 1, 2011 and lasted three and half hours. The UAV has since entered service with Chinese navy. Silver Eagle is launched from a 6 x 6 truck, which is both the launching platform and transportation vehicle, and the UAV utilizes rocket assisted take-off. Presumably, there would be at least another vehicle housing the ground control station. Very little information has been publicized by the official Chinese government sources, which only reveal (as of 2014) that Silver Eagle is a shore-based naval UAV. There are postulates that Silver Eagle can either act as a communication relay or electronic intelligence gathering platform, or as an aerial jamming platform, but such claims have yet to be confirmed.

System

Alternative Designation: Aisheng ASN-209 (Silver Eagle)

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: Xi'an ASN Technology Group / CATIC / AO

In Service: 2012-Present

Crew: None

Cargo Capacity: 50 kg

Dimensions

Length: 4.273 m

Wingspan: 7.5 m

Height: 1.539 m

Maximum Takeoff Weight: 320 kg

Automotive

Engine Name: INA

Engine Type: Rear installed engine disposition

Engine Power: INA

Maximum Speed: 180 km/h

Cruise Speed: 40 km/h

Combat Range: 200 km

Endurance: 10 h

Service Ceiling: 5,000 m

Notes:

The Aisheng ASN-209 from Xi'an Technology is a medium altitude/medium endurance multi-role UAV. ASN-209 Tactical UAV System is composed of Aircraft Platform, Avionics, Airborne Mission Payload, Data Link, Ground Control Station and Launch and Recovery Equipment, ASN-209 UAV can perform aerial reconnaissance, battle field survey, target location, destroy validation and artillery fire adjustment in day and night in real time. ASN-209 uses digital flight control and navigation system, its flight control mode has manual, program and emergency control. In addition, ASN-209 uses rocket booster launch, parachute recovery which render the operating system of ASN-209 flexible due to the fact that no contact with an airport is needed, and the GCS allows multitasking and can be edited in real-time. In civil application, it can be fitted with Synthetic Aperture Radar (SAR), electro-optical payload, and multi-function payload, etc. that can be applied for forest fire prevention, anti-drug action, communication, nature disaster forecast, ground observation, atmosphere measuring, aviation photo, resource detection, climate observation and artificial raining, etc. In military operation, it can be with multiple operational configurations for Ground Moving Target Indication (GMTI), Electronic Intelligence (ELINT), Electronic Warfare (EW), Ground Target Designation (GTD) and Communication Relay. ASN-209 uses twin-boom pusher layout, rear installed engine disposition with high-set wings and a stabilizer linking the twin fins. Excellent overall aerodynamic design and EMC design enable the system to install many different kinds of airborne equipment, such as Electronic countermeasures (ECM), communication relay and weather detection. With a coverage radius is 200 km and endurance of 10 hours, ASN-209 UAV System can supervise big area and frontier within one sortie. In order to overcome with refueling issue, using two UAVs and switching them out when one reaches its 10-hour limit so that they can be used for 24 hours consecutively. The practicality of the ASN-209 system reduces the needs for maintenance or parts from China, as ASN-209 can be deployed using a modified truck and is controlled using electronics equipment installed in a cargo van, which in turn overcomes the disadvantage of comparable US UAVs that depend on US parts and maintenance.

Eleron-3 Russian Reconnaissance Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Eleron-B:** Export Model

System

Alternative Designation: Elron-3; ZAO ENIX Eleron-3 (Aileron-3)
Type of UAV: Short-Ranged Surveillance and Reconnaissance UAV
Manufacturer: ZAO Enix
In Service: 2005-Present
Flight Control Method: INA
Day/Night Capable: Yes
All Weather Capable: INA
Takeoff or Landing Limitations: INA
Ground Crew: No
Ceiling, Maximum: m4,000
Endurance: hours2
Range: the system’s range is planned to be extended to 250 km
Date Transmit Distance: INA
Launch System: launched by throwing it and can land by flying close to the ground and shutting its engine off.
Recovery System: launched by throwing it and can land by flying close to the ground and shutting its engine off.
Number of Hard Points: INA
Manned-Unmanned Teaming (MUM-T) Capable: No
Automatic Landing and Takeoff Capability: Yes
Return to Launch site Autonomously: Yes

Dimensions

Length: mm1,470

Width (Wing Span): mm635

Height: mINA

Weight, Combat: kg5.5

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: hpINA

Maximum Range: the system’s range is planned to be extended to 250 km

Speed, Maximum Road: km/h130

Speed, Average: km/hINA

Endurance: hoursINA

Maximum Takeoff Weight: kg5.3

Payload Weight: up to 1kg

Maximum Altitude: m4,000

Communications

Radio: INA

Retrans Radio: INA

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: Yes

Laser Designator: INA

GPS: Yes

Navigation: Global Navigation Satellite System (GLONASS)

Still Camera: Yes

Thermal Imaging Sensors: Yes

IR Camera: Yes

Low-Light Level TV Camera: YEs

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Eleron-3 is a short-range tactical tail-less delta UAV with a maximum takeoff weight (MTOW) of 5.3kg carrying a 1kg payload. Manufactured by ENICS JSC it has a speed of 56 knots (104 km/h) and operates at a maximum altitude of 13,123 feet (4,000m). The Eleron-3 can perform autonomous, remote-controlled and patrolling flights, and point observation missions. The UAV returns to the launch site autonomously and uses GPS and GLONASS signals for navigation.

Wing Loong II Chinese Medium-Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV)







Tiers:

1 2 3 4

Variants:

- **Pterosaur I:** First member of Wing Loong series, with program of Wing Loong begun in May 2005. Maiden flight was completed in October 2007 and payload evaluation flight was completed a year later in October 2008. This first model of Wing Loong series lacked the bulge at the nose tip of the fuselage due to the lack of a satellite antenna, and while the English name used by the developer differed from later models, the Chinese name remains the same, and so is the name Wing Loong for the entire series.The lack of satellite antenna results in cheaper cost, with the reduction of the maximum control range around to 200 km. This model is no longer actively marketed when Pterodactyl I appeared, but is still available as a cheaper alternative up on potential customers' request.
- **Pterodactyl I::** The second member of Wing Loong series is distinguished from the earlier Pterosaur I in that there is a bulge at the nose tip of the fuselage to house a satellite antenna, and this is the version most widely publicized and actively marketed as a surveillance platform. United Arab Emirates and Uzbekistan were reported to be the first two foreign customers of Pterodactyl I.
- **Sky Saker::** Sky Saker is a derivative of Wing Loong developed by Norinco mainly intended for export. The Chinese name is Rui Ying, meaning Sharp Eagle, but the English name adopted by the developer is Sky Saker. Sky Saker / Rui Ying carries both a miniature synthetic aperture radar and an electro-optical pod to perform reconnaissance in both the visible light and radar spectra. The capability of Sky Saker / Rui Ying has been exaggerated by many Chinese internet sources claiming that it has both scout and strike capabilities at the same time, but this has been proven to the contrary. According to all info released by Norinco itself (as of 2015), the UAV can employ only a single capability at a time: when the UAV carries the reconnaissance payload, no weaponry is carried. Similarly, when weaponry is carried, the reconnaissance payload is absent.
- **WJ1:** The first land attack version of Pterodactyl I, which is a weapon platform without the reconnaissance/targeting pod under the chin. The designation WJ stands for Wu-Zhuang Wu-Ren-Ji, meaning armed UAV. WJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin GJ-1.
- **GJ-1:** Another land attack version of Pterodactyl I that combines the capabilities of both Pterodactyl I and WJ-1 so that it can identify and engage targets on its own. GJ-1 can be distinguished from both Pterodactyl I and WJ-1 in that GJ-1 has both the reconnaissance/targeting pod under the chin as well as hardpoints to carry weapons. The designation GJ stands for Gong-Ji Wu-Ren-Ji, meaning "attack UAV." GJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin WJ-1.
- **Wing Loong ID::** Upgraded variant of the Wing Loong I, with improved aerodynamics and engine enabling greater takeoff weight, service ceiling, and endurance. Other upgrades include both internal and external stores, as well as communications equipment. The variant launched in 2018 with Egypt being the first buyer of 32 systems.The variant achieved its first flight on 23 December 2018
- **Wing Loong II SIGINT Variant:** In December 2019, a Jane's article described a image of a Wing Loong II SIGNT Variant

which, "shows shows a GJ-2 featuring several rod-shaped antennas configured in a circular array fitted underneath the fuselage that could serve as a communications band-direction-finding array capable of not only intercepting communication signals but also providing a bearing of the transmitter. A blister is also evident on the side of the forward fuselage, which may house several directional radar-sensing antennas." Souce: https://www.janes.com/article/92973/image-emerges-of-possible-sigint-variant-of-plaaf-s-gj-2-uav

Systems

Alternative Designation: Known in PLAAF service as the Gongji-2 ('Attack 2' or GJ-2), also dubbed the "Air Sniper"

Type UAV: Medium-Altitude Long-Endurance (MALE)

Expected out of Service Date: 2037

Manufacturer: Chengdu Aircraft Industrial Group (CAIG)

Cost: INA

Primary Function: The Wing Loong II can conduct intelligence, surveillance and reconnaissance; electronic warfare; search-and-rescue; strike; peacekeeping; and border patrol missions.

Flight Control Method: Wireless Communication or by Pilot on the ground

Day/Night Capable: Yes

All Weather Capable: INA

Takeoff or Landing Limitations: 1 km Runway needed for Launch

Operator: ea1

Complete Ground Crew System Includes: A complete Wing Loong II system includes air vehicles, a ground-control station, mission payload and an integrated logistics system.

Ceiling, Maximum: m9,000

Ceiling, Minimum: mINA

Line of Sight Range: km200

Satellite Communication Link Range: km2,000

Endurance: hours32

Location Positioning System: BeiDou Navigation Satellite System (BDS)

Guidance Tracking: GP

Propeller: 3 Blade Design

Wing type: Low-Wing Monoplane Design

Wing Sweep: deg10

Number of Hard Points: ea6 (3 on each wing)

Launch System: Runway,(1 km Runway needed for Launch)

Takeoff Roll: m600

Manned-Unmanned Teaming (MUM-T) Capable: INA

Automatic Landing and Takeoff Capability: Yes

Recovery System: Runway

Landing Gear: The landing gear consists of two main wheels under the fuselage and one single wheel under the nose, facilitates safe take-off and landing.

Note: The Wing Loong II has been described as being in the same class as the U.S. MQ-9 Reaper.

Dimensions

Length: m11

Height: m4.1

Width (Wing Span): m20.5

Gross Weight: kg4,200

Weight, Maximum Takeoff: kg4,200

Weight, Payload: kg480

Automotive

Engine Name: Rotax 914 Turbocharged Engine

Engine Type: Four-Stroke, Four-Cylinder, Horizontally Opposed Aircraft Engine

Engine Power: hp100

Number of Engines: ea1

Engine Location: Top of the Airframe

Speed, Maximum: km/h370.4

Maximum Range: km200

Operational Range Radius: km1,500

Endurance: hour32

Payload: kg400

Propellers Type: 3 Bladed Design

Communications

Radio: Satellite Communication System

Encrypted Data Link: Yes

Armament & Ammunition

Payload Types: EO/IR, SAR, laser-guided missiles

Air to Air Missiles: INA

Air to Ground Missiles: Yes

Rockets: Yes

Missile Type: YJ-9E Anti-Ship Missiles, AR-1/HJ-10 Anti-Tank Missiles

Bomb Type: T-9/50 50kg bomb, GB3 250 kg laser-guided bomb, TL-10 bomb, Lan Jian 7 (Blue Arrow 7) laser-guided air-to-surface missiles, TG100 laser/INS/GPS-guided bombs

Armament Weight Total: kg400

Air to Ground Bombs/Missiles Total Capacity: ea10

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Radar Type: Synthetic Aperture Radar

Radar Designator: Yes

Laser Rangefinder: Yes

Laser Designator: Yes

Full-Motion Video: Yes

Forward-Looking Infrared (FLIR) Camera: Yes

Still Camera: Yes

Thermal Imaging Sensors: Yes

Electro Optical Pod: Yes, Loong Eye LE380 electro-optical sensor pod

Protection

Fuselage: Slender Design, with a Chine, used to control Radar Reflections

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: No

EW Counter Measures / CCM: Yes

Counter Measures (Chaffs/Flares): INA

Notes:

The Wing Loong II is a medium-altitude, long-endurance unmanned aerial vehicle based on the Wing Loong (Pterodactyl). It is larger and more capable -- with significantly greater payload -- than its predecessor. The Wing Loong II has been described as being in the same class as the U.S. MQ-9 Reaper. The Wing Loong II can conduct intelligence, surveillance and reconnaissance; electronic warfare; search-and-rescue; strike; peacekeeping; and border patrol missions. The air vehicle features six hard points, compared to two on the Wing Loong, with four that can carry double payloads. As a result, the Wing Loong II can carry up to 10 air-to-ground bombs and missiles.

→→Long-Distance UAVs (More than 300 km)

ASN-207 Chinese MALE Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **ASN-206:** An older version of the ASN-207 with less control range, smaller payload capacity, and shorter endurance. The ASN-206 is a medium tactical unmanned aerial vehicle (TUAV) in service with the People's Liberation Army (PLA) in China. The air vehicle is used for day and night reconnaissance; battlefield surveillance; target positioning; artillery shooting adjustment; border patrol; nuclear radiation survey and sample; aerial photography; and disaster surveillance. The system consists of one air vehicle, a powerplant and a launch-and-recovery system. Upgrades may include an electronic support measures capability for self-protection. The air vehicle is launched by rocket and uses a parachute to land. It does not need a runway. The ASN-206 has a twin-boom layout with a high-wing configuration and twin tail. This permits the tail-mounted two-blade propeller to be out of the sight line of the sensor package. The ASN-206's electro-optical observation package is believed to be a derivative of an Israeli system. The air vehicle can be equipped with vertical and panoramic cameras; infrared sensors; television cameras; and positioning correction equipment. It is fitted with a digital control and management system, integrated radio and advanced mission-control equipment. Some ASN-206s appear to have been fitted with a satellite communication antenna. Video can be transmitted in real time to the ground station. The ASN-206 can also determine the position of a ground target in real time to correct artillery firing. For electronic warfare missions, the air vehicle can be equipped with a JN-1102 electronic countermeasures suite, which can scan, intercept, analyze, monitor and jam hostile ground-to-air communications at 20 MHz to 500 MHz. The system consists of a UAV-mounted intercept subsystem, UAV-mounted jamming subsystem and a ground-based intercept and jamming control subsystem. A complete system consists of six to 10 air vehicles and one ground station. The ground station comprises command vehicles, launch vehicles, power supply vehicles, intelligence-processing vehicles, maintenance and transport vehicles.
- **Navalized ASN-206:** The variant is designed to serves as a communication relay between a supporting surface ship and an amphibious force. It was noted in operation during the Chinese navy's first remote communication support drill with drones on July 10, 2011, at a comprehensive training range of a general communication station of the South China Sea Fleet.

System

Alternative Designation: ANS-207
Engine Power: hpINA
Propulsion: INA
Max Launch Weight: kgINA
Maximum (level): km/hINA
Cruising Speed: km/hINA
Endurance: hrsINA
Max Ceiling, Normal: mINA

Ceiling, Service: mINA

Radius of Operation: km600

↳*Dimensions*

Wing Span: mINA

Length, Overall: mINA

Height, Overall: mINA

↳*Flight Control*

Launch Method: Solid rocket booster on a zero length launcher

Recovery Method: Parachute (non-steerable)

Landing Method: 2 spring loaded skids

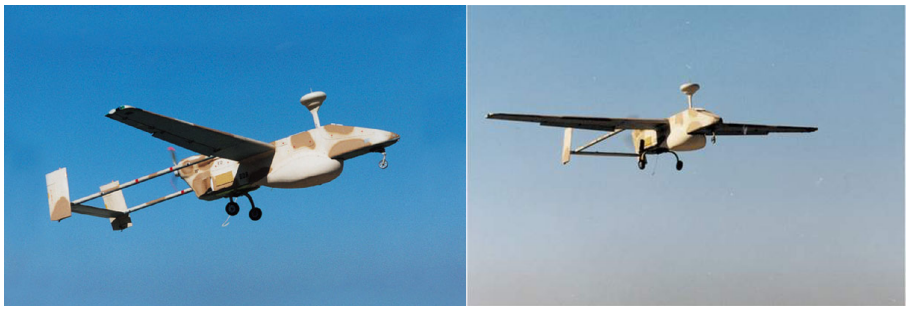
Payload Types

EW / ECM Suite: INA

Notes:

The ASN-207 is an upgraded version, though the specifics about the upgrades are not known. The maximum range is 370 mi (600 km). It is said to have twice the payload and endurance of the ASN-206. The ASN-207 was first seen in public in 2002. The ASN-207 is identifiable by the mushroom-shaped antenna mounted on top of the fuselage. SEE Variant: ASN206 below.

IAI Searcher Mk II Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Searcher Mk II:** The Mk II is the fourth in a line of UAVs that began development as the Scout (the Searcher was the third generation). The Searcher Mk II is slightly larger, measuring 19 ft 2 in (5.85 m) in height and 28 ft 1 in (8.55 m) in diameter; it has higher maximum takeoff weight and payload at 939 lb (426 kg) and 220 lb (100 kg), respectively. The main benefit of these updates is greater flight endurance at higher altitudes.
- **Searcher Mk III:** The most recent variant, the Mk III was launched in 2010 and has over twice the range of the Mk II with two more hours of endurance and a higher ceiling. It is equipped with a four-stroke silent engine, along with a maximum takeoff weight of 961 lb (436 kg) and higher maximum payload weights of 264 lb (120 kg). The Searcher Mk III has an aerial data relay capability for beyond line-of-sight operations. Two simultaneous automatic takeoff and landing systems improve safety.
- **Forpost:** This is the Russian designation for Searcher Mk II UAVs being produced domestically. According to the Urals Civil Aircraft Plant, which builds the systems, the Forpost has a flight endurance of 17.5 hours, maximum takeoff weight of 1,000 lb (454 kg) and a max payload of 130 lb (60 kg). The air vehicle has a top speed of 130 mi (210 kmh) and a ceiling of 11,800 ft (3,600 m).

System

Alternative Designation: IAI Searcher II, Searcher Mk II, Searcher II
Type of UAV: Unmanned Reconnaissance Drone
Manufacturer: IAI
In Service: 1998-Present
Primary Function: Long Endurance Reconnaissance Drone
Day/Night Capable: Yes
All Weather Capable: Yes
Ground Crew: 4 (external pilot, internal pilot, observer and commander)
Endurance: hours16
Launch System: Runway (Fully Automatic)
Recovery System: Runway (Fully Automatic)
Number of Hard Points: INA
Manned-Unmanned Teaming (MUM-T) Capable: No
Automatic Landing and Takeoff Capability: Yes, Automatic Takeoff and Landing (ATOL) systems
Electro-Optical and Infrared Sensors (EO/IR): Yes

Real-Time Imagery: Yes

Synthetic Aperture Radar (SAR): Available and would replace the Electro-Optical and Infrared Sensors (EO/IR)

SAR/GMTI Capable: Yes

SIG/INT Capable: Yes

EO/IR Capable: Yes

Note #1: The IAI Searcher Mk II is built from composite materials to reduce radar detection

Dimensions

Length: m5.15

Width (Wing Span): m7.22

Height: m1.16

Weight, Payload: kg91

Weight, Maximum Takeoff: kg377

Automotive

Engine Name: AR 682 rotary engine

Engine Type: 1 x flat-twin, 2-stroke AR 682 rotary engine

Engine Power: hpINA

Endurance: hours20

Propeller: driving 2-blade pusher propeller

Fuel: liters130

Maximum Speed: km/h104

Dash Speed: km/h185

Cruise Speed: km/h111

Ceiling: m5,639

Endurance: hours16

Maximum Range: km300

Communications

Line of Sight Radio (UAV & Ground Crew): Direct Line-of-Sight (LOS) data link

Beyond Line of Sight Radio (UAV & Ground Crew): UAV airborne data relay for beyond LOS missions & Ground-based data relay for beyond LOS missions

Note: In the event of communications via datalink are lost the air vehicle will return automatically to its base.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

The Searcher is a multi mission tactical Unmanned Air System (UAS) used for surveillance, reconnaissance, target acquisition, artillery adjustment and damage assessment and developed by IAI in the 1990s. It was designed to meet present and future requirements for Unmanned Aerial Vehicles (UAVs) in support of the Israel Air Force as well as export customers. The air vehicle design provides excellent engine and aerodynamics performance and handling qualities while the ground control station was designed to provide compatibility with other UAV systems produced by Israel. So far the Searcher family includes the Mk I, Mk II and Mk III models.

Hermes 900 Israeli Unmanned Aerial Vehicle (UAV)







Tiers:



Variants:

- **Hermes 900, attack version:** An attack version of Hermes 900 may be possible. Each wing has two external hardpoints similar to the weaponized Hermes 450. The Mikholit, Israeli 10km variant of Nimrod long-range missile, is designed for launch from the Hermes 450.

System

Alternative designations: INA
Ground Crew: 2
Engine: 105hp gasoline Rotax 914 turbocharged engine
Propulsion: 3 blade pusher propeller
Maximum (level): km/h222
Cruising Speed: km/h130-175
Endurance: hrs36
Max Ceiling, normal: m30,000
Ceiling, Service: m9,100
Radius of Operation: km1,000
Launch Method: Wheeled take-off
Recovery Method: Conventional landing
Landing Method: 3-wheeled, retractable landing gear. independent take-off and landing
Flight Control Method: Preprogrammed/in-flight reprogram. Secure redundant Line of Sight data link and redundant satellite communications beyond line of sight
Flight Control: Ground control station vehicle. can control two Hermes simultaneously

Dimensions

Wing Span: m15.3
Overall Length: m6.1
Overall Height: m2.36

Take-off Weight: kg970

Payload: kg300

Launch and Recovery

Landing Method: Conventional landing

Launch Method: Wheeled take-off

Recovery/Landing Method: 3-wheeled, retractable landing gear.

Wind speed at launch: INA

Payload Types

↳*Gabbiano T200 - Synthetic Aperture Radar*

Description: Long range surveillance radar, x band (8-12.5 GHz), 407km maritime range, MTI and SAr, >200 target Track-While Scan (TWS)

Moving Target Indication: Yes

↳*DSP-1 Electro Optical Camera*

Description: Camera

Detection Range: km25

Recognition Range: km10

Swath: ha400

FLIR Enabled: Yes

Laser Designator: Yes

↳*Tadiran SKYFIX / SKYJAM EW Payload*

Intecept Freq. range: MHz20 - 500

Direction Finding Freq. Range: MHz1.5 - 1000

Jammer Freq. Range: MHz20 - 500

↳*Emerald AES-210V*

Description: ELINT

↳*Elop DCoMPASS*

Description: Digital compact multi-purpose advanced stabilized system. Stabilized turret incorporating thermal imager, color TV, dual-band laser designator rangefinder, inertial measurement unit and laser spot tracker

Survivability / Countermeasures

Description: Light composite structure, low radar signature

Notes:

The Elbit Systems Hermes 900 Kochav (Star) is an Israeli medium-size, multi-payload, medium-altitude long-endurance

unmanned aerial vehicle (UAV) designed for tactical missions. It is a sequel to the Hermes 450 series of drones, one of the most widely used military drones in the world. It has an endurance of over 30 hours and can fly at a maximum altitude of 30,000 feet (9,100 m), with a primary mission of reconnaissance, surveillance and communications relay. The Hermes 900 has a wingspan of 15 m (49 ft) and weighs 970 kg (2,140 lb), with a payload capability of 300 kg (660 lb). Payload options include electro-optical/infrared sensors, synthetic-aperture radar/ground-moving target indication, communications and electronic intelligence, electronic warfare, and hyperspectral sensors.

Wing Loong I Chinese Medium-Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Pterosaur I:** First member of Wing Loong series, with program of Wing Loong begun in May 2005. Maiden flight was completed in October 2007 and payload evaluation flight was completed a year later in October 2008. This first model of Wing Loong series lacked the bulge at the nose tip of the fuselage due to the lack of a satellite antenna, and while the English name used by the developer differed from later models, the Chinese name remains the same, and so is the name Wing Loong for the entire series. he lack of satellite antenna results in cheaper cost, with the reduction of the maximum control range around to 200 km.This model is no longer actively marketed when Pterodactyl I appeared, but is still available as a cheaper alternative up on potential customers' request.
- **Pterodactyl I:** Sky Saker is a derivative of Wing Loong developed by Norinco mainly intended for export. The Chinese name is Rui Ying, meaning Sharp Eagle, but the English name adopted by the developer is Sky Saker. Sky Saker / Rui Ying carries both a miniature synthetic aperture radar and an electro-optical pod to perform reconnaissance in both the visible light and radar spectra. The capability of Sky Saker / Rui Ying has been exaggerated by many Chinese internet sources claiming that it has both scout and strike capabilities at the same time, but this has been proven to the contrary. According to all info released by Norinco itself (as of 2015), the UAV can employ only a single capability at a time: when the UAV carries the reconnaissance payload, no weaponry is carried. Similarly, when weaponry is carried, the reconnaissance payload is absent.
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- **WJ-1:** The first land attack version of Pterodactyl I, which is a weapon platform without the reconnaissance/targeting pod under the chin. The designation WJ stands for Wu-Zhuang Wu-Ren-Ji, meaning armed UAV. WJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin GJ-1.
- **GJ-1:** Another land attack version of Pterodactyl I that combines the capabilities of both Pterodactyl I and WJ-1 so that it can identify and engage targets on its own. GJ-1 can be distinguished from both Pterodactyl I and WJ-1 in that GJ-1 has both the reconnaissance/targeting pod under the chin as well as hardpoints to carry weapons. The designation GJ stands for Gong-Ji Wu-Ren-Ji, meaning "attack UAV." GJ-1 UAV made its public debut in November 2014 at the 10th Zhuhai Airshow along with its cousin WJ-1.
- **Wing Loong II:** An upgraded variant of the Wing Loong, with provisions for up to twelve air-to-surface missiles. Officially entered service with the PLAAF in November 2018. Wing Loong II is known in PLAAF service as the Gongji-2 ('Attack 2' or GJ-2).
- **Wing Loong ID:** Upgraded variant of the Wing Loong I, with improved aerodynamics and engine enabling greater takeoff weight, service ceiling, and endurance. Other upgrades include both internal and external stores, as well as communications equipment. The variant launched in 2018 with Egypt being the first buyer of 32 systems. The variant achieved its first flight on 23 December 2018

System

Alternative Designation: Pterodactyl I., PLAAF refer to it as Gonji-1 (Attack-1)

Type UAV: Medium-Altitude Long-Endurance (MALE)

Expected out of Service Date: 2038

Manufacturer: Chengdu Aircraft Industry Group

Cost: Less than $:1 Million each

Primary Function: Surveillance and Aerial Reconnaissance Platform

Flight Control Method: Wireless Communication or by Pilot on the ground

Day/Night Capable: Yes

All Weather Capable: INA

Takeoff or Landing Limitations: 1 km Runway needed for Launch

Ground Crew: The ground control station features dedicated consoles for the pilot and weapon/sensors operators. Three workstations are provided, each one equipped with at least two joysticks and a couple of liquid-crystal displays.

Complete System Includes: Four air vehicles; a ground-control station; mission payloads; and an integrated logistic support system.

Ceiling, Maximum: m8,000

Ceiling, Minimum: mINA

Range: km4,000

Endurance: hours20

Data Transmit Distance: km200

Location Positioning System: GPS

Wing type: Fixed Mid-Mounted

Number of Hard Points: ea2

Launch System: Runway,(1 km Runway needed for Launch)

Takeoff Roll: m600

Manned-Unmanned Teaming (MUM-T) Capable: INA

Automatic Landing and Takeoff Capability: Yes

Recovery System: Runway

Landing Gear: Retractable tricycle landing gear, with two main wheels under the fuselage and a single wheel under the nose.

Landing Distance: m800

Proliferation: China: +100, Saudi Arabia: INA, Egypt: 3, Kazakhstan: 2, Pakistan:2 and the UAE: 5.

Dimensions

Length: m9.05

Height: m2.77

Width (Wing Span): m14

Gross Weight: kg1,100

Weight, Maximum Takeoff: kg1,540

Weight, Payload: kg200

Automotive

Engine Name: Rotax 914 Turbocharged Engine

Engine Type: Four-Stroke, Four-Cylinder, Horizontally Opposed Aircraft Engine

Engine Power: hp100

Number of Engines: ea1

Cruising Range: kmINA

Speed, Maximum: km/h280

Speed, Average: km/h222

Endurance: hour20

Payload: kg200

Propellers Type: 3-Blade

Communications

Radio: Satellite Communications Antenna

Encrypted Data Link: Yes

Armament & Ammunition

Air to Air Missiles: INA

Air to Ground Missiles: Yes, can carry the BA-7 air-to-ground missile, YZ-212 laser-guided bomb, YZ-102A anti-personnel bomb and 50-kilogram LS-6 miniature guided bomb.

Missile Type: BRM1, AKD-10

Bomb Type: FT-10, FT-9, FT-7, GB7, GB4

Armament Weight Total: kg1,000

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Radar Type: Synthetic Aperture Radar

Radar Designator: Yes

Laser Rangefinder: Yes

Laser Designator: Yes

Full-Motion Video: Yes, High-Definition TV Cameras

Still Camera: Yes

Thermal Imaging Sensors: Yes

Forward Looking Infrared Turret: Yes

Electro Optical Pod: Yes, Loong Eye LE380 electro-optical sensor pod

Sensor Turret Diameter: mm380

Sensor Turret Height: mm550

Sensor Turret Weight: kg39

Sensor Turret Traverse: deg360

Sensor Turret Elevation: deg-130 to 30

Protection

Fuselage: Conventional aluminium fuselage supported by composite structural components

Stealth Properties: INA

Heat Signature Reduction: Yes

Add on Armor: INA

EW: INA

EW Counter Measures / CCM: Yes

Counter Measures (Chaffs/Flares): INA

Notes:

The Chengdu Pterodactyl, also known as Wing Loong, is a Medium-Altitude Long-Endurance (MALE) unmanned aerial vehicle (UAV), developed by the Chengdu Aircraft Industry Group in the People's Republic of China. Intended for use as a surveillance and aerial reconnaissance platform, the Pterodactyl I is capable of being fitted with air-to-surface weapons for use in an unmanned combat aerial vehicle (UCAV) role. It is designed for intelligence, surveillance and reconnaissance missions. The air vehicle can also be equipped with weapons for strike operations and perform civil missions such as disaster assessment, meteorological and environmental protection. The system has been compared, at least in appearance, to the U.S. MQ-1 Predator. Based on official marketing material released by CADI, the Pterodactyl can carry the BA-7 air-to-ground missile, YZ-212 laser-guided bomb, YZ-102A anti-personnel bomb and 50-kilogram LS-6 miniature guided bomb.

Mirach 150 Italian Unmanned Aerial Vehicle (UAV)





Tiers:

1 **2** 3 4

System

Alternate Designation: Mirach 150

Type: Unmanned Aerial Vehicle

Manufacturer: Selex ES Finmeccanica (since 2016) Leonardo(since 2017)

Crew: None

Payload: 60 kg payload, ncluding Electro-optic/infrared (EO/IR) imagers, Signals intelligence (SIGINT) payloads, or Electronic countermeasure (ECM) payloads.

Launch Type: ground or air-launched

Recovery Type: recovered by parachute.

Dimensions

Length: 4.70 m

Wingspan: 2.10 m

Weight: 345 kg

Automotive

Engine Name: 1 × Microturbo TRS-18-1

Engine Type: INA

Engine Power: 1.5 kN (330 lbf) thrust

Maximum Speed: 855 km/h

Range: 380 km

Service Ceiling: 9,200 m

Endurance: 1 hour

Notes:

The Mirach 150 is a reconnaissance Unmanned aerial vehicle (UAV) developed in Italy in the 1990s. A turbojet-powered machine, it is apparently a derivative of the Mirach 100 series of targets, being of the same general size and also powered by a Microturbo TRS-18-1 turbojet. Meteor is now promoting a new derivative of the Meteor 150, named the Nibbio, for tactical reconnaissance and other missions. It has an operational radius of 380 kilometers (240 mi) and can carry a 60 kilogram (122

pound) payload, including Electro-optic/infrared (EO/IR) imagers, Signals intelligence (SIGINT) payloads, or Electronic countermeasure (ECM) payloads. It can be ground or air-launched, and is recovered by parachute.

Forposts Russian Reconnaissance Unmanned Aerial Vehicle (UAV)





Tiers:



Parent:

IAI Searcher Mk I Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)

Variants:

- **Searcher Mk II:** The Mk II is the fourth in a line of UAVs that began development as the Scout (the Searcher was the third generation). The Searcher Mk II is slightly larger, measuring 19 ft 2 in (5.85 m) in height and 28 ft 1 in (8.55 m) in diameter; it has higher maximum takeoff weight and payload at 939 lb (426 kg) and 220 lb (100 kg), respectively. The main benefit of these updates is greater flight endurance at higher altitudes.
- **Searcher Mk III:** The most recent variant, the Mk III was launched in 2010 and has over twice the range of the Mk II with two more hours of endurance and a higher ceiling. It is equipped with a four-stroke silent engine, along with a maximum takeoff weight of 961 lb (436 kg) and higher maximum payload weights of 264 lb (120 kg). The Searcher Mk III has an aerial data relay capability for beyond line-of-sight operations. Two simultaneous automatic takeoff and landing systems improve safety.
- **Forpost:** This is the Russian designation for Searcher Mk II UAVs being produced domestically. According to the Urals Civil Aircraft Plant, which builds the systems, the Forpost has a flight endurance of 17.5 hours, maximum takeoff weight of 1,000 lb (454 kg) and a max payload of 130 lb (60 kg). The air vehicle has a top speed of 130 mi (210 kmh) and a ceiling of 11,800 ft (3,600 m).

System

Alternative Designation: Forpost, Outposts (with updated Russian electronics)
Type of UAV: Unmanned Reconnaissance Drone
Manufacturer: State Factory Russia
In Service: 2014-Present
Primary Function: Long Endurance Reconnaissance Drone
Day/Night Capable: Yes
All Weather Capable: Yes

Ground Crew: 4 (external pilot, internal pilot, observer and commander)

Endurance: hours17.5

Launch System: Runway (Fully Automatic)

Recovery System: Runway (Fully Automatic)

Number of Hard Points: INA

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: Yes, Automatic Takeoff and Landing (ATOL) systems

Electro-Optical and Infrared Sensors (EO/IR): Yes

Real-Time Imagery: Yes

Synthetic Aperture Radar (SAR): Available and would replace the Electro-Optical and Infrared Sensors (EO/IR)

SAR/GMTI Capable: Yes

SIG/INT Capable: Yes

EO/IR Capable: Yes

Dimensions

Length: m5.85

Width (Wing Span): m8.55

Height: m1.25

Weight, Empty: kg350

Weight, MTOE: kg500

Automotive

Engine Name: APD-85 engine

Engine Type: Gasoline

Engine Power: hp47

Endurance: hours17.5

Propeller: driving 2-blade pusher propeller

Fuel: liters130

Maximum Speed: km/h200

Dash Speed: km/h185

Cruise Speed: km/h111

Ceiling: m7

Endurance: hours17.5

Maximum Range: km400

Communications

Line of Sight Radio (UAV & Ground Crew): Direct Line-of-Sight (LOS) data link

Beyond Line of Sight Radio (UAV & Ground Crew): UAV airborne data relay for beyond LOS missions & Ground-based

data relay for beyond LOS missions

Note #1: The Russians have outfitted the Forposts with all new electronics such as the Outpost-R Intergerence-free radio line, which has increased the radious of the drone by 100 km.

Note #2: In the event of communications via datalink are lost the air vehicle will return automatically to its base.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

EW: No

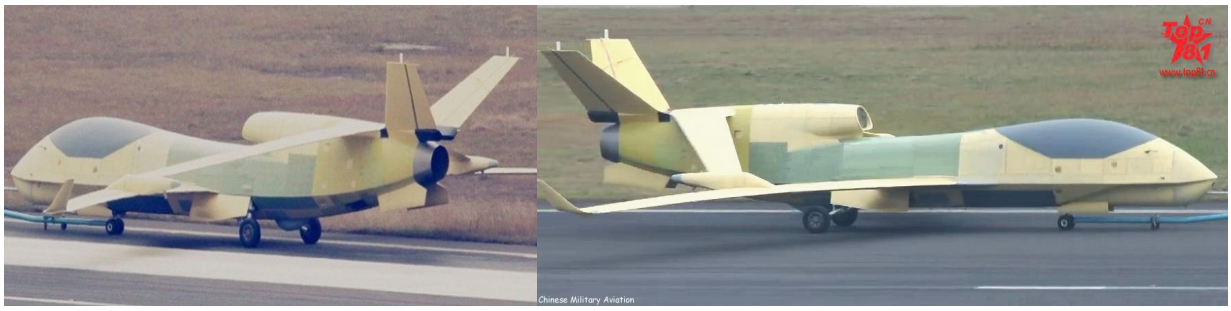
EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Notes:

This is the Russian designation for Searcher Mk II UAVs being produced domestically. According to the Urals Civil Aircraft Plant, which builds the systems, the Forpost has a flight endurance of 17.5 hours, maximum takeoff weight of 1,000 lb (454 kg) and a max payload of 130 lb (60 kg). The air vehicle has a top speed of 130 mi (210 kmh) and a ceiling of 11,800 ft (3,600 m).

EA-03 Soar Dragon Chinese High-Altitude Long-Endurance (HALE) Unmanned Aerial Vehicle



Tiers:



System

Alternate Designation: EA-03 Soar Dragon; Xianglong (Chinese for "Soar Dragon")

Type: High-Altitude Long-Endurance (HALE) Unmanned Aerial Vehicle

Manufacturer: Chengdu Aircraft Corp., Chengdu, China

Dimensions

Length: 13.7 m

Wingspan: 22.9 m

Maximum Takeoff Weight: 7,500 kg

Maximum Payload Weight: 650 kg

Automotive

Engine Name: INA

Engine Type: Turbofan or Turbojet

Engine Power: INA

Maximum Speed: 750 km/h

Maximum Distance: 7,040 km

Maximum Altitude: 18,300 m

Notes:

Xianglong/Flying Dragon HALE UAVThe "Xianglong" [Flying Dragon/Soar Dragon] automated observation airplane has a body plan fundamentally the same as the United States, "Worldwide Hawk" high-elevation long flight reconnaissance UAV. The fuselage tail is a dorsal balance furnished with composite motor compartment, the delta shape is semi-oval. The upper aspect of the nose is additionally an immense smoothed out rankle formed.

Shahed-129 Iranian Medium-Altitude Long-Endurance Unmanned Combat Aerial Vehicle (UCAV)







Tiers:



System

Alternative Designation: Shahed-129, S129

Type of UAV: Shahed-129 Iranian Medium-Altitude Long-Endurance Unmanned Combat Aerial Vehicle (UCAV)

Manufacturer: HESA

In Service: 2012-Present

Primary Function: Ground Attack; Reconnaissance (RECCE) Unmanned

Propellers: 3-bladed

Flight Control Method:

Day/Night Capable: Yes, a chin-mounted gimbal electro-optic/infrared sensor

All Weather Capable: Yes

Takeoff or Landing Limitations: INA

Ground Crew: Relies on a ground control station, the drone's reliance on a ground station severely circumscribes its effective range

Date Transmit Distance: km300-400

Location Positioning System: Yes

Launch System: Runway

Recovery System: Runway

Number of Hard Points: two twin hardpoints, for a total of up to four munitions

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: INA

Landing Gear: Retractable

Payload Capacity: kg400

Stabilizers: V-tail vertical stabilizers

Combat Range: m1,700

Autopilot: Yes

Endurance: 24 hours

Note: similar to the MQ-1 Predator

Dimensions

Length: m8

Width (Wing Span): m16

Height: m3.1

Weight,: kg990

Weight, Payload: INA

Fuselage: 65–75 cm in diameter, and is fabricated from large panels of composite material with an aluminum alloy superstructure

Automotive

Engine Name: 1 × Rotax 914 four cylinder, four stroke aircraft engine

Engine Type: four stroke aircraft engine

Engine Power: hpINA

Cruising Range: km1,700

Speed, Maximum: INA

Speed, Average: km/h150

Ferry Range: km3,400

Endurance: hours24

Service Ceiling: m7,300

Communications

Radio: INA

Retrans Radio: INA

Armament and Ammunition

Name: Sadid-345

Type: Precision-guided glide bomb with a fragmentation warhead.

Length: mm1,690

Width: mm1,520

Weight: kg34

Payload Bay: Yes

Warhead Type: glide bomb with a fragmentation

Fin Type: four fixed fins on the body for lift and stability and four deflectable fins on the tail for trajectory control

Maximum Effective Range: km6

Lethal Radius: m30

Detonation Mechanism: impact fuse

Infrared Seeker: Available

CEP: m2.5

Basic Load: ea4

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Radar Type: INA

Radar Designator: INA

Laser Rangefinder: Yes

Laser Designator: INA

Full-Motion Video: Real-time video data link

Still Camera: Yes

Thermal Imaging Sensors: Oghab-6 electro-optical/infrared sensor

Electro Optical Pod: Yes

Protection

Fuselage: INA

Stealth Properties: INA

Heat Signature Reduction: INA

Add on Armor: INA

EW: INA

EW Counter Measures / CCM: INA

Counter Measures (Chaffs/Flares): INA

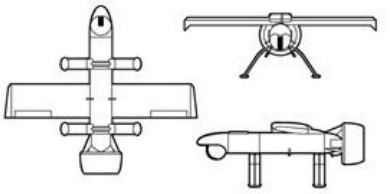
Notes:

The Shahed 129 is an Iranian single-engine medium-altitude long-endurance unmanned combat aerial vehicle (UCAV) designed by Shahed Aviation Industries for the Islamic Revolutionary Guard Corps (IRGC). The Shahed 129 is capable of combat and reconnaissance missions and has an endurance of 24 hours; it is similar in size, shape and role to the American MQ-1 Predator and is widely considered the most capable drone in Iranian service. Similar to the MQ-1 Predator

Shmel-1 (Bumblebee) Russian Close-Range Reconnaissance Unmanned Aerial Vehicle (UAV)









Tiers:



Variants:

- **Shmel-2:** The Shmel-2 is a civil version of the aircraft, with inverted-V tail on short booms in place of annular duct. Its planned missions: pipeline inspection, highway patrol, agricultural and fishery inspection, oceanological and environmental applications.

System

Alternate Designation: Shmel-1; YAK-061; NATO: Bumblebee
Type: Close-Range Reconnaissance Unmanned Aerial Vehicle (UAV)
Manufacturer: A.S. Yakovlev OKB, Moscow, Russia

Dimensions

Length: 2.78 m
Height: 1.10 m
Wingspan: 3.25 m
Maximum Takeoff Weight: 130 kg

Automotive

Engine Name: 1 x Samara/Trud (Kuznetsov) P-032 2-cyl

Engine Type: 2-Stroke Gasoline Engine

Engine Power: 32 hp

Maximum Speed: 180 km/h

Cruising Speed: 140 km/h

Maximum Ceiling: 3,000 m

Minimum Ceiling: 100 m

Range: 60 km

Endurance: 2 hours

Armament

Note: No Armament

Protection

Stealth Properties: None

Heat Signature Reduction: No

Add on Armor: INA

EW Counter Measures: No

Chaffs/Flares: No

Notes:

The Shmel (Bumblebee) has been the Russian army's primary close-range reconnaissance unmanned aerial vehicle (UAV). The Shmel has high mounted straight wings with turned-down tips and ailerons for roll control. A broad-chord ring enshrouds the pusher propeller and the rotable elevator and rudder. According to its manufacturer, the Shmel-1's annular channel ensures: *"an increase in the effective thrust of the propeller; *"an increase in the efficiency of the control surfaces by placing them in the propeller wash and retain efficiency in all flight conditions; *"an improvement in the acoustic characteristics of the propeller; and *"ground maintenance safety while the engine is running." The Shmel's transport/launcher/control vehicle is a tracked, fully amphibious, NBC (nuclear, biological and chemical) protected vehicle adapted from the BMD armored personnel carrier.

IAI Searcher Mk III Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)







Tiers:



Parent:

IAI Searcher Mk I Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)

Variants:

- **Searcher Mk II:** The Mk II is the fourth in a line of UAVs that began development as the Scout (the Searcher was the third generation). The Searcher Mk II is slightly larger, measuring 19 ft 2 in (5.85 m) in height and 28 ft 1 in (8.55 m) in diameter; it has higher maximum takeoff weight and payload at 939 lb (426 kg) and 220 lb (100 kg), respectively. The main benefit of these updates is greater flight endurance at higher altitudes.
- **Searcher Mk III:** The most recent variant, the Mk III was launched in 2010 and has over twice the range of the Mk II with two more hours of endurance and a higher ceiling. It is equipped with a four-stroke silent engine, along with a maximum takeoff weight of 961 lb (436 kg) and higher maximum payload weights of 264 lb (120 kg). The Searcher Mk III has an aerial data relay capability for beyond line-of-sight operations. Two simultaneous automatic takeoff and landing systems improve safety.
- **Forpost:** This is the Russian designation for Searcher Mk II UAVs being produced domestically. According to the Urals Civil Aircraft Plant, which builds the systems, the Forpost has a flight endurance of 17.5 hours, maximum takeoff weight of 1,000 lb (454 kg) and a max payload of 130 lb (60 kg). The air vehicle has a top speed of 130 mi (210 kmh) and a ceiling of 11,800 ft (3,600 m).

System

Alternative Designation: IAI Searcher III, Searcher Mk III, Searcher III
Type of UAV: Unmanned Reconnaissance Drone
Date of Introduction: 2010
Manufacturer: IAI
In Service: 2110-Present
Proliferation: Azerbaijan [5] Ecuador Navy [4] (Searcher Mk II) India Air Force [N/A] (Searcher Mk II) Army [12] (Searcher Mk I/Mk II) Navy [7] (Searcher Mk II) Indonesia [4] Israel Air Force [44] (Searcher Mk II) South Korea Air Force [3] Russia [18] (4 Searcher Mk II, Singapore Air Force [40] Spain Army [4] (Searcher Mk II-J) Sri Lanka Air Force [2] Thailand Army [4] (Searcher

Mk I/Mk II)

Primary Function: Long Endurance Reconnaissance Drone

Day/Night Capable: Yes

All Weather Capable: Yes

Ground Crew: 4 (external pilot, internal pilot, observer and commander)

Endurance: hours20

Launch System: Runway (Fully Automatic)

Recovery System: Runway (Fully Automatic)

Number of Hard Points: INA

Manned-Unmanned Teaming (MUM-T) Capable: No

Automatic Landing and Takeoff Capability: Yes, Automatic Takeoff and Landing (ATOL) systems

Electro-Optical and Infrared Sensors (EO/IR): Yes

Real-Time Imagery: Yes

Synthetic Aperture Radar (SAR): Yes

SIG/INT Capable: Yes

EO/IR Capable: Yes

Global System Mobile (GSM): Yes

Electronic Support Measures /Electronic intelligence (ESM/ELINT): Yes

Maritime Patrol Radar (MPR): Yes

Landing Gear Type: Fixed with a arresting hook

Note #1: The IAI Searcher Mk III is built from composite materials to reduce radar detection

Dimensions

Length: m5.15

Width (Wing Span): m8.55

Height: m1.16

Weight, Payload: kg120

Weight, Maximum Takeoff: kg436

Automotive

Engine Name: AR 682 rotary engine

Engine Type: 1 x flat-twin, 2-stroke AR 682 rotary gasoline engine

Engine Power: hpINA

Endurance: hours18

Propeller: driving 2-blade pusher propeller

Fuel: liters130

Maximum Speed: km/h104

Dash Speed: km/h185

Cruise Speed: km/h111

Ceiling: m7,010

Endurance: hours16

Maximum Range: km350

Communications

Line of Sight Radio (UAV & Ground Crew): Direct Line-of-Sight (LOS) data link

Beyond Line of Sight Radio (UAV & Ground Crew): UAV airborne data relay for beyond LOS missions & Ground-based data relay for beyond LOS missions

HR Capable: Yes

VHF Capable: Yes

UHF/DF Capable: Yes

Note: In the event of communications via datalink are lost the air vehicle will return automatically to its base.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

EW: No

EW Counter Measures / CCM: No

Counter Measures (Chaffs/Flares): No

Electronic Support Measures /Electronic intelligence (ESM/ELINT): Yes

IFF Capable: Yes

Notes:

Searcher Mk III is a multi-mission tactical unmanned aerial system (UAS) used for surveillance, reconnaissance, target acquisition, artillery adjustment and damage assessment. The Searcher Mk III Unmanned Aerial System (UAS) is a compact system designed for use in military, law enforcement, and homeland security missions. The Searcher Mk III enables high quality real-time intelligence gathering and transmission while operating at a distance from the mission region.

Harpy Israeli Loitering Munition Unmanned Aerial Vehicle (UAV)



Tiers:



Variants:

- **Cutlass:** This variant of the Harpy was evaluated in 1999 with Raytheon for search-and-destroy missions and the ability to attack a wider range of targets. It would have been a sea-launched weapon employing advanced sensors from Raytheon
- **Harop/Harpy 2:** This is a larger, upgraded variant. Designed as a fire-and-forget weapon, the Harop can fly more than 600 mi (1,000 km) to patrol a specific area and attack any hostile radars detected.
- **Harpy NG (new generation):** This is an upgraded variant that uses the Harop airframe. It was developed to counter newer air defense radar threats.
- **Mini-Harpy:** This tactical loitering munition combines the operating characteristics of the Harpy and Harop. It can lock onto radar and other emitting threats via person-in-the-loop electro-optical guidance. Fully autonomous operation is available as an option. It can attack emitting and non-emitting targets.
- **Maritime Harop:** This is a variant of the Harop optimized for operation from naval vessels, from patrol ships to frigates. It features a maritime-configured launcher and modified communications.
- **ASN-301:** This is a Chinese copy of the Harpy. It has a delta wing and pusher propeller configuration that appears virtually identical to the Israeli system. According to the China National Aero-Technology Import & Export Corp. (CATIC), the ASN-301 targets radar frequencies in the 2-16 GHz range and has a radar search range of 16 mi (25 km). The system is said to be able to target up to eight preset radar targets.

System

Alternate Designation: Harpy

Type: Unmanned Aerial Vehicle (UAV)

Manufacturer: Israel Aerospace Industries, Ben Gurion International Airport, Israel

Dimensions

Length: 2.10 m

Wingspan: 2.41 m

Takeoff Weight: 114 kg

Warhead Weight: 18 kg

Automotive

Engine Name: 1 x UEL AR731

Engine Type: Rotary Engine

Engine Power: 37 hp (28 kW)

Maximum Speed: 417 kph

Maximum Range: 500 km

Ceiling: 4,570 m

Endurance: 9 hours

Fire Control and Avionics

Communication Maximum Range: 200 km

Radar Name: INA

Radar Distance: INA

Radar Cross-Section: <0.5 sq m

Notes:

The IAI Harpy is a loitering munition produced by Israel Aerospace Industries. The Harpy is designed to attack radar systems and is optimised for the suppression of enemy air defence (SEAD) role. It carries a high explosive warhead. HARPY is a lethal UAV designed to detect, attack and destroy radar emitters. Harpy is a "Fire-and-Forget" all-weather, day/night autonomous weapon system, launched from a ground vehicle behind the battle zone or from ship based launchers. HARPY effectively suppresses hostile SAM and radar sites for long duration, by detecting, attacking and destroying radar targets with a very high hit accuracy. HARPY provides the most effective solution to the hostile radar problem, at the lowest price. HARPY is in production, is already operational with several nations Air Forces, and is currently available.

DP-12 Rhino American Autonomous Unmanned Helicopter







Tiers:



Variants:

- **DP-6XT Whisper:** This upgraded variant, the present production model, features a most payload of fifteen pound (7 kg). The air vehicle will operate in crosswinds of up to forty knots (74 kmh). The DP-6XT has associate degree endurance of half-hour with a 15-lb payload and a 60-minute endurance with a two.2 pound (1 kg) payload. It may be deployed in quarter-hour. Batteries may be recharged in quarter-hour or swapped in three minutes. The air vehicle may be bound to associate degree surface power supply for constant 24/7 operation. A 200-ft (60-m) tether is out there as associate degree possibility. The air vehicle will give a mobile impromptu Wi-Fi network or close-range stable representational process. The system may be operated by one person and offers easy waypoint navigation. Payload options embody external hardpoints; directional mike and speaker; electro-optical/infrared day or night detector with three-axis stabilization with a optical device illuminator; and a high-bandwidth encrypted communication link. The DP-6XT options exactness management through autonomous flight path programming; nap of the world flight even in complicated terrain; non-line-of-sight flight, together with in GPS-denied environments; autonomous operation; and a little profile.
- **DP-12 Rhino:** This is a bigger version designed to hold payloads of as much as a hundred and fifty lb (70 kg) over distances of as much as 350 mi (560 km). It can fly in crosswinds of as much as 30 knots (fifty six kmh). The unmanned helicopter has an persistence of approximately 1 hour with a a hundred and fifty-lb payload or three hours with a 32-lb (15-kg) payload. The air car functions more than one hardpoints forward, aft, to the edges and at the stomach to hold quite a few payloads. Typical payloads consist of cameras; artificial aperture radar; ultra-wideband radar; LIDAR; electro-optical/infrared sensors; magnetometers; ground-penetrating radar; mapping packages; acoustic and ultrasonic sensors; and steady verbal exchange relays and links. The DP-12 may be released in 5 mins if organized at the touchdown pad and the flight route is already programmed. It can release in 10 mins from a chilly begin and the flight route is programmed. Launch from a chilly begin takes approximately 15 mins if a brand new flight route need to be programmed.
- **DP-14 Hawk:** This is a heavy-raise variation designed for missions inclusive of air deliver to ahead working bases. It is designed to hold as much as 430 lb (195 kg) of payload in its 26 cu ft (0.7 cu m) of shipment area or outside hardpoints. It can reportedly fly for approximately 2.4 hours with a 430-lb payload or four.three hours with a 100-lb (45-kg) payload. The DP-14 can perform in crosswinds of as much as forty knots (seventy four kmh). The air automobile could be powered with the aid of using both an 87-hp Solar T62 engine or a 133-hp Microturbo eAPU turbine and is designed to apply both JP-five or JP-eight heavy fuel. The power plant could generate four.2 kW of strength for avionics and sensors. The DP-14 Hawk makes use of onboard LIDAR and superior algorithms to navigate in complex, restrained environments, inclusive of superior intelligence for course planning, path corrections, perception, impediment avoidance and touchdown-webweb page selection. These competencies permit the air automobile to fly intelligent, self sustaining, non-line-of-sight, nap-of-the-earth missions and dynamically adapt to adjustments in flight situations and terrain, in accordance to Dragonfly Pictures. The machine employs IMU and GPS for takeoff and touchdown and an ultrasonic

sensor as a rangefinder to decide peak from the floor at some point of touchdown. These sensors allow landings even in brownouts or different degraded visible environments. The air automobile may be ready with side-established pods for over-sized items. The unmanned helicopter functions 1 ms autopilot biking and fast pitch correction at some point of self sustaining shipment offloading, which permits precision airdrops with accuracy of higher than 10 ft (three m). It calls for a touchdown webweb page measuring approximately 60 ft (18 m) x 60 ft (18 m). All-terrain touchdown tools helps landings on choppy floor; slopes of up to fifteen degrees; and heaving deliver decks. A relative positioning machine lets in the DP-14 to self-release and self-get better on pitching ships with an eight-in (203-mm) round mistakes probable. The machine may be assembled, readied and released inside 30 minutes.

System

Alternate Designation: DP-12 Rhino

Type: Autonomous Unmanned Helicopter

Manufacturer: Dragonfly Pictures, Essington, Pa.

Dimensions

Length: 2.04 m

Width: 1.37 m

Height: 1.01 m

Total Weight: 180 kg

Payload Capacity: This is a larger variant designed to hold payloads of up to 150 lb (70 kg) over distances of up to 350 mi (560 km). It will fly in crosswinds of up to 30 knots (56 kmh).

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: INA

Maximum Speed: 207 km/h

Maximum Range: 560 km

Ceiling: INA

Climb Rate: 150 m/min

Endurance Payload 68 kg: 2.4 Hours

Endurance payload 14.6 kg: 4.3 Hours

Notes:

This is a bigger version of the DP-6, designed to hold payloads of as much as a hundred and fifty lb (70 kg) over distances of as much as 350 mi (560 km). It can fly in crosswinds of as much as 30 knots (56 km/h). The unmanned helicopter has an endurance of approximately 1 hour with a a 150-lb payload or three hours with a 32-lb (15-kg) payload. The air car functions more than one hardpoints forward, aft, to the edges and at the stomach to hold quite a few payloads. Typical payloads consist of cameras; artificial aperture radar; ultra-wideband radar; LIDAR; electro-optical/infrared sensors; magnetometers; ground-penetrating radar; mapping packages; acoustic and ultrasonic sensors; and steady verbal exchange relays and links. The DP-12 may be released in 5 mins if organized at the touchdown pad and the flight route is already programmed. It can release in 10 mins from a chilly begin and the flight route is programmed. Launch from a the ground begin takes approximately 15 mins if a brand new flight route need to be programmed.

Harop Israeli Loitering Munition Unmanned Aerial Vehicle (UAV)





Tiers:



System

Alternative Designation: The IAI Harop (or IAI Harpy 2)
Ground Crew: 3-4 (Est)
Engine Power: hp38
Propulsion: Rotary engine driving a 2-blade pusher propeller
Weight, Maximum Launch: kg135
Maximum Speed (level): km/hINA
Cruising Speed: km/h185
Endurance: hours6
Max Ceiling, normal: mINA
Wing Span: m3
Length, Overall: m2.5
Height, Overall: m.3
Flight Control:: Mission Control Shelter (MCS) controls vehicle with a “man-in-the-loop” able to engage or abort the attack in real time. In event of an abort, reverts to loiter mode until attack is restarted.
Lanch Method:: Solid-propellant booster rocket from ground-based storage container
Recovery / Landing Method:: Intentionally expendable, non-recoverable
Launcher Trucks per Battery: INA
Missiles per Launcher: 12
Total Missiles per Battery: INA
Ceiling, Services: m3,000
Range: km1,000

Payload

Passive Rada Seeker Sensor: Wide range of frequencies
Electro Optical: Color CCD, FLIR (IAI Tamam POF-200)

User Image Capabilities: Images recieved via satcom datalink.

Missile: HE-Frag warhead

Max Payload with Warhead: kg23

Notes:

The IAI Harop (or IAI Harpy 2) is a loitering munition developed by the MBT division of Israel Aerospace Industries. It is an anti-radiation drone that can autonomously home in on radio emissions. Rather than holding a separate high-explosive warhead, the drone itself is the main munition. This SEAD-optimised loitering munition is designed to loiter the battlefield and attack targets by self-destructing into them. The drone can either operate fully autonomously, using its anti-radar homing system, or it can take a human-in-the-loop mode. If a target is not engaged, the drone will return and land itself back at base. It has been designed to minimize its radar-signature through stealth (low-observability). This anti-radiation drone is designed to target enemy air-defense systems in a first line of attack, as the small drone (with its small radar cross-section) can evade SAMs and radar detection systems which are designed to target much larger aircraft or to intercept fixed-trajectory missiles. The IAI Harop has a loiter (flying) time of 6 hours and a range of 1000 km both ways. It is a larger version of the IAI Harpy and is launched from ground- or sea-based canisters, but can be adapted for air-launch.The Harop can either operate fully autonomously, or it can take a man-in-the-loop mode, being controlled by a remote operator.The Harop features two guidance modes: it can either home in on radio emissions by itself with its anti-radar homing system, or the operator can select static or moving targets detected by the aircraft's electro-optical sensor. This latter mode allows the Harop to attack radars that are presently shut down and therefore not providing emissions for the aircraft to automatically home in on. If a target is not engaged, the drone will return and land itself back at base. The small drone (with a Radar Cross Section similar to a large bird) can evade SAMs and radar detection systems which are designed to target much larger aircraft or to intercept fixed-trajectory missiles. IAI is developing a smaller version of the Harop for smaller applications, which was unveiled in 2015. The smaller Harop would be one-fifth the size and have a lighter 3–4 kg (6.6–8.8 lb) warhead. It will be cheaper and have a shorter endurance of 2–3 hours to be used tactically against time-critical targets or ones that hide and re-appear

IAI Searcher Mk I Israeli Reconnaissance Unmanned Aerial Vehicle (UAV)





Tiers:



Variants:

- **Searcher Mk II:** The Mk II is the fourth in a line of UAVs that began development as the Scout (the Searcher was the third generation). The Searcher Mk II is slightly larger, measuring 19 ft 2 in (5.85 m) in height and 28 ft 1 in (8.55 m) in diameter; it has higher maximum takeoff weight and payload at 939 lb (426 kg) and 220 lb (100 kg), respectively. The main benefit of these updates is greater flight endurance at higher altitudes.
- **Searcher Mk III:** The most recent variant, the Mk III was launched in 2010 and has over twice the range of the Mk II with two more hours of endurance and a higher ceiling. It is equipped with a four-stroke silent engine, along with a maximum takeoff weight of 961 lb (436 kg) and higher maximum payload weights of 264 lb (120 kg). The Searcher Mk III has an aerial data relay capability for beyond line-of-sight operations. Two simultaneous automatic takeoff and landing systems improve safety.
- **Forpost:** This is the Russian designation for Searcher Mk II UAVs being produced domestically. According to the Urals Civil Aircraft Plant, which builds the systems, the Forpost has a flight endurance of 17.5 hours, maximum takeoff weight of 1,000 lb (454 kg) and a max payload of 130 lb (60 kg). The air vehicle has a top speed of 130 mi (210 kmh) and a ceiling of 11,800 ft (3,600 m).

System

Alternative Designation: IAI Searcher, Searcher Mk I, Searcher I
Type of UAV: Unmanned Reconnaissance Drone
Manufacturer: IAI
In Service: 1992-Present
Primary Function: Long Endurance Reconnaissance Drone
Day/Night Capable: Yes
All Weather Capable: Yes
Ground Crew: 4 (external pilot, internal pilot, observer and commander)
Endurance: hours24
Launch System: Runway (Fully Automatic)
Recovery System: Runway (Fully Automatic)
Number of Hard Points: INA
Manned-Unmanned Teaming (MUM-T) Capable: No
Automatic Landing and Takeoff Capability: Yes, Automatic Takeoff and Landing (ATOL) systems
Electro-Optical and Infrared Sensors (EO/IR): Yes

Real-Time Imagery: Yes

Synthetic Aperture Radar (SAR): Available and would replace the Electro-Optical and Infrared Sensors (EO/IR)

SAR/GMTI Capable: INA

SIG/INT Capable: Yes

EO/IR Capable: Yes

Fuselage: Composite

Gyro-Stabilized TV Camera: Yes

Note #1: The IAI Searcher Mk II is built from composite materials to reduce radar detection

Dimensions

Length: m5.85

Width (Wing Span): m8.54

Height: m1.25

Weight, Empty: kg350

Weight, MTOE: kg500

Automotive

Engine Name: Limbach L550 Engine

Engine Type: 1 X Limbach L550 Engine

Engine Power: hp47

Endurance: hours24

Propeller: driving 2-blade pusher propeller

Fuel: liters130

Maximum Speed: km/h200

Dash Speed: km/h185

Cruise Speed: km/h111

Ceiling: m6,100

Endurance: hours16

Maximum Range: km300

Payload: kg65

Communications

Line of Sight Radio (UAV & Ground Crew): Direct Line-of-Sight (LOS) data link

Beyond Line of Sight Radio (UAV & Ground Crew): UAV airborne data relay for beyond LOS missions & Ground-based data relay for beyond LOS missions

Note: In the event of communications via datalink are lost the air vehicle will return automatically to its base.

Protection

Stealth Properties: No

Heat Signature Reduction: INA

Add on Armor: INA

EW: Yes

EW Counter Measures / CCM: No

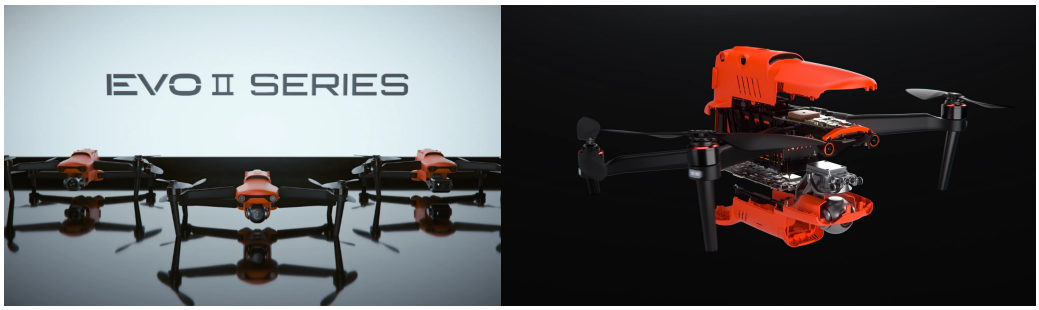
Counter Measures (Chaffs/Flares): No

Notes:

The Searcher is a multi mission tactical Unmanned Air System (UAS) used for surveillance, reconnaissance, target acquisition, artillery adjustment and damage assessment and developed by IAI in the 1990s. It was designed to meet present and future requirements for Unmanned Aerial Vehicles (UAVs) in support of the Israel Air Force as well as export customers. The air vehicle design provides excellent engine and aerodynamics performance and handling qualities while the ground control station was designed to provide compatibility with other UAV systems produced by Israel. So far the Searcher family includes the Mk I, Mk II and Mk III models. The Searcher looks almost identical to the Scout and Pioneer, but is in fact scaled up and is well over twice the size of the Scout. The Searcher is powered by a 35 kW (47 hp) piston engine. The new design features updated avionics and sensor systems with greater flight endurance as well as increased redundancy for improved survivability. In addition to Israel, the system had been exported and is currently in use by Russia, India, South Korea, Sri Lanka, Singapore, Thailand and Turkey

→Remote Controlled Aircraft

Evo II American Remote Controlled Quadcopter



Tiers:



Variants:

- **Evo I:** The Evolution of flight has arrived. EVO is a compact folding unit designed to go wherever your adventure takes you. Equipped on the front EVO offers a powerful camera on a 3-axis stabilize gimbal that records video at 4k resolution up to 60 frames per second and a recording speed up to 100mbps in an H.264 or H.265 codec. Using real-glass optics EVO captures stunning photos at 12 megapixels with a wide dynamic range for more details and color. Integrated advanced computer vision systems provide forward obstacle avoidance, rear obstacle detection and bottom sensors for more accurate landings and stable indoor flights. EVO boasts flight times up to 30 minutes with a range of 4.3 miles (7KM). Additionally, EVO offers failsafe features letting you know when the battery is low and it's time to return to home. EVO includes a remote controller which houses a 3.3-inch OLED screen providing you with critical flight information or a live 720p HD video feed letting you see the camera view without the need for a mobile device.

System

Alternate Designation: EVO II
Type: Remote Controlled Quadcopter
Manufacturer: Autel Robotics
Vision System: Downward, Forward, Backward, Left, Right
Obstacle Sensory Range: 1.6 to 131.2' / 0.5 to 40.0 m
Forward Field of View: 60° (Horizontal) 80° (Vertical)
Backward Field of View: 60° (Horizontal) 80° (Vertical)
Operating Frequency: 2.4 GHz
Maximum Operating Distance: 5.59 Miles / 9 km at 2.4 G
Battery Chemistry: Lithium-Ion Polymer (LiPo)
Battery Capacity: 5000 mAh
Built-In Display Size: 3.3"
Photo Resolution: 4:3: 8000 x 6000
Video Format: 7680 x 4320 (MP4/MOV via H.264/AVC, H.265/HEVC)
Recording Media: SD (up to 128 GB)

Dimensions

Length: INA
Width: INA
Height: INA
Weight: 2.62 lb / 1192 g

Automotive

Engine Name: INA
Engine Type: INA
Number of Rotors: 4
Engine Power: INA
Maximum Horizontal Speed: 44.8 mph / 20 m/s
Flight Ceiling: 4.35 Miles / 7000 m
Maximum Flight Time: 40 Minutes
Maximum Hover Time: 35 Minutes
Number of Axes: 3 (Pitch, Roll, Yaw)

Notes:

Experience the current leading edge of video resolution with the EVO II 8K Drone from Autel. With an 8K camera payload, the EVO II 8K can capture video at up to 7680 x 4320 resolution (8000 x 6000 stills). This lets you make prints up to 100" wide, punch in, crop, and scale images with great detail, and capture stunning hi-res screenshots from your footage. The EVO II drone provides hi-end specifications and abilities well beyond videography and photography. The 7100mAh battery lets it fly for up to 40 minutes at a time, the motors can fly in Ludicrous Speed mode at up to 44.8 mph, and you can transmit HD footage back to the controller's 3.3" OLED screen from up to 5.6 miles away. While flying and tracking, 12-sensor omnidirectional obstacle avoidance is coupled with a dual-core processor and AI machine learning to let the EVO II navigate itself around the environment safely, while still getting the shot. Additional Features *Remote controller with 3.3" OLED screen *Capture 48MP hi-res stills *Record HDR video at up to Ultra HD 4K resolution *Get a clear image with phase detection autofocus *Capture action in dramatic 120 fps slow motion at up to 2K resolution *4x lossless in-camera zoom *Support for 10-bit A-LOG *Defogging mode *Foldable design for a compact and ultra-portable form factor *Battlock system to help prevent accidental battery ejections during hard maneuvers and landings *Radar feature for more environmental information while manually piloting with avoidance turned off

Evo American Remote Controlled Quadcopter



Tiers:

1 2 3 4

System

Alternate Designation: Evo
Type: Remote Controlled Quadcopter
Proliferation: INA
Manufacturer: Autel Robotics
Flight Modes: GPS · ATTI · SPORT
Operating Environment Temperature: 32° F ~ 104° F (0° C ~ 40° C)
Storage Temperature: -10°C~40°C (14°F~104°F)
Operating Environment Temp.: 0°C~40°C (32°F~104°F)
Still Photography Modes: Single shot Burst shooting Auto Exposure Bracketing (AEB) Time-lapse
Video Link Frequency: 2.4GHz~2.4835GHz
Receiver Frequency: 2.4GHz~2.4835GHz
Video Recording Modes: Normal · Picture In Video (PIV)
Supported SD Card Types: Micro-SD, 4 GB - 128 GB, Class 10 or UHS-3
Battery Type: Rechargeable Lithium-Polymer Battery
Battery Voltage Charging: 11.4 V
Max Control and Video Transmission Distance: 7km (4.3miles)
Battery: 6700mAH

Dimensions

Length: INA
Diagonal Wheelbase: 338 mm
Height: INA
Total Weight: 863g
Propeller Size: 8.3" x 2.9"

Automotive

Engine Name: INA
Engine Type: INA
Engine Power: INA
Hover Precision: GPS+ Ultrasonic+IMU: Horizontal: ±1.5m, Vertical: ±0.2m; Vision+IMU: Horizontal: ±0.1m, Vertical: ±0.1m
Max. Yaw Rate: 200 dps
Max. Inclination Angle: 35°
Max. Ascent/Descent Speed: Ascent: 5m/s Descent: 3m/s
Max. Horizontal Speed: 20 m/s (44.7mph)
Flight Time: Up to 30 minutes
Max Operating Time: 3 hours

Notes:

The Evolution of flight has arrived. EVO is a compact folding unit designed to go wherever your adventure takes you. Equipped on the front EVO offers a powerful camera on a 3-axis stabilize gimbal that records video at 4k resolution up to 60 frames per second and a recording speed up to 100mbps in an H.264 or H.265 codec. Using real-glass optics EVO captures stunning photos at 12 megapixels with a wide dynamic range for more details and color. Integrated advanced computer vision systems provide forward obstacle avoidance, rear obstacle detection and bottom sensors for more accurate landings and stable indoor flights. EVO boasts flight times up to 30 minutes with a range of 4.3 miles (7KM). Additionally, EVO offers failsafe features letting you know when the battery is low and it’s time to return to home. EVO includes a remote controller which houses a 3.3-inch OLED screen providing you with critical flight information or a live 720p HD video feed letting you see the camera view without the need for a mobile device. Download the free Autel Explorer app available for Apple iOS or Android devices and connect to the remote controller and gain access to more advanced settings and autonomous flight features like Dynamic Track, Viewpoint, Orbit, VR first person view and Waypoint mission planning. *What's in the box: *EVO aircraft *Remote Controller *Power Cable *Charger *Micro-USB Cable *USB-C Cable *Intelligent battery with 30 minutes of flight time per charge *Propellers (3 total pairs) *32-GB MicroSD card to record 1-hour of 4K video

Aircraft Armament

→Aircraft Missiles

→→Air-to-Air Missiles

AIM-9 Sidewinder American Short-Range Air-to-Air Missile





Tiers:



Variants:

- **AIM-9C:** As a Semi-Active Radar Homing (SARH) missile, the AIM-9C could be used from the frontal aspect of the target, provided a radar lock of sufficient quality was obtained.
- **AIM-9L:** The next major advance in IR Sidewinder development was the AIM-9L ("Lima") model which was in full production in 1977. This was the first "all-aspect" Sidewinder with the ability to attack from all directions, including head-on, which had a dramatic effect on close-in combat tactics. Its first combat use was by a pair of US Navy F-14s in the Gulf of Sidra in 1981 versus two Libyan Su-22 Fighters, both of the latter being destroyed by AIM-9Ls. Its first use in a large-scale conflict was by the United Kingdom during the 1982 Falklands War. In this campaign the "Lima" reportedly achieved kills from 80% of launches, a dramatic improvement over the 10–15% levels of earlier versions, scoring 17 kills and 2 shared kills against Argentine aircraft.
- **AIM-9M:** The subsequent AIM-9M ("Mike") has the all-aspect capability of the L model while providing all-around higher performance. The M model has improved capability against infrared countermeasures, enhanced background discrimination capability, and a reduced-smoke rocket motor. These modifications increase its ability to locate and lock-on to a target and decrease the chance of missile detection. Deliveries of the initial AIM-9M-1 began in 1982. The only changes from the AIM-9L to the AIM-9M were related to the Guidance Control Section (GCS). Several models were introduced in pairs with even numbers designating Navy versions and odd for USAF: AIM-9M-2/3, AIM-9M-4/5, and AIM-9M-6/7 which was rushed to the Persian Gulf area during Operation Desert Shield (1991) to address specific threats expected to be present.
- **AIM-9R:** The Navy began development of AIM-9R, a Sidewinder seeker upgrade in 1987 that featured a focal-plane array (FPA) seeker using video-camera type charge-coupled device (CCD) detectors and featuring increased off-boresight capability. The technology at the time was restricted to visual (daylight) use only and the USAF did not agree on this requirement, preferring another technology path. AIM-9R reached flight test stage before it was cancelled and subsequently both services agreed to a joint development of the AIM-9X variant.
- **BOA/Boxoffice:** China Lake developed an improved compressed carriage control configuration titled BOA. ("Compressed carriage" missiles have smaller control surfaces to allow more missiles to fit in a given space. The surfaces may be permanently "clipped", or may fold out when the missile is launched.) The BOA design reduced size of control surfaces, eliminating the rollerons, and returned to simple forward-canard design. Although the Navy and Air Force had jointly developed and procured AIM-9L/M, BOA was a Navy-only effort supported by internal China Lake Independent Research & Development (IR&D) funding. Meanwhile, the Air Force was pursuing a parallel effort to develop a compressed carriage version of Sidewinder, called Boxoffice, for the F-22. The Joint Chiefs of Staff directed that the services collaborate on AIM-9X, which ended these separate efforts. The results of BOA and Boxoffice were provided to the industry teams competing for AIM-9X, and elements of both can be found in the AIM-9X design.
- **AIM-9X:** After looking at advanced short range missile designs during the AIM portion of the ACEVAL/AIMVAL Joint Test and Evaluation at Nellis AFB in the 1974–78 timeframe, the Air Force and Navy agreed on the need for the Advanced Medium Range Air-to-Air Missile AMRAAM. However, agreement over development of an Advanced Short Range Air-to-

Air Missile ASRAAM was problematic and disagreement between the Air Force and Navy over design concepts (Air Force had developed AIM-82 and Navy had flight-tested Agile and flown it in AIMVAL). Congress eventually insisted the services work on a joint effort resulting in the AIM-9M, thereby compromising without exploring the improved off boresight and kinematic capability potential offered by Agile. In 1985, the Soviet Union did field a short range missile (SRM) (AA-11 Archer/R-73) that was very similar to Agile. At that point, the Soviet Union took the lead in SRM technology and correspondingly fielded improved infrared countermeasures (IRCM) to defeat or reduce the effectiveness of the latest Sidewinders. With the reunification of Germany and improved relations in the aftermath of the Soviet Union, the West became aware of how potent both the AA-11 and IRCM were and SRM requirements were readdressed.

- **Block II:** Testing work on the AIM-9X Block II version began in September 2008. The Block II adds Lock-on After Launch capability with a datalink, so the missile can be launched first and then directed to its target afterwards by an aircraft with the proper equipment for 360 degree engagements, such as the F-35 and F-22. By January 2013, the AIM-9X Block II was about halfway through its operational testing and performing better than expected. NAVAIR reported that the missile was exceeding performance requirements in all areas, including lock-on after launch (LOAL). One area where the Block II needs improvement is helmetless high off-boresight (HHOBS) performance. It is functioning well on the missile, but performance is below that of the Block I AIM-9X. The HHOBS deficiency does not impact any other Block II capabilities, and is planned to be improved upon by a software clean-up build. Objectives of the operational test were due to be completed by the third quarter of 2013. However, as of May 2014 there have been plans to resume operational testing and evaluation (including surface-to-air missile system compatibility). As of June 2013, Raytheon has delivered 5,000 AIM-9X missiles to the armed services.
- **Block III:** In September 2012, Raytheon was ordered to continue developing the Sidewinder into a Block III variant, even though the Block II had not yet entered service. The USN projected that the new missile would have a 60 percent longer range, modern components to replace old ones, and an insensitive munitions warhead, which is more stable and less likely to detonate by accident, making it safer for ground crews. The need for the AIM-9 to have an increased range was from digital radio frequency memory (DRFM) jammers that can blind the onboard radar of an AIM-120D AMRAAM, so the Sidewinder Block III's passive imaging infrared homing guidance system was a useful alternative. Although it could supplement the AMRAAM for beyond visual range (BVR) engagements, it would still be capable at performing within visual range (WVR). Modifying the AIM-9X was seen as a cost-effective alternative to developing a new missile in a time of declining budgets. To achieve the range increase, the rocket motor would have a combination of increased performance and missile power management. The Block III would "leverage" the Block II's guidance unit and electronics, including the AMRAAM-derived datalink.

AIM-9 Sidewinder Missile

↳***System***

Name: AIM-9 Sidewinder
Type: Short-Range Air-to-Air Missile
Basic Load: INA
Length: 3.02 m
Diameter: 127.0 mm
Warhead: WDU-17/B annular blast-frag
Warhead Weight: 9.4 kg
Detonation mechanism: IR proximity fuze
Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket
Wingspan: 279.4 mm
Operational Range: 1.0 to 35.4 km
Speed: Mach 2.5+
Guidance System: Infrared homing (most models) semi-active radar homing (AIM-9C)
Launch Platform: Aircraft, naval vessels, fixed launchers, and ground vehicles

System

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:

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Notes:

The AIM-9 Sidewinder is a short-range air-to-air missile which entered service with the US Navy in 1956 and subsequently was adopted by the US Air Force in 1964. Since then the Sidewinder has proved to be an enduring international success, and its latest variants are still standard equipment in most western-aligned air forces. The Soviet K-13, a reverse-engineered copy of the AIM-9, was also widely adopted by a number of nations. Low-level development started in the late 1940s, emerging in the early 1950s as a guidance system for the modular Zuni rocket. This modularity allowed for the introduction of newer seekers and rocket motors, including the AIM-9C variant, which used semi-active radar homing and served as the basis of the AGM-122 Sidearm anti-radar missile. Originally a tail-chasing system, early models saw extensive use during the Vietnam War but had a low success rate. This led to all-aspect capabilities in the L version which proved to be an extremely effective weapon during combat in the Falklands War and the Operation Mole Cricket 19 ("Bekaa Valley Turkey Shoot") in Lebanon. Its adaptability has kept it in service over newer designs like the AIM-95 Agile and SRAAM that were intended to replace it. The Sidewinder is the most widely used air-to-air missile in the West, with more than 110,000 missiles produced for the U.S. and 27 other nations, of which perhaps one percent have been used in combat. It has been built under license by some other nations including Sweden, and can even equip helicopters, such as the Bell AH-1Z Viper. The AIM-9 is one of the oldest, least expensive, and most successful air-to-air missiles, with an estimated 270 aircraft kills in its history of use. When firing a Sidewinder, NATO pilots use the brevity code FOX-2 The United States Navy hosted a 50th-anniversary celebration for the Sidewinder in 2002. Boeing won a contract in March 2010 to support Sidewinder operations through to 2055, guaranteeing that the weapons system will remain in operation until at least that date. Air Force Spokeswoman Stephanie Powell noted that due to its relatively low cost, versatility, and reliability it is "very possible that the Sidewinder will remain in Air Force inventories through the late 21st century". The AIM-9 is made up of a number of different components manufactured by different companies, including Aerojet and Raytheon. The missile is divided into four main sections: guidance, target detector, warhead, and rocket motor. The guidance and control unit (GCU) contains most of the electronics and mechanics that enable the missile to function. At the very front is the IR seeker head utilizing the rotating reticle, mirror, and five CdS cells or "pan and scan" staring array (AIM-9X), electric motor, and armature, all protruding into a glass dome. Directly behind this are the electronics that gather data, interpret signals, and generate the control signals that steer the missile. An umbilical on the side of the GCU attaches to the launcher, which detaches from the missile at launch. To cool the seeker head, a 5,000 psi (34 MPa) argon bottle (TMU-72/B or A/B) is carried internally in Air Force AIM-9L/M variants, while the Navy uses a rail-mounted nitrogen bottle. The AIM-9X model contains a Stirling cryo-engine to cool the seeker elements. Two electric servos power the canards to steer the missile (except AIM-9X). At the back of the GCU is a gas grain generator or thermal battery (AIM-9X) to provide electrical power. The AIM-9X features high off-boresight capability; together with JHMCS (Joint Helmet-Mounted Cueing System), this missile is capable of locking on to a target that is in its field of regard said to be up to 90 degrees off boresight. The AIM-9X has several unique design features including built-in test to aid in maintenance and reliability, an electronic safe and arm device, an additional digital umbilical similar to the AMRAAM and jet vane control. Next is a target detector with four IR emitters and detectors that detect whether the target is moving farther away. When it detects this action taking place, it sends a signal to the warhead safe and arm device to detonate the warhead. Versions older than the AIM-9L featured an influence fuze that relied on the target's magnetic field as input. Current trends in shielded wires and non-magnetic metals in aircraft construction rendered this obsolete. The AIM-9H model contained a 25 lb (11 kg) expanding rod-blast fragmentary warhead. All other models up to the AIM-9M contained a 22 lb (10.0 kg) annular-blast fragmentary warhead. The missile's warhead rods can break rotor blades (an immediately fatal event for any helicopter). Recent models of the AIM-9 are configured with an annular-blast fragmentation warhead, the WDU-17B by Argotech Corporation. The case is made from spirally wound spring steel filled with 8 lb (3.6 kg) of PBXN-3 explosive. The warhead features a safe/arm device requiring five seconds at 20 g (~200 m/s^2) acceleration before the fuze is armed, giving a minimum range of approximately 2.5 km (1.6 mi). The Mk36 solid-propellant rocket motor provides propulsion for the missile. A reduced-smoke propellant makes it difficult for a target to see and avoid the missile. This section also features the launch lugs used to hold the missile to the rail of the missile launcher. The forward of the three lugs has two contact buttons that electrically activate the motor igniter. The fins provide stability from an aerodynamic point of view, but it is the "rollerons" at the end of the wings providing gyroscopic precession to free-hinging control surfaces in the tail that prevent the missile from spinning in flight. The wings and fins of the AIM-9X are much smaller and control surfaces are reversed from earlier Sidewinders with the control section located in the rear, while the wings up front provide stability. The AIM-9X also features vectored thrust or jet vane control to increase maneuverability and accuracy, with four vanes inside the exhaust that move as the fins move. The last upgrade to the missile motor on the AIM-9X is the addition of a wire harness that allows communication between the guidance section and the control section, as well as a new 1760 bus to connect the guidance section with the launcher's digital umbilical.

PL-7 Chinese Air-to-Air Infrared Homing Missile




Tiers:

1 2 **3** 4

System

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:
:

↳ ***PL-7 Air-to-Air Missile***

Name: PL-7
Type: Air-to-Air Missile
Manufacturer: Factory 331 (Zhuzhou Aeroengine factory)
Length: 2.74 m
Diameter: 157 mm
Wingspan: 0.66 m
Weight: 89 kg
Warhead: 12.5 kg
Speed: Mach 2.5
Range: 0.5 to 14 km
Guidance: Infrared homing

Notes:

The PL-7 (Chinese: □□-7; pinyin: Pī Lì-7; literally: 'Thunderbolt-7') is the PRC version of the French Magic R.550 air-to-air missile. It is a short-range, Infrared homing missile used by Chinese fighters. It was designed by Wu Shendao, and produced at the Factory 331 (Zhuzhou Aeroengine factory).

R-60 (AA-8 Aphid) Russian Short-Range Infrared Homing Air-to-Air Missile



Tiers:

1 2 **3** 4

System

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:
:

↳*R-60 Infrared Homing Air-to-Air Missile*

Name: R-60
Type: Infrared Homing Air-to-Air Missile
Manufacturer: Vympel
Length: 2,090 mm
Diameter: 120 mm
Wingspan: 390 mm
Warhead: 3 kg
Detonation mechanism: proximity
Operational Range: 8 km
Flight Altitude: 20,000 m
Maximum Speed: Mach 2.7
Guidance System: Infrared homing

Notes:

The Molniya (now Vympel) R-60 (NATO reporting name: AA-8 "Aphid") is a short-range lightweight infrared homing air-to-air missile designed for use by Soviet fighter aircraft. It has been widely exported, and remains in service with the CIS and many other nations. The R-60 was initially developed for the MiG-23. Work began on the weapon, under the bureau designation K-60 (izdeliye 62), in the late 1960s. Series production began in 1973. It entered service with the designation R-60 (NATO reporting name "Aphid-A"). When introduced, the R-60 was one of the world's lightest air-to-air missiles, with a launch weight of 44 kg (97 lb). It has infrared guidance, with an uncooled Komar (Mosquito) seeker head. Control is by forward rudders with large rear fins. The distinctive canards on the nose, known as "destabilizers," serve to improve the rudders' efficiency at high angles of attack. The R-60 uses a small, 3 kg (6.6 lb) tungsten expanding-rod surrounding a high explosive fragmentation warhead. Two different types of proximity fuze can be fitted: the standard Strizh (Swift) optical fuse, which can be replaced with a Kolibri active radar fuse. Missiles equipped with the latter fuse were designated R-60K.

Aspide Italian Air-to-Air Missile





Tiers:



Variants:

- **Aspide Mk.1:** Similar to AIM-7E, with Selenia monopulse semi-active seeker and SNIA-Viscosa solid-propellant rocket motor. This version was popular with export customers, and sold to 17 countries
- **Aspide Mk.2:** Improved version with active radar-homing seeker. Development was shelved in favor of better missiles, such as the AIM-120 AMRAAM.
- **Aspide 2000:** Surface-to-air version of the Aspide Mk.1, used on Italian Army Skyguard and Spada air-defense systems

System

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Apside Air-to-Air Missile

↳*Missile*

Name: Apside
Type: Air-to-Air Missile
Length: 3.72 m
Diameter: 234 mm
Wingspan: 80 cm
Weight: 220 kg
Speed: 4520 km/h (mach 3.7)
Effective Firing Range: 25 km
Warhead: 35 kg warhead

Notes:

Aspide (the Italian name for the adder) is an Italian medium range air-to-air and surface-to-air missile produced by Selenia (now part of the Alenia consortium). It is provided with semi-active radar homing seeker. It is very similar to the American AIM-7 Sparrow, using the same airframe, but at the moment of its introduction, the Aspide was provided with monopulse guide instead of the conic scan, which made it more resistant to ECM and more precise. This innovation appeared on the Sparrows

only with the late AIM-7M version. Closed-loop hydraulics were also substituted for Sparrow's open-loop type, which gave Aspide better downrange maneuverability. This resemblance, and the fact that Selenia was provided with the technology know-how of the AIM-7 (around 1,000 of which it had produced under license), has generally led non-Italian press to refer to the Aspide as a Sparrow variant. However, the Aspide had original electronics and warhead, and a new and more powerful engine. Even the control surfaces are different, replacing the original triangular wings, fixed in the air-to-air and instead foldable in the surface-to-air version, to a newly designed common cropped delta fixed version. Aspide, in its various versions, was used both in the air-to-air role, carried by Aeritalia F-104s in the apposite versions F-104S and F-104ASA, and in the surface-to-air naval role. In the latter role it has been replaced by the MBDA Aster. Naval Aspide launchers can be adapted to fire the Sparrow by merely switching a single circuit board. In the mid 1980s, China imported a small batch of the Aspide Mk.1 from Italy, then signed an agreement with Alenia to produce the missile locally under license. In 1989, China produced its first batch of Aspide Mk.1 missiles using imported parts from Italy. However, due to the European Union arms embargo imposed after the Tiananmen Square incident, China was unable to purchase additional Aspide kits. China subsequently developed its own missile family based on the Aspide Mk.1, with surface to air versions designated as the LY-60, and an air-to-air version designated as PL-10. The rocket engine of the Aspide is produced by Turkish missile manufacturer Roketsan.

R-27ER (AA-10c) Russian Air-to-Air Missile




Tiers:



Variants:

- **R-27R/Alamo A:** This variant has semi-active radar guidance and a short-burn motor. It has a longer afterbody than other versions and a pointed nose. The 9B-1101K semi-active radar seeker has a lock-on range of 19 mi (30 km) against typical fighter targets and operates in J-band (10-20 GHz) with continuous wave monopulse systems. It has a look angle of +/-50 deg off boresight. The seeker weighs 74 lb (33.5 kg).
- **R-27T/Alamo B:** This version features IR guidance and a short-burn motor. The missile has a cylindrical body, blunt nose, tapered nozzle and a cruciform antenna. There are "ears" forward of the fixed cruciform inverse-tapered foreplanes. "Cropped delta" tail fins are located aft. The R-27T is equipped with a 36T infrared seeker.
- **R-27ER/Alamo C:** The R-27ER missile features semi-active radar guidance and a long-burn motor.
- **R-27ET/Alamo D:** This infrared guided variant has a long-burn motor. It was first seen by Western observers at an August 1989 Soviet air show. The R-27ET features an improved seeker compared to the R-27T with improved protection against IR countermeasures and better performance against low-flying cruise missiles. The seeker has a look angle of +/-55 deg off boresight.
- **R-27AE/R-27A/R-27EA/Alamo E:** This variant has active-radar homing and a long-burn motor. At the 1992 Farnborough Air Show, an R-27AE active-radar variant was unveiled that used the seeker developed by Agat for the R-77 (AA-12 Adder). Weighing 32 lb (15 kg) and measuring 24 in (600 mm) long, the seeker combined an inertial platform with a multimode pulse-Doppler active radar. These were controlled by a 2.2-lb (1-kg) digital computer with a 32-kilobyte read-only memory (ROM) and a 32K random-access memory (RAM) computer. The Agat 9B-1103M multi-function monopulse Doppler seeker has a lock-on range of 12 mi (20 km) against fighter targets. The radome has a distinctive conical shape unlike any other R-27 variant. After a cruise phase during which the missile receives command updates from the launch aircraft, the radar switches on and searches for a target. Against a target with a 53.8-sq ft (5-sq m) RCS, radar lock-on can occur at 10.8 nm (12.4 mi; 20 km). Vympel's chief designer claimed that the seeker could pick a target in a multi-target environment and would pursue a cruise missile. At the time of the 1992 air show, the seeker was described as having just left the design phase and being about to enter the development phase. The R-27AE is said to have superior ballistic performance to the R-77 (AA-12 Adder) and, as a result, more straight-line range.
- **R-27EM:** This missile has a semi-active radar seeker with improved low altitude engagement capability. It is said to be able to intercept targets flying as low as 10 ft (3 m). The R-27EM was modified for use over water and intended for the Su-33 carrier-based fighter.
- **R-27P:** Numerous reports have indicated that the R-27P likely entered service in the 1990s, according to Jane's Air-Launched Weapons for Sept. 15, 2010. The missile has a short, conical nose and Avtomatika's 9B-1032 (PRGS-27) anti-radiation seeker, which homes in on other airborne radars. The 9B-1032 seeker is modular and interchangeable with the R-77/RVV-AE. The R-27P is believed to have a range of 50 mi (80 km).
- **R-27EP/Alamo F:** This variant has a new 9B-1103M active radar seeker from Agat. It is said to be more advanced than the 9B-1348 seeker that equips the R-77/ RVV-AE . The R-27EP is said to have a range of 68 mi (110 km).

System

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↳*R-27ER (AA-10c) Air-to-Air Missile*

Name: R-27ER; Alamo C; AA-10c
Type: Air-to-Air Missile
Manufacturer: Spetzetekhnika Vympel NPO, Moscow, Russia, in cooperation with Artem, Ukraine
Length: 4.78 m
DIameter: 260 mm
Wingspan: 0.80 m
Weight: 350 kg
Warhead: 39 kg
Control Plane Span: 0.97 m
Propulsion: single-stage boost motor and sustainer engine
Maximum Speed: supersonic
Maximum Range: 60-63 km
Guidance System: IR-cooled seeker, all-aspect capability, flare countermeasure filters; semi-active radar J band, CW monopulse seeker; ARM J band, passive IR homing, passive radar seeker

Notes:

R-27ER/Alamo C The R-27ER missile features semi-active radar guidance and a long-burn motor.

PL-9 Chinese Air-to-Air Missile




Tiers:



System

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↳ ***PL-9 Air-to-Air Missile***

Name: PL-9
Type: Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory
Length: 2.9m
Diameter: 0.157m
Wingspan: 0.856m
Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)
Detonation Mechanism: laser proximity fuse
Engine: Solid-fuel rocket
Operational Range: 22km
Flight Altitude: 4.5km
Maximum Speed: Mach 2+
Guidance System: multi-element infrared

Notes:

The PL-9 (Chinese: □□-9; pinyin: Pī Lì-9; literally: 'Thunderbolt-9') is a short-range, infrared-homing air-to-air missile (AAM) developed by the People's Republic of China. It was originally designed by Dong Bingyin (□□□) at the Luoyang Electro Optical Center, which is also known as Institute 612 and renamed in 2002 as the China Air-to-Air Guided Missile Research Institute (□□□ □□□□□□). After Dong Bingyin died, his position was succeeded by Mr. Jin Xianzhong (□□□). The deputy general designer of PL-9 is the same deputy general designer of PL-12, Dr. Liang Xiaogeng (□□□). The PL-9C is one of the latest versions of the PL-9, which also has a surface-to-air variant (DK-9). The PL-9C tactical low-altitude surface-to-air missile (SAM) was first revealed during the 1989 Paris Air Show. The launch unit is available in both towed and self-propelled arrangement. The self-propelled version has a launch complex consisting four-rail launcher and the associated target acquisition and radar and electro-optical director

mounted on a 6X6 WZ551 armored personnel carrier (APC). The towed version has a four-rail launcher mounted on a four-wheel carriage. The launch unit is supported by a range of truck-mounted ground equipment for maintenance and missile testing. The missile is fitted with a cryogenic liquid nitrogen gas-cooled IR seeker capable of +/-40 degree off boresight angles. Flight control is by long span pointed delta fins at the front of the missile with Sidewinder-type slipstream driven rollerons on the aft tail fin surfaces to prevent roll and so enhance the operation of the guidance system. The missile has a maximum effective range of 35 km and an altitude limit of 6.5 km. The single-shot hit probability for a single missile launch at an approaching target is 90%. The missile can be used at a stand-alone system, or as a part of the Type 390 (DK-9) brigade (regiment)-level combined AAA/SAM air defence system. The missile entered production in 1991 and saw limited service with the PLA ground forces.

Super 530F French Medium-Range Air-to-Air Missile





Tiers:



Variants:

- **Super 530D:** Super 530D is carried on the Dassault-Breguet Mirage 2000. It was introduced in 1988.
- **Super 530F:** Super 530F is carried on the Dassault Mirage F1. It was introduced in 1979.

System

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Super 530F Medium-Range Air-to-Air Missile

↳ ***Missile***

Name: Super 530F
Type: Medium-range air-to-air missile.
Basic Load: 2
Length: Super 530F: 3.54 m Super 530D: 3.80 m
Diameter: mm263
Weight: Super 530F: 245 kg Super 530D: 270 kg
Warhead Type: High-explosive fragmentation
Warhead Weight: kg30
Detonation Mechansim: Super 530F: RF Super 530D: Active Radar
Engine: Solid-fuel rocket motor
Wingspan: Super 530F: 0.88 m Super 530D: 0.62 m
Operational Range: Super 530F: 25 km Super 530D: 40 km
Speed: Super 530F: Mach 4.5 Super 530D: Mach <5.0
Guidance System: Semi-active radar homing (SARH)

Notes:

The Matra Super 530 is a French short to medium-range air-to-air missile. The Super 530 series is an improved type of the R.530 missile. Super 530F is carried on the Dassault Mirage F1. It was introduced in 1979. Super 530D is carried on the Dassault-Breguet Mirage 2000. It was introduced in 1988. The Super 530 is being replaced by the MICA (missile). The Super 530F and Super 530D share the same general aerodynamic features and internal layout with cruciform low aspect ratio wings, cruciform aft controls, and 30 kg high explosive fragmentation warhead. However the 530D has a lengthened stainless steel body. This allows it to accommodate a more powerful dual-thrust solid propellant motor and a new seeker assembly. The new seeker includes doppler filtering for improved low altitude performance and digital micro-processing to enable the seeker to be reprogrammed against new threats. The 530D has a claimed maximum interception altitude of 24,400 m (80,100 ft), with a snap-up capability of 12,200 m (40,000 ft), and a snap-down capability to targets at 60 m (200 ft). The missile has a range of 40 km and a maximum speed of less than Mach 5. During the Iran-Iraq War, during the 1980s, the Iraqi Air Force used them on their Mirage F1 against Iran. On 14 September 1983, in an incident that was revealed thirty years later, two Turkish F-100F violated Iraqi air space and one was shot down by an Iraqi Mirage F1EQ firing a Super 530F missile. The Turkish pilots survived and returned to Turkey. On 15 July 2019, during a police operation in Northern Italy, a functioning Super 530F missile was seized together with firearms. The missile lacked the warhead. The weapons were smuggled by a group of people connected to far-right movements. The missile canister indicated it was originally sold to the Qatari armed forces. The original contract date with Qatar was October 1980.

PL-11 (ASR) Chinese Air-to-Air Missile




Tiers:



Variants:

- **HQ-61:** Because China had not developed any ship-borne SAM system, China decided to first develop a land-based, fixed-site version of HQ-61 SAM, and then progress to the naval version after the development of the land-based version had been matured. The naval version would be based on the expertise gained from the land-based version to reduce costs and risks. The land-based, fixed-site version was designated as HQ-61, while the naval version was designated as HQ-61B. Before 1970, the HQ-61 went through two major redesigns based on the feedback of earlier tests. In September 1970, new problem arose when it was discovered the speed of the missile had dropped drastically after the redesign. Based on the suggestion from staffs of the SAM testing range, the 2nd Electro Mechanical Bureau of Shanghai organized another redesign in 1973, successfully solved problems encountered, including speed reduction and vibration. Meanwhile, new technologies were also adopted, including transistors, gyro accelerometer and measures against salinity and other environmental hazards. From March 1975 through April 1975, four rounds of prototype of HQ-61 missile with independent closed-loop were test-fired, with satisfactory result. In 1976, tests were conducted on subsystem interfacing, including that of radar seekers and ground equipment, and one of the results was that the seeker had successfully locked on the target, proving the design was sound for the time being. The success convinced the developer to extend the test over the sea and beginning in December 1976, 45-day-long sea trials were conducted on 12 sorties completed by frigates of Chinese navy, and 13 sorties completed by Harbin H-5 for supporting. Various tests were conducted during the sea trial, including test launches, tracking of the parachute targets, engaging parachute targets, guidance accuracy, reliability of the launcher, effects of launching in different sea states, noise and vibration caused by the launch. During the sea trial, two duds and two remotely controlled rounds were fired, and the result was less than satisfactory. The two duds were relatively successful, but the two remotely controlled rounds resulted in complete failure, missing the parachute targets. The unsatisfactory result convinced the developer not to rush to the sea, but instead, to keep a prudent pace on land first to stamp out all the problems before going any further. In 1978, a flight test of HQ-61 was conducted on a SAM test range in western Liaoning. This flight test was a mixture of simulation of mathematical modeling and real equipment, with targets being simulated by simulators. A total of nine ballistic trajectories and more than eighty scenarios were tested over four hundred times, providing valuable data and proving the design so far. The prototypes of HQ-61 were also test-fired against Type 381 parachute targets for further evaluation, but the result was not completely satisfactory: although the C3I system developed for HQ-61 worked fine, the first shot missed while the second shot scored a direct hit. In order to resolve problems revealed during these tests, the system of general designer was established, and during the development of HQ-61 and later models, Mr. Wu Zhongying (□□□) and Mr. Liang Jincai (□□□) had been assigned as the general designers of HQ-61 series missiles. However, when the development of the land-based version of fix-site HQ-61 was completed, its service (only with limited numbers) in Chinese military had never gone beyond the evaluation stage, because the need it intended to fill could be filled with HQ-2, and there were no mass production plans for HQ-61 since resources were allocated on concentrating on the development of HQ-61B, the naval version. Furthermore, the fixed-site version was deemed by the Chinese military as not adequate in mobile warfare on the modern battlefield.
- **HQ-61B:** By the end of 1980, the developers were confident enough to move from land to sea, and HQ-61B thus begun its own tests. However, the very first test ended in failure and investigation revealed that the cause of the failure was that the fuse did not activate during the entire test. After rework, the test was moved back to land in the spring next year, but met with two continuous failures again, when the fuse detonated earlier than it should. As a result, in February, 1981, the 2nd Electro Mechanical Bureau of Shanghai concentrated most of its effort on solving the difficulties on fuse, and its staffs came up with three plans to answer the problem: large rework/redesign, intermediate rework/redesign, and minor rework/redesign. After testing samples built according to each plan and comparing result, the intermediate rework/repair plan was adopted, result in a new combined fuse that was reliable. During this time, the 2nd Electro Mechanical Bureau of Shanghai was reorganized as Shanghai Aerospace Bureau, and measures were taken

to address the numerous problems encountered in the development of HQ-61B, totaling more than 410. When these problems were solved, the subsequent test on land in November, 1984 was successful, including downing of two Changkong-1 (□□1□) drones. Meanwhile, the C3I system associated with HQ-61B was also making slow but steady progress. In addition to extra temperature and salinity factors, noise and stability were also challenges of ship-based system, while the space is cramped on board. As a result, developer was forced to adopt new technologies and new means, many of them were first in China. A mono-pulse centimeter wavelength tracking radar was developed for HQ-61B for surveillance / tracking, while a continuous-wave centimeter wavelength illuminating radar was developed for HQ-61B for engagement. Fire control computer of HQ-61B was a newly designed digital computer, incorporating analog – digital and digital – analog conversions. The launching system was hydraulically operated with twin launchers, connecting to ammunition drum below, where additional missile were stored vertically. The control consol of HQ-61B also performs maintenance tests / checks on missiles mounted on the launcher. From November 1986 through December, 1986, tests were resumed at sea, achieving satisfactory results, including downing five Sea Eagle-1 (□□1□) drones and two Changkong-1 drones in a single test. After these successful tests, the HQ-61B entered low-rate production and saw limited service in Chinese military, and the production pickup in November, 1988 when Chinese State Department and the Chinese Central Military Commission certified so. HQ-61B served only in relatively short time with Chinese navy, and it has been converted to air-to-air and anti-radiation versions after it was retired from Chinese service. One of the reasons of its short service time was that as a design originated in the 1960s, it could not adequately meet the modern threats faced by naval ships. For example, the system can only engage a single target at a time and with two launchers on each ship, the maximum number of threat it can face is only two, which is not sufficient enough to defend the ship from saturated attack.

- **HQ-61A:** To improve the land-based air defense for Chinese ground force, Chinese State Department and the Chinese Central Military Commission decided to develop a mobile low-to-medium level surface-to-air missile based on HQ-61B, and named the mobile SAM system as Hongqi-61A (□□-61□), or HQ-61A for short. This would lead to HQ-61A being a later model than HQ-61B, which is an earlier model of HQ-61 series, despite have the A suffix. In August, 1979, the 8th Industrial Bureau of Machinery and the artillery corps of the People's Liberation Army Ground Force jointly redefined the requirement of the mobile SAM system, stating that the C2I system used by HQ-61B should be utilized as much as possible to keep the cost down. The primary contractor remains the same, as the 2nd Electro Mechanical Bureau of Shanghai, which would later be reorganized as Shanghai Aerospace Bureau in the early 1980s. The prime subcontractor was the Shanghai Broadcasting Equipment Factory, which was tasked to develop vehicle-based version of C4I system of HQ-61A. HQ-61A SAM system consists of three vehicles: launcher / transporter, radar vehicle, C2I vehicle, all of which are based on the same SX250 6 x 6 cross country truck to simplify logistics and reducing operational cost. In November, 1984, two initial trials were completed, proving the design was sound. More intensive testing followed, lasting from April, 1986 through June, 1986, which included the successful continuous downing of three drones, and the missile subsequently entered Chinese service, but it was not until two year later, in November, 1988, did the production pickup its pace, when Chinese State Department and the Chinese Central Military Commission finally gave their certifications to do so.
- **HQ-61 ARM (YJ-5):** In addition to SAM versions of HQ-61, an anti radar version is also developed in the 1980s. China was seeking a replacement after the termination of Fenglei-7 anti-radar missile (FL-7), and it was decided to utilize HQ-61 to develop an anti-radiation missile (ARM) to meet the urgent need. Development of most subsystems of FL-7 continued as research projects after the production was shelved, and these subsystems were mated with HQ-61 to create the anti-radar missile needed, and most experience was gained via the reverse engineering attempt of AGM-45 Shrike, and to a much less extend, that of AGM-78 Standard ARM. Samples of both missiles were mainly obtained from down American jets and provided to China by North Vietnam during the Vietnam War, though several unexploded samples launched by American jets failed to detonate were also transferred. HQ-61 ARM is basically a HQ-61 missile equipped with the guidance and control system of FL-7 and thanks to the research development rooted from FL-7, HQ-61ARM was quickly completed. HQ-61 ARM also has a less known name as YJ-5, with YJ is short for Yingji (□□), meaning Eagle Strike. Due to the highly classified nature and small number produced, HQ-61 ARM is relatively unknown to the public and its YJ-5 designation is often erroneously identified as an anti-ship or land attack cruise missile, as most of other YJ series produced by China. In reality, it is a totally different missile with a different mission in comparison to other better known Chinese missiles of YJ series. The first batch of YJ-5/HQ-61 ARM was completed in 1984, and was test-fired by Harbin H-5. The missiles met the original requirements, but also revealed many shortcomings, including poor ECCM capability, narrow frequency band coverage, and not being able to lock on to the target after the targeted radar has been switched off. The second batch was completed in 1986, incorporating improvements to solve these shortcomings. The coverage of frequency band was expanded, and memory circuitry was added to calculate the approximate location of the target after the targeted radar had been switched off. The third and final batch was completed in the early 1990s with a new capability added to counter the frequency-hopping radars, and to a limited degree, phased array radars. Despite these improvements, the Chinese technological and industrial capability at the time was not adequate enough to face modern threats on the battlefields, and only limited number entered Chinese service, with Harbin H-5 modified as the carrier, designated as HD-5. The performance of YJ-5/HQ-61 ARM is better than AGM-45, though not too much, and for this reason, plus the purchase of Kh-31 by China, the missile did not enter mass production, and HD-6, the planned modified Xian H-6 intended as another platform did not materialize as a result, and other planned platforms such as proposed modifications for Shenyang J-8, Xian JH-7 and Nanchang Q-5 were also shelved. After receiving newer ARMs such as Kh-31, YJ-91 and YJ-12 entered Chinese service, the surviving HQ-61 ARMs are believed to have been exhausted in training already.

- **HQ-61C:** HQ-61C is the upgrade of previous version, excluding the ARM. The primary improvement is in the electronics. Fully solid state and highly digitized microelectronics are used to upgrade both the missile itself and the associating C3I system. In addition to simplifying logistics and reducing costs, the upgraded system can also be automatically linked to larger air defense networks, with all information transmitted electronically in real time. Previously, such information could only be transmitted verbally by operators because the older HQ-61 system could not be easily integrated into larger air defense network, and the communication subsystem of the C3I system of HQ-61 was only consisted of wired and wireless vocal communication equipment. Another improvement is the adaptation of new rocket motor which boosted the speed of the missile by a third, from the original Mach 3 of earlier versions of HQ-61 to Mach 4 of HQ-61C. The range is also increased but exactly how much is unknown. Some Chinese enthusiasts have claimed that because of the new rocket motors adopted, the size and the weight of the missile is also reduced slightly, but this has yet to be confirmed by other credible sources.

System

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↳***PL-11 Air-to-Air Missile***

Name: PL-11
Type: Air-to-Air Missile
Manufacturer: Shanghai Aerospace Bureau
Length: 3.89 m
Diameter: 0.286 m
Wingspan: 0.68 m
Weight: 310 kg (Some sources claim 220 kg)
Speed: Mach 4
Maximum Range: 40 – 75 km, depending on the size, speed, and heading of the target
Note: PL-11 did not enter Chinese service in very large numbers because it was only used as a stopgap measure until the more advanced PL-12 became available, and there is no confirmed export either.

Notes:

PL-11 is the air-to-air derivative of HQ-61, and it is also developed by the same developer of HQ-61, Shanghai Aerospace Bureau. The first successful flight test of PL-11 was conducted in 1992, and the missile entered Chinese service in the mid-1990s. The latest upgrade of PL-11 was completed in 2002. The first PL-11 was an air-launched HQ-61 armed with a mono-pulse SARH seeker based on Italian Selenia Aspide, and eventually upgraded with an ARH seeker. To meet the airborne requirement, PL-11 is slightly shorter than its SAM counterparts, and has a different set of redesigned control surfaces, which has much smaller wingspans while ensure the same performance. Versions: PL-11: This is the basic version, with HQ-61C armed with the mono-pulse SARH seeker based on Italian Selenia Aspide. PL-11A: PL-11 incorporating inertial guidance so that targets would only need to be illuminated at the final stage of the engagement, as opposed to the entire engagement for PL-11. Depending on the airborne radar, PL-11A can engage two to four targets in the same time it takes for PL-11 to engage a single target. PL-11B: ARH version of PL-11, and the last version of PL-11 family. This is a PL-11A armed with an ARH seeker AMR-1. Also known as PL-11-AMR, named after the ARH seeker AMR-1.

PL-2B Chinese Air-to-Air Missile



Tiers:



Variants:

- **PL-2:** In 1962, China decided to manufacture former-Soviet Vympel K-13 AAM, and works on setting up the production line begun immediately. The main contractor to provide the production equipment was Easter Machinery Factory in Xi'an (□□□□□□□), and over two dozen subcontractors were also involved. In October 1964, Zhuzhou Aero-engine Factory (□□□□□□□□) of the Ministry of Aviation Industry was selected as the main contractor of the AAM, and a month later, in November 1964, work on components of the AAM started. By September 1965, all components were completed and individually tested successfully. In November 1966, the 1st batch of production was completed with 18 missiles, and other soon followed, and tests were conducted. After two major test events both completed successfully, the 1st of which was in March 1967 with firing of 19 missiles and the 2nd of which was in May 1967 with firing of 22 missiles, the missile received state certification in November 1967.
- **PL-3:** PL-3 was the first indigenously developed AAM in China. Originally, the idea was to build an improved version of Vympel K-13 in increasing speed, range, precision, lethality and maneuverability. The main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). However, after the program begun in June 1962, the original goal proved to be too technologically ambitious for the Chinese industry back then to achieve. Additionally, Cultural Revolution occurred several years later also greatly affected the progress of the PL-3 program. As a result, PL-3 project had borrowed heavily from PL-2 and the program was protracted: after the 1st batch of 20 missiles completed in June 1968 and the 2nd batch of 30 completed in December 1969, the necessary tests was not completed until November 1974, four years after the initial start in 1970. The missile finally received its state certification in April, 1980, and 50 production version missiles was completed by 1981. However, during training and evaluations, it was revealed that PL-3 did not significantly outperform PL-2, and furthermore, all experience gained from PL-3 can be readily incorporated in the PL-2 improvement efforts, so there was no need to have an additional separate AAM program when the requirement could be meet by just one.
- **PL-5:** PL-5 is a further Chinese development of PL-2. Although earlier PL series have been developed from the former-Soviet Vympel K-13, all of them were infrared guided. PL-5 AAM is the first Chinese attempt to follow the former-Soviet practice of develop both Semi-active radar homing (SARH) and infrared guidance for the same missile, and the main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). Work on the SARH version of PL-5 begun in April, 1966, and first test flight was conducted in July 1971. Live round test fire begun in September 1972, but due to Cultural Revolution that had serious disrupted and delayed production and development, all of the missiles of the first batch of production ran out before the test could be completed. It was not until April, 1984, well after the end of Cultural Revolution, when the 2nd batch was completed and tests were resumed in August 1984, finally completed in March 1982. However, tests and evaluation revealed that the SARH guided version was not adequate enough and this version was consequently cancelled in 1983. The infrared guided version of PL-5 was equally affected by the same political turmoil in China, and its development was delayed even further: it was not until September 1986 when this version finally received its state certification and the missile entered mass production in the same year.
- **PL-6:** Due to the prolonged delay of PL-3 AAM development, PL-3 AAM was already inadequate before its completion. A follow-up was planned to incorporate advance in microelectronics and lessons learned in the aerial combats, which is based on the feedback of Vietnam War. The reason for starting a new AAM was because of the inherit design limitation of PL-3 back then, it was difficult to incorporate the technological advances planned to be incorporated. The program was designated as PL-6 and begun in 1975, before PL-3 program was even completed. The main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). The first batch of missile was completed in 1978 and tests were successfully completed in 1979. However, PL-6 met the same fate of its predecessor, PL-3 in that during training and evaluations, it was revealed that PL-6 did not significantly outperform PL-3, and furthermore, all experience gained from PL-6 can be readily incorporated in the PL-2 improvement

efforts, so there was no need to have an additional separate AAM program when the requirement could be meet by just one. Consequently, PL-6 program was drastically scaled back in 1981, and after very limited production, PL-6 was terminated in 1983.

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↳ ***PL-2B Air-to-Air Missile***

Name: PL-2B
Type: Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)
Length: 2.99 m
Diameter: 127 mm
Wingspan: 528 m
Weight: 76 kg
Warhead: 11.3 kg high explosive
Detonation Mechanism: Impact / Proximity
Propellant: solid fuel
Operational Range: 10 km
Flight Ceiling: 21,500 m
Maximum Speed: Mach 2.5
Guidance System: Nitrogen cooled passive InPb infrared seeker

Notes:

PL-2B Chinese Air-to-Air Missile

PL-5 Chinese Air-to-Air Missile




Tiers:

1 2 **3** 4

System

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↳*PL-5 Air-to-Air Missile*

Name: PL-5
Type: Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factory
Length: 3.128 m
Diameter: 0.127m
Wingspan: 0.657m
Weight: 148 kg
Warhead: 6kg blast-frag, or expanding rod (RF-fuse)
Detonation Mechanism: Active infrared, laser proximity fuse(PL-5EII)
Engine: Solid-fuel rocket
Operational Range: 1.3–16km
Maximum Speed: Mach 2.5
Guidance System: Infrared homing, multi-element, dual band detector(PL-5EII)

Notes:

The PL-5 (□□-5) air-to-air missile (PL stands for Pi Li, "Thunderbolt" in Chinese, the generic designation for all PRC air-to-air missiles) is a short-range, Infrared homing missile use by Chinese fighters. It is based on AA-2 Atoll technology and resembles the AIM-9 Sidewinder. The PL-5 was designed and developed at China's Luoyang Electro-Optics Technology Development Centre (EOTDC), also known as Institute 612; its design team members included Chen Jiali (□□□), Dong Chunfeng, Hu Rongchao (□□□), Huang Bin, Zhang Ming (□□), and Zheng Zhiwei (□□□). It was reportedly produced at the Hanzhong Nanfeng Machine Factory (also known as the Hanzhong Air-to-Air Missile Factory) of China Aviation Industry Corporation I. The PL-5 have been continuously upgraded by Luoyang and the latest variant, the PL-5EII added a dual band, multi-element detector as well as a laser proximity fuse similar to the PL-9. According to Chinese export/import agency CATIC, the PL5E has an all-aspect capability

with the seeker having a maximum off boresight angle of ±25° before launch, and ±40° after launch. PLAAF J-10 and J-11 fighter jets are mainly using PL-8 missile, which is more advanced comparing PL-5. However, due to greater weight and dimension of PL-8 missile, for F-7 and JH-7, PL-5 is still the preferable air-to-air missile at this stage.

PL-8 Chinese Air-to-Air Missile





Tiers:



Variants:

- **Note:** Unlike the conventional Chinese designation practice where a missile is given a Chinese name after at least 70% of it is made in China, Python 3 received a Chinese name at the very beginning, receiving PL-8 when it was purchased. It was speculated that China did so because it did not want to further reveal its tie with Israel, so that the original Israeli name was replaced with a Chinese one to avoid harming the relationship between Chinese and Muslim countries. As PL-8/Python 3 AAM has wing span much larger than PL-2/PL-5 (which has dimensions close to AIM-9 missiles), Chinese fighter jets were modified to carry extended pylon to carry PL-8 missiles. Wingtip pylon of newly released J-15 carrier based fighter jet is also extended for this purpose, and become a visual signature of J-15 comparing Su-33. PL-8: Python 3 AAM provided by Israel PL-8A: License assembled AAM in China with Israeli supplied components PL-8B: Chinese built AAM with 100% domestic Chinese components PL-8H: Surface-to-air version with slightly smaller warhead weighing 10 kg The surface-to-air version is developed by China National Aero-Technology Import & Export Corporation (CATIC). According to the developers, there are minor improvements incorporated in each version, but they have not specified the exact upgrades.

System

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↳*PL-8 Air-to-Air Missile*

Name: PL-8
Type: Air-to-Air Missile
Manufacturer: Xi'an Eastern Machinery Factory and CATIC
Length: 2.95 m
Diameter: 160 mm

Wingspan: 800 mm

Weight: 115 kg

Warhead: 11 kg high explosive

Detonation Mechansim: Impact / Proximity

Engine: solid rocket

Propellant: solid fuel

Operational Range: 20 km

Flight Ceiling: 21 km

Flight Altitude: 05 km

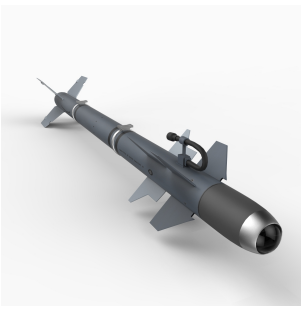
Maximum Speed: Mach 3.5

Guidance System: passive infrared homing

Notes:

The PL-8 (Chinese: □□-8; pinyin: Pī Lì-8; literally: 'Thunderbolt-8') is a Chinese air-to-air missile (AAM) originated from the Israeli Python-3 AAM. Experience gained from PL-8/Python-3 had helped China greatly in developing its next missile, the PL-9. China's PLAAF was quite impressed with this missile, and paid for licensed production as the PL-8 AAM in the 1980s. The program was code named "Number 8 Project" (□□□□) and formally started on September 15, 1983. The major supplier of the missile was Xi'an Eastern Machinery Factory (□□□□□□□) located in Xi'an. From March 1988 to April 1989, technology transfer to China was complete while license assembly and license built parts continued, and by the spring of 1989, the complete domestic Chinese built missile received state certification. China has also developed a helmet-mounted sight (HMS) system for the PL-8. Elbit Systems DASH (Display And Sight Helmet) helmet mounted sight (HMS). However, it's not clear that if this was part of the Python-3 deal or a separate deal instead. The seeker of the original Python-3 AAM was able to be slaved to either the airborne fire control radars or DASH HMS. These capabilities initially did not exist on PL-8 at the earlier stage of its service in Chinese hands, because the missile is only compatible with western radars, but not compatible with Chinese radars. The only exception was that capability of being slaved to airborne fire control radars could be achieved by PL-8 only when it is used in conjunction with the few western radars in Chinese inventory, such as the British GEC-Marconi Skyranger airborne radar and Italian FIAR Grifo series airborne radar on Chengdu J-7, but for most part, the seeker of PL-8 could only be fixed, pointing to the front when deployed on aircraft with domestic Chinese radars. These capabilities would not be fully achieved until the advent of PL-9, the next Chinese AAM, when the missile became compatible not only with western radars, but also Chinese and Russian radars as well, and these capabilities of PL-9 were eventually incorporated to PL-8 AAMs in its upgrades so that PL-8 is fully capable as Python-3.

R550 Magic 2 French Short-Range Air-to-Air Missile





Tiers:



Variants:

- **R.550 Magic:** The R550 Magic is a short-range missile designed in 1968 by French company Matra to compete with the American AIM-9 Sidewinder.The largest single competitor for Sidewinder in Western Europe, the Matra Magic R.550 has better design and performance requirements. It can be fired at any speed (no minimum), meaning that it is a prime candidate for the arming of attack helicopters. Magic is slightly larger in diameter than Sidewinder, but the launch installation components in the carrying aircraft were wisely made interchangeable. The tail fins of the R.550 are free to rotate around the rocket's nozzle, providing of spin-stabilization. The Magic has 8 fixed fins, and 4 movable fins. It has a solid-fuel engine, and can engage the target independently from the firing aircraft with its passive IR guidance system. The warhead is armed 1.8 seconds after launch, giving a minimum engagement distance of 0.30 km, and a maximum range of around 3 km.

System

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R550 Magic 2 Short-Range Air-to-Air Missile

↳ ***Missile***

Name: R550 Magic 2
Type: Short-Range Air-to-Air Missile
Basic Load: 2-4
Manufacturer: Matra, MBDA
Length: 2.75 m
Diameter: 160 mm
Span, Foreplanes: 0.47 m
Span, Tailplanes: 0.66 m
Weight: 89 kg
Warhead: Pre-fragmented with controlled splintering
Warhead Weight: 13 kg

Configuration: Thin cylinder with rounded nose 2 sets of cruciform foreplanes, front "cropped delta" non-steering, rear compound sweep steerable rear cruciform "cropped delta" fins mounted on slip ring and rotating freely

Propulsion: Richard single-stage butylene solid-propellant rocket

Speed: Mach 3+

Effective Range: km3

Minimum Distance to Launch: m500

Altitude: 20,000 m

Guidance System: All-aspect, cooled IR seeker proximity fuze detonation

Platforms: Attack Attack A-4 Skyhawk Alpha Jet Jaguar Mirage V Mirage F1 Sea Harrier Super Etendard Fighters F-5 Tiger MiG-21 MiG-23 Mirage III Mirage 2000 Rafale F-16 Trainers Hawk Note: Users may employ the Magic on other aircraft that are capable of firing the AIM-9 Sidewinder

Notes:

The R550 Magic 2 replaced the AD3601 seeking head by the AD3633, allowing frontal fire on the target. The R550 Magic 1 could only be fired from the rear on the target due to the lack of sensitivity of the IR detector. R550 Magic 2 also received improved counter-countermeasures including flare rejection. R550 Magic 2 has many more improvements over R550 Magic 1, but principally has an all-aspect engagement capability and it takes far less time to prepare the missiles for launch. The R550 Magic 2 retains the same general aerodynamic and external characteristics as the Magic 1, with double cruciform canards (the aft set acting as control surfaces) and free rotating rear fins. Magic 2 is 2.75 m long, has a body diameter of 157 mm, a wing span of 0.66 m and a weight of 90 kg. However, it has an increased range of up to 5 km compare to the R550 Magic 1 with 3 km. In Pakistan Air Force R550 Magic and R550 Magic 2 short-range missiles can be carried by Mirage III/V, F-16A/B, F-7, and A-5.

PL-2 Chinese Air-to-Air Missile





Tiers:



Variants:

- **PL-2:** In 1962, China decided to manufacture former-Soviet Vympel K-13 AAM, and works on setting up the production line begun immediately. The main contractor to provide the production equipment was Easter Machinery Factory in Xi'an (□□□□□□□), and over two dozen subcontractors were also involved. In October 1964, Zhuzhou Aero-engine Factory (□□□□□□□□) of the Ministry of Aviation Industry was selected as the main contractor of the AAM, and a month later, in November 1964, work on components of the AAM started. By September 1965, all components were completed and individually tested successfully. In November 1966, the 1st batch of production was completed with 18 missiles, and other soon followed, and tests were conducted. After two major test events both completed successfully, the 1st of which was in March 1967 with firing of 19 missiles and the 2nd of which was in May 1967 with firing of 22 missiles, the missile received state certification in November 1967. In August 1970, the AAM entered series production and was formally named as PL-2.
- **PL-3:** PL-3 was the first indigenously developed AAM in China. Originally, the idea was to build an improved version of Vympel K-13 in increasing speed, range, precision, lethality and maneuverability. The main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). However, after the program begun in June 1962, the original goal proved to be too technologically ambitious for the Chinese industry back then to achieve. Additionally, Cultural Revolution occurred several years later also greatly affected the progress of the PL-3 program. As a result, PL-3 project had borrowed heavily from PL-2 and the program was protracted: after the 1st batch of 20 missiles completed in June 1968 and the 2nd batch of 30 completed in December 1969, the necessary tests was not completed until November 1974, four years after the initial start in 1970. The missile finally received its state certification in April, 1980, and 50 production version missiles was completed by 1981. However, during training and evaluations, it was revealed that PL-3 did not significantly outperform PL-2, and furthermore, all experience gained from PL-3 can be readily incorporated in the PL-2 improvement efforts, so there was no need to have an additional separate AAM program when the requirement could be meet by just one. Consequently, PL-3 was terminated in 1983.
- **PL-5:** PL-5 is a further Chinese development of PL-2. Although earlier PL series have been developed from the former-Soviet Vympel K-13, all of them were infrared guided. PL-5 AAM is the first Chinese attempt to follow the former-Soviet practice of develop both Semi-active radar homing (SARH) and infrared guidance for the same missile, and the main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). Work on the SARH version of PL-5 begun in April, 1966, and first test flight was conducted in July 1971. Live round test fire begun in September 1972, but due to Cultural Revolution that had serious disrupted and delayed production and development, all of the missiles of the first batch of production ran out before the test could be completed. It was not until April, 1984, well after the end of Cultural Revolution, when the 2nd batch was completed and tests were resumed in August 1984, finally completed in March 1982. However, tests and evaluation revealed that the SARH guided version was not adequate enough and this version was consequently cancelled in 1983. The infrared

guided version of PL-5 was equally affected by the same political turmoil in China, and its development was delayed even further: it was not until September 1986 when this version finally received its state certification and the missile entered mass production in the same year. Despite the delay, this version proved to be more successful and many further upgrades were developed later on, including PL-5E.

- **PL-6:** Due to the prolonged delay of PL-3 AAM development, PL-3 AAM was already inadequate before its completion. A follow-up was planned to incorporate advance in microelectronics and lessons learned in the aerial combats, which is based on the feedback of Vietnam War. The reason for starting a new AAM was because of the inherit design limitation of PL-3 back then, it was difficult to incorporate the technological advances planned to be incorporated. The program was designated as PL-6 and begun in 1975, before PL-3 program was even completed. The main contractor was the 612th Research Institute (later reorganized as Luoyang Electro-Optics Technology Development Centre (EOTDC)). The first batch of missile was completed in 1978 and tests were successfully completed in 1979. However, PL-6 met the same fate of its predecessor, PL-3 in that during training and evaluations, it was revealed that PL-6 did not significantly outperform PL-3, and furthermore, all experience gained from PL-6 can be readily incorporated in the PL-2 improvement efforts, so there was no need to have an additional separate AAM program when the requirement could be meet by just one. Consequently, PL-6 program was drastically scaled back in 1981, and after very limited production, PL-6 was terminated in 1983.

System

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↳***PL-2 Air-to-Air Missile***

Name: PL-2
Type: Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)
Length: 2.15 to 2.99 meter
Diameter: 127 mm
Wingspan: 528 to 609 mm
Weight: 60 to 152.3 kg
Warhead: 11.3 kg high explosive
Detonation Mechanism: Impact / Proximity
Engine: rocket 2668dN
Propellant: solid fuel
Operational Range: 6 to 10 km
Flight Ceiling: 15 to 21.5 km
Maximum Speed: Mach 1.6 to 2.5
Guidance System: Nitrogen cooled passive InPb infrared seeker

Notes:

PL-2 (Chinese: □□-2; pinyin: Pī Lì-2; literally: 'Thunderbolt-2') and its derivatives are members of a series of Chinese air-to-air missiles (AAM) originated from the former-Soviet Vympel K-13 AAM. Unlike PL-2 itself, the second Chinese AAM, most of derivatives of PL-2 failed to enter mass production, with the exception of infrared guided PL-5. In 1962, China decided to manufacture former-Soviet Vympel K-13 AAM, and works on setting up the production line begun immediately. The main contractor to provide the production equipment was Easter Machinery Factory in Xi'an (□□□□□□□), and over two dozen subcontractors were also involved. In October 1964, Zhuzhou Aero-engine Factory (□□□□□□□□) of the Ministry of Aviation Industry was selected as the main contractor of the AAM, and a month later, in November 1964, work on components of the

AAM started. By September 1965, all components were completed and individually tested successfully. In November 1966, the 1st batch of production was completed with 18 missiles, and other soon followed, and tests were conducted. After two major test events both completed successfully, the 1st of which was in March 1967 with firing of 19 missiles and the 2nd of which was in May 1967 with firing of 22 missiles, the missile received state certification in November 1967. In August 1970, the AAM entered series production and was formally named as PL-2.

YJ-91 Chinese Anti-Radiation Missile





Tiers:



Variants:

- **YJ-91 Anti-Radiation Missile:** The anti-radiation version of the YJ-91 missile was developed from the Kh-31P, which uses a wide array of seekers to cover the entire radar frequency band. The Chinese were not satisfied with the requirement to include multiple seekers and preferred to have a single seeker capable of covering multiple frequency bands, like the AGM-88 HARM. However, such ambitions proved to be too great for the Chinese microelectronics industry. They could not achieve the goal in a single step within the required timeline originally specified by the Chinese military. Instead, a two-step approach was implemented: The completion of the development of a single seeker covering multiple frequency bands was pushed back, while a stopgap measure was adopted in the meantime. The Kh-31P was modified so that the seekers could be rapidly changed in the forward airstrips (providing the specialized tooling is available), so that missile would not need to be sent back to depots or factories to perform such operation. The resulting anti-radiation version of YJ-91 missile has a slightly increased the range to 120 km in comparison to 110 km of the original Kh-31P. In addition to a seeker that covers multiple frequency bands, additional measures to upgrade the missile are in development, such as, an open software architecture. Additional measures reportedly include prioritizing threats, which could be uploaded to the onboard computer from the ground or by the pilots while in flight. Threats could then be updated in real time. The multi-band seeker is of higher priority.
- **YJ-91 Anti-Ship Missile:** The Chinese have also developed an anti-ship version of the YJ-91 missile. However, this version is an indigenous development of the Chinese from the Kh-31P anti-radiation missile, and not from the Kh-31A anti-ship missile. China did not order any of the Kh-31A. The Chinese felt that the original Kh-31A could not fully satisfy their requirements, because the high-low trajectory of the missile meant early detection, thus it is prone to interception. In contrast, the low-low trajectory usually adopted by subsonic anti-ship missiles better uses the supersonic speed of Kh-31A. Such a trajectory shortens the detection range and the high-speed reduces the target's reaction time, once the missile is detected. As a result, China did not order any Kh-31A anti-ship missiles. The resulting anti-ship version of the YJ-91 is capable of sea-skimming. Its cruising altitude is no more than 20 metre above sea level. At the terminal attack stage (usually after the active radar seeker of the missile is turned on), the missile drops to 7 metre above sea level. This attack altitude can be further reduced to just 1.2 metre above sea level, when the sea state allows. Alternatively, the missile can be programmed to popup-and-dive like that the Boeing Harpoon. However, such sea-skimming capability comes at the expense of maximum range: in comparison to the original 70 km range of the Kh-31A, the maximum range of YJ-91 anti-ship missile was reduced by more than a quarter to 50 km. Like the anti-radiation version, it is reported that many planned upgrades are in development. An application for research grants to develop a submerged launched version of YJ-91 anti-ship missile once appeared on Chinese websites on the Internet, indicating China is attempting to develop a version for its submarine fleet.

System

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↳YJ-91 Anti-Radiation Missile

Name: YJ-91

Type: Anti-Radiation Missile

Manufacturer: Hongdu Aviation Industry Corporation

Length: 4.7 m

Diameter: 0.3602 m

Weight: 0.6 ton

Warhead: 165 kg

Detonation Mechanism: Semi-armor-piercing and other

Engine: Ramjet

Propellant: Liquid fuel

Operational Range: 50-120 km

Maximum Speed: Mach 4.5

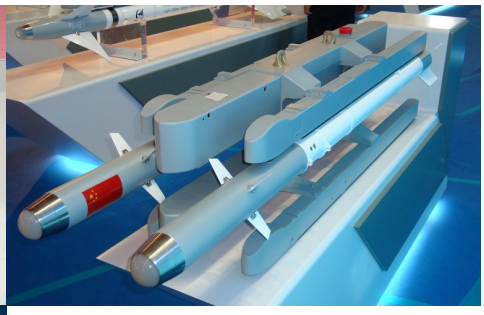
Guidance System: ARH / PRH

Notes:

YJ-91 is the Chinese version of the Kh-31. YJ is short for Ying Ji (Yingji, □□) meaning eagle strike. After purchasing 200 Kh-31Ps from Russia, China decided to develop its own version, because the original Kh-31 missile did not fully satisfy Chinese requirements. The resulting YJ-91 missile was developed by Hongdu Aviation Industry Corporation, the same manufacturer of the Silkworm missile. The experience gained from YJ-91 also helped the engine development of another supersonic missile indigenously developed in China, YJ-12, which is sometimes confused by non-Chinese sources with the YJ-91, as both share the same origin for their propulsion systems. YJ-91 Anti-radiation missile The anti-radiation version of the YJ-91 missile was developed from the Kh-31P, which uses a wide array of seekers to cover the entire radar frequency band. The Chinese were not satisfied with the requirement to include multiple seekers and preferred to have a single seeker capable of covering multiple frequency bands, like the AGM-88 HARM. However, such ambitions proved to be too great for the Chinese microelectronics industry. They could not achieve the goal in a single step within the required timeline originally specified by the Chinese military. Instead, a two-step approach was implemented: The completion of the development of a single seeker covering multiple frequency bands was pushed back, while a stopgap measure was adopted in the meantime. The Kh-31P was modified so that the seekers could be rapidly changed in the forward airstrips (providing the specialized tooling is available), so that missile would not need to be sent back to depots or factories to perform such operation. The resulting anti-radiation version of YJ-91 missile has a slightly increased the range to 120 km in comparison to 110 km of the original Kh-31P. In addition to a seeker that covers multiple frequency bands, additional measures to upgrade the missile are in development, such as, an open software architecture. Additional measures reportedly include prioritizing threats, which could be uploaded to the onboard computer from the ground or by the pilots while in flight. Threats could then be updated in real time. The multi-band seeker is of higher priority.

TY-90 Chinese Air-to-Air Missile







Tiers:



Variants:

- **SG-II ADS:** In 2004, a land based air defense variant of TY-90 is revealed to Chinese public after entering Chinese service in small numbers for sometime. Shengong (Deity Bow, □□)-II Air Defense System (SG-II ADS) is the upgrade of its predecessor SG ADS, with a quadruple TY-90/DY-90 missile launcher replacing the original Type 80 23mm AAA gun in its predecessor, resulting in the new SG-II ADS. Like its predecessor, SG-II ADS is also a towed system, and utilizes all other subsystems of its predecessor with the exception of the gun. Because TY/DY-90 is a fire and forget weapon, no modification is needed for the fire control system of the original SG ADS.
- **LS ADS:** During the 5th Zhuhai Airshow held at the end of 2004, a mobile land based air defense variant of TY-90 was revealed, dubbed as LS ADS, short for Lie-Shou (□□, meaning Hunter) Air Defense System. Eight TY-90 in two groups of four are mounted in the back of a Dongfeng (□□, East Wind) EQ2050 Iron Armor (Tiejia, □□) High Mobility Multipurpose Wheeled Vehicle (HMMWV), and the fire control system consists of electro-optics including laser, IR & TV, mounted between the two quadruple launchers. The LS ADS is developed by Norinco, with Dongfeng Motor Corporation as the subcontractor to develop chassis (vehicle). LS ADS is capable of being air transported, included being slung under helicopters. The system is operated by a team of two, one driver and one weaponry system officer. The system can also being integrated into larger air defense network. A small number subsequently entered PLA service for evaluation purposes.
- **YT ADS:** In 2005, another mobile land based air defense variant of TY-90 was revealed to the Chinese public, named as YT ADS, short for Yi-Tian (□□, meaning leaning on the sky) Air Defense System. YT ADS is a development of earlier LS ADS designed to specifically address the shortcomings of the latter, namely, the insufficient armor protection, lack of amphibious capability and radar. Like its predecessor LS ADS, the system is also developed by Norinco. Weaponry of YT ADS is similar to that of earlier LS ADS, with the missile configuration remains the same as that of LS ADS, but additionally, there is an extra 12.7 mm heavy machine gun and 3 smoke grenade dischargers as secondary armament for added protection. WZ551 is utilized as the chassis of the YT ADS, giving the system amphibious capability and added protection. Additionally, a light solid state 3-D passive phased array radar is added to the fire control system, just above the original electro-optical fire control system, providing the ADS with greater surveillance range. The radar can be folded down for traveling and transportation.
- **FL-3000N:** The Flying Leopard 3000 Naval (FL-3000N) was first revealed to the public at the 7th Zhuhai Airshow at the end of 2008. Although using the Flying Leopard designation, the FL-3000N is actually a different missile system than the FL-2000(V) shown earlier. In fact, the only commonality shared by both SAM system is the launcher design, and even the launchers differ in size due to the different diameters of the missiles used in the systems. Instead of using QW-1 Vanguard MANPADs, the FL-3000N system uses the HHQ-10 (Red Flag 10) naval surface to air missile developed from TY-90 missile.[citation needed] The diameter of the missile is enlarged by a third, but the most important design difference is its guidance system. The FL-3000N missile utilizes a combined guidance system that incorporates both passive radio frequency (RF) guidance and imaging infrared (ImIR) guidance. There are a pair of horn like protrusions

mounted on the ImIR seeker at the tip of the missile, and these two protrusions are the passive RF seeker. An optional ImIR only guidance is also available and the missile is a fire and forget weapon.

System

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TY-90 Air-to-Air Missiles

↳***Missile***

Name: TY-90
Type: Air-to-Air Missiles
Manufacturer: China Aviation Industry Corporation I
Length: m1.9
Diameter: mm90
Weight, Warhead: kg3
Aircraft Capible to Carry: ea16
Detonation Mechansim: Impact/Proximity
Engine Propllant: Solid Fuel
Operational Range: km0.5-6
Flight Ceiling: km6
Flight Alitude: km0-6
Speed: Mach2
Guidance System: ImiR IR

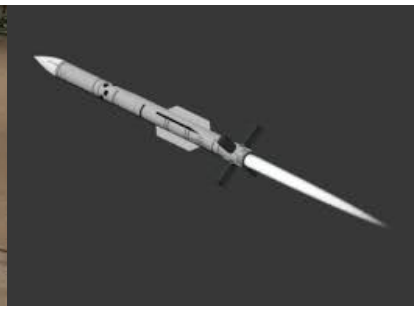
Notes:

TY-90 (Chinese: □□-90; pinyin: Tiān Yàn-90; literally: 'Sky Swallow-90') is the first air-to-air missile specifically developed for military helicopters in dogfights. Contrary to the erroneous claims, the missile is not developed from MANPAD missiles such as QW-1 Vanguard, but instead, it is designed as an air-to-air missile from the start. It is the world first air to air missile that is specifically designed for helicopters. Later, the surface-to-air version was further developed from the air-to-air version. Chinese determined that the MANPAD missiles converted for helicopter use in dogfights was not adequate, so a brand new air-to-air missile specifically for helicopter use was sanctioned, and TY-90 was the resulting product. The 3 kg warhead of the missile is specially designed to sever the rotary wing with a single shot, and the missile has all-aspect attack capability. The missile is designed to ensure a single shot would be sufficient to down an attack helicopter, or at least knock it out of action. At least three additional versions have been developed in addition to the basic version, and two of them being air-to-air versions. The first adopts a dual-band guidance, adding UV to the original IR, while the second adopts an ImIR guidance. During the 5th Zhuhai Airshow held at the end of 2004, a ground-launched air defense version appeared, with designation of DY-90, which was essentially the original TY-90, but with an additional option of incorporating a rocket booster to increase range upon customer's request. A navalized surface-to-air version is also developed, utilizing the FLS-1 system and the basic version with IR guidance, thus providing a fire-and-forget capability in comparison to the case where QW-3 is used. However, this navalized version has not entered service as of 2008, and the reason is reportedly because that the Chinese military wants to wait until the more advanced dual-band or Imaging IR (ImIR) version to be incorporated into the FLS-1 system, which are currently under development. However, at Zhuhai Airshow, AVIC I, the developer of TY-90 only acknowledged the developing and active marketing such systems, but refused to further confirm whether the Chinese military or any foreign customers had placed any orders, and neither did the developer confirm such developmental works were privately funded by the developer or received any funds from the state or foreign customers. Despite marketing efforts, as of 2008, there is no known export of TY-90 of any

kind.

R-77 (AA-12 Adder) Russian Air-to-Air Missile





Tiers:



Variants:

- **R-77 (izdeliye 170):** Standard model
- **RVV-AE (izdeliye 190):** Export model of the R-77
- **R-77P** / **RVV-PE:** Passive homing model
- **R-77T** / **RVV-TE:** Infrared homing model
- **R-77-1 (izdeliye 170-1):** Russian-built variant with a streamlined nose, 9B-1248 (Izdeliye-50-1) active radar seeker head, and new fins
- **RVV-SD:** Export model of the R-77-1
- **R-77-SRK:** Ship-to-air variant
- **R-77-ZRK** / **RVV-AE-ZRK:** RVV-ZRK Surface-to-air variant
- **R-77-PD** / **RVV-AE-PD:** Ramjet model
- **R-77-PD ZRK** / **RVV-AE-ZRK:** RVV-(PD-)ZRK Surface-to-air variant
- **K-77M (izdeliye 180):** Version under development for the Sukhoi Su-57 with AESA seeker, conventional fins, and two-pulse motor
- **K-77ME (izdeliye 180-BD):** Ramjet model of the K-77M

System

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R-77 (AA-12 Adder) Air-to-Air Missile

↳***Missile***

Name: R-77 (AA-12 Adder)
Type: Long-range, active radar homing air-to-air missile.
Basic Load: INA
Length: 3.6 m (R-77), 3.71 m (R-77-1)
DIameter: mm200
Warhead: 22.5 kg HE fragmenting (R-77)
Detonation Mechanism: laser proximity fuse
Engine: Solid fuel rocket motor (R-77), air-breathing ramjet (R-77-PD)

Wingspan: mm700

Operational Range: 80–100 km (R-77), 110 km (R-77-1) 193 km (R-77M)

Flight Altitude: km5-25

Speed: Mach 4,Mach 5 for K-77PD (RVV-AE-PD)[

Guidance System: Inertial with mid-course update and terminal active radar homing/infrared homing (R-77T)

Launch Platforms: Mikoyan-Gurevich MiG-21-93/LanceR/Bison, Mikoyan-Gurevich MiG-23, Mikoyan-Gurevich MiG-25, Mikoyan-Gurevich MiG-27, Mikoyan MiG-29, Mikoyan MiG-31, Mikoyan MiG-35, Sukhoi Su-27, Sukhoi Su-30, Sukhoi Su-33, Sukhoi Su-34, Sukhoi Su-35, HAL Tejas, Yakovlev Yak-141, Chengdu J-10

Notes:

The maximum current Russian R-77 medium-variety missiles (AA-12 "AMRAAMSKI") is just like and in a few respects identical to the American AIM-a hundred and twenty AMRAAM missiles. The R-77 missile has an energetic radar finder and a most variety of 90-100 kilometers (50 km more than AMRAAM) and flies at 4 times the velocity of sound. The AA-12 has square slender span wings and a one of a kind set of 4 rectangular control surfaces on the rear. just like the configuration used at the terminal control fins of the SS-21 'Scarab' and SS-23 'Spider' ballistic missiles. These specific control surfaces function decreased flow separation at excessive angles of attack, producing extra aerodynamic moment force than traditional manage surfaces. The missile's steerage is inertial with mid-direction updates from the release plane, accompanied through a terminal energetic radar section from an acquisition range of approximately 20 kilometers. The Rocket was created particularly to offer the opportunity to apply practically from any aircraft equipped with way of measuring the goal coordinates (radar or optical), and the semi-energetic steerage enabled, if there are suitable skills of the radar, to set up numerous missiles on numerous targets. The R-77 missiles (the export name RVV-AE) belong to the fourth-technology air-to-air missiles. The missile is designed to destroy at all angles day and night, in one of a kind climate conditions, in opposition to the history of land and sea, below the impact of energetic radar jamming the subsequent objectives: notably maneuverable aircraft with an overload of up to 12 units, strategic bombers, helicopters and which include hover mode, missiles for numerous purposes (ground-to-air and air-to-air). Dimensions and mass of the missile, its design (small-extension wings and folding grilles) offer: the opportunity of the use of mild provider plane; massive ammunition carriage on medium and massive plane carriers; and the opportunity of conformal or internal placement. The R-77 is used withinside the armament device of MiG-29 and Su-27 warring parties of all modifications. The R-77 missile (RVV-AE) is made in the normal aerodynamic scheme (the rudders are placed at the back of the wings), with the X-fashioned and symmetrical arrangement of the wings and rudders. It includes 8 cubicles linked with the aid of wedge clamp packages. It makes use of non-detachable wings of ultra-small elongation and folded grating wheels, which may be in positions - folded (in the course of transportation and storage) or uncovered (whilst suspended below a provider plane). Each steerage wheel operates autonomously (kinematically now no longer linked with different steerage wheels) from a separate force motor. The R-seventy seven has a single-mode rocket engine with strong fuel. The aerodynamics are novel, combining vestigial cruciform wings with grid fins used as tail control surfaces (similar devices are used on the OTR-23 Oka, and USAF makes use of them on MOAB). Each floor includes a metallic body containing a blade-like grid meeting which mixes a extra manage area, and for that reason lifting pressure, with decreased weight and size. The improvement for this manage idea took 3 years of theoretical paintings and testing. These surfaces require much less effective actuators than traditional fins.[citation needed] The waft separation which happens at excessive angles of assault complements its turning ability, giving the missile a maximum turn rate of as much as 150° in line with second. However, up to date editions of the R-77, including the izdeliye a hundred and eighty this is destined for the Sukhoi Su-57, will use traditional fins instead. The missile makes use of a multi-characteristic doppler-monopulse energetic radar seeker evolved through OAO Agat. The radar capabilities modes of operation, over quick distances, the missile will release in an energetic "fire-and-forget" mode. Over longer distances the missile is managed through an inertial steerage car pilot with occasional encoded statistics hyperlink updates from the release plane's radar on modifications in spatial function or G of the goal. As the missile comes inside 20 km (12 mi) of its goal, the missile switches to its energetic radar mode. The host radar device keeps computed goal data in case the goal breaks the missile's lock-on.

R-73 (AA-11 Archer) Russian Short-Range Air-to-Air Missile




Tiers:



Variants:

- **R-73:** Standard model with ±40° off-boresight.
- **R-73E:** Export version of the standard model.
- **R-73M:** Improved model.
- **R-74 (izdeliye 740):** Improved model with ±60° off-boresight.
- **RVV-MD:** Export model of the R-74
- **K-74M (izdeliye 750):** Improved model with ±75° off-boresight.
- **K-74M2 (izdeliye 760):** Further improved variant with reduced cross-section for the Sukhoi Su-57. It serves as the Russian equivalent to the AIM-9X and ASRAAM.

System

Alternate Designation: R-73; AA-11 Archer
Manufacturer: Vympel NPO (current), Tbilisi Aircraft Manufacturing (current)
Engine: Solid-fuel rocket engine
Operational Range: R-73E: 30 kilometres (19 mi) R-73M1: 30 kilometres (19 mi) R-74: 40 kilometres (25 mi)
Speed: Mach 2.5
Guidance System: All-aspect infrared homing
Launch Platform: MiG-21(Upgraded), MiG-23-98, MiG-25, MiG-27, MiG-29, MiG-31, MiG-35 Sukhoi Su-24, Su-25, Su-27, Su-30, Su-33, Su-34, Su-35, Sukhoi Su-57 (future) Mil Mi-24, Mil Mi-28, Kamov Ka-50, Kamov Ka-52 Yak-141, Yak-130 HAL Tejas IRIAF F-14 J-10

Dimensions

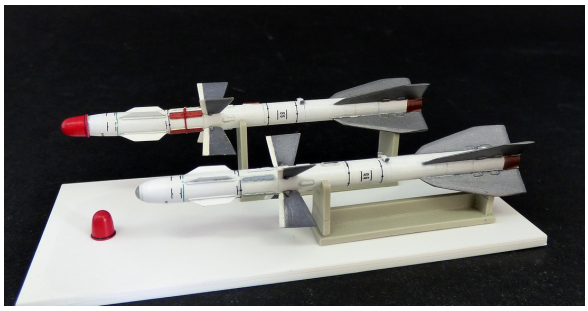
Length: 2.93 m
Diameter: 165 mm
Wingspan: 510 mm
Weight: 105 kg
Warhead: 7.4 kg

Notes:

The Vympel R-73 (NATO reporting name AA-11 Archer) is a short-variety air-to-air missile evolved with the aid of using Vympel NPO that entered service in 1984. The R-73 was evolved to update the sooner R-60 (AA-8 'Aphid') weapon for short-range use with the aid of using Soviet fighter aircraft. Work commenced in 1973, and the primary missiles entered service in 1984. The

R-73 is an infrared homing (heat-seeking) missile with a sensitive, cryogenic cooled seeker with a substantial "off-boresight" capability: the seeker can "see" objectives as much as 40° off the missile's centerline. It may be centered with the aid of using a helmet-mounted sight (HMS) permitting pilots to designate objectives with the aid of using searching at them. Minimum engagement range is ready 300 meters, with most aerodynamic variety of almost 30 km (19 mi) at altitude. The weapon is utilized by the MiG-29, MiG-31, Su-27/33, Su-34 and Su-35, and may be carried with the aid of using more recent variations of the MiG-21, MiG-23, Sukhoi Su-24, and Su-25 aircraft. India is seeking to use the missile on their HAL Tejas. It also can be carried with the aid of using Russian assault helicopters, along with the Mil Mi-24, Mil Mi-28, and Kamov Ka-50/52. From 1994, the R-73 has been upgraded in production to the R-73M standard, which entered CIS carrier in 1997. The R-73M has more variety and a much wider seeker angle (to 60° off-boresight), in addition to advanced IRCCM (Infrared Counter-Counter-Measures). Further tendencies encompass the R-74 (izdeliye 740) and its export variant RVV-MD. Russia presently gets new advanced air-to-air missiles on the idea of the R-73. An advanced model of the R-74, the K-74M (izdeliye 750) features fully digital and re-programmable systems, and is meant to be used at the MiG-35, MiG-29K/M/M2, Su-27SM, Su-30MK and Su-35S. A similarly upgrade, referred to as the K-74M2 (izdeliye 760), is meant for the fifth-generation Sukhoi Su-57 aircraft. This missile has decreased move phase to healthy in inner weapon bays and could suit the overall performance of the AIM-9X and the ASRAAM. A easy sheet design, the K-MD (izdeliye 300), will supersede the K-74M2 in the future

R-27T (AA-10b) Russian Air-to-Air Missile



Tiers:



Variants:

- **R-27R/Alamo A:** This variant has semi-active radar guidance and a short-burn motor. It has a longer afterbody than other versions and a pointed nose. The 9B-1101K semi-active radar seeker has a lock-on range of 19 mi (30 km) against typical fighter targets and operates in J-band (10-20 GHz) with continuous wave monopulse systems. It has a look angle of +/-50 deg off boresight. The seeker weighs 74 lb (33.5 kg).
- **R-27T/Alamo B:** This version features IR guidance and a short-burn motor. The missile has a cylindrical body, blunt nose, tapered nozzle and a cruciform antenna. There are "ears" forward of the fixed cruciform inverse-tapered foreplanes. "Cropped delta" tail fins are located aft. The R-27T is equipped with a 36T infrared seeker.
- **R-27ER/Alamo C:** The R-27ER missile features semi-active radar guidance and a long-burn motor.
- **R-27ET/Alamo D:** This infrared guided variant has a long-burn motor. It was first seen by Western observers at an August 1989 Soviet air show. The R-27ET features an improved seeker compared to the R-27T with improved protection against IR countermeasures and better performance against low-flying cruise missiles. The seeker has a look angle of +/-55 deg off boresight.
- **R-27AE/R-27A/R-27EA/Alamo E:** This variant has active-radar homing and a long-burn motor. At the 1992 Farnborough Air Show, an R-27AE active-radar variant was unveiled that used the seeker developed by Agat for the R-77 (AA-12 Adder). Weighing 32 lb (15 kg) and measuring 24 in (600 mm) long, the seeker combined an inertial platform with a multimode pulse-Doppler active radar. These were controlled by a 2.2-lb (1-kg) digital computer with a 32-kilobyte read-only memory (ROM) and a 32K random-access memory (RAM) computer. The Agat 9B-1103M multi-function monopulse Doppler seeker has a lock-on range of 12 mi (20 km) against fighter targets. The radome has a distinctive conical shape unlike any other R-27 variant. After a cruise phase during which the missile receives command updates from the launch aircraft, the radar switches on and searches for a target. Against a target with a 53.8-sq ft (5-sq m) RCS, radar lock-on can occur at 10.8 nm (12.4 mi; 20 km). Vympel's chief designer claimed that the seeker could pick a target in a multi-target environment and would pursue a cruise missile. At the time of the 1992 air show, the seeker was described as having just left the design phase and being about to enter the development phase. The R-27AE is said to have superior ballistic performance to the R-77 (AA-12 Adder) and, as a result, more straight-line range.
- **R-27EM:** This missile has a semi-active radar seeker with improved low altitude engagement capability. It is said to be able to intercept targets flying as low as 10 ft (3 m). The R-27EM was modified for use over water and intended for the Su-33 carrier-based fighter.
- **R-27P:** Numerous reports have indicated that the R-27P likely entered service in the 1990s, according to Jane's Air-Launched Weapons for Sept. 15, 2010. The missile has a short, conical nose and Avtomatika's 9B-1032 (PRGS-27) anti-radiation seeker, which homes in on other airborne radars. The 9B-1032 seeker is modular and interchangeable with the R-77/RVV-AE. The R-27P is believed to have a range of 50 mi (80 km).
- **R-27EP/Alamo F:** This variant has a new 9B-1103M active radar seeker from Agat. It is said to be more advanced than the 9B-1348 seeker that equips the R-77/ RVV-AE . The R-27EP is said to have a range of 68 mi (110 km).

System

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↳*R-27 (AA-10b) Air-to-Air Missile*

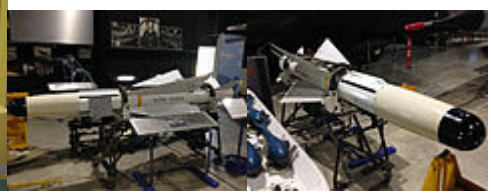
Name: R-27T/Alamo B; AA-10b
Type: Air-to-Air Missile
Manufacturer: Spetzetekhnika Vympel NPO, Moscow, Russia, in cooperation with Artem, Ukraine
Length: 3.70 m
DIameter: 230 mm
Wingspan: 0.77 m
Weight: 245 kg
Warhead: Conventional high-explosive wrapped by rods
Control Plane Span: 0.97 m
Propulsion: single-stage boost motor
Maximum Speed: supersonic
Maximum Range: 65 km
Guidance System: IR-cooled seeker, all-aspect capability, flare countermeasure filters; semi-active radar J band, CW monopulse seeker; ARM J band, passive IR homing, passive radar seeker

Notes:

R-27T/Alamo B This version features IR guidance and a short-burn motor. The missile has a cylindrical body, blunt nose, tapered nozzle and a cruciform antenna. There are "ears" forward of the fixed cruciform inverse-tapered foreplanes. "Cropped delta" tail fins are located aft. The R-27T is equipped with a 36T infrared seeker.

Matra R.530 French Short-Range Air-to-Air Missile





Tiers:

1 2 3 4

System

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Matra R.530 Short-Range Air-to-Air Missile

↳***Missile***

Name: Matra R.530
Type: Short-range air-to-air missile
Basic Load: 2
Proliferation: Argentina Australia Brazil Cameroon Colombia France Egypt Iraq Israel Jordan Lebanon Morocco Pakistan South Africa Spain Venezuela Qatar
Manufacturer: Matra
In Service: 1962-Present
Length: 3.28 m
Diameter: 263 mm
Weight: 192 kg
Engine: two stage solid rocket, Hotchkiss-Brandt/SNPE Antoinette rocket 83.3 kN for 2.7 s + 6.5 s cruise
Wingspan: m1.1
Operational Range: 1.5 to 20 km
Speed: Mach 2.7
Guidance System: Semi active radar homing and Infrared homing[
Launch Platform: Dassault Mirage F1 Dassault Mirage III [1] F-8 Crusader

Notes:

The Matra R.530 is a French medium to short range air-to-air missile. It was available in infrared homing and semi active radar

homing as the main armament of the Mirage III which was able to carry a single missile in the centerline, the Mirage F1, which carried two (one of each type) under the wings, and the F-8 Crusader in French Navy service. On 29 November 1966, an Israeli Air Force Dassault Mirage III shot down two Egyptian MiG-19s which were trying to intercept an Israeli reconnaissance Piper J-3 Cub in Israeli airspace. The first MiG was destroyed with a R.530 fired from less than a mile away, marking the first aerial kill for the French made missile. The second MiG-19 was destroyed with cannon fire.

R-37M (AA-X-13/AA-13 Arrow) Russian Air-to-Air Missile




Tiers:

1 2 **3** 4

System

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Missile

↳*Missile System*

Name: R-37 (AA-X-13/AA-13) Missile
Type: Supersonic Air-to-Air Missile
Manufacturer: Tactical Missiles Corporation
Length: 4.20 m
Diameter: 38 cm
Wingspan: 0.7 m
Weight: 600 kg
Warhead: HE, fragmenting
Propellant: Boost-Sustain Solid Rocket
Warhead Weight: 60 kg
Operational Range: 150-398 km
Speed: Mach 5
Guidance System: Inertial with mid-course update, semi-active and active radar homing

Notes:

The Vympel R-37M (NATO reporting name: AA-X-13/AA-13 Arrow) is a Russian supersonic air-to-air missile with a very long range. The missile and its variants also had the names K-37, izdeliye 610 and R-VD (Ракета Высокой Дальности (Raketa-Vysokoy Dalnosty), "Very Long Range Missile"). It was developed from the R-33. It was designed to shoot down tankers, AWACS and other C4ISTAR aircraft whilst keeping the launch platform out of range of any fighters that might be protecting the target. The R-37 is now in production to equip upgraded Russian MiG-31BM interceptors. Despite the early intent to integrate the weapon on the Flanker family, this has yet to be reported. The R-37 was developed from the R-33. For compatibility with

aircraft that did not have the MiG-31's sophisticated radar, the semi-active seeker was replaced with a variant of the Agat 9B-1388 active seeker; mid-body strakes enhance lift and hence range, and folding tail controls allow semi-conformal carriage on planes that are not as big as the MiG-31. According to Defence Today, the range depends on the flight profile, from 80 nautical miles (150 km) for a direct shot to 215 nautical miles (398 km) for a cruise glide profile. According to Jane's there are two variants, the R-37 and the R-37M; the latter has a jettisonable rocket booster that increases the range to "300-400km" (160–220 nm). The R-37M designation has since been used for a modernized variant of the missile, also known as RVV-BD (Raketa Vozduh-Vozduh Bolyshoy Dalnosty, English for Long-Range Air-to-Air Missile). R-37M is hypersonic and has range exceeding 300km. It will be carried by the modernized MiG-31BM interceptors and Su-35S and Su-57 multirole fighters. It is not known if the long range air-to-air missile for the Su-57, designated as Izdeliye 810, is a derivative of the R-37M. The missile can attack targets ranging in altitude between 15–25,000 meters. Missiles can be guided semi-actively or actively through Agat 9B-1388 system.

PL-15 (Thunderbolt-15) Chinese Active Radar-Guided Very Long Range Air-to-Air Missile





Tiers:



System

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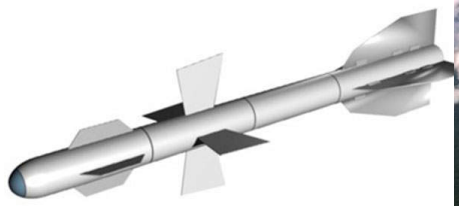
↳*PL-15 Active Radar-Guided Very Long-Range Air-to-Air Missile*

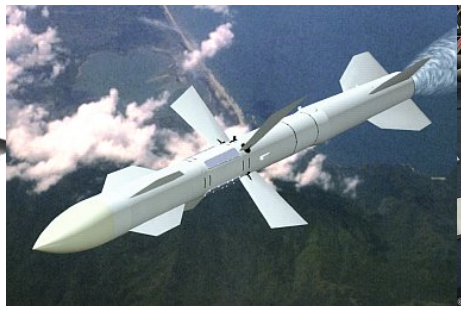
Name: PL-15
Type: Active Radar-Guided Very Long-Range Air-to-Air Missile
Manufacturer: 607 (Air-to-Air Missile Research Institute)
Length: 4.0 m
Diameter: INA
Wingspan: INA
Engine: Pulsed solid-propellant rocket
Operational Range: 300+ km
Maximum Speed: Mach 4
Guidance System: Active Radar-Guided

Notes:

The PL-15 (Chinese: □□-15; pinyin: Pī Lì-15; lit.: 'Thunderbolt-15') is an active radar-guided very long range air-to-air missile developed by the People's Republic of China. The PL-15 entered military service in 2016 and is carried by the Chengdu J-10C, Shenyang J-16 and the Chengdu J-20, aircraft. The missile features an active electronically scanned array radar, and has a range exceeding 200 km – comparable to that of the Russian R-37 missile. It is 4 meters long and incorporates a dual-thrust rocket motor, capable of a speed of Mach 4. Photos show that it has also been fitted to the newest version of the J-11B fighter upgraded with AESA radar. A reported PL-15 missile with a range of over 400 km carried by a J-16 fighter may actually be the PL-21 missile. Compared to the previous generation PL-12, the new and larger PL-15 has a longer radar detection range, increased anti-jamming capability and around twice the range. During the 2018 Airshow China, two J-20 fighters of the PLAAF displayed their internal payload bays, with each carrying four PL-15 and two PL-10E short-range missiles. The PL-15 effectively increases Chinese anti-access/area denial capability by targeting key "enabler" targets, such as aerial refueling and AEW&C aircraft. Military expert Fu Qianshao suggested that China was developing an advanced long-range air-to-air missile capable of hitting targets at a distance of up to 400 km.

R-27 (AA-10 Alamo) Russian Air-to-Air Missile







Tiers:



Variants:

- **R-27R:** AA-10 Alamo-A, semi-active radar homing. Missile can be used at 20 to 25,000 meters altitude (launch platform or target). Effective kill range for a target at same altitude: 2 to 42.5 km head-on, 0.7 to 7.5 km tail-on. Maximum range: 73 km. Maximum allowed vertical separation between target and launch platform: +/− 10 km.
- **R-27T:** AA-10 Alamo-B, infrared homing, passive homing using the Avtomatika 9B-1032 (PRGS-27) IR seeker head. Missile can be used at 20 to 25,000 meters altitude. Effective kill range for a target at same altitude: 2 to 33 km head-on, 0 to 5.5 km tail-on. Maximum range: 63 km. Maximum allowed vertical separation: +/−10 km.
- **R-27ER:** AA-10 Alamo-C, the semi-active-radar homing extended-range version. Missile can be used at 20 to 27,000 meters altitude. Effective kill range for a target at same altitude: 2 to 65.5 km head-on, 0.7 to 16.5 km tail-on. Missile cannot be fired at altitude less than 3 km against a target with background earth, if launch range is less than 6 kilometers. Maximum range: 117 km. Maximum allowed vertical separation: 12 km.[
- **R-27ET:** AA-10 Alamo-D, the infrared-homing extended-range version, Weight 348 kg. Missile can be used at 20 to 27,000 meters altitude. Effective kill range: 2 to 52.5 km head-on, 0.7 to 12.5 tail-on. Maximum range: 104 km. Maximum allowed vertical separation: 12 km.
- **R-27P:** AA-10 Alamo-E, passive radar homing with a range of up to 72 km.
- **R-27EP:** AA-10 Alamo-F, a longer range passive anti-radiation missile with a range of up to 70 nm (110 km)
- **R-27EA:** active radar homing with 9B-1103K active seeker, range of >130 km.
- **R-27EM:** active radar homing with 9B-1103K active seeker, range of >170 km.

System

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↳*R-27 Missile*

Name: R-27
Type: Air-to-Air Missile
Manufacturer: Vympel
Length: 4.08 m
Diameter: 230 mm
Wingspan: 772 mm
Weight: 253 kg
Warhead Type: blast/fragmentation, or continuous rod

Warhead Weight: 39 kg

Detonation Mechanism: radar-proximity and impact fuzes

Engine: High performance, w. directed-rocket motor Solid-fuel rocket motor

Operational Range: up to 40 km

Flight Altitude: INA

Maximum Speed: Mach 4.5

Guidance System: semi-active radar homing (A/C), active-radar-homing (R-27EA), infrared homing (B/D), passive radar (E/F)

Notes:

The Vympel R-27 missile (NATO reporting name AA-10 Alamo) is a medium-to-long-range air-to-air missile developed by the Soviet Union. It remains in service with the Russian Air Force and air forces of the Commonwealth of Independent States. The R-27 is manufactured in infrared-homing (R-27T), semi-active-radar-homing (R-27R), and active-radar-homing (R-27EA) versions, in both Russia and Ukraine. The R-27 missile is carried by the Mikoyan MiG-29 and Sukhoi Su-27 fighters, and some of the later-model MiG-23MLD fighters have also been adapted to carry it. The R-27 missile is also license-produced in China, though the production license was bought from Ukraine instead of Russia.

PL-5EII Chinese Short-Range Infrared-Homing Air-to-Air Missile



Tiers:



Variants:

- **Pl-5:** The PL-5 (□□-5) air-to-air missile (PL stands for Pi Li, "Thunderbolt" in Chinese, the generic designation for all PRC air-to-air missiles) is a short-range, Infrared homing missile use by Chinese fighters. It is based on AA-2 Atoll technology and resembles the AIM-9 Sidewinder.

System

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↳***PL-5EII Short-Range Air-to-Air Missile***

Name: PL-5EII
Type: Short-Range Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC), Hanzhong Nanfeng Machine Factor
Length: 2.893m
Diameter: 0.127m
Wingspan: 0.617m
Weight: 83kg
Warhead: 6kg blast-frag, or expanding rod (RF-fuse)
Detonation Mechanism: Active infrared, laser proximity fuse
Engine: Solid-fuel rocket
Operational Range: 16~18km
Maximum Speed: Mach 2.5
Guidance System: Infrared homing, multi-element, dual band detector

Notes:

The PL-5 (□□-5) air-to-air missile (PL stands for Pi Li, "Thunderbolt" in Chinese, the generic designation for all PRC air-to-air missiles) is a short-range, Infrared homing missile use by Chinese fighters. It is based on AA-2 Atoll technology and resembles

the AIM-9 Sidewinder. The PL-5 was designed and developed at China's Luoyang Electro-Optics Technology Development Centre (EOTDC), also known as Institute 612; its design team members included Chen Jiali (□□□), Dong Chunfeng, Hu Rongchao (□□□), Huang Bin, Zhang Ming (□□), and Zheng Zhiwei (□□□). It was reportedly produced at the Hanzhong Nanfeng Machine Factory (also known as the Hanzhong Air-to-Air Missile Factory) of China Aviation Industry Corporation I. The PL-5 have been continuously upgraded by Luoyang and the latest variant, the PL-5EII added a dual band, multi-element detector as well as a laser proximity fuse similar to the PL-9. According to Chinese export/import agency CATIC, the PL5E has an all-aspect capability with the seeker having a maximum off boresight angle of ±25° before launch, and ±40° after launch. PLAAF J-10 and J-11 fighter jets are mainly using PL-8 missile, which is more advanced comparing PL-5. However, due to greater weight and dimension of PL-8 missile, for F-7 and JH-7, PL-5 is still the preferable air-to-air missile at this stage.

R-73E Russian Air-to-Air Missile





Tiers:



Variants:

- **R-73A:** This is the domestic Russian air force variant.
- **R-73E:** The R-73E is the export variant with extended range.
- **R-73M Upgrade/R-74:** The versions includes improvements to the seeker and radar that allow the AA-11 to increase its boresight engagement angle from 60 degrees to as much as 90 degrees. A new algorithm also enhances the missile's resistance to countermeasures and provides automatic precision selection of the aimpoint. This version may have been redesignated as the R-74. Two variants of this upgrade have been identified as the R-73M1 and R-72M2 (R-72 RDM-2).
- **R-73 Rearward-Launched Missile:** This variant was once under experimental development; its final disposition is unknown. Test launches were conducted from the Su-27 Flanker at both sub- and supersonic speeds. It was launched in the rear hemisphere of the aircraft and could be utilized in day or night conditions with high ECM and i ntense ground clutter. Rearward flight was controlled trough "aerogaz dynamic" controls (vectored thrust control). Although similar to the R-73 in many respects, the rearward-launched R-73 had the following characteristics:

System

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↳***R-73E Air-to-Air Missile***

Name: R-73E
Type: Air-to-Air Missile
Manufacturer: Molniya, Moscow, Russia (designer) Spetztekhnika Vympel, Moscow, Russia (manufacturer) Arsenal central design office, Kiev, Ukraine (seeker assembly)
Length: 2.90 m
Diameter: 170 mm
Wingspan: 0.51 m
Maximum Launch Distance, Front Hemisphere: 30 km
Maximum Launch Distance, Rear Hemisphere: 300 m
Maximum Range: 30 km
Minimum Range: 200 m

Maximum Target Speed: 2,500 km/h, Mach 2.35

Maximum Target Load: 12 g

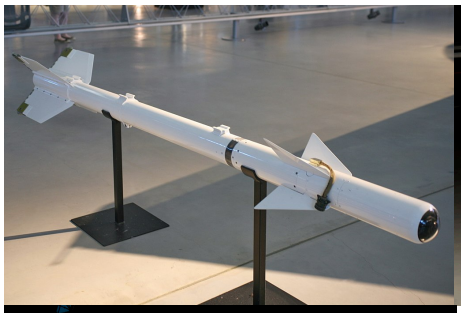
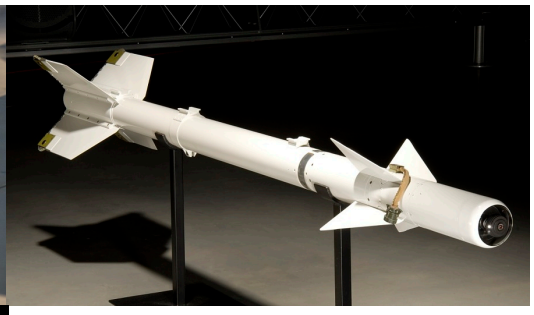
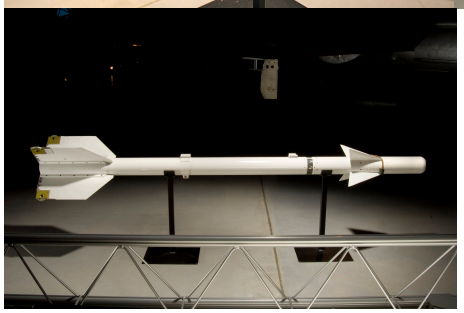
Warhead: conventional high-explosive expanding rod

Guidance System: cooled IR seeker, probably with all-aspect capability, flare countermeasure filters

Notes:

R-73E The R-73E is the export variant with extended range. The AA-11 Archer (Russian R-73) is an infrared (IR) seeking air-to-air missile (AAM) that has become the benchmark for all IR missiles under development. It is the best short-range AAM in the Russian arsenal and has been cleared for use on a wide variety of aircraft. The Archer is fitted with four sets of cruciform fins, all indexed in line with one another. The lead set of fins is small and mounted on a small pivot arm. The fin area is behind the pivot point. The second set has four fixed, rhomboid, low-aspect-ratio vanes with a notch cut in the trailing edge to accommodate the leading edge of the third set of larger, movable, delta-wing fins.

K-13 (AA-2 Atoll) Russian Short-Range Infrared Homing Air-to-Air Missile

Tiers:

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↳ ***K-13 (AA-2 Atoll) Infrared Homing Air-to-Air Missile***

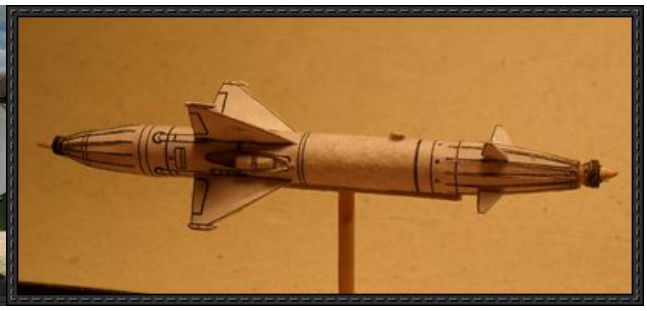
Name: K-13; NATO: AA-2 Atoll
Type: Infrared Homing Air-to-Air Missile
Manufacturer: Vympel
Length: 2.830 m
Diameter: 127 mm
Wingspan: 631 mm
Weight: 90 kg
Warhead Weight: 7.4 kg
Engine: solid-fuel rocket engine
Operational Range: 1.0 to 3.5 km
Maximum Speed: Mach 2.5
Guidance System: infrared homing
Launch Platform: MiG-21, MiG-23, MiG-19 Sukhoi Su-17/20/22

Notes:

The Vympel K-13 (NATO reporting name: AA-2 "Atoll") is a short-range, infrared homing air-to-air missile developed by the Soviet Union. It is similar in appearance and function to the American AIM-9 Sidewinder from which it was reverse-engineered. Although it since has been replaced by more modern missiles in frontline service, it saw widespread service in many nations. The Sidewinder was quickly reverse engineered as the K-13 (also called R-3 or Object 300) and entered limited service only two years later in 1960. This was followed by the improved K-13A (R-3S, Object 310), which entered service in 1962. The R-3S was the first version to enter widespread production, in spite of a very long seeker settling time on the order of 22 seconds, as opposed to 11 seconds for the original version. The R-3S was seen by the West in 1961 and given the NATO reporting name AA-2A 'Atoll'. Minimum engagement range for the R-3S is about one kilometre. All K-13 variants are physically similar to Sidewinder, sharing the 5 inch (127 mm) diameter. Subsequent examination of AA-2 missiles captured by NATO forces showed that parts from an AIM-9 could be interfaced with parts from an AA-2 and either combination would still work.

K-5 (AA-1 Alkali) Russian Short-Range Air-to-Air Missile





Tiers:

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↳*K-5 Air-to-Air Missile*

Name: K-5; NATO: AA-1 Alkali
Type: Air-to-Air Missile
Manufacturer: Kaliningrad Series Production Plant
Length: 2.49 m
Diameter: 200 mm
Weight: 82.7 kg
Warhead Type: High explosive
Warhead Weight: 13 kg
Engine: Rocket
Operational Range: 2-6 km
Maximum Speed: 2,880 km/h
Guidance System: Beam riding
Launch Platforms: MiG-17, MiG-19, MiG-21, Su-9

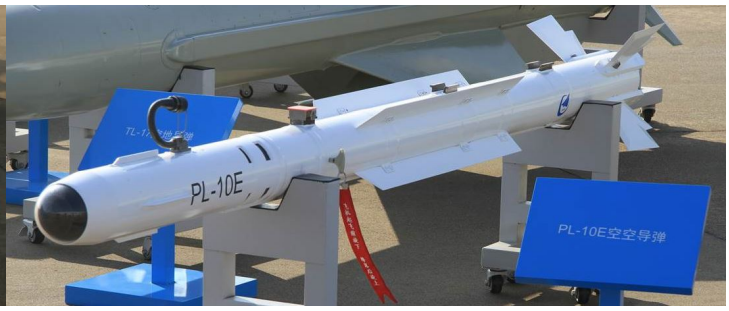
Notes:

The Kaliningrad K-5 (NATO reporting name AA-1 Alkali), also known as RS-1U or product ShM, was an early Soviet air-to-air missile. The development of the K-5 began in 1951. The first test firings were in 1953. It was tested (but not operationally carried) by the Yakovlev Yak-25. The weapon entered service as the Grushin/Tomashevich (Russian: Грушин/Томашевич) RS-2U (also known as the R-5MS or K-5MS) in 1957. The initial version was matched to the RP-2U (Izumrud-2) radar used on the MiG-17PFU, MiG-19PM. An improved variant, K-5M or RS-2US in PVO service, entered production in 1959, matched to the RP-9/RP-9U (Sapfir) radar of the Sukhoi Su-9. The People's Republic of China developed a copy under the designation PL-1, for use by their J-6B fighters. The difficulties associated with beam-riding guidance, particularly in a single-seat fighter aircraft, were substantial, making the 'Alkali' primarily a short-range anti-bomber missile. Around 1967 the K-5 was replaced by the K-55

(R-55 in service), which replaced the beam-riding seeker with the semi-active radar homing or infrared seekers of the K-13 (AA-2 'Atoll'). The weapon was 7.8 kg (17 lb) heavier than the K-5, but had a smaller 9.1 kg (20 lb) warhead. The K-55 remained in service through about 1977, probably being retired with the last of the Sukhoi Su-9 interceptors.

PL-10 Chinese Air-to-Air Missile





Tiers:

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↳ ***PL-10 (ASR) Air-to-Air Missile***

Name: PL-10 (ASR)
Type: Air-to-Air Missile
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)
Length: 3.0 m
Weight: 89 kg
Diameter: INA
Warhead: Blast-frag, or expanding rod (RF-fuse)
Detonation Mechanism: Laser proximity fuse and impact
Engine: Solid-propellant rocket
Guidance System: Multi-element imaging infrared
Maximum Range: 60 km
Note: The missile is fitted with a multi-element IIR seeker capable of +/-90 degree off boresight angles. The missile seeker can be slaved to a helmet-mounted display (HMD),allowing the pilot to track a target beyond the aircraft's radar scan envelope using the missile's high off-boresight capability, achieved by the pilot turning his head towards the target to lock-on, better known as "look and shoot". Flight is controlled by a thrust-vector controlled solid rocket motor and free-moving type control wings on the missile's tail. The central portion of the missile has long, thin strakes, which help maintain missile maneuverability in the terminal homing stage after the rocket motor stops firing.

Notes:

The PL-10 (Chinese: □□-10; pinyin: Pī Lì-10; literally: 'Thunderbolt-10') is a short-range, infrared-homing air-to-air missile (AAM) developed by the People's Republic of China. It was designed by Dr. Liang Xiaogeng (□□□) at the Luoyang Electro Optical Center, which is also known as Institute 612 and renamed in 2002 as the China Air-to-Air Guided Missile Research Institute (□□□ □□□□□□). Development of the missile commenced in 2004 for use on stealth fighters such as the J-20. The missile is fitted with a multi-element IIR seeker capable of +/-90 degree off boresight angles. The missile seeker can be slaved to a helmet-mounted

display (HMD), allowing the pilot to track a target beyond the aircraft's radar scan envelope using the missile's high off-boresight capability, achieved by the pilot turning his head towards the target to lock-on, better known as "look and shoot". Flight is controlled by a thrust-vector controlled solid rocket motor and free-moving type control wings on the missile's tail. The central portion of the missile has long, thin strakes, which help maintain missile maneuverability in the terminal homing stage after the rocket motor stops firing.

R-23 (AA-7 Apex) Russian Air-to-Air Missile





Tiers:

1 2 **3** 4

System

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↳ ***R-23 Air-to-Air Missile***

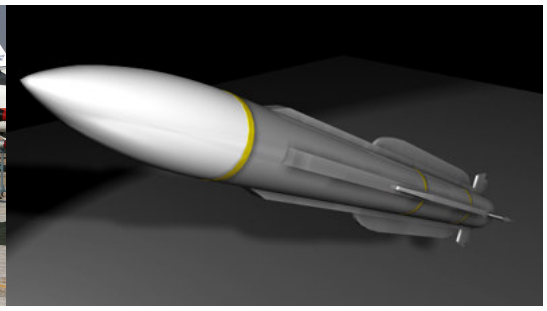
Name: R-23; NATO: AA-7 Apex
Type: Air-to-Air Missile
Manufacturer: Vympel NPO
Length: 4.50 m
Diameter: 223 mm
Weight: 222 kg
Warhead Type: expanding-rod high explosive
Warhead Weight: 25 kg
Engine: solid fuel rocket
Propellant: 1.04 m
Operational Range: 35 km
Maximum Speed: Mach 3
Guidance System: Semi-active radar homing

Notes:

The Vympel R-23 (NATO reporting name AA-7 Apex) is a medium-range air-to-air missile developed by Vympel in the Soviet Union for fighter aircraft. An updated version with greater range, the R-24, replaced it in service. It is comparable to the American AIM-7 Sparrow, both in terms of overall performance as well as role. Design of a new missile to arm the MiG-23 fighter started in the mid-1960s under the direction of V.A. Pustyakov's design team. Known as the K-23 during its design, the new weapon was intended for use against bomber-sized targets, with "snap-up" capability to attack targets at higher altitude than the launch aircraft. It originally was intended to have a dual-mode seeker using both semi-active radar homing and infrared guidance, but this proved unfeasible, and separate SARH and IR models (Izdeliye (Product) 340 and 360, respectively) were developed instead. Test firings were carried out in 1967, although the SARH missile's seeker head proved to be extremely problematic. In 1968 the Soviets acquired an AIM-7 and a Vympel team started copying it as the K-25. A comparison of the two led to the K-23 entering production, based largely on its better range and countermeasures resistance. The K-25 work ended in 1971. Nevertheless, several features of the Sparrow were later used in the Vympel R-27 design. The missile, designated R-23, entered service in January 1974, the SARH version as the R-23R, the IR version R-23T. Both versions used the same motor and warhead, which had a lethal radius of 8 m (26 ft). In the west these were known as the AA-7A and AA-7B, respectively. An inert training round, the R-23UT, was also developed. The airframe featured four delta wings arranged cruciform just behind the midpoint of the fuselage, and cropped-delta control surfaces at the extreme rear in-line with the wings. Smaller cropped-triangular surfaces are mounted in-line near the nose : known as "destabilizers", they serve to improve the rudders' efficiency at high angles of attack (the R-60 missile uses the same feature). The only external difference between the two versions was the nose cone, which was an ogive for the SARH seeker, and shorter (by 30 cm) and more rounded for the IR version. Maximum range for the R-23R is 35 km, and for the infrared version R-23T is 15 km. Large numbers of R-23s were built., both by Molniya (ex OKB-4) as well as Vympel (ex OKB-134). Starting in 1975 an improved version of the weapon was developed to arm the MiG-23ML/MLD. The resultant SARH R-24R had lock-on after launch capability and expanded range (up to 50 km) and altitude capability (up to 25,000 m/82,000 ft), while the IR R-24T had a much improved seeker with greater sensitivity. Both versions had a larger motor, a heavier warhead, and a greatly reduced minimum range of 500 m (1,600 ft) for a rear-quarter engagement. They also could be used by or against aircraft maneuvering at up to 7g. The missiles were known officially as izdeliye (Product) 140 and 160 in the USSR, and AA-7C and AA-7D in the west. The R-23/24 was also produced under license in Romania as the A-911/A901. The R-24 remained in at least limited Russian service until the withdrawal of the last Russian MiG-23s in 1997.

Super 530D French Medium-Range Air-to-Air Missile





Tiers:



Variants:

- **Super 530D:** Super 530D is carried on the Dassault-Breguet Mirage 2000. It was introduced in 1988.
- **Super 530F:** Super 530F is carried on the Dassault Mirage F1. It was introduced in 1979.

System

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Super 530D Medium-Range Air-to-Air Missile

↳ ***Missile***

Name: Super 530D
Type: Medium-range air-to-air missile.
Basic Load: 2
Proliferation: Widely Proliferated. France Egypt India Jordan Qatar Kuwait Peru
Length: Super 530F: 3.54 m Super 530D: 3.80 m
Diameter: mm263
Weight: Super 530F: 245 kg Super 530D: 270 kg
Warhead Type: High-explosive fragmentation
Warhead Weight: kg30
Detonation Mechansim: Super 530F: RF Super 530D: Active Radar
Engine: Solid-fuel rocket motor
Wingspan: Super 530F: 0.88 m Super 530D: 0.62 m
Operational Range: Super 530F: 25 km Super 530D: 40 km
Speed: Super 530F: Mach 4.5 Super 530D: Mach <5.0
Guidance System: Semi-active radar homing (SARH)

Notes:

The Matra Super 530 is a French short to medium-range air-to-air missile. The Super 530 series is an improved type of the R.530 missile. Super 530F is carried on the Dassault Mirage F1. It was introduced in 1979. Super 530D is carried on the Dassault-Breguet Mirage 2000. It was introduced in 1988. The Super 530 is being replaced by the MICA (missile). The Super 530F and Super 530D share the same general aerodynamic features and internal layout with cruciform low aspect ratio wings, cruciform aft controls, and 30 kg high explosive fragmentation warhead. However the 530D has a lengthened stainless steel body. This allows it to accommodate a more powerful dual-thrust solid propellant motor and a new seeker assembly. The new seeker includes doppler filtering for improved low altitude performance and digital micro-processing to enable the seeker to be reprogrammed against new threats. The 530D has a claimed maximum interception altitude of 24,400 m (80,100 ft), with a snap-up capability of 12,200 m (40,000 ft), and a snap-down capability to targets at 60 m (200 ft). The missile has a range of 40 km and a maximum speed of less than Mach 5. During the Iran-Iraq War, during the 1980s, the Iraqi Air Force used them on their Mirage F1 against Iran. On 14 September 1983, in an incident that was revealed thirty years later, two Turkish F-100F violated Iraqi air space and one was shot down by an Iraqi Mirage F1EQ firing a Super 530F missile. The Turkish pilots survived and returned to Turkey. On 15 July 2019, during a police operation in Northern Italy, a functioning Super 530F missile was seized together with firearms. The missile lacked the warhead. The weapons were smuggled by a group of people connected to far-right movements. The missile canister indicated it was originally sold to the Qatari armed forces. The original contract date with Qatar was October 1980.

AIM-9L American Short-Range Air-to-Air Missile



Tiers:



Variants:

- **AIM-9C:** As a Semi-Active Radar Homing (SARH) missile, the AIM-9C could be used from the frontal aspect of the target, provided a radar lock of sufficient quality was obtained.
- **AIM-9L:** The next major advance in IR Sidewinder development was the AIM-9L ("Lima") model which was in full production in 1977. This was the first "all-aspect" Sidewinder with the ability to attack from all directions, including head-on, which had a dramatic effect on close-in combat tactics. Its first combat use was by a pair of US Navy F-14s in the Gulf of Sidra in 1981 versus two Libyan Su-22 Fighters, both of the latter being destroyed by AIM-9Ls. Its first use in a large-scale conflict was by the United Kingdom during the 1982 Falklands War. In this campaign the "Lima" reportedly achieved kills from 80% of launches, a dramatic improvement over the 10–15% levels of earlier versions, scoring 17 kills and 2 shared kills against Argentine aircraft.
- **AIM-9M:** The subsequent AIM-9M ("Mike") has the all-aspect capability of the L model while providing all-around higher performance. The M model has improved capability against infrared countermeasures, enhanced background discrimination capability, and a reduced-smoke rocket motor. These modifications increase its ability to locate and lock-on to a target and decrease the chance of missile detection. Deliveries of the initial AIM-9M-1 began in 1982. The only changes from the AIM-9L to the AIM-9M were related to the Guidance Control Section (GCS). Several models were introduced in pairs with even numbers designating Navy versions and odd for USAF: AIM-9M-2/3, AIM-9M-4/5, and AIM-9M-6/7 which was rushed to the Persian Gulf area during Operation Desert Shield (1991) to address specific threats expected to be present.
- **AIM-9R:** The Navy began development of AIM-9R, a Sidewinder seeker upgrade in 1987 that featured a focal-plane array (FPA) seeker using video-camera type charge-coupled device (CCD) detectors and featuring increased off-boresight capability. The technology at the time was restricted to visual (daylight) use only and the USAF did not agree on this requirement, preferring another technology path. AIM-9R reached flight test stage before it was cancelled and subsequently both services agreed to a joint development of the AIM-9X variant.
- **BOA/Boxoffice:** China Lake developed an improved compressed carriage control configuration titled BOA. ("Compressed carriage" missiles have smaller control surfaces to allow more missiles to fit in a given space.[21] The surfaces may be permanently "clipped", or may fold out when the missile is launched.) The BOA design reduced size of control surfaces, eliminating the rollerons, and returned to simple forward-canard design. Although the Navy and Air Force had jointly developed and procured AIM-9L/M, BOA was a Navy-only effort supported by internal China Lake Independent Research & Development (IR&D) funding. Meanwhile, the Air Force was pursuing a parallel effort to develop a compressed carriage version of Sidewinder, called Boxoffice, for the F-22. The Joint Chiefs of Staff directed that the services collaborate on AIM-9X, which ended these separate efforts. The results of BOA and Boxoffice were provided to the industry teams competing for AIM-9X, and elements of both can be found in the AIM-9X design.
- **AIM-9X:** After looking at advanced short range missile designs during the AIM portion of the ACEVAL/AIMVAL Joint Test and Evaluation at Nellis AFB in the 1974–78 timeframe, the Air Force and Navy agreed on the need for the Advanced Medium Range Air-to-Air Missile AMRAAM. However, agreement over development of an Advanced Short Range Air-to-Air Missile ASRAAM was problematic and disagreement between the Air Force and Navy over design concepts (Air Force had developed AIM-82 and Navy had flight-tested Agile and flown it in AIMVAL). Congress eventually insisted the services work on a joint effort resulting in the AIM-9M, thereby compromising without exploring the improved off boresight and kinematic capability potential offered by Agile. In 1985, the Soviet Union did field a short range missile (SRM) (AA-11 Archer/R-73) that was very similar to Agile. At that point, the Soviet Union took the lead in SRM technology and correspondingly fielded improved infrared countermeasures (IRCM) to defeat or reduce the effectiveness of the latest Sidewinders. With the reunification of Germany and improved relations in the aftermath of the Soviet Union, the West became aware of how potent both the AA-11 and IRCM were and SRM requirements were readdressed.

- **Block II:** Testing work on the AIM-9X Block II version began in September 2008.[26] The Block II adds Lock-on After Launch capability with a datalink, so the missile can be launched first and then directed to its target afterwards by an aircraft with the proper equipment for 360 degree engagements, such as the F-35 and F-22. By January 2013, the AIM-9X Block II was about halfway through its operational testing and performing better than expected. NAVAIR reported that the missile was exceeding performance requirements in all areas, including lock-on after launch (LOAL). One area where the Block II needs improvement is helmetless high off-boresight (HHOBS) performance. It is functioning well on the missile, but performance is below that of the Block I AIM-9X. The HHOBS deficiency does not impact any other Block II capabilities, and is planned to be improved upon by a software clean-up build. Objectives of the operational test were due to be completed by the third quarter of 2013. However, as of May 2014 there have been plans to resume operational testing and evaluation (including surface-to-air missile system compatibility). As of June 2013, Raytheon has delivered 5,000 AIM-9X missiles to the armed services.
- **Block III:** In September 2012, Raytheon was ordered to continue developing the Sidewinder into a Block III variant, even though the Block II had not yet entered service. The USN projected that the new missile would have a 60 percent longer range, modern components to replace old ones, and an insensitive munitions warhead, which is more stable and less likely to detonate by accident, making it safer for ground crews. The need for the AIM-9 to have an increased range was from digital radio frequency memory (DRFM) jammers that can blind the onboard radar of an AIM-120D AMRAAM, so the Sidewinder Block III's passive imaging infrared homing guidance system was a useful alternative. Although it could supplement the AMRAAM for beyond visual range (BVR) engagements, it would still be capable at performing within visual range (WVR). Modifying the AIM-9X was seen as a cost-effective alternative to developing a new missile in a time of declining budgets. To achieve the range increase, the rocket motor would have a combination of increased performance and missile power management. The Block III would "leverage" the Block II's guidance unit and electronics, including the AMRAAM-derived datalink. The Block III was scheduled to achieve initial operational capability (IOC) in 2022, following the increased number of F-35 Lightning II Joint Strike Fighters to enter service.

System

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↳ ***AIM-9L Short-Range Air-to-Air Missile***

Name: AIM-9L
Type: Short-Range Air-to-Air Missile
Manufacturer: Raytheon Company Ford Aerospace Loral Corp.
Length: 3.02 m
Diameter: 127.0 mm
Wingspan: 279.4 mm
Weight: 85.3 kg
Warhead Type: WDU-17/B annular blast-frag
Warhead Weight: 9.4 kg
Detonation Mechanism: IR proximity fuze
Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket
Operational Range: 1.0 to 35.4 km
Maximum Speed: Mach 2.5+
Guidance System: Infrared homing

Notes:

The next major advance in IR Sidewinder development was the AIM-9L ("Lima") model which was in full production in 1977. This

was the first "all-aspect" Sidewinder with the ability to attack from all directions, including head-on, which had a dramatic effect on close-in combat tactics. Its first combat use was by a pair of US Navy F-14s in the Gulf of Sidra in 1981 versus two Libyan Su-22 Fighters, both of the latter being destroyed by AIM-9Ls. Its first use in a large-scale conflict was by the United Kingdom during the 1982 Falklands War. In this campaign the "Lima" reportedly achieved kills from 80% of launches, a dramatic improvement over the 10–15% levels of earlier versions, scoring 17 kills and 2 shared kills against Argentine aircraft. In combat uses of the AIM-9L, opponents had not developed tactics for the evasion of head-on missile shots with it, making them more vulnerable. The AIM-9L was also the first Sidewinder that was a joint variant used by both the US Navy and Air Force since the AIM-9B. The "Lima" was distinguished from earlier Sidewinder variants by its double delta forward canard configuration and natural metal finish of the guidance and control section. The Lima was also built under license in Europe by a team headed by Diehl BGT Defence. There are a number of "Lima" variants in operational service at present. First developed was the 9L Tactical, which is an upgraded version of the basic 9L missile. Next was the 9L Genetic, which has increased infra-red counter-counter measures (IRCCM); this upgrade consisted of a removable module in the Guidance Control Section (GCS) which provided flare-rejection capability. Next came the 9L, which had its IRCCM module hardwired into the GCS, providing improved counter-countermeasures as well as an upgraded seeker system. Diehl BGT also markets the AIM-9L-1 which again upgrades the 9L GCS and is considered an operational equivalent to the initially "US only" AIM-9M.

PL-21 Chinese Active Radar-Guided Long Range Air-to-Air Missile



Tiers:

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System

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↳*PL-21 Active Radar-Guided Long Range Air-to-Air Missile*

Name: PL-21
Type: Active Radar-Guided Long Range Air-to-Air Missile
Manufacturer: China Aerospace Science and Technology Corporation
Length: 5.5 m
Diameter: 250–300 mm
Engine: Ramjet
Guidance System: Active radar with AESA

Notes:

The PL-21 (PL-XX) is an active radar-guided long range beyond-visual-range air-to-air missile developed by the People's Republic of China. It is considered comparable to the American AIM-120 AMRAAM, DARPA's Triple Threat Terminator (T3), Europe's MBDA's Meteor and the Russian R-77.

AIM-9M American Short-Range Air-to-Air Missile



Tiers:



Variants:

- **AIM-9C:** As a Semi-Active Radar Homing (SARH) missile, the AIM-9C could be used from the frontal aspect of the target, provided a radar lock of sufficient quality was obtained.
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- **AIM-9R:** The Navy began development of AIM-9R, a Sidewinder seeker upgrade in 1987 that featured a focal-plane array (FPA) seeker using video-camera type charge-coupled device (CCD) detectors and featuring increased off-boresight capability. The technology at the time was restricted to visual (daylight) use only and the USAF did not agree on this requirement, preferring another technology path. AIM-9R reached flight test stage before it was cancelled and subsequently both services agreed to a joint development of the AIM-9X variant.
- **BOA/Boxoffice:** China Lake developed an improved compressed carriage control configuration titled BOA. ("Compressed carriage" missiles have smaller control surfaces to allow more missiles to fit in a given space.[21] The surfaces may be permanently "clipped", or may fold out when the missile is launched.) The BOA design reduced size of control surfaces, eliminating the rollerons, and returned to simple forward-canard design. Although the Navy and Air Force had jointly developed and procured AIM-9L/M, BOA was a Navy-only effort supported by internal China Lake Independent Research & Development (IR&D) funding. Meanwhile, the Air Force was pursuing a parallel effort to develop a compressed carriage version of Sidewinder, called Boxoffice, for the F-22. The Joint Chiefs of Staff directed that the services collaborate on AIM-9X, which ended these separate efforts. The results of BOA and Boxoffice were provided to the industry teams competing for AIM-9X, and elements of both can be found in the AIM-9X design.
- **AIM-9X:** After looking at advanced short range missile designs during the AIM portion of the ACEVAL/AIMVAL Joint Test and Evaluation at Nellis AFB in the 1974–78 timeframe, the Air Force and Navy agreed on the need for the Advanced Medium Range Air-to-Air Missile AMRAAM. However, agreement over development of an Advanced Short Range Air-to-Air Missile ASRAAM was problematic and disagreement between the Air Force and Navy over design concepts (Air Force had developed AIM-82 and Navy had flight-tested Agile and flown it in AIMVAL). Congress eventually insisted the services work on a joint effort resulting in the AIM-9M, thereby compromising without exploring the improved off boresight and kinematic capability potential offered by Agile. In 1985, the Soviet Union did field a short range missile (SRM) (AA-11 Archer/R-73) that was very similar to Agile. At that point, the Soviet Union took the lead in SRM technology and correspondingly fielded improved infrared countermeasures (IRCM) to defeat or reduce the effectiveness of the latest Sidewinders. With the reunification of Germany and improved relations in the aftermath of the Soviet Union, the West became aware of how potent both the AA-11 and IRCM were and SRM requirements were readdressed.

- **Block II:** Testing work on the AIM-9X Block II version began in September 2008.[26] The Block II adds Lock-on After Launch capability with a datalink, so the missile can be launched first and then directed to its target afterwards by an aircraft with the proper equipment for 360 degree engagements, such as the F-35 and F-22. By January 2013, the AIM-9X Block II was about halfway through its operational testing and performing better than expected. NAVAIR reported that the missile was exceeding performance requirements in all areas, including lock-on after launch (LOAL). One area where the Block II needs improvement is helmetless high off-boresight (HHOBS) performance. It is functioning well on the missile, but performance is below that of the Block I AIM-9X. The HHOBS deficiency does not impact any other Block II capabilities, and is planned to be improved upon by a software clean-up build. Objectives of the operational test were due to be completed by the third quarter of 2013. However, as of May 2014 there have been plans to resume operational testing and evaluation (including surface-to-air missile system compatibility). As of June 2013, Raytheon has delivered 5,000 AIM-9X missiles to the armed services.
- **Block III:** In September 2012, Raytheon was ordered to continue developing the Sidewinder into a Block III variant, even though the Block II had not yet entered service. The USN projected that the new missile would have a 60 percent longer range, modern components to replace old ones, and an insensitive munitions warhead, which is more stable and less likely to detonate by accident, making it safer for ground crews. The need for the AIM-9 to have an increased range was from digital radio frequency memory (DRFM) jammers that can blind the onboard radar of an AIM-120D AMRAAM, so the Sidewinder Block III's passive imaging infrared homing guidance system was a useful alternative. Although it could supplement the AMRAAM for beyond visual range (BVR) engagements, it would still be capable at performing within visual range (WVR). Modifying the AIM-9X was seen as a cost-effective alternative to developing a new missile in a time of declining budgets. To achieve the range increase, the rocket motor would have a combination of increased performance and missile power management. The Block III would "leverage" the Block II's guidance unit and electronics, including the AMRAAM-derived datalink. The Block III was scheduled to achieve initial operational capability (IOC) in 2022, following the increased number of F-35 Lightning II Joint Strike Fighters to enter service.

System

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↳ ***AIM-9M Short-Range Air-to-Air Missile***

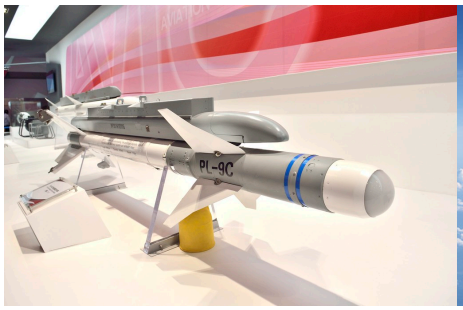
Name: AIM-9M
Type: Short-Range Air-to-Air Missile
Manufacturer: Raytheon Company Ford Aerospace Loral Corp.
Length: 3.02 m
Diameter: 127.0 mm
Wingspan: 279.4 mm
Weight: 85.3 kg
Warhead Type: WDU-17/B annular blast-frag
Warhead Weight: 9.4 kg
Detonation Mechanism: IR proximity fuze
Engine: Hercules/Bermite Mk. 36 Solid-fuel rocket
Operational Range: 1.0 to 35.4 km
Maximum Speed: Mach 2.5+
Guidance System: Infrared homing

Notes:

The subsequent AIM-9M ("Mike") has the all-aspect capability of the L model while providing all-around higher performance. The

M model has improved capability against infrared countermeasures, enhanced background discrimination capability, and a reduced-smoke rocket motor. These modifications increase its ability to locate and lock-on to a target and decrease the chance of missile detection. Deliveries of the initial AIM-9M-1 began in 1982. The only changes from the AIM-9L to the AIM-9M were related to the Guidance Control Section (GCS). Several models were introduced in pairs with even numbers designating Navy versions and odd for USAF: AIM-9M-2/3, AIM-9M-4/5, and AIM-9M-6/7 which was rushed to the Persian Gulf area during Operation Desert Shield (1991) to address specific threats expected to be present. The AIM-9M-8/9 incorporated replacement of five circuit cards and the related motherboard to update infrared counter-countermeasures (IRCCM) capability to improve 9M capability against the latest threat IRCM. The first AIM-9M-8/9 modifications, fielded in 1995, involved deskinning the guidance section and substitution of circuit cards at the depot level, which is labor-intensive and expensive—as well as removing missiles from inventory during the upgrade period. The AIM-9X concept is to use reprogrammable software to permit upgrades without disassembly.

PL-9C Chinese Short-Range Infrared-Homing Air-to-Air Missile





Tiers:

1 **2** 3 4

Variants:

- **PL-9:** The PL-9 (Chinese: □□-9; pinyin: Pī Lì-9; lit.: 'Thunderbolt-9') is a short-range, infrared-homing air-to-air missile (AAM) developed by the People's Republic of China.

System

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↳*PL-9C Infrared-Homing Air-to-Air Missile*

Name: PL-9C
Type: Infrared-Homing Air-to-Air Missile
Length: 2.9m
Diameter: 0.157m
Wingspan: 0.856m
Weight: 115kg
Warhead: 11.8kg blast-frag, or expanding rod (RF-fuse)
Detonation Mechanism: laser proximity fuse
Engine: Solid-fuel rocket
Operational Range: 22km (PL-9C, air-to-air), > 8km (surface-to-air)
Flight Altitude: 4.5km (surface-to-air)
Maximum Speed: Mach 2+
Guidance System: multi-element infrared

Notes:

The PL-9 (Chinese: □□-9; pinyin: Pī Lì-9; lit.: 'Thunderbolt-9') is a short-range, infrared-homing air-to-air missile (AAM) developed by the People's Republic of China. It was originally designed by Dong Bingyin (□□□) at the Luoyang Electro Optical Center, which is also known as Institute 612 and renamed in 2002 as the China Air-to-Air Guided Missile Research Institute (□□□□□□□□□). After

Dong Bingyin died, his position was succeeded by Mr. Jin Xianzhong (□□□). The deputy general designer of PL-9 is the same deputy general designer of PL-12, Dr. Liang Xiaogeng (□□□). The PL-9C is one of the latest versions of the PL-9, which also has a surface-to-air variant (DK-9). The PL-9C tactical low-altitude surface-to-air missile (SAM) was first revealed during the 1989 Paris Air Show. The launch unit is available in both towed and self-propelled arrangement. The self-propelled version has a launch complex consisting four-rail launcher and the associated target acquisition and radar and electro-optical director mounted on a 6X6 WZ551 armored personnel carrier (APC). The towed version has a four-rail launcher mounted on a four-wheel carriage. The launch unit is supported by a range of truck-mounted ground equipment for maintenance and missile testing. The missile is fitted with a cryogenic liquid nitrogen gas-cooled IR seeker capable of +/-40 degree off boresight angles. Flight control is by long span pointed delta fins at the front of the missile with Sidewinder-type slipstream driven rollerons on the aft tail fin surfaces to prevent roll and so enhance the operation of the guidance system. The missile has a maximum effective range of 35 km and an altitude limit of 6.5 km. The single-shot hit probability for a single missile launch at an approaching target is 90%. The missile can be used at a stand-alone system, or as a part of the Type 390 (DK-9) brigade (regiment)-level combined AAA/SAM air defence system. The missile entered production in 1991 and saw limited service with the PLA ground forces.

PL-12 Chinese Air-to-Air Missile




Tiers:



Variants:

- **SD-10:** Export version of the PL-12. There is also a SD-10B.
- **DK-10A:** Surface-to-air variant with a range of 3 to 50 km and altitude from 30 m to 20 km.

System

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↳***PL-12 Air-to-Air Missile***

Name: PL-12
Type: Air-to-Air Missile
Length: INA
Diameter: INA
Weight: 180 kg
Operational Range: 100 km
Guidance System: Active Radar

Notes:

The PL-12 (Chinese: □□-12; pinyin: Pī Lì-12; literally: 'Thunderbolt-12') is an active radar-guided beyond-visual-range air-to-air missile developed by the People's Republic of China. It is considered comparable to the American AIM-120 AMRAAM and the Russian R-77. The first public information of the Leihua Electronic Technology Research Institute's PL-12 – then called the SD-10 – emerged in 2001. Development was assisted by Vympel NPO and Agat of Russia. Liang Xiaogeng is believed to have been the chief designer. Four successful test firings were made in 2004. By 2005, the missile was also known as the PL-12. The PL-12 may use the radar and data link from the Russian R-77,[13] or otherwise use systems benefiting from technology transfers from Russia. The missile uses a Chinese rocket motor and airframe. The PL-12 may have a passive homing mode for use against jammers and AEW aircraft.

→→Air-to-Surface Missiles

AS-30L French Short-to-Medium Range Air-to-Ground Missile



Tiers:



Variants:

- **AS-30:** Initial production variant using MCLOS guidance via a radio command link.

System

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AS-30L French Short-to-Medium Range Air-to-Ground Missile

↳***Missile***

Name: AS-30L
Type: MCLOS with radio command link / laser guided short-to-medium range air-to-ground missile
Basic Load: 2
Manufacturer: Aérospatiale
Length: 3.7 m
Diameter: mm340
Weight: kg520
Warhead Type: Impact-fuzed SAPHE (Semi-Armor-Piercing High-Explosive)
Warhead Weight: kg240
Detonation Mechanism: Delayed AP impact fuse (2 m ferroconcrete)
Engine: Two-stage solid propellant rocket motors, composite booster, double-based sustainer
Wingspan: m1
Operational Range: km3-11
Flight Ceiling: m10,000

Speed: 1,700 km/h

Guidance System: Semi-active laser homing

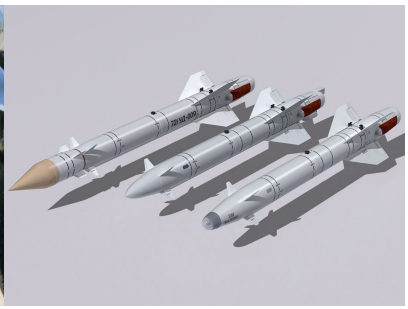
Launch Platforms: Mirage 2000D, Mirage 2000-5, F-16, Jaguar, Mirage F1, upgraded Super Etendard, Rafale

Notes:

The AS-30L is a French short-to-medium range air-to-ground missile which employs laser homing guidance. The AS-30L was a development of the earlier 1970s AS-30 missile, which uses MCLOS guidance via a radio command link between the aircraft and the missile. The only difference between the AS-30 and AS-30L is their guidance systems. In appearance, the earlier AS-30 has a sharp nose and the AS-30L has a slightly blunted nose. The AS-30L is employed for attacking targets which require a high degree of precision to engage effectively, but are also potentially dangerous enough to necessitate a longer-distance "stand off" attack profile to reduce the danger to the aircraft and pilot to ground-based anti-aircraft defences. The missile has a range of 3 to 11 kilometers, carries a 240 kilogram warhead, and claims a 1-meter CEP with either airborne or ground-based laser designators.

Kh-25 (AS-10 Karen) Russian Air-to-Ground Missile





Tiers:



Variants:

- **Kh-25:** original laser-guided variant
- **Kh-25ML:** semi-active laser guidance with tandem warhead that can penetrate 1 metre (39 in) of concrete
- **Kh-25MA:** active radar guidance, first offered for export in 1999
- **Kh-25MAE:** Kh-25MA update announced for export in August 2005 with Ka-band seeker, probably Phazotron's PSM which can detect a tank at 4,000 m (4,370 yd) and which can also be used on the Kh-25MA
- **Kh-25MS:** satellite navigation (GPS or GLONASS)[
- **Kh-25MSE:** export version of Kh-25MS, announced August 2005
- **Kh-25MT:** TV guidance
- **Kh-25MTP:** infra-red guidance variant of Kh-25MT
- **Kh-25R/Kh-25MR:** Radio-command guidance variant, it has a bigger 140 kg (309 lb) warhead.
- **Kh-27:** original anti-radiation missile
- **Kh-25MP:** modular anti-radiation variant
- **Kh-25MPU:** Updated Kh-25MP

System

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↳***Kh-25 Air-to-Ground Missile***

Name: Kh-25; NATO: AS-10 Karen
Type: Air-to-Ground Missile
Manufacturer: Zvezda-Strela
Length: 370.5 cm
Diameter: 27.5 cm
Wingspan: 75.5 cm
Warhead: High explosive, shell-forming
Warhead Weight: 89.6 kg
Operational Range: 11 km
Maximum Speed: 1,370–2,410 km/h

Guidance System: Laser guidance, passive radar, TV guidance, IIR, Satellite guidance, active radar homing depending on varian

Launch Platform: MiG-21, MiG-23/27, MiG-29, Ka-52, Su-17/20/22, Su-24, Su-25, Su-27, Yakovlev Yak-130 Kh-25MP : MiG-23/27, Su-17/22, Su-24, Su-25

Notes:

The Kh-25/Kh-25M (Russian: X-25; NATO:AS-10 'Karen') is a family of Soviet lightweight air-to-ground missiles with a modular range of guidance systems and a range of 10 km. The anti-radar variant (Kh-25MP) is known to NATO as the AS-12 'Kegler' and has a range up to 40 km.[2] Designed by Zvezda-Strela, the Kh-25 is derived from the laser-guided version of the Kh-23 Grom (AS-7 'Kerry'). It has now been succeeded by the Kh-38 family, but the Kh-25 remains in widespread use. Based on an air-to-air missile, the beam-riding Kh-66 had been the Soviet Union's first air-to-ground missile for tactical aircraft, entering service in 1968. However it proved difficult to use in practice as the launch aircraft had to dive towards the target. A version with radio-command guidance, the Kh-23, was first tested in 1968 but problems with the guidance system meant that it would not enter service for another five years. So in 1971 work began on a version with a semi-active laser seeker, which became the Kh-25. This was initially known in the West as the Kh-23L. State testing began on 24 November 1974, and the Kh-25 entered production in 1975. Work began on an anti-radar missile derived from the Kh-66[5] in 1972, using a passive radar seeker and SUR-73 autopilot. The long-range Kh-31 anti-radar missile came out of the same project. The Kh-27 began state testing on a MiG-27 on 8 August 1975 but did not enter service until 2 September 1980. It was assigned the NATO reporting name AS-12 'Kegler' and in effect it replaced the much heavier Kh-28 (AS-9 'Kyle'). In 1973 Victor Bugaiskii was appointed head engineer of the bureau and he started work on combining the Kh-23M, Kh-25 and Kh-27 into a single modular system to reduce costs and improve tactical flexibility. This was completed by the end of 1978, resulting in the Kh-25MP (anti-radar), Kh-25ML (laser-guided) and Kh-25MR (radio-guided) family. NATO continued to refer to these as the AS-12 and AS-10 respectively, even though they could now be switched by a simple change of seeker head.

HJ-9 (Red Arrow 9) Chinese Air-to-Surface Missile





Tiers:

1 2 3 4

System

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Hong Jian-9 (HJ-9) Air-to-Surface Missile

↳*System*

Manufacturer: Norinco
Length: mm1200
Diameter: mm152
Weight: kg37
Engine: Rocket Motor
Propellant: Solid Fuel
Warhead: Tandem HEAT warhead, 1100-1200 mm penetration RHAe
Detonation Mechanism: Contact Fuse
Guidance System: Laser-beam-riding & MMW Radar
Operational Range: m100-5,500

Notes:

The Hong Jian-9 (Chinese: □□-9; pinyin: Hóng Jiàn-9; literally: 'Red Arrow-9') is an advanced, third-generation anti-tank missile system deployed by the People's Liberation Army. The missile was developed by China North Industries Corporation (Norinco), and one of the chief designers was Yang Chunming (□□□). It is similar in appearance to the Israeli MAPATS (man portable anti-tank system), causing speculation about the link between the two missiles. It is also similar to the South African ZT3 Ingwe anti-tank missile. Like the MAPATS and ZT3, the HJ-9 is guided by laser beam riding. The HJ-9 has a maximum range of 5.5 km (3.4 mi), and a minimum range of 100 m (110 yd). Claimed armor penetration is 1,200mm, which is greater than that of the HJ-8. The missile may be fitted with high-explosive or thermal effect warheads for use against non-armored point targets, bunkers and fortifications. Like the HJ-8, the HJ-9 utilizes a disposable container/launching tube, but the one for HJ-9 is heavier, weighing 37 kg (82 lb) because HJ-9 is larger than HJ-8. The diameter of the HJ-9 is 152 mm (6.0 in) and the missile is compatible with a

variety of thermal imaging sights. In 2005, Norinco revealed in various public events that another version of HJ-9, the HJ-9A was already in service with Chinese armed forces, and this version used semi-active millimetre wave radar guidance. However, only photos of HJ-9A in service with Chinese paratroops were shown to the public. In these photos, the HJ-9A launcher is mounted on a jeep, and Norinco claimed the launcher on vehicles could be rapidly dismounted for foot soldiers. Norinco also revealed a further-developed advanced version of the HJ-9A, designated HJ-9B.

HJ-10 (Red Arrow 10) Chinese Air-to-Surface Missile






Tiers:



Variants:

- **AFT-10:** The AFT-10 (Chinese: □□□□-10; pinyin: Fǎn tǎnkè dǎodàn-10; literally: 'Anti-tank missile-10') is the surface-to-surface variant in the HJ-10 family, receiving designation of AFT-10. AFT-10 is a fiber-optic wire-guided missile that equipped with ZBD-04 Anti-tank platform. AFT-10 was first revealed in its deployment in Peace Mission 2014 joint military exercise.
- **AKD-10:** The AKD-10 is a air-to-surface variant. It weighs 50 kg (110 lb) and is laser guided
- **LJ-7:** The LJ-7 (or "Blue Arrow-7") is an air-to-surface export version. The tandem HEAT warhead can penetrate 1,400 mm (55 in). It has semi-active laser guidance, and an effective range of 2 kilometres (1.2 miles) to 8 km (5.0 mi). The launch weight is 47 kg (104 lb).

System

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HJ-10 (Red Arrow 10) Chinese Air-to-Surface Missile

↳***Missile***

Name: HJ-10 (Red Arrow 10)
Alternate Designation: Lan Jian 7 (Blue Arrow 7)
Type: Air-to-Surface Missile
Manufacturer: Norinco
Length: 1,850 mm
Diameter: 170 mm
Weight: kg50
Warhead: Heat and others
Engine Propellant: Solid Fuel
Operational Range: km3-10
Speed: Supersonic
Guidance System: Fiber-optic wire-guided missile (AFT-10) semi-active laser homing and millimeter wave radar seeker

(AKD-10) Infrared homing

Aircraft Capible to Carry: ea16

Launch Platforms: CAIC Z-10 Changhe Z-11WB Harbin Z-19 CASC Rainbow ZBD-04A

Notes:

HJ-10 (or "Red Arrow 10") is a Chinese anti-tank missile developed by Norinco. It has a tandem high-explosive anti-tank (HEAT) warhead, that may penetrate 1,400 mm (55 in) of conventional steel armor protected by explosive reactive armor. The maximum range is 10 km (6.2 mi), with pre- or post-launch lock-on. Air-launched variants for helicopters and drones have also been developed. AFT-10, equipped on the ZBD-04A Anti-tank platform, is the ATGM version of the HJ-10 platform and it is the first one to be developed.

9M120 Ataka (AT-9 Spiral-2) Russian Air-to-Surface Missile





Tiers:



Variants:

- **9M120 Ataka:** 9M120 Ataka "AT-9 Spiral-2" SACLOS radio command guidance missile.
- **9M120:** 9M120 – This variant features a tandem HEAT warhead to defeat current and future armored fighting vehicles equipped with ERA.
- **9M120F:** 9M120F – This variant uses a thermobaric warhead for greater effect against buildings, unarmored targets, and bunkers.
- **9M220O:** This variant is included with an expanding rod warhead for use against helicopters. It is equipped with a proximity fuse to destroy aircraft, and detonates its fragmentation warhead when less than four meters from the target.
- **9M120M:** A modernized variant with an extended range of 8,000 m. The improved warhead can penetrate over 950 mm of RHA after ERA.
- **9M120D:** An improved variant with a range of 10 km
- **9M120-1 Ataka:** Upgraded Ataka missiles used by Ataka-T GWS
- **9M127-1 Ataka-VM:** New air to surface version for helicopters.

System

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9M120 Ataka (AT-9 Spiral-2)

↳ ***Missile***

Name: 9M120 Ataka (AT-9 Spiral-2)
Type: Anti-Tank Guided Missile
Manufacturer: Degtyarev plant
Missile Length: m1.83
Missile Diameter: m0.13
Fin Span: m0.36
Missile Weight: kg42.5
Warhead Type: Tandem HEAT, fuel-air explosive, expanding rod
Warhead Weight: kg7.4

Range of Fire: km6

Guidance System: Radio-Guided & Semi-Automatic Command to Line of Sight (SACLOS) guidance

Speed: Supersonic

Notes:

The 9M120 Ataka (Russian: Атака; Attack) is an anti-tank guided missile (ATGM) originating from the Soviet Union. The NATO reporting name of the 9M120 missile is the AT-9 Spiral-2. It is the next major generation in the 9K114 Shturm (AT-6 Spiral) family. The missile has radio command guidance and is also a Beam riding SACLOS. This missile's primary variant was designed to defeat tanks with composite armour and explosive reactive armor. The 9M120 Ataka system is often confused with the 9K121 Vikhr system, despite being different weapons systems developed by different companies. The former was designed by the KBM machine-building design bureau and manufactured by the Degtyarev plant. According to the Stockholm International Peace Research Institute, Russia exported the Ataka ATGM to Iran, Kazakhstan, and Slovenia. The Ataka missile is stored in a glass reinforced plastic tube, which also acts as its launcher. The missile is reported to be considerably faster than the 9K114 Shturm, with longer range than the original version. It still uses radio command guidance, but the system has been improved when compared to the earlier 9K114 Shturm. The system is carried by the multiple kinds of helicopters including the Mi-28 and Mi-35. It is also offered for ground vehicles like the BMPT and the 9P149. There are three main missiles that are compatible with the launch system. The first is a two-stage anti-armour weapon that features a tandem warhead for dealing with add-on armor. The second variant of the missile – designated as 9M120F – has a thermobaric warhead for use against infantry positions and bunkers. The third variant of the 9M120 Ataka is the 9M220, which features a proximity fused expanding rod warhead, providing the missile with air-to-air capability against low- and slow-flying aircraft.

AGM-65 Maverick American Air-to-Surface Missile





Tiers:



Variants:

- **Maverick A:** Maverick A is the basic model and uses an electro-optical television guidance system. No longer in U.S. service.
- **Maverick B:** Maverick B is similar to the A model, although the B model added optical zooming to lock onto small or distant targets.
- **Maverick C:** Maverick C was to be a laser-guided variant for the United States Marine Corps (USMC). It was canceled before production, however its requirement was later met by the Maverick E.
- **Maverick D:** Maverick D replaced the electro-optical guidance with an imaging infrared system which doubled the practical firing distance and allowed for its use at night and during bad weather. A reduced smoke rocket engine was also introduced in this model. It achieved its initial operation capability in 1983.
- **Maverick E:** Maverick E uses a laser designator guidance system optimized for fortified installations and heavier penetrating blast-fragmentation warhead (140 kg (300 lb) vs. 57 kg (125 lb) in older models). It achieved IOC in 1985 and was used mainly by USMC aviation.
- **Maverick F:** Maverick F, designed specially for United States Navy, it uses a modified Maverick D infrared guidance system optimized for tracking ships fitted onto a Maverick-E body and warhead.
- **Maverick G:** Maverick G model essentially has the same guidance system as the D with some software modification that enables the pilot to track larger targets. The G model's major difference is its heavier penetrator warhead taken from the Maverick E, compared to the D model's shaped-charge warhead. It completed tests in 1988.
- **Maverick H:** Maverick H model is an AGM-65B/D missile upgraded with a new charge-coupled device (CCD) seeker better suited for the desert environment.
- **Maverick J:** Maverick J model is a Navy AGM-65F missile upgraded with the new CCD seeker. However, this conversion is not confirmed.
- **Maverick K:** Maverick K model is an AGM-65G upgraded with the CCD seeker; at least 1,200, but possibly up to 2,500 AGM-65G rounds are planned for conversion to AGM-65K standard.
- **Maverick E2/L:** Maverick E2/L model incorporates a laser-guided seeker that allows for designation by the launch aircraft, another aircraft, or a ground source and can engage small, fast moving, and maneuvering targets on land and at sea.

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AGM-65 Maverick Missile

↳***Missile***

Name: AGM-65 Maverick
Type: Air-to-Ground Missile
Basic Load: INA
Manufacturer: Raytheon Missile Systems Raytheon
Length: 249 cm (8 ft 2 in)
Diameter: cm30
Warhead: 57 kg (126 lb) WDU-20/B shaped-charge (A/B/C/D/H models) 136 kg (300 lb) WDU-24/B penetrating blast-fragmentation (E/F/G/J/K models) E models utilize FMU-135/B delayed impact fuze
Weight: 210–304 kg
Engine: A/B:Thiokol SR109-TC-1 D/E/F/G/H/J/K: SR114-TC-1 (or Aerojet SR115-AJ-1) Solid propellant rocket motor via a WPU-4/B or WPU-8/B propulsion section
Wingspan: 710 mm
Propellant: Solid propellant
Operational Range: Greater than 22 km
Speed: 1,150 km/h
Guidance System: system A/B/H/J/K:: Electro-optical guidance D/F/G: imaging infrared guidance E: Laser guidance

Notes:

The AGM-65 Maverick is an air-to-ground missile (AGM) designed for close air support. It is the most widely produced precision-guided missile in the Western world, and is effective against a wide range of tactical targets, including armor, air defenses, ships, ground transportation and fuel storage facilities. Development began in 1966 at Hughes as the first missile to use an electronic contrast seeker. It entered service with the United States Air Force in August 1972. Since then, it has been exported to more than 30 countries and is certified on 25 aircraft. The Maverick served during the Vietnam, Yom Kippur, Iran–Iraq, and Persian Gulf Wars, along with other smaller conflicts, destroying enemy forces and installations with varying degrees of success. Since its introduction into service, numerous Maverick versions had been designed and produced using electro-optical, laser, and imaging infrared guidance systems. The AGM-65 has two types of warhead: one has a contact fuze in the nose, the other has a heavyweight warhead fitted with a delayed-action fuze, which penetrates the target with its kinetic energy before detonating. The missile is currently produced by Raytheon Missile Systems. The Maverick shares the same configuration as Hughes's AIM-4 Falcon and AIM-54 Phoenix, and measures more than 2.4 m (8 ft) in length and 30 cm (12 in) in diameter. The Maverick has a modular design, allowing for different combinations of the guidance package and warhead to be attached to the rocket motor to produce a different weapon. It has long-chord delta wings and a cylindrical body, reminiscent of the AIM-4 Falcon and the AIM-54 Phoenix. Different models of the AGM-65 have used electro-optical, laser, and imaging infrared guidance systems. The AGM-65 has two types of warhead: one has a contact fuze in the nose, the other has a heavyweight warhead fitted with a delayed-action fuze, which penetrates the target with its kinetic energy before detonating. The latter is most effective against large, hard targets. The propulsion system for both types is a solid-fuel rocket motor behind the warhead. The Maverick missile is unable to lock onto targets on its own; it has to be given input by the pilot or weapon systems officer (WSO) after which it follows the path to the target autonomously. In an A-10 Thunderbolt II, for example, the video feed from the seeker head is relayed to a screen in the cockpit, where the pilot can check the locked target of the missile before launch. A crosshair on the heads-up display is shifted by the pilot to set the approximate target, where the missile will then automatically recognize and lock on to the target. Once the missile is launched, it requires no further assistance from the launch vehicle and tracks its target automatically. This fire-and-forget property is not shared by the E version that uses semi-active laser homing.

KH-31 (AS-17 Krypton) Russian Air-to-Surface Missile





Tiers:



Variants:

- **Kh-31A:** active seeker head for use as an anti-ship missile against vessels up to destroyer size, range of 25 km–103 km (13.5–55.6 nmi). Missile is sea-skimming as it approaches the target.
- **Kh-31P:** Type 77P) - passive seeker head for use as an anti-radiation missile. Stays at high altitude throughout its flight, allowing higher speeds and increasing range to 110 km (60 nmi; 70 mi). The seeker has three interchangeable modules to cover different radar frequency bands, but they can only be changed at the factory.
- **Kh-31AD/Kh-31PD ("Kh-31 Mod 2"):** increase range through increasing the fuselage from 4.70 m (15 ft 5 in) to 5.3 m (17 ft 5 in) long.[18] As of 2012, the Kh-31PD is serially produced. Kh-31AD is in series production since 2013.
- **Kh-31PK:** installed non-contact fuse, maximum speed 900 m/s, range 120–160 km. Destined for Su-27SM, Su-30MK, Su-35. In serial production since 2009.
- **MA-31:** telemetry and other systems installed by McDonnell Douglas/Boeing for use by the US Navy as a target drone. Tested between 1996-2007; a version upgraded with GPS, the MA-31PG, was offered to the Navy as a replacement for the MQM-8 Vandal but they bought the GQM-163 Coyote. Even with the additional equipment, the MA-31 was capable of Mach 2.7 and 15G manoeuvres in its anti-ship (sea-skimming) flight profile and Mach 3.5 in ARM mode at 48,000 ft (15,000 m).
- **KR-1:** version of the Kh-31P exported to China in 1997. It seems that Zvezda wanted to sell an initial batch of KR-1's to China, before the KR-1 went into production in China. Rather than the original three seeker modules, the KR-1 has a single K-112E "export" seeker targeting D-F band (S band) emissions, and reportedly optimised for specific Taiwanese radars.
- **YJ-91:** Ying Ji 91 - Chinese missile based on the Kh-31P.[citation needed] They are also reported to have developed an anti-shipping version with an indigenous active seeker, and are looking to develop this for use in submarines. The name YJ-91 was already in use by 1997, and may have been a Chinese name for the original Russian missiles designated X-31 by the Russians. By 2005, the name YJ-93 was being applied to missiles made in China, but Western reports generally do not distinguish between YJ-91 and YJ-93.
- **Note:** An active/passive air-to-air version for use against slow-moving support aircraft, a so-called "AWACS killer", was announced at the 1992 Moscow air show with 200 km (110 nmi; 120 mi) range. That would be less than the 300–400 kilometres (160–220 nmi; 190–250 mi) promised by the Vympel R-37 (AA-13 'Arrow') and Novator R-172 missiles, but a Kh-31 derivative could be carried by a wider range of aircraft. However this may have been mere propaganda; in 2004 the Tactical Missiles Corporation "emphatically denied" that it had ever worked on an air-to-air version of the Kh-31. In 2005 rumours persisted of a Russian AWACS killer based on the Kh-31A anti-shipping model, and of the Chinese adapting the YJ-91, derived from the Kh-31P, for the same purpose.

KH-31 (AS-17 Krypton) Russian Air-to-Surface Missile

↳*System*

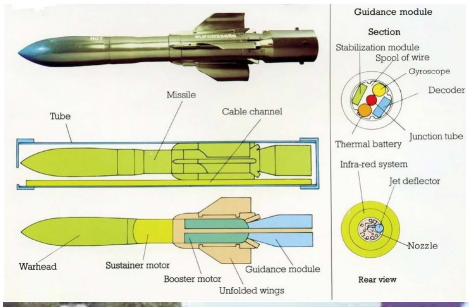
Name: KH-31 (AS-17 Krypton)
Type: Medium-range Air-to-Surface Missile
Basic Load: INA
Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)

Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)
Diameter: 360 mm
Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)
Warhead: HE shaped charge
Detonation Mechanism: Impact
Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb
Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory
Wingspan: mm914
Propellant: Kerosene
Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)
Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)
Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar
Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M

Notes:

New air defense weapon systems of the American Patriot kind have raised the requirements which antiradar missiles must meet. These include first of all higher speed and longer range, then also high interference immunity and radar turn-off when attacked. For the special purpose of meeting these requirements, the "Zvezda" group under the direction of V. Bugayskiy began in 1977 working on the Kh-31 missile (Article) 77P). The first launchings of this missile took place in 1982. The most interesting component of the Kh-31P is its dual propulsion system designed by the "Soyuz" Design Bureau in Turayevo near Moscow (note: there are several "Soyuz" engineering groups in Russia). First the missile is accelerated by its solid-fuel rocket engine to a speed of Mach 1.8, then the engine is discarded and the interior of the missile is converted into the combustion chamber of the missile's jet engine. The latter accelerates the missile to a speed of almost Mach 4.5, while four air intake holes on the sides of the missile body open up. On the basis of the Kh-31P antiradar missile were developed the Kh-31A missile (Article 77A) with an active-radar guidance head and also an M-31 flying target for air defense training exercises. The Kh-31 was for the first time publicly displayed in November 1991, in Dubai (United Arab Emirates). The State Scientific Production Center Zvezda-Strela has upgraded the air-to-surface supersonic ASM Kh-31A NATO: AS-17 Krypton). Recently a variant of the air-to-air class based on the Kh-31 was made available, equipped with a hybrid active-passive guidance head for use against nonmaneuvering airborne targets such as AWACS (passive guidance) from far distances. The range of this missile is 200 km. The unofficial designation of this missile is 'mini-Moskit'. The Kh-31A missile has been developed from the technologies of the 1970-80s. The improved version of the KH-31PM, a missile that is already very well known in the US Navy, was deployed in 2015. The KH-31 was a missile that the American fleet bought from Russia in the 1990s as a target missile for developing ships' anti-aircraft systems. The Americans used the KH-31PM to learn how to hit the Chinese 3M-54 Moskit anti-ship missiles, which had been produced by Russia. In the West the Moskit is codenamed “Sunburn”, due to its speed of over 1,700 mph and its destructive potential. The KH-31, which is very similar to the Moskit, is smaller and cheaper and is used for destroying above-water targets, radar stations and anti-aircraft missile complexes such as the Patriot. It can be installed in all types of Russian destroyers and bombers. The new KH-31PM has an increased range of 160 miles. It also has a new guidance system and engine, which make its flight more unpredictable and deadlier for the adversary. For example, the missile is equipped with the broadband guidance head, which can be used against practically all anti-aircraft systems. The earlier missiles were equipped with selective heads, which could only be used against one type of system.

Hot-3 French Air-to-Ground Missile







Tiers:



Variants:

- **HOT 1:** Designation HOT, Length 1.27 m/ Diameter 136 mm/ Wingspan 0.31 m/ Launch weight 23.5 kg/ Warhead 5 kg HEAT/ Armor penetration (est.) 800 mm/ Range 75–4,000 m/ Speed 864 km/h//
- **HOT 2/-2MP:** Designation HOT-2/-2MP/ Length 1.30 m/ Diameter 150 mm/ Wingspan 0.31 m/ Launch weight 23.5 kg/ Warhead 5 kg HEAT/ Armor penetration (est.) 900 mm/ 350mm (-2MP)/ Range 75–4,000 m/ Speed 864 km/h//

System

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Helicopter Launched Anti-Tank Guided Missile

Name: HOT-3 (French: Haut subsonique Optiquement Téléguidé Tiré d'un Tube)
Type: Anti-tank Guided
Manufacturer: MBDA
Length: 1.3m
Diameter: 0.15m
Missile Weight: 24.5kg
Minimum Range: 75m
Maximum Range: 4,300m
Missile Velocity: 864 km/h
Armor Penetration: 1250mm

Warhead Type: Tandem charge HEAT

Guidance: Semi-automatic command to line of sight (SACLOS)

Engine: Two-stage solid fuel rocket

Notes:

The HOT (French: Haut subsonique Optiquement Téléguidé Tiré d'un Tube, or High Subsonic, Optical, Remote-Guided, Tube-Launched) is a second-generation long-range anti-tank missile system developed originally as an effort to meet a joint German-French Army requirement, by the then German firm Bölkow and the French firm Nord, to replace the older SS.11 wire guided missile which was in service with both nations. A few years later, Bölkow and Nord merged into MBB and Aérospatiale respectively, both of which firms later formed Euromissile to design and produce the MILAN, Roland and HOT. This firm (now MBDA), is a joint corporation of French and German defense firms. The HOT has become one of the most successful missiles of its class, with tens of thousands of missiles produced, used by no fewer than a dozen countries worldwide, and validated in combat in several wars. The missile system is also commonly mounted on light and medium armored vehicles, and attack helicopters. HOT entered limited production in 1976, with mass production of 800 missiles a month reached in 1978. HOT initially became operational with the German and French armies fitted to specialized armored antitank vehicles. In addition, Euromissile was in the enviable position of having large export orders from Middle East nations at the start of mass production. This was likely due to the situation in the late 1970s where many nations did not want to rely solely on arms purchases from the Soviets combined with the U.S. Congress restrictions on the export sales of the TOW antitank missile. In Europe, the end of the service life of the HOT missile system is in sight with the French opting to purchase Hellfire II missiles for their Tiger-HAD attack helicopters and the Germans planning to transition to the PARS 3 LR. Austria has decommissioned its HOT-carrying tank destroyers, while Spain is transitioning to Spike missiles to replace their HOT missile inventory. The HOT missile continues to be in widespread use in other areas of the world.

Kh-38 (Kh-38M) Russian Air-to-Surface Missile




Tiers:

1 **2** 3 4

Variants:

- **Kh-38MAE:** inertial, active radar homing
- **Kh-38MKE:** inertial, satellite guidance
- **Kh-38MLE:** inertial, laser guidance
- **Kh-38MTE:** inertial, infrared guidance
- **Kh-36 Grom-1:** AS-23 tactical cruise missile derivative/ AGM Air to Surface with 120km range
- **Kh-36P Grom-2:** AS-23B / KAB- guided bomb gliding 50-km range version 600 kg, various aim guidance, both created on the base of Kh-38M short-range tactical missile and also have a modular structure, warheads and seekers. First seen at MAKS 2015, intended to equip all types of fighters, including the MiG-35 and Su-57 fighters.
- **Kh-38M2:** improvement of Kh-38M, optoelectronic IR UV (CCD also ?) sensors

System

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Kh-38/Kh-38M Missile

↳ ***Missile***

Name: Kh-38/Kh-38M Missile
Type: Air-to-Surface Missile
Manufacturer: Tactical Missiles Corporation JSC
Length: 4.2 m
Diameter: 0.31 m
Wingspan: 1.14 m
Weight: 520 kg
Warhead: HE fragmentation, cluster warhead, armor-piercing
Warhead Weight: up to 250 kg
Detonation Mechanism: Contact fuse
Engine: Solid rocket motor

Operational Range: up to 70 km

Flight Ceiling: 12000 m

Flight Altitude: 200-12000 m

Speed: Mach 2.2

Guidance System: Laser, active radar, IR, satellite, depending on variant

Notes:

The Kh-38/Kh-38M (Russian: X-38) is a family of air-to-surface missiles meant to succeed the Kh-25 family of missiles. The basic configuration of the Kh-38M was revealed at the 2007 Moscow Air Show (MAKS). The modular guided air-to-surface missile is meant to succeed the venerable Kh-25 missile family. The missile is designed to be carried by the fifth-generation Sukhoi Su-57 fighter aircraft. The first prototypes of the missile had initially folding wings and tail fins for internal carriage, and would have a variety of seeker heads for different variants. In a successive version, unveiled at MAKS 2017, both control surfaces were replaced by longer and narrower fixed ones, a solution similar to the one used in the Selenia Aspide missile.

YJ-8/C-802 (NATO: CSS-N-4 Sardine) Chinese Air-to-Surface Missile



Tiers:



Variants:

- **YJ-8:** YJ-8: Basic version with fixed wings
- **YJ-8A:** YJ-8A: Modified YJ-8 with folding wings
- **YJ-81:** YJ-81: Air-launched version without the booster.
- **YJ-82:** YJ-82: Submarine-launched version.
- **C-801:** C-801: Export version of YJ-8.
- **C-801K:** C-801K: Export version of the YJ-81.
- **C-801Q:** C-801Q: Export version of YJ-82.

YJ-8/C-802 (NATO: CSS-N-4 Sardine) Chinese Anti-Ship Missile

↳System

Name: YJ-8/C-802 (NATO: CSS-N-4 Sardine)
Type: Anti-Ship & Air-to-Surface Missiles
Manufactuer: China Aerospace Science and Industry Corporation
In Service: 1980s-Present
Length: m5.81
Width: INA
Weight: kg815
Warhead Type: High-explosive fragmentation
Warhead Weight: kg165
Engine: Rocket
Propellant: Solid Rocket
Operational Range: km42
Flight Altitude: m5-7
Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance
Basic Load: ea2

Notes:

The YJ-8 (Chinese: □□-8; pinyin: yingji-8; literally: 'eagle strike 8'; NATO reporting name: CSS-N-4 Sardine) is a Chinese surface-launched subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation (CASIC) Third Academy. The YJ-8 was developed into air-launched (YJ-81) and submarine-launched (YJ-82) variants. The YJ-8 is either based on, or is a heavily modified copy of, the MM38 Exocet; the two missiles share virtually identical operational profiles. The replication of the MM38's "revolutionary flight profile" in less than ten years and with an immature industrial base strongly suggests that China had access to proven technology.[4] The YJ-8 was a "radical departure" from China's first anti-ship missiles derived from the P-15 Termit. The YJ-8 carried a smaller warhead, but had the same range and speed while being significantly smaller and lighter. The development of the YJ-8 was approved in late-1976 following a few years of encouraging work on solid-fuel rockets. According to a 1991 Aerospace China article, development of the missile's engine began in 1978, and flight testing was completed in 1985. The YJ-8 reach initial operating capability in the People's Liberation Army Navy in 1987, the same year the export version—the C-801—was announced. CASIC received the first National Science and Technology Advancement Award for development of the YJ-8 in 1988.

9M17 Fleyta (AT-2 Swatter) Russian Air-to-Surface Missile



Tiers:



Variants:

- **AT-2A Swatter A MCLOS:** 3M11 / 9M11
- **AT-2B Swatter B Range increased to 3.5 km.:** 9M17 9M17DB Modified system to work with the Mi-8TB (Hip-E). 9M17M Skorpion-M MCLOS 9K8 (Falanga-M). Launch weight 29 kg (64 lb), Maximum range 3,500 m. First seen in the 1973 Moscow Parade.
- **AT-2C Swatter C SACLOS Falanga-PV (Fleyta) 9K8.:** 9M17P First SACLOS version. 9M17MP Improved engine and guidance lamp. Maximum range 4,000 m. 9M17N

System

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9M17 Fleyta (AT-2 Swatter) Anti-Tank Guided Missile (ATGM)

↳***Missile***

Name: 9M17 Fleyta (AT-2 Swatter)
Type: Anti-Tank Guided Missile (ATGM)
Manufacturer: Nudelman OKB-16
Weight: kg27
Length: cm116
Diamter: mm148
Warhead Type: HEAT
Warhead Weight: kg5.4
Engine: Solid fuel rocket
Wingspan: cm68
Operational Range: km0.5-2.5
Speed: 160 m/s (360 mph)
Guidance System: Radio command

Steering System: MCLOS

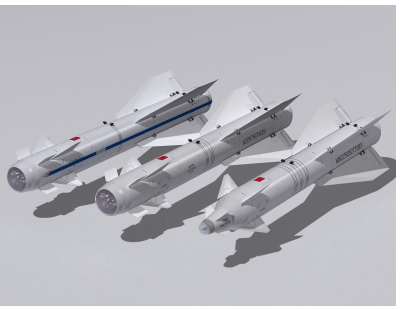
Launch Platform: Mi-4, Mi-8, Mi-24, Mi-25, BRDM-1, BRDM-2

Notes:

The AT-2 Swatter is the NATO reporting name for the 3M11 Fleyta (flute) MCLOS radio command anti-tank missile of the Soviet Union. he missile was developed by the Nudelman OKB-16 design bureau. It was developed at about the same time as the AT-1 Snapper as a heavy ATGM for use on both ground launchers and helicopters. It addressed some of the problems of the AT-1; it was much faster, and had slightly longer range. These improvements were achieved by sending commands via a radio link instead of a trailing guidance wire, which allowed the missile to travel faster. However, it did make it vulnerable to jamming. The missile system was shown to Soviet premier Nikita Khrushchev in September 1964, and accepted for service shortly afterwards. The AT-2 was the first Soviet ATGM to be deployed from helicopters. Small numbers were fitted to the Mi-4AV. The missile was deployed on the Mi-8 Hip as well as the Mi-24 and Mi-25 'Hind' series of helicopters. It was also deployed on the BRDM-1 and BRDM-2 infantry fighting vehicles. The original AT-2A (3M11 Falanga) missile was problematic; one Russian source describes the missile as "notable for its complexity and low reliability". Also, the missile's range was felt to be inadequate. An improved version of the missile was developed: the AT-2B (9M17 Skorpion). Externally, the missiles are very similar, however the AT-2B range is increased to 3.5 km. The standard production version was the 9M17M Skorpion-M, which entered service in 1968. The next development was to integrate SACLOS guidance, resulting in the AT-2 Swatter-C or 9M17P Skorpion-P. It entered service in 1969. A product improved version the 9M17MP was developed that had an improved engine and signal lamp. The missile has been used extensively in the following wars on the Mi-24 platform. *Angolan War of Independence *Soviet invasion of Afghanistan *1980s Iran–Iraq War *1982 Lebanon War It was replaced in Soviet service by the 9K114 Shturm ATGM.

Kh-29 (AS-14 Kedge) Russian Air-to-Surface Missile



Tiers:



Variants:

- **Kh-29L (Izdeliye 63, 'Kedge-A'):** uses semi-active laser seeker and has a range of 8–10 km.
- **Kh-29ML:** is an upgraded version of the Kh-29L
- **Kh-29T (Izdeliye 64, 'Kedge-B')[:** is the TV-guided version which is fitted with automatic optical homing to a distinguishable object indicated by the pilot in the cockpit.
- **Kh-29TE[:** is a long-range (30 km) development of the Kh-29T. Minimum range is 3 km; launch altitude is 200-10,000 m.
- **Kh-29MP:** is a third generation guidance variant with active radar homing, making it a fire-and-forget weapon. It has a large 250 kg warhead with 12 km range.
- **Kh-29D:** is the fourth variant of the Kh-29TE which uses infrared imaging guidance.

System

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↳*Kh-29 Air-to-Service Missile*

Name: Kh-29
Type: Air-to-Surface Missile
Manufacturer: Vympel / Tactical Missiles Corporation
Length: 390 cm
Diameter: 38.0 cm
Wingspan: 110 cm
Weight: 660 kg
Warhead Type: HE armour-piercing
Warhead Weight: 320 kg
Detonation Mechanism: Impact
Engine: Fixed thrust solid fuel rocket
Operational Range: 10 km
Maximum Speed: 1,470 km/h

Guidance System: semi-active laser guidance

Notes:

The Kh-29 (Russian: X-29; NATO: AS-14 'Kedge'; GRAU: 9M721) is a Soviet air-to-surface missile with a range of 10–30 km. It has a large warhead of 320 kg, has a choice of laser, infrared, active radar or TV guidance, and is typically carried by tactical aircraft such as the Su-24, Su-30, MiG-29K as well as the "T/TM" models of the Su-25, giving that craft an expanded standoff capability. The Kh-29 is intended for primary use against larger battlefield targets and infrastructure such as industrial buildings, depots and bridges, but can also be used against ships up to 10,000 tonnes, hardened aircraft shelters and concrete runways. The basic aerodynamic layout of the Kh-29 is similar to the Molniya R-60 (AA-8 'Aphid'), reflecting Molniya's heritage in air-to-air missiles. The laser guidance head came from the Kh-25 (AS-10 'Karen') and the TV guidance from the Kh-59 (AS-13 'Kingbolt'), mated to a large warhead. It has been compared to the United States' AGM-65 Maverick, but the AGM-65 is a much smaller missile than the Kh-29, and weighs less than half as much.

HOT-3 French Air-to-Ground Anti-Tank Guided Missile



Tiers:



Variants:

- **HOT-1:** fielded in 1978
- **HOT-2:** Fielded in 1985
- **HOT-3:** Fielded in 1998

Anti-Tank Guided Missile System

Name: HOT-3
Type: Air-to-Ground Anti-Tank Missile
Length: 1.30 m
Diameter, Launcher: 175 mm
Diameter, Missile: 150 mm
Launcher Weight: 23.5 kg
Launcher and Missile Weight: 32.0 kg
Warhead Weight: 5.0 kg
Warhead: Octol hollow-charge high-explosive anti-tank or multi-purpose penetration of rolled homogeneous armor (RHA). Penetrates up to 47 in (1,200 mm) of armor.
Engine: 1 x two-stage solid-propellant rocket; Bugeat booster with a burn of 0.9 sec; Epictete sustainer, 53 lb (24 kg) static thrust with a burn of 17.4 sec
Maximum Speed: Mach 0.74
Maximum Range: 4,300 m
Minimum Range: 400 m
Flight Time to 2,000 m: 9 sec
Flight Time to 3,000 m: 13 sec
Flight Time to 4,000 m: 17 sec
Guidance System: SACLOS wire-guided
Tracking System: optical or IR tracking of target; IR tracking of missile.
Basic Load: INA

Notes:

HOT-3 was brought into service in 1998 and has a tandem shaped-charge HEAT warhead capable of breaching explosive reactive armor as well as improved anti-jamming capabilities. HOT-3 was selected to be the missile armament of the Tiger attack helicopter for Germany at least until the PARS 3 LR becomes available. The HOT (French: Haut subsonique Optiquement Téléguidé Tiré d'un Tube, or High Subsonic, Optical, Remote-Guided, Tube-Launched) is a second-generation long-range anti-tank missile system developed originally as an effort to meet a joint German-French Army requirement, by the then German firm Bölkow and the French firm Nord, to replace the older SS.11 wire guided missile which was in service with both nations. A few years later, Bölkow and Nord merged into MBB and Aérospatiale respectively, both of which firms later formed Euromissile to design and produce the MILAN, Roland and HOT. This firm (now MBDA), is a joint corporation of French and German defense firms. The HOT has become one of the most successful missiles of its class, with tens of thousands of missiles produced, used by no fewer than a dozen countries worldwide, and validated in combat in several wars. The missile system is also commonly mounted on light and medium armored vehicles, and attack helicopters. HOT entered limited production in 1976, with mass production of 800 missiles a month reached in 1978. HOT initially became operational with the German and French armies fitted to specialized armored antitank vehicles. In addition, Euromissile was in the enviable position of having large export orders from Middle East nations at the start of mass production. This was likely due to the situation in the late 1970s where many nations did not want to rely solely on arms purchases from the Soviets combined with the U.S. Congress restrictions on the export sales of the TOW antitank missile. In Europe, the end of the service life of the HOT missile system is in sight with the French opting to purchase Hellfire II missiles for their Tiger-HAD attack helicopters and the Germans planning to transition to the PARS 3 LR. Austria has decommissioned its HOT-carrying tank destroyers, while Spain is transitioning to Spike missiles to replace their HOT missile inventory. The HOT missile continues to be in widespread use in other areas of the world.

9K121 Vikhr (AT-16 Scallion) Russian Laser Guided Anti-Tank Missile




Tiers:

1 **2** 3 4

Variants:

- **9A1472 Vikhr-1:** Upgraded version.[

System

Alternate Designation: 9K121 Vikhr; NATO: AT-16 Scallion
Manufacturer: KBP Instrument Design Bureau
Engine: solid-fuel rocket
Propellant: solid fuel
Operational Range: 10–12 km
Speed: 600m/s, Mach 1.8
Guidance System: Laser beam riding
Launch Platform: Helicopters Ka-50 Ka-52 Aircraft Su-25T/25TM Ships AK-630 Vikhr-K

Dimensions

Length: 2.80 m
Diameter: 130 mm
Weight: 45 kg
Wingspan: 380 mm
Warhead: 8–12 kg tandem HEAT charge, armor penetration behind ERA, 1,000 mm

Notes:

The 9K121 Vikhr (Russian: Вихрь, English: Whirlwind; NATO reporting name: AT-16 Scallion) is a Russian laser guided anti-tank missile. "9K121" is the GRAU designation for the missile system. The missile can be launched from warships, Ka-50 and Ka-52 helicopters, and Su-25T aircraft. It was first shown publicly at the 1992 Farnborough Airshow. The missile is designed to engage vital ground targets, including armoured targets fitted out with built-in and add-on explosive reactive armor, at a range of up to 8 km when fired from a helicopter and 10 km when fired from a fixed-wing aircraft in daytime and up to 5 km at night, as well as air targets in conditions of air defense assets activity. The Vikhr-1 missile is part of the Vikhr-M system, which also includes an automatic sight and a depressible launcher. Adopted in 1990. The automatic sight is provided with TV and IR channels for target sighting, a laser beam channel for missile control, a laser rangefinder, an automatic target tracking unit, a digital computer and a system for stabilization and aiming the sighting and beam channels. The automatic sight provides for target detection and identification both by day and night, automatic target tracking and missile guidance, and generates exact

information for gun and rocket firing. The guided missile consists of a HEAT fragmentation warhead fitted with a contact and a proximity fuze, an air-dynamic control actuator, control electronics, a motor and laser detector. It is kept in a sealed launching transporting container. The multi-purpose warhead (two-stage HEAT and an additional fragmentation sleeve) allows the missile to be used against armoured, airborne and area targets alike. This is an advantage compared to the three different missiles required in the 9M120 Ataka-V complex. The use of the proximity fuze allows a near miss of up to 5 m and makes it possible to engage an air target at speeds of 500 m/s. The Vikhr missile laser beam control system provides for its precise guidance owing to data transmission to the missile in the course of its launch, which is excluded in homing systems. The laser guidance principle is identical to that used by 9M117 Bastion or 9M119 Svir anti armor missiles. The Vikhr missile control system has high jamming immunity because its receiver faces the carrier, thereby protecting it from jamming signals. The high pinpoint target hit probability (reported 0.95 against stationary targets) is provided by the automatic target tracking system and highly accurate missile control system that makes allowance for changes in the parameters of the carrier and the target in the course of firing. The missiles can be fired singly or in pairs (at the same target to increase lethality). The high flight speed allows it to engage targets rapidly. The system is capable of launching Vikhr missiles against two to four targets during a 30-second period and starting at a range of 10 km, which increases its lethality to three to four times that of earlier systems.

9K114 Shturm (AT-6 Spiral) Russian SACLOS Radio Guided Anti-Tank Missile System







Tiers:



Variants:

- **9M114 Kokon / AT-6 Spiral:** 9M114 Kokon / AT-6 Spiral Entered service in 1976
- **9M114V Shturm-V:** 9M114V Shturm-V – Air to surface version for helicopters.
- **9M114 Shturm / AT-6A Spiral:** 9M114 Shturm / AT-6A Spiral SACLOS
- **9M114M:** 9M114M HEAT warhead.
- **9M114F:** 9M114F Thermobaric warhead.
- **9M114M1 Shturm / AT-6B Spiral:** 9M114M1 Shturm / AT-6B Spiral SACLOS, heavier 7.4 kg (16 lb) warhead penetrating 600–650 mm, longer 6 km (3.7 mi) range.
- **9M114M2 Shturm / AT-6C Spiral:** 9M114M2 Shturm / AT-6C Spiral SACLOS, further increased 7 km (4.3 mi) range.
- **9M120 Shturm-VM / AT-9 Spiral-2:** 9M120 Shturm-VM / AT-9 Spiral-2 – see 9M120 Ataka-V

System

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9K114 Shturm SACLOS Radio Guided Anti-Tank Missile System

↳*System*

Name: 9K114 Shturm
Type: SACLOS Radio Guided Anti-Tank Missile System
Missile Length: mm1,630
Missile Diameter: mm130
Fin Span: mm360
Missile Weight: kg31.4

Warhead Type: HEAT

Warhead Weight: kg5.3

Guidance System: Radio Guided

Range of Fire: km5

Notes:

9K114 Shturm (Russian: 9К114 «Штурм» - "Sturm" is German for "storm" (also "assault") - is a SACLOS radio guided anti-tank missile system of the Soviet Union. Its GRAU designation is 9K114. Its NATO reporting name is AT-6 Spiral. The missile itself is known as the 9M114 Kokon (Cocoon). The missile called 9M114 Kokon (Cocoon) was developed by the Kolomna Machine Design Bureau, which was also responsible for the 3M6 Shmel and 9M14 Malyutka. Work on the missile began in 1967, with the hope of using the missile on Mi-24s. However, delays forced the design of an upgraded Falanga system (9M17 Skorpion) using SACLOS guidance as a stopgap. Testing of the missile was completed in 1974, and it was accepted into service in 1976. The missile has no direct western counterpart, though, in role, it is closest to the AGM-114 Hellfire, and in guidance method, to the MGM-18 Lacrosse. It was originally given the NATO designation AS-8, before being redesignated as AT-6. The missile can be deployed on a variety of platforms, including the Mi-24V and from 1979-onwards the MT-LB based 9P149 tank destroyer. There is also a shipborne version of the missile, with the launcher holding six missiles. The missile is transported and launched from a glass-reinforced plastic tube. The missile uses a Soyuz NPO solid-rocket sustainer, with a small booster stage to launch the missile from its tube. The missile is SACLOS with a radio command link. The use of a radio link allows the missile to travel much faster and further than if it were wire guided. The radio link is a VHF system with five frequency bands and two codes to minimize the risk of jamming. The system comprises a KPS-53AV 8× daylight-only direct vision sight with an integrated laser rangefinder. After the missile is launched, the gunner has to keep the sight's crosshairs on the target until impact. Appropriate steering commands are transmitted to the missile via the radio link. The missile flies above the gunner's line of sight to the target. With the range of the target determined by the laser rangefinder, the missile descends onto the target just before impact. This is done primarily to clear obstacles, instead of achieving a top-attack, and can be switched off. It is possible to engage low and slow moving helicopters with the system; however, since the missile only has a contact fuze, a direct hit would be needed. Soviet sources report kill ratios of 75–85% during the Soviet invasion of Afghanistan. Also a Mil demonstration in Sweden in late 1995 using a Mi-28A firing Shturm and Ataka missiles also showed good results: from a hovering helicopter, a Shturm was fired at a target 900 m away; and from level flight at 200 km/h an Ataka was fired at a target 4,700 m away. Both missiles passed within 1 m of their aiming point. t is possible there were problems with early models of the missile; Soviet stocks of the missile were rebuilt to AT-6B and C standard by 1994. 30 June 2014 adopted by the Russian army modernized self-propelled antitank missile system 9M114 Shturm-S into 9K132 Shturm-SM having a sight with television and thermal channels as well as a new missile with a high-explosive fragmentation warhead and a proximity fuse

YJ-6 Chinese Air-to-Surface Missile



Tiers:



Variants:

- **SY-2:** The liquid fuel engine was rather hazardous and unreliable, so a solid fuel rocket engine was developed. This engine also made it possible to reduce the size and weight of the missile while providing greater range. The warhead weight is also reduced, but its effectiveness was actually increased when a time-delayed semi-armour-piercing high-explosive design was adopted. The extended version developed is designated SY-2A.
- **HY-1:** The HY-1 received two separate NATO reporting name, the CSS-N-2 Safflower for the ship to ship version and the CSSC-2 Silkworm for the land based coastal defense variant. The HY-1J was intended for use on the Type 051 destroyers. However, the turmoil of the Cultural Revolution prolonged development into the 1980s. As a result, the Type 051s deployed into the Pacific Ocean to support ballistic missile tests without anti-ship missiles.
- **HY-2:** The HY-2 is identical to the HY-1 but with a further stretched body. The missile features a round nose accommodating the radar seeker, a pair of mid-mounted delta wings on the middle section of missile body, and three tail control surfaces. The missile is powered by a liquid-fuel rocket motor, with a solid rocket booster attached under the missile fuselage. The HY-2 is launched from land-based launcher and flies at an altitude of 1000 m during the initial stage of the flight. After the missile switched to the cruising mode, the flight altitude was reduced to 100 ~ 300 m. During the final stage of the flight, the missile switched on its radar seeker and dives to an altitude of 8 m until it hits the target. The single-shot hit probability is estimated to be 90%. Due to its oversized body, the HY-2 did not develop a ship-to-ship variant. The missile is obsolete and will be replaced by the YJ-8 series in the future.
- **HY-3:** The HaiYing-3 (HY-3, also known as C-301 in its export name; NATO codename: CSS-C-6 Sawhorse) is the active radar homing, ramjet-powered supersonic land-to-ship missile developed by China Haiying Electro-Mechanical Technology Academy (CHETA, also known as 3rd Space Academy). The missile was developed in the 1980s based on the design of the HY-2 (C-201) and the ramjet technology of the cancelled YJ-1 (C-101). The development was completed in the early 1990s but the missile did not enter service.
- **HY-4:** The HY-4 development of the C-201 is a mid-range ground-, air-, and ship-launched cruise missile. Development of the C-201 HY-4 is believed to have started in the mid-1970s, replacing the C-201 HY-2 liquid propellant sustainer motor with a small turbojet engine, and adding a monopulse active radar seeker. Apart from the substitution of the turbojet engine, the overall configuration of the HY-4 variant of the C-201 missile is similar to the HY-2 variants of the C-201, with two delta wings and tri-form rudder and tail. The missile has a radar altimeter which allows the cruise height to be varied between 70 and 200 m altitude, followed by a steep dive onto the target. The air-launched version is designated as C-401
- **FL-1:** The FL-1 (NATO designation CSS-NX-1) was a SY-1 with a high-frequency monopulse seeker. It used a radar altimeter to cruise at 30 metres.
- **FL-2:** The FL-2 anti-ship missiles was the land-based derivative of the SY-2. It was produced at the Nanchang Aircraft Factory
- **SFQ-1:** SFQ-1 was an unarmed test vehicle derivative of the Silkworm missile family. The test vehicle was used in the Chinese development of small turbojets that were designed to improve the range of the Chinese anti-ship cruise missiles, as well as powering the experimental versions of land attack YJ-4 cruise missiles. The entire project was reportedly named as Kunpeng (□□) Project, which first started in the early 1970s. SFQ-1 was specifically developed to test mini turbojet engines WP-11 and FW-41, the Chinese reverse engineered western turojet engines for UAVs and missiles.
- **YJ-4:** SFQ-1 was an unarmed test vehicle derivative of the Silkworm missile family. The test vehicle was used in the Chinese development of small turbojets that were designed to improve the range of the Chinese anti-ship cruise missiles, as well as powering the experimental versions of land attack YJ-4 cruise missiles. The entire project was reportedly named as Kunpeng (□□) Project, which first started in the early 1970s. SFQ-1 was specifically developed to test mini turbojet engines WP-11 and FW-41, the Chinese reverse engineered western turojet engines for UAVs and missiles.

- **YJ-4:** YJ-4 is a family of experimental land-attack cruise missiles developed by China in the 1970s and early 1980s. Due to the limitation of Chinese industrial and technological bottleneck at the time, the YJ-4 only entered the Chinese services in extremely limited numbers, mainly serving as a foundation for more successful Chinese cruise missiles developed later, such as Changfeng missile. Two versions of YJ-4 family were developed: YJ-4I, which is also frequently but erroneously referred as YJ-41, and YJ-4II, which is also frequently but erroneously referred as YJ-42. The two missiles only differed in their respective powerplant, YJ-4I was equipped with WP-11, the Chinese version of Turbomeca Marboré, while the longer ranged YJ-4II was equipped with an engine that was twice as powerful, FW-41, the Chinese version of Teledyne CAE J69, reversed engineered from downed American Ryan Firebee.
- **XW-41:** A developed version based on HY-4, known as the XW-41, has been developed. This latest version of the C-201 missile family is said to have a 300 km range with additional GPS/GLONASS guidance. However, due to the availability of more advanced anti-ship missile with similar range, such as the C-602, the future of XW-41, like others in the Silkworm missile family, is uncertain despite its successful trials. Although still a member of Silkworm missile, the developer considers the missile was different enough to be a listed as a separate category of its own due to the amount of new technologies adopted. After the Gulf War, United Arab Emirates ordered 30 of these shore-based version for coastal defense, and accordingly to Jane's Defence Weekly, these missiles are referred by the general name Silkworm missiles, but domestic Chinese sources have claimed that these were XW-41s, though there are reports claiming these missiles are other models of Silkworm series.
- **C-611:** Upgraded version of C-601 and other earlier models of the air-to-surface missiles of Silkworm family. Not all upgrades are necessarily the same due to difference between various versions, but electronics for all versions are upgraded to the latest standard. The seeker of the missile is modernized to include semi-active radar homing and passive homing capability, and the missile can be used against coastal ground targets. Cruise altitude is decreased while the range is increased.
- **YJ-63 (C-603):** XW-41 and its predecessor HY-4 lost their intended market when the wars in middle east ended, so XW-41 was converted to the first indigenously developed air-to-surface precision strike missile. The developmental work begun in the mid-1990s when Sea Eagle Mechanical-Electrical Research Academy (□□□□□□□□□) received support of Chinese military and the project was completed in 2002. The resulting new missile was named as YJ-63, also known as C-603. In comparison to XW-41, the original radar guidance was changed to TV guidance. The original inverted Y-configuration of tail control surfaces was changed to X-configuration. Like its predecessor, XW-41, turbojet engine was adopted instead of liquid fuel rocket engine used on HY-2. Range is 500km.[
- **KD-63:** Newest version of YJ-63 series that entered service in 2004 - 2005. This land attack version is almost identical to C-603 in appearance, except it has a solid nose instead of a window for TV guidance optronics. The solid nose indicates that the guidance of this air-to-surface missile adopts other means of guidance such as radar, but the exact type remain unknown.

YJ-6 Chinese Air-to-Surface Missile

↳*System*

Name: YJ-6
Type: Air-to-Surface Missile
Basic Load: INA
Manufactuer: Nanchang Aircraft Factory (Chinese)
Length: 7.48 m
Diameter: 0.76 m
Wingspan: 2.4 m
Warhead Type: Shaped charge high explosive
Warhead Weight: 513 kg
Weight, Total: 2,095 kg
Propulsion: One liquid rocket engine and one solid rocket booster
Speed: Mach 0.8
Range: 200 km
Cruising Altitude: < 20 metres

Guidanc System: Inertial guidance + active conical scanning terminal guidance radar (SY-1); or inertial + active monopulse radar (SY-1A)

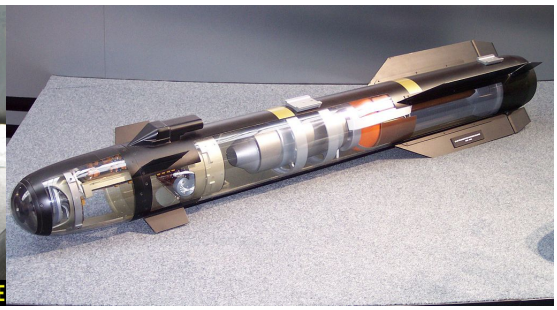
Single-Shot Kill Probability: 90%

Notes:

YJ-6: Air launched variant of the HY-2. The HY-2 is identical to the HY-1 but with a further stretched body. The missile features a round nose accommodating the radar seeker, a pair of mid-mounted delta wings on the middle section of missile body, and three tail control surfaces. The missile is powered by a liquid-fuel rocket motor, with a solid rocket booster attached under the missile fuselage. The HY-2 is launched from land-based launcher and flies at an altitude of 1000 m during the initial stage of the flight. After the missile switched to the cruising mode, the flight altitude was reduced to 100 ~ 300 m. During the final stage of the flight, the missile switched on its radar seeker and dives to an altitude of 8 m until it hits the target. The single-shot hit probability is estimated to be 90%. Due to its oversized body, the HY-2 did not develop a ship-to-ship variant. The missile is obsolete and will be replaced by the YJ-8 series in the future. The HY-2 was widely exported to the Middle East, and was the missile most associated with the silkworm nickname.

AGM-114 Hellfire American Anti-Tank Guided Missile (ATGM)





Tiers:



Variants:

- **AGM-114A/B/C/D/E/F/G/H/J/K/L/M/N/P/Q/R/S/T/M36/R9X:** AGM-114A Basic Hellfire Target: Tanks, armored vehicles: Range: 8,700 yd (8,000 m), Guidance: Semi-active laser homing (SALH). Warhead: 18 lb (8 kg) shaped charge HEAT. Length: 64 in (163 cm) Weight: 99 lb (45 kg)// AGM-114B/C Basic Hellfire M120E1 low smoke motor.// AGM-114B has electronic SAD (Safe/Arming Device) for safe shipboard use. Unit cost: $25,000.// AGM-114D/E Basic Hellfire, Proposed upgrade of AGM-114B/C with digital autopilot—not built.// AGM-114F Interim Hellfire,Target: Tanks, armored vehicles, Range: 7,700 yd (7,000 m), Guidance: Semi-active laser homing. Warhead: 20 lb (9 kg) tandem shaped charge HEAT. Length: 71 in (180 cm) Weight: 107 lb (48.5 kg).// AGM-114G Interim Hellfire Proposed version of AGM-114F with SAD—not built// AGM-114H Interim Hellfire Proposed upgrade of AGM-114F with digital autopilot—not built.// AGM-114J Hellfire II Proposed version of AGM-114F with lighter components, shorter airframe, and increased range—not built. Hellfire II missile exposed through a transparent casing, showing laser homing guidance system in front, copper cone explosively formed penetrator (EFP) in shaped charge explosive in middle, propulsion in rear.// AGM-114K Hellfire II Target: All armored threats Range: 8,700 yd (8,000 m) Guidance: Semi-active laser homing with electro-optical countermeasures hardening, Digital autopilot improvements allow target reacquisition after lost laser lock New electronic SAD Warhead: 20 lb (9 kg) tandem shaped charge HEAT Length: 64 in (163 cm) Weight: 100 lb (45.4 kg) Unit cost: $65,000. Essentially the proposed AGM-114J w/ SAD.// AGM-114L Longbow Hellfire Target: All armored threats Range: 8,700 yd (8,000 m) Guidance: o Fire and forget millimeter wave radar seeker coupled with inertial guidance. Homing capability in adverse weather and the presence of battlefield obscurants Warhead: 20 lb (9 kg) tandem shaped charge high explosive anti-tank (HEAT) Length: 69 in (176 cm) Weight: 108 lb (49 kg).// AGM-114M Hellfire II Target: Bunkers, light vehicles, urban (soft) targets and caves Range: 8,700 yd (8,000 m) Guidance: Semi-active laser homing Warhead: Blast fragmentation/incendiary Weight: 106 lb (48.2 kg)) Length: 64 in (163 cm).// AGM-114N Hellfire II Target: Enclosures, ships, urban targets, air defense units Range: 8,700 yd (8,000 m) Guidance: o Semi-active laser homing Warhead: Metal augmented charge (MAC) (Thermobaric) Weight: 106 lb (48 kg) Length: 64 in (163 cm).// AGM-114P Hellfire II Version of AGM-114K optimized for use from UCAVs flying at high altitude.// ATM-114Q Hellfire II . Practice version of AGM-114N with inert warhead.// AGM-114R Hellfire II (Hellfire Romeo) Target: All Target Types , Range: 8,700 yd (8,000 m) Guidance: Semi-active laser homing. Warhead: Multi-function warhead, Weight: 110 lb (50 kg) Speed: Mach 1.3 Unit Cost: $99,600 (All-Up Round, 2015 USD).// AGM-114S Hellfire II Practice version of AGM-114K with a spotting charge instead of a warhead.// AGM-114T Hellfire II AGM-114R with insensitive munition rocket motor and electromagnetic control actuators.// M36 Captive Flight Training Missile The M36 is an inert device used for training the handling of the Hellfire. It includes an operational laser seeker.// AGM-114R9X The Hellfire R9X is a Hellfire variant that utilizes a kinetic warhead with pop-out blades, intended to reduce collateral damage when targeting specific individuals. Deployed in secret in 2017, its existence has been public since 2019. This variant was used in the killing of Jamal Ahmad Mohammad Al Badawi, accused mastermind of the 2000 USS Cole bombing, Abu Khayr al-Masri, a member of al Qaeda's leadership. The weapon has also been used in Syria and in Afghanistan, the latter gainst a commander in the Taliban.

System

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AGM-114 Hellfire Anti-Tank Guided Missile

Name: AGM-114 Hellfire

Type: Air-to-Surface

Manufacturer: Northrop Grumman, Lockheed Martin, Boeing, United States of America

Length: 1.6m

Diameter: 180mm

Missile Weight: 45-49kg

Minimum Range: 499m

Maximum Range: 11,008m

Missile Velocity: 1601 km/h

Armor Penetration: INA

Warhead Type: High-explosive anti-tank (HEAT); 9.1 kg tandem anti-armor. Metal augmented charge (MAC); 8.2 kg shaped charge Blast fragmentation

Guidance: Semi-active laser homing millimeter wave radar seeker

Enginie: Solid-fuel rocket

Proliferation: Australia// Croatia// Egypt// France// Greece// India// Indonesia// Iraq// Israel// Italy// Jordan// Japan// Kuwait// Lebanon// Netherlands// Norway// Pakistan// Qatar// South Korea// Saudi Arabia// Singapore Spain// Sweden// Taiwan (Republic of China)// Tunisia// Turkey// United Arab Emirates// United Kingdom// United States

Notes:

"The AGM-114 Hellfire is an air-to-surface missile (ASM) first developed for anti-armor use, but later models were developed for precision drone strikes against other target types, and have been used in a number of targeted killings of high-profile individuals. It was originally developed under the name Heliborne, Laser, Fire and Forget Missile, which led to the colloquial name "Hellfire" ultimately becoming the missile's formal name. It has multi-mission, multi-target precision-strike ability, and can be launched from multiple air, sea, and ground platforms, including the Predator drone. The Hellfire missile is the primary 100-pound (45 kg) class air-to-ground precision weapon for the armed forces of the United States and many other nations. The Hellfire can be fired from rotary- and fixed-wing aircraft, waterborne vessels and land-based systems against a variety of targets. Most variants are laser guided, with one variant, the AGM-114L "Longbow Hellfire", being radar guided.Laser guidance can be provided either from the launcher, such as the nose-mounted opto-electronics of the AH-64 Apache attack helicopter, other airborne target designators or from ground-based observers, the latter two options allowing the launcher to break line of sight with the target and seek cover. Cockpit video showing a Hellfire missile being fired at two people in Afghanistan. The development of the Hellfire Missile System began in 1974 with the U.S. Army requirement for a "tank-buster", launched from helicopters to defeat armored fighting vehicles. Production of the AGM-114A started in 1982. The Hellfire II, developed in the early 1990s is a modular missile system with several variants. Hellfire II's semi-active laser variants—AGM-114K high-explosive anti-tank (HEAT), AGM-114KII with external blast fragmentation sleeve, AGM-114M (blast fragmentation), and AGM-114N metal augmented charge (MAC)—achieve pinpoint accuracy by homing in on a reflected laser beam aimed at the target. Predator and Reaper UCAVs carry the Hellfire II, but the most common platform is the AH-64 Apache helicopter gunship, which can carry up to 16 of the missiles at once. The AGM-114L, or Longbow Hellfire, is a fire-and-forget weapon: equipped with a millimeter wave (MMW) radar seeker, it requires no further guidance after launch—even being able to lock-on to its target after launch—and can hit its target without the launcher or other friendly unit being in line of sight of the target. It also works in adverse weather and battlefield obscurants, such as smoke and fog which can mask the position of a target or prevent a designating laser from forming a detectable reflection. Each Hellfire weighs 104 pounds (47 kg), including the 20 pounds (9 kg) warhead, and has a range of 4.4–6.8 miles (7.1–11 km) depending on trajectory.The AGM-114R "Romeo" Hellfire II entered service in late 2012. It uses a semi-active laser homing guidance system and a K-charge multipurpose warhead to engage targets that previously needed multiple Hellfire variants. It will replace AGM-114K, M, N, and P variants in U.S. service.In October 2012, the U.S. ordered 24,000 Hellfire II missiles, for both the U.S. armed forces and foreign customers. The Joint Common Missile (JCM) was to replace Hellfire II (along with the AGM-65 Maverick) by around 2011. The JCM was developed with a tri-mode seeker and a multi-purpose warhead that would combine the capabilities of the several Hellfire variants. In the budget for FY2006, the U.S. Department of Defense canceled a number of projects that they felt no longer warranted continuation based on their cost effectiveness, including the JCM. A possible new JCM successor called the Joint Air to Ground Missile (JAGM) is under consideration. Due to budget reductions, JAGM development was separated into increments, with Increment 1 focusing on adding a millimeter wave radar to the Hellfire-R to give it a dual-mode seeker, enabling it to track moving targets in bad

weather."

Kh-23 Grom (AS-7 Kerry) Russian Air-to-Surface Missile





Tiers:



Variants:

- **Kh-66:** the original beam-riding missile based on the K-8
- **Kh-23:** First command-guidance version with improved propellant
- **Kh-23M:** improved Kh-23 with technology from the Kh-25 family
- **Kh-23L:** Western name for a laser-guided version that in fact was the baseline Kh-25 (AS-10 'Karen')
- **A921:** Version made in Romania
- **Grom (Grom 02):** Yugoslav version that appeared in the 1980s. This should not be confused with the Polish SAM
- **Grom-B (Grom 2):** TV-guided version from Serbia's Vojno-Tehnički Institut in the mid-late 1990s; uses seeker based on that of AGM-65B Maverick

System

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↳*Kh-23 Grom Air-to-Air Missile*

Name: Kh-23 Grom; NATO: A S-7 Kerry
Type: Air-to-Air Missile
Manufacturer: Zvezda-Strela
Length: 3.525 m
Diameter: 27.5 cm
Wingspan: 78.5 cm
Weight: 287 kg
Warhead Weight: 111 kg
Engine: Solid fuel rocket
Operational Range: 2–10 km
Maximum Speed: 2,160–2,700 km/h
Guidance System: Radio command guidance
Launch Platforms: MiG-21PFM, MiG-23, MiG-27, Su-17M3/20/22/22M3/M4,

Notes:

The Zvezda Kh-66 and Kh-23 Grom (Russian: Х-23 Гром 'Thunder'; NATO:AS-7 'Kerry') are a family of early Soviet tactical air-to-surface missiles with a range of 10 km. They were intended for use against small ground or naval targets. The Kh-66 was effectively a heavy-warhead, beam-riding version of the K-8 (AA-3 'Anab') air-to-air missile rushed into service in Vietnam in 1968. The Kh-23 was an improved Kh-66 with command-guidance, similar to the AGM-12 Bullpup. The Kh-66 used the airframe of the Kaliningrad K-8 (AA-3 'Anab') air-to-air missile, with the nozzle split to make room for the antenna of the beam-riding guidance system of the Kaliningrad K-5 (AA-1 'Alkali'). It has cruciform control fins on the nose, and four clipped-tip delta-wings at the rear with elevators for control. Work on air-to-air missiles had started at the Kaliningrad Engineering Plant (then known as Plant #455, and later merged into Zvezda-Strela) in 1955. This had resulted in the Kaliningrad K-5 (AA-1 'Alkali') family of beam-guided missiles, including the K-51 (RS-2-US) carried by the Su-9 'Fishpot'. OKB-4 Molniya (later Vympel NPO) under Matus Bisnovat would go on to produce missiles such as the AA-6 Acrid. Meanwhile, in 1963 the RS-2-US was tested as an air-to-surface missile. It was concluded that the small warhead and inaccurate guidance made such an application "pointless". However, in 1965 North Vietnam requested an air-to-surface missile from the Soviet government; the AGM-12 Bullpup had entered service with the US Air Force before the start of the Vietnam War. In April 1965 OKB-134 (later NPO Vympel) started work on this missile under the project name Kh-23, but they had problems developing a guidance system that would work with existing aircraft. As a result, Yurii N. Korolyov came up with his own proposals based on the earlier experiments with the RS-2-US. A design bureau to develop the RS-2-US for surface targets was set up under Korolyov by decree #100 of 12 March 1966 of the Ministry of the Aircraft Industry; this bureau would become the Zvezda OKB in 1976. The resulting weapon used the body of a K-8 (AA-3 'Anab') K-5 guidance and propulsion systems but increased the warhead from 13 kg (29 lb) to 100 kg (220 lb). This had the big advantage of allowing the new weapon to be fitted to any aircraft capable of firing the K-5. Design began in 1966, so the project was known as Kh-66 or Izdeliye 66 ('Article 66'). The Kh-66 was a beam-riding weapon that was tested on a MiG-21PFM and entered production in 1968 for that aircraft. The Kh-66 was only an interim solution as it required the launch aircraft to dive towards the target to maintain lock on the target. Flight testing of the Kh-66 began in 1967 and it entered service on 20 June 1968.

→→Anti-Ship Missiles

YJ-8/C-802 (NATO: CSS-N-4 Sardine) Chinese Anti-Ship Missile



Tiers:



Variants:

- **YJ-8:** YJ-8: Basic version with fixed wings
- **YJ-8A:** YJ-8A: Modified YJ-8 with folding wings
- **YJ-81:** YJ-81: Air-launched version without the booster.
- **YJ-82:** YJ-82: Submarine-launched version.
- **C-801:** C-801: Export version of YJ-8.
- **C-801K:** C-801K: Export version of the YJ-81.
- **C-801Q:** C-801Q: Export version of YJ-82.

System

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YJ-8/C-802 (NATO: CSS-N-4 Sardine) Chinese Anti-Ship Missile

↳***Missile***

Name: YJ-8/C-802 (NATO: CSS-N-4 Sardine)
Type: Anti-Ship & Air-to-Surface Missiles
Manufactuer: China Aerospace Science and Industry Corporation
In Service: 1980s-Present
Length: m5.81
Width: INA
Weight: kg815
Warhead Type: High-explosive fragmentation
Warhead Weight: kg165
Engine: Rocket
Propellant: Solid Rocket

Operational Range: km42

Flight Altitude: m5-7

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: ea2

Notes:

The YJ-8 (Chinese: □□-8; pinyin: yingji-8; literally: 'eagle strike 8'; NATO reporting name: CSS-N-4 Sardine) is a Chinese surface-launched subsonic anti-ship cruise missile. It is manufactured by the China Aerospace Science and Industry Corporation (CASIC) Third Academy. The YJ-8 was developed into air-launched (YJ-81) and submarine-launched (YJ-82) variants. The YJ-8 is either based on, or is a heavily modified copy of, the MM38 Exocet; the two missiles share virtually identical operational profiles. The replication of the MM38's "revolutionary flight profile" in less than ten years and with an immature industrial base strongly suggests that China had access to proven technology.[4] The YJ-8 was a "radical departure" from China's first anti-ship missiles derived from the P-15 Termit. The YJ-8 carried a smaller warhead, but had the same range and speed while being significantly smaller and lighter. The development of the YJ-8 was approved in late-1976 following a few years of encouraging work on solid-fuel rockets. According to a 1991 Aerospace China article, development of the missile's engine began in 1978, and flight testing was completed in 1985. The YJ-8 reach initial operating capability in the People's Liberation Army Navy in 1987, the same year the export version—the C-801—was announced. CASIC received the first National Science and Technology Advancement Award for development of the YJ-8 in 1988.

AGM-84 (Harpoon) American Anti-Ship Missile







Tiers:



Variants:

- **Harpoon Block 1D:** This version featured a larger fuel tank and re-attack capability, but was not produced in large numbers because its intended mission (warfare with the Warsaw Pact countries of Eastern Europe) was considered to be unlikely following the Dissolution of the Soviet Union. Range is 278 kilometres (173 mi). Block 1D missiles were designated RGM/AGM-84F.
- **SLAM ATA (Block 1G):** This version, under development, gives the SLAM a re-attack capability, as well as an image comparison capability similar to the Tomahawk cruise missile; that is, the weapon can compare the target scene in front of it with an image stored in its on-board computer during terminal phase target acquisition and lock on (this is known as DSMAC). Block 1G missiles AGM/RGM/UGM-84G; the original SLAM-ER missiles were designated AGM-84H (2000-2002) and later ones the AGM-84K (2002 onwards)
- **Harpoon Block 1J:** Block 1J was a proposal for a further upgrade, AGM/RGM/UGM-84J Harpoon (or Harpoon 2000), for use against both ship and land targets.
- **Harpoon Block II:** In production at Boeing facilities in Saint Charles, Missouri, is the Harpoon Block II, intended to offer an expanded engagement envelope, enhanced resistance to electronic countermeasures and improved targeting. Specifically, the Harpoon was initially designed as an open-ocean weapon. The Block II missiles continue progress begun with Block IE, and the Block II missile provides the Harpoon with a littoral-water anti-ship capability.
- **Harpoon Block III:** Harpoon Block III was intended to be an upgrade package to the existing USN Block 1C missiles and Command Launch Systems (CLS) for guided missile cruisers, guided missile destroyers, and the F/A-18E/F Super Hornet fighter aircraft. After experiencing an increase in the scope of required government ship integration, test and evaluation, and a delay in development of a data-link, the Harpoon Block III program was canceled by the U.S. Navy in April 2009.
- **Harpoon Block II+ ER:** In April 2015, Boeing unveiled a modified version of the RGM-84 it called the Harpoon Next Generation. It increases the ship-launched Harpoon missile's range from the Block II's 70 nmi (81 mi; 130 km) to 167.5 nmi (192.8 mi; 310.2 km), along with a new lighter 300 lb (140 kg) warhead and a more fuel-efficient engine with electronic fuel controls. Boeing offered the missile as the U.S. Navy's Littoral Combat Ship frigate upgrade over-the-horizon anti-ship missile as a cost-effective missile upgrade option; complete Next Gen Harpoons would cost approximately as much as a Block II at $1.2 million each, with upgrades for an existing missile costing half that.

System

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AGM-84 (Harpoon) American Anti-Ship Missile

↳***Missile***

Name: AGM-84 (Harpoon)
Manufacturer: McDonnell Douglas Boeing Defense, Space & Security
Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)
Diameter: 13.5 in (34 cm)
Wingspan: 3 ft (0.91 m)
Weight: 1,523 lb (691 kg) with booster
Warhead: 488 pounds (221 kg)
Detonation Mechanism: Impact Fuze
Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust
Operational Range: In excess of 150 nmi (280 km) depending on launch platform
Flight Altitude: Sea-skimming
Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)
Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing
Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

Notes:

The Harpoon is an all-weather, over-the-horizon, anti-ship missile, developed and manufactured by McDonnell Douglas (now Boeing Defense, Space & Security). The Standoff Land Attack Missile (SLAM) is a land-attack variant. The regular Harpoon uses active radar homing and flies just above the water to evade defenses. The missile can be launched from: * Fixed-wing aircraft (the AGM-84, without the solid-fuel rocket booster) * Surface ships (the RGM-84, fitted with a solid-fuel rocket booster that detaches when expended, to allow the missile's main turbojet to maintain flight) * Submarines (the UGM-84, fitted with a solid-fuel rocket booster and encapsulated in a container to enable submerged launch through a torpedo tube); * Coastal defense batteries, from which it would be fired with a solid-fuel rocket booster. In 1965 the United States Navy began studies for a missile in the 45 kilometres (24 nmi) range class for use against surfaced submarines. The name Harpoon was assigned to the project. The sinking of the Israeli destroyer Eilat in 1967 by a Soviet-built Styx anti-ship missile shocked senior United States Navy officers, who until then had not been conscious of the threat posed by anti-ship missiles. In 1970 Chief of Naval Operations Admiral Elmo Zumwalt accelerated the development of Harpoon as part of his "Project Sixty" initiative, hoping to add much-needed striking power to U.S. surface warships such as theTiconderoga-class cruiser.[citation needed] The first Harpoon was delivered in 1977; in 2004, Boeing delivered the 7,000th. The Harpoon has also been adapted for carriage on several aircraft, including the P-3 Orion, the P-8 Poseidon, the AV-8B Harrier II, the F/A-18 Hornet and the U.S. Air Force B-52H bombers. The Harpoon was purchased by many American allies, including India, Japan, Singapore, South Korea, Taiwan, the United Arab Emirates and most NATO countries. The Royal Australian Air Force can fire AGM-84-series missiles from its F/A-18F Super Hornets, F/A-18A/B Hornets, and AP-3C Orion aircraft, and previously from the now retired F-111C/Gs. The Royal Australian Navy deploys the Harpoon on major surface combatants and in the Collins-class submarines. The Spanish Air Force and the Chilean Navy are also AGM-84D customers, and they deploy the missiles on surface ships, and F/A-18s, F-16s, and P-3 Orion aircraft. The British Royal Navy deploys the Harpoon on several types of surface ships. The Royal Canadian Navy carries Harpoon missiles on its Halifax-class frigates. The Royal New Zealand Air Force is looking at adding the capability of carrying a stand-off missile, probably Harpoon or AGM-65 Maverick, on its six P-3 Orion patrol planes once they have all been upgraded to P3K2 standard.[citation needed] The Republic of Singapore Air Force also operates five modified Fokker 50 Maritime Patrol Aircraft (MPA) which are fitted with the sensors needed to fire the Harpoon missile. The Pakistani Navy carries the Harpoon missile on its frigates and P-3C Orions. The Turkish Navy carries Harpoons on surface warships and Type 209 submarines. The Turkish Air Force will be armed with the SLAM-ER. At least 339 Harpoon missiles were sold to the Republic of China Air Force (Taiwan) for its F-16 A/B Block 20 fleet and the Taiwanese Navy, which operates four guided-missile destroyers and eight guided-missile frigates with the capability of carrying the Harpoon, including the eight former U.S. Navy Knox-class frigates and

the four former USN Kidd-class destroyers which have been sold to Taiwan. The two Zwaardvis/Hai Lung submarines and 12 P-3C Orion aircraft can also use the missile. The eight Cheng Kung-class frigates, despite being based on the US Oliver Hazard Perry class, have Harpoon capabilities deleted from their combat systems, and funding to restore it has so far been denied. The Block 1 missiles were designated AGM/RGM/UGM-84A in US service and UGM-84B in the UK. Block 1B standard missiles were designated AGM/RGM/UGM-84C, Block 1C missiles were designated AGM/RGM/UGM-84D. Block 1 used a terminal attack mode that included a pop-up to approximately 1,800 metres (5,900 ft) before diving on the target; Block 1B omitted the terminal pop-up; and Block 1C provided a selectable terminal attack mode.

Kh-31A Russian Anti-Ship Missile







Tiers:



Variants:

- **Kh-31A:** active seeker head for use as an anti-ship missile against vessels up to destroyer size, range of 25 km–103 km (13.5–55.6 nmi). Missile is sea-skimming as it approaches the target.
- **Kh-31P:** Type 77P) - passive seeker head for use as an anti-radiation missile. Stays at high altitude throughout its flight, allowing higher speeds and increasing range to 110 km (60 nmi; 70 mi). The seeker has three interchangeable modules to cover different radar frequency bands, but they can only be changed at the factory.
- **Kh-31AD/Kh-31PD ("Kh-31 Mod 2"):** increase range through increasing the fuselage from 4.70 m (15 ft 5 in) to 5.3 m (17 ft 5 in) long.[18] As of 2012, the Kh-31PD is serially produced. Kh-31AD is in series production since 2013.
- **Kh-31PK:** installed non-contact fuse, maximum speed 900 m/s, range 120–160 km. Destined for Su-27SM, Su-30MK, Su-35. In serial production since 2009.
- **MA-31:** telemetry and other systems installed by McDonnell Douglas/Boeing for use by the US Navy as a target drone. Tested between 1996-2007; a version upgraded with GPS, the MA-31PG, was offered to the Navy as a replacement for the MQM-8 Vandal but they bought the GQM-163 Coyote. Even with the additional equipment, the MA-31 was capable of Mach 2.7 and 15G manoeuvres in its anti-ship (sea-skimming) flight profile and Mach 3.5 in ARM mode at 48,000 ft (15,000 m).
- **KR-1:** version of the Kh-31P exported to China in 1997. It seems that Zvezda wanted to sell an initial batch of KR-1's to China, before the KR-1 went into production in China. Rather than the original three seeker modules, the KR-1 has a single K-112E "export" seeker targeting D-F band (S band) emissions, and reportedly optimised for specific Taiwanese radars.
- **YJ-91:** Ying Ji 91 - Chinese missile based on the Kh-31P.[citation needed] They are also reported to have developed an anti-shipping version with an indigenous active seeker, and are looking to develop this for use in submarines. The name YJ-91 was already in use by 1997, and may have been a Chinese name for the original Russian missiles designated X-31 by the Russians. By 2005, the name YJ-93 was being applied to missiles made in China, but Western reports generally do not distinguish between YJ-91 and YJ-93.
- **Note:** An active/passive air-to-air version for use against slow-moving support aircraft, a so-called "AWACS killer", was announced at the 1992 Moscow air show with 200 km (110 nmi; 120 mi) range. That would be less than the 300–400 kilometres (160–220 nmi; 190–250 mi) promised by the Vympel R-37 (AA-13 'Arrow') and Novator R-172 missiles, but a Kh-31 derivative could be carried by a wider range of aircraft. However this may have been mere propaganda; in 2004 the Tactical Missiles Corporation "emphatically denied" that it had ever worked on an air-to-air version of the Kh-31. In 2005 rumours persisted of a Russian AWACS killer based on the Kh-31A anti-shipping model, and of the Chinese adapting the YJ-91, derived from the Kh-31P, for the same purpose.

System

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KH-31 (AS-17 Krypton) Russian Air-to-Surface Missile

↳***Missile***

Name: KH-31A
Type: Medium-range Anti-Ship Missile
Basic Load: INA
Manufacturer: Tactical Missiles Corporation (Zvezda-Strela before 2002)
Length: Mod 1 : 4.700 m (15 ft 5.0 in)[3] Mod 2 (AD/PD) : 5.3 m (17 ft 5 in)
Diameter: 360 mm
Weight: Kh-31A :610 kg (1,340 lb) Kh-31P :600 kg (1,320 lb)
Warhead: HE shaped charge
Detonation Mechanism: Impact
Warhead Weight: Kh-31A :94 kg (207 lb) Kh-31P :87 kg (192 lb
Engine: Solid fuel rocket in initial stage, ramjet for rest of trajectory
Wingspan: mm914
Propellant: Kerosene
Operational Range: Kh-31A: 25 km–103 km (13.5–55.6 nmi; Kh-31P: up to 110 km (60 nmi; 70 mi)
Speed: Kh-31A/P: 2,160–2,520 km/h (1,340–1,570 mph) MA-31: Mach 2.7 (low), Mach 3.5 (high)
Guidance System: Kh-31A: inertial guidance with active radar homing Kh-31P: inertial with passive radar
Launch Platform: Both : Su-27SM, Su-30MKI, Su-25, Su-34, Su-35, MiG-29M, HAL Tejas Mk1 and Mk2, MiG-29K Kh-31A only : Su-33 Also : Su-24M
Note: Missile is sea-skimming as it approaches the target.

Notes:

Kh-31A - active seeker head for use as an anti-ship missile against vessels up to destroyer size, range of 25 km–103 km (13.5–55.6 nmi). Missile is sea-skimming as it approaches the target. The Kh-31A is a variant of the KH-31 (AS-17 Krypton) New air defense weapon systems of the American Patriot kind have raised the requirements which antiradar missiles must meet. These include first of all higher speed and longer range, then also high interference immunity and radar turn-off when attacked. For the special purpose of meeting these requirements, the "Zvezda" group under the direction of V. Bugayskiy began in 1977 working on the Kh-31 missile (Article) 77P). The first launchings of this missile took place in 1982. The most interesting component of the Kh-31P is its dual propulsion system designed by the "Soyuz" Design Bureau in Turayevo near Moscow (note: there are several "Soyuz" engineering groups in Russia). First the missile is accelerated by its solid-fuel rocket engine to a speed of Mach 1.8, then the engine is discarded and the interior of the missile is converted into the combustion chamber of the missile's jet engine. The latter accelerates the missile to a speed of almost Mach 4.5, while four air intake holes on the sides of the missile body open up. On the basis of the Kh-31P antiradar missile were developed the Kh-31A missile (Article 77A) with an active-radar guidance head and also an M-31 flying target for air defense training exercises. The Kh-31 was for the first time publicly displayed in November 1991, in Dubai (United Arab Emirates). The State Scientific Production Center Zvezda-Strela has upgraded the air-to-surface supersonic ASM Kh-31A NATO: AS-17 Krypton). Recently a variant of the air-to-air class based on the Kh-31 was made available, equipped with a hybrid active-passive guidance head for use against nonmaneuvering airborne

targets such as AWACS (passive guidance) from far distances. The range of this missile is 200 km. The unofficial designation of this missile is 'mini-Moskit'. The Kh-31A missile has been developed from the technologies of the 1970-80s. The improved version of the KH-31PM, a missile that is already very well known in the US Navy, was deployed in 2015. The KH-31 was a missile that the American fleet bought from Russia in the 1990s as a target missile for developing ships' anti-aircraft systems. The Americans used the KH-31PM to learn how to hit the Chinese 3M-54 Moskit anti-ship missiles, which had been produced by Russia. In the West the Moskit is codenamed “Sunburn”, due to its speed of over 1,700 mph and its destructive potential. The KH-31, which is very similar to the Moskit, is smaller and cheaper and is used for destroying above-water targets, radar stations and anti-aircraft missile complexes such as the Patriot. It can be installed in all types of Russian destroyers and bombers. The new KH-31PM has an increased range of 160 miles. It also has a new guidance system and engine, which make its flight more unpredictable and deadlier for the adversary. For example, the missile is equipped with the broadband guidance head, which can be used against practically all anti-aircraft systems. The earlier missiles were equipped with selective heads, which could only be used against one type of system.

AS15TT French Anti-Ship Guided Missile



Tiers:

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System

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↳ ***AS15TT Anti-Ship Missile***

Name: AS15TT Anti-Ship Missile
Type: Anti-Ship Missile
Length: 2.30 m
Diameter: 190 mm
Wingspan: 0.56 m
Warhead: 30 kg derived from OP3C APHE
Fuze: impact
Weight: 98 kg
Maximum Range: 15 km
Maximum Speed: 1,007 kph
Flight Altitude: Sea-Skimming
Guidance System: SACLOS by Thomson-CSF Agrion 15 chin-mounted I/J-band radar
Basic Load: INA

Notes:

The AS.15 and AS.15TT (in French: "Tous Temps", meaning "All weather") are French anti-shipping missiles. It was developed as a replacement for the AS-12 missile. The missile consists of a long cylindrical main body ending in a pointed nose, with four fins arranged in a cruciform cross-section. Each fin has a pod on the tip containing either a radar receiver or a battery. From front to back the missile consists of the warhead and impact fuse and safety and arming mechanism. Next is the autopilot (EOP), altimeter, gyro, and radar receiver and a battery. Following that is the SNPE Acis CDB solid rocket sustainer motor, which exhausts through a small central nozzle. Behind the sustainer are the two solid rocket SNPE Anubis CMDB booster motors, which exhaust through two large nozzles. On the rear underside of the missile is a radar altimeter. On the rear of the missile are four inline control fins. The guidance system of the missile is actually command guidance, as the missile doesn't have its

own radar. It only follows orders provided by the onboard radar of the carrier/launcher helicopter, the Thomson-CSF I/J-band "Agrion 15". When this radar detects and identifies a suitable target, it switches to automatic tracking mode. Once the target is inside the missiles range it launches, the booster motors accelerate the missile to its cruise speed of 280 meters per second, after which the sustainer motor cuts in. The missile immediately begins descending to an altitude of around 3 to 5 meters.The rocket motors have a combined burn time of around 45 seconds. Bearing corrections are transmitted to the missile via the Agrion 15 radar and are picked up by the rearward-facing receiver units in two of the wing pods. The directional nature of the receivers makes jamming the command link difficult. On final approach to the target (about 1000 ft remaining to target), the missile descends to an altitude of around two meters. Its powerful warhead is able to perforate a 40 millimetres (1.6 in) thick steel armoured hull. The Agrion 15 radar is capable of detecting a large ship at a range of 150 kilometres (93 mi) and a smaller attack boat at a range of 100 kilometres (62 mi).

YJ-91 Chinese Anti-Ship Missile



Tiers:



Variants:

- **YJ-91 Anti-Radiation Missile:** The anti-radiation version of the YJ-91 missile was developed from the Kh-31P, which uses a wide array of seekers to cover the entire radar frequency band. The Chinese were not satisfied with the requirement to include multiple seekers and preferred to have a single seeker capable of covering multiple frequency bands, like the AGM-88 HARM. However, such ambitions proved to be too great for the Chinese microelectronics industry. They could not achieve the goal in a single step within the required timeline originally specified by the Chinese military. Instead, a two-step approach was implemented: The completion of the development of a single seeker covering multiple frequency bands was pushed back, while a stopgap measure was adopted in the meantime. The Kh-31P was modified so that the seekers could be rapidly changed in the forward airstrips (providing the specialized tooling is available), so that missile would not need to be sent back to depots or factories to perform such operation. The resulting anti-radiation version of YJ-91 missile has a slightly increased the range to 120 km in comparison to 110 km of the original Kh-31P. In addition to a seeker that covers multiple frequency bands, additional measures to upgrade the missile are in development, such as, an open software architecture. Additional measures reportedly include prioritizing threats, which could be uploaded to the onboard computer from the ground or by the pilots while in flight. Threats could then be updated in real time. The multi-band seeker is of higher priority.
- **YJ-91 Anti-Ship Missile:** The Chinese have also developed an anti-ship version of the YJ-91 missile. However, this version is an indigenous development of the Chinese from the Kh-31P anti-radiation missile, and not from the Kh-31A anti-ship missile. China did not order any of the Kh-31A. The Chinese felt that the original Kh-31A could not fully satisfy their requirements, because the high-low trajectory of the missile meant early detection, thus it is prone to interception. In contrast, the low-low trajectory usually adopted by subsonic anti-ship missiles better uses the supersonic speed of Kh-31A. Such a trajectory shortens the detection range and the high-speed reduces the target's reaction time, once the missile is detected. As a result, China did not order any Kh-31A anti-ship missiles. The resulting anti-ship version of the YJ-91 is capable of sea-skimming. Its cruising altitude is no more than 20 metre above sea level. At the terminal attack stage (usually after the active radar seeker of the missile is turned on), the missile drops to 7 metre above sea level. This attack altitude can be further reduced to just 1.2 metre above sea level, when the sea state allows. Alternatively, the missile can be programmed to popup-and-dive like that the Boeing Harpoon. However, such sea-skimming capability comes at the expense of maximum range: in comparison to the original 70 km range of the Kh-31A, the maximum range of YJ-91 anti-ship missile was reduced by more than a quarter to 50 km. Like the anti-radiation version, it is reported that many planned upgrades are in development. An application for research grants to develop a submerged launched version of YJ-91 anti-ship missile once appeared on Chinese websites on the Internet, indicating China is attempting to develop a version for its submarine fleet.

System

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↳*YJ-91 Anti-Radiation Missile*

Name: YJ-91

Type: Anti-Ship Missile

Manufacturer: Hongdu Aviation Industry Corporation

Length: 4.7 m

Diameter: 0.3602 m

Weight: 0.6 ton

Warhead: 165 kg

Detonation Mechanism: Semi-armor-piercing and other

Engine: Ramjet

Propellant: Liquid fuel

Operational Range: 50-120 km

Maximum Speed: Mach 4.5

Cruising Altitude: Its cruising altitude is no more than 20 metre above sea level. At the terminal attack stage (usually after the active radar seeker of the missile is turned on), the missile drops to 7 metre above sea level. This attack altitude can be further reduced to just 1.2 metre above sea level, when the sea state allows.

Guidance System: ARH / PRH

Notes:

YJ-91 is the Chinese version of the Kh-31. YJ is short for Ying Ji (Yingji, □□) meaning eagle strike. After purchasing 200 Kh-31Ps from Russia, China decided to develop its own version, because the original Kh-31 missile did not fully satisfy Chinese requirements. The resulting YJ-91 missile was developed by Hongdu Aviation Industry Corporation, the same manufacturer of the Silkworm missile. The experience gained from YJ-91 also helped the engine development of another supersonic missile indigenously developed in China, YJ-12, which is sometimes confused by non-Chinese sources with the YJ-91, as both share the same origin for their propulsion systems. YJ-91 Anti-Ship Missile The Chinese have also developed an anti-ship version of the YJ-91 missile. However, this version is an indigenous development of the Chinese from the Kh-31P anti-radiation missile, and not from the Kh-31A anti-ship missile. China did not order any of the Kh-31A. The Chinese felt that the original Kh-31A could not fully satisfy their requirements, because the high-low trajectory of the missile meant early detection, thus it is prone to interception. In contrast, the low-low trajectory usually adopted by subsonic anti-ship missiles better uses the supersonic speed of Kh-31A. Such a trajectory shortens the detection range and the high-speed reduces the target’s reaction time, once the missile is detected. As a result, China did not order any Kh-31A anti-ship missiles. The resulting anti-ship version of the YJ-91 is capable of sea-skimming. Its cruising altitude is no more than 20 metre above sea level. At the terminal attack stage (usually after the active radar seeker of the missile is turned on), the missile drops to 7 metre above sea level. This attack altitude can be further reduced to just 1.2 metre above sea level, when the sea state allows. Alternatively, the missile can be programmed to popup-and-dive like that the Boeing Harpoon. However, such sea-skimming capability comes at the expense of maximum range: in comparison to the original 70 km range of the Kh-31A, the maximum range of YJ-91 anti-ship missile was reduced by more than a quarter to 50 km. Like the anti-radiation version, it is reported that many planned upgrades are in development. An application for research grants to develop a submerged launched version of YJ-91 anti-ship missile once appeared on Chinese websites on the Internet, indicating China is attempting to develop a version for its submarine fleet.

RBS-15 Swedish Long-Range Anti-Ship Missile





Tiers:



Variants:

- **RBS-15 Mk. I:** Powered by a French Microturbo TRI-60 engine, with a thrust of 3.73 kN (380 khp/830 lbf). Range 70+ km
- **RBS-15F:** An Mk. I adapted for air launch. Entered service in 1989.
- **RBS-15 Mk. II:** Range 70+ km. Designed to be launched from a number of different platforms, such as land-based launchers, aircraft, and ships.
- **RBS-15SF:** Mk. II version for Finland. Local designation MTO 85 (Meritorjuntaohjus 1985)
- **RBS-15 Mk. III:** Range over 200 km, with land attack capability. New warhead (increased penetration and insensitive munitions qualification) from TDW. There is only a ship launched version. Production started in 2004. New oval launch tubes instead of the old box type.
- **RBS-15F ER:** Aircraft launched version of the Mk. III
- **RBS-15SF-3:** Both new Mk. IIIs and upgraded Mk. IIs, which have been upgraded to Mk. III standard. Finnish designation MTO 85M
- **RB-15 Mk. III+ & RB 15 F-ER:** Ordered in March 2017 by Sweden. Will have better range, a better seeker and lower weight. It will have the ability to knock out a wide range of sea and land targets, all-weather capability and a design that allows for future upgrades. To be carried by Visby-class corvettes and JAS Gripen E. Will be delivered between 2017-2026 and fully operational in the mid 2020s.

RBS-15 Missile

↳System

Name: RBS-15
Type: Long-Range Fire-and-Forget Surface-to-Surface and Ar-to-Surface, Anti-Ship Missile.
Manufacturer: Saab Bofors Dynamics, Diehl BGT Defence
Length: m4.33
Diameter: cm50
Wingspan: 1.4 m
Warhead: 200 kg HE blast and pre-fragmented warhead.
Detonation Mechanism: impact or proximity
Engine: Turbojet
Operational Range: 70 km for RBS-15 Mk. I and II, 250 km for RBS-15 Mk. III, 300+km for RBS-15 MkV
Flight Altitude: Sea skimming
Speed: Subsonic

Guidance System: inertial, GPS, terminal active radar homing (J band)

Launch Platform: naval ships, aircraft and land-based missile launchers

Notes:

The RBS-15 (Robotsystem 15) is a long-range fire-and-forget surface-to-surface and air-to-surface, anti-ship missile. The later version Mk. III has the ability to attack land targets as well. The missile was developed by the Swedish company Saab Bofors Dynamics. The missile was developed from the RB 04 missile that was used by the Swedish air force. The front of the missile was retained, including the warhead, but the rear received new wings and a turbofan engine replaced the rocket previously used. The RBS-15 underwent trials on the missile FAC HMS Piteå from 1983 and became operational with the Swedish Navy in 1985. The Västergötland class submarines were to have 4 vertical missile launch tubes for RBS-15 missiles in an extended hull, canceled due to budget constraints and to not fitting the way Swedish submarines operated. In March 2017 Saab received an order for a new generation anti-ship missile to replace the RBS-15. The order is valued at 3.2 billion SEK and deliveries will take place between 2017–26. The new missile will have better range, a better seeker and lower weight. It will have the ability to knock out a wide range of sea and land targets, all-weather capability and a design that allows for future upgrades.

AM 39 Exocet French Anti-Ship Missile





Tiers:



Variants:

- **MM38 (surface-launched):** deployed on warships. Range: 42 km. No longer produced (1970). A coast defence version known as "Excalibur" was developed in the United Kingdom and deployed in Gibraltar from 1985–1997
- **AM38 (helicopter-launched):** tested only
- **AM39 (air-launched):** B2 Mod 2: deployed on 14 types of aircraft (combat jets, maritime patrol aircraft, helicopters). Range between 50 and 70 km, depending on the altitude and the speed of the launch aircraft.
- **SM39 (submarine-launched):** B2 Mod 2: deployed on submarines. The missile is housed inside a watertight launched capsule (VSM or véhicule Sous marin), which is fired by the submarine's torpedo-launch tubes. On leaving the water, the capsule is ejected and the missile's motor is ignited. It then behaves like an MM40. The missile will be fired at depth, which makes it particularly suitable for discreet submarine operations.
- **MM40 (surface-launched):** Block 1, Block 2 and Block 3: deployed on warships and in coastal batteries. Range: 72 km for the Block 2, in excess of 180 km for the Block3.
- **MM40 Block 3:** In February 2004, the Délégation Générale pour l'Armement (DGA) notified MBDA of a contract for the design and production of a new missile, the MM40 Block 3. It has an improved range, in excess of 180 kilometres (97 nautical miles)—through the use of a turbojet engine, and includes four air intakes to provide continuous airflow to the power plant during high-G manoeuvres. The Block 3 missile accepts GPS guidance system waypoint commands, which allow it to attack naval targets from different angles and to strike land targets, giving it a marginal role as a land-attack missile. The Block 3 Exocet is lighter than the previous MM40 Block 2 Exocet.

System

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AM 39 Exocet Anti-Ship Missile

↳*System*

Name: AM 39 Exocet
Type: Anti-Ship Missile
Basic Load: 2
Manufacturer: 1979–1999: Aérospatiale 1999–2001: Aérospatiale-Matra 2001–present: MBDA
Length: m4.69
Diameter: mm348

Wingspan: m1.10

Weight: kg655

Configuration: Slim, pointed cylinder cruciform cropped and swept delta mainplanes indexed in line with small cruciform tail planes

Propulsion: 2 SNPE double-base Nitramite smokeless solid-propellant rockets 1 Dondor booster with 2 sec burn 1 Helios sustainer with 130-150 sec burn

Speed: 1,100 km/h or Mach 0.93

Maximum Range: 50-70 km

Warhead Type: Hexolite blast-fragmentation

Warhead Weight: kg165

Senors /Fire Control: "Fire-and-forget" TRT AHV-7 radio altimeter inertial navigation during first part of flight Electronique Marcel Dassault ADAC or Super ADAC I/J-band active radar homing in terminal phase that begins search approximately 5.4 nm (6.2 mi.; 10 km) from target's estimated position

Notes:

The Exocet (French pronunciation: [ɛgzɔsɛ]; French for "flying fish" is a French-built anti-ship missile whose various versions can be launched from surface vessels, submarines, helicopters and fixed-wing aircraft. The Exocet is built by MBDA, a European missile company. Development began in 1967 by Nord as a ship-launched weapon named the MM 38. A few years later Aerospatiale and Nord merged. The basic body design was based on the Nord AS30 air-to-ground tactical missile. The air-launched Exocet was developed in 1974 and entered service with the French Navy five years later. The relatively compact missile is designed for attacking small- to medium-size warships (e.g., frigates, corvettes and destroyers), although multiple hits are effective against larger vessels, such as aircraft carriers. It is guided inertially in mid-flight and turns on active radar late in its flight to find and hit its target. As a countermeasure against air defence around the target, it maintains a very low altitude during ingress, staying one to two meters above the sea surface. Due to the effect of the radar horizon, this means that the target may not detect an incoming attack until the missile is only 6,000 m from impact. This leaves little time for reaction and stimulated the design of close-in weapon systems (CIWS). Its rocket motor, which is fuelled by solid propellant, gives the Exocet a maximum range of 70 kilometres (43 mi; 38 nmi). It was replaced on the Block 3 MM40 ship-launched version of the missile with a solid-propellant booster and a turbojet sustainer motor which extends the range of the missile to more than 180 kilometres (110 mi; 97 nmi). The submarine-launched version places the missile inside a launch capsule.

SY-1 (Silkworm) Chinese Anti-Ship Missile



Tiers:



Variants:

- **SY-2:** The liquid fuel engine was rather hazardous and unreliable, so a solid fuel rocket engine was developed. This engine also made it possible to reduce the size and weight of the missile while providing greater range. The warhead weight is also reduced, but its effectiveness was actually increased when a time-delayed semi-armour-piercing high-explosive design was adopted. The extended version developed is designated SY-2A.
- **HY-1:** The HY-1 received two separate NATO reporting name, the CSS-N-2 Safflower for the ship to ship version and the CSSC-2 Silkworm for the land based coastal defense variant. The HY-1J was intended for use on the Type 051 destroyers. However, the turmoil of the Cultural Revolution prolonged development into the 1980s. As a result, the Type 051s deployed into the Pacific Ocean to support ballistic missile tests without anti-ship missiles.
- **HY-2:** The HY-2 is identical to the HY-1 but with a further stretched body. The missile features a round nose accommodating the radar seeker, a pair of mid-mounted delta wings on the middle section of missile body, and three tail control surfaces. The missile is powered by a liquid-fuel rocket motor, with a solid rocket booster attached under the missile fuselage. The HY-2 is launched from land-based launcher and flies at an altitude of 1000 m during the initial stage of the flight. After the missile switched to the cruising mode, the flight altitude was reduced to 100 ~ 300 m. During the final stage of the flight, the missile switched on its radar seeker and dives to an altitude of 8 m until it hits the target. The single-shot hit probability is estimated to be 90%. Due to its oversized body, the HY-2 did not develop a ship-to-ship variant. The missile is obsolete and will be replaced by the YJ-8 series in the future.
- **HY-3:** The HaiYing-3 (HY-3, also known as C-301 in its export name; NATO codename: CSS-C-6 Sawhorse) is the active radar homing, ramjet-powered supersonic land-to-ship missile developed by China Haiying Electro-Mechanical Technology Academy (CHETA, also known as 3rd Space Academy). The missile was developed in the 1980s based on the design of the HY-2 (C-201) and the ramjet technology of the cancelled YJ-1 (C-101). The development was completed in the early 1990s but the missile did not enter service.
- **HY-4:** The HY-4 development of the C-201 is a mid-range ground-, air-, and ship-launched cruise missile. Development of the C-201 HY-4 is believed to have started in the mid-1970s, replacing the C-201 HY-2 liquid propellant sustainer motor with a small turbojet engine, and adding a monopulse active radar seeker. Apart from the substitution of the turbojet engine, the overall configuration of the HY-4 variant of the C-201 missile is similar to the HY-2 variants of the C-201, with two delta wings and tri-form rudder and tail. The missile has a radar altimeter which allows the cruise height to be varied between 70 and 200 m altitude, followed by a steep dive onto the target. The air-launched version is designated as C-401
- **FL-1:** The FL-1 (NATO designation CSS-NX-1) was a SY-1 with a high-frequency monopulse seeker. It used a radar altimeter to cruise at 30 metres.
- **FL-2:** The FL-2 anti-ship missiles was the land-based derivative of the SY-2. It was produced at the Nanchang Aircraft Factory
- **SFQ-1:** SFQ-1 was an unarmed test vehicle derivative of the Silkworm missile family. The test vehicle was used in the Chinese development of small turbojets that were designed to improve the range of the Chinese anti-ship cruise missiles, as well as powering the experimental versions of land attack YJ-4 cruise missiles. The entire project was reportedly named as Kunpeng (□□) Project, which first started in the early 1970s. SFQ-1 was specifically developed to test mini turbojet engines WP-11 and FW-41, the Chinese reverse engineered western turojet engines for UAVs and missiles.
- **YJ-4:** SFQ-1 was an unarmed test vehicle derivative of the Silkworm missile family. The test vehicle was used in the Chinese development of small turbojets that were designed to improve the range of the Chinese anti-ship cruise missiles, as well as powering the experimental versions of land attack YJ-4 cruise missiles. The entire project was reportedly named as Kunpeng (□□) Project, which first started in the early 1970s. SFQ-1 was specifically developed to test mini turbojet engines WP-11 and FW-41, the Chinese reverse engineered western turojet engines for UAVs and missiles.

- **YJ-4:** YJ-4 is a family of experimental land-attack cruise missiles developed by China in the 1970s and early 1980s. Due to the limitation of Chinese industrial and technological bottleneck at the time, the YJ-4 only entered the Chinese services in extremely limited numbers, mainly serving as a foundation for more successful Chinese cruise missiles developed later, such as Changfeng missile. Two versions of YJ-4 family were developed: YJ-4I, which is also frequently but erroneously referred as YJ-41, and YJ-4II, which is also frequently but erroneously referred as YJ-42. The two missiles only differed in their respective powerplant, YJ-4I was equipped with WP-11, the Chinese version of Turbomeca Marboré, while the longer ranged YJ-4II was equipped with an engine that was twice as powerful, FW-41, the Chinese version of Teledyne CAE J69, reversed engineered from downed American Ryan Firebee.
- **XW-41:** A developed version based on HY-4, known as the XW-41, has been developed. This latest version of the C-201 missile family is said to have a 300 km range with additional GPS/GLONASS guidance. However, due to the availability of more advanced anti-ship missile with similar range, such as the C-602, the future of XW-41, like others in the Silkworm missile family, is uncertain despite its successful trials. Although still a member of Silkworm missile, the developer considers the missile was different enough to be a listed as a separate category of its own due to the amount of new technologies adopted. After the Gulf War, United Arab Emirates ordered 30 of these shore-based version for coastal defense, and accordingly to Jane's Defence Weekly, these missiles are referred by the general name Silkworm missiles, but domestic Chinese sources have claimed that these were XW-41s, though there are reports claiming these missiles are other models of Silkworm series.
- **C-611:** Upgraded version of C-601 and other earlier models of the air-to-surface missiles of Silkworm family. Not all upgrades are necessarily the same due to difference between various versions, but electronics for all versions are upgraded to the latest standard. The seeker of the missile is modernized to include semi-active radar homing and passive homing capability, and the missile can be used against coastal ground targets. Cruise altitude is decreased while the range is increased.
- **YJ-63 (C-603):** XW-41 and its predecessor HY-4 lost their intended market when the wars in middle east ended, so XW-41 was converted to the first indigenously developed air-to-surface precision strike missile. The developmental work begun in the mid-1990s when Sea Eagle Mechanical-Electrical Research Academy (□□□□□□□□□) received support of Chinese military and the project was completed in 2002. The resulting new missile was named as YJ-63, also known as C-603. In comparison to XW-41, the original radar guidance was changed to TV guidance. The original inverted Y-configuration of tail control surfaces was changed to X-configuration. Like its predecessor, XW-41, turbojet engine was adopted instead of liquid fuel rocket engine used on HY-2. Range is 500km.[
- **KD-63:** Newest version of YJ-63 series that entered service in 2004 - 2005. This land attack version is almost identical to C-603 in appearance, except it has a solid nose instead of a window for TV guidance optronics. The solid nose indicates that the guidance of this air-to-surface missile adopts other means of guidance such as radar, but the exact type remain unknown.

System

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SY-1 (Silkworm) Anti-Ship Missile

↳***Missile***

Name: SY-1 (Silkworm)
Type: Anti-Ship Missile
Basic Load: INA
Manufactuer: Nanchang Aircraft Factory (Chinese)
Length: 6.55 m
Diameter: 0.76 m
Wingspan: 2.4 m
Warhead Type: Shaped charge high explosive
Warhead Weight: 513 kg

Weight, Total: 2,095 kg

Propulsion: One liquid rocket engine and one solid rocket booster

Speed: Mach 0.8

Range: 150 km

Cruising Altitude: < 20 metres

Guidanc System: Inertial guidance + active conical scanning terminal guidance radar (SY-1); or inertial + active monopulse radar (SY-1A)

Single-Shot Kill Probability: 70%

Notes:

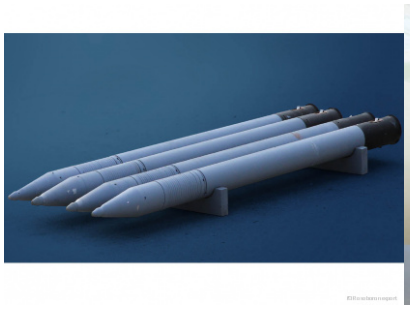
This is the original Chinese version of Soviet P-15 Termit missile, and the first was SY-1, produced at Factory 320 (the Nanchang Aircraft Factory, □□□□□□□); Chinese sources identify the designers as Li Tongli and Lu Lin. The main difference between P-15 Termit and SY-1 missiles is that the unreliable aneroid altimeter of P-15 Termit was replaced by a much more reliable radar altimeter in SY-1. The successor of SY-1, designed by Peng Lisheng (□□□) and designated as SY-1A, had a mono-pulse terminal guidance radar seeker replacing the original conical scanning radar seeker. The missile received a NATO reporting name CSS-N-1 Scrubbrush. The missile has been upgraded to be air-launched, and the air-launched version is known as C-601 (YJ-6), which is the first air-launched anti-ship missile in China. The missile received a NATO reporting name CAS-1 Kraken. It was used by Iraqi H-6Ds during Iran–Iraq War. An upgraded version that is fully solid state (electronics) with integrated circuitry and new active radar homing seeker and new radar altimeter entered service as SY-1A in early 1980s.

→→Anti-Submarine Missiles

→Aircraft Rockets

→→Air-to-Air Rockets

S-8KOM Russian Air-to-Air Rocket




Tiers:

1 2 3 4

System

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↳***S-8KOM Air-to-Air Rocket***

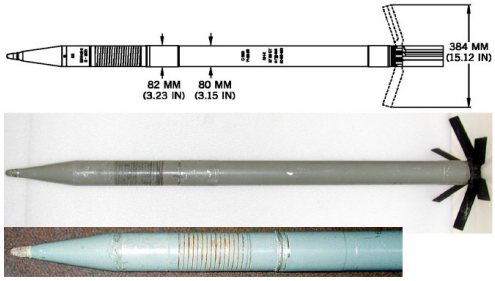
Name: S-8KOM
Type: HEAT Rocket, Air-to-Air Rocket
Length: 1.57 m
Diameter: INA
Weight: 11.3 kg
Warhead Weight: 3.6 kg (1.1 kg of Hecphol-5/A-IX-10 explosive)
Engine: low smoke motor with powder BN-K.
Range: 1.3 to 4 km
Velocity: 400 mm versus RHA.
Armor Penetration: Velocity 610 m/s.

Notes:

The S-8 is a rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and various export customers. Developed in the 1970s, the S-8 is an 80 mm (3.1 in) rocket used by fighter bombers and helicopters. The system entered service in 1984 and is produced in a variety of subtypes with different warheads, including HEAT anti-armor, high-explosive fragmentation, smoke, and incendiary, as well as the specialized S-8BM runway-destroying munition and the S-8DM fuel-air explosive variants. Each rocket is between 1.5 meters (4 ft 11 in) and 1.7 meters (5 ft 7 in)

long and weighs between 11.3 kg (25 lb) and 15.2 kg (33.5 lb), depending on warhead and fuse. Range is 2 to 4 kilometers (1.3 to 2.6 mi). The S-8 is generally carried in the B series of rocket pods, carrying either seven or 20 rockets. In 2018, the Russian Aerospace Forces took delivery and completed state tests of several batches of the S-8OFP Broneboishchik, successor to the S-8. While both rockets are unguided, the S-8OFP has greater range, a heavier warhead, and a digital fuse. The rocket is intended for armament of Su-25 type aircraft and Mi-8 helicopters, depending on the settings of the fuse, is able to penetrate obstacles facing the set targets, it can also explode in front of the obstacle and behind the obstacle. An armored self-propelled 80-tube MLRS vehicle using S-8 rockets has been developed by Belorussian industry. Relatively short range of the rocket (3 - 5km cross-ground) compared to Grad rockets is compensated for by lower cost and greater beaten area from a high number of rockets.

S-8 Russian Rocket





Tiers:



System

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↳ ***S-8 Rocket***

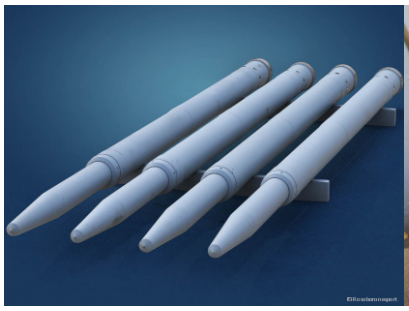
Name: S-8
Type: Rocket
Manufacturer: INA
Length: 1.56 m
Diameter: INA
Weight: 11.5 kg
Warhead Weight: 3.6 kg (0.9 kg of Hecphol-5/A-IX-10 explosive)
Effective Range: 1.3 to 4 km
Warhead Types: HEAT anti-armor, high-explosive fragmentation, smoke, and incendiary, as well as the specialized S-8BM runway-destroying munition and the S-8DM fuel-air explosive variants.
Note: Basic variant. 350 mm versus RHA. Velocity 692 m/s. N-26A fuze. BIK-2D motor powder. During launch of this model may have black smoke.

Notes:

The S-8 is a rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and various export customers. Developed in the 1970s, the S-8 is an 80 mm (3.1 in) rocket used by fighter bombers and helicopters. The system entered service in 1984 and is produced in a variety of subtypes with different warheads, including HEAT anti-armor, high-explosive fragmentation, smoke, and incendiary, as well as the specialized S-8BM runway-destroying munition and the S-8DM fuel-air explosive variants. Each rocket is between 1.5 meters (4 ft 11 in) and 1.7 meters (5 ft 7 in) long and weighs between 11.3 kg (25 lb) and 15.2 kg (33.5 lb), depending on warhead and fuse. Range is 2 to 4 kilometers (1.3 to 2.6 mi). The S-8 is generally carried in the B series of rocket pods, carrying either seven or 20 rockets. In 2018, the Russian Aerospace Forces took delivery and completed state tests of several batches of the S-8OFP Broneboishchik, successor to the S-8. While both rockets are unguided, the S-8OFP has greater range, a heavier warhead, and a digital fuse. The rocket is intended for armament of Su-25 type aircraft and Mi-8 helicopters, depending on the settings of the fuse, is able to penetrate obstacles facing the set targets, it can also explode in front of the obstacle and behind the obstacle. An armored self-propelled 80-tube MLRS vehicle using S-8 rockets has been developed by Belorussian industry. Relatively short range of the rocket (3 -

5km cross-ground) compared to Grad rockets is compensated for by lower cost and greater beaten area from a high number of rockets.

S-13T Russian Air-to-Air Rocket




Tiers:



System

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↳ ***S-13T Air-to-Air Rocket***

Name: S-13T
Type: Tandem HEAT, Air-to-Air Rocket
Length: 2.99 m
Diameter: INA
Weight: 75 kg
Warhead Weight: 21 kg and 16.3 kg (1.8 kg and 2.7 kg of explosives)
Range: 1.1 – 4 km
Velocity: Velocity 500 m/s
Armor Penetration: Combined penetration of 6 m of earth and 1 m of reinforced concrete.

Notes:

The S-13 is a 122 mm calibre unguided rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and some other countries. The S-13 rocket was developed in the 1970s to meet requirements for a penetrating weapon capable of cratering runways and penetrating hardened aircraft shelters, bunkers and pillboxes, to fill a gap between 80 mm and 240 mm rockets and fulfill a role similar to the 127 mm Zuni rocket. The S-13 is conventional in layout, with a solid rocket motor and folding tail fins that provide stability after launch. The first trials were in 1973, but it was introduced only in 1983. S-13 rockets are shot from 5-tube launchers B-13L, that can be carried by most of Soviet and Russian attack and new fighter aircraft, like Sukhoi Su-17/20/22, Sukhoi Su-24, Sukhoi Su-25, Sukhoi Su-27, MiG-23BN, MiG-27, MiG-29. B-13L1 launcher is used by helicopters such as Mil Mi-24, Mil Mi-28, Kamov Ka-29TB, Kamov Ka-50 and Kamov Ka-52.

→→Air-to-Surface Rockets

UB-32 Russian 57mm Reusable, 32-salvo Rocket Pod





Tiers:

1 2 3 4

System

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UB-32 Russian 57mm Reusable, 32-salvo Rocket Pod

↳Rocket Launching System

Name: UB-32
Type: 57mm, reusable, 32-salvo rocket pod
Basic Load (UB-32 Rocket Pod): ea2-4
Launcher Length: mm2,080
Launcher Diameter: mm464
Weight, Empty: kg103
Weight, Loaded: kg264

↳Rocket System Projectile

Name: S-5M (ARS-57) Rocket
Type: Unguided HE-FRAG
Caliber: mm55
Length: m1.4
Diameter: mmINA
Weight: kg5
Basic Load (S-5 Rockets): ea32
Operational Range: km3-4

Engine: Solid Rocket Motor
Speed: 300 meters in 1.1 seconds
Note #1: Produces 75 Splinters
Note #2: The S-5 is carried in rocket pods, with 4–32 rockets.

Notes:

The UB-32 is a 57mm, reusable, 32-salvo rocket pod developed by the Soviet Union in the 1970s for aerial use in close air support and ground attack situations. Typically, it is mounted on external aircraft hardpoints and fires S-5 rockets. The launcher has a length of 2,080 mm (6.8 ft) and a diameter of 464 mm (1.5 ft). The UB-32 has also been used in improvised manners on the back of armored vehicles and trucks.

Zuni American 5-inch Folding-Fin Aircraft Rocket (FFAR)





Tiers:



Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR)

↳Rocket System

Name: Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR)
Type: 5 inch unguided rocket
Length: mm2,000
Diameter: mm130
Warhead Type: Various
Engine: Solid-fuel rocket
Operational Range: km8
Speed: km/h2,599
Guidance System: None

System

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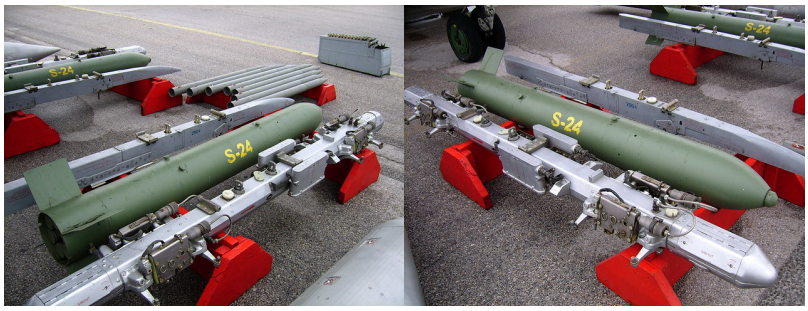
Notes:

The Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR), or simply Zuni, is a 5.0 in (127.0 mm) unguided rocket developed by the Hunter-Douglas Division of Bridgeport Brass Company and deployed by the United States armed forces. The rocket was developed for both air-to-air and air-to-ground operations. It can be used to carry various types of warheads, including chaff for

countermeasures. It is usually fired from the LAU-10 rocket pod holding four rockets. In the early 1950s, U.S. Navy engineers Naval Ordnance Test Station China Lake began to develop a new 12.7 cm unguided rocket to replace the High Velocity Aircraft Rocket. The Zuni was designed as a modular system, to allow the use of different types of warheads and fuzes. One type of warhead was a proximity fuze, as the rocket was originally intended to be used as an air-to-air rocket. This led to its selection as the basis for the AIM-9 Sidewinder airframe in the early 1950s. The Zuni was approved for production in 1957. A number of different launchers were tested for the Zuni, e.g. single launchers fitted to the Sidewinder launching rails of the Vought F-8 Crusader. However, four-tube LAU-10/A series pods became the most commonly used launcher.

S-24 Russian Air-to-Surface Rocket



Tiers:

1 2 3 **4**

Variants:

- **Shafaq:** The rocket is also license produced in Iran under the name of Shafaq

System

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S-24 Rocket

↳*System*

Name: S-24 Rocket
Type: Unguided high-velocity airborne rocket
Proliferation: INA
Diameter: mm240
Length: m2.33
Launch Weight: kg235
Warhead Type: blast-fragmentation warhead
Warhead Weight: kg123
Operational Range: km2-3
Basic Load: ea2-4
Proximity Fuze: R-24
Fragmentation Casualty Zone Radius: m300-400
Number of Fragments: 4,000
Penetration: 30mm of armor
Note: The S-24 Warhead detones 3 meters above the ground

Notes:

The S-24 is a rocket weapon designed and used by the Soviet Air Force. It remains in use by the Russian Aerospace Forces The name is based on the diameter of the rocket, 24 cm (9.4 in). The Soviet Union was an early, enthusiastic user of rocket weapons, employing them as early as the 1930s. The S-24/S-24B is a very large, powerful unguided weapon and one of a handful of successors to the earlier World War II-era BETAB-750DS rockets. The S-24B differs from the S-24 in that it uses BN-K low smoke motor powder for a low-smoke flight. The S-24 is 2.33 metres (7 ft 8 in) long, with a launch weight of 235 kg (520 lb). It has a 123 kg (271 lb) blast-fragmentation warhead. Its range is about 2–3 kilometres (1.2–1.9 mi). The S-24 is carried individually on weapon pylons, rather than in pods. Proximity fuze RV-24 is also available, in which the warhead detonate 3 meters above ground, creating 300—400m radius of fragmentation casualty zone. The body is mesh-texture shape-harden by electric treatment and creating 4000 fragments that can penetrate up to 30 millimeters of armor, though some sources dispute this and give a figure of 25 millimeters. The rocket is also license produced in Iran under the name of Shafaq.

S-13 Russian 122mm Unguided Rocket



Tiers:



Variants:

- **S-13:** Penetrates 3 m of earth and 1 m of reinforced concrete. On runways it produces a demolition area of 20 m². Velocity 650 m/s
- **S-13B:** Penetrates 3 m of earth and 1 m of concrete.
- **S-13T:** Combined penetration of 6 m of earth and 1 m of reinforced concrete. Velocity 500 m/s
- **S-13OF:** Produces 450 splinters between 23 and 35 g, capable of penetrating lightly armoured vehicles such as APCs and IFVs. Velocity 530 m/s. Introduced in 1993.
- **S-13D:** 35 – 40 kg TNT equivalent. Velocity 530 m/s. Introduced in 1995.
- **S-13DF[:** Up to 40 kg TNT equivalent. Velocity 530 m/s. Ordered upgraded in 2018.

System

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S-13 Russian 122mm Unguided Rocket

↳*Rocket Launcher*

Name: B-13L Rocket Pod
Type: Rocket Pod
Basic Load: 2 x Rocket Pods
Length: mm3560
Diameter: mm410
Unloaded Weight: kg160
Number of Rockets per Rocket Pod: ea5
Firing Interval: sec0.15

↳*Rocket System Ammunition*

Name: S-13
Type: 122 mm calibre unguided rocket weapon

Proliferation: The S-13 is a 122 mm calibre unguided rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and some other countries.
Length: m2.54
Diameter: mmINA
Muzzle Velocity: m/sINA
Basic Load: ea5 Rockets per B-13L
Launch Weight: kg57
Warhead Weight: kg21
Effective Range: km1.1-3
Penetration: Penetrates 3 m of earth and 1 m of reinforced concrete. On runways it produces a demolition area of 20 m^2. Velocity 650 m/s.

Notes:

The S-13 is a 122 mm calibre unguided rocket weapon developed by the Soviet Air Force for use by military aircraft. It remains in service with the Russian Air Force and some other countries. The S-13 rocket was developed in the 1970s to meet requirements for a penetrating weapon capable of cratering runways and penetrating hardened aircraft shelters, bunkers and pillboxes, to fill a gap between 80 mm and 240 mm rockets and fulfill a role similar to the 127 mm Zuni rocket. The S-13 is conventional in layout, with a solid rocket motor and folding tail fins that provide stability after launch. The first trials were in 1973, but it was introduced only in 1983. S-13 rockets are shot from 5-tube launchers B-13L, that can be carried by most of Soviet and Russian attack and new fighter aircraft, like Sukhoi Su-17/20/22, Sukhoi Su-24, Sukhoi Su-25, Sukhoi Su-27, MiG-23BN, MiG-27, MiG-29. B-13L1 launcher is used by helicopters such as Mil Mi-24, Mil Mi-28, Kamov Ka-29TB, Kamov Ka-50 and Kamov Ka-52.

Shafaq Iranian Air-to-Surface Rocket



Tiers:



Variants:

- **S-24:** The S-24 is a rocket weapon designed and used by the Soviet Air Force. It remains in use by the Russian Aerospace Forces The name is based on the diameter of the rocket, 24 cm (9.4 in).

System

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Shafaq Rocket

↳ ***System***

Name: Shafaq Rocket
Type: Unguided high-velocity airborne rocket
Diameter: mm240
Length: m2.33
Launch Weight: kg235
Warhead Type: blast-fragmentation warhead
Warhead Weight: kg123
Operational Range: km2-3
Basic Load: ea2-4
Proximity Fuze: R-24
Fragmentation Casualty Zone Radius: m300-400
Number of Fragments: 4,000
Penetration: 30mm of armor
Note: The S-24 Warhead detones 3 meters above the ground

Notes:

The Shafaq is a Iranian licensed Russian S-24 Rocket. The S-24 is a rocket weapon designed and used by the Soviet Air Force. It remains in use by the Russian Aerospace Forces The name is based on the diameter of the rocket, 24 cm (9.4 in). The Soviet Union was an early, enthusiastic user of rocket weapons, employing them as early as the 1930s. The S-24/S-24B is a very large,

powerful unguided weapon and one of a handful of successors to the earlier World War II-era BETAB-750DS rockets. The S-24B differs from the S-24 in that it uses BN-K low smoke motor powder for a low-smoke flight. The S-24 is 2.33 metres (7 ft 8 in) long, with a launch weight of 235 kg (520 lb). It has a 123 kg (271 lb) blast-fragmentation warhead. Its range is about 2–3 kilometres (1.2–1.9 mi). The S-24 is carried individually on weapon pylons, rather than in pods. Proximity fuze RV-24 is also available, in which the warhead detonate 3 meters above ground, creating 300—400m radius of fragmentation casualty zone. The body is mesh-texture shape-harden by electric treatment and creating 4000 fragments that can penetrate up to 30 millimeters of armor, though some sources dispute this and give a figure of 25 millimeters.

→→Anti-Ship Rockets

→→Anti-Submarine Rockets

→Aircraft Bombs

LS-6 Chinese Precision-Guided Bomb



Tiers:

1 2 3 4

System

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↳***LS-6 Precision-Guided Bomb***

Name: LS-6
Type: Precision-Guided Bomb
Manufacturer: Luoyang Electro-Optics Technology Development Centre (EOTDC)
Length: INA
Diameter: INA
Weight: 50 kg version and a 100 kg version
Warhead: Various gravity bombs
Detonation Mechanism: Impact or Proximity
Maximum Speed: Free-fall
Guidance System: INS with GPS or laser guidance

Notes:

LS is an abbreviation for a family of Chinese built precision-guided munitions (PGM) named Thunder Stone Precision Guided Bomb developed by Luoyang Electro-Optics Technology Development Centre (EOTDC), a subsidiary of China Aerospace Science and Technology Corporation (CASC). Alternatively, the LS PGB is also referred to by its gliding capability, as Thunder Stone Gliding Guided Bomb, or LS GGB. The guidance design of LS PGB is also adopted for another family of Chinese PGM, the YZ series, such as YZ-102 series. These PGMs are referred to in China as precision guided bombs (PGB). LS PGB is actually an

upgrade kit to modernize gravity bombs with precision / laser guidance, with the kit consisted of two modules, the guidance module and the gliding module. The guidance of the weapon is based on two other Chinese PGM, the FT PGB and LT PGB, with the former providing the inertial/satellite guidance, while the latter providing different types of laser guidance. The gliding module including the folding wings and control surfaces is made of the composite material and aluminum alloys, and comes in different versions for different sizes of gravity bombs. The LS PGB upgrade kit can be fit to iron bombs up to five tons. Advanced versions are reportedly under development, such as imaging infrared targeting system, which is based on the seekers of air-to-air missiles developed by EOTDC. When released at an altitude of eleven thousand meters, the maximum range of LS PGB is greater than sixty kilometers. Chinese media have shown photographs of FT PGB being dropped from helicopters such as Chinese Naval Ka-28, in addition to the fixed-wing platforms. However, for the laser guided subfamily of FT PGB based on LT PGB/LGB, neither nose-mounted nor mast-mounted targeting turrets have been specially developed for rotary platforms, but instead, the targeting pods for fixed-wing platforms are carried directly by Chinese helicopters for targeting. All targeting pods developed for LT LGB/PGB can be used for the laser guided subfamily of FT PGB that is based on LT LGB/PGB, and additionally, general purpose targeting pod such as FILAT can also be used. LS series GGB/PGB was first revealed to public at the 6th Zhuhai Airshow held in November 2006 with LT-6 model of the family. All models in the family of this weapon are built to Chinese GJV289A standard, the Chinese equivalent of MIL-STD-1553B. The adaptation of such military standard means that the weapon can be readily deployed on any western platforms. Small 50 kg and 100 kg variants of the LS-6 are also featured, similar to the GBU-39 Small Diameter Bomb, that can be carried in the internal weapons bays of fighters like the J-20.

Mark 83 American Low-Drag General Purpose Bomb



Tiers:



Variants:

- **Mark 81:** The Mark 81 (Mk 81) 250-pound (110 kg) general-purpose bomb (nicknamed "Firecracker") is the smallest of the Mark 80 series of low-drag general-purpose bombs.
- **Mark 82:** The Mark 82 (Mk 82) is an unguided, low-drag general-purpose bomb, part of the United States Mark 80 series. The explosive filling is usually tritonal, though other compositions have sometimes been used.
- **Mark 84:** The Mark 84 or BLU-117 is an American general-purpose bomb. It is the largest of the Mark 80 series of weapons. Entering service during the Vietnam War, it became a commonly used US heavy unguided bomb (due to the amount of high-explosive content packed inside) to be dropped. At the time, it was the third largest bomb by weight in the US inventory behind the 15,000-pound (6,800 kg) BLU-82 "Daisy Cutter" and the 3,000-pound (1,400 kg) M118 "demolition" bomb. It is currently sixth in size due to the addition of the 5,000 lb (2,300 kg) GBU-28 in 1991, the 22,600 lb (10,300 kg) GBU-43/B Massive Ordnance Air Blast bomb (MOAB) in 2003, and the 30,000 lb (14,000 kg) Massive Ordnance Penetrator.

System

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↳*Mark 83 Unguided General-Purpose Bomb*

Name: Mark 83
Type: Unguided General-Purpose Bomb
Manufacturer: General Dynamics
Length: 3000 mm
Diameter: 357 mm
Weight: 459 kg
Filling: Tritonal, Minol or Composition H6
Filling Weight: 202 kg
Note: The Mk 83 is a streamlined steel casing containing 445 lb (202 kg) of tritonal high explosive. When filled with PBXN-109 thermally insensitive explosive, the bomb is designated BLU-110.

Notes:

The Mark 83 is part of the Mark 80 series of low-drag general-purpose bombs in United States service. The nominal weight of the bomb is 1,000 lb (454 kg), although its actual weight varies between 985 lb (447 kg) and 1,030 lb (468 kg), depending on fuze options, and fin configuration. The Mk 83 is a streamlined steel casing containing 445 lb (202 kg) of tritonal high explosive. When filled with PBXN-109 thermally insensitive explosive, the bomb is designated BLU-110. The Mk 83/BLU-110 is used as the warhead for a variety of precision-guided weapons, including the GBU-16 Paveway laser-guided bombs, the GBU-32 JDAM and Quickstrike sea mines. This bomb is most typically used by the United States Navy but is used by the USAF in the F-22A in a JDAM configuration. According to a test report conducted by the United States Navy's Weapon System Explosives Safety Review Board (WSESRB) established in the wake of the 1967 USS Forrestal fire, the cooking-off time for a Mk 83 is approximately 8 minutes 40 seconds. The bomb has been controversially used during the Saudi Arabian-led intervention in Yemen.

BETAB-500 Russian Concrete-Piercing Bomb







Tiers:

1 2 3 4

System

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↳ ***BETAB-500 Concrete-Piercing Bomb***

Name: BETAB-500
Type: Concrete-Piercing Bomb
Length: 2,200 mm
Diameter: 350 mm
Weight: 477 kg
Explosive Weight: 98 kg
Release Altitude: 30–5,000 m
Release Speed: 600–1,200 km/h

Notes:

The BETAB-500 (Russian: БетАБ-500) or the BETAB-500 Concrete-Piercing Bomb is a Soviet and Russian 500-kilogram (1,100 lb) bomb designed to penetrate and destroy reinforced concrete structures and to damage runways. During the Syrian civil war, the Russian military has used it repeatedly. In 2016, apparently the first use of this bomb in an urban environment occurred in the Eastern part of the city of Aleppo.

Mark 84 American General-Purpose Bomb





Tiers:

1 2 3 4

Variants:

- **Mark 82:** The Mark 82 (Mk 82) is an unguided, low-drag general-purpose bomb, part of the United States Mark 80 series. The explosive filling is usually tritonal, though other compositions have sometimes been used.
- **Mark 83:** The Mark 83 is part of the Mark 80 series of low-drag general-purpose bombs in United States service.
- **Mark 81:** The Mark 81 (Mk 81) 250-pound (110 kg) general-purpose bomb (nicknamed "Firecracker") is the smallest of the Mark 80 series of low-drag general-purpose bombs.

System

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↳***Mark 84 General-Purpose Bomb***

Name: Mark 84
Type: General-Purpose Bomb
Length: 3280 mm
Diameter: 458 mm
Weight: 925 kg
Filling: Tritonal, Minol or Composition H6
Filling Weight: 429 kg
Note: It is a streamlined steel casing filled with 945 lb (429 kg) of Tritonal high explosive.

Notes:

The Mark 84 or BLU-117 is an American general-purpose bomb. It is the largest of the Mark 80 series of weapons. Entering service during the Vietnam War, it became a commonly used US heavy unguided bomb (due to the amount of high-explosive content packed inside) to be dropped. At the time, it was the third largest bomb by weight in the US inventory behind the 15,000-pound (6,800 kg) BLU-82 "Daisy Cutter" and the 3,000-pound (1,400 kg) M118 "demolition" bomb. It is currently sixth in size due to the addition of the 5,000 lb (2,300 kg) GBU-28 in 1991, the 22,600 lb (10,300 kg) GBU-43/B Massive Ordnance Air Blast bomb (MOAB) in 2003, and the 30,000 lb (14,000 kg) Massive Ordnance Penetrator. The Mark 84 has a nominal weight of 2,000 lb (907 kg), but its actual weight varies depending on its fin, fuze options, and retardation configuration, from 1,972 to 2,083 lb (894 to 945 kg). It is a streamlined steel casing filled with 945 lb (429 kg) of Tritonal high explosive. The Mark 84 is capable of forming a crater 50 feet (15 m) wide and 36 ft (11 m) deep. It can penetrate up to 15 inches (38 cm) of metal or 11

ft (3.4 m) of concrete, depending on the height from which it is dropped, and causes lethal fragmentation to a radius of 400 yards (370 m). Many Mark 84s have been retrofitted with stabilizing and retarding devices to provide precision guidance capabilities. They serve as the warhead of a variety of precision-guided munitions, including the GBU-10/GBU-24/GBU-27 Paveway laser-guided bombs, GBU-15 electro-optical bomb, GBU-31 JDAM and Quickstrike sea mines. The HGK is a Turkish guidance kit used to convert 2000-lb Mark 84 bombs into GPS/INS guided smart bombs. According to a test report conducted by the United States Navy's Weapon System Explosives Safety Review Board (WSESRB) established in the wake of the 1967 USS Forrestal fire, the cooking off time for a Mk 84 is approximately 8 minutes 40 seconds.

BL755 British Cluster Bomb





Tiers:

1 2 **3** 4

System

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BL755 Cluster Bomb

↳***Bomb***

Name: BL755
Type: Cluster Bomb
Manufacturer: Hunting Engineering, Ltd.
Proliferation: Widely Proliferated
Length: mm2,451
Diameter: mm419
Weight: kg264
Warhead: Shaped charge HEAT warhead
Fragments: 1,400 anti-personnel fragments

Notes:

BL755 is a cluster bomb. Its primary targets are armoured vehicles and tanks with secondary soft target (anti personnel) capabilities. The BL755 looks like a standard 450-kilogram (1,000 lb) general-purpose bomb but with a hard "saddle" on the spine for ejector release and crutching pad loads and a distinctive large turbine-like air arming vane on the nose. The four rear fins are squared off in appearance, but on closer inspection can be seen to be hollow and telescopic. A central extruded aluminum skeleton is divided into seven bays, each containing 21 submunitions (147 total). The submunitions are ejected by means of a central cartridge and individual inflatable bladders for each bay, operating in a similar manner to a car airbag. Ejection on the original BL755 bomb is triggered by the rotation of the arming vane, driven by the airflow. Each submunition is contained within its own SAFU (safety and arming unit) and is telescoped shut. Upon release, the submunition is expanded by a spring. A focal distance stand off and detonating device deploys at the front and a fan of stabilising fins at the rear. Each has a shaped charge HEAT warhead for armour penetration, the casing of which is constructed from wound tessellated square wire, which produces around 1,400 anti-personnel fragments. A single cluster bomb produces a total of more than two hundred thousand fragments. The weapon was developed in the early 1970s by Hunting Engineering, Ltd. of Ampthill, Bedfordshire but manufactured elsewhere at their production facility. The original BL755 has been updated twice. IBL755 is a bomblet update,

increasing its reliability and armour penetration. RBL755 is the BL755 weapon fitted with a radar altimeter that acts as a proximity fuze, triggering bomblet ejection at the optimum altitude whilst allowing the bomb to be released from a safe height and distance. This was in response to the dangers illustrated by low-level Panavia Tornado missions in the 1991 Gulf War; the original vane-armed BL755 had to be released at a predetermined low altitude, with the attacking aircraft exposed to ground fire and shoulder-launched surface-to-air missiles such as the 9K34 Strela-3 and its variants.

KAB-1500L Russian Precision Guided Bomb






Tiers:



Variants:

- **KAB-1500S-E:** The KAB-1500S-E (Russian: КАБ-1500С-Э) is a precision guided bomb, part of KAB-1500 family, designed for the Russian Federation Air Force (RFAF) to carry out precision attacks, using 24-channel GLONASS and is equivalent to the United States Air Force (USAF) Joint Direct Attack Munition (JDAM) family of Global Positioning System (GPS) guided weapons. It is believed to be similar to the KAB-500S-E, and to use the same Kompas PSN-2001 (Pribor Sputnikovoy Navigatsii) satellite receiver.[1][2] KTRV has fully completed testing of products of the K08B and K029B (UPAB-1500B) types, both products are in serial production and are delivered to combat units. Russia intends to fit it to the Su-24M, Su-34, Su-35 and Mig-35 aircraft. They hope to export to India and China.

System

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↳*Bomb*

Name: KAB-1500L
Type: Precision Guided Bomb
Manufacturer: Tactical Missiles Corporation
Length: 4,280 mm
Diameter: 820 mm
Wingspan: 0.58 m
Weight: about 1500 kg
Warhead Type: high explosive (LG-F-E), penetrating (LG-Pr-E), fuel-air (LG-OD-E)

Warhead Weight: INA
Flight Ceiling: 8-10 km
Guidance System: Laser-guided
Accuracy: 4 to 7 m

Notes:

KAB-1500L is a Russian precision guided weapon, part of KAB-1500 family, a laser guided bomb and also the current production standard for use on 4+ and 4++ generation fighter jets, like the Sukhoi Su-30MKI/Sukhoi Su-30MKK, Sukhoi Su-34 and Sukhoi Su-35. It is claimed to be the Russian equivalent to USA's Paveway II/Paveway III and is designed to hit railway, ammunition depots, railway terminals, highway bridges, military and industrial facilities, ships and transport vessels. The KAB-1500LG-F-E has an impact fuze which includes 3 different delay modes for target attack and it can also be mounted on older aircraft, like the Sukhoi Su-24 and the Mikoyan MiG-27. The bomb has been used in the Russian military campaigns in Chechnya and Syria.

KAB-500L Russian Laser-Guided Bomb





Tiers:



Variants:

- **KAB-500S-E:** KAB-500S-E is a Precision-Guided Munition (PGM) whose guidance system is based on GLONASS. The weapon can be dropped from aircraft flying at an altitude from 500 meters to 5000 meters and with an airspeed of 500–1150 km/h. The CEP is 7–12 meters. These bombs were used for the first time in the Russian military intervention in the Syrian Civil War in September 2015.

Systems

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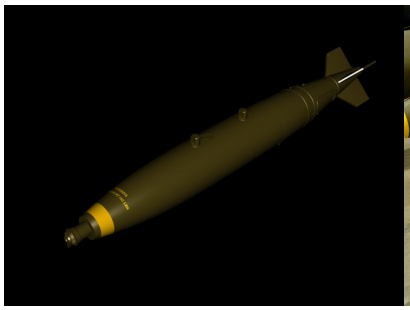
↳***KAB-500L Laser-Guided Bomb***

Name: KAB-500L
Type: Laser-Guided Bomb
Length: 3.05 m
Diameter: INA
Weight: Its warhead makes up 450 kg (990 lb) of the total weight, of which roughly 50% is blast-effect high explosive.
Warhead Type: INA
Warhead Weight: 450 kg
Guidance Sytem: semi-active laser seeker and guidance fins, turning it into an unpowered guided bomb.
CEP: 7 meters

Notes:

The KAB-500L is a laser-guided bomb developed by the Soviet Air Force. It remains in service with the CIS and post-Soviet Russian Air Force. The KAB-500L is a standard FAB-500 general-purpose bomb, which has a nominal weight of 500 kg (1,100 lb), fitted with a semi-active laser seeker and guidance fins, turning it into an unpowered guided bomb. The KAB-500L is 3.05 m (10.0 ft) long and weighs 525 kg (1,157 lb). Its warhead makes up 450 kg (990 lb) of the total weight, of which roughly 50% is blast-effect high explosive. Russian sources credit it with a CEP of 7 meters (23 feet). The technology of KAB-500L is also used for larger bombs, such as the KAB-1500L family. It is also deployed by the Indian Air Force. The primary launch platform is Su-30MKI.

Mark 82 American General-Purpose Bomb





Tiers:



Variants:

- **Mark 82:** The Mark 82 (Mk 82) is an unguided, low-drag general-purpose bomb, part of the United States Mark 80 series. The explosive filling is usually tritonal, though other compositions have sometimes been used.
- **Mark 83:** The Mark 83 is part of the Mark 80 series of low-drag general-purpose bombs in United States service.
- **Mark 81:** The Mark 81 (Mk 81) 250-pound (110 kg) general-purpose bomb (nicknamed "Firecracker") is the smallest of the Mark 80 series of low-drag general-purpose bombs.

System

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↳*Mark 82 Unguided General-Purpose Bomb*

Name: Mark 82
Type: Unguided General-Purpose Bomb
Length: 2.22 m
Diameter: 273 mm
Weight: 227 kg
Filling: Tritonal, Minol (explosive) or Composition H6
Filling Weight: 87 kg
Cook Off Time: approximately 2 minutes 30 seconds.

Notes:

The Mark 82 (Mk 82) is an unguided, low-drag general-purpose bomb, part of the United States Mark 80 series. The explosive filling is usually tritonal, though other compositions have sometimes been used. With a nominal weight of 500 lb (227 kg), it is the one of the smallest in current service, and one of the most common air-dropped weapons in the world. Although the Mk 82's nominal weight is 500 lb (227 kg), its actual weight varies depending on its configuration, from 510 lb (232 kg) to 570 lb (259 kg). It is a streamlined steel casing containing 192 lb (89 kg) of Tritonal high explosive. The Mk 82 is offered with a variety of fin kits, fuzes, and retarders for different purposes. The Mk 82 is the warhead for the GBU-12 laser-guided bombs and for the GBU-38 JDAM. Currently only the General Dynamics plant in Garland, Texas and Nitro-Chem in Bydgoszcz, Poland is Department of Defense-certified to manufacture bombs for the US Armed Forces. The Mk 82 is currently undergoing a minor redesign to allow it to meet the insensitive munitions requirements set by Congress. According to a test report conducted by

the United States Navy's Weapon System Explosives Safety Review Board (WSESRB) established in the wake of the 1967 USS Forrestal fire, the cooking off time for a Mk 82 is approximately 2 minutes 30 seconds. More than 4,500 GBU-12/Mk 82 laser-guided bombs were dropped on Iraq during the Persian Gulf War. France requested 1,200 Mk 82s in 2010 to Société des Ateliers Mécaniques de Pont-sur-Sambre (SAMP) which builds Mk 82s under licence. Saudi Arabia requested 8,000 Mk 82s in 2015, along with guidance kits and other weapons.

RBK-250 Russian Cluster Bomb



Tiers:



Variants:

- **AO-2.5 Bomblet:** The AO-2.5 (aviatsionnaya oskolochnaya bomba, "aviation fragmentation bomb") bomblet is the original submunition used in the RBK-250-275. It has a cylindrical body with four fins on the tail. A variant, the AO-2.5-2, has elongated, flatter fins.
- **AO-1 SCh bomblet:** The AO-1 SCh looks like a miniature bomb, with a serrated cylindrical body and four tail fins, and is probably a more modern successor of the original AO-2.5. When armed with this bomblet, the RBK-250-275 has a destructive footprint of 5,740 sq yd (4,800 sq m).
- **PTAB-2.5 bomblet:** The PTAB-2.5 (protivotankovaya aviatsionnaya bomba, "anti-tank aviation bomb") is an anti-tank bomblet armed by an air-rotating vane in the drum assembly. The shaped charge can reportedly penetrate up to 4.72 in (120 mm) of armor plate.
- **PTAB-2.5M long-tail and short-tail bomblet:** A slight variation on the PTAB-2.5, the PTAB-2.5M comes in long-tail and short-tail versions, which differ from the original only in a protective covering over the nose fuze, the tail assembly and a slightly altered explosive mixture.

System

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↳***RBK-250 Cluster Bomb***

Name: RBK-250
Type: Cluster Bomb
Manufacturer: VO GED (General Export for Defense), Moscow, Russia Bazalt State Research and Production Enterprise, Moscow, Russia
Length: 2.12 m
Diameter: 325 mm
Lug Spacing: 250 mm
Weight: 275 kg
Warhead: HE Bomblets
Fuzes: INA

Notes:

The RBK-250-275 (razovaya bombovaya kasseta, "one-use bombing cartridge") is designed to carry a wide variety of bomblets, including the AO-2.5, AO-1 SCh and PTAB-2.5. This permits the weapon to be used in many different roles, including anti-personnel, anti-materiel, anti-armor and runway-c ratering missions.

KAB-500KR Russian Fire and Forget Bomb



Tiers:

1 2 3 4

System

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↳*KAB-500Kr Bomb*

Name: KAB-500Kr
Type: Electro-optical TV-guided fire and forget bomb
Basic Load: INA
Manufacturer: Russia
Proliferation: INA
Length: m3.05
Diameter: INA
Warhead Type: Hardened, armor-piercing warhead
Weight: kg520
Warhead Weight: kg380
Penetration: up to 1.5 metres (4 feet 11 inches) of reinforced concrete.
Effective Range: The weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.
Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Notes:

The KAB-500Kr (Correctable air bomb - 500 kg) is an electro-optical TV-guided fire and forget bomb developed by the Soviet Air Force in the 1980s. It remains in service with the CIS and various export customers. The KAB-500Kr is analogous to the American GBU-15 weapon. It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb. The bomb is 3.05 m (10.0 ft) long and weighs 520 kg (1,150 lb), of which 380 kg (840 lb) is a hardened, armor-piercing warhead capable of penetrating up to 1.5 metres (4 feet 11 inches) of reinforced concrete. The weapon's seeker can lock onto a

target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility. The KAB-500-OD[3] variant is equipped with a fuel-air explosive warhead. The technology of KAB-500Kr is also used for larger bombs, such as KAB-1500Kr based on the 1500 kg class FAB-1500 iron bomb. There is also training bomb KAB-500Kr-U

KAB-500 Series of Russian Fire and Forget Bombs







Tiers:

1 2 **3** 4

Variants:

- **KAB-500-OD:** Is equipped with a fuel-air explosive warhead.
- **KAB-1500Kr:** Based upon the 1500kg class FAB-1500 iron bomb.

System

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↳***Bomb***

Name: KAB-500Kr
Type: Electro-optical TV-guided fire and forget bomb
Basic Load: INA
Length: m3.05
Diameter: 0.35
Warhead Type: Hardened, armor-piercing warhead
Weight: kg520
Warhead Weight: kg380
Penetration: Up to 1.5 metres (4 feet 11 inches) of reinforced concrete.
Effective Range: The weapon's seeker can lock onto a target at ranges of up to 15 to 17 km (9.3 to 10.6 mi), depending on visibility.

Bomb Drop Altitude: km0.5-5

Note: It uses a standard Soviet/Russian FAB-500 general-purpose bomb, with a nominal weight of 500 kg (1,100 lb), as a warhead, adding a low-light television seeker and guidance fins to turn it into a guided, unpowered glide bomb.

Notes:

The KAB-500Kr, KAB-500-OD, KAB-1500Kr corrected air bombs are fitted with TV/terrain-matching homing heads and various types of warheads. TV homers with target data processing correlation algorithm can "remember" target location and correct bomb's flight trajectory until the impact on the target, thus realizing the "fire and forget" principle. Such homing heads can help defeat low-contrast and masked targets provided that terrain reference points and target coordinates related to them are available. The Pr-E/F-E/OD-E/K-E are the most perfected example of the caliber of 500 kg, which has no direct relation to their foreign counterparts in the TV seeker, with a correlation algorithm of information processing of the purpose. Theyhave a Betonoboynymi-explosive warhead. Corrected air bombs KAB-500Kr caliber 500 kg is designed to engage a wide range of ground and surface stationary targets, including durable and low-contrast (disguised, whose position is known relative to the surrounding landmark), with the implementation of the "Reset - forget" principle). The guidance system bombs on target - TV-correlation. KAB-500Kr can be used singly and a volley from horizontal flight, dive, or pitching in the daytime (for illuminated targets - and at night), including a plurality of spaced targets in a single attack. The bomb consists of a housing, a television homing, electric charging fuse, unit control system device, warhead, turbogenerator power source, fuse, steering gear, block-board automation. Television gyrostabilized seeker head with the correlation algorithm of the information processing target includes opto-electronic part mounted on a three-stage gyrostabilized platform and an electronic data processing unit located in a single housing. The front part of the head is closed spherical transparent fairing. The head provides guidance bombs on target with illumination on the ground 50-100000 lux and contrast targets 0.2. Range capture target type "aircraft parked" at a meteorological visibility range of 10 km - 15-17 km. Suspension bomb on the plane by means of a universal beam holder DB3-U series. The KAB-500Kr, KAB-500-OD, KAB-1500Kr corrected air bombs make part of weapon systems of such front-line aircraft types as Su-27, Su-30, Su-34, Su24M, MIG-29 and others. The KAB-500Kr corrected air bomb is designed to engage stationary ground/surface small-sized hardened targets, such as reinforced concrete shelters, runways, railway and highway bridges, military industrial installations, warships, and transport vessels. < The KAB-1500Kr corrected air bomb is designed to engage various stationary ground/surface small-sized hardened targets, such as reinforced concrete shelters, military industrial installations, depots, and seaport terminals. The delivery set can be completed with the KAB-500Kr-U training bomb used for pilots' mastering combat employment skills for KAB-500Kr, KAB-500-OD and KAB-1500Kr corrected air bombs. The KAB-500Kr-U training bomb parameters are as follows: weight - 85kg, length 1,83m, diameter - 0,35m. The television channel management KAB-500Kr was developed in parallel with the KAB-500L air bombs. It had a caliber of 500 mm. The bomb was intended to destroy stationary ground targets such as railway bridges, fortifications, communications nodes, and so on. The television guidance system correlation type provide the possibility of defeat and concealed targets. Unlike foreign analogues, such as American bombs AGM-62 Walleye, exciting contrast optical target seeker KAB-500Kr fixed the relative positions of different optical contrast objects. This goal can not stand out from the area, and the bomb will be induced on a design point defined marker. If one believed the advertising magazine article "Military Parade" during the military operation received circular error probability less than three meters.

FT-2 Chinese Precision Guided Bomb







Tiers:



Variants:

- **FT-1:** This kit equips 1,100-lb (500-kg) bombs and is effective only against fixed targets. It consists of an unguided bomb section and a tail-guidance module with four control fins. Four stabilizing strakes are fitted to the body.
- **FT-2:** This kit is also for 1,100-lb (500-kg) bombs and features a planar wing kit for extended range.
- **FT-3:** The FT-3 is for 550-lb (250-kg) bombs and has a unique cruciform strake arrangement on the tail kit.
- **FT-3A:** The FT-3A is an improvement upon the FT-3 that includes a TV/imaging infrared seeker. The manufacturer, CASC, claims the accuracy has improved from a circular error probable of 65 ft (20 m) to 10 ft (3 m).
- **FT-4:** This version is for 550-lb (250-kg) bombs and has a planar wing kit.
- **FT-5:** This kit is for 220-lb (100-kg) bombs, with a strake and tail kit similar to the FT-1. The bomb-casing geometry is reportedly conventional and not intended for deep penetration of concrete. According to some reports, the FT-5 is designed primarily for unmanned aerial vehicles. It is said to be similar to the U.S. Small Diameter Bomb . A laser-guided variant has also reportedly been developed for integration with the Chinese CH-3 UAV.
- **FT-6:** This version is for 550-lb (250-kg) bombs and has a slim low drag bomb casing and a planar glide wing kit similar to the FT-3.
- **FT-6A:** An improvement upon the FT-6, the FT-6A is able to directly target air-defense and mobile systems through its anti-radiation seeking capability.
- **FT-12:** This is a rocket-boosted, precision-guided glide bomb. It has an 11-22 lb (5-10 kg) rocket motor, according to CASC. A release velocity of 370-620 mph (600-1,000 kmh) gives the 1,540 lb (700 kg) FT-12 a maximum range of 90 mi (150 km). The FT-12 can attack static targets with an accuracy of about 66 ft (20 m) circular error probable using a GPS /INS guidance system.

System

:

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↳***FT-2 Precision Guided Bomb***

Name: FT-2

Type: Precision Guided Bomb
Length: depends on the gravity bomb used
Height: depends on the gravity bomb used
Diameter: depends on the gravity bomb used
Wingspan: depends on the gravity bomb used
Weight: 550 kg
Warhead: various gravity bombs
Detonation Mechanism: Impact / Proximity
Range: 15-90 km
Drop Altitude: 3,000-12,000 m
CEP: 20 m

Notes:

FT-2 This kit is also for 1,100-lb (500-kg) bombs and features a planar wing kit for extended range.

Naval Watercraft

→Aircraft Carriers

Shandong (17) Chinese Type 001A Aircraft Carrier



Tiers:

1 2 3 4

System

Alternative Designation: Shandong
Total Built: 1
Type: Aircraft Carrier
Class: Type 001A Class
Builder: Dalian Shipbuilding Industry
In Service: 2019-Present
Pendent: CV-17
Crew: ea2,000
Aircrew: 500
Flag Staff: 126
Endurance: 90 days

Dimensions

Length: m315
Beam, Waterline: m38
Beam, Deck: m72

Draught: m11

Flight Deck Length: m304.5

Flight Deck Width: m72

Hanger Deck Length: m153

Displacement, Standard: 48 000 tons

Displacement, Full Load: 64 000 tons

Propulsion System

Engine Name: INA

Steam Boilers: 8

Steam Turbines: 4

Engine Power: 200,000 shp

Shafts: 4

Main Armament

↳*System*

Name: Type 730 CIWS

Type: Close-In Weapon System

Caliber: 30mm

Quantity: 3 x Type 730 CIWS

Main Armament: The 30 mm Gatling gun mount designated as H/PJ-12 is extremely similar to the General Electric GAU-8/A Avenger. Although there are sources claiming that it is the Chinese version of the Russian Gryazev-Shipunov GSh-6-30 Gatling gun, this appears to be unlikely, since the Russian Gatling gun only has six barrels. H/PJ-12 is versatile in that its FCS can be either separately installed at different locations like the Soviet AK-630, or directly integrated on the gun mount. Like the American GAU-8/A Avenger, it is recommended not to fire longer than a single minute at a rate of 4,200 rounds per minute, after which the generated heat would begin melting the rifling of the barrels, shortening its useful life. Rates of fire beyond 4,200 rounds per minute increase wear. There are one Type 730 or two Type 730B/C, LD-2000 ammunition drums each contains 640 Type 730 or 500 Type 730B/C, LD-2000 rounds, and other versions of the ammunition drums have been reportedly developed.

Barrels: 7-barrel

Rate of Fire: 1,200-4,200 rounds/minute (Type 730) 11,000 rounds/minute (Type 1130)

Effective Firing Range: 1–1.5 km

Maximum Firing Range: 3 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds.

Guidance Systemm: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition*

Type: Rifle

Caliber: mm30

Basic Load: INA

Missile Weapon Systems

↳ ***System***

Name: FL-3000N

Type: Ship-Defense Missile System

Quantity: 3 x FL-3000N Ship-Defense Missile Systems

Length: 2.00 m

Diamter: 0.12 m

Missile: HQ-10

Missile Basic Load: INA

Maximum Range Against High-Speed Targets: 6,000 m

Maximum Range Against Low-Speed Targets: 9,000 m

Minimum Range: 500 m

Elevation: INA

Traverse: INA

Onboard Aviation Facilities

Aircraft: 28-36 J-15 naval fighters

Helicopters: 12-16 helicopters

Fire Control

Type 730 CIWS: The OFC-3 system is modular design that comprises a laser range finder, a color TV camera, and an IR camera, and the laser range finder can be replaced by a laser designator (for a laser beam-riding SAM), the TV camera can be replaced by a night vision camera, and the IR camera can be replaced by an ImIR, at higher cost. Development to incorporate the dual band IR, night vision camera, and the color TV camera is reportedly in progress. Type 730 CIWS is an autonomous closed-loop system and thus offers faster reaction time than the Russian AK-630. Type 730 CIWS is fully compatible with Chinese and European combat data systems such as ZKJ-1, ZKJ-4, ZKJ-4A-3, ZKJ-5, ZKJ-6, ZKJ-7, H/ZBJ-1, and Thomson-CSF TAVITAC, and can be directly integrated with these combat data systems without any modification.

Sensors: The carrier is fitted with the advanced Type 346 S-band active electronically scanned array (AESA) radar. The phased-array radar panels face diagonally outward on both sides of the bridge, fore and aft. The Type 001A's electronic equipment is entirely new.

Fire Control Radar

Type 730 CIWS: The TR47C radar operates in the same way of AN/APY-1/2 radar on board E-3 Sentry in that the azimuth is scanned mechanically, while the elevation is scanned electronically, incorporating a total of 169 transceivers of phased array technology that enables the radar to pick up the splashes of 30 mm rounds. Like the western CIWS, the information is processed on site, via local computers of the radar and the gun mount, thus providing faster reaction time than the Russian design in which the radar and fire control system are separately located. The system can track a sea-skimming target with 0.1 square metre radar cross section at 8 km, extended to 15 km if the radar cross section is increased to 2 square metres, and further extended to 20 km if the radar cross section is increased to 10 square metres, though the targets could not be engaged until much closer (3 km) due to the limited range of the gun.

Protection

Active Protection System: INA

NBC Protection: Yes

Notes:

The SHANDONG (Type 001A) is China's first domestically built aircraft carrier. It is a development of the LIAONING class, China's first aircraft carrier, which is based on a former Soviet vessel (see separate record). The carrier is named after the province in eastern China. Shandong (17; Chinese: □□□; pinyin: Shāndōng Jiàn) is a first-generation Chinese aircraft carrier that was launched on 26 April 2017 for the People's Liberation Army Navy (PLAN) of the People's Republic of China (PRC). It is the country's second aircraft carrier after the completion of Liaoning, and the first built domestically. Shandong was initially designated as a Type 001A air carrier during development but was finalized as Type 002 at commissioning. Shandong was constructed by the Dalian Shipbuilding Industry, part of the China Shipbuilding Industry Corporation, in Dalian, Liaoning province, China. According to the state media service Xinhua, they started fabrication of vessel in November 2013, and laid down the keel for its hull in a drydock beginning in March 2015. The Chinese government did not publicly confirm the ship's existence until construction was well underway. Satellite imagery for the defense analysis industry showed the aircraft carrier in the early stages of hull assembly by March 2015. Public photos of a hull with military characteristics at the Dalian shipyard surfaced on the internet the next month. In October 2015, the first definitive signs of the vessel's role appeared when construction of a hangar deck began on the hull. In December 2015, a Chinese defense ministry spokesman confirmed that the ship was an aircraft carrier, stating that the design and construction work was under way. In May 2016, the ski jump takeoff ramp was noted to be close to installation. The ship's island superstructure was fabricated in two parts: the nine-deck forward half, containing the bridge and main mast, was installed by September of that year; the aft half, with the funnel and air intakes, was installed in the weeks that followed. By the end of 2016, the ship was substantially structurally complete. Following the launch, the carrier was fitted-out and underwent early tests of the propulsion system. The dockside system trials began after the out-fitting was completed in November 2017. At the time of its launch, the ship was not expected to be delivered to PLAN until 2020; however, successful early tests put the project ahead of schedule and media reports indicated that it could enter the navy fleet in 2019. While its predecessor Liaoning has been used largely as a training ship since it entered active service in 2012, the Type 002 is expected to be used in regular military operational service. The aircraft carrier's design is largely based on China's first carrier Liaoning, which was itself built from the partially-complete hull of the Soviet Kuznetsov-class aircraft carrier Varyag. It retains the ski jump takeoff, which limits its air wing to helicopters and Shenyang J-15 fighter jets, and the ship is powered by conventional oil-fired boilers driving eight steam turbines derived from the Soviet-designed examples installed on Liaoning. It measures about 315 metres (1,033 ft) long, with a displacement of about 55,000 tonnes (70,000 loaded). However, it carries modifications and upgrades compared to Liaoning. It has increased storage for ammunition and fuel, with a larger aircraft capacity of 44 aircraft, eight more than Liaoning. Shandong has a broader flight deck but a shorter island superstructure than Liaoning to give more space for aircraft movements. The island also has redesigned radars and a new bridge, while the fleet command and flight control tower are on separate floors for more efficiency. It includes an active electronically scanned array (AESA) radar system. Shandong, like its predecessor, uses the simpler "short take-off but arrested recovery" (STOBAR) launch and recovery system. Future carriers, such as the Type 003 aircraft carrier, are planned to use an Electromagnetic Aircraft Launch System (EMALS) that allows the launch of heavier and more advanced aircraft such as the Shenyang J-31 or the Chengdu J-20.

FPB-57 Nav V Indonesian Fast Patrol Boat (FPB)








Tiers:



Variants:

- **KRI Todak (803):** Commissioned: 2000 Status: Active
- **KRI Shark (804):** Commissioned: 2000 Status: Active
- **KRI Layang (805):** Commissioned: 2003 Status: Active
- **KRI Lemadang (806):** Commissioned: 2004 Status: Active

System

Alternative Designation: FPB-57 Nav V Class

Type: Fast Patrol Boat

Builder: PT.PAL

Crew: 42

Note: In the near future, the Pandrong class and the Todak class will be equipped with C 802 anti-ship missiles made in China with a maximum reach of 130 km.

Dimensions

Length: 58.10 m

Beam: 7.62 m

Draft: 4.75 m

Displacement, Standard: 445 tons

Displacement, Full Load: INA

Propulsion System

Engine Name: 2 X Diesel Engines

Engine Type: Diesel

Engine Power: 8,850 bhp

Maximum Range: 2,200 nm at 27 knots 6,000 nm at 15 knots

Maximum Speed: 28.1 kn (52.0 km / h; 32.3 mph) (maximum)

Fuel Capacity: INA

Main Gun System

Radar/Optronic Director: LIROD MK2

LIROD MK2 Description: LIROD MK2 is a flexible and compact sensor system, most suitable as an accurate, low cost, all-weather tracker for fire control systems.

LIROD MK2 Details: The system has been designed for as the primary gun control system onboard of smaller ships, against both surface and air targets, and as a secondary system in larger configurations. With an appropriate gun, it is suitable for CIWS functions. LIROD Mk2 is also capable of controlling short-range missiles. The radar system operates in the K-band, and applies a new, powerful TWT transmitter to improve the performance under adverse conditions. The antenna is of an ellipsoid design to achieve the best low elevation performance against sea-skimming targets, while maintaining fast target acquisition against manoeuvring targets.

↳*System*

Name: Bofors 57 mm l/L70 Naval Gun

Type: Naval Gun

Caliber: mm57

Quantity: 1 x Bofors 57 mm l/L70 Naval Gun

Barrel Length: 3,990 mm

Weight: 14,000 kg

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Action: Electronic firing

Elevation: −10°/+78°

Traverse: Full 360°

Rate of Fire: 200 rounds/min

Muzzle Velocity: 1,035 m/s

Maximum Firing Range: 17,000 m

Effective Firing Range: 8,500 m

Feed System: 40 ready rounds, 128 rounds in ready racks in mount

Sights: Gyro-stabilized in local control.

↳*Ammunition*

Type: Rifle

Caliber: 57mm

Shell: INA

Basic Load: INA

Auxiliary Weapon Systems

↳*Auxiliary Weapon System #1*

Name: Bofors 40 mm gun
Type: Anti-Aircraft Autocannon
Caliber: 40mm
Quantity: 4 x Bofors 40 mm Anti-Aircraft Autocannon
Length: 6.5 m
Barrel Length: 2.2 m
Width: 1.8 m
Height: 1.9 m
Weight: 1,981 kg
Barrels: 1 or 2[
Traverse: 360°
Rate of Fire: 120 round/min
Muzzle Velocity: 881 m/s
Maximum Firing Range: 7,160 m

↳*Auxiliary Weapon System #1 Ammunition*

Type: Rifle
Caliber: 40mm
Shell: 40×311mmR
Basic Load: INA

↳*Auxiliary Weapon System #2*

Name: Rheinmetall Mk 20 Rh-202
Type: Autocannon
Caliber: 20mm
Quantity: 2 x Rheinmetall Mk 20 Rh-202 Autocannons
Length: 2612 mm
Height: 241 mm
Weight: 83 kg
Action: Gas unlocked blowback
Rate of Fire: 880 to 1,030 rpm
Muzzle Velocity: 1,044 m/s with HEI 1,100 m/s with AP
Effective Firing Range: 1,600 m against high flying aircraft 2,500 m against ground targets

Auxiliary Weapon System #2 Ammunition

Type: Rifle

Caliber: 20mm

Shell: 20 × 139 mm

Basic Load: INA

Torpedo System

↳*Launcher*

Launching Tubes: 2 x Torque launch tubes Ø 533 millimeters (20.98 in)

↳*Torpedos*

Name: AEG SUT

Type: Surface & Underwater Target guided torpedo

Speed: 23 knots

Range: 28 km

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Aircraft Facilities

Note: The FPB-57 Nav V Class is equipped with a flight deck and hangar at the rear for the NBO-105 Class Helicopters.

Radar Systems

Navigation Radar: INA

Scout Surface Radar: Racal Decca / Signaal Scout surface radar

Sonar

Name: PHS-32

Type: Hull Mounted

Protection

Active Protection System: Yes, DR200S system for defense against guided missiles

Countermeasures: Yes, Feeder (Countermeasures) Dagie decoy RL

NBC Water Washdown System: Yes

↳

Notes:

FPB-57 or Fast Patrol Boat 57 m or Fast Patrol Boats 57 m or PB-57 (because not all high speed) is a draft patrol boat made by Liirssen , Germany . In the agreement, PT. PAL, which originally only assembled this ship in Surabaya , also obtained the right to produce the design of this ship. Furthermore, this ship has been made in Surabaya. In Germany it started with the Albatros class fast patrol boat , where in Germany itself in 2005 , some ships in this class had been retired or sold to Tunisia. It is the last generation of FPB-57. This shipbuilding is fully carried out by PT. PAL Surabaya. These ships include: *KRI Todak (803) , was inaugurated in 2000 *KRI Shark (804) , was inaugurated in 2000 *KRI Layang (805) , was inaugurated in 2003 *KRI Lemadang (806) , was inaugurated in 2004

INS Vikramaditya Class Indian Aircraft Carrier





Tiers:

1 2 3 4

System

Alternative Designation: INS Vikramaditya; The vessel used to be Russia's Admiral Gorshkov Aircraft Carrier

Total Built: 1

Builder: Black Sea Shipyard, USSR, and Sevmash, Russia

Russian Commisioned: 11 December 1987

Russian Decommissioned: 1996

Refurbished Complete: 19 April 2012

India's Commision Dated: 16 November 2013

Homeport: INS Kadamba, Karwar

Crew: ea1,610 (110 off. + 1,500 enl.)

Dimensions

Length, Overall: 928 ft 5 in (283.0 m)

Length, Waterline: 818 ft 6 in (249.5 m)

Beam, Overall: 167 ft 4 in (51.0 m)

Beam, Waterline: 107 ft 3 in (32.7 m)

Draft: 32 ft 8 in (10.0 m)

Hanger Length: 426 ft 6 in (130.0 m)

Hanger Width: 75 ft 6 in (23.0 m)

Hanger Height: 18 ft 8 in (5.7 m)

Flight Deck: 918 ft 8 in (280.0 m

Runway Length: 649 ft 7 in (198.0 m)

Runway Width: 78 ft 9 in (24.0 m)

Aircraft Area on deck: 25,833 sq ft (2,400 sq m)

Displacement, Standard: 46,129 tons

Propulsion System

Engine Name: 4 x GTZA 674 geared turbines
Engine Power: hp180,000 total shp
Shafts: 4 shafts
Boilers: 8 x KWG4 turbo pressurized
Maximum Range: 7,000 nm (8,050 mi) at 18 knots
Maximum Speed: 29 knots max
Endurance: 30 days

Communications

Communcations System: Composite Communications System Mk II
Data Link: Link 11

Main Armament

↳*System*

Name: AK-630
Caliber: 30mm
Type: Close-In Weapon System
Quantity: 6 x AK-630 30mm Close-In Weapon System
Main Armament: 1 or 2 AO-18 autocannons
Secondary Armament: Rafael Barak 1 surface-to-air missile systems
Number of Missiles per AK-630 30mm Close-In Weapon System: 4 missiles per 30mm Close-In Weapon System
Number of Missiles Total: 24 x Rafael Barak 1 surface-to-air missile systems
Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)
Width: 1,240 mm (49 in) (mount ring)
Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)
Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)
Crew: 1
Action: Gas-operated rotary cannon
Elevation: +88° ... -12° (50°/sec)
Traverse: ±180° (70°/sec)
Rate of Fire: 4,000–5,000 rounds/min
Muzzle Velocity: 880–900 m/s
Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range
Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)
Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

↳***Ammunition***

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 4,000 per AK-630 30mm Close-In Weapon System

Onboard Aviation Facilities

Aircraft: 26 × Mikoyan MiG-29K multi-role fighters

Helicopters: 10 × Kamov Ka-31 AEW&C and Kamov Ka-28 ASW helicopters

Note: Vikramaditya has been designed as a STOBAR carrier capable of operating both conventional fixed-wing aircraft and helicopters, with up to 34 aircraft capable of being accommodated. Its primary embarked aircraft type is the Mikoyan MiG-29K, a navalised version of the Mikoyan MiG-29M. The MiG-29K is an advanced, all weather multi-role fighter capable of undertaking both the fleet air defence, low level strike and anti-shipping roles. The primary ASW platform is the venerable Westland Sea King, while AEW is undertaken by the Kamov Ka-31. Carriage ranges given for the ship seem to converge around 16–24 MiG-29K and 10 Kamov Ka-31 or Dhruv helicopters; however Vikramaditya is not capable of operating fixed-wing AEW aircraft owing to her configuration as a STOBAR carrier. Utility and plane guard duties are undertaken by the HAL Chetak (or HAL Dhruv).

Fire Control

Combatr Data System: Lesorub E

FCS: See Main Armament

Radar

Air/Sea Radar: 1 x Plate Steer (M-700 series Fregat-M) air search

Surface Search Radar: 2 x Strut Pair (MR-320M Topaz) surface search

Navigation Radar: 2 x Navigation (Name: INA

Addiitonal Radar: 1 x Resistor-E

Protection

Active Protection System: Yes

Electronic Warfare: Bharat intercept and jammers

NBC Protection: Yes

Rocket Launcher Decoys: 2 x trainable PK-2 decoy rocket launchers

Torpedos: 2 x towed torpedo decoys

Notes:

INS Vikramaditya (Sanskrit, Vikramāditya meaning "Brave as the Sun") is a modified Kiev-class aircraft carrier and the flagship of the Indian Navy, which entered into service in 2013. She has been renamed in honour of Vikramaditya, a legendary emperor of India. Originally built as Baku and commissioned in 1987, the carrier served with the Soviet Navy and later with the Russian Navy (as Admiral Gorshkov) before being decommissioned in 1996. The carrier was purchased by India on 20 January 2004

after years of negotiations at a final price of $2.35 billion. The ship successfully completed her sea trials in July 2013 and aviation trials in September 2013. She was commissioned on 16 November 2013 at a ceremony held at Severodvinsk, Russia. On 14 June 2014, the Prime Minister of India formally inducted INS Vikramaditya into the Indian Navy and dedicated her to the nation. Refurbishment The hull work was completed by 2008[45] and Vikramaditya was launched on 4 December 2008. Around 99% of the structural work and almost 50% of the cabling work had been completed by June 2010. Almost all of the large equipment, including engines and diesel generators, was installed. A naval MiG-29K prototype aircraft was used to test the deck systems of Vikramaditya in 2010. All reconfiguration work was completed at Severodvinsk, Russia; however it was delayed by three years due to underestimation of the amount of cabling needed. An expert level discussion on technical and financial matters was held between India and Russia to sort out the issues. The MiG-29K entered operational service with India in February 2010. A compromise was finalised and India was to pay an extra undisclosed amount. Russia was to install new systems instead of repairing the old ones. On 1 June 2010, The Times of India reported a naval officer saying: "With India earlier this year agreeing to the revised refit cost of $2.33 billion for Gorshkov after three years of bitter wrangling since the earlier agreement inked in January 2004 had earmarked only $974 million for it, Russia has appointed a high-level apex committee to oversee the work on the carrier". The ship was to go for harbour trials by early 2011 to ensure it could be handed over to India by December 2012 or so. Dock trials began on 1 March 2011. The focus of these trials was on the main power generation units and the radio-electronic armament systems, manufactured in India. Indian Navy personnel began training on Vikramaditya in April 2011. On 19 April 2012, it was announced that all internal systems were functioning, and the ship was entirely self-contained. Measurement of the ship's magnetic field and centre of gravity were performed before sea trials began. As completed, Vikramaditya has a larger full load displacement than when the ship was originally launched in 1982 as Baku. 1,750 out of 2,500 compartments of the ship were re-fabricated, and extensive re-cabling was done to support new radars and sensors. The elevators were upgraded, and two restraining stands were fitted, allowing combat aircraft to reach full power before making a ski jump-assisted short take-off. Three arresting gears were fitted on the aft part of the angled deck, and navigation and carrier-landing aids were added to support fixed-wing "short take-off but arrested recovery" (STOBAR) operations. The major modifications were to allow Admiral Gorshkov to operate as a STOBAR aircraft carrier in Indian service, as opposed to the STOVL configuration the ship was built as. This involved removal of all the armament, including the P-500 Bazalt cruise missile launchers and the four Antey Kinzhal surface-to-air missile bins fitted on ship's bow, to make way for a 14.3°, full-width ski-jump. The 20-ton capacity aircraft lift beside the ship's island superstructure was unchanged, but the aft lift was enlarged and its lift capacity increased to 30 tons. For STOBAR operations, three 30 m arrestor wires and three restraining gears on the stern of the angled deck were fitted. Sponsons were installed to increase the area of the flight deck, to allow the ski-jump to be fitted, for strengthening of arresting gear and runway area, and to lengthen the after end, which allowed an increase to the length of the landing strip aft of the arresting gear. 234 new hull sections were installed to achieve the desired shape, and the total steel added to carry out these modifications amounted to 2500 tons. The superstructure profile was designed to accommodate the fixed phased array scanners of the Soviet Navy's Mars-Passat 3D air search radar system, along with extensive command and control facilities to conduct an aerial campaign. Extensive revamp of sensors was carried out, with long range air-surveillance radars and advanced electronic warfare suites fitted, which enable the maintenance of a surveillance bubble of over 500 km around the ship. An aft mast was installed to accommodate various communication antennae. These changes needed 2,300 km of new cables, and 3,000 km of new pipes. The eight original boilers were replaced by new generation, high-pressure boilers, converted to take diesel fuel utilising LSHSD instead of furnace fuel oil, each providing a steam capacity of 100 tonnes per hour. The new boilers are highly efficient and have high levels of automation. They power four propellers in four shaft configuration, producing a total thrust of 180,000 horsepower (134,226 kW) at the shaft, providing a top speed of over 30 knots. Six turbo alternators and six diesel alternators generate 18 MW of electricity to power various equipment. Modern oil-water separators as well as a sewage treatment plant were incorporated to meet international standards. Six new Finnish Wärtsilä 1.5 MW diesel generators, a Global Marine communications system, Sperry Bridgemaster navigation radar, a new telephone exchange, new data link and an IFF Mk XI system were added. Hotel services were improved with the addition of two reverse osmosis plants producing 400 tons of fresh water per day, as well as updated refrigeration and air conditioning. A new galley was installed together with improved domestic services and accommodation for 10 female officers. Combat systems he combat systems on board the carrier are controlled by LESORUB-E, the computer-aided action information system. It gathers data from the ship's sensors and data links and creates comprehensive situation awareness. The CCS Mk II communication complex is installed for external communications and the Link II tactical data system enables integration into the Indian Navy's network-centric operations. Modern launch and recovery systems are installed for handling different aircraft – the LUNA landing system for MiG-29Ks and the DAPS Landing system for Sea Harriers. The Resistor-E automated air-traffic control system has been installed, which provides assistance during approach, landing and short range navigation down to a distance of 30 metres short of flight deck to the pilots. Along with various other sub-systems, it provides navigation and flight data to ship-borne aircraft operating at long distances from the carrier. When delivered, Vikramaditya had yet to be fitted with any on-board armament, leaving her dependent on her battle group for self-defence. This was rectified during the ship's short refit of April–June 2015, when she was fitted with four license-built AK-630 CIWS, and a Barak 1 SAM system stripped from the decommissioned INS Godavari. During the ship's first scheduled major refit in 2017, the Barak 1 system will be replaced with the newly developed Barak 8 long-range air-defence system (LR-SAM), which is currently being tested. It is launched from vertical launch cells, and has an operational range of 0.5–100 km. The carrier will carry up to 48 missiles. The official expected life span of the ship is 40 years, and is unlikely to require any major repair work for at least a decade. Over 70% of the ship and her equipment is new and the remainder has been refurbished.[Sevmash Shipyard, which upgraded the carrier, will provide warranty servicing including maintenance for the next 20 years.

INS Vikrant Class Indian Aircraft Carrier





Tiers:



System

Alternative Designation: INS Vikrant, also known as Indigenous Aircraft Carrier 1 (IAC-1),
Total Built: 1 Aircraft Carrier Scheduled to be built
Laid Down: 28 February 2009
Completed: 2021 (expected)
Commissioned: 2022 (expected)
Builder: Cochin Shipyard Limited
Type: Air Craft Carrier
Crew: 1,400 (160 off. + 1,240 enl.)

Dimensions

Length: 262.50 m
Beam: 60.84 m
Draft: 8.40 m
Draght: 8.4 m
Decks: 2.5 acres (110,000 sq ft; 10,000 m2)
Displacment, Standard: 40,642 tons

Propulsion System

Engine Name: 4 x H.A.L.-General Electric LM-2500 gas turbines

Engine Power: 120,000 hp total

Shaft: 2 shafts w/controllable-pitch propellers

Maximum Range: 7,500 nm at 18 knots

Maximum Speed: 28 knots

Endurance: INA

Main Armament

↳*System*

Name: OTO Melara

Caliber: 76mm

Type: Naval Gun

Quantity: 4 x OTO Melara 76mm Naval Gun

Barrel Length: 4,724.4mm

Weight: Empty: 7.5 tonnes

Crew: Remote Controlled

Elevation: −15°/+85° speed: 35°/s (acceleration: 72°/s²)

Traverse: 360° speed: 60°/s (acceleration: 72°/s²)

Rate of Fire: Compact: 85 rounds/min Super Rapid: 120 rounds/min

Muzzle Velocity: 915 m/s

Maximum Firing Range: HE-PFF 16,000 m

Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

Sights: INA

↳*Ammunition*

Type: Rifle

Caliber: mm76

Shell: 76×636mmR cartridge weight 12.5 kilograms (28 lb) shell weight 6.3 kilograms (14 lb) propellant weight 2.35 kilograms (5.2 lb)

Basic Load: INA

Auxiliary Weapon Systems

↳*System*

Name: AK-630

Caliber: 30mm

Type: Close-In Weapon System (CIWS)

Quantity: 1 x AK-630 30mm Close-In Weapon System (CIWS)

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 2 x 32 cells VLS

Missile Type: Barak 1 & Barak 8 Missile

Missile Basic Load: 64

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Effective Firing Range: the projectiles self-destruct past 5,000 m

Feed System: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

Fire Control Systems: Vympel MR-123 Vympel-A MR-123/176 Vympel-AM MR-123-02/MR-123-03 Vympel-AME MR-123-02/176 Laska 5P-10E

↳***Ammunition***

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 4,000

Onboard Aviation Facilities

Aircraft: 20 x MiG-29K Fulcrum-D and/or Tejas light combat aircraft

Helicopters: 10 x Ka-31 and HAL Dhruv helicopters

Radar

Navigation Radar: 1 x navigation (Name: INA)

Air/Surface Radar: 1 x ELM-2248 STAR air/surface search

Surface Radar: 1 x Selex RAN-40L long-range early warning and surveillance AESA radar

Protection

Active Protection System: Yes

Sonar: 1 x HUMSA hull-mounted sonar

NBC Protection: Yes

Notes:

INS Vikrant, also known as Indigenous Aircraft Carrier 1 (IAC-1), is an aircraft carrier under construction by Cochin Shipyard in Kochi, Kerala for the Indian Navy. It is the first aircraft carrier to be built in India. The name Vikrant (Sanskrit vikrānta, literally "stepping beyond") means "courageous". The motto of the ship is Jayema Sam Yudhi Sprdhah, which is taken from Rigveda 1.8.3 and can be translated as "I defeat those who fight against me". Work on the ship's design began in 1999, and the keel was laid in February 2009. The carrier was floated out of its dry dock on 29 December 2011 and was launched on 12 August 2013. As of 2019, the ship is expected to start sea trials in February 2021 and enter into service in early 2022. The project cost has escalated, by 2014, to ₹19,341 crore (equivalent to ₹230 billion or US$3.2 billion in 2018). With an additional ₹3,000 crore (US$420 million) authorised for phase III, in 2019. It is 262 metres (860 ft) long and 60 metres (200 ft) wide, and displaces about 40,000 metric tons (39,000 long tons). It features a STOBAR configuration with a ski-jump. The deck is designed to enable aircraft such as the MiG-29K to operate from the carrier. It is expected to carry an air group of up to thirty aircraft, which will include up to 24–26 fixed-wing combat aircraft,[23] primarily the Mikoyan MiG-29K, besides carrying 10 Kamov Ka-31 or Westland Sea King helicopters. The Ka-31 will fulfill the airborne early warning (AEW) role and the Sea King will provide anti-submarine warfare (ASW) capability. Vikrant is powered by four General Electric LM2500+ gas turbines on two shafts, generating over 80 megawatts (110,000 hp) of power. The gearboxes for the carriers were designed and supplied by Elecon Engineering. The ship's combat management system (CMS) was developed by Tata Power Strategic Engineering Division in collaboration with Weapon and Electronics System Engineering Establishment and MARS, Russia. It is the first CMS developed by a private company for the Indian Navy, was handed over to the Navy on 28 March 2019 India considered a number of aircraft for operation from its INS Vikramaditya and the planned indigenous aircraft carrier. India evaluated the Russian Sukhoi Su-33, but chose the lighter Mikoyan MiG-29K as Vikramaditya was smaller and lacked an aircraft catapult. On 18 January 2010, it was reported that India and Russia were close to signing a deal for 29 MiG-29K fighters to operate from IAC-1. In addition, the navy signed a deal for six naval-variants of the HAL Tejas. In June 2012, Flight Global reported that the Indian Navy was considering the use of Rafale M (Naval variant) on these carriers. In December 2016, the navy announced that the HAL Tejas was overweight for carrier operations, and other alternatives would be looked at. The ship's completion and commissioning has been delayed several times. Vikrant was originally intended to be delivered in December 2010 and commissioned in 2016. This was later postponed, with sea trials to begin in 2017 and commissioning planned for 2018. In July 2016, the Comptroller & Auditor General (CAG) published a 2014 project plan, supplied by the Cochin Shipyard, that shows an expected completion date in 2023, though the Navy hoped to partially commission the ship before this date. In December 2017, the Chief of Naval Staff Admiral Sunil Lanba announced that the ship was expected to be commence sea trials and be commissioned in 2020.[62][64] In January 2018, Commodore Chowdhary, the principal director of naval design, announced the remaining procurement delays stalling Vikrant's construction had been resolved, and that the carrier would be completed and delivered by December 2018; it would then undergo two years of sea trials before its expected commissioning in October 2020. In July 2019, Vice Admiral Saxena, Controller of Warship Production and Acquisition in the Navy, said that the ship was expected to be delivered by 2021.

Liaoning (16) Chinese Type 001 Aircraft Carrier







Tiers:



System

Alternative designations: Originally laid down in 1985 for the Soviet Navy as the Kuznetsov-class aircraft cruiser Riga, she was launched on 4 December 1988 and renamed Varyag in 1990. Riga (1988) then Varyag (1990)
Namesake: City of Riga, Latvia (1988) then Varyag, named for the Varangians (1990), the name Varyag was then adopted by another cruiser.
Builder: Mykolaiv South Nevskoye Planning and Design Bureau
Laid Down: 6 December 1985
Launched: 4 December 1988
Completed: 2011
Fate: Sold to a Chinese shell company, 1998 Transferred to Chinese navy, 2002
Commissioned: 25 September 2012
Status: In Active Status
Crew: 1,960 (200 off. + 626 air crew + 40 flag staff)
Endurance: 45 days

Dimensions

Length, Overall: 304.5 m
Length, Waterline: 280.0 m
Beam, Overall: 70.0 m
Beam, Waterline: 37.0 m
Draft: 10.5 m

Flight Deck Length: 304.5 m

Flight Deck Beam: 70.0 m

Hanger Length: 183.0 m

Hanger Width: 29.4 m

Hanger Height: 7.5 m

Displacement, Standard: 46,637 tons

Displacement , Load: 59,439 tons

Automotive

Propulsion: 8 x boilers; 4 x turbines

Power: 200,000 hp (147 MW); 4 shafts

Maximum Speed: 30 knots (56 km/h)

Maximum Range: 3,850 nm at 29 knots 8,500 nm at 18 knots

Armament

↳*Weapon Station #1*

Name: FL-3000N 24-cell launchers

Type: Missile Launcher

Quantity: 4 x FL-3000N 24-cell launchers

Missile: Instead of using QW-1 Vanguard MANPADs, the FL-3000N system uses the HHQ-10 (Red Flag 10) naval surface to air missile developed from TY-90 missile.

Length: m2

Diameter: m0.12

Maximum Range: > 9 km for subsonic targets, > 6 km for supersonic targets

Minimum Range: < 500 meters

Guidance System: passive RF + ImIR or ImIR only. The FL-3000N missile utilizes a combined guidance system that incorporates both passive radio frequency (RF) guidance and imaging infrared (ImIR) guidance. There are a pair of horn like protrusions mounted on the ImIR seeker at the tip of the missile, and these two protrusions are the passive RF seeker. An optional ImIR only guidance is also available and the missile is a fire and forget weapon.

Fire Control: The fire control system (FCS) of FL-3000N can simultaneously control two launchers, and can be integrated into other FCS on board ships. Alternatively, FL-3000N is also capable being directly controlled by other FCS on board ships. The system is usually fully automatic without human intervention, but manual operation can be inserted when needed.

↳*Weapon Station #2*

Name: Type 730 CIWS

Type: seven-barrelled 30 mm Gatling gun CIWS.

Caliber: 30mm

Quantity: 2 x 30-mm Type 730 CIWS

Barrels: 7-barrel (Type 730)

Crew: Automated, with human oversight

Rate of Fire: 1,200-4,200 rounds/minute (Type 730) 11,000 rounds/minute (Type 1130)

Effective Firing Range: 1–1.5 km

Maximum Firing Range: 3 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds Type 730B/C, LD-2000: Two ammunition boxes, each holding 500 rounds (total 1000 rounds) Type 1130: Two ammunition boxes, each holding 640 rounds (total 1280 rounds)

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition Weapon Station #2*

Cartridge: INA

Caliber: 30mm

Basic Load: INA

↳*Weapon Station #3*

Name: RBU-6000

Type: 213 mm caliber Soviet anti-submarine rocket launcher.

Quantity: 2 x RBU-6000 mortar

Launcher, Length: 2 m

Launcher, Width: 1.75 m

Launcher, Height: 2.25 m

Launcher, Weight: 3,100 kg (empty)

Launcher, Elevation: -15° to +65°

Launcher, Traverse: 180°

Maximum Effective Range: Ballistic 1 - 350 m to 1700 m, Ballistic 2 - 1500 m to 5500 m

Rocket Name: RGB-60 projectile

Rocket, Length: m1.83

Rocket, Diameter: m0.212

Rocket, Weight: 113.5 kg

Rocket, Warhead Weight: 23 kg

Rocket, Depth: 10 to 500 m

Rocket, Sink Rate: 11.6m/s

Aircraft

Note: On 4 November 2012, the People's Liberation Army's website (Chinese: □□□□) reported that Shenyang J-15s had performed carrier touch-and-go training. On 25 November 2012, China announced that J-15s had made five successful arrested landings on Liaoning. In June 2013, a second round of flight tests began on board Liaoning, with personnel from the fleet air arm of the Brazilian Navy providing carrier training support to the PLAN. In August 2014, based on an article from Chinese state media, Western news outlets reported that two pilots had been killed testing jets slated to operate from

Liaoning. Chinese military officials stated such reports were misleading, and clarified that deaths were in fact unrelated with tests on the carrier. The original Chinese article from Xinhua also did not link the deaths with the J-15 nor mention any loss of such aircraft. In August 2014, the Chinese-language Shanghai Morning Post listed that Liaoning would carry 36 aircraft: 24 Shenyang J-15 fighters, six Changhe Z-18F anti-submarine warfare (ASW) helicopters, four Changhe Z-18J airborne early warning helicopters and two Harbin Z-9C rescue helicopters. The Chinese carrier aircraft inventory is similar to a balanced combat and support aircraft approach intended for Soviet aircraft carriers, which supported nuclear submarines, large surface combatants, and land-based strike bombers performing anti-access roles. The air wing lacks long-range radar and anti-submarine fixed-wing aircraft, needing support from shore-based aircraft such as Tupolev Tu-154 ASW and Shaanxi Y-8 AWACS aircraft. The U.S. Department of Defense noted that J-15s will have below normal range and armament when operating from the carrier, due to limits imposed by the ski-jump takeoff system. The lack of a carrier onboard delivery aircraft like the United States Navy (USN) Grumman C-2 Greyhound also limits logistics capabilities. Liaoning would need extensive land-based support to oppose a USN carrier strike group; however, it would be potent against the Vietnam People's Navy and the Philippine Navy. Deficiencies will likely be corrected with future aircraft carriers, which are expected to be larger with conventional takeoff decks and catapult launching for heavier fighters, plus fixed-wing radar and anti-submarine patrol aircraft.

↳***J-15 or Su-33 Flanker***

Quantity: Up to 24

↳***Ka-31 Helix / Ka-27 / Z-8 / Z-9 / Z-18***

Quantity: Up to 12

Radars

1 x Top Plate (Fregate MAE-3) air search: The Fregat, Top Plate and Top Steer NATO codename, is a family of 3D, 360-degree/full-coverage ship-based radar systems developed for the Soviet Union Navy and designed to provide surveillance and detection of surface and airborne targets and to deliver target designation data to weapon systems. The Fregat radar system can operate effectively in intense jamming and countermeasures environments. Moreover, the radar system also provides identification friend or foe (IFF). The Fregat family of radar systems features automatic target tracking and built-in self-diagnosis system. The radar system is made of line replaceable units that can be removed with ease in the event of a malfunction. The radars developed under Fregat family are tailored for a variety of ships depending on their displacement and purpose. The main differences among them are: air surveillance range, number of channels and frequency bands, and weight. Typically, Fregat radars operate in the E-band excepting the lightest Fregat MAE-4k which operates in the H-band. All variants can detect a surface ship at the line-of-sight while the maximum detection range for an airborne target with the radar cross section of a non-stealth fighter aircraft varies from 58 to 230 kilometers. The Fregat MAE-3 radar system is intended for medium and large displacement ships. It is an E-band two-channel radar with a maximum instrumented range of 300 kilometers and a maximum vertical detection range of 30 km. Fregat MAE-3 can detect a fighter aircraft at a maximum range of 180 km or a missile at a maximum range of 38 km. The radar's equipment and the antenna station weigh approximately 9.1-t (6.6-t and 2.5-t respectively).

1 x Type 346 Dragon Eye air search/fire: Type 346 radar is a highly digitized, multi-function, dual-band (S and C bands) naval active electronically scanned array (AESA) installed on Type 052C destroyers, Type 052D destroyers, Type 055 destroyers and Type 001A aircraft carriers[1] of the PLAN. The radar is named as the Star of the Sea (Hai-Zhi-Xing, □□□) by its developer and it is one of the two competitors for PLAN’s SAPARS (Shipborne Active Phased Array Radar System) project/program. Due to its secrecy and lack of information, Type 346 radar has been frequently but erroneously confused with a Chinese fire control radar Type 348, and mistakenly identified as Type 348 by many sources. Furthermore, it is also frequently confused with and misidentified as Sea Lion series C-band phased array radars developed by another design house. Several models in the Type 346 series have been developed. When Star of the Sea was selected as the winner of SAPARS and accepted into Chinese service, it received the Chinese naval designation for the entire radar system as H/LJG-346 or Type 346 for short. The NATO reporting name for Type 346 radar is Dragon Eye.

1 x Sea Eagle surface search: Type 382 radar is a Chinese naval 3-D air search radar designed to replace earlier Chinese Type 381. Contrary to many frequent but erroneous claim, Type 382 radar is not a simple Chinese copy of Russian MR-710 Fregat (meaning frigatebird) radar (NATO reporting name: Top Plate), though Type 382 does borrow heavily from MR-710 radar. Type 382 radar program had already begun in the early 1990s, before the start of the negotiation of importing Russian Sovremennyy-class destroyer in 1994. Type 382 is designed to be a successor of earlier Type 381, but development had run into technological bottleneck for the next generation passive phased array radar due to the technical and industrial limitations in the early and mid-1990s China had at the time. The import of Russian MR-710 radar had provided a significant boost in the development of Type 382 radar in that designers of Type 382 can borrow ideas of MR-710, and as a result, Type 382 has become a cross between Type 381 and MR-710. L Chinese designers abandoned the development of passive phased

array radar and decided to adopt the planar array of MR-710 with the same back-to-back configuration of MR-710, because Chinese industry at the time could not provide a new generation passive phased array with the reliability and performance level required by Chinese navy. The more matured planar array of MR-710 not only provided better reliability, but also proved to be more capable than the domestic Chinese passive phased array designed in the mid-1990s. However, Chinese passive phased array Type 381 does have its advantage over its Russian counterpart in that the equipment below deck is far more compact and reliable. Type 382 design was hence altered to combine the best of two systems by integrating the planar array of MR-710 above the deck and the electronic cabinets and operator consoles of Type 381 below deck together. As a result, the original more than 20 cabinets of MR-710 is drastically reduced on the Type 382. However, the most significant difference between MR-710 and Type 382 is that the former is only a single band radar operates at E-band, while the latter is a dual band radar operates at two frequency bands: S (E/F) and C (G/H) bands. Hence Type 382 also has a name: Sea Eagle (Hai-Ying, □□) S/C, named after the frequency bands it operates at.Maximum power of Type 382 is increased to 100 kW from the 90 kW of the original MR-710. while the maximum range against a fighter sized target is increased to 250 km from the original 230 km of MR-710. In addition to stronger power and higher precision, the rotation rate of Type 382 is increased from the original 12/min to nearly 30/min and scan rate is also nearly doubled.

Notes:

Liaoning (16; Chinese: □□□; pinyin: Liáoníng Jiàn) is a Chinese Type 001 aircraft carrier. The first aircraft carrier commissioned into the People's Liberation Army Navy Surface Force, she is classified as a training ship, intended to allow the Navy to experiment, train and gain familiarity with aircraft carrier operations. Originally laid down in 1985 for the Soviet Navy as the Kuznetsov-class aircraft cruiser Riga, she was launched on 4 December 1988 and renamed Varyag in 1990. After the dissolution of the Soviet Union in 1991, construction was halted and the ship was put up for sale by Ukraine. The stripped hulk was purchased in 1998 and towed to the Dalian naval shipyard in northeast China. The ship was rebuilt and commissioned into the People's Liberation Army Navy (PLAN) as Liaoning on 25 September 2012. Its Chinese ship class designation is Type 001. In November 2016, the political commissar of Liaoning, Commodore Li Dongyou, stated that Liaoning was combat ready. The Kuznetsov-class ships were originally designated by the Soviet Navy as "тяжёлый авианесущий крейсер" (tyazholiy avianesushchiy kreyser, TAKR or TAVKR), meaning "heavy aircraft-carrying cruiser". In addition to aircraft, the ships were designed to carry P-700 Granit anti-ship cruise missiles that also form the main armament of the Kirov-class battlecruisers. This multirole capability allowed the ships to avoid classification as aircraft carriers, thus allowing them to pass through the Turkish Straits between the Black Sea and the Mediterranean Sea. Under the Montreux Convention, aircraft carriers larger than 15,000 tons are not permitted to pass through the Straits, but there is no displacement limit on other types of capital ship from Black Sea powers. In contrast, the People's Liberation Army Navy considers Liaoning to be an aircraft carrier. Since China is not located on the Black Sea and thus not considered a Black Sea power under the Montreux Convention, it does not need and cannot use the tonnage exemption for non-aircraft carrier capital ships. The ship was completed as an aircraft carrier, and cruise missiles were never installed. Liaoning is equipped only with air defence weapons and must use its aircraft for surface attack. Modernization and refit 701st Institute was tasked to redesign Varyag with Zhu Yingfu (□□□) and Wu Xiaoguang (□□□) were assigned respectively as the general designer and deputy general designer. Wang Zhiguo (□□□) was assigned as the general system engineer, and Yang Lei (□□) was assigned the general supervisor. The workload of converting Varyag for operational use was equivalent to building ten new destroyers. Varyag was moved in June 2005 to a dry dock at Dalian (38.935°N 121.6141°E). Her hull was sandblasted, scaffolding erected, and the ship's island was painted in a red marine primer to treat metal corrosion. Observers have noted the installation of Type 348 active electronically scanned array (AESA) Radar (four arrays) and Sea Eagle radar.[citation needed] The air defence system consists of the Type 1130 CIWS and the FL-3000N missile system. The anti-ship missile tubes would not be used, freeing up internal space for hangar or storage use. Russia has explored similar modifications to her sister ship Admiral Kuznetsov. On 8 June 2011, General Chen Bingde made the first public acknowledgement of the ship's refit. On 27 July 2011, the Chinese Defence Ministry announced it was refitting the vessel for "scientific research, experiment and training"

FPB-57 Nav I Class Indonesian Fast Patrol Boat (FPB)







Tiers:

1 2 **3** 4

Variants:

- **KRI Kakap (811):** Commissioned: 1988 Status: Active
- **KRI Grouper (812):** Commissioned: 1989 Status: Active
- **KRI Tongkol (813):** Commissioned: 1993 Status: Active
- **KRI Barracuda (814):** Commissioned: 1998 Status: Active

System

Alternative Designation: FPB-57 Nav I Class

Type: Fast Patrol Boat

Builder: Manufactured in Lurssen, Germany

Crew: 42

Dimensions

Length: 58.10 m

Beam: 7.62 m

Draft: 4.75 m

Displacement, Standard: 454 tons

Displacement, Full Load: INA

Propulsion System

Engine Name: 2 X Diesel Engines

Engine Type: Diesel

Engine Power: 8,260 hp

Maximum Range: INA

Maximum Speed: 28.1 kn (52.0 km / h; 32.3 mph) (maximum)

Fuel Capacity: INA

Main Weapon System

Note: The main cannon of the FPB-57 Nav I is a single 40 mm cannon (name: INA) and two 7.62 mm machine guns.

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Radar Systems

Navigation Radar: INA

Aircraft Facilities

Note: The FPB-57 Nav I Class is equipped with a flight deck and hangar at the rear for the NBO-105 Class Helicopters.

Protection

Active Protection System: Yes, DR200S system for defense against guided missiles

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

FPB-57 or Fast Patrol Boat 57 m or Fast Patrol Boats 57 m or PB-57 (because not all high speed) is a draft patrol boat made by Liirssen , Germany . In the agreement, PT. PAL, which originally only assembled this ship in Surabaya , also obtained the right to produce the design of this ship. Furthermore, this ship has been made in Surabaya. In Germany it started with the Albatros class fast patrol boat , where in Germany itself in 2005 , some ships in this class had been retired or sold to Tunisia. It is the first generation FPB-57, fully manufactured in Lurssen, Germany. This ship functions as a torpedo attack ship, which is: *KRI Kakap (811) , operated in 1988 *KRI Grouper (812) , operated in 1989 *KRI Tongkol (813) , operated in 1993 *KRI Barracuda (814) , put into operation in 1995

Charles De Gaulle Class French Nuclear-Powered Aircraft Carrier





Tiers:



System

Alternative Designation: Charles de Gaulle; CDG	
Total Built: 1 ship	
Type: Aircraft Carrier	
Builder: Naval Group	
In Service: 1994-Present	
Vessel Crew: 1,150	
Air Crew: 550	
Air Support: 50	

Dimensions

Length, Overall: 261.50 m	
Length, Waterline: 238.00 m	
Beam, Overall: 64.36 m	
Beam, Waterline: 31.50 m	
Draft: 9.40 m	
Flight Deck Length: 261.50 m	
Flight Deck Width: 64.40 m	
Displacement, Standard: 37,085 tons	
Displacement, Full Load: 42,500 tons	

Propulsion System

Main engine: 2 x Gec-Alsthom 150-mW each PWR type K15 pressurized-water reactor plants; double reduction Alsthom geared steam turbines, 83,000 total shp; two shafts
Engine Power: hp83,000 total shp
Maximum Range: Unlimited distance; 20–25 years
Maximum Speed: 27 knots
Endurance: 45 days of food
Capacity: 800 commandos, 500 tonnes of ammunitions

Main Armament

↳*System*

Name: Modèle F2 gun
Type: Naval Defense Weapon System
Caliber: 20mm
Quantity: 8 x Modèle F2 gun Naval Defense Weapon System
Length: INA
Weight: 332 kg (732 lb) (without ammunition)
Action: Gas unlocked, delayed blowback
Maximum Elevation: deg+65
Minimum Elevation: deg-15
Traverse Range: INA
Rate of Fire: 720 round/min
Muzzle Velocity: 1,050 m/s (3,400 ft/s)
Effective Firing Range: 1,500 m (4,900 ft) against aerial targets

↳*Ammunition*

Type: Rifle
Caliber: mm20
Cartridge: 20×139mm
Basic Load: INA

Auxiliary Missile Systems

↳*System*

Name: Sylver A-43 octuple vertical-launch SAM
Type: Vertical Launch SAM System
Quantity: 2 x Sylver A-43 octuple vertical-launch SAM groups
Missile Types: * Aster 15 - Ship point and local area defence. * Aster 30 Block 0 - Ship local and wide area defence. *

Aster 30 Block 1NT (New Technology) - wide area defence capable against 1500 km-range ballistic missiles * Aster 30 Block 2 BMD currently being developed for anti-ballistic defense against 3000 km-range maneuvering missiles.

Missile Length: Aster 15: 4.2 m Aster 30: 4.9 m

Missile Diameter: Aster 15: 180 mm

Missile Warhead: Directed fragmentation.

Missile Detonation Mechansim: Direct contact or proximity

Missile Engine: Solid propellant two-stage rocket.

Missile Operaitonal Range: Aster 15: 1.7–30+ km Aster 30: 3–120 km

Missile Flight Altitude: Aster 15: 0–13 km Aster 30: 0–20 km

Missile Speed: Aster 15: Mach 3.5 (1,191 m/s) Aster 30: Mach 4.5 (1,531 m/s)[

Missile Guidance System: Inertial guidance with up-link. Active RF seeker.[

Missile Basic Load: INA

Auxiliary Missile Systems

Name: Matra-Sadral 6-round point-defense SAM System

Type: Vertical Launch SAM System

Quantity: 2 x Matra-Sadral 6-round point-defense SAM systems [Mistral missiles)

Missile Type: Mistral Missile

Missile Length: 1.86 m

Missile Diameter: 90 mm

Missile Effective Fire: up to 6 km

Missile Warhead: High Explosive with high density tungsten balls

Missile Warhead Weight: 2.95 kg

Missile Detonation Mechansim: Laser proximity or impact triggered

Missile Engine: Solid Rocket Motor

Missile Speed: 800 m/s, approx. Mach 2.6 (high supersonic)

Missile Guidance System: Infrared homing

Missile Basic Load: INA

Onboard Aviation Facilities

Capacity: 40 Max

↳*Aircraft*

Note: 30 x Dassault Rafale-M F2 or F3 strike-fighters 3 x Northrop Grumman E-2 Hawkeye

↳*Helicopters*

Note: SA 365 Dauphin EC 725 Caracal AS 532 Cougar

Fire Control

Name: INA

Computerized FCS: Yes

↳*Radars*

Note: 1 x Thales DRBV-26D Jupiter long-range air search 1 x Thales SMART-S Mk 2 multifunction 3D radar 1 x Thales DRBV-15C Tiger air/surface search 1 x Terma Scanter 6002 navigation radar 1 x Thales Arabel SAAM target designation

↳*EO*

Note: 2 x Sagem EOMS NG 1 x Thales ARTEMIS infrared search-and-track

↳*EW*

Note: 1 x Thales ARBR-21 radar intercept 2 x ARBB-33B jammers 4 x AMBL-2A Sagaie six-round decoy rocket launchers 1 x ARBG-2 Enigme comms. intercept 1 x SLAT torpedo alert and decoy launcher

Protection

Active Protection System: Yes

NBC Protection: Yes

Notes:

The 38,000 ton, nuclear-powered aircraft carrier Charles De Gaulle was constructed at the DCN Brest naval shipyard in Brittany. The ship was launched in May 1994 and commissioned in September 2000, following sea trials that began in January 1999. As a result of trials, the landing deck has been lengthened by 4.4m to enable the E-2C to land and clear the deck quickly. The carrier was due to enter service in December 2000, but, following the breakage of a propeller blade during long-distance trials, this was delayed to April 2001. In June 2001, the carrier took part in exercises in the Mediterranean and in December 2001 left to take part in Operation Enduring Freedom where it was stationed in the Arabian Gulf. It returned to its home port of Toulon in July 2002. Super Etendard and Hawkeye E-2C aircraft carried out a number of sorties but the ship's F1 standard Rafale M fighters did not take part in operations, although they were included in exercises with the US Navy. In April 2007, DCN became DCNS. This followed an agreement in which Thales became a 25% shareholder in the new company and DCN acquired the naval business of Thales France (excluding naval equipment). In September 2007, Charles de Gaulle began a refit, which included overhaul and refuelling of the nuclear propulsion system and installing a new SYTEX command and control system with Syracuse III satellite communications system. The combat system has also been adapted for operations with the Rafale F3 equipped with AASM, ASMPA and Scalp-EG missiles. The refit was completed and the carrier returned to the French Navy in December 2008. DCNS completed an intermediate refit of Charles de Gaulle in July 2013 and works included painting of the ship, systems inspection, refurbishing of galley, and 35km of cabling and replacement of stabilisation computer. DCNS performed second major technical shutdown and mid-life refit of Charles de Gaulle from February 2017 to November 2018 to extend the life of the vessel for an additional 25 years. The maintenance works included overall replacement of the control room, modernisation of tactical system, refurbishment of telecommunication systems, replacement of radars, as well as the renovation and recalibration of the steering control system. The aviation installations and spaces were also modernised as part of the refit. The French Navy's plans of a second carrier have been put on hold. The new carrier will not be the same class as the Charles de Gaulle, but will be a conventionally powered carrier. It will be built by DCNS. The design phase for the carrier programme (PA2) was launched in January 2005. In December 2005, following discussions between the French and UK governments on the possibility of a joint development with the UK's CVF carrier project, which Thales UK is designing, it was agreed that France would pay one-third of the costs of the demonstration phase of the baseline CVF design. The ship can operate a fleet of up to 40 aircraft: Rafale M (range 3,340km), Super Etendard (range 1,682km) and three E-2C Hawkeye airborne early warning aircraft. The ship also supports Dolphin PEDRO, AS 565 Panther or NH 90 helicopters. The main deck consists of a main runway angled at 8.5° to the ship's axis and an aircraft launch area forward of the island. These are each equipped with a USN-type C13 catapult, capable of launching one aircraft a minute. The runway is 195m long and the whole deck measures 260m x 64m. The carrier is fitted with the Sagem Defense Sécurité (formerly EADS Defence and Electronics) DALAS laser landing aid. The carrier is fitted with the SATRAP computerised, integrated stabilisation system designed to maintain stabilisation to within 0.5° of horizontal, allowing aircraft to be operated up to sea state 5/6. As well as the carrier's two pairs of active stabilising fins and twin rudders, the system has two computer-controlled compensation units consisting of two rail tracks for trains carrying 22t of deadweight. These tracks run transversely below the flight deck. This system is

designed to compensate for wind and heel and control roll, yaw and surge. The ship's weapons are managed by a Senit combat management system, which has the capacity to track up to 2,000 targets. The weapon control system consists of two Vigy 105 optronic directors supplied by Sagem. The ship also has two Sagem Vampir search and track systems. In February 2004, Thales was awarded a contract for a new command and control system for the French Navy. The new SYTEX system is being fitted on the Charles de Gaulle as well as other vessels and shore locations and allows the vessel to access national or coalition command networks. The ship is armed with two surface anti-air missile (SAAM) () system, developed by Eurosam (set up by MBDA and Thales) for defence against hostile aircraft and anti-ship missiles. The system uses the Aster 15 surface-to-air missile and entered operational service in November 2002, with the first firing of the missile from the Charles de Gaulle. The Aster missile has a 13kg warhead and a range of 30km. The missile's guidance is inertial with data uplink and active radar terminal homing. For increased manoeuvrability in the terminal phase, the missile uses a 'PIF-PAF' direct thrust control system with gas jets. Two eight-cell Sylver vertical launch systems are installed on the starboard side forward of the bridge and two on the port side aft of the bridge. The system uses the Thales (formerly Thomson-CSF) Arabel radar, which is a multi-function three-dimensional radar with a range of 70km for a target area of 2m². The ship has two six-cell Sadral launching systems for the MBDA (formerly Matra BAe Dynamics) Mistral anti-aircraft and anti-missile missile. Mistral has an infra-red seeker and a range of 4km.

FPB-57 Nav II Class Indonesian Fast Patrol Boat (FPB)





Tiers:

1 2 **3** 4

Variants:

- **KRI Andau (650):** Commissioned: 1988 Status: Active
- **KRI Singa (651):** Commissioned: 1988 Status: Active
- **KRI Tongkak (652):** Commissioned: 1989 Status: Active
- **KRI Ajak (653):** Commissioned: 1989 Status: Active

System

Alternative Designation: FPB-57 Nav II Class
Type: Fast Patrol Boat
Builder: Manufactured in Lurssen, Germany
Crew: 42

Dimensions

Length: 58.10 m
Beam: 7.62 m
Draft: 4.75 m
Displacement, Standard: 445 tons
Displacement, Full Load: INA

Propulsion System

Engine Name: 2 X Diesel Engines
Engine Type: Diesel
Engine Power: 8,260 hp
Maximum Range: 2,200 nm at 27 knots 6,000 nm at 15 knots
Maximum Speed: 28.1 kn (52.0 km / h; 32.3 mph) (maximum)
Fuel Capacity: INA

Main Gun System

↳ ***System***

Name: Bofors 57 mm l/L70 Naval Gun
Type: Naval Gun
Caliber: mm57
Quantity: 1 x Bofors 57 mm l/L70 Naval Gun
Barrel Length: 3,990 mm
Weight: 14,000 kg
Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)
Action: Electronic firing
Elevation: −10°/+78°
Traverse: Full 360°
Rate of Fire: 200 rounds/min
Muzzle Velocity: 1,035 m/s
Maximum Firing Range: 17,000 m
Effective Firing Range: 8,500 m
Feed System: 40 ready rounds, 128 rounds in ready racks in mount
Sights: Gyro-stabilized in local control.

↳ ***Ammunition***

Type: Rifle
Caliber: 57mm
Shell: INA
Basic Load: INA

Auxiliary Weapon System

↳ ***System***

Name: Bofors 40 mm gun
Type: Anti-Aircraft Autocannon
Caliber: 40mm
Quantity: 4 x Bofors 40 mm Anti-Aircraft Autocannon
Length: 6.5 m
Barrel Length: 2.2 m
Width: 1.8 m
Height: 1.9 m
Weight: 1,981 kg
Barrels: 1 or 2[

Traverse: 360°

Rate of Fire: 120 round/min

Muzzle Velocity: 881 m/s

Maximum Firing Range: 7,160 m

↳*Ammunition*

Type: Rifle

Caliber: 40mm

Shell: 40×311mmR

Basic Load: INA

Torpedo System

↳*Launcher*

Launching Tubes: 2 x Torque launch tubes Ø 533 millimeters (20.98 in)

↳*Torpedos*

Name: AEG SUT

Type: Surface & Underwater Target guided torpedo

Speed: 23 knots

Range: 28 km

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Aircraft Facilities

Note: The FPB-57 Nav I Class is equipped with a flight deck and hangar at the rear for the NBO-105 Class Helicopters.

Radar Systems

Navigation Radar: INA

Scout Surface Radar: Racal Decca / Signaal Scout surface radar

Sonar

Name: PHS-32

Type: Hull Mounted

Protection

Active Protection System: Yes, DR200S system for defense against guided missiles

Countermeasures: Yes, Feeder (Countermeasures) Dagie decoy RL

NBC Water Washdown System: Yes

Notes:

FPB-57 or Fast Patrol Boat 57 m or Fast Patrol Boats 57 m or PB-57 (because not all high speed) is a draft patrol boat made by Liirssen , Germany . In the agreement, PT. PAL, which originally only assembled this ship in Surabaya , also obtained the right to produce the design of this ship. Furthermore, this ship has been made in Surabaya. In Germany it started with the Albatros class fast patrol boat , where in Germany itself in 2005 , some ships in this class had been retired or sold to Tunisia. This generation of FPB-57 is part of the hull and the equipment is made in Germany, and installed at PT. PAL, Surabaya. Among others are: *KRI Andau (650) , created in 1988 *KRI Singa (651) , created in 1988 *KRI Tongkak (652) , created in 1989 *KRI Ajak (653) , created in 1989

→Submarines

→→Diesel-Electric Patrol and Attack Submarines

Cakra 401 Class Indonesian Diesel-Electric Submarine



Tiers:



Variants:

- **CAKRA:** Commissioned: 1981 Status: Active
- **NANGGALA:** Commissioned: 1981 Status: Active

System

Alternative Designation: Cakra 401 Class
Type: Diesel-Electric Submarine
Builder: Howaldtswerke (HDW), Kiel, Germany
Crew: 34 (6 off. + 28 enl.)

Dimensions

Length: 59.50 m
Beam: 6.30 m
Draft: 5.50 m
Displacement, Standard: 1,100 tons
Displacement, Surface: 1,265 tons
Displacement, Submerged: 1,395 tons

Propulsion System

Engine Name: 4 x MTU 12V493 AZ80 GA31L
Engine Type: Diesels
Engine Power: 600 bhp each
Generators: 4 x Siemens 405 kW generators
Electric Motor: 1 x Siemens electric motor

Total Power: 5,000 shp

Fuel: 87 tons (108 tons emergency)

Surface Speed: 11 knots

Submerged Speed: 25 knots

Surface Range: 8,200 nm at 11 knots

Submerged Range: 400 nm at 4 knots

Endurance: 50 days

Torpedoes

Torpedo Tubes: 8 x 533-mm bow

Torpedo Name: 14 AEG SUT Mod 0 wire-guided Torpedoes

Torpedo Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Radar Systems

Surface Search/Navigation Radar: 1 x Thales Calypso-II surface search/navigation

Sonar Systems

1 x STN Atlas Elektronik CSU-3-2 suite: 1 x AN-526 passive; 1 x 407 A9 passive; 1 x Thales DUUX-2 intercept

Protection

Active Protection System: INA

Countermeasures: Yes

NBC Water Washdown System: Yes

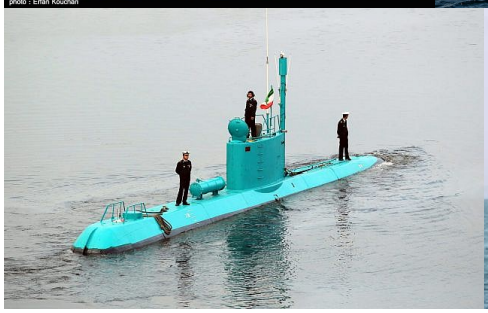
EW: 1 x Thales DR 2000U

Notes:

These submarines are the 1300 design of the widely used German Type 209 attack submarines; they were designed by the IKL firm in Lubeck and constructed in Germany. The subs were ordered on April 2, 1977. CAKRA and NANGGALA finished refits in 1987 and 1989, respectively. CAKRA was again refitted between June 1993 and June 1997; NANGGALA also received another refit between October 1997 and mid-1997. During these refits, both boats received new batteries and an improved combat data system. Both were refitted again by Daewoo Shipbuilding, South Korea -- CAKRA in 2004/2005. NANGGALA's was completed in April 2006. During the latter refits, both received new batteries, had their engines overhauled and their combat data systems modernized.

Ghadir Class Iranian Midget Submarine




Tiers:



Variants:

- **Ghadir 942:** Launched: 2007
- **Ghadir 943:** Launched: 2008
- **Ghadir 944:** Launched: 2008
- **Ghadir 945:** Launched: 2009
- **Ghadir 946:** Launched: 2009
- **Ghadir 947:** Launched: 2009
- **Ghadir 948:** Launched: 2009
- **Ghadir 949:** Launched: 2010
- **Ghadir 950:** Launched: 2010
- **Ghadir 951:** Launched: 2010
- **Ghadir 952:** Launched: 2011
- **Ghadir 953:** Launched: 2011
- **Ghadir 954:** Launched: 2011
- **Ghadir 955:** Launched: 2011
- **Ghadir 956:** Launched: 2011
- **Ghadir 957:** Launched: 2011
- **Ghadir 958:** Launched: 2011
- **Ghadir 959:** Launched: 2012
- **Ghadir 960:** Launched: 2012
- **Ghadir 961:** Launched: 2012
- **Ghadir 962:** Launched: 2012

System

Alternative designations: IS 120
Total Built: 23 Ghadir Class Submarines in total.
Builders: Marine Industries Organization
Operators: Islamic Republic of Iran Navy
In Service: 2007-Present

Type: Coastal submarine

Crew: 7

Dimensions

Length: 29.00 m

Beam: 2.75 m

Draft: 2.50 m

Displacement, Surface: 117 tons

Displacement, Submerged: 125 tons

Draught: 2.5 m

Automotive

Main Propulsion: 1 x diesel-electric drive

Maximum Speed, Surface: 7 knots

Maximum Speed, Submerged: 9 knots

Armament

Torpedoes Carried: INA

Mines Carried: INA

Missile Carried: INA

Note: It is reported that the torpedoes are 533mm Torpedoes, which have a average maximum effective range of 18,000 meters, a Wake Homing Guidance System, and a speed of 83 km/h

Notes:

Ghadir (Persian: غدیر) is a class of midget submarines built by Iran specifically for cruising within the shallow waters of the Persian Gulf. It has a surface displacement estimated at about 115 long tons (117 tons). The Ghadir class is probably better described as a coastal or littoral submarine, similar in concept to the Italian Sauro class, though significantly smaller. The Ghadir class is based on the North Korean Yono-class submarine. Photographs indicate a pair of bow torpedo tubes around 21 inches (530 mm) diameter, allowing them to fire typical heavyweight torpedoes. It could thus serve as a launch platform for the VA-111 Shkval rocket torpedo. On 24 November 2007 Iranian rear-admiral Habibollah Sayyari announced: "A home-made destroyer called Jamaran and a home-made submarine of Ghadir class will launch operation on November 28." He also said that the submarine was equipped with the latest military and technological equipment and that its capabilities are equal to that of foreign types. Iranian supreme leader Ali Khamenei was quoted saying to Iran's navy commanders on the day the submarine was launched: "Today, you have been able to design and build many of the military requirements. We have become self-sufficient from other countries." New Ghadir submarines were delivered to the Iranian navy on June 2009, August 2010, August 2011, November 2011, February 2012, November 2012 and November 2018. While Ghadir resembles the North Korean Yono-class submarine, it is probably better described as a littoral submarine. Head of the Marine Industries Organization of Iran General Amir Rastegari announced Dec 02, 2018 that subsurface-to-surface missiles have been mounted on the new home-made Qadir-class submarine, adding that many foreign states are willing to purchase the vessel. He also added that a home-made torpedo, Valfajr, mounted on the submarine enjoys a destruction power 6 times more than a cruise missile and can drown a 1,000-ton vessel into the sea in less than 10 seconds. He said that a unique periscope has also been mounted on Qadir submarine, noting that a number of industrial countries have demanded to purchase this periscope and optical system from Iran.

Yono Class North Korean Midget Submarine



Tiers:

1 2 3 4

Variants:

- **Export and foreign production:** Iran The US Congressional Research Service suggests that Iran has purchased several midget submarines from North Korea. The purchase may have involved Yono and Yugo-class mini-subs. Beginning in 2006, Iran launched the first of several domestically-produced mini-submarines. In 2007 the Iranian navy unveiled its Ghadir-class submarine, the first of a number of planned midget submarines of the Yono class. Observers have disagreed on the exact classification of the Iranian derivative: Iran claims the vessel is a fully independent design, but it has been compared to the North Korean Yugo boats, Yono subs, and/or Sang-O-class coastal submarines.

System

Alternative Designation: Yono Class

Type: Midget Submarine

Builder: North Korean Navy Yukdaeso-ri Naval Shipyards

Crew: 2

Special Forces Soldiers: 7

Dimensions

Length: 20–22 m

Beam: 2.75 m

Draft: 1.6 m

Displacement, Submerged: 130 tons submerged

Displacement, Surface: 76-95 tons surfaced

Propulsion System

Engine Name: Single-shaft MTU

Engine Type: Diesel engine with electric drive

Engine Power: INA

Surface Speed: 10–11 knots (19–20 km/h; 12–13 mph) surfaced

Submerged Speed: 4–8 knots (7.4–14.8 km/h; 4.6–9.2 mph) submerged

Surface Range: 550 nmi (1,020 km; 630 mi) surfaced

Submerged Range: 50 nmi (93 km; 58 mi) submerged

Torpedo Weapon Systems

Note: 2 × 533 mm (21 in) torpedo tubes Mines

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: INA

Radar Systems

Name: INA

Type: INA

Frequency: INA

Range: INA

Sonar Systems

Name: INA

Type: INA

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Yono-class submarine (also as Yugo class) is a class of North Korean miniature submarines, produced for domestic use as well as for export. Also referred to as the Yeono class, these submarines displace 130 tons, significantly less than North Korea's larger 1,800-ton Romeo-class submarines. As of May 2010, North Korea is reported to operate ten of these submarines. A Yono-class submarine is thought to have fired the torpedo attack which sank a South Korean Pohang-class corvette, ROKS Cheonan on 26 March 2010 in South Korean waters. According to some investigators, the weapon used in the attack was a North Korean-manufactured CHT-02D torpedo, from which substantial propulsion parts were recovered. The device allegedly exploded not by contact, but by proximity 6 to 9 metres (20 to 30 ft) below Cheonan, creating a powerful pillar of water, called the bubble jet effect. High ranking North Korean military officials denounced the international investigation and said the North does not have the type of submarines that supposedly carried out the attack. They also dismissed claims regarding writings on the torpedo and clarified that "when we put serial numbers on weapons, we engrave them with machines." South Korea's Yonhap News quoted South Korean officials as saying the North has about ten of the Yeono-class submarines. A member of the North Korean cabinet who defected to South Korea in 2011, said on 7 December 2012 that the crew of the North Korean submarine which

sank Cheonan had been honored by the North Korean military and government. The defector, known by the alias "Ahn Cheol-nam", stated that the captain, co-captain, engineer, and boatswain of the mini-sub which sank Cheonan had been awarded "Hero of the DPRK" in October 2010.

Santa Cruz Class (TR-1700 Class) Argentinian Diesel-Electric Patrol Submarine





Tiers:



Variants:

- **ARA Santa Cruz:** Completed: 1984 Status: In service with Argentine Navy
- **ARA San Juan:** Completed: 1985 Status: Formerly in service with Argentine Navy. Confirmed lost on 23 November 2017; wreck found in Atlantic Ocean on 16 November 2018. Recovery by American team pending naval decision.
- **ARA Santa Fe:** Completed: INA Status: Construction suspended - 70% (or 52%) complete Boat could be completed after feasibility studies. Unknown if sub was cannibalized for parts along with the rest of incomplete members of the class.
- **ARA Santiago Del Estero:** Completed: INA Status: Construction suspended - 30% complete and eventually cannibalized for spare parts for active subs.

System

Alternative Designation: Santa Cruz Class; TR-1700-class
Total Built: 4 Submarines Built
Type: Diesel-Electric Patrol Submarine
Builders: Thyssen Nordseewerke, Emden, Germany
In Service: 1984-Present
Crew: 30 (5 off. + 25 enl.)

Dimensions

Length: 65.93 m
Beam: 7.30 m
Draft: 6.50 m
Displacement, Standard: 1,770 tons
Displacement, Surface: 2,116 tons
Displacement, Submerged: 2,264 tons

Propulsion System

Engine Name: 4 x MTU 16V652 MB80 diesel driving 4 alternators driving 2 Siemens HR4525 motors
Engine Type: Diesel-Electric
Engine Power: 8,980 total bhp

Shaft: 1

Speed, Surface: 11 knots

Speed, Snorkeling: 12 knots

Speed, Submerged: 21 knots

Range, Submerged: 400 nm at 4 knots

Range, Surface: 12,000 nm at 8 knots

Range Snorkeling: 6,000 nm at 8 knots

Operational Depth: 270 m

Maximum Depth: 300 m

Endurance: 30 days

Main Armament

↳*System*

Name: INA

Type: 533mm Torpedo Tubes

Quantity: 6 x 533mm Torpedo Tubes

↳*Torpedos*

Name: Mk 48

Type: Heavy Torpedo

Caliber: mm533

Variants: Ex-10 RETORC (Research Torpedo Configuration); Mk 48 Mod 0/2; Mk 48 Mod 1; Mk 48 Mod 3; Mk 48 Mod 4; Mk 48 Mod 5; Mk 48 Mod 6; Mk 48 Mod6AT; "Full-up" ADCAP; Closed-Cycle Advanced Capability Propulsion System (CCACPS); Mk 48 Mod 7 ADCAP CBASS Half-Length Mk 48

Basic Load: 22

Length: 5.84 m

Diameter: 533 mm

Weight: 1,565 kg

Warhead Weight: 295 kg

Warhead Type: conventional high-explosive (PBXN-3)

Propulsion: 500-hp axial-flow, gas-piston (swashplate) pump-jet using Otto II mono-propellant (nitrogen ester and Hydroxylamine Perchlorate/HAP oxidant) liquid fuel

Speed: 55 kts (102 kmh)

Maximum Range at 55 knots: 20 nm (23 mi, 37 km)

Maximum Range at 40 knots: 27 nm (31 mi, 50 km)

Maximum Depth: 760 m

Guidance System: may be launched as free-running or wire-guided free-running; homing is by either active or passive acoustic means. Wire-guidance permits two-way communication between torpedo and submarine and can be either active or passive acoustic search.

↳***Mines***

Note: 34 x total mines in lieu of torpedoes

Radar

Navigation Radar: 1 x Thales Calypso-IV navigation

Search and Attack Radar: 1 x STN Atlas-Electronic CSU-3/4 active/passive search and attack suite

Passive Radar: 1 x Thales DUUX-5 passive ranging

Fire Control

Computerized FCS: Yes

Type: Signaal SIMBADS weapons control system

Quantity: 1 x Signaal SIMBADS weapons control system

Protection

Active Protection System: INA

NBC Protection: Yes

Electronic Warfare: 1 x Kollmorgen Sea Sentry III radar warning

Notes:

The TR-1700 (Santa Cruz) is a class of diesel-electric patrol submarines built by Thyssen Nordseewerke for the Argentine Navy in the 1980s, with two submarines completed. These ships are amongst the largest submarines built in Germany since World War II and are among the fastest diesel-electric submarines in the world. ARA San Juan was lost on 17 November 2017, leaving ARA Santa Cruz as the only remaining submarine of this class. The original 1977 plan called for six boats, two TR-1700s built in Germany by Thyssen Nordseewerke, two in Argentina by Astillero Domecq Garcia, and two smaller TR-1400s also built in Argentina. The final agreement in 1982 was modified to six TR-1700s, with the last four to be built in Argentina. The TR-1700s to be built in Argentina were considered for an upgrade to a nuclear submarine using INVAP's CAREM reactor, which began development at that time. The nuclear submarine project never came to fruition, despite later attempts to revive it. The submarine was designed by Thyssen and its features include high underwater speed, endurance (for a diesel submarine), and survivability. The boat's four MTU diesel engines, four generators, and Siemens electric motor can propel it at speeds up to 25 knots (46 km/h; 29 mph). Eight 120-cell batteries are installed on each boat. They have a diving depth of 300 m (980 ft). Normal endurance of these boats is 30 days with an extended range up to 70 days. These boats are equipped to accept a Deep Submergence Rescue Vehicle (DSRV). Armaments include six bow 533 mm (21 in) torpedo tubes and 22 SST (Special Surface Target) or Mark 37 torpedo. The automatic torpedo reload system can reload the tubes in 50 seconds. Thyssen proposed the TR1700A for the Australian Collins-class submarine program. The proposed design had a reworked pressure hull, was six meters longer, and half a meter wider than the TR-1700s built for Argentina. It lost to the Type 471 from Kockums, an enlarged Västergötland-class submarine. The first two submarines were delivered on schedule in 1984–85. The remaining four built in Argentina were suspended due to the Argentinean economic crisis of the 1980s. In 1996 work completely ceased on ARA Santa Fe at 70% (or 52%) completion while ARA Santiago del Estero was only 30% complete. After attempts to complete and sell the boats to Taiwan failed, they were cannibalized, along with the parts for the fifth and sixth units, to support the continued operations of the first two submarines. Santa Cruz received its mid-life modernization at Arsenal de Marinha, Rio de Janeiro Brazil between September 1999 and 2001. The work involved the replacement of the engines, batteries, and sonar. Her sister boat San Juan entered the Astillero Domecq Garcia shipyard to receive her refit in 2007; she completed refit in 2013. In September 2010, it was revealed that the Ministry of Defense was conducting feasibility studies to decide if ARA Santa Fe (S-43) should be completed. The decision should be made sometime after completing the mid-life modernization of ARA San Juan (S-42). The estimated cost of completing Santa Fe was $60 million. On 17 November 2017, the ARA San Juan was reported missing; reports of a fire at the time were denied by the Argentine Navy. A year after that, on 17 November 2018, private company Ocean Infinity (appointed by the Argentine Government) announced that they successfully located the wreck, at 900 metres depth and 500 km from Comodoro Rivadavia.

Type 849 Class (Romeo Class) Egyptian Diesel-Electric Submarine







Tiers:



Variants:

- **Chinese Type 033 Romeo-class and its variants:** Under the 1950 Sino-Soviet Friendship and Mutual Assistance Treaty, the Soviets passed to China (and later to North Korea) the documentation necessary to produce Romeo submarines in 1963. The Chinese variant is known as the Type 033 Romeo. A total of 84 Type 033 submarines were built in China from 1962 to 1984, plus several exported to other countries. The Chinese Type 033 incorporated some improvements over the original Romeo, including noise reduction of 20 dB. Sonar on board was also continuously upgraded: the original Soviet sonar was first replaced by domestic Chinese Type 105 sonar, which consequently was replaced by H/SQ2-262A sonar built by No. 613 Factory. Today most of the Type 033 subs have been retired or preserved, with a few remaining in service for training purposes. A total of six Chinese Romeo class submarine variants were developed: Type 6633: Original Chinese built Romeo, China was to have assembled these Romeos from knock-down kits provided by the Soviet Union, 6 were planned, but only 2 were completed. The construction program came to a complete stop when the USSR stopped delivery of parts following the Sino-Soviet split. Construction of the 3rd unit at Wuhan was stopped, and available parts were diverted to complete the first pair, but many parts had to be developed indigenously. The primary improvement of Type 6633 over the original Soviet boats is the use of domestic Chinese batteries, which had slightly superior performance to that of the original Soviet batteries. Type 033: Complete domestic production in China was achieved in 1967, and subsequently the project was renamed the Type 033. However, experience from deployment of completed boats in warmer climates proved that the original Soviet refrigeration and air conditioning system designed for subarctic and arctic area was woefully inadequate for subtropical and tropical regions, so redesigns were needed to improve refrigeration and air conditioning systems, and all boats to be stationed in tropical and subtropical regions went through such a refit. In September 1969 construction of new Type 033s, with improved air conditioning and refrigeration capability, began at Huangpu Shipyard in Guangzhou, eventually, 13 units were completed. ES5A: Upgraded Type 033, with improvements mainly involving the replacement of equipment of Soviet origin with domestic Chinese systems, which includes: QZHA—10 (Type 779) attack periscope and QDYA—10 (Type 778) general purpose periscope. Addition of H/SQG-2 ranging sonar, Type 063 communication systems, and countermeasure systems. Domestic Chinese Type 801 sonar replaced the original Soviet MARS-24 sonar. The only difference between the Type 801 sonar and the MARS-24 sonar is that there are 24 transducer elements for the Type 801 as opposed to 12 in the original MARS 24, so the Chinese sonar had better accuracy. Domestic Chinese H/SQZ-D reconnaissance sonar (with Type 105 transducers) replaced the original Soviet system, the performance of the SQZ-D is almost identical to the original Soviet sonar it was developed from, except for the sector of scan, which is increased by 15 degrees. Additional noise reduction measures were also adopted. This is the type China originally sold to Egypt in the 1980s. Type 033G: Development of the ES5A, with the incorporation of the capability to launch acoustic homing torpedoes; analog computers installed to achieve automation of, and speeding up of, torpedo fire control calculations that were previously manually calculated. All Chinese Romeos were converted to this standard. The NATO reporting name for this type is rumored to be the Wuhan-class. Type 033G1: A single Type 033G was modified to carry 6 YJ-1 (CSS-N-4) anti-

ship missiles, this variant is called Type 033G1, with the rumored NATO reporting name of Wuhan A. The missile had to be fired while the boat was surfaced, with a total exposure time on the surface of less than 7 minutes. The most significant improvement, however, is the reduction of noise level by 12 dB. ES5B: Development of the Type 033G, primarily intended for export. This is an upgrade package for Romeo submarine users. The primary improvement of this class is the ability to launch wire guided torpedoes and anti-ship missiles (AShM) while submerged. The program originally begun in the mid-1980s, and Egypt is reported to be the only customer when China won a contract to upgrade its Romeo-class submarine fleet, including both Soviet built and Chinese built units. This is the last type of Chinese Romeo class submarine; with noise reduction of 20 dB to 140 dB in comparison to the 160 dB of the original Soviet Project 633 submarines acquired by China.

System

Alternative Designation: Type 849 Class; NATO: Romeo Class

Type: Diesel-Electric Submarine

Builder: Krasnoye Sormovo Shipyard, Gorky Wuchang Shipyard (Wuhan) Guangzhou Shipyard (Canton) Jiangnan Shipyard (Shanghai) Bohai Shipyard (Huludao) Mayang-do Naval Shipyard (North Korea) - Assembly site of North Korean kits from China.

Crew: 54 total (8 off. + 42 enl.)

Dimensions

Length: 76.0 m

Beam: 6.7 m

Draft: 4.9 m

Displacement, Surface: 1,470 tons surface

Displacement, Submerged: 1,830 tons submerged

Propulsion System

Engine Name: Type 37D

Engine Type: Diesel-Electric drive: 2 x Type 37D diesels

Engine Power: hp2,700 total bhp; 2 shafts

Auxiliary Power: 2 Electric 100 shp creep motors

Speed, Surface: 15.2 knots surface

Speed, Submerged: 13 knots submerged

Range, Surface: 14,000 nm at 9 kts(surface)

Range, Submerged: 350 nm at 9 kts(submerged

Normal Operation Depth: 270.0 m

Maximum Operation Depth: 300.0 m

Torpedo Weapon Systems

↳*Torpedo Launcher*

Number of Tubes: 8 533-mm tubes (6 bow and 2 stern)

↳*Torpedo #1*

Name: Mark 37

Type: Acoustic Torpedo

Length: 3.4 m

Diameter: 480 mm

Weight: 650 kg

Effective Firing Range: 21 km at 17 knots

Warhead: Mk 37 Mod 0, HBX-3

Warhead Weight: 149.7 kg

Detonation Mechanism: Mk 19 contact exploder

Engine: Electric

Maximum Speed: 48 km/h

Guidance System: Gyroscope (initial), passive sonar (cruise) and Doppler active sonar homing (terminal)

Missile Weapon System

↳*System*

Name: Harpoon

Type: Anti-Ship Missile

Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)

Diameter: 34 cm

Wingspan: 0.91 m

Weight: 691 kg

Warhead: 221 kg

Detonation Mechanism: Impact fuze

Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust

Operational Range: 280 km

Flight Altitude: Sea-skimming

Maximum Speed: 864 km/h

Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing

Basic Load: 14

Mines

Note: Can carry 28 mines in lieu of torpedoes

Fire Control System

FCS Name: 1 x Singer Librascope, Mark 2 and datalink

Computerized FCS: Yes

Radar Systems

Name: 1 x Snoop Plate

Type: Surface search/navigation

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x STN Atlas Elektronik CSU-83 active/passive suite, with PSU-2-83 passive array and STU-3 sonar training set

Type: Active Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Electronic Warfare: 1 x Argo Phoenix AR-700-S5 radar warning

Notes:

he ROMEO class is a Russian-designed, medium-range, torpedo attack submarine. The four surviving from the Egyptian ROMEO class were all Chinese-built. The first pair was delivered on March 28, 1983, and the second pair on Jan. 3, 1984. When cruising on the surface, these submarines are easily identified by the periscope housing that tops the sail and resembles a surface ship's funnel. The sonar is housed in a small "bump" on the bow. All were officially commissioned on May 21, 1984.

Type 033 Class (Romeo Class) Chinese Diesel-Electric Submarine




Tiers:



Variants:

- **Project 633 Class; NATO: Romeo Class:** Under the 1950 Sino-Soviet Friendship and Mutual Assistance Treaty, the Soviets passed to China (and later to North Korea) the documentation necessary to produce Romeo submarines in 1963. The Chinese variant is known as the Type 033 Romeo. A total of 84 Type 033 submarines were built in China from 1962 to 1984, plus several exported to other countries. The Chinese Type 033 incorporated some improvements over the original Romeo, including noise reduction of 20 dB. Sonar on board was also continuously upgraded: the original Soviet sonar was first replaced by domestic Chinese Type 105 sonar, which consequently was replaced by H/SQ2-262A sonar built by No. 613 Factory. Today most of the Type 033 subs have been retired or preserved, with a few remaining in service for training purposes. A total of six Chinese Romeo class submarine variants were developed: Type 6633: Original Chinese built Romeo, China was to have assembled these Romeos from knock-down kits provided by the Soviet Union, 6 were planned, but only 2 were completed. The construction program came to a complete stop when the USSR stopped delivery of parts following the Sino-Soviet split. Construction of the 3rd unit at Wuhan was stopped, and available parts were diverted to complete the first pair, but many parts had to be developed indigenously. The primary improvement of Type 6633 over the original Soviet boats is the use of domestic Chinese batteries, which had slightly superior performance to that of the original Soviet batteries. Type 033: Complete domestic production in China was achieved in 1967, and subsequently the project was renamed the Type 033. However, experience from deployment of completed boats in warmer climates proved that the original Soviet refrigeration and air conditioning system designed for subarctic and arctic area was woefully inadequate for subtropical and tropical regions, so redesigns were needed to improve refrigeration and air conditioning systems, and all boats to be stationed in tropical and subtropical regions went through such a refit. In September 1969 construction of new Type 033s, with improved air conditioning and refrigeration capability, began at Huangpu Shipyard in Guangzhou, eventually, 13 units were completed. ES5A: Upgraded Type 033, with improvements mainly involving the replacement of equipment of Soviet origin with domestic Chinese systems, which includes: QZHA—10 (Type 779) attack periscope and QDYA—10 (Type 778) general purpose periscope. Addition of H/SQG-2 ranging sonar, Type 063 communication systems, and countermeasure systems. Domestic Chinese Type 801 sonar replaced the original Soviet MARS-24 sonar. The only difference between the Type 801 sonar and the MARS-24 sonar is that there are 24 transducer elements for the Type 801 as opposed to 12 in the original MARS 24, so the Chinese sonar had better accuracy. Domestic Chinese H/SQZ-D reconnaissance sonar (with Type 105 transducers) replaced the original Soviet system, the performance of the SQZ-D is almost identical to the original Soviet sonar it was developed from, except for the sector of scan, which is increased by 15 degrees. Additional noise reduction measures were also adopted. This is the type China originally sold to Egypt in the 1980s. Type 033G: Development of the ES5A, with the incorporation of the capability to launch acoustic homing torpedoes; analog computers installed to achieve automation of, and speeding up of, torpedo fire control calculations that were previously manually calculated. All Chinese Romeos were converted to this standard. The NATO reporting name for this type is rumored to be the Wuhan-class. Type 033G1: A single Type 033G was modified to carry 6 YJ-1 (CSS-N-4) anti-ship missiles, this variant is called Type 033G1, with the rumored NATO reporting name of Wuhan A. The missile had to be fired while the boat was surfaced, with a total exposure time on the surface of less than 7 minutes. The most significant improvement, however, is the reduction of noise level by 12 dB. ES5B: Development of the Type 033G, primarily intended for export. This is an upgrade package for Romeo submarine users. The primary improvement of this class is the ability to launch wire guided torpedoes and anti-ship missiles (AShM) while submerged. The program originally begun in the mid-1980s, and Egypt is reported to be the only customer when China won a contract to upgrade its Romeo-class submarine fleet, including both Soviet built and Chinese built units. This is the last type of Chinese Romeo class submarine; with noise reduction of 20 dB to 140 dB in comparison to the 160 dB of the original Soviet Project 633 submarines acquired by China.
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System

Alternative Designation: Type 033 Class; NATO: Romeo Class

Type: Diesel-Electric Submarine

Builder: Krasnoye Sormovo Shipyard, Gorky Wuchang Shipyard (Wuhan) Guangzhou Shipyard (Canton) Jiangnan Shipyard (Shanghai) Bohai Shipyard (Huludao) Mayang-do Naval Shipyard (North Korea) - Assembly site of North Korean kits from China.

Crew: 65 total (10 Off. + 55 Enl.)

Dimensions

Length: 76.6 m

Beam: 6.7 m

Draft: 5.0 m

Displacement, Surface: 1,319 tons surface

Displacement, Submerged: 1,830 tons submerged

Propulsion System

Engine Name: Type 37D

Engine Type: Diesel-Electric drive: 2 Type 37D diesels

Engine Power: hp2,700 total bhp; 2 shafts

Auxiliary Power: 2 Electric 100 shp creep motors

Speed, Surface: 13 knots (surface)

Speed, Submerged: 10 knots (submerged)

Range, Surface: 14,000 nm at 9 kts(surface)

Range, Submerged: 350 nm at 9 kts(submerged

Normal Operation Depth: 270.0 m

Maximum Operation Depth: 300.0 m

Torpedo Weapon Systems

↳*Torpedo Launcher*

Number of Tubes: 8 533-mm tubes (6 fwd; 2 aft)

↳*Torpedo (Option #1)*

Name: SAET-60

Type: Heavy Weight Torpedo

Length: 7.80 m

Diameter: 533 mm

Weight, Total: 1.855 kg

Explosive Warhead: The SAET-60 uses an electric motor and has a 300 kg high explosive warhead with impact and proximity fuse.

Guidance System: Homing Passive acoustic homing

Wire Guidance: No

Power Source: Silver zinc battery, 46 cells

Propulsion: Twin propeller wakeless propulsion

Speed: 42 kt

Maximum Range: 13 km at 42 kt

Depth: Up to 400 m launch depth

Basic Load: 14

↳*Torpedo (Option #2)*

Name: Yu-1

Type: Torpedo

Length: 7.8 m

Diameter: 533 mm

Weight: 2,000 kg

Warhead Weight: 400 kg

Engine: Steam

Operational Range: 3.5 km at 50 knots 9 km at 39 knots

Maximum Speed: 39 to 50 knots

Guidance System: Straight running gyroscopic, later upgraded to passive acoustic homing

Mines

Note: Can carry 28 mines in lieu of torpedoes

Radar Systems

Name: 1 x Snoop Plate

Type: Surface search/navigation

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x 1 Herkules or Tamir-5L high-frequency active/passive search and attack

Type: Active Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Electronic Warfare: 1 CEIEC Model 92A intercept

Notes:

Chinese Type 033 Romeo-class Under the 1950 Sino-Soviet Friendship and Mutual Assistance Treaty, the Soviets passed to China (and later to North Korea) the documentation necessary to produce Romeo submarines in 1963. The Chinese variant is known as the Type 033 Romeo. A total of 84 Type 033 submarines were built in China from 1962 to 1984, plus several exported to other countries. The Chinese Type 033 incorporated some improvements over the original Romeo, including noise reduction of 20 dB. Sonar on board was also continuously upgraded: the original Soviet sonar was first replaced by domestic Chinese Type 105 sonar, which consequently was replaced by H/SQ2-262A sonar built by No. 613 Factory. Today most of the Type 033 subs have been retired or preserved, with a few remaining in service for training purposes. A total of six Chinese Romeo class submarine variants were developed: Type 6633: Original Chinese built Romeo, China was to have assembled these Romeos from knock-down kits provided by the Soviet Union, 6 were planned, but only 2 were completed. The construction program came to a complete stop when the USSR stopped delivery of parts following the Sino-Soviet split. Construction of the 3rd unit at Wuhan was stopped, and available parts were diverted to complete the first pair, but many parts had to be developed indigenously. The primary improvement of Type 6633 over the original Soviet boats is the use of domestic Chinese batteries, which had slightly superior performance to that of the original Soviet batteries. Type 033: Complete domestic production in China was achieved in 1967, and subsequently the project was renamed the Type 033. However, experience from deployment of completed boats in warmer climates proved that the original Soviet refrigeration and air conditioning system designed for subarctic and arctic area was woefully inadequate for subtropical and tropical regions, so redesigns were needed to improve refrigeration and air conditioning systems, and all boats to be stationed in tropical and subtropical regions went through such a refit. In September 1969 construction of new Type 033s, with improved air conditioning and refrigeration capability, began at Huangpu Shipyard in Guangzhou, eventually, 13 units were completed. ES5A: Upgraded Type 033, with improvements mainly involving the replacement of equipment of Soviet origin with domestic Chinese systems, which includes: QZHA—10 (Type 779) attack periscope and QDYA—10 (Type 778) general purpose periscope. Addition of H/SQG-2 ranging sonar, Type 063 communication systems, and countermeasure systems. Domestic Chinese Type 801 sonar replaced the original Soviet MARS-24 sonar. The only difference between the Type 801 sonar and the MARS-24 sonar is that there are 24 transducer elements for the

Type 801 as opposed to 12 in the original MARS 24, so the Chinese sonar had better accuracy. Domestic Chinese H/SQZ-D reconnaissance sonar (with Type 105 transducers) replaced the original Soviet system, the performance of the SQZ-D is almost identical to the original Soviet sonar it was developed from, except for the sector of scan, which is increased by 15 degrees. Additional noise reduction measures were also adopted. This is the type China originally sold to Egypt in the 1980s. Type 033G: Development of the ES5A, with the incorporation of the capability to launch acoustic homing torpedoes; analog computers installed to achieve automation of, and speeding up of, torpedo fire control calculations that were previously manually calculated. All Chinese Romeos were converted to this standard. The NATO reporting name for this type is rumored to be the Wuhan-class. Type 033G1: A single Type 033G was modified to carry 6 YJ-1 (CSS-N-4) anti-ship missiles, this variant is called Type 033G1, with the rumored NATO reporting name of Wuhan A. The missile had to be fired while the boat was surfaced, with a total exposure time on the surface of less than 7 minutes. The most significant improvement, however, is the reduction of noise level by 12 dB. ES5B: Development of the Type 033G, primarily intended for export. This is an upgrade package for Romeo submarine users. The primary improvement of this class is the ability to launch wire guided torpedoes and anti-ship missiles (AShM) while submerged. The program originally begun in the mid-1980s, and Egypt is reported to be the only customer when China won a contract to upgrade its Romeo-class submarine fleet, including both Soviet built and Chinese built units. This is the last type of Chinese Romeo class submarine; with noise reduction of 20 dB to 140 dB in comparison to the 160 dB of the original Soviet Project 633 submarines acquired by China.

Kilo Class (Project 877 Paltus) Russian Diesel-Electric Attack Submarine







Tiers:



Variants:

- **CHITA:** Commissioned: Dec. 31, 1980
- **VYBORG:** Commissioned: Feb. 23, 1983
- **NOVOSIBIRSK:** Commissioned: Sept. 30, 1984
- **VOLOGDA:** Commissioned: Dec. 30, 1984
- **DMITROV:** Commissioned: Sept. 25, 1986
- **SVYATOI NIKOLAI CHUDOTVORETS:** Commissioned: Jan. 30, 1988
- **YAROSLAVL:** Commissioned: Dec. 27, 1988
- **NURLAT:** Commissioned: Dec. 30, 1988
- **KALUGA:** Commissioned: Sept. 30, 1989
- **VLADIKAVKAZ:** Commissioned: Sept. 30, 1990
- **MAGNITOGORSK:** Commissioned: Dec. 30, 1990
- **UST-BOLSHERETSK:** Commissioned: Dec. 30, 1990
- **KOMSOMOLSK-ON-AMUR:** Commissioned: Dec. 30, 1991
- **LIPETSK:** Commissioned: Dec. 30, 1991
- **KRASNOKAMENSK:** Commissioned: Dec. 30, 1992
- **MOGOCHA:** Commissioned: Jan. 22, 1994

System

Alternative Designation: Kilo Class; Soviet Designation: Project 877 Paltus

Type: Diesel-Electric Attack Submarine

Builder: Rubin Design Bureau Krasnoye Sormovo Shipyard Amur Shipbuilding Plant Admiralty Shipyard Sevmash

Crew: 57 (12 off. + 45 max. enl.)

Dimensions

Length, Overall: 72.6 m

Length, Waterline: 70.0 m

Beam: 9.9 m

Draft: 6.6 m

Displacement, Surfaced: 2,325 tons

Displacement, Submerged: 3,076 tons

Propulsion System

Engine Name: 2 x Type 4-2DL42M

Engine Type: 2 x Type 4-2DL42M diesel generator sets, electric drive, 1 motor

Engine Power: 5,900 total shp; 1 6-bladed prop (except ALROSA: one pumpjet)

Auxiliary Power: 1 x 130-shp low-speed motor; 2 x 204 shp low-speed maneuvering motors; 2 ducted propellers

Fuel Capacity: 172 tons

Maximum Speed, Surface: 10 knots

Maximum Speed, Submerged: 17 knots

Maximum Range, Snorkeling: 6,000 nm at 7 knots

Maximum Range, Submerged: 400 nm at 3 knots

Endurance: 45 days

Missile Weapon System

↳***Missile #1***

Name: Igla-M missiles

Type: 1 x shoulder-launched SAM system

Operational Range: 6.0 km

Maximum Speed: 570m/s

Guidance System: Dual waveband infra-red (S-version

Torpedoes

Torpedo Tubess: 6 x 533-mm bow

Torpedo: SS-N-15A Starfish Torpedo

Basic Load: 18

Mines

Basic Load: 24 mines carried

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Name: 1 x Zarnitsa (Skin Head**) or 1 x Type 351 (Pot Head**)

Type: Surface Search

Frequency: INA

Range: INA

Sonar Systems

↳*Sonar #1*

Name: 1 x MGK-400 Rubikon (NATO: Shark Gill)

Type: active/passive, low-frequency suite: passive hull array sonar

↳*Sonar #2*

Name: 1 x MG-519 Arfa (NATO: Mouse Roar)

Type: high-frequency active target classification/mine avoidance sonar

↳*Sonar #3*

Name: 1 x MG-553

Type: sound-velocity measuring sonar

↳*Sonar #4*

Name: 1 x MG-512

Type: self-cavitation measurement sonar

↳*Sonar #5*

Name: 1 x MG-53

Type: sonar intercept (on some units) sonar

↳*Sonar #6*

Name: 1 x MRM-25EM (NATO: Squid Head)

Type: intercept sonar

↳*Sonar #6*

Name: 1 x 6701E (NATO: Quad Loop)

Type: direction-finder sonar

Protection

Active Protection System: INA

Countermeasures: Yes

NBC Water Washdown System: Yes

EW Intercept: 1 x MRM-25EM (NATO: Squid Head) intercept

EW Direction Finder: 1 x 6701E (NATO: Quad Loop) direction-finder

Notes:

Kilo class, Soviet designation Project 877 Paltus (Russian: Па́лтус, meaning "halibut", NATO reporting name Kilo), is a class of diesel-electric attack submarines designed and built in the Soviet Union for the Soviet Navy. The class was built until the mid-1990s, when production was switched to the more advanced Project 636 Varshavyanka variant, also known as Improved Kilo-class by the West. These attack submarines are mainly intended for anti-shipping and anti-submarine operations in relatively shallow waters. Original Project 877 boats are equipped with Rubikon MGK-400 sonar system (with NATO reporting name Shark Gill), which includes a mine detection and avoidance sonar MG-519 Arfa (with NATO reporting name Mouse Roar). Newer Project 636 boats are equipped with improved MGK-400EM, with MG-519 Arfa also upgraded to MG-519 EM.MGK 400E can detect submarines with 0.05 Pa/Hz noisiness in 16 km and surface vessels with 10 Pa/Hz noisiness in 100km. The improved sonar systems have reduced the number of operators needed by sharing the same console via automation. Anechoic tiles are fitted on casings and fins to absorb the sound waves of active sonar, which results in a reduction and distortion of the return signal. These tiles also help attenuate sounds that are emitted from the submarine, thus reducing the range at which the sub may be detected by passive sonar.

Type 039A Class (Yuan Class) Chinese Diesel-Electric Submarine





Tiers:



System

Alternative Designation: Type 039A Class; Yuan Class
Type: Diesel-Electric Submarine
Builder: Wuchang Shipbuilding, Wuhan
Crew: 52
Note: There is little publicly known about the new Chinese YUAN-class diesel-electric powered submarine. The class is comparable to the Russian KILO-class (Project 636) submarine, however with numerous improvements.

Dimensions

Length: 72.0 m
Beam: 8.4 m
Draft: Unknown
Displacement, Surface: 2,350 tons surface
Displacement, Submerged: 3,126 tons submerged

Propulsion System

Engine Name: 4 x Shaanxi diesels
Engine Type: Diesel-Electric
Engine Power: 6,092 total bhp; 1 shaft
Maximum Range: INA
Maximum Speed: 12 knots (surfaced)/25 knots (submerged)

Missile Weapon System

↳*Missile #1*

Name: YJ-8(C-801) (NATO: CSS-N-4 Sardine)

Type: Anti-Ship Cruise Missile

Length: 5.81 m

Weight: 815 kg

Warhead: 165 kg

Engine: Rocket

Propellant: Solid Rocket

Operational Range: 42 km

Flight Altitude: 5 or 7 m

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: 8

Torpedoes

Torpedo Tubes: 6 x 533-mm bow-mounted

Torpedos: Yu-3 anti-ship torpedoes; Yu-4 anti-sub torpedoes; or 53-65KE wake-homing torpedoes.

Basic Load: 18

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Name: INA

Type: Search/Navigation Radar

Frequency: INA

Range: INA

Sonar Systems

↳*Sonar #1*

Name: INA

Type: 1 x active/passive medium-frequency bow-mounted sonar

Sonar #2

Name:
Type: 1 x high freq active classification/mine avoidance sonar

Protection

Active Protection System: INA
Countermeasures: Yes
NBC Water Washdown System: Yes
EW: 1 X Radar Warning

Notes:

The Type 039A submarine (NATO reporting name: Yuan class) is a class of diesel-electric submarine in China's People's Liberation Army Navy. It is China's first AIP powered submarine and presumed to be one of the quietest diesel-electric submarine classes in service. This class is the successor of the Type 039 submarine. The official Chinese designation is 039A as the ship is based on the 039 class, but as the 039A has very little resemblance to the 039 it is commonly referred to as the Type 041. The class is designed to replace the aging Type 033 Romeo and the older Type 035 submarines that previously formed the backbone of the conventional submarine force. According to an early assessment by the US Naval Institute, the Yuan class was primarily designed as "an anti-ship cruise missile (ASCM) platform capable of hiding submerged for long periods of time in difficult to access shallow littorals. However, another assessment by USNI includes an open-ocean capability which can be used beyond coastal waters. Also updated was its role within China's naval fleet, and as of August 2015 it is considered to be a more traditional attack submarine, with a secondary ASCM role. The Type 039A inherits the tail design of the Type 039 (NATO codename: Song class) with four diving planes and a single large shaft. A pair of foreplanes are positioned in the middle of the sail. The submarine is equipped with indigenously developed cabin-raft (shock absorbers) system that helped to reduce noise level by over 35 dB. Additionally, the submarine is covered with rubber anti-sonar protection tiles to reduce the risk of detection. A new improved "C" variant was also launched.

↳

Type 039 Class (Song-Class) Chinese Diesel-Electric Submarine



Tiers:

1 **2** 3 4

Variants:

- **Yuanzheng 20:** Commissioned: June 1999 Status: Active
- **Yuanzheng 21:** Commissioned: April 2001 Status: Active
- **Yuanzheng 22:** Commissioned: Dec. 2001 Status: Active
- **Yuanzheng 14:** Commissioned: Nov. 2003 Status: Active
- **Yuanzheng 15:** Commissioned: Dec. 2003 Status: Active
- **Yuanzheng 16:** Commissioned: 2004 Status: Active
- **Yuanzheng 23:** Commissioned: 2004 Status: Active
- **Yuanzheng 24:** Commissioned: 2004 Status: Active
- **Yuanzheng 25:** Commissioned: 2005 Status: Active
- **Yuanzheng 26:** Commissioned: 2005 Status: Active
- **Yuanzheng 17:** Commissioned: 2005 Status: Active
- **Yuanzheng 18:** Commissioned: 2005 Status: Active
- **Yuanzheng 19:** Commissioned: 2006 Status: Active

System

Alternative Designation: Type 039 Class; NATO: Song Class

Type: Diesel-Electric Submarine

Builder: YUANZHENG-18: Jiangnan Shipyard, Shanghai, China Remainder: Wuhan Shipbuilding Industry Co., Wuhan, China

Crew: 60

Dimensions

Length: 74.9 m

Beam: 8.4 m

Draft: 5.3 m

Displacement, Surface: 1,992 tons surface

Displacement, Submerged: 2,250 tons submerged

Propulsion System

Engine Name: 4 x MTU type 16V396 SE83/84

Engine Type: Diesel-electric

Engine Power: hp6,092 total bhp; 1 shaft

Maximum Speed: 15 knots (surface)/22 knots (submerged)

Maximum Range: 22 nm at 22 kts.; 72 nm at 3 kts.

Missile Weapon Systems

↳*Missile Weapon System #1*

Name: C-801 (CSS-N-4 Sardine)

Type: Anti-Ship Cruise Missile

Quantity: INA

Length: 5.81 m

Diameter: INA

Weight: 815 kg

Warhead: 165 kg

Engine: Rocket

Propellant: Solid Rocket

Operational Range: 42 km

Flight Altitude: 5-7 m

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Torpedo Weapon Systems

↳*Torpedo Launcher*

Number of Tubes: 6 x 533-mm tubes

↳*Torpedo #1*

Name: Yu-5

Type: Wire-Guided Torpedo

Length: 7.8 m

Diameter: 533 mm

Weight: INA

Basic Load: 6

Warhead: 400 kg

Propulsion: Otto fuel II

Guidance: active / passive acoustic homing + wire guidance

Maximum Speed: Up to 50-knot (93 km/h)

Maximum Range: Up to 30 km @ 50 knots (93 km/h)

Depth: > 400 m

Mines

Note: 36 mines in lieu of torpedoes

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: INA

Radar Systems

Name: INA

Type: Surface Search/Navigation Radar

Frequency: INA

Range: INA

Sonar Systems

↳*Sonar #1*

Name: 1 x Thales TSM-2233 Eledone

Type: Passive Bow Array Sonar

↳*Sonar #2*

Name: 1 Thales TSM-2255 Fenelon or Chinese SQB-2

Type: Flank Array Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

EW: CEIEC Type 921A intercept

Notes:

The Type 039 submarine (NATO reporting name: Song-class) is a class of diesel-electric submarines of the People's Liberation Army Navy. The class is the first diesel-electric submarine to be fully developed within China and also the first Chinese diesel-

electric submarine to use the modern teardrop hull shape. Designed for attacking both other submarines and surface ships with torpedoes, the submarine uses a modern teardrop-shape hull for underwater performance. The hull incorporates four rudders and is propelled by a single propeller. The engine is imported from Germany. For quieter operation, the engine was mounted with shock absorbers and the hull is plated in rubber tiles for sound deadening. Development was not without problems, as a lengthy testing period for the first vessel (320) attests. Problems with noise levels and underwater performance led to revisions in the design and only a single boat was ever built to the original specification. Improvements led to the specification for the Type 039G, which became the bulk of production, with seven of the type entering service. Elimination of the stepped design for the conning tower is the primary visual cue for identification of the G variant. This class has two versions: the original Type 039, Type 039G. The most obvious visual difference between the two types is the conning tower. The Type 039's conning tower is stepped, rising aft. In an effort to shrink the submarine's acoustic signature, the Type 039G's conning tower was given a more conventional shape without any step. Weapons: Primary weapon for the Type 039 is the 533 mm Yu-4 torpedo, a locally produced passive homing 40-knot (74 km/h) torpedo based on the SAET-50 and roughly comparable to the SAET-60. Surface targets may be attacked at up to 15 km. Yu-6 wire-guided torpedoes may also be used for targeting submarines. It is also likely that the Type 039 is capable of carrying the YJ-8 anti-ship missile, a cruise missile which can be launched from the same tube as the boat's torpedoes, and can target surface vessels at up to 80 km. The missile is subsonic and carries a 165 kg warhead. For mining operations, in place of torpedoes, the submarine can carry 24 to 36 naval mines, deliverable through the torpedo tubes. The general designer of the torpedo and missile launching system is Mr. Sun Zhuguo (□□□, 1937-), and the launching system is compatible with AShM, ASW, torpedoes of both China and Russian/Soviet origin. Although Type 039 has successfully test fired the CY-1 ASW Missile under water like the Yuan-class submarine, the status of the missile is in question because nothing is heard about it entering mass production. The CY-1 ASW missile has a maximum range of 18 km (10 nm), and when using A244 or Mark 46 torpedo as a payload. Sensors: The main sensor is the medium-frequency sonar mounted in the bow of the submarine, with passive and active modes, which is used for both search and attack. In addition, the system offers a method of underwater communications, and also functions as a torpedo approach warning system. This sonar is the Chinese development of French Thomson-CSF TSM-2233 sonar, and is capable of simultaneously tracking 4 to 12 targets depending on the function it is used for. To enhance passive search capabilities, a low frequency sonar of French Thomson-CSF TSM-2255 design is mounted on the flanks of the hull, with a maximum range in excess of 30 km and capable of simultaneously tracking four targets. The system is further enhanced with the integration of a domestic Chinese passive ranging sonar on board, designated as H/SQG-04 sonar. For surface search, a small I-band radar is fitted. This class is the first Chinese submarine to be fitted with an integrated electronic support measures / radio direction finder / radar warning receiver system designated as SRW209 Submarine Radar Reconnaissance Equipment, which works at S - Ku bands with 100% detection rate. The SRW209 is fully automatic and can be either operated by a single operator with a console with a color CRT (which can be replaced by LCD) display console, or linked to the combat data system, which is capable of tracking multiple targets.

Type 212 Class (Todaro Class) German Diesel-Electric Submarine



Tiers:



Variants:

- **S181 (U-31):** Commissioned:19 October 2005: Active Navy: Germany
- **S182 (U-32):** Commissioned: 19 October 2005: Active Navy: Germany
- **S183 (U-33):** Commissioned: 13 June 2006: Active Navy: Germany
- **S184 (U-34):** Commissioned: 3 May 2007: Active Navy: Germany
- **S185 (U-35):** Commissioned: 23 March 2015: Active Navy: Germany
- **S186 (U-36):** Commissioned: 10 October 2016: Active Navy: Germany
- **S187 (U37):** Not commissioned: In planning stage Navy: Germany
- **S188 (U-38):** Not commissioned: In planning stage Navy: Germany
- **S526 (Salvatore Todaro):** Commissioned: 29 March 2006: Active Navy: Italy
- **S527 (Scire):** Commissioned: 19 February 2007: Active Navy: Italy
- **S528 (Pietro Venuti):** Commissioned: 6 July 2016: Active Navy: Italy
- **S529 (Romeo Romei):** Commissioned: 11 May 2017: Active Navy: Italy
- **:** Note 1: The Italian Navy has several other variants approved and financed as of 2019. These vessels have yet to be deployed into the fleet.

System

Alternative Designation: German: Type 212 Class; Italian: Todaro Class
Type: Diesel-Electric Submarine
Builder: Howaldtswerke-Deutsche Werft GmbH (HDW) - Fincantieri SpA
Crew: 27 men, 5 officers and 22 men

Dimensions

Length: m56
Beam: m6.8
Draft: m6.4
Displacement, Surfaced: 1500 t long
Displacement, Submerged: 1800 t long

Propulsion System

Engine Name: Siemens Permasyn electric motor
Engine Type: FR6439-3900KW

Engine Power: 1 x MTU-396 16V

Maximum Range: km/h15,000

Maximum Speed, surfaced: 22 km/h (12 knots)

Maximum Speed, submerged: 37 km/h (20 knots)

Main Weapon Systems

↳*Gun Weapon System*

Name: Muräne

Type: Auto-cannon

Caliber: mm30

Quantity: 1

↳*Gun Weapon Systems Ammunition*

Type: INA

Caliber: INA

Cartridge: INA

Basic Load: INA

Torpedoes

Name: DM2A4 Seehecht ("Seahake") heavyweight torpedoes

Type: Fiber-optic guided torpedo

Length: m6.6

Diameter: mm533

Warhead: PBX

Warhead weight: kg260

Engine: Electrical silver-zinc oxide batteries

Maximum Speed: 92 km/h (50 knots)

Guidance system: Wire-guided with autonomous active terminal homing sonar

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: INA

Radar Systems

Name: ISUS90-20

Type: Surface Search

Frequency: INA

Range: INA

Sonar Systems

Name: CSU 90 (DBQS-40FTC

Type: Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Electronic Warfare: EADS FL 1800U suite

Notes:

The German Type 212 class, also Italian Todaro class, is a non-nuclear submarine developed by Howaldtswerke-Deutsche Werft AG (HDW) for the German and Italian navies. It features diesel propulsion and an additional air-independent propulsion (AIP) system using Siemens proton exchange membrane (PEM) compressed hydrogen fuel cells. The submarines can operate at high speed on diesel power or switch to the AIP system for silent slow cruising, staying submerged for up to three weeks with little exhaust heat. The system is also said to be vibration-free, extremely quiet and virtually undetectable. Type 212 is the first fuel cell propulsion system equipped submarine series.

Sang-O Class North Korean Diesel-Electric Submarine





Tiers:



Variants:

- **Note:** There is no list of the names of each Sang-O Class Submarine. In Total there are 40 Sang-O Class Submarines operating in North Korea.

System

Alternative designations: SHARK
Type: Coastal Submarine
Total Built: 40 Sang-O Class Submarines in Total operating within North Korea
Builder: Bong Dao Bo Shipyards, Singpo
Crew: 19 in torpedo version 11 crew and 15 troops in special forces version,

Dimensions

Length: 35.5 m
Beam: 3.8 m
Draft: 3.2 m
Displacement, Surface: 295 tons
Displacement, Submerged: 325 tons

Automotive

Engine: 1 x diesel electric generator set
Engine Power: 300 bhp est
Propeller: single shrouded
Surface Speed: km/h14.1
Snorkeling Speed: km/h13.3
Submerged Speed: km/h16.5
Maximum Range: 5,000 km

Armament

Torpedo Version: 4 x bow 533-mm torpedo tubes, no reloads

Minelaying Version: 16 x mines in external racks

↳*Weapon Station #1*

Name: 53-65KE Torpedoes

Type: Type 53 torpedo

Basic Load: INA

Length: 7.2 m

Diameter: 533 mm

Weight: 2,070–2,300 kg

Operational Range: 18,000 meters

Speed: 83 km/h

Warhead: 307.6 kilograms (678 lb) high explosive

Guidance System: Wake homing

Sensors

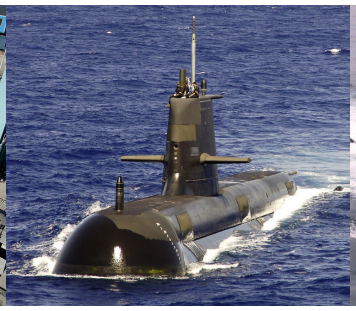
Radar: 1 x Furuno navigation

Sonar: 1 x passive array only

Notes:

The Sang-o-class coastal submarine is smaller than Romeo- and Whiskey-class subs, but larger than a midget submarine. It is apparently intended for use in coastal defense missions, minelaying and special forces insertion. The name Sang-o is a Korean word meaning shark. It was given to the submarine by Western intelligence agencies. The actual North Korea class name is unknown. Examinations of a special forces transport version reveal a crude design with poor manufacturing quality. The captured variant did not have any torpedo tubes, but instead had 16 mine or external cargo-carrying fixtures, eight per side. Another variant reportedly does carry torpedo tubes. Reportedly built at Singpo beginning in 1991 at a rate of four to six per year. Only three were built in 1997 when construction halted. Two submarines, both reportedly in extremely poor condition, were sold to Vietnam in 1996. The Vietnamese ships were last reported to be undergoing reconditioning at Cam Ranh Bay naval base.

Collins Class Australian Diesel-Electric Submarine


Tiers:



Variants:

- **Collins:** Commisioned: 1996 Pennant Number: SSG 73
- **Farncomb:** Commisioned: 1998 Pennant Number:SSG 74
- **Waller:** Commisioned: 1999 Pennant Number: SSG 75
- **Dechaineux:** Commisioned: 2001 Pennant Number: SSG 76
- **Sheean:** Commisioned: 2001Pennant Number: SSG 77
- **Rankin:** Commisioned: 2003 Pennant Number: SSG 78

System

Alternative Designation: Collins-class submarine
Total Built: 6 Collins Class Submarines Built
Type: Diesel-Electric Submarine
Builder: Australian Submarine Corporation Kockums
In Service: 1996-Present
Crew: 42 (6 off. + 36 enl.)

Dimensions

Length: 77.4 m
Beam: 7.8 m
Draft: 7.0 m Maximum
Draught: 7 m
Displacement, Light: 2,450 tons
Displacement, Surface: 3,051 tons
Displacement, Submerged: 3,353 tons

Propulsion System

Engine Name: 3 x Garden Island-Hedemora HV V18B/15Ub (VB 210) 18-cylinder diesel generator sets; 1 x Jeumont-Schneider electric motor
Engine Type: Diesel-electric drive

Engine Power: hp7,200 total shp

Shaft: 1

Speed, Surface: 10.5 knots

Speed, Submerged: 21.0 knots

Range, Surface: 11,500 nm at 10 knots

Range, Snorkeling: 9,000 nm at 10 knots

Range, Submerged: 480 nm at 4 knots

Diving Depth: >590 ft (180 m)

Endurance: 70 Days

Main Armament

Launching Tubes: 6 x bow 533mm Tubes

↳*Missiles*

Name: AGM-84 Harpoon

Type: Long-range sea-skimming, anti-ship missile

Variants: AGM-/RGM-84A; UGM-84B; RGM-84C (Block 1B production variant); AGM-/RGM-/UGM-84D (Block 1C); AGM-/RGM-84F (Block 1D); RGM-84G/UGM-84G Block 1G; AGM-84H SLAM-ER (Extended Response); SLAM-ATA (Automatic Target Acquisition) Block 1G; Land-launched coastal defense; Harpoon 2000/Block II; AGM-84M Harpoon Block III; AGM-84N Harpoon Block II+

Proliferation: The AGM-/RGM-/UGM-84 Harpoon is a long-range sea-skimming, anti-ship missile that is the most widely used anti-ship missile in the West.

Length: 3.90 m

DIameter: 340mm

Wingspan: 0.91 m

Weight: 531.6 kg

Warhead Type: Conventional high-explosive with some penetration capability

Warhead Weight: 227 kg

Speed: Mach 0.85

Range: 75-80 nm (86.3-92.1 mi, 139-148 km)

Targeting: HCLS provides targeting data; no updates once missile is launched.

Guidance: on-board Midcourse Guidance Unit (MGU)-IBM digital computer Smiths Industries three-axis ARA Honeywell AN/APN-194

Missile Basic Load: INA

↳*Torpedoes*

Name: Mk 48

Type: Heavy Torpedo

Variants: Ex-10 RETORC (Research Torpedo Configuration); Mk 48 Mod 0/2; Mk 48 Mod 1; Mk 48 Mod 3; Mk 48 Mod 4; Mk 48 Mod 5; Mk 48 Mod 6; Mk 48 Mod6AT; "Full-up" ADCAP; Closed-Cycle Advanced Capability Propulsion System

(CCACPS); Mk 48 Mod 7 ADCAP CBASS; Half-Length Mk 48

Proliferation: It is the principal weapon of U.S. attack submarines, being a successor to the Mk 37. The Mk 48 is generally considered the most advanced torpedo in Western naval inventories.

Length: 5.84 m

Diameter: 533 mm

Weight: 1,565 kg

Warhead: conventional high-explosive (PBXN-3)

Warhead Weight: 295 kg

Speed: 55 kts (102 kmh)

Maximum Range at 55 Knots: 20 nm (23 mi, 37 km)

Maximum Range at 40 Knots: 27 nm (31 mi, 50 km)

Maximum Depth: 760 m

Guidance System: may be launched as free-running or wire-guided free-running; homing is by either active or passive acoustic means. Wire-guidance permits two-way communication between torpedo and submarine and can be either active or passive acoustic search.

Torpedo Basic Load: INA

↳***Mines***

Note: 44 x BAE Systems Stonefish Mk III [carried in lieu of torpedoes and/or missiles]

Fire Control

Computerized FCS: Yes

FCS Name: 1 x Raytheon SFCS Mark 3

Search Periscope: Thales CK043 search periscope

Attack Periscope: Thales CH093 attack periscope

Radar

Surface Search Radar: 1 x GEC-Marconi Type 1007 surface search

Sonar System

Bow and Clank Array Sonar: 1 x Thales Karriwarra passive towed array (COLLINS and FARNCOMB only)

Passive Towed Array Radar: 1 x Thales Karriwarra passive towed array or Thales Narama towed array (remainder)

Protection

Active Protection System: Yes

Electronic Warfare: Condor CS-5600 ESM

Decoys: 1 x Argo/Systems Phoenix AR-740-US intercept

Notes:

The Collins class of six Australian-built diesel-electric submarines is operated by the Royal Australian Navy (RAN). The Collins class takes its name from Australian Vice Admiral John Augustine Collins; all six submarines are named after significant RAN

personnel who distinguished themselves in action during World War II. The boats were the first submarines to be constructed in Australia, prompting widespread improvements in Australian industry and delivering a sovereign (Australian controlled) sustainment/maintenance capability. Planning for a new design to replace the RAN's Oberon-class submarines began in the late 1970s and early 1980s. Proposals were received from seven companies; two were selected for a funded study to determine the winning design, which was announced in mid-1987. The submarines, enlarged versions of Swedish shipbuilder Kockums' Västergötland class and originally referred to as the Type 471, were constructed between 1990 and 2003 in South Australia by the Australian Submarine Corporation (ASC). The submarines have been the subject of many incidents and technical problems since the design phase, including accusations of foul play and bias during the design selection, improper handling of design changes during construction, major capability deficiencies in the first submarines, and ongoing technical problems throughout the early life of the class. These problems have been compounded by the inability of the RAN to retain sufficient personnel to operate the submarines—by 2008, only three could be manned, and between 2009 and 2012, on average two or fewer were fully operational. The resulting negative press has led to a poor public perception of the Collins class. After 20 years of service issues, the boats have finally provided high availability to the RAN since 2016. The Collins class was expected to be retired about 2026, however, the 2016 Defence White Paper extended this into the 2030s. The Collins class life will now be extended and will receive an unplanned capability upgrade, including but not limited to: sonar and communications. The Collins class will be replaced by the Future Submarine Program (SEA 1000) that is scheduled, according to the 2016 Defence White Paper, to begin entering service in the early 2030s with construction extending to 2050. The Future Submarine Program will be based on the Shortfin Barracuda, a nuclear attack submarine designed by French company DCNS; twelve submarines will be acquired, all built in Australia. The Australian Submarine Corporation construction facility was established on previously undeveloped land on the bank of the Port River, at Osborne, South Australia. Work on the site began on 29 June 1987, and it was opened in November 1989. South Australia was selected as the site of the construction facility based on the proposed location of the facility and promises by the State Government to help minimise any problems caused by workers unions. The state's bid was aided by careful promotion to both Kockums and IKL/HDW during early in the project, and problems with the other states' proposals: Tasmania and Western Australia lacked the necessary industrial base, New South Wales could not decide on the location of the construction facility, Victoria's proposed site was poorly sited, and building in Liberal-led Queensland would have been politically unwise for the project when Labor was in power both federally and in all other states. Each submarine was constructed in six sections, each consisting of several sub-sections. One of the main criteria of the project was that Australian industries contribute to at least 60% of the work; by the conclusion of the project 70% of the construction and 45% of the software preparation had been completed by Australian-owned companies. Work was sub-contracted out to 426 companies across twelve countries, plus numerous sub-sub-contractors. In many cases, components for the first submarine were constructed by companies outside Australia, while those for the following five boats were replicated by an Australian-owned partner or subsidiary. The project prompted major increases in quality control standards across Australian industries: in 1980, only 35 Australian companies possessed the appropriate quality control certifications for Defence projects, but by 1998 this had increased to over 1,500. Although the acquisition project organisers originally planned for the first submarine to be constructed overseas, the Cabinet decided as part of the project's approval that all six submarines would be built in Australia; the increases in construction time and cost from not building the lead ship in the winning designer's home shipyard was considered to be offset by the additional experience provided to Australian industries. Even so, two sections of the first submarine were constructed by Kockums' shipyard in Malmo, Sweden. By the end of 1990, Chicago Bridge & Iron and Wormald International had both sold their shares in ASC. The shares were bought up by Kockums and the Australian Industry Development Corporation, with some of Kockums' shares then sold to James Hardie Industries to maintain an Australian majority ownership of the company. On 5 April 2000, the shares in ASC held by Kockums were bought out and the company was nationalised, despite a trend at the time to privatise government-owned companies. At the end of 2003, a contract to maintain the Collins class worth $3.5 billion over 25 years was awarded to ASC. As of April 1996, the option to order the seventh and eighth submarines was still under consideration, but was looked on unfavourably by the Department of Defence at the time, as the additional cost would require the diversion of funding from the Australian Army and Royal Australian Air Force, resulting in an imbalance in the capabilities of the Australian Defence Force. The option was cancelled outright by late 2001.

Yugo Class North Korean Midget Submarine







Tiers:



System

Alternative Designation: Yugo Class

Type: Midget Submarine

Builder: Yukdaeso-ri shipyard

Total Built: 36

Crew: 2

Special Forces Soldiers: 7

Dimensions

Length: 22.0 m

Beam: 2.0 m

Draft: 1.6 m

Displacement, Surface: 76 tons

Displacement, Submerged: 90 tons

Propulsion System

Engine Name: 1 x MTU Diesel Electric

Engine Type: Diesel Electric

Engine Power: 160 shp

Primary Propeller: 1 x 7-bladed

Auxiliary Propeller: 1 x 5-bladed freewheeling

Surface Speed: 10 kts

Submerged Speed: 4 kts

Surface Range: 1,019 km at 10 kts

Submerged Range: 93 km at 4 kts

Torpedo Weapon Systems

Note: 2 x 533-mm tubes (2 torpedoes carried)

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Name: INA

Type: INA

Frequency: INA

Range: INA

Sonar Systems

Name: INA

Type: INA

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The North Korean Yugo class (NATO code name) is said by some sources to be so named because it was built to plans supplied by Yugoslavia in 1965. The Yugoslav Navy was designed to control the coast of the Adriatic with fast patrol boats, frigates and small submarines. These submarines included three Heroj class submarines commissioned in the 1960s, no less than nine Una and Mala class midgets submarines (the same model was later sold to North Korea) and two more modern Sava class boats laid down in 1975. The Savas were 964 tons full load displacement, and carried six 533mm forward torpedo tubes in a 65 meter (213 foot) long hull. Pyongyang exported some midget submarines to Vietnam in 1997. Vietnam purchased two Yugo-class midget submarines from North Korea that are torpedo-capable, but are used mostly for swimmer/diver delivery. A Yugo-class midget submarine from North Korea was seized in late June 1998 on the territorial waters of South Korea. The North Korean Yugo-class midget submarine was found to have nine dead men, who were speculated to have preferred death instead of capture. The North Korean Yugo-class midget submarine, which sank after getting entangled in nets utilized for fishing, was believed to be performing an infiltration mission in South Korea.

Lada-Class Russian Diesel-Electric Attack Submarine







Tiers:

1 **2** 3 4

Variants:

- **Kronshtadt:** Commissioned: 2010 Fleet: Northern
- **Velikiye Luki:** Commissioned: 2021 Fleet: Baltic

System

Alternative designations: Project 677; SANKT PETERSBURG

Date of introduction: 2010

Type: Attack Submarine

Total Built: Planned: 12 Active: 1

Builder: Admiralty Shipyard, Saint Petersburg

Crew (total): 35 officers and men

Dimensions

Length: 72 m (236 ft 3 in); 67 m (219 ft 10 in) on waterline

Beam: 7.1 m

Draught: 6.5 m

Displacement: 2,700 long tons (2,700 t) submerged 1,765 long tons (1,793 t) surfaced

Automotive

Propulsion: Electric propulsion motor on permanent magnets Storage battery with increased service life 2 diesel Air Independent Propulsion (AIP) systems based on oxygen-hydrogen fuel cells (perspectively) 1 shaft 2,700 hp (2,013 kW)

Speed: 21 kn (24 mph; 39 km/h) submerged 10 kn (12 mph; 19 km/h) surfaced

Endurance: 45 days

Test Depth: 300 m

Electric Motors: 1 x 5 576 hp

Diesel Generators: 2 x 3 499 hp

Armament

Launcher: 6 × 533-millimetre (21 in) torpedo tubes

Armament Options: Missiles: Alfa (SS-N-27 Sizzler) cruise missile, Oniks (SS-N-26) anti-ship cruise missile Torpedoes: 6 x 533 mm torpedo tubes, for 18 torpedoes, anti-submarine or anti-ship missiles.

↳*Weapon Station #1*

Name: SS-N-27 “Sizzler”

Type: Short-Range Anti-Ship Missile

Basic Load: 18

Length: 8.22 m

Diameter: 0.534-0.645 m

Launch Weight: 1,920 kg for 3M54 (1,570 kg for 3M54M1)

Payload: single conventional warhead

Basing: ubmarine- ship-launched

Warhead: 1X200 kg HE for 3M54 (1X450 kg HE for 3M54M1)

Propulsion: solid propellant, turbojet (3M54 is three stage, 3M54M1 is two stage)

Range: 220 km (3M54), 300 km (3M54M1)

Sensors

CICS: Litiy CICS

Sonar: sophisticated sonar equipment with bow and flank arrays, as well as towed array.

Notes:

Lada class, Russian designation Project 677 Lada (Russian: Лада, meaning "Lada", NATO reporting name Lada) is the new advanced class of diesel-electric attack submarine designed by the Russian Rubin Design Bureau. A program to develop a "fourth generation" diesel-electric submarine, it aimed to produce a highly improved version of the Project 636 with better acoustic signature, new combat systems and possibly air-independent propulsion. The project 677 St. Petersburg is a Russian diesel-electric submarine developed in the late 1990s. The submarine is designed for anti-submarine and anti-surface warfare, defense of naval bases, seashore and sea lanes, as well as for conducting reconnaissance. The class marks the first usage of a mono-hull design by the Russian navy for an attack submarine since the 1940s. Displacement is 25% lower than that of its predecessor, the Kilo-class submarine, but its capabilities are greatly enhanced. Top submerged speed is 21 knots (39 km/h), up from 19 knots for the Kilo class. The class is designed for an endurance of 45 days with a complement of 34. The submarine is equipped with automated combat control system Litiy, (eng. Lithium). A variant designated as the project 1650 Amur-class submarine is offered as an export model.

Project 633 Class (Romeo Class) Russian Diesel-Electric Submarine




Tiers:



Variants:

- **Chinese Type 033 Romeo-class and its variants:** Under the 1950 Sino-Soviet Friendship and Mutual Assistance Treaty, the Soviets passed to China (and later to North Korea) the documentation necessary to produce Romeo submarines in 1963. The Chinese variant is known as the Type 033 Romeo. A total of 84 Type 033 submarines were built in China from 1962 to 1984, plus several exported to other countries. The Chinese Type 033 incorporated some improvements over the original Romeo, including noise reduction of 20 dB. Sonar on board was also continuously upgraded: the original Soviet sonar was first replaced by domestic Chinese Type 105 sonar, which consequently was replaced by H/SQ2-262A sonar built by No. 613 Factory. Today most of the Type 033 subs have been retired or preserved, with a few remaining in service for training purposes. A total of six Chinese Romeo class submarine variants were developed: Type 6633: Original Chinese built Romeo, China was to have assembled these Romeos from knock-down kits provided by the Soviet Union, 6 were planned, but only 2 were completed. The construction program came to a complete stop when the USSR stopped delivery of parts following the Sino-Soviet split. Construction of the 3rd unit at Wuhan was stopped, and available parts were diverted to complete the first pair, but many parts had to be developed indigenously. The primary improvement of Type 6633 over the original Soviet boats is the use of domestic Chinese batteries, which had slightly superior performance to that of the original Soviet batteries. Type 033: Complete domestic production in China was achieved in 1967, and subsequently the project was renamed the Type 033. However, experience from deployment of completed boats in warmer climates proved that the original Soviet refrigeration and air conditioning system designed for subarctic and arctic area was woefully inadequate for subtropical and tropical regions, so redesigns were needed to improve refrigeration and air conditioning systems, and all boats to be stationed in tropical and subtropical regions went through such a refit. In September 1969 construction of new Type 033s, with improved air conditioning and refrigeration capability, began at Huangpu Shipyard in Guangzhou, eventually, 13 units were completed. ES5A: Upgraded Type 033, with improvements mainly involving the replacement of equipment of Soviet origin with domestic Chinese systems, which includes: QZHA—10 (Type 779) attack periscope and QDYA—10 (Type 778) general purpose periscope. Addition of H/SQG-2 ranging sonar, Type 063 communication systems, and countermeasure systems. Domestic Chinese Type 801 sonar replaced the original Soviet MARS-24 sonar. The only difference between the Type 801 sonar and the MARS-24 sonar is that there are 24 transducer elements for the Type 801 as opposed to 12 in the original MARS 24, so the Chinese sonar had better accuracy. Domestic Chinese H/SQZ-D reconnaissance sonar (with Type 105 transducers) replaced the original Soviet system, the performance of the SQZ-D is almost identical to the original Soviet sonar it was developed from, except for the sector of scan, which is increased by 15 degrees. Additional noise reduction measures were also adopted. This is the type China originally sold to Egypt in the 1980s. Type 033G: Development of the ES5A, with the incorporation of the capability to launch acoustic homing torpedoes; analog computers installed to achieve automation of, and speeding up of, torpedo fire control calculations that were previously manually calculated. All Chinese Romeos were converted to this standard. The NATO reporting name for this type is rumored to be the Wuhan-class. Type 033G1: A single Type 033G was modified to carry 6 YJ-1 (CSS-N-4) anti-ship missiles, this variant is called Type 033G1, with the rumored NATO reporting name of Wuhan A. The missile had to be fired while the boat was surfaced, with a total exposure time on the surface of less than 7 minutes. The most significant improvement, however, is the reduction of noise level by 12 dB. ES5B: Development of the Type 033G, primarily intended for export. This is an upgrade package for Romeo submarine users. The primary improvement of this class is the ability to launch wire guided torpedoes and anti-ship missiles (AShM) while submerged. The program originally begun in the mid-1980s, and Egypt is reported to be the only customer when China won a contract to upgrade its Romeo-class submarine fleet, including both Soviet built and Chinese built units. This is the last type of Chinese Romeo class submarine; with noise reduction of 20 dB to 140 dB in comparison to the 160 dB of the original Soviet Project 633 submarines acquired by China.

System

Alternative Designation: Project 633 Class; NATO: Romeo Class

Type: Diesel-Electric Submarine

Builder: Krasnoye Sormovo Shipyard, Gorky Wuchang Shipyard (Wuhan) Guangzhou Shipyard (Canton) Jiangnan Shipyard (Shanghai) Bohai Shipyard (Huludao) Mayang-do Naval Shipyard (North Korea) - Assembly site of North Korean kits from China.

Crew: 51 total (8 Off. + 43 Enl.)

Dimensions

Length: 76.6 m

Beam: 6.7 m

Draft: 5.0 m

Displacement, Surface: 1,319 tons surface

Displacement, Submerged: 1,712 tons submerged

Propulsion System

Engine Name: Type 37D

Engine Type: Diesel-Electric drive: 2 Type 37D diesels

Engine Power: hp2,700 total bhp; 2 shafts

Auxiliary Power: 2 Electric 100 shp creep motors

Speed, Surface: 15.2 knots surface

Speed, Submerged: 13 knots submerged

Range, Surface: 14,000 nm at 9 kts(surface)

Range, Submerged: 350 nm at 9 kts(submerged

Normal Operation Depth: 270.0 m

Maximum Operation Depth: 300.0 m

Torpedo Weapon Systems

↳*Torpedo Launcher*

Number of Tubes: 6 forward 533-mm and 2 aft 533-mm torpedo tubes

↳*Torpedo (Option #1)*

Name: SAET-60

Type: Heavy Weight Torpedo

Length: 7.80 m

Diameter: 533 mm

Weight, Total: 1.855 kg

Explosive Warhead: The SAET-60 uses an electric motor and has a 300 kg high explosive warhead with impact and proximity fuse.

Guidance System: Homing Passive acoustic homing

Wire Guidance: No

Power Source: Silver zinc battery, 46 cells

Propulsion: Twin propeller wakeless propulsion

Speed: 42 kt

Maximum Range: 13 km at 42 kt

Depth: Up to 400 m launch depth

Basic Load: 14

↳ ***Torpedo (Option #2)***

Name: Type 53-65

Type: Torpedo

Length: 7.2 m

Diameter: 533 mm

Weight: 2,070–2,300 kg

Range: 18,000 metres

Speed: 83 km/h

Guidance System: Wake homing

Warhead: 307.6 kilograms (678 lb) high explosive

Mines

Note: Can carry 28 mines in lieu of torpedoes

Radar Systems

Name: 1 x Snoop Plate

Type: Surface search/navigation

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x 1 Tamir-5L Active Sonar

Type: Active Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Electronic Warfare: 1 x MRP-11-14 series Stop Light intercept

Notes:

The Project 633 class (known in the West by its NATO reporting name as the Romeo class) is a class of Soviet diesel-electric submarine, built between 1957 and 1961. A Chinese variant - Type 033 - was built in China from 1962 to 1984. Project 633 was a further development of the Soviet navy's post-war 611 (Zulu-) and 613 (Whiskey-class) designs. The project was undertaken by Lazurit Central Design Bureau of Gorky. Only 20 of the Soviet Union's originally intended 56 were completed between October 1957 and the end of December 1961 because of the introduction of the nuclear submarine into the Soviet Navy. By today's standards Romeo class submarines are considered obsolete, but they still have some value as training and surveillance vessels.

Type 035 Class (Ming Class) Chinese Diesel-Electric Submarine







Tiers:



Variants:

- **Type 035:** First unit of the Ming-class submarine, with construction of two units begun simultaneously in October 1969 in Wuchang Shipyard and Jiangnan Shipyard. The general designer was Wei Xumin (□□□). The most significant difference between Type 035 Ming class and Type 033 Wuhan class is that the former is driven by a single shaft instead of twin shafts of the latter. Trials completed in October 1974 and this first unit (original pennant number 162, but later changed to 232) built at Jiangnan Shipyard entered Chinese service in the following month.
- **Type 035A:** The second unit of the Ming-class submarine with pennant number 342 was built at Wuchang Shipyard, and many problems were discovered during its trials. As a result, the Chinese navy ordered 701st Institute to perform a major redesign, which not only solved the problem, but also increased the top speed by 40% to 18.3 knots (33.9 km/h; 21.1 mph). The redesigned boat was completed in June 1980, and finally entered Chinese service on December 24, 1982, with a new designation of Type 035A. In December 1983, the decision was made to stop the production of a new Type 033-class boat and replace it with a Type 035A. After the completion of the first Type 035A in 1982, the production of Type 035 briefly halted, until 1987, when the production restarted again and 3 more units were completed before the production ended in 1990.
- **ES5C:** Export version of Type 035/035A, with updated fire control system to launch acoustic homing torpedoes. There is no known export, but the design was used to upgrade Type 035/035A fleet.
- **ES5D:** further development of ES5C for export, with capability to launch anti-ship missiles while submerged added. As with its predecessor ES5C, there is no known export but the design was used to upgrade Type 035/035A fleet.
- **Type 035G:** Program begun in 1985, and the first unit with pennant number 356 was launched in 1989, entering service in December 1990, and state certification received in 1993. This is the first Type 035 series to have anti-submarine (ASW) capability. The primary weaponry for Type 035G is Yu-3 torpedo, and French sonar DUUX-5 and its Chinese-built version were used on later units, 12 of which were completed between 1990 and 1999. The last unit with pennant number 308 was lengthened by 2 meters (6 ft 7 in) to add a section for AIP tests.
- **ES5E:** Export version developed from Type 035G, with ability to launch wire-guided torpedoes added, but there is no known export.
- **Type 035ET:** French sonar system and its equivalent Chinese version on ES5E export version of Ming was expensive, so a cheaper alternative was developed, using Italian sonar systems, the JP-64 active sonar and Velox passive sonar of the Toti-class submarine. However, this failed to attract any buyers and the unit went into Chinese service instead.
- **ES5F:** Export version with integrated sonar system that integrates previously separated active, passive ranging, flank (and towed upon customer's request) sonar into one
- **Type 035B:** First batch of four completed between 2000 through 2003, and additional order followed sometimes later. Conning tower and certain portion of hull was redesigned, with new structure similar to that of Type 039 submarine. This type was capable of launching land attack cruise missiles from torpedo tubes.

System

Alternative Designation: Type 035 Class; Ming Class

Pendant Numbers: Pendant Numbers 305 through 310 342 352 through 354 356 through 360 362 and 363 plus four more units All are reported to be active. The "Ming Mod." type are all assigned to the Northern Fleet, while the "Ming Mod-II" type are being assigned to the Southern Fleet.

Type: Diesel-Electric Submarine

Builder: Wuchang Shipyard Jiangnan Shipyard

In Service: 1974-Present

Crew: 57

Dimensions

Length: 76.0 m

Beam: 7.6 m

Draft: 5.1 m

Displacement, Full Load: 1,584 tons surface 2,113 tons submerged

Propulsion System

Engine Name: Diesel-electric drive: 2 Shaanxi type 6E390 ZC1 diesels

Engine Type: Diestel-Electric

Engine Power: 3,500 total bhp

Maximum Range: 330 nm at 4 kts. (submerged); 8,000 nm at 8 kts.(snorkle)

Maximum Speed: 5 knots (surfaced); 10 knots (snorkle); 18 knots (submerged)

Endurance: 60 days

Torpedo Weapon Systems

↳*Torpedo Launcher*

Name: INA

Type: Torpedo Tube

Number of Tubes: 8

Location: 6 bow, 2 stern

↳*Torpedo (Option 1)*

Name: Yu-1

Type: Torpedo

Length: 7.8 m

Diameter: 533 mm

Weight: 2,000 kg

Warhead Weight: 400 kg

Basic Load: 16 x Yu-1 Torpedos

Engine: Steam

Operational Range: 3.5 km at 50 knots 9 km at 39 knots

Speed: 39 to 50 knots

Guidance System: Straight running gyroscopic, later upgraded to passive acoustic homing

↳***Torpedo (Option 2)***

Name: Yu-4

Type: Torpedo

Length: 7.75 m

Diameter: 533 mm

Weight: 1,775 kg

Warhead Weight: 309 kg

Basic Load: 16 x Yu-4 Torpedo

Engine: electrical, silver-zinc battery

Operational Range: 6 km (original) at 30 knots (56 km/h) 15 km (upgraded) @ 40 knots (74 km/h)

Speed: 30 knots (56 km/h) or 40 knots (75 km) upgraded

Guidance System: acoustic homing: Yu-4A: passive, Yu-4B: active/passive

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: INA

Radar Systems

Surface Search and Navigation Sonar: 1 Snoop Tray Radar

Sonar Systems

Passive Search and Attack Sonar: 1 Pike Jaw Sonar

Passive Ranging and Intercept Sonar: DUUX 5 ** passive ranging and intercept low frequency (later versions only)

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

The Type 035 submarine (NATO reporting name: Ming class) is a class of diesel-electric submarines of the People's Liberation Army Navy. The Type 035 is a heavily improved redesign of the older Type 033 Romeo-class submarines, which were built in China from 1962 to 1984. In 1963, under the 1950 Sino-Soviet Treaty of Friendship, Alliance and Mutual Assistance, the Soviet

Union passed to China the necessary design details in order to produce Romeo-class submarines. The Chinese variant became known as the Type 033 Romeo class, of which China built a total of 84 between 1962 and 1984. During the 1970s, China's ambition to create an indigenous submarine industry lead to the commissioning of Wuhan Ship Development and Design Institute (701 Institute) to design and build an improved submarine based on the Type 033 hull, named the Type 035 Ming class. Two Type 035 boats were completed by 1974. Further improvements were deemed necessary and by the early 1980s a new and improved design, named the Type 035A Ming class were produced. The first of these improved "A" models entered service in 1982, with three more under construction. The latter three boats were completed and commissioned by 1990. The Type 035G Ming class is the most numerous variant. A total of 12 were built and commissioned between 1990 and 1999. They were built with further improvements, especially in terms of noise reduction, weapons, sensors and crew living standards. The PLAN refer to this sub-class as, "new wine in an old bottle". Two boats of the Type 035A were upgraded to same standard as the Type 035G. The most modern design variant is the Type 035B Ming class, which features a redesigned conning tower and portions of the hull, giving it a very similar appearance to the newer Type 039 submarines. Type 035B are capable of launching land attack cruise missiles from their torpedo tubes. A total of four boats were commissioned between 2000 and 2003.

→→Nuclear-Powered Attack Submarines

Type 093 Class (Shang Class) Chinese Nuclear-Powered Attack Submarine







Tiers:



Variants:

- **Type 093 Shang-I class:** Construction of the Type 093 reportedly began in the late 1990s at the Huludao-based CSIC Bohai Shipbuilding Heavy Industry Co., Ltd. The first-of-class Boat 407 was launched sometime in 2001 to 2002. After a sea trial that lasted for four years, the submarine was finally commissioned by the PLA Navy in 2006. The second hull Boat 408 was launched in late 2003 and commissioned around 2007. The production then stopped and replaced by the follow-up variants. The basic variant Type 093 (Shang I class) was said to have been partially based on the Russian Victor III class in design, though the two submarines bear no resemblance in appearance. The submarine is estimated to have 6.000 to 7,000 t displacement when dived. It features a water-drop shape hull, with a pair of fin-mounted hydroplanes and four diving planes. Six (three on each side) flank-mounted sonar arrays are clearly visible on the hull of the submarine. There are six 533 mm bow torpedo tubes (4 above, 2 below), capable of carrying the various anti-submarine/surface torpedoes of wire-, acoustic- and wake-homing, as well as the YJ-82 anti-ship cruise missile (ASCM).
- **Type 093A Shang-II class:** This is an improved variant with a redesigned sail with a tapered front (similar to that of the Seawolf class and Virginia class) and all windows removed.
- **Type 093B Shang-III class:** The improved Type 093B nuclear-power guided missile submarine (SSGN) was launched n 2012 and commissioned in 2015. This variant features some redesign to the sail, with the tapered front retained but all windows removed. There is a mysterious hump located immediately behind the sail, which is believed to accommodate a missile vertical launch system (VLS). The VLS is said to be used for carrying and launching the YJ-18 ASCM, the Yu-8 rocket-propelled torpedo, and the CJ-10 land-attack cruise missile (LACM). The YJ-18, a Chinese copy of the Russian 3M-54 Klub (SS-N-27 'Sizzler'), is capable of attacking surface and land targets to a maximum range of 650 km. The CJ-10, rumoured to have been developed from the Russian Kh-55 (AS-15 'Kent'), employs a combined inertial navigation system (INS), satellite, and terrain contour matching (TERCOM) navigation to a maximum range of 1,500 km. These missiles allow the Type 093B to project power ashore over long distance – a capability not previously possessed by Chinese SSNs.

System

Alternative Designation: Type 093 Class; Shang Class
Total Built: 6 Type 093 Class Attack Submarines Built.
Type: Nuclear-Powered Attack Submarine

Builder: China Shipbuilding Industry Corporation Bohai Shipyard, Huludao

In Service: 2006-Present

Crew: 100

Dimensions

Length: m107

Beam: m11

Draught: m7.5

Displacement, Submerged: 7,000 tons

Displacement, Surface: INA

Draft: INA

Propulsion System

Engine Name: INA (Nuclear with turbo-electric arrangement)

Engine Type: Pressurized water Nuclear Reactor

Engine Power: INA

Shafts: 1

Maximum Range: Unlimited

Maximum Speed: 30 knots; 56 km/h

Endurance: INA

Propeller: 7-blade propeller

Auxiliary Armament

Torpedo Tube: 6x 533mm torpedo tubes

↳*Torpedos*

Note: The Shang class nuclear-powered attack submarine is armed with six 533 mm torpedo tubes. These can be used to launch a range of indigenous and Russian anti-submarine and anti-ship torpedoes with wire-, acoustic- and wave-homing. Torpedo tubes can also be used to launch Chinese YJ-82 anti-ship missiles.

Basic Load: 20 Torpedos

↳*Mines*

Note: The Type 093 can carry either 20 Torpedoes or 36 Mines

Fire Control System

FCS Name: INA

Computerized FCS: Yes, Multi-purpose combat data and command system for submarine control and weapon firing.

Radars

Surface Search Radar: Yes, (Name: INA)

Sonar Systems

Bow-Mounted Sonar: H/SQ2-262 bow-mounted, medium-frequency sonar for active/passive search and attack

Flank-Mounted Sonar: H/SQG-207 flank-mounted sonar (3 sonar arrays on each side)

Additional Sonar Systems: Low frequency sonar, passive ranging and intercept and a Towed array sonar for active search and attack

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

Radar Warning: Radar warning receiver and direction-finder

Notes:

The Type 093 (or Type 09-III, NATO codename: Shang class) is China's 2nd-generation nuclear-powered attack submarine (SSN) introduced in the early 2000s. It represents a significant improvement over the 1st-generation submarines in performance and capability. At least six hulls have already been commissioned into the PLA Navy as of 2015, and the construction programme continues. The improved Type 093B (Shang-III class) SSGN is capable of carrying log-range cruise missiles for anti-ship and land-attack. The PLA Navy initiated the development of its next-generation Type 093 nuclear attack submarine in the mid-1980s as a successor to its 1st-generation Type 091 (Han class). However, little progress was made until the mid-1990s, when Russia agreed to transfer its nuclear submarine technology to China in exchange for urgently-needed cash. The St. Petersburg-based Rubin Central Design Bureau for Marine Engineering, one of Russia's primary centres for submarine design, offered consultation to the Type 093's development, including overall hull design, engine and machinery quieting, combat system, weapon system, and countermeasures outfit. The existence of the submarine programme was first reported by the Pentagon in 2003. The U.S. Navy intelligence and Pentagon suggested that 2 hulls in the basic variant Type 093 and 4 hulls in the improved Type 093A variant had been constructed by 2017 ((Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, 2017, page 24.)). While the basic variant Type 093 is only comparable to the 1970s U.S. and Russian designs such as the early variant Los Angeles (688) class and the Victor-III class, the improved Type 093A/B is believed to be approaching the later variant Los Angeles class and the Akula class in quietness and overall capability, though they still cannot match the more advanced Seawolf and Virginia class. Type 093 Shang-I class Construction of the Type 093 reportedly began in the late 1990s at the Huludao-based CSIC Bohai Shipbuilding Heavy Industry Co., Ltd. The first-of-class Boat 407 was launched sometime in 2001 to 2002. After a sea trial that lasted for four years, the submarine was finally commissioned by the PLA Navy in 2006. The second hull Boat 408 was launched in late 2003 and commissioned around 2007. The production then stopped and replaced by the follow-up variants. The basic variant Type 093 (Shang I class) was said to have been partially based on the Russian Victor III class in design, though the two submarines bear no resemblance in appearance. The submarine is estimated to have 6.000 to 7,000 t displacement when dived. It features a water-drop shape hull, with a pair of fin-mounted hydroplanes and four diving planes. Six (three on each side) flank-mounted sonar arrays are clearly visible on the hull of the submarine. There are six 533 mm bow torpedo tubes (4 above, 2 below), capable of carrying the various anti-submarine/surface torpedoes of wire-, acoustic- and wake-homing, as well as the YJ-82 anti-ship cruise missile (ASCM). Type 093A Shang-II class This is an improved variant with a redesigned sail with a tapered front (similar to that of the Seawolf class and Virginia class) and all windows removed. Type 093B Shang-III class The improved Type 093B nuclear-power guided missile submarine (SSGN) was launched n 2012 and commissioned in 2015. This variant features some redesign to the sail, with the tapered front retained but all windows removed. There is a mysterious hump located immediately behind the sail, which is believed to accommodate a missile vertical launch system (VLS). The VLS is said to be used for carrying and launching the YJ-18 ASCM, the Yu-8 rocket-propelled torpedo, and the CJ-10 land-attack cruise missile (LACM). The YJ-18, a Chinese copy of the Russian 3M-54 Klub (SS-N-27 'Sizzler'), is capable of attacking surface and land targets to a maximum range of 650 km. The CJ-10, rumoured to have been developed from the Russian Kh-55 (AS-15 'Kent'), employs a combined inertial navigation system (INS), satellite, and terrain contour matching (TERCOM) navigation to a maximum range of 1,500 km. These missiles allow the Type 093B to project power ashore over long distance – a capability not previously possessed by Chinese SSNs.

Borei Class Russian Nuclear-Powered Ballistic Missile Submarine



Tiers:



Variants:

- **Project 955A (Borei-A):** Units of the Project 955A include improved communication and detection systems, improved acoustic signature and have major structural changes such as addition of all moving rudders and vertical endplates to the hydroplanes for higher maneuverability, and a different sail geometry. Besides, they are equipped with hydraulic jets and improved screws what allows them to sail at nearly 30 knots while submerged with minimal noise. Although first reported to carry 20 Bulava SLBMs, the 955A will be armed with 16 SLBMs with 6-10 nuclear warheads atop each, just like the project 955 submarines. The contract for five modified 955A submarines was delayed several times due to price dispute between the Russian Defence Ministry and the United Shipbuilding Corporation. The contract was formally signed on 28 May 2012. The first 955A submarine, Knyaz Vladimir, was laid down on 30 July 2012, during a ceremony attended by the Russian President Vladimir Putin. Two additional project 955A submarines were laid down in 2014, one in late 2015, and one in late 2016. According to Sevmash official, Vitaliy Bukovskiy, all Borei-A submarines are to be equipped with aspen banyas able to accommodate 3-4 people.
- **Project 955B (Borei-B):** The Project 955B was expected to feature a new water jet propulsion system, an upgraded hull, and new noise reduction technology. The concept design was to be initiated by the Rubin Design Bureau in 2018 and four project 955B boats were been proposed with first unit to be delivered to the Russian Navy in 2026. However, the project wasn't reportedly included in the Russia's State Armament Programme for 2018–2027 due to cost-efficiency. Instead, six more Borei-A submarines were to be built after 2023. According to a 2018 report, Russia's State Armament Programme for 2018–2027 includes construction of two more Borei-A submarines by 2028. The construction should take place at Sevmash starting in 2024 with deliveries to the Russian Navy in 2026 and 2027 respectively.
- **Yury Dolgorukiy:** Project: 955 Commisioned: 2013 Fleet: Northern
- **Alexander Nevsky:** Project: 955 Commisioned: 2013 Fleet: Pacific
- **Vladimir Monomakh:** Project: 955 Commisioned: 2014 Fleet: Pacific
- **Knyaz Vladimir:** Project: 955A Commisioned: 2020 Fleet: Northern
- **Knyaz Oleg:** Project: 955A Commisioned: 2020 Fleet: Pacific
- **Generalissimus Suvorov[7:** Project: 955A Commisioned: 2021 Fleet: Pacific
- **Imperator Aleksandr III[:** Project: 955A Commisioned: 2022 Fleet: Pacific
- **Knyaz Pozharskiy:** Project: 955A Commisioned: 2023 Fleet: Northern

System

Alternative designations: BOREI; Project 955; YURI DOLGORUKY

Builders: Sevmash, designed by Rubin

Type: Ballistic Missile Submarine

Crew: 107 (55 off. + 52 enl.)

Diminsions

Length: 170.0 m

Beam: 13.5 m

Draft: 9.0 m

Displacement, Surface: 14,720 tons

Displacement, Submerged: 24,000 tons

Draught: 10 m

Automotive

Reactor: 2 x OK-650B pressurized-water nuclear reactors

Power: 190 MW each

Turbine: 2 x OK-9 steam

Emergency Prop Power: 2 DC electric

Generator: 1,000 shp total

Total Electrical: 7,400 kW

Surface Speed: 15 knots (17 mph, 28 kph) max

Submerged Speed: 29 knots (33 mph, 54 kph) max

Endurance: 90 days

Normal Diving Depth: 1,247 ft (380 m)

Maximum Diving Depth: 1,575 ft (480 m)

Armament

↳*Weapon Station #1*

Name: RSM-56 Bulava (NATO: SS-NX-30)

Type: Submarine-Launched Ballistic Missile (SLBM)

Basic Load: 12 x RSM-56 Bulava (NATO: SS-NX-30)

Proliferation: The Russian Navy is the only operator of the RSM-56 Bulava. As of 2019, 48 missiles were deployed on 3 Borei-class ballistic missile submarines: K-535 Yury Dolgorukiy K-550 Alexander Nevsky K-549 Vladimir Monomakh

Length: 11.5 m (38 ft) (without warhead) 12.1 m (40 ft) (launch container)

Diameter: 2 m (6 ft 7 in) (missile) 2.1 m (6 ft 11 in) (launch container)

Weight: 36.8 t (36.2 long tons; 40.6 short tons)

Warhead: 6-10 × 100-150 kt MIRVs

Engine: Three stage solid and liquid head stage

Propellant: Solid propellant and liquid fuel

Operational Range: 8,000-8,300 km ≥ 9,300 [7] (> 9 - 10+k km)

Guidance System: Inertial guidance, possibly with Astro-inertial guidance and/or GLONASS update

Accuracy: 120-350 meters

Launch Platform: Borei-class submarines Typhoon-class submarine Dmitri Donskoi (as a testbed)

↳*Weapon Station #2*

Name: Type 53 Torpedo

Type: ASUW Torpedo

Length: 7.2 m

Basic Load: 12 x Type 53 Torpedos

Diameter: 533 mm

Weight: 2,070–2,300 kg

Range: 18,000 metres

Speed: 83 km/h

Guidance System: Wake homing

Note: Type 53 Torpedos include a mixture of SAET-60M and UGST torpedoes, SS-N-16 Stallion anti-ship missiles

↳ *Weapon Station #3*

Name: 1 x Igla-M shoulder-launched system

Type: man-portable infrared homing surface-to-air missile (SAM)

Basic Load: 1 x Igla-M shoulder-launched system with 8 x 9K38 Igla Missiles

Length: 1.574 m

Diameter: 72 mm

Warhead: 1.17 kg (2.6 lb) with 390 g (14 oz) explosive

Weight: Missile weight: 10.8 kg (24 lb), Full system: 17.9 kg (39 lb)

Detonation Mechanism: contact and grazing fuzes

Engine: solid fuel rocket motor

Operational Range: 5.2 km

Flight Ceiling: 3.5 km

Speed: 570m/s

Guidance System: dual waveband infra-red (S-version

Sensors

Navigation: Medveditsa-M system

Sonar: MGK-540 Skat-3M with towed array

Communications: Molnaya-M system

Combat Control: Omnibus system

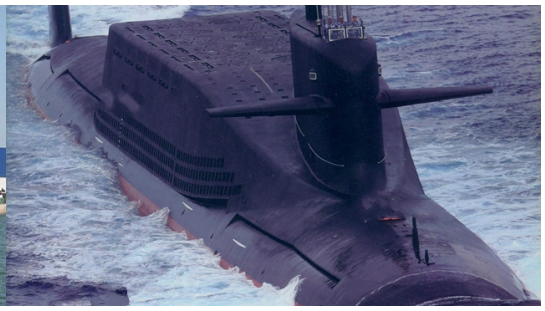
Protection

Note: Borei class includes a compact and integrated hydrodynamically efficient hull for reduced broadband noise and the first ever use of pump-jet propulsion on a Russian nuclear submarine.The noise level is to be five times lower when compared to the third-generation nuclear-powered Akula-class submarines and two times lower than that of the U.S. Virginia-class submarines. The acoustic signature of Borey is significantly stealthier than that of the previous generations of Russian SSBNs, nevertheless the USN has been able to identify the main noise emitter, i.e. the hydraulic pump. As the pump ages, it tends to become noisier, allowing for easier detection of the submarine.

Notes:

The Borei class, alternate transliteration Borey, Russian designation Project 955 Borei and Project 955A Borei-A, (Russian: Борей, meaning "Boreas, NATO reporting name Borei), also referred to as Dolgorukiy class, are series of nuclear-powered ballistic missile submarines being constructed by Sevmash for the Russian Navy. The class is projected to replace the Soviet-era Delta III, Delta IV and Typhoon classes in Russian Navy service. Despite being a replacement for many types of submarines, the Borei-class submarines are much smaller than those of the Typhoon class in both volume and crew (24,000 tons opposed to 48,000 tons and 107 people as opposed to 160 for the Typhoons), and are in terms of class more accurately a follow-on to for the Delta IV-class SSBNs. The first design work on the project started in the mid-1980s and the construction of the first vessel started in 1996. Previously, a short-lived, smaller parallel design appeared in 1980s with designation Project 935 Borei II. A new submarine-launched ballistic missile (SLBM) called the R-39UTTH Bark was developed in parallel. However, the work on this missile was abandoned and a new missile, the RSM-56 Bulava, was designed. The submarine needed to be redesigned to accommodate the new missile, and the design name was changed to Project 955. The vessels were developed by Rubin Design Bureau are being built by Russia's Northern shipyard Sevmash in Severodvinsk. Because of the repeated failures during Bulava test launches, some experts suggested that the Borei submarines could instead be armed with R-29RMU Sineva SLBMs, already in active duty with the Delta IV-class submarines. It has been reported that the arrival of the Borei class will enable the Russian Navy to resume strategic patrols in southern latitudes that have not seen a Russian missile submarine for 20 years. Borei class includes a compact and integrated hydrodynamically efficient hull for reduced broadband noise and the first ever use of pump-jet propulsion on a Russian nuclear submarine. The noise level is to be five times lower when compared to the third-generation nuclear-powered Akula-class submarines and two times lower than that of the U.S. Virginia-class submarines. The acoustic signature of Borey is significantly stealthier than that of the previous generations of Russian SSBNs, nevertheless the USN has been able to identify the main noise emitter, i.e. the hydraulic pump. As the pump ages, it tends to become noisier, allowing for easier detection of the submarine. The Borei submarines are approximately 170 metres (560 ft) long, 13 metres (43 ft) in diameter, and have a maximum submerged speed of at least 46 kilometres per hour (25 kn; 29 mph). They are equipped with a floating rescue chamber designed to fit in the whole crew. Smaller than the Typhoon class, the Boreis were initially reported to carry 12 missiles but are able to carry four more due to the decrease in mass of the 36-ton Bulava SLBM (a modified version of the Topol-M ICBM) over the originally proposed R-39UTTH Bark. Cost is some ₽23 billion (USD$890 million), in comparison the cost of an Ohio-class SSBN was around US$2 billion per boat (1997 prices). Each Borey includes of 1.3 million units and mechanisms. Its construction requires 17 thousand tons of metal which is 50 % more than the Eiffel Tower. The total length of pipelines is 109 km and the length of cable routes is 600 km. 10 thousand rubber plates cover the hull of the boat.

Type 094 Class (Jin Class) Chinese Nuclear-Powered Ballistic Missile Submarine (SSBN)


Tiers:



Variants:

- **Type 094A:** The Type 094A is a variant with a modified and improved sail. The sail appears to incorporate features from one installed on a modified Type 093.

System

Alternative Designation: Type 094 Class; Jin Class
Total Built: 8 Planned; 6 Completed
Type: Nuclear-Powered Ballistic Missile Submarine (SSBN)
Builder: Bohai Shipyard, Huludao, China
In Service: 2010-Present
Crew: 140+
Note: Once on high alert these submarines can leave their bases and operate in China's coastal water, protected by the China's fleet. So the Jin class boats have high probability of surviving the first strike, once the country has been attacked. However these submarines are not as advanced or stealthy as the Western ballistic missile submarines. Furthermore these are even inferior to the Russian submarines. China was always dragging behind in terms of submarine technology. It was reported that the Type 094 class boats are as noisy as the Russian Delta III class submarines, that were adopted back in the mid 1970s.

Dimensions

Length: 125.0 m
Beam: 12.5 m
Displacement, Submerged: 8,500 tons
Displacement, Surface: INA

Propulsion System

Engine Name: 1 x 90-MW pressurized-water nuclear reactor

Turbines: 2 steam turbines

Engine Power: INA

Maximum Range: Unlimited

Maximum Speed: INA

Endurance: INA

Missile System

↳***Missile***

Name: JL-2 (CSS-N-14)

Type: Intercontinental-Range Submarine-Launched Ballistic Missile (SLBM)

In Service: 2015-Present

Proliferation: INA

Basic Load: 12

Length: 13 m

Diameter: INA

Weight: 42,000 km

Warhead: 1 nuclear warhead

Blast Yield: 1 megaton of TNT

Propellant: Solid-fuel rocke

Operational Range: 7,200 km

Guidance System: Astro-inertial with Beidou

Launch Platform: Type 094 submarine

Torpedo System

Torpedo Tubes: 6 x 533mm Bow Tubes

↳***Torpedo***

Name: Yu-3 Torpedo

Type: Acoustic homing torpedo

In Service: 1980s-Present

Proliferation: INA

Basic Load: 12

Length: 7.8 meter

Diameter: 533 mm

Weight: 1.34 ton (1.2 ton for the training version)

Warhead: 205 kg

Guidance System: active/passive acoustic homing

Propulsion: electrical, silver-zinc battery

Range: 13 km

Speed: 35 kt

Depth: up to 400 m

Fire Control System

FCS Name: INA

Computerized FCS: Yes

Radar Systems

Navigation Radar: INA

Sonar Systems

Note: There is no unclassified information on the types of Sonar onboard the Type 094 class submarines.

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

Notes:

The Type 094 (simplified Chinese: 09-IV□□□□; traditional Chinese: 09-IV□□□□; Chinese designation: 09-IV; NATO reporting name: Jin class) is a class of ballistic missile submarine developed by China for the People's Liberation Army Navy Submarine Force. The Type 094 succeeds the Type 092 submarine. The Type 094 was first spotted in 2006 on commercial satellite imagery of the Xiaopingdao Submarine Base. It was noted as being longer than the Type 092. Two Type 094s were spotted at the Bohai Shipyard in May 2007, although it was not clear if these included the one spotted in 2006. One was operational in 2010, three in 2013, and four in 2015. As many as eight may enter service by 2020. The PRC is interested in augmenting its ICBM forces with SSBNs to enhance its comprehensive nuclear deterrent force. Nuclear deterrent patrols commenced in December 2015. The Type 094 is armed with 12 JL-2 SLBMs, each with an estimated range of 7,400 km (4,600 mi). Each missile carries one warhead. The Type 094 and JL-2 is China's first credible sea-based nuclear deterrent. Globalsecurity.org notes that a Type 094 patrolling just northeast of the Kuril Islands would be able to strike three-quarters of the contiguous United States; whereas launching from Chinese coastal waters would barely reach the Aleutian Islands. Thomas-Noone and Medcalf note that the Type 094's noisiness would make it difficult for it to reach and maintain patrol areas where it could strike at the contiguous United States; no such limitations would exist against Indian targets. The Type 094 (Western reporting name Jin class) is a Nuclear-Powered Ballistic Missile Submarine (SSBN). It is the second-generation SSBN of the Chinese navy. Development possibly began in the early 1980s. It is a successor to the unreliable sole Type 092 or Xia class boat, which was a catalogue of disasters and had little strategic value. The whole development project of the Type 094 class is kept in secrecy. Speculations have been made, that development of the Type 094 class was assisted by Russian Rubin Design Bureau, however this information was not confirmed. Construction of the lead vessel began in 1999 and it was launched in 2004. It seems that the first boat was commissioned in 2010. The second boat of the class was launched in 2007. Some sources claim that these Chinese ballistic missile submarines were plagued with various problems and design flaws. As of 2018 China operates 4 of these ballistic missile submarines. This fact was also confirmed by a US Department of Defense report. It is believed that at least one of these boats was completed to an improved project, which is sometimes referred as Type 094A. These boats are deployed on the Longpo naval base on Hainan island. These ballistic missile boats form China's sea-based nuclear deterrent capability. By 2018 Jin class boats were never sent on long-range deterrent patrol missions, possibly due to various problems and design flaws. Instead these boats are patrolling in South China Sea, relatively close to China's coastal waters. The South China Sea is becoming a

bastion for Chinese SSBN operations.

Type 091 Class (Han Class) Chinese Nuclear Attack Submarine







Tiers:



Variants:

- **CHANG ZHENG-1:** Commissioned: Aug. 1, 1974 Status: Museum
- **CHANG ZHENG-2:** Commissioned: January 1980 Status: Stricken
- **CHANG ZHENG-3:** Commissioned: Sept. 21, 1984 Status: Active
- **CHANG ZHENG-4:** Commissioned: November 1988 Status: Active
- **CHANG ZHENG-5:** Commissioned: December 1990 Status: Active

System

Alternative Designation: Type 091 Class; NATO: Han Class

Type: 1st Generation Nuclear Attack Submarine

Builder: Bohai Shipyard, Huludao

Crew: 75

Dimensions

Length: 101.0 m

Beam: 10.6 m

Draft: 7.4 m

Displacement, Surface: 4,572 tons

Displacement, Submerged: 5,639 tons

Propulsion System

Engine Name: 1 x 90 MW

Engine Type: pressurized-water nuclear reactor

Engine Power: 12,000 total bhp; 1 shaft

Turbines: 2 steam turbines

Maximum Speed, Submerged: 25 knots

Maximum Speed, Surface: 12 knots

Diving Depth: 300 m

Missile Weapon System

↳*Missile #1*

Name: YJ-82 SSM

Type: Anti-Ship Cruise Missile

Description: The YJ-82 is a solid-fuelled rocket. It is launched from submarines from a buoyant launch canister. The YJ-82 lacks the solid-rocket booster of the surface-launched YJ-8/8A and likely has less range than the latter's 42 km. The terminal sea-skimming attack altitude is 5 to 7 meters. The launch capsule is a copy of the one used by submarine-launched Harpoons; China likely received the technology from Pakistan, which had such weapons

Warhead: 165 kg high-explosive fragmenting warhead

Operational Range: <42 km

Maximum SPeed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Torpedoes

Torpedo Tubes: 6 x 533-mm bow tubes

Torpedos: Yu-3 (Russian SET-65E) ASW torpedoes and Yu-4 anti-ship torpedoes carried.

Basic Load: 18 Torpedoes

Mines

Note: 36 x in lieu of torpedoes

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Name: 1 x Snoop Tray Surface Search

Type: Surface Search

Frequency: INA

Range: INA

Sonar Systems

↳*Sonar #1*

Name: 1 x H/SQ2-262

Type: bow-mounted, medium-frequency for active/passive search, attack

↳*Sonar #2*

Name: 1 x H/SQG-207

Type: Flank Array Sonar

↳*Sonar #3*

Name: 1 x Thales DUUX 5

Type: Passive Ranging and Intercept Sonar

↳*Sonar #4*

Name: 1 x CEIEC Type 921A

Type: RWR and DF Sonar

Protection

Active Protection System: INA

Countermeasures: Yes

NBC Water Washdown System: Yes

Notes:

The Type 091 (Chinese designation: 09-I; NATO reporting name: Han class) is a first generation nuclear attack submarine produced by the People's Republic of China. They were the first nuclear-powered submarine employed by the People's Liberation Army Navy Submarine Force, and the first indigenously produced nuclear attack submarines in Asia. The Chinese naval nuclear power program started in July 1958 when the Central Military Commission gave approval to start the 091 submarine project.[5] Mao Zedong declared that China would build nuclear attack submarines even if it took ten thousand years.[6] Peng Shilu was the first chief designer of this project. The first submarine in the class, the Long March I, was commissioned in 1974[3]; the last was launched in 1990. In 1983, Peng shifted from military to civilian sector in application of nuclear power plants and his duty at the nuclear submarine project was succeeded by Huang Xuhua. The Type 091 has operated mainly in local waters, and has appeared in incidents. One submarine shadowed a U.S. carrier battle group in the mid-1990s. Another entered Japanese territorial waters through the Ishigaki, Okinawa island group near Taiwan in November 2004, causing Japan's maritime forces to go on alert for the second time since the Second World War; China apologized for the trespass and blamed "technical reasons" on the submarine. The boats have received major upgrades and numerous refits since commissioning. They have six 533 mm (21 in) torpedo tubes and carry 20 torpedoes. Alternatively, they can carry 36 mines in their tubes. It is capable of firing sub-launched variants of the C-801 anti-ship missile as well as a range of indigenous and Russian torpedoes or mines. All remaining hulls have been refitted with new sonars, with Type H/SQ2-262B sonar manufactured by No. 613 Factory replacing the original Type 603 sonar on board. Anechoic tiles were added later to reduce noise levels.

Yesen Class Russian Nuclear-Powered Cruise Missile Submarine



Tiers:

1 2 3 4

Variants:

- **Severodvinsk:** Commissioned: 2013 Fleet: Northern
- **Kazan:** Commissioned: 2020 Fleet:INA
- **Novosibirsk:** Commissioned: 2020 Fleet: INA
- **Krasnoyarsk:** Commissioned: 2021 Fleet: INA
- **Arkhangelsk:** Commissioned: 2022 Fleet: INA
- **Perm:** Commissioned: 2023 Fleet:INA
- **Ulyanovsk:** Commissioned: 2024 Fleet:INA

System

Alternative designations: Project 885; SEVERODVINSK; GRANEY
Type: Nuclear cruise missile submarine
Total Built: 10 in total are planned to be built. One Active as of early 2020.
Builders: Sevmash
Crew: 64

Dimensions

Length: Surfaced: 8,600 tons Submerged: 13,800 tons
Beam: 13–15 m
Displacement: Surfaced: 8,600 tons Submerged: 13,800 tons

Automotive

Propulsion: OK-650KPMpressurized water reactor 200 MWt turbines of 43,000 shp
Range: Unlimited
Endurance: Only limited by food and maintenance requirements
Surface Speed: 20 kn (37 km/h; 23 mph)
Submerged Speed (Silent): 28 kn (52 km/h; 32 mph)
Submerged Speed (Maximum): 35 kn (65 km/h; 40 mph)
Test Depth: Safe depth: 1,475 feet (450m) Never exceed depth: 1,804 feet (580m) Crush depth: 2,160 feet (658m)

Armament

Launcher: 8 x VLS equipped silos for either

↳*Weapon Station #1*

Name: P-800 Oniks

Type: Supersonic Anti-Ship Cruise Missile

Basic Load: 32

Length: 8.9 m

Diameter: 0.7 m

Weight: 3,000 kg

Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE

Detonation Mechanism: delay fuze

Engine: Ramjet 4 tons of thrust

Wingspan: 1.7 m

Propellant: kerosene liquid fuel

Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi) depending on altitude (Yakhont export version)

Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

Accuracy: 1.5 m

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

↳*Weapon Station #2*

Name: 9K38 Igla

Type: Surface-to-Air Missiles

Basic Load: INA

Launcher: 10 x torpedo tubes (533 mm

Length: 1.574 m

Diameter: 72 mm

Weight: Missile weight: 10.8 kg (24 lb), Full system: 17.9 kg (39 lb)

Warhead: 1.17 kg (2.6 lb) with 390 g (14 oz) explosive

Detonation Mechanism: contact and grazing fuzes

Engine: solid fuel rocket motor

Operational Range: 5.2 km

Flight Ceiling: 3.5 km

Speed: 570m/s

Guidance System: dual waveband infra-red (S-version)

Sensors

Radar: Rim Hat ESM/ECM Snoop Pair Surface Search Radar

Notes:

K-560 Severodvinsk is a Yasen class nuclear-powered cruise missile submarine of the Russian Navy, and the lead vessel of the class. The submarine is named after the city of Severodvinsk. The Yasen class, Russian designations Project 885 Yasen and Project 885M Yasen-M (Russian: Ясень, lit. 'ash tree', NATO reporting name: Yasen), also referred to as Graney class, are series of newest nuclear-powered cruise missile submarines designed by Malakhit and being constructed by Sevmash for the Russian Navy. Based on the Akula class and Alfa class designs, the Yasen class is projected to replace Russian Navy's current Soviet-era nuclear attack submarines. The vessel's design is claimed to be state-of-the-art. The Yasen-class nuclear submarines are presumed to be armed with land-attack cruise missiles, anti-ship missiles, anti-submarine missiles including the P-800 Oniks SLCM, Kalibr family SLCM or 3M51 SLCM.[9] Kalibr-PL has several variants including the 3M54K (terminal-supersonic) and 3M54K1 (subsonic) anti-ship, 91R1 anti-submarine, and the 3M14K land-attack variant. In the future, there will be also an option to install the hypersonic 3M22 Zircon cruise missiles on upgraded 855M boats. Each submarine can carry 32 Kalibr or 24 Oniks (other sources claim 40 Kalibr and 32 Oniks) cruise missiles which are stored in eight (ten for 855M) vertical launchers (additional missiles may be carried in the torpedo room at the expense of torpedoes). It will also have ten 533 mm tubes, as well as mines and anti-submarine missiles such as the RPK-7. It is the first Russian submarine class to be equipped with a spherical sonar, designated as MGK-600 Irtysh-Amfora. The device (allegedly the Irtysh/Amfora sonar system) was tested on a modified Yankee-class submarine. The sonar system consists of a spherical bow array, flank arrays and a towed array. Due to the large size of this spherical array, the torpedo tubes are slanted. In other words, the torpedo tube outer doors are not located in the immediate bow as in the previous Akula class but moved aft. The hull is constructed from low-magnetic steel. Unlike previous Russian submarines which have a double hull, Yasen-class submarines mostly have a single hull. The Yasen class has a crew of 85 on project 885 and 64 on project 885M, suggesting a high degree of automation in the submarine's different systems. The newest U.S. Virginia-class submarines, has a crew of 134 in comparison. Yasen-class submarines are the first to be equipped with a fourth generation nuclear reactor. The reactor, built by Afrikantov OKBM, will allegedly have a 25-30 year core life and will not have to be refueled. Steam turbines are supplied by Kaluga Turbine Works. The inclusion of new generation KTP-6 reactor on the Yasen-M boats is thought to significantly reduce their noise level: the reactor's primary cooling loop facilitates natural circulation of water and thus doesn't require continuous operation of the main circulation pumps, which are the key noise factor on a nuclear submarine. The only other submarine classes in service with such reactor design are USN' Ohio and Virginia, employing the S8G and S9G reactors respectively. A VSK rescue pod is carried in the sail. According to admiral Foggo, the commander of the US Naval Forces Europe, the Yasen class submarines are "very quiet, which is the most important thing in submarine warfare". It's claimed that Severodvinsk is far quieter than previous Russian SSNs, capable of 20 knots while running quiet, which is equal to the Seawolf class and inferior only to Virginia (25 knots). Other sources claim that Severodvinsk is capable of even 28 knots in silent mode

Suffren Class (Barracuda Class) French Nuclear Attack Submarine







Tiers:



Variants:

- **Note:** Ships Planned: 6 Ships Completed: 1
- **Suffren:** Commissioned: Expected in 2020
- **Duguay-Trouin:** Commissioned: Expected in 2025
- **Tourville:** Commissioned: Expected in 2025
- **De Grasse:** Commissioned: Expected in 2025
- **Rubis:** Commissioned: Expected in 2030
- **Casabianca or Dupetit-Thouars:** Commissioned: Expected in 2030

System

Alternative Designation: Suffren Class; Barracuda Class
Total Built: Ships Planned: 6 Ships Completed: 1
Type: Nuclear Attack Submarine
Builder: Naval Group (formerly known as DCNS and DCN)
Crew: 60 (8 off. + 52 enl.) + 10 special forces

Dimensions

Length: 99.5 m
Beam: 8.8 m
Draft: 7.3 m
Displacement, Surface: 4,680 tons
Displacement, Submerged: 5,300 tons
Draught: 7.3 m

Propulsion System

Engine Name: 1 x modified K-15 pressurized water reactor.

Engine Power: 41,500 total shp

Auxiliary Propulsion: 2 x SEMT-Pielstick 8 PA4 V200 diesel generator sets; 1,225 total bhp

Maximum Range: Unlimited range, 10 years (nuclear fuel)

Maximum Speed, Surface: 14 knots

Maximum Speed, Submerged: 25 knots

Endurance: 70 days

Main Armament

Torpedo Tubes: 4 x 533-mm Torpedo Tubes

Total Armament: 20 total Weapons of either SCALP Naval cruise missiles; SM 39 Exocet anti-ship missiles; F21 heavyweight torpedoes; or FG-29 type mines in lieu of torpedoes.

↳*Anti-Ship Missile (Option 1)*

Name: SM 39 Exocet

Type: Anti-Ship Cruise Missile

In Service: 1974-Present

Proliferation: India France Pakistan

Manufacturer: 1979–1999: Aérospatiale 1999–2001: Aérospatiale-Matra 2001–present: MBDA

Length: 5.80 m

Diameter: 348 mm

Wingspan: 1.14 m

Weight: 666 kg

Configuration: slim, pointed cylinder cruciform cropped and swept delta mainplanes indexed in-line with small cruciform tail planes

Propulsion: 2 x SNPE double-base Nitramite smokeless solid-propellant rockets. 1 x Epervier booster with 2.4 sec burn. 1 x Eole V sustainer with 200-220 sec burn

Speed: 594 kt (684 mph; 1,100 km/h) or Mach 0.93

Maximum Range: 50 km

Minimum Range: 4 km

Peak Altitude: 50 m

Warhead: 363 lb. (165 kg) Hexolite blast fragmentation

Sensor and Fire Control: TRT AHV-7 radio altimeter inertial navigation during first part of flight Electronique Marcel Dassault ADAC or Super ADAC I/J-band active radar homing in terminal phase that begins search approx 5.4 nm (6.2 mi.; 10 km) from target's estimated position.

Basic Load: See total Armament

↳*Cruise Missile (Option 2)*

Name: Missile de Croisière Naval (Storm Shadow CASOM)

Type: Long-Range Cruise Missile

Manufacturer: MBDA

Proliferation: Egypt 50 ordered for the Egyptian Air Force in 2015 as part of the Dassault Rafale deal France 500 ordered for the French Air Force in 1998. 50 MdCNs ordered in 2006 and a further 100 ordered in 2009 for the French Navy. As of 2016, France will reduce its stocks down 100 missiles. Greece 90 ordered for the Hellenic Air Force in 2000 and 2003. Italy 200 ordered for the Aeronautica Militare in 1999. India Unknown number ordered for the Indian Air Force in 2016 as part of the Dassault Rafale deal. Qatar 140 ordered for the Qatar Air Force in 2015. Saudi Arabia 300+ ordered for the Royal Saudi Air Force in 2006. United Arab Emirates 600 ordered for the United Arab Emirates Air Force in 1997. Known as Black Shaheen. United Kingdom 900+ ordered for the Royal Air Force in 1997

Length: 6.5 m

Diameter: 500 mm

Wingspan: 2.85 m

Engine: Microturbo

Effective Firing Range: >1,000 km (620 mi; 540 nmi

Speed: 800 km/h (500 mph; 430 kn; Mach 0.65)

Guidance System: inertial guidance, topographic (TERCOM/TERPROM), active radar homing and infrared guidance, GPS

Accuracy: Metric

Launch Platform: FREMM frigates Barracuda submarines Scorpène submarines

Basic Load: See total Armament

↳*Torpedo (Option 3)*

Name: F21

Type: Heavy Torpedo

Length: 6.0 m

Diameter: 533 mm

Weight: 1,550 kg

Effective Firing Range: >50 km (31 mi; 27 nmi)

Detonation Mechanism: proximity fuze

Maximum Depth: up to 600 m (2,000 ft)

Speed: 50 kn (58 mph; 93 km/h)

↳*Mines*

Note: FG-29 type mines can be carried in lieu of torpedoes.

Fire Control System

FCS Name: INA

Computerized FCS: Yes

Radar Systems

Navigation Radar: 1 x Sagem/Kelvin Hughes Series 10 CSR navigation

Sonar Systems

Hull and Flank Sonar: 1 x Thales UMS-3000 integrated sonar suite

Protection

Active Protection System: Yes

Electronic Warfare: INA

Decoys: 1 x Canto-S decoy dispenser

Notes:

The Barracuda class (or Suffren class) is a nuclear attack submarine, designed by the French shipbuilder Naval Group (formerly known as DCNS and DCN) for the French Navy. It is intended to replace the Rubis-class submarines. Construction began in 2007 and the first unit will be commissioned in 2020. In October 1998, the Delegation Générale pour l'Armement, the French government's defense procurement agency, established an integrated project team consisting of the Naval Staff, DCN (now known as Naval Group), Technicatome and the Commissariat a l'Énergie Atomique, a regulatory body that oversees nuclear power plants, to oversee the design of a new attack submarine class. DCN was to be the boat's designer and builder while Technicatome (since acquired by Areva) was to be responsible for the nuclear power plant. The two companies were to act jointly as a single prime contractor to share the industrial risks, manage the schedules, and be responsible for the design's performance and costs, which at the time was estimated to be US$4.9 billion. On 22 December 2006, the French government placed a €7.9 billion order for six Barracuda submarines with Naval Group and their nuclear power plants with Areva-Technicatome. According to the DGA “Competition at the subcontractor level will be open to foreign companies for the first time.”According to the contract, the first boat was to commence sea trials in early 2016, with delivery occurring in late 2016/early 2017. This was to be followed by entry into service in late 2017. Naval Group also designed a conventionally powered derivative, dubbed the SMX-Ocean, featuring fuel cells and vertical launchers. Another conventionally powered design, the Shortfin Barracuda, was selected as a future replacement for the Collins-class vessels with the Royal Australian Navy. In 2016, Naval Group also began to position itself and its Shortfin Barracuda design to the Royal Canadian Navy's Future Canadian Submarines project. The project is planned to replace the Victoria-class submarines by 2030. Naval Group is also offering a version of the "Shortfin" diesel-electric variant as replacement for the current Walrus-class submarines of the Royal Netherlands Navy competing against the A26 design by Saab and Damen. Barracudas will use technology from the Triomphant class, including pump-jet propulsion. This class reportedly produces approximately 1/1000 of the detectable noise of the Redoutable-class boats (submarines), and they are ten times more sensitive in detecting other submarines. They will be fitted with torpedo-tube-launched cruise missiles MDCN SCALP Naval for long-range (well above 1,000 km, 620 mi) strikes against strategic land targets. Their missions will include anti-surface and anti-submarine warfare, land attack, intelligence gathering, crisis management and special operations. The Barracuda class nuclear reactor incorporates several improvements over that of the preceding Rubis. Notably, it extends the time between refueling and complex overhauls (RCOHs) from 7 to 10 years, enabling higher at-sea availability. In support of special operations missions, Barracudas may also accommodate up to 12 commandos, while carrying their equipment in a mobile pod attached aft of the sail.

→Guided Missile Cruisers

Type 055 Class Chinese Guided Missile Cruiser





Tiers:



System

Alternative Designation: Type 055 destroyer (NATO/OSD Renhai-class cruiser[
Total Built: 1 ship built as of 2020, 6 in total scheduled to be built.
Type: Guided Missile Cruiser
Builders: Changxingdao-Jiangnan Shipyard Dalian Shipbuilding Industry Company
In Service: 2019-Present
Crew: 280 ~ 300 men

Dimensions

Length: m180
Beam: m20
Draught: m6.6
Displacement, Standard: INA
Displacement, Full Load: 12 000 - 13 000 tons

Propulsion System

Engine Name: COGAG propulsion system with 4 QC-280 gas turbines (28 MW each) and 6 QD-50 gas turbines (5 MW each)
Engine Power: Total: 112 MW (150,000 shp
Maximum Range: 5,000 nmi (9,300 km)

Maximum Speed: 30 knots (56 km/h; 35 mph)

Endurance: INA

Weapons Station #1

↳*System*

Name: H/PJ-38 130mm Naval Gun

Type: Naval Gun

Quantity: 1 X H/PJ-38 130mm Naval Gun

Caliber: 30mm

Note: Designed by the Zhengzhou Mechanical-Electrical Engineering Research Institute (□□□□□□□□□, also known as the 713th Research Institute of the 7th Academy) and manufactured by Inner Mongolia 2nd Machinery Manufacturing Factory (□□□□□□□□□), the H/PJ-38 130 mm naval gun was developed from reverse engineering of Soviet AK-130 twin 130 mm naval gun, which was carried out by the same two establishments. The general designer of the H/PJ-38, Chen Dingfeng (□□□), was also the general designer of all models of Type 79 100 mm naval gun, all models of Type 210 100 mm naval gun, and the H/PJ26 76 mm naval gun. Chen was recalled from retirement to complete the H/PJ-38 single barrel 130 mm naval gun. When the Soviet AK-130 was first successfully copied by Chinese developers, the Chinese navy was unsatisfied and decided not to let the AK-130 into production, despite all performance parameters being met. Because the AK-130 was judged out-of-date by the Chinese Navy, the H/PJ-38 program was created in 2005. The H/PJ-38 130 mm single barrel naval gun is considered more powerful and more reliable than other smaller caliber naval guns currently in Chinese service, and as with naval guns on most warships, it is installed in front of the VLS.

↳*Ammunition*

Type: Rifle

Caliber: mm130

Note: The general designer of munitions for the H/PJ-38, Zhou Bingwu (□□□), entered the business in 1997 and almost lost the index finger of his right hand in November 2007 during an important trial. As early as 1987, Zhou had proposed multiple kinds of precision-guided munitions (PGMs) to be fired by a single caliber gun mount, but due to the limitations of the Chinese technological base and industrial capability, it was not until two decades later when it finally became a reality. Research led to the development of a single barreled 70 caliber, 130 mm system which took more than four years to complete, and the H/PJ-38 went to series production soon after completion. The primary improvement of the H/PJ-38 over the AK-130 is its adaptability: H/PJ-38 can fire both separate loading rounds and semi-fixed rounds, which is crucial in firing gun-launched missiles and PGMs. The H/PJ-38 can also fire a variety of sub-caliber rounds, but more importantly, a variety of PGMs were developed for H/PJ-38 to increase its effectiveness.

Weapon Station #2

↳*System*

Name: H/PJ-11 CIWS (forward)

Type: Gatling Gun

Caliber: 30mm

Quanitity: 1 × H/PJ-11 CIWS

Crew: Automated, with human oversight

Rate of Fire: 1,200-4,200 rounds/minute (Type 730)

Effective Firing Range: 1–1.5 km

Maximum Firing Range: 3 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳***Ammunition***

Type: Rifle

Caliber: mm30

Basic Load: INA

Weapon Station #3

Name: HHQ-10 Short-Range SAM

Type: Short-Range SAM

Quantity: 1 × HHQ-10 short-range SAM in 24-cell launcher (aft)

Missile: HHQ-10 (Red Flag 10) Surface-to-Air Missile

Length: 2 m

Diameter: 0.12 m

Maximum Range: 9 km for subsonic targets, > 6 km for supersonic targets.

Minimum Range: Less than 500 m

Guidance System: RF + ImIR or ImIR only

Weapon Station #4

Name: 112 VLS

Type: Vertical Launch System

Missile Types: * HHQ-9 surface-to-air missiles * YJ-18 anti-ship cruise missiles * CJ-10 land-attack cruise missiles * Missile-launched anti-submarine torpedoes

Maximum Range: INA

Minimum Range: INA

Onboard Aviation Facilities

Helicopters: 2 × Changhe Z-18F ASW helicopters

Facilities: Stern hangar for up to two medium-lift helicopters Helicopter landing platform

Sensors and Processing Systems

Radar: H/LJG-346B Active Phased Radar System (C/S-band) coordinated by X-band Horizon-Search&Track Active Phased Radar System (Dual-band radar)

Protection

Active Protection System: Yes

Electronic Warfare: Electronic Warfare Support System Decoy Launching System

NBC Protection: Yes

Notes:

The Type 055 destroyer (NATO/OSD Renhai-class cruiser) is a class of stealth guided missile destroyers being constructed for the Chinese People's Liberation Army Navy Surface Force. It is a multi-mission design; the combination of sensors and weapons suggests a main role of area air defence, with anti-submarine warfare capabilities surpassing previous Chinese surface combatants. The Type 055 is expected to undertake expeditionary missions and form the primary escort for Chinese aircraft carriers. The United States classifies these ships as cruisers. The United States Navy defines a cruiser as a large multi-mission surface combatant with flag facilities; this suggests the U.S. expects the Type 055 to fulfil a similar role as the Ticonderoga-class cruiser. The People's Liberation Army Navy was interested in a large destroyer from at least the late-1960s. A development program, code-named "055", initiated in 1976 was cancelled in 1983 after encountering insurmountable technical obstacles from industrial underdevelopment; for example, the required gas turbine power plants could neither be produced domestically, nor imported at acceptable prices. In April 2014, an image emerged of a full-scale mock-up of the Type 055 superstructure - with enclosed integrated mast for radar and other electronics - at the Chinese naval electronic testing range in Wuhan. Nanchang, the first ship of the class, began construction in 2014 at the Jiangnan Shipyard in Shanghai, and was commissioned on 12 January 2020. Its first public appearance - preceding commissioning - was during the PLAN's 70th anniversary parade on 23 April 2019. When launched, Nanchang was among the largest post-Second World War warships launched in East Asia. The Type 055 adopts a conventional flared hull with distinctive stealthy features including an enclosed bulbous bow that hides mooring points, anchor chains and other equipment. The bow and main deckhouse are configured similarly to previous Type 052C/D destroyers. A continuous structure amidship increases internal volume and reduces radar cross-section. The smoke stack design reduces both infrared signature and radar cross-section. Chinese sources credit the design as being generally stealthy, with reduced radar, noise, infrared, and electromagnetic radiation signatures. Power plants Propulsive power is generated by four 28 MW QC-280 gas turbines in combined gas and gas arrangement. Additional power may be provided by six 5 MW QD-50 gas turbines. The maximum speed is estimated to be 30 knots. Electronics The Type 055's battle management system may allow integration with carrier strike groups. The integrated mast may mount X band radar in four fixed active electronically scanned arrays (AESA). The deckhouse may mount four Type 346B AESA panels; the previous Type 346 was a dual S and C band radar, but the Type 346B may only be S band as a X band radar is included. The X band radar may be mounted higher as it is better suited for horizon search and low altitude object detection. The Type 346B arrays can be larger and have higher power when mounted on the deckhouse below the X band radar. Various electronic warfare support measures (ESM), electronic countermeasures (ECM), and electro-optic (EO) sensors and datalinks are mounted. They are likely more advanced than those deployed on previous ships. A deployment port exists for variable depth and towed array sonar. The large bulbous bow likely contains a bow sonar; the Type 055 may mount a larger bow sonar than previous Chinese surface combatants. Armament The primary armament are missiles carried in 112 universal vertical launch cells (VLS); 64 cells forward and 48 cells aft. The same VLS model is used on the Type 052D destroyer,[8] which is believed to be an implementation of the GJB 5860-2006 standard. The longest variant, with 9-metre cells, is likely used. The Type 055 is expected to carry HHQ-9 surface-to-air missiles, YJ-18 anti-ship cruise missiles, CJ-10 land-attack cruise missiles, and missile-launched anti-submarine torpedoes upon entering service. Future developments It has been suggested that future variants may be armed with lasers or electromagnetic railguns. Since the current design does not have integrated electric propulsion, installation of integrated electric propulsion will be required for the ship to meet power requirements in the future. The universal VLS makes it possible to carry future anti-ballistic missiles (ABM).

Slava Class Russian Guided Missile Cruiser







Tiers:

1 2 **3** 4

Variants:

- **Moskva (ex-Slava):** Commisioned: 1982
- **Marshal Ustinov (ex-Admiral Lobov):** Commisioned: 1986
- **Varyag (ex-Chervona Ukraina):** Commisioned: 1989
- **Ukraina (ex-Admiral Lobov):** Incomplete, never commissioned. Belongs to Ukraine

System

Alternative Designation: Slava Class; Project 1164 Atlant Class
Total Built: 3 Slava Class Cruisers built.
Type: Guided Missile Cruiser
Builder: 61 Communards Shipyard
In Service: 1982-Present
Crew: 485 (66 Off, 419 WO/Enl), alternate information 476-529 (84 Off, 75 WO, 370 Enl)

Dimensions

Length: 186 m
Beam: 21.5 m
Draught: 7.6 m
Displacement, Standard: 10 000 tons
Displacement, Full Load: 12 500 tons

Propulsion System

Engine Name: GTU M21 2x M70 cruise gas turbines and 4x M90 boost gas turbines , 2 cruise steam turbines, 2 exhaust gas

boilers, 4 x M8KF Gas turbines

Engine Power: 130,000 shp (97,000 kW)

Shafts: 2

Speed: 32 kn (59 km/h; 37 mph) (36.8mph)

Range: 3,000 nmi (3,450 mi) (5,560 km) at 18kn (20.7mph)

Endurance: INA

Missile System

↳*Anti-Ship Missile System*

Name: P-1000 Vulkan

Type: Anti-Ship Missile Cruise Missile

Basic Load: 16 x Missiles (8 x 2) P-1000 Vulcan (SS-N-12 Sandbox) anti-ship missiles

Manufactuer: P.A. Strela

In Service: 1982-Present

Proliferation: The P-1000 has been installed on the Slava class cruiser Varyag,[7] and some sources report P-1000 missiles on her sister ship Moskva.

Length: 11.7 m

Diameter: 0.88 m

Wingspan: 2.6 meters

Weight: 2 tons

Warhead: High explosive or nuclear

Warhead Weight: 1,000 kg

Blast Yield: 350 kt

Engine: Turbojet

Operational Range: 800 km

Flight Altitude: 50–5,000 m

Speed: Mach 2.5

Guidance System: Semi-active radar homing, terminal active radar homing

Launch Platform: Echo II & Juliett-class submarines Kiev-class aircraft carrier & Slava-class cruiser.

↳*Surface-to-Air Missile #1*

Name: S-300F

Type: Naval Surface-to-Air Missile

In Service: 1984-Present

Basic Load: 64 x Missile total (8 x 8) S-300F Fort (SA-N-6 Grumble) Cruise Missile

Missile Name: 5V55RM missile

Launcher: Vertical Launching System

Length: 7 m

Diameter: 450mm

Weight: 1,450 kg

Warhead: 100 kg

Target Acquisition Radar #1: MR-750 Top Steer target acquisition radar, D/E band, range 300 km

Target Acquisition Radar #2: Top Pair target acquisition radar, C/D band, range 200 km.

Target Tracking Radar: 3R41 Volna Top Dome target tracking radar, I/J band, range 100 km.

Speed: 6,120 kph (3,800 mph)

Maximum Range: 90 km

Minimum Range: 7.00 km

Floor: 25 m

↳*Surface-to-Air Missile #2*

Name: 4K33 "OSA-M" (NATO reporting name SA-N-4 "Gecko")

Type: Navel Surface-to-Air Missile

Basic Load: 40 x Missiles (2 × 20) OSA-M (SA-N-4 Gecko) SR SAM

In Service: 1974-Present

Missile Name: 9M33M3 Missile

Length: 3158 mm

Diameter: 209.6 mm

Weight: 170 kg

Warhead: Frag-HE

Warhead Weight: 16 Kg

Detonation Mechanism: Contact and proximity

Propellant: Solid propellant rocket motor

Operational Range: 15 km

Flight Altitude: 12,000 m

Boost TIme: 2 s boost, then 15 s sustain

Speed: 1020 m/s

Guidance System: RF CLOS

Accuracy: 5 m

Launch Platforms: . It has been installed on Gepard class frigate, Kara class guided missile cruisers, Kiev class VTOL cruisers and also the Kirov, Slava and Krivak classes.

Gun Weapon Systems

↳*Gun System #1*

Name: AK-130

Type: Automatic Naval Cannon

Caliber: 130mm

Quantity: 1 x AK-130 Automatic Naval Cannon Stations

Length: 9100 mm (70 calibers)

Barrel Length: INA

Weight: 8 tons

Maximum Elevation: deg+85

Minimum Elevation: INA

Traverse Range: INA

Rate of Fire: 90 rds/min

Maximum Firing Range: 23,000 m (surface targets) 15,000 m (aircraft) 8,000 m (missiles)

Autoloader: The autoloader removed the need of a loader and allows for continuous firing until the ammo storage is emptied.

Fire Control System: The fire control system has sight correction devices for bursts of falling shells and a target post for firing at coastal targets. Its high rate of fire, when provided with adequate types of shells, allows the cannon to serve as anti-aircraft artillery. The cartridges include charges with remote and radar detonators.

Radar: It uses the MR-184 radar, a dual-band radar. It can track and target two targets. Its range is 75 km with a tracking range of 40 km.

Guidance System: The Lev-218 (MR-184) guidance system was developed by KB Ametist on the basis of Lev-114: (MR-114 from the AK-100). According to some reports, Lev-214 (MR-104) was used instead on Project 956 destroyers. The system includes a target tracking radar, a TV-sight, the DVU-2 laser rangefinder, a ballistic computer, equipment selection system and counter-jamming. The system is able to receive target designation from detection equipment on the ship, movement parameters, elevate the cannons and can adjust shooting bursts as well as track projectiles automatically. The DVU-2 , along with the software, was developed by TsNIIAG and PO LOMO, using an autonomous indirectly stabilized laser beam in 1977.

↳*Gun System Ammunition #1*

Type: Rifle

Caliber: mm130

Basic Load: INA

↳*Gun System #2*

Name: AK-630

Type: Close-In Weapons Systems stations

Quantity: 6 × AK-630 Close-In Weapons Systems stations

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 x 9A4172 Missiles (Vikhr-K upgrade)

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Barrels: 6

Width: 1,240 mm

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2)

External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

↳*Gun System Ammunition #2*

Type: Rifle

Caliber: 30mm

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 4,000

Torpedo System

Torpedo Tubes: 10 (2 x 5) 533mm torpedo tubes

Torpedo Name: INA

Basic Load: 20 each

Anti-Submarine Mortars

Name: RBU-6000 Smerch-2

Type: Anti-Submarine Rocket Launcher

Quantity: 2 × 12 RBU-6000 anti-submarine mortars

Mortar Basic Load: +24 Mortars

Morar Name: RGB-60 Projectile

Mortar Range: Ballistic 1 - 350 m to 1700 m, Ballistic 2 - 1500 m to 5500 m

Mortar Depth: 10 to 500 m

Sink Rate: 11.6m/s

Aircraft Facilities

Helicopter: 1 Kamov Ka-25 or Kamov Ka-27 Helicopter

Fire Control System

FCS #1: 3R41 Volna/Top Dome SA-N-6 SAM control.

FCS #2: MPZ-301 Baza/Pop Group SA-N-4 SAM control.

SSM Control: Argument/Front Door-C SSM control.

Additional Fire Control Systems: See Gun Weapon Systems

Radar Systems

Long-Range Air Search Radar: 1 x MR-800 Voshkod/Top Pair 3-D long range air search.

Secondary Air Search Radar: MR-700 Fregat/Top Steer (first two) or MR-710 Fregat-MA/Top Plate (second two) 3-D air search

Sonar Systems

Bow Sonar: MG-332 Tigan-2T/Bull Nose hull mounted LF

Stern Sonar: Platina/Horse Tail MF VDS

Protection

Armor: Splinter plating

Electronic Warfare: Kol'cho suite with Gurzhor-A&B/Side Globe intercept and the

Decoys: 2 PK-2 decoy RL, 12 PK-10 decoy RL (in last two units only) Bell Crown intercept

Jammers: MR-404/Rum Tub jammers

Notes:

The Slava class, Soviet designation Project 1164 Atlant, is a class of guided missile cruisers designed and constructed in the Soviet Union for the Soviet Navy, and currently operated by the Russian Navy. The design started in the late 1960s, based around use of the P-500 Bazalt missile, and was intended as a less expensive conventionally powered alternative to the nuclear-powered Kirov-class battlecruisers. Moskva is armed with P-1000 Vulkan AShM missiles, developed in the late 1970s to late 1980s. It is not known which Slava-class cruisers carry P-1000s other than Moskva. There was a long delay in this programme, while the problems with the Bazalt were resolved. These ships acted as flagships for numerous task forces. All ships were built at the 61 Kommunar yard, in Mykolaiv (Nikolaev), Ukrainian SSR. The class was a follow up to the Kara-class cruiser which the Soviet Navy typed as a Large Anti-submarine Ship (Russ. BPK), constructed at the same shipyard and appears to be built on a stretched version of the Kara-class hull. The Slava class was initially designated BLACKCOM 1 (Black Sea Combatant 1) and then designated the Krasina class for a short period until Slava was observed at sea. The SS-N-12 launchers are fixed facing forward at around 8° elevation with no reloads available. As there was nothing revolutionary about the design of the class western observers felt they were created as a hedge against the failure of the more radical Kirov class. The helicopter hangar deck is located 1/2 deck below the landing pad with a ramp connecting the two. Originally 10 ships were planned, but with the collapse of the Soviet Union only three were completed. A fourth vessel was launched, but final construction remains incomplete and the ship has not been commissioned into service. Following the collapse and the re-emergence of the nation of Russia, the three finished ships serve in the Russian Navy and the uncompleted fourth vessel, renamed Ukrayina, is owned by Ukraine. Efforts have been made to complete and update the unfinished ship; in 2010, Ukrainian president Viktor Yanukovych stated that Russia and Ukraine would work together on the project. Russia has also expressed interest in purchasing the vessel, which Ukraine had previously offered for sale. However, as of early 2011 no final agreement has been concluded between the two countries, on this matter. The Russian navy has plans for extensive upgrades of all their Slava-class vessels during the 2010s; completing work on Ukrayina may serve as a test-bed for this. As of mid-2016 the fourth hull remains afloat in the shipyard uncompleted.

→Destroyers

Type 052C Class (Luyang II Class) Chinese Destroyer







Tiers:



Variants:

- **Lanzhou:** Commissioned: 2004 Fleet: South Sea Fleet
- **Haikou:** Commissioned: 2005 Fleet: South Sea Fleet
- **Changchun:** Commissioned: 2013 Fleet: East Sea Fleet
- **Zhengzhou:** Commissioned: 2013 Fleet: INA
- **Jinan:** Commissioned: Sea Trials Fleet: INA
- **Xi'an:** Commissioned: Sea Trials Fleet: INA

System

Alternative Designation: Type 052C Class; Luyang II Class
Total Built: 6 Built
Type: Destroyer
Builder: Jiangnan Shipyard
In Service: 2004-Present
Crew: 280

Dimensions

Length: 154.0 m
Beam: 17.0 m
Draft: 6.0 m
Draught: 6.0 M

Displacement, Full Load: 6,500 tons

Propulsion System

Engine Name: 2 x Ukraine DA80/DN80 gas turbines and 2 x Shaanxi diesels

Engine Power: Ukraine DA80/DN80 gas turbines: 48,600 shp total. Shaanxi diesels: 8,840 total bhp

Shafts: 2

Speed: 29 knots

Range: 6,000 nm at 14 kts; 1,600 nm at 30 kts

Endurance: INA

Missile Systems

↳*Missile System #1*

Name: HQ-9 VLS

Type: 48 cell HQ-9 VLS SAM system

Quantity: 1 x 48 cell HQ-9 VLS SAM system

Launcher Type: Vertical Launch System (VLS)

Missile Name: HQ-9

Missile Type: medium- to long-range, active radar homing surface-to-air missile.

Missile Basic Load: 48

Length: 6.8 m

Weight: 1300 kg

Warhead Type: INA

Warhead Weight: 180 kg

Engine: Two-stage solid propellant rocket

Operational Range: 200 km (FD-2000 version) 250 km (HQ-9A version) 300+ km for HQ-9B version

Flight Ceiling: 27 km

Speed: Mach 4.2

Guidance System: Inertial guidance with mid-course update and terminal active radar homing

Launch Platform: *Taian TA580/TAS5380 8×8 transporter erector launcher (TEL) *Type 052C destroyer *Type 052D destroyer *Type 055 destroyer

↳*Missile System #2*

Name: Quad YJ-62 (C-602) SSM launchers

Type: INA

Quantity: 2 x Quad YJ-62 (C-602) SSM launchers

Launcher Type: SSM Launcher

Manufacturer: China Aerospace Science and Industry Corporation

Proliferation: Widely Proliferated

Missile Name: YJ-62

Missile Type: Subsonic Anti-Ship Cruise Missile

Missile Basic Load: INA

Length: INA

Diameter: INA

Weight: INA

Warhead Weight: 210 kg

Detonation Mechanism: Semi-armor-piercing

Operational Range: 400 km

Flight Altitude: 7 – 10 meter terminal

Speed: Mach 0.6-0.8

Guidance System: Inertial/active terminal guidance

Launch Platform: TEL Type 052C destroyer

Gun Systems

↳*Gun System #1*

Name: Type 210

Type: Naval Gun

Caliber: 100mm

Quantity: 2 x Type 210 100mm Naval Gun Systems

Rate of Fire: The weapon's maximum rate of fire for a single type of unguided round was 90 rounds per minute.

Range: INA

Note: The Type 210 automatic single 100 mm naval gun is the Chinese modification of the Compact model of the French 100 mm naval gun. There are at least two variants, with both sharing similar characteristics with the French weapon.The Type 210 was developed to make the French gun suitable for Chinese deployment. The French gun was incompatible with Soviet and Chinese electronics; it was easier to make the gun compatible with these electronics, and Western electronics, than to alter the electronic suites already aboard warships. Furthermore, the Chinese added the capability to fire laser- and infrared-guided shells; this required significant changes to the magazine.

↳*Ammunition Gun System #1*

Type: Rifle

Caliber: 100mm

Shell: INA

Basic Load: INA

↳*Gun System #2*

Name: Type 730 CIWS

Type: Close-In Weapon System

Quantity: 2 x 30-mm Type 730 Gatling CIWS

Caliber: 30mm

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Barrels: 7-barrel

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Effective Range: 3 km

Effective Firing Range: 1–1.5 km

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

Feed System: Type 730: One ammunition boxes, holding 640 rounds

↳***Ammunition Gun System #2***

Type: Rifle

Caliber: 30mm

Basic Load: 2,000

Torpedo System

Torpedo Lunacher: 324mm Torpedo Tubes

Quantity: 2 x 324mm Torpedo Tubes

Torpedo Name: Yu-7 torpedo

Length: 2.7 m

Weight: 235 kg

Warhead Weight: 45 kg (99 lb) shaped charge

Effective Firing Range: 7.6 nmi (14.1 km)

Propellant: Otto fuel II

Maximum Depth: 400 m

Speed: 83 km/h

Steering System: CIACIO-S seeker

ASW System

Name: INA

Type: 18-barrel multiple rocket launchers

Quantity: 4 x 18-barrel multiple rocket launchers

Rocket Basic Load: INA

Onboard Aviation Facilities

Facilities: Stern hangar Helicopter landing platform.

Helicopters: 1 x Z-9 or Ka-28 ASW helicopters

Fire Control System

Type 730 CIWS FCS: 2 x Type 327G (EFR-1) (Rice Lamp**) fire control (for the Type 730 CIWS)

SSM Missile and 100mm Gun FCS: 1 x Russian Band Stand** fire control (for SSM missile/100-mm gun)

Radar Systems

Phased Array Radar: 1 x Type 346 multi-function phased array radar

Air Search Radar: 1 x Type 517H-1 (Knife Rest**) long range 2-D air

Surface Radar: 1 x surface search

Navigation Radar: 1 x navigation

Fire Control Radar: 1 x Type 366 radar (YJ-62 fire control) Bow mounted sonar

Protection

Active Protection System: INA

Electronic Warfare: NRJ-6A

Decoys: INA

Notes:

Luyang II / Type 052C / Lanzhou Multirole Destroyer There are significant difference between the “Lanzhou” guided missile destroyer, also known as the “Chinese Aegis”, and the “Yulin” and “Hengshui” guided missile frigates. These two types of warships are differently graded in tonnage. About 2,000 tons bigger than “Yulin” and “Hengshui” guided missile frigates in tonnage, the “Lanzhou” guided missile destroyer is mounted with more powerful air-defense guided missiles and radar-detection equipment than those in the frigates. Nevertheless, coordination must be formed between these two types of warships. Although frigates are relatively small, they are very agile and can accomplish different tasks respectively under the unified command of the taskforce. During an air defense operation in an open air, the frigates can perform pre-phase security detection and early warning, and serve as an effective sentinel against the detection of the enemy's air defense areas. Its anti-aircraft guided missiles can also form an effective protection shield. In terms of costs, frigates cost less than destroyers. Therefore, the taskforce composed by guided missile frigates and guided missile destroyers is an effective coordination and bears key importance. The Type 052C Luyang II is generally similar to 052B, with the notable addition of four fixed phased array antennas in the foreward superstructure. Two antennae cover the forward hemisphere while the other pair covers the rear hemisphere, the arragement adopted on the US Navy's Arleigh Burkes and the Japanese Kongos. Reports indicate this radar may be a co-development program with the Kvant-Radiolokatsiya company of the Ukraine. The band and performance of this radar have not yet been publicly reported. The radar may be a developed version of that first seen on the No. 970 weapons development ship, and could either be S-Band or Russian-style X-Band. Based on the hull design of the Type 052B (Luyang class) multirole destroyer, the Type 052C features an indigenously developed e four-array multifunction phased array radar (PAR) similar to the Aegis AN/SPY-1 equipped by the U.S. Arleigh Burke class and Japanese Kongo class DDG. The ship is also armed with the indigenous HQ-9 air defence missile system, which is believed to be comparable to the Russian S-300F/Rif in performance, and a newly developed anti-ship cruise missile (ASCM) designated YJ-62 (C-602). The Type 052C is fitted with four multifunction phased array radar antenna. The radar is reportedly developed by Nanjing Research Institute of Electronic Technology (also known as 14 Institute). There is also a Type 517H-1 (NATO codename: Knife Rest) long-range 2D air search radar; a Russian Band Stand fire-control radar (for anti-ship missile and main gun); and two Type 327G (EFR-1, NATO codename: Rice Lamp) fire control radar for the CIWS. By adopting a modular approach where two classes of destroyers shared the same hull design and propulsions, Jiangnan was able to save construction time and costs in the programs. However, unlike the Type 052B Luyang class, which was fitted with a mixture of both Russian and Chinese indigenous systems, the Type 052C Luyang-II class was largely based on the indigenous technologies. The bridge is also much taller on the Type 052C, so that four fixed phased array radar antennas can be embedded on its four sides. Using the same stealthy hull and engine configuration of the No. 168 class, this destroyer is armed with forty-eight new type vertical-launched anti-aircraft missiles of either Russian or Chinese origin. As such they will be the first dedicated long range air defense ships for the PLAN. The forward VLS station (possibly 6 revolver launchers, each with 6 missiles) are between the forward CIWS platform and the main gun, while the aft VLS station (possibly a pair of six-pack revolver launchers) are forward of the helicopter hanger. A total of 48 indigenous HQ-9 air defence missiles are housed in eight 6-cell vertical launch systems (VLS). Unlike the Russian-style revolver VLS, the Type 052C’s VLS is fixed with each launch cell having its own lid. The missile system utilises the ‘cold launch’ method, in which the missile was first ejected from the launch tube, and then ignites its rocket engine at low altitude. This launch method avoids the complex flame and gas exhausting pipes on the Western-style ‘hot launch’ VLS, and also decreases damage to the ship

structure caused by the rocket motor blast. The naval variant HQ-9 was developed from the land-based HQ-9 surface-to-air missile system developed in the 1990s. The missile may have adopted some Russian S-300 rocket motor and control technologies, with a “Track via Missile” (TVM) guidance system developed from the U.S. Patriot missile technology. The missile is housed inside a cylinder shape container, which is placed inside the VLS. The missile is guided by an unknown type of guidance radar with multi-target engagement capability. The surface-to-surface weapon of the Type 052C destroyer is the indigenously developed YJ-62 (C-602) ASCM. A pair of quadruple semi-cylindical racks for the new YJ-62 long-range SSM are between the rear mast and the helicopter hanger. The missiles are guided by the Band Stand radar on top of the bridge and a Light Bulb datalink forward of the hanger. The same guidance package was also found onboard 052B. A metric-wave radar with Yagi antenna is midship, for long range detection or ECM. A new EW suite featuring phased array antennas similar to AN/SLQ-32 EW system is on the side of the forward mast. The ship was also expected to have a new generation of Aegis-like C3I system. The ships feature an aft flight deck for the Z-9C ASW helicopter, and a hangar that can support a pair of these helicopters. Unlike the previous YJ-8 series anti-ship missiles, which were all carried inside a box-shape launcher, the YJ-62 is carried inside a cylinder-shape launcher. A total of eight missiles (two 4-cell launchers) are located at the mid-ship position. The missiles are guided by the Band Stand radar installed on top of the bridge and a Light Bulb datalink forward of the hanger. The YJ-62 missile uses strap-down inertial guidance coupled with GPS, and active radar for the terminal phase. The missile has a stated range of 280km, with the missile flying at an altitude of 30m during the cruise phase of an engagement. In the terminal phase, the missile descends 7~10m. The active radar seeker has an acquisition range of up to 40km. The ship has a single-barrel 100mm gun developed by 713 Institute on the basis of the French Creusot-Loire T100C design. The gun can be used against surface targets and air targets such as aircraft and low speed missile, with a maximum rate of fire of 90 rounds/min. The gun can be operated in fully automatic mode from the radar control system, from the shipborne optical sighting system, or laid manually. The turret design incorporates strong radar cross-section reduction features. For short-range air defence, the Type 052C is equipped with two (one front, one rear) Type 730 close-in weapon system (CIWS) for short-range air defence. The two Type 730 CIWS have been relocated to the raised platform in front of bridge and atop the rear helicopter hanger. The two seven-barrel 30mm Type 730 CIWS are located both sides behind the bridge. The weapon system has a maximum rate of fire of 4,600~5,800 rounds/min and a maximum range of 3km. A destroyer’s overall air defence, surface strike, and antisubmarine warfare (ASW) capabilities largely depend on how well different weapon systems and sensors are integrated together by the combat system. Most Chinese warships use the command and control system derived from the French Thomson-CSF TAVITAC, but the Type 052C might have a newly developed system with improved processing power to engage anti-ship missile threats. Although the detailed information on the combat system of the Type 052C is unknown, it is likely that the system comprises the multifunction phased array radar system, command and decision system, battlefield display system, and weapon control system. The command and decision system receives data from ship sensors and provides command, control and threat assessment. The weapon control system receives engagement instruction from the command and decision system, selects weapons and interfaces with the weapon fire control systems. In together with its long-range air defence missile and close-in weapon system (CIWS), the Type 052C is the first Chinese-made surface combatant with a true fleet air defence capability. The combat system will ensure that the ship can engage multiple air targets such as sea-skimming missile and aircraft simultaneously. The ship might also be able to transmit combat information to other ships and aircraft via datalink and satellite communications to form a maritime combat network. The destroyer’s stern hanger accommodates one Kamov Ka-28 (NATO codename: Helix) antisubmarine warfare (ASW) helicopter. Carrying various weapons including torpedoes and deep charges, the helicopter can operate in all weather conditions up to 200km from the host ship. Alternatively, the destroyer can carry an indigenous Z-9C helicopter. The Type 052C’s propulsion is in the form of CODOG, consisting of two Ukraine-made DA80/DN80 gas turbines rated at 48,600hp and two Shaanxi diesels (Chinese copy of the MTU 20V956TB92) rated at 8,840hp (6.5 MW). Two Type 052C (NATO codename: Luyang-II class) air defence guided missile destroyers have been built by Jiangnan Shipyard of Shanghai for the PLA Navy. Following the launch of two Type 052B multirole missile destroyers in 2002, Shanghai-based Jiangnan Shipyard began to build two subsequent hulls based on the same hull design but with different weapon and sensor configuration. The first-of-class 170 Lanzhou was laid down in late 2002 and launched on 29 April 2003. Sea trial began in late 2003 and the destroyer was commissioned in July 2004. The second hull, 171 Haikou was launched on 30 October 2003 and was commissioned in 2005. Both hulls are deployed by the South Sea Fleet based at Zhanjiang in Guangdong Province. The fourth unit of the Luhai class (probably Type 052C or possibly Type 052BK?) was also constructed at Jiangnan Shipyard, as the two Type 052B DDGs were being fitted out. The Type 052 series has evidently embraced a modular design featuring spiral development, with new variants being introduced after only one or two units of the previous version. As of early 2004 a pair of 052Cs were under construction (170 & 171) with the first ship launched on 29 April 2003 and the second on 30 October 2003. The building of two 052Bs and two 052Cs in such a short time frame reflects the PLAN's need to replace the obsolete air-defense systems of its surface ships. In June 2005 it was reported that two Luyang II missile destroyers were undergoing sea trials. The fourth Type 052C class destroyer, pennant number 173 went into service with the People's Liberation Army Navy (PLA Navy) in June 2012. After commissioning no new destroyers in 2008-2010, construction of new destroyers appeared to have resumed with serial production of Luyang II-class ships. Construction of the LUYANG II-class DDG (Type 052C) continued, with one ship entering service in 2012, and an additional three ships under various stages of construction and sea trials, bringing the total number of ships of this class to six by the end of 2013.

Hangzhou Class Chinese Guided Missile Destroyer





Tiers:



Variants:

- **Hangzhou (ex-Vazhnyy):** Commissioned: 1999 Status: Active
- **Fuzhou (ex-Vdumchivyy):** Commissioned: 2000 Status:Active
- **Taizhou (ex-Vnushitelnyy):** Commissioned: 2005 Status: Active
- **Ningbo (ex-Vechnyy):** Commissioned: 2006 Status: Active

System

Alternative Designation: Hangzhou Class
Type: Guided Missile Destroyer
Builder: Zhdanov Shipyard
Crew: 296 (25 off. + 271 enl.)
Accomodation: 368 (38 off. + 330 enl.)

Dimensions

Length: 156.4 m
Beam: 17.2 m
Draft: 7.9 m
Displacement, Light: 6,500 tons
Displacement, Standard: 7,940 tons
Displacement, Full Load: 8,480 tons

Propulsion System

Engine Name: 2 x TV-12
Engine Type: Geared Steam Turbines
Engine Power: 110,000 total shp
Boiler: 4 x turbo pressurised Type KVN-98/64, 640 kg/sq cm, 500 deg Celsius
Fuel Capacity: 1,740 tons + 5 tons aviation
Maximum Range: 1,345 nm at 32.7 kts, 3,920 nm at 18 kts

Maximum Speed: 63 km/h (34 knots)

Endurance: 30 days

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-630

Type: Naval Close-In Weapon System

Caliber: 30mm

Quantity: 4 x 30-mm/65 cal. (AK-630M) Gatling CIWS

Length: INA

Barrel Length: 1,629 mm

Width: 1,240 mm

Height: 1,070 mm

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630); External nodes: 800 kg (1,800 lb) (AK-630); 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds

Sights: Radar / TV-optical

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 16,000

↳*Gun Weapon System #2*

Name: AK-130

Type: Automatic Naval Cannon

Caliber: 130mm

Quantity: 2 x twin 130-mm/70 cal. (AK-130) DP guns

Length: 9100 mm

Barrel Length: INA

Weight: INA

Elevation: 85 degrees

Traverse: 360 degrees

Rate of Fire: 35 RPM

Maximum Firing Range: 23,000 m (surface targets) 15,000 m (aircraft) 8,000 m (missiles)

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 130mm

Cartridge: INA

Basic Load: 2,000 Rounds

Missile Weapon System

↳*Missile #1*

Name: SS-N-22 Sunburn

Type: Anti-Ship Missile

Launcher: 2 x quad P-100 Moskit-M 3M83 SSM

Note: SS-N-22 Sunburn is the NATO reporting name for two unrelated Soviet anti-ship missiles. Although the missiles were very different, distinguishing between them is difficult because their ship-mounted launching containers were identical. Confusion was exacerbated by the Soviet practice of mixing missile types within a class of ships. It was therefore not confirmed that the "SS-N-22" actually referenced two different missiles until after the fall of the Soviet Union.

↳*Missile #2*

Name: SA-N-7 Gadfly

Type: Surface-to-Air Missile (SAM)

Launcher: 2 x ZR-90 Uragan (SA-N-7) type MS-196 SAM missile launchers

Length: 5.55 m

Diameter: 0.40 m

Wingspan: 1.20 m

Weight: 690 kg

Engine: 1 x solid-fuel rocket

Maximum Range: 30 km

Maximum Speed: 3,680 kph, Mach 3

Maximum Altitude: 15,000 m

Minimum Altitude: 25-30 m

Maximum Load: 23 g

Sensors/Electronics: Front Dome (Orekh) H/I-band radar, said to be capable of illuminating an individual target once it is designated by D/E/F-band air search radars and associated digital computers

Torpedoes

Torpedo Tubes: 2 x twin 533-mm type DTA-53 tubes

Torpedos: INA

Basic Load: INA

Fire Control Systems

SA-N-7 Missile FCS: 6 x OP-3 (Front Dome**) fire control for SA-N-7 missiles

AK-130 Gun FCS: 1 x MR-184M Lev (Kite Screech**) fire control for 130-mm guns

AK-630 Gun FCS: 2 x MR-123 Vympel (Bass Tilt**) fire control for 30-mm CIWS

SS-N-22 Missile FCS: 1 x Mineral (Band Stand**) surface target and designation for the SS-N-22

Laser Rangfinder: 1 x Squeeze Box optronic director with laser range finder

Aircraft

Helicopters: 1 x Kamov Helix-A(Ka-27PL)** ASW; or 1 x Helix-A (Ka-27RT) targeting type

ASW Weapons

Launcher: 2 x 6-round RBU-1000 rocket launchers

Rocket Name: RGB-10

Basic Load: 48

Mines

Launcher: 2 x mine rails fitted

Mine Name: INA

Basic Load: 40

Radar Systems

3-D Air Search Radar: 1 x MR-760MA Fregat-MA (Top Plate**) 3-D air search

Navigation Radar: 3 x MR-212/201 Vaygach-U (Palm Frond**) navigation

Sonar Systems

Name: 1 x MGK-335MS Platina-S (Bull Horn**)

Type: Medium-Frequency, Hull Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: 8 x 10-tubed PK-10 fixed decoy launchers (all except BOYEVOY: none)

NBC Water Washdown System: Yes

Electronic Warfare: 2 x MP-405M Start-2 or MR-401 intercept system; 2 x MRP-11M/12M (Bell Shroud**); 2 x Bell Squat**; 4 x Foot Ball-B**

Jamming System: 1 x MR-407 jamming system

Notes:

The Chinese People's Liberation Army Navy Surface Force (PLAN) had two modified Sovremenny-class destroyers delivered in December 1999 and November 2000. In 2002, the PLAN ordered two improved versions designated 956-EM. The first vessel was launched in late 2005, while the second was launched in 2006. All four vessels were commissioned to the East Sea Fleet. On the improved Project 956EM the aft AK-130 main gun was removed. The four AK-630 CIWS were replaced by two sets of Kashtan CIWS short-range air defence gun/missile systems. Each Kashtan system comprises a 3R86E1 command module and two 3R87E combat modules. Each 3R87E combat module has two 30 mm GSh-30k six-barrel automatic guns (range 0.5–4 km (0.31–2.49 mi)) and two SA-N-11 air defence missiles. The missile is armed with a 9 kg (20 lb) warhead and has a range of 1.5–8 km (0.93–4.97 mi). This improved 956EM version is also the first to be armed with the newer version of SS-N-22, which is reported to have a designation of 3-M80MBE and possibly funded by China (according to Russian sources), and the new missile differs from the older ones mainly in that the range is increased from 120 km (75 mi) to 200 km (120 mi). The air defense software is upgraded to accommodate the newer SA-N-12/SA-17 SAM system, but since China had already joined Russia in developing an even newer successor, it is not clear if SA-N-12/SA-17 has entered Chinese service in large numbers. In 2006, the extra spheres (painted white as the mid-2006) added atop of the superstructures of the Chinese ships appearing in latest photographs of the Chinese units have shown that these Chinese ships had been upgraded with the domestic HN-900 Data link (Chinese equivalent of Link 11A/B, to be upgraded) and SATCOM (probably the SNTI-240). From mid-2014, all four Chinese Sovremenny-class destroyers are planned to undergo a midlife upgrade program. As of 2016, Hangzhou was reported to be undergoing refit with its original components replaced with domestic systems. In addition to replacement of electronics and sensors, armament upgrades include replacing 2x4 3M80E Moskit anti-ship missiles with 2x4 YJ-12A supersonic missiles, swapping two launchers for 48 SA-N-12 SAMs with 4 sets of 8-cell vertical launch systems totaling 32 cells for HQ-16C or Yu-8 anti-submarine missiles and adding a 24-cell FL-3000N short-range anti-air missiles. Project cost: 600 million US$ (mid-1990s price) was the price paid for Project 956A (two ships), and 1.4 billion US$ (early-2000s price) for Project 956EM (two ships).

Type 051C Class (Luzhou Class) Chinese Guided Missile Destroyer







Tiers:

1 **2** 3 4

Variants:

- **Shenyang:** Commissioned: 2006 Fleet: North Sea Fleet Status: Active
- **Shijiazhuang:** Commissioned: 2007 Fleet: North Sea Fleet Status: Active

System

Alternative Designation: Type 051C Class; Luzhou Class

Type: Long-Range Air-Defence Guided Missile Destroyer

Builder: Dalian Shipbuilding Industry Company

Crew: 280

Dimensions

Length: 155.0 m

Beam: 17.0 m

Draft: 6.0 m

Displacement, Standard: INA

Displacement, Full Load: 7,112 tons

Propulsion System

Engine Name: INA

Engine Type: 2 x indigenous steam turbines

Engine Power: INA

Maximum Range: INA

Maximum Speed: 60 km/h (32 knots)

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: INA

Type: 100-mm/56 cal DP Naval Gun

Caliber: 100mm

Quantity: 1 x 100-mm/56 cal DP Naval Gun

Note: There is no information available that outlines the name of this Gun Weapon System #1.

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm100

Cartridge: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 730 CIWS

Type: Close-in Weapon System

Caliber: 30mm

Quantity: 2 x Type 730 30mm CIWS

Length: INA

Weight: INA

Barrels: 7-barrel

Rate of FIre: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 1–1.5 km

Feed System: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 30mm

Cartridge: INA

Basic Load: INA

Missile Weapon System

↳*Missile #1*

Name: SA-N-6 Grumble
Type: Naval Long-Range Surface-to-Air Missile
Launcher: 6 x circular VLS (2 fwd, 4 aft) (8 rounds/launcher)
Length: 7.20 m
Diameter: 0.51 m
Tailspin: 1.13 m
Missile Weight: 1,665 kg
Warhead Weight: 130 kg
Warhead Type: high-explosive fragmentation w/RF fuze
Engine: 1 x single-stage, solid-fuel rocket
Maximum Speed: Mach 6
Maximum Range: 100 km
Maximum Altitude: 30,480 m
Minimum Altitude: 305 m
Maximum Load: 100 g
Sensors/Electronics: Top Dome I- or J-band radar system missile guidance is thought to be track-via-missile (i.e., the missile provides radar updates to the launching ship)
Basic Load: 48

↳*Missile #2*

Name: YJ-83
Type: Anti-Ship Cruise Missile
Launcher: 2 x quad YJ-83 (C-803) SSM launchers
Length: INA
Width: INA
Engine: CTJ-2 turbojet
Warhead: 190 kg high-explosive fragmentation
Operational Range: 180 km
Maximum Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance
Basic Load: 8

Torpedoes

Name: Yu-7

Type: Lightweight Torpedo

Launcher: 2 x triple 324-mm torpedo tubes

Length: 2.7 m

Diameter: 324 mm

Weight: 235 kg

Warhead: high explosive

Warhead Weight: 45 kg

Effective Firing Range: 14.1 km

Propellant: Otto fuel II

Maximum Depth: 400 m

Maximum Speed: >45 kn

Guidance System: active / passive acoustic homing

Steering System: CIACIO-S seeker

Basic Load: INA

Fire Control Systems

YJ-83 FCS: 1 x Mineral-ME (Band Stand**) fire control (for YJ-83)

10mm Gun FCS: 1 x Type 344 (MR-34 (for 100-mm gun)

Rif-M FCS: 1 x Volna (Tomb Stone**) (for Rif-M)

Type 730 FCS: 2 x Type 347G(2) (LR-66) (for Type 730)

Battle Management System: INA

Computerized FCS: Yes

Radar Systems

Air Search Radar: 1 x Fregat-MAE-5 Top Plate** E-band 3-D air-search

Air/Surface Search Radar: 1 x Type 364 (Seagull-C**) air/surface search

Long Range Air Search: 1 x Type 363 E/F-band long range air search

Navigation Radar: INA

Protection

Active Protection System: INA

Decoys: 2 x Type 946 15-round chaff/decoy launchers and 2 x 10-round Launchers

NBC Water Washdown System: Yes

Electronic Warfare: INA

Notes:

The Type 051C or Luzhou class destroyer is a long-range air-defence guided missile destroyer built by China in its ongoing effort to create a true blue water navy. The ship uses the hull design of the older Type 051B (Luhai class), but is equipped with the advanced Russian S-300FM air defence missiles systems. Currently, two ships of this class have been launched and deployed by People's Liberation Army Navy North Sea Fleet. The construction of the Luzhou class destroyer at China’s northern

Dalian Shipyard was revealed in 2004 with the help of Internet photographs. A disadvantage of the Type 051C is that it lacks the stealthier radar cross-section found on the newer Chinese warships. The ship also possesses less advanced steam turbine propulsion compared to gas turbine propulsion present in all newer Chinese destroyers. The Type 051C is a stop gap measure to provide long range area air defense to the fleet by mating the mature hull design with proven SAM system that is more capable than that of Type 052B destroyer. Production of this class stopped once more advanced Type 052C destroyers became available.

Type 052 Class (Luhu Class) Chinese Guided Missile Destroyer







Tiers:



Variants:

- **Harbin:** Commissioned: 1993 Status: Active
- **Qingdao:** Commissioned: 1996 Status: Active

System

Alternative Designation: Type 052 Class; Luhu Class

Type: Guided Missile Destroyer

Builder: HARBIN: Qiuxin Shipyard, Shanghai, China QINGDAO: Jiangnan Shipyard, Shanghai, China

Crew: 260 (40 Off. + 220 Enl.)

2011 Upgrade: Both of the Type 052 destroyers were upgraded in 2011. The four Type 76A guns were replaced by two Type 730 CIWS on top of the helicopter hangar. The Crotale/HHQ-7 short-range SAM may have been replaced by the newer model (FM-90?) which provides better interception against sea-skimming AShMs. Two Type 726-4 decoy launchers were installed on the sides of the forward bridge for better self-protection. Various onboard systems were integrated together (to a certain degree) by a Thomson-CSF TAVITAC combat data system which is thought to have been replaced by a new indigenous C3I system (ZJK-4B or a newer model). The Thomson-CSF Sea Tiger air/surface search radar was first replaced by an indigenous Type 518 Hai Ying radar and is now replaced by a Type 517M long-range air search radar. The Type 362 air/surface radar installed on top of the aft mast has been replaced by a Type 364. A pair of SATCOM antennas has been installed on top of the helicopter hangar as well.

Dimensions

Length, Overall: 148.0 m

Length, Waterline: 142.6 m

Beam: 16.0 m

Draft: 7.5 m

Displacement, Standard: 4,800 tons

Displacement, Full Load: 5,700 tons

Propulsion System

Engine Name: HARBIN: 2 x General Electric LM-2500; QUINGDAO: 2 x Mashproekt-Zorya GT25000

Engine Type: Gas Turbines

Engine Power: 26,800 shp each

Maximum Range: 4,000 nm at 29.6 km/h(16 kts)

Maximum Speed: 69.2 km/h (32 kts)

Endurance: 15 Days

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: INA

Type: 1 x twin 100mm DP

Caliber: 100mm

Quantity: 1 x twin 100mm DP

Maximum Range: INA

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm100

Shell: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 76A

Type: Anti-Aircraft Guns

Caliber: 37mm

Quantity: 4 x twin 37-mm/63 cal (Type 76A) AA

Note: The Type 76A is a fully enclosed and fully automatic model in the Type 76 series. Unlike the Type 76F, the gun is fully automatic, with the semi-automatic operational mode and the one-man operator console removed. In addition to the optronic FCS found in the Type 76F, the Type 76A is linked to radar FCS. The maximum rate of fire, however, is reduced in comparison to Type 76, dropping from the original 400 rd/min/barrel to 375 rd/min/barrel. In addition to anti-aircraft and anti-surface roles, the Type 76A can also be used as a close-in-weapon system

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: mm37

Shell: INA

Basic Load: INA

Missile Weapon System

↳*Missile #1*

Name: 1 x 8-round HQ-7 A (FM-80)/French Crotale-type SAM

Type: Surface-to-Air Missile (SAM)

Basic Load: 24

↳*Missile #2*

Name: 4 x quad Ying Ji-83 (YJ-83, C-803) SSM

Type: Anti-Ship Cruise Missile

Basic Load: INA

ASW Weapons

ASW Rocket Launcher: 2 x 12-round 240-mm (Type 75) ASW rocket launchers;

Rocket Name: Type 75

Rocket Basic Load: INA

Torpedo Tubes: 2 x triple 324-mm ILAS-3 ASW tubes

Torpedo Name: Yu-7 (copy of U.S. Mk 46 Mod 1) torpedoe

Torpedo Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes, 1 x Type 345 (MR35) fire control (for HQ-7 system); 1 x Type 344 (MR34) fire control (for SSM and 100-mm gun); 2 x Type 347G (EFR1- Rice Lamp) fire control (for 37-mm mounts)

Battle Management System: INA

Radar Systems

Long-Range 3D Air Search Radar: 1 x Type 518 (REL-1/2) "Hai Ying" long-range 3-D air search

Air/Search Radar: 1 x Type 360S (SR60) air/surface search (QUINGDAO only)

Low-Altitude Air/Surface Radar: 1 x Type 362 (ESR-I) low-altitude air/surface search

Navigation Radar: 2 x Racal Decca RM-1290A/D navigation

IR Directors: 2 x GDG-77S radar/TV/laser/IR directors

Aircraft Facilities

Helicopters: 2 x Harbin Z-9C helicopters

Sonar Systems

Hull Mounted Active Search Sonar: 1 x ZJK-4 (French DUBV-23) hull-mounted, active search/attack, MF

Active Attack VDS Sonar: 1 x ESS-1 (French DUBV-43) active attack VDS, MF

Protection

Active Protection System: INA

Countermeasures: 2 x 15-round Type 946 100-mm decoy RL

NBC Water Washdown System: Yes

Intercept/Jammer EW: 1 x Type 826C (BM-8610) intercept/jammer; radar warning intercept system

Notes:

The Type 052 Luhu-class is one of the first modern multi-role guided missile destroyers built by China. There are currently two units in active service with the People's Liberation Army Navy Surface Force. It was succeeded by the Type 051B. Designed by the China Warship Design Institute (formerly the Seventh Academy of the Ministry of National Defense), both ships were built at Jiangnan Shipyard - No. 112 Harbin was the first Luhu destroyer followed by No. 113 Qingdao. The chief designer was academician Mr. Pan Jingfu (□□□). The class is said to be the first indigenous Chinese warship design approaching modern standards, a significant improvement over the earlier Luda class. The Luhu class made extensive use of foreign technologies that were accessible to the PRC prior to the Tiananmen Square incident of 1989. These included French-made radars and fire-control systems and the General Electric LM2500 gas turbine engines from the US, two of which power each ship. The Type 052 became the first Chinese destroyer design to use gas turbine engines, and also the first equipped with an integrated combat system. Even with incorporation of Western technology, the chronic lack of adequate shipborne air defense systems has had great impact on PLAN operations. Equipped with a small number of surface-to-air missiles with visual-range only and guns with limited range and performance, Chinese warships have historically limited their operations to the area covered by their land-based aircraft due to a lack of fleet defense capability. To rectify this trend, the Luhu destroyers (and the smaller Jiangwei class frigate) were fitted with the HQ-7 SAM that gives them much better air defense capability than other previous Chinese designs, although they are still limited to within visual range (WVR). The HQ-7 SAM system is reported to be equipped with 8 ready to fire missiles, plus 16 stored in a semi-automatic reloader system. The same system is also used on the upgraded 051G Luda Destroyer. In spite of the advances, the 052 Luhu-class destroyers still suffer in some areas such as electronic warfare and electronic counter-measures. The operational capability of the Luhu-class destroyers has been called into question by naval analysts. Ship visits in 1997 allowed US Naval officers to board and inspect Luhu Destroyer No. 112 Harbin and to take numerous photographs. Analysis of these photographs and reports by officers present strongly suggested that the Luhu destroyers were mainly intended as technology demonstration vessels rather than serious naval combatants. For example, the large amount of foreign-supplied equipment onboard was still labeled in the language of the country of origin; this was also the case with most of the onboard manuals and other documentation, calling into question the ability of the crew to operate efficiently under stressful circumstances when called upon to deal with equipment labeled in English, French, or Italian, as well as Chinese. Furthermore, the various European systems installed were not originally designed to operate together and as a result were not well integrated - a problem the Chinese could not overcome owing to their lack of familiarity with the underlying technology. The Chinese attempted to address these problems with the introduction of an improved Luhu design, the Luhai-class. This follow-on, essentially an enlarged Luhu, features some improved electronics from foreign suppliers as well as more advanced weapons. However, in some cases, the designers appear to have opted for less capable indigenous designs to ease the system integration issues suffered by the Luhu-class destroyers. The PLAN was reportedly unhappy with the design of the Luhai-class destroyers and production ceased after a single unit was completed. According to Chinese media and internet sources, the Luhu-class is mainly used as a technological demonstrator to compare and evaluate different foreign systems, and the two ships initially did not have identical equipment. The first unit had a licensed production of Raytheon AN/SQS-56 sonar, the Italian DE-1164 integrated sonar system, which consists of DE-1160 hull mounted sonar (HMS) and DE-1163 variable depth sonar (VDS), and these were later replaced by domestic copy, SJD-7 sonar system. The second unit had French Thomson-CSF DUBV 23/43 HMS/VDS, which were subsequently replaced by domestic copy SJD-9 sonar system. the combat data systems for the first unit was ZKJ-3 (ZKJ-III), a Chinese equivalent of the Italian IPN-10 combat data system. ZKJ-3 is developed from the export version of IPN-10, SADOC 2, (SADOC = systema dirizione della Operazioni di combattimento). SADOC 2 was sold to China in 1985 and it differs from IPN-10 in that it lacks the data link the latter has. Incorporation of a domestic data link is the main improvement of Chinese ZKJ-3, making it the Chinese equivalent of IPN-10. The combat data system of the second unit is ZKJ-4, which is the Chinese version of French Thomson-CSF TAVITAC combat data system, two of which were sold to China in 1985 and delivered 2–3 years later. These combat data systems were later replaced by more advanced follow-on equipment such as ZKJ-4A/B series during upgrades. Experience gained in handling these foreign systems has helped subsequent development of similar Chinese systems. 2011 Upgrade: Both of the Type 052 destroyers were upgraded in 2011. The four Type 76A guns were replaced by two Type 730 CIWS on top of the helicopter hangar. The Crotale/HHQ-7 short-range SAM may have been replaced by the newer model (FM-90?) which provides better interception against sea-skimming AShMs. Two Type 726-4 decoy launchers were installed on the sides of the forward bridge for better self-protection. Various onboard systems were integrated together (to a certain degree) by a Thomson-CSF TAVITAC combat data system which is thought to have been

replaced by a new indigenous C3I system (ZJK-4B or a newer model). The Thomson-CSF Sea Tiger air/surface search radar was first replaced by an indigenous Type 518 Hai Ying radar and is now replaced by a Type 517M long-range air search radar. The Type 362 air/surface radar installed on top of the aft mast has been replaced by a Type 364. A pair of SATCOM antennas has been installed on top of the helicopter hangar as well.

Type 052B Class (Luyang I Class) Chinese Destroyer







Tiers:

1 **2** 3 4

Variants:

- **Guangzhou:** Commissioned: 2004 Fleet: South Sea Fleet
- **Wuhan:** Commissioned: 2004 Fleet: South Sea Fleet

System

Alternative Designation: Type 052B Class; Luyang I Class
Total Built: 2 ships built of this class
Type: Destroyer
Builder: Jiangnan Shipyard
In Service: 2004-Present
Crew: 280

Dimensions

Length: 155 m
Beam: 17.2 m
Draft: 6 m

Displacement: 5,850 tons standard; 6,500 tons full load

Propulsion System

Engine Name: INA

Engine Type: Diesel

Engine Power: 57,000 shp

Maximum Range: INA

Maximum Speed: 30 knots

Endurance: INA

Gun Weapon Systems

↳*Gun Weapon Systems #1: System*

Name: Type 210 100mm Dual Purpose Gun

Type: Dual Purpose Naval Gun

Caliber: 100mm

Quantity: 1× Type 210 100 mm dual purpose gun

Note: The Type 210 automatic single 100 mm naval gun is the Chinese modification of the Compact model of the French 100 mm naval gun. There are at least two variants, with both sharing similar characteristics with the French weapon.The Type 210 was developed to make the French gun suitable for Chinese deployment. The French gun was incompatible with Soviet and Chinese electronics; it was easier to make the gun compatible with these electronics, and Western electronics, than to alter the electronic suites already aboard warships. Furthermore, the Chinese added the capability to fire laser- and infrared-guided shells; this required significant changes to the magazine. The weapon's maximum rate of fire for a single type of unguided round was 90 rounds per minute. The rate of fire was reduced when switching between different types of ammunition.

↳*Gun Weapon Systems #1: Ammunition*

Type: Rifle

Caliber: mm100

Shell: INA

Basic Load: INA

↳*Gun Weapon Systems #2: System*

Name: Type 730 CIWS

Type: Close-in Weapon System

Caliber: 30mm

Quantity: 2 x Type 730 CIWS

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Barrel Length: INA

Weight: INA

Crew: Automated, with human oversight

Barrels: 7-barrel

Maximum Firing Range: 3 km

Effective Firing Range: 1.5 km

Feed System: One ammunition boxes, holding 640 rounds

↳*Gun Weapon Systems #1: Ammunition*

Type: Rifle

Caliber: 30mm

Cartridge: INA

Basic Load: INA

Missile Weapon Systems

↳*Missile Weapon System #1:*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Anti-Ship Cruise Missile

Quantity: 16 x YJ-83 (CSS-N-8 Saccade) Anti-Ship Cruise Missile

Length: INA

Diameter: INA

Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: CTJ-2 turbojet

Operational Range: 180 km

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Missile Weapon System #2:*

Name: SA-N-12 Grizzly

Type: Surface-to-Air Missile

Quantity: 48 x SA-N-12 Grizzly Surface-to-Air Missile

Length: INA

Diameter: INA

Weight: 581 kg

Maximum Range: 50 km

Maximum Altitude: 15,000 m

Missile Speed: 830 m/s[

Torpedo Weapon Systems

↳*Torpedo Launcher*

Name: INA

Type: Torpedo Launcher

Number of Tubes: 6

↳*Torpedo*

Name: INA

Type: INA

Length: INA

Diameter: INA

Maximum Range: INA

Basic Load: INA

Onboard Aviation Facilities

Facilities: Single helicopter hangar

Aircraft: No

Helicopters: 1 helicopter: Kamov Ka-27

Fire Control Systems

FCS Name: Type 344 Fire-Control Radar and MR90 Front-Dome fire control radar Mineral-ME (Band Stand) over-the-horizon targeting radar

Computerized FCS: Yes

Battle Management System: Yes

Radar Systems

↳*Radar #1*

Name: Fregat-MAE-5 (Top Plate)

Type: 3D air search phased array radar

Frequency: INA

Maximum Range: INA

↳*Radar #2*

Name: MR90

Type: Front-Dome fire control radar Mineral-ME (Band Stand) over-the-horizon targeting radar

Frequency: S-Band

Passive Range: 240 km

Active Range: 250 km

↳*Radar #3*

Name: Type 344

Type: Fire Control Radar

Frequency: INA

Maximum Range: INA

Note: The Type 344 is a multifunctional fire control radar (FCR) developed by the Xian Research Institute of Navigation Technology (□□□□□□□□□)/XRINT/ No. 20th Research Institute. It can track two batches of target simultaneously and measure the position deviation between the shell and the target, constantly calibrating the gun's firing parameters in action. The system also includes a TV tracker and laser range finder. It is used to control 76m, 100mm and 130mm guns in PLAN service.

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

Type 052B Luyang-class Multirole Destroyer Guangzhou Although the PLAN had claimed that Shenzhen was the first indigenously-produced warship to be designed with stealth as a primary design feature, measures to further reduce radar signature from the hull and superstructure are far more pronounced in this second unit of the class. The large smooth and angled surfaces, a common feature among the new generaton of European FFGs such as French La Fayette class, represent a considerable innovation for China. The PLA Navy received two Type 052B (NATO codename: Luyang class) multirole missile destroyer in 2004. These ships, built by Shanghai-based Jiangnan Shipyard, featured enhanced air defence and antisubmarine warfare capabilities using a mixture of Russian-made and Chinese indigenous systems. Building of the first-of-class ship, 168 Guangzhou, began in 2000. The ship was launched on 23 May 2002, and had been stationed at Jiangnan Shipyard sine then for weapon and radar system installations. The sea trial began in May 2003, and the ship officially entered service with the PLA Navy on 15 July 2004. The second hull 169 Wuhan was launched in January 2003 and commissioned in late 2004. Unlike the previous Chinese-built surface combatants, which were mainly equipped with European and indigenous weapon and radar systems, the Type 052B was the first to have adopted Russian technologies including the 9M317 Shtil (NATO codename: SA-N-12 Grizzly) air defence missile and its associated Front Dome fire-control radar, and the Top Plate 3D air search radar. The ship also used two Ukraine-made DA80/DN80 gas turbines as its primary propulsion. Newly developed indigenous technologies onboard the Type 052B included the 100mm single-barrel compact main gun and the Type 730 seven-barrelled close-in defence system (CIWS). The Type 052B is thought to be comparable to the Russian Project 956E Sovremenny class destroyer in terms of general performance and capability. This project has set a perfect example of integrating the indigenous platform with foreign-made systems to fill the gap before similar indigenous systems become available, thus reducing the amount of time required in the whole project. The acquiring of the two Type 052B destroyers further increased the PLA Navy’s capability to combat in deep ocean. It also demonstrates China’s rapid progress in building a ‘blue water’ navy that is capable of operating far away from its homeports, a capability that the Chinese navy has been seeking for nearly two decades. The displacement of the ship is estimated to be 6,500 tonnes. The ship’s hull design incorporates strong radar signature reduction features such as the sloped sides and reduced external features. The hull surface is coated in radar-absorbent paint. The funnel also has cooling devices to reduce the ship’s infrared feature. The ships has a stern flight deck and a helicopter hanger to accommodate one Ka-28 ASW helicopter. The Type 052B destroyer is armed with two Russian-made surface-to-air missile launchers, one on the front deck behind the 100mm main gun, and one on top of the helicopter hanger. The launchers can fire the latest 9M317 Shtil (NATO codename: SA-N-12 Grizzly) semi-active, radar-homing, medium-range air defence missile. The missile uses the ship’s Russian-made Fregat M2EM Top Plate 3D circular scan radar for target acquisition, and the Front Dome (two radar for each launcher, each radar with two guidance channels) indication radar for missile guidance. Up to three missiles can be aimed simultaneously. The range is up to 38km against aircraft and 20km against anti-ship cruise missile. The ship carries 48 missiles. Four 4-cell launcher for the YJ-83 (C-803) sea-skimming, radar-homing anti-ship cruise missile system are installed behind the funnel. The YJ-83 is said to have a final approach speed of Mach 1.5 and a maximum range of 150km. It was noted that the YJ-83 onboard the Type 052B relies on a Russian-made Band Stand fire-control radar to provide target information, which would enable the YJ-83 to reach its maximum range of fire without relaying target information by the shipborne helicopter. The Type 052B destroyer was the first PLA Navy warship to be fitted with the CIWS. There is a seven-barrel 30mm Type 730 CIWS

installed on each side of the bridge. The weapon system has a maximum rate of fire of 4,600~5,800 rounds/min. The ship also has a single-barrel 100mm gun developed by 713 Institute on the basis of the French Creusot-Loire T100C design. The gun can be used against surface targets and air targets such as aircraft and low speed missile, with a maximum rate of fire of 90 rounds/min. The gun can be operated in fully automatic mode from the radar control system, from the shipborne optical sighting system, or laid manually. The turret design incorporates strong radar cross-section reduction features. The Type 052B destroyer is fitted with two triple 324mm Yu-7 (Mk-46 Mod 1) antisubmarine torpedo tubes and two Type 75 twelve-barrel 240mm antisubmarine rocket launchers. Range is up to 1,200m. The rocket is armed with a 34kg warhead. Additionally, the destroyer has four 18-barrel multiple rocket launchers (MRLs) installed on the front deck. The purpose of these MRLs remains unknown but is thought to be used to launch antisubmarine rockets, ground- attack rockets and/or decoys/chaffs. The air search radar is a Russian Fregat M2EM (NATO codename: Top Plate) 3D air search radar operating at D/E band. The radar has a maximum detect range of 230km to aircraft and 50km to sea-skimming missile. There are four (in contrast to six on Sovremenny class) Russian Front Dome fire control radar (F band) for the 9M38 air defence missile. The main gun and anti-ship missile are controlled by the Russian Band Stand radar. The ZJK-5 combat system onboard the Type 052B is thought to be an improved variant of the Type 051B (Luhai class)'s ZJK-4-3A. The ZJK-5 is based on the 1553B military data bus and the 100Mbps Ethernet technology. The multi-channel defence suite is capable of engaging several targets simultaneously. The destroyer's stern hanger accommodates one Kamov Ka-28 (NATO codename: Helix) antisubmarine warfare (ASW) helicopter. Carrying various weapons including torpedoes and deep charges, the helicopter can operate in all weather conditions up to 200km from the host ship. Alternatively, the destroyer can carry an indigenous Z-9C helicopter. The Type 052B's propulsion is in the form of CODOG, consisting of two Ukraine-made DA80/DN80 gas turbines rated at 48,600hp and two Shaanxi diesels (Chinese copy of the MTU 20V956TB92) rated at 8,840hp (6.5 MW). The unit [hull number 168, initially thought to possibly be named Yantai, but actually named Guangzhou], started building in 1999, with initially completion expected in 2001. By mid-2002 it appeared that this unit was fitting out, and was evidently constructed along modified lines to reduce radar signature. Initially it was expected that the second unit of this class would enter service in 2000, with two more following with commissioning dates in 2002 and 2003. Since 1999, only two hulls had been constructed at Jiangnan Shipyard in Shanghai, with the first ship [168] launched on 25 May 2002. The second ship [169] was launched in October 2002. By April 2003 it became apparent that the ships would carry new Russian weapons -- the effective SA-N-12 anti-aircraft missile plus a long-range Russian search radar, and another radar similar to the Russian BAND STAND over-the-horizon targeting radar. The latter indicated that a new, long range anti-ship missile will be carried. These ships are basically comparable to Taiwan's new U.S. KIDD class destroyers in size and capability, but much more stealthy. In June 2005 it was reported that two Luyang I destroyers were operational or undergoing sea trials. The destroyer "Guangzhou" (Hull Number 168) of the PLA Navy set sail for the sea waters off Pakistan on 21 February 2009 from Sanya City of Hainan Province to participate in the "Peace 09" multinational maritime military exercise. The multinational maritime military exercise was initiated by the Pakistani Navy. Navies from 11 countries, including China, the US, the UK, France, Japan and Turkey, sent their ships, aircraft and Marine Corps elements to participate in the exercise. And military observers from 20-odd countries, including Russia, Germany, Australia, Egypt and Indonesia viewed the exercise. The Chinese Navy sent a task force composed of the destroyer "Guangzhou" from the South China Sea Fleet (SCSF), a helicopter and 10 members of the Marine Corps to participate in this "Peace 09" exercise. Military officials and soldiers of Chinese navy's missile destroyer DDG-168 Guangzhou attended a sail setting ceremony in Sanya, south China's Hainan Province, on March 4, 2010. A new Chinese naval task force set sail on Thursday morning from a military port in the south Hainan Island to replace the fourth batch of flotilla in the Gulf of Aden escorting merchant vessels. Chinese navy's missile destroyer DDG-168 Guangzhou arrived in Guangzhou in south China's Guangdong province, December 26, 2012 and took part in an activity marking the 4th anniversary of the start of China's escorting missions in the Gulf of Aden. The ship was open to the public during its stay in the city. China's Defense Ministry defended a regular training and sailing mission by Chinese ships in the East China Sea. The statement on 26 October 2012 was in response to Japanese reports that three Chinese maritime surveillance ships entered the waters around the Diaoyu Islands. The Ministry added that the mission of China's ships was justified and legal. China hopes related parties will treat the issue objectively and rationally. The three surveillance ships belong to the South China Sea Fleet. They were the 168 Guangzhou guided missile destroyer, the 171 Haikou guided missile destroyer and the missile frigate 571 Yuncheng. Japan's Coast Guard spotted three Chinese maritime ships in waters 471 kilometers off the island of Okinawa. Japan said it would conduct a thorough investigation. A total of seven Chinese vessels registered under China's three People's Liberation Army Navy fleets (South Sea, East Sea and North Sea) sail near Japanese islands before returning to their bases on Oct. 28 and 29. The Type 052B (Guangzhou, 168) Destroyer and the Type 054A (Hunagshan, 570) Frigate, both from the South Sea Fleet, are followed by a Japanese destroyer when they sail through the waters at some 600 kilometers from Okinawa.

Type 052D Class (Luyank III-Class) Chinese Destroyer





Tiers:



Variants:

- **Kunming:** Commissioned: 2014 Fleet: South Sea Fleet
- **Changsha:** Commissioned: 2015 Fleet: South Sea Fleet
- **Hefei:** Commissioned: 2015 Fleet: South Sea Fleet
- **Yinchuan:** Commissioned: 2016 Fleet: South Sea Fleet
- **Xining:** Commissioned: 2017 Fleet: North Sea Fleet
- **Ürümqi:** Commissioned: 2018 Fleet: North Sea Fleet
- **Xiamen:** Commissioned: 2017 Fleet: East Sea Fleet
- **Guiyang:** Commissioned: 2019 Fleet: North Sea Fleet

System

Alternative designations: Kunming (LUYANG III Class) Chinese Type 052D Destroyer
Total Built: 10 total ships in the Luyang III Class
Builder: INA
In Service: 2014-Present
Crew (total): 280

Dimensions

Length: 160 m
Beam: 18 m
Displacement, Full Load: 8,000 tons
Draught: 6 m

Automotive

Propulsion: 2 x gas turbines
Maximum Speed: 30 knots
Maximum Range: 4,500 nm

Armament

↳*Weapon Station #1*

Name: PJ-38

Type: 30 mm naval gun

Caliber: 130mm

Quantity: 1 x PJ-38

Design: Designed by the Zhengzhou Mechanical-Electrical Engineering Research Institute (□□□□□□□□□, also known as the 713th Research Institute of the 7th Academy) and manufactured by Inner Mongolia 2nd Machinery Manufacturing Factory (□□□□□□□□□), the H/PJ-38 130 mm naval gun was developed from reverse engineering of Soviet AK-130 twin 130 mm naval gun, which was carried out by the same two establishments. The general designer of the H/PJ-38, Chen Dingfeng (□□□), was also the general designer of all models of Type 79 100 mm naval gun, all models of Type 210 100 mm naval gun, and the H/PJ26 76 mm naval gun. Chen was recalled from retirement to complete the H/PJ-38 single barrel 130 mm naval gun. When the Soviet AK-130 was first successfully copied by Chinese developers, the Chinese navy was unsatisfied and decided not to let the AK-130 into production, despite all performance parameters being met. Because the AK-130 was judged out-of-date by the Chinese Navy, the H/PJ-38 program was created in 2005. The H/PJ-38 130 mm single barrel naval gun is considered more powerful and more reliable than other smaller caliber naval guns currently in Chinese service, and as with naval guns on most warships, it is installed in front of the VLS.

Ammunition: The general designer of munitions for the H/PJ-38, Zhou Bingwu (□□□), entered the business in 1997 and almost lost the index finger of his right hand in November 2007 during an important trial. As early as 1987, Zhou had proposed multiple kinds of precision-guided munitions (PGMs) to be fired by a single caliber gun mount, but due to the limitations of the Chinese technological base and industrial capability, it was not until two decades later when it finally became a reality. Research led to the development of a single barreled 70 caliber, 130 mm system which took more than four years to complete, and the H/PJ-38 went to series production soon after completion. The primary improvement of the H/PJ-38 over the AK-130 is its adaptability: H/PJ-38 can fire both separate loading rounds and semi-fixed rounds, which is crucial in firing gun-launched missiles and PGMs. The H/PJ-38 can also fire a variety of sub-caliber rounds, but more importantly, a variety of PGMs were developed for H/PJ-38 to increase its effectiveness.

↳*Weapon Station #2*

Name: Type 730 CIWS

Type: seven-barrelled 30 mm Gatling gun CIWS.

Caliber: 30mm

Quantity: 2 x Type 730 CIWS Systems

Crew: Automated, with human oversight

Barrels: 7-barrel (Type 730)

Rate of Fire: 1,200-4,200 rounds/minute (Type 730) 11,000 rounds/minute (Type 1130)

Effective Firing Range: 1–1.5 km

Maximum Firing Range: 3 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds Type 730B/C, LD-2000: Two ammunition boxes, each holding 500 rounds (total 1000 rounds) Type 1130: Two ammunition boxes, each holding 640 rounds (total 1280 rounds)

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

Radar: The TR47C radar operates in the same way of AN/APY-1/2 radar on board E-3 Sentry in that the azimuth is scanned mechanically, while the elevation is scanned electronically, incorporating a total of 169 transceivers of phased array technology that enables the radar to pick up the splashes of 30 mm rounds. Like the western CIWS, the information is processed on site, via local computers of the radar and the gun mount, thus providing faster reaction time than the Russian design in which the radar and fire control system are separately located. The system can track a sea-skimming target with 0.1 square metre radar cross section at 8 km, extended to 15 km if the radar cross section is increased to 2 square metres, and further extended to 20 km if the radar cross section is increased to 10 square metres,

though the targets could not be engaged until much closer (3 km) due to the limited range of the gun.

Fire Control System: The OFC-3 system is modular design that comprises a laser range finder, a color TV camera, and an IR camera, and the laser range finder can be replaced by a laser designator (for a laser beam-riding SAM), the TV camera can be replaced by a night vision camera, and the IR camera can be replaced by an ImIR, at higher cost. Development to incorporate the dual band IR, night vision camera, and the color TV camera is reportedly in progress. Type 730 CIWS is an autonomous closed-loop system and thus offers faster reaction time than the Russian AK-630. Type 730 CIWS is fully compatible with Chinese and European combat data systems such as ZKJ-1, ZKJ-4, ZKJ-4A-3, ZKJ-5, ZKJ-6, ZKJ-7, H/ZBJ-1, and Thomson-CSF TAVITAC, and can be directly integrated with these combat data systems without any modification.

↳*Weapon Station #3*

Name: 64 cell VLS (GJB 5860-2006)

Type: Missile Launcher (32 Cells)

Missiles: HHQ-9 SAM YJ-18 SSM CY-5 ASW

Basic Load: INA

Note: GJB 5860-2006 (Chinese: □□□□□□ 5860-2006; pinyin: Guo-jia Jun-yong 5860-2006; literally: 'National Military Standard 5860-2006') is a Chinese military technical standard describing a vertical launching system (VLS) for all types of missiles aboard surface combatants. Cells have a square cross section with 850 millimetres (33 in) sides, and may be 9 m (30 ft), 7 m (23 ft), or 3.3 m (11 ft) deep. Each cell carries one missile; the shortest cell may carry four missiles. Hot and cold launches are supported; hot launching uses the concentric canister launch (CCL) approach with exhaust vents within each launch cell. The first operational implementation is believed to be the VLS aboard the People's Liberation Army Navy's Type 052D destroyer

Torpedoes

Name: Yu-7 torpedo

Type: Torpedos

Quantity: 6 x Yu-7 Torpedos

Length: 2.7 m

Weight: 235 kg

Effective Firing Range: 14.1 km

Warhead Weight: 45 kg (99 lb) shaped charge

Propellant: Otto fuel II

Maximum Depth: 400 m

Speed: 83 km/h

Steering System: CIACIO-S seeker

Launch Platform: Surface ships Helicopters

Aircraft

↳*Z-9 / Ka-27 / Ka-28 Helix*

Quantity: 1-2

Radars

1 x Type 346 multi-function phased-array radar: Type 346 radar is a highly digitized, multi-function, dual-band (S and C

bands) naval active electronically scanned array (AESA) installed on Type 052C destroyers, Type 052D destroyers, Type 055 destroyers and Type 001A aircraft carriers[1] of the PLAN. The radar is named as the Star of the Sea (Hai-Zhi-Xing, □□□) by its developer and it is one of the two competitors for PLAN's SAPARS (Shipborne Active Phased Array Radar System) project/program. Due to its secrecy and lack of information, Type 346 radar has been frequently but erroneously confused with a Chinese fire control radar Type 348, and mistakenly identified as Type 348 by many sources. Furthermore, it is also frequently confused with and misidentified as Sea Lion series C-band phased array radars developed by another design house. Several models in the Type 346 series have been developed. When Star of the Sea was selected as the winner of SAPARS and accepted into Chinese service, it received the Chinese naval designation for the entire radar system as H/LJG-346 or Type 346 for short. The NATO reporting name for Type 346 radar is Dragon Eye.

1 x Type 518 L-band air-surveillance radar: The Type 518 radar is a Chinese high performance L band long range shipboard air surveillance radar. The Type 518 radar may be installed in destroyers or heavy tonnage naval vessels to detect long range high altitude aircraft in adverse natural noise and active electronic jamming environments. The Type 518 have only been installed and deployed on the 2 units of the Luhu class destroyers. It is manufactured and exported by the Nanjing Changjiang Machinery Group Co Ltd. Specifications: *L - band *Wide frequency band, pulse-to-pulse frequency jump *4 phase code pulse compression technology *Low sidelobe super cosecant squared antenna *Counter electronic countermeasure and noise suppression capability *Adaptive MTI filters for noise map and speed map are provided. *Interference analysis and selected transmission technology

Notes:

The LUYANG III incorporates the PLA Navy's first multipurpose vertical launch system, likely capable of launching ASCM, land attack cruise missiles (LACM), surface-to-air missiles (SAM), and anti-submarine rockets. One source reported that "Type 052D DDG ... will be a 10,000 ton destroyer, upgraded version of the Type 052C, with up to 96 VLS launchers and 128 YJ-12 anti ship missiles. Construction is expected in 2012. This will be the main surface combatant of the future PLA Navy." At least one Chinese source of uncertain reliability predicted the Type 052D would have a vertical launch system with a a total of 96 new missile interceptors [16 VLS system with six VLS with 96 VLS cells] , and eight new Eagle 12e anti-ship cruise missiles with a range of about 180-240 km. The ship was projected to have a top speed of 32 knots, and an endurance of 14,000 nautical miles. The ship was projected to have a light displacement of 9500 tons, and a full load displacement of 12,000 tons. The length was reported as 180 meters, a beam of 20 meters, and a draft of 6.5 meters. Even if these specifications were little more than wishful thinking, they are indicative of an expectation that China would eventually deploy a locally designed surface combatant with a displacement of about 10,000 tons, significantly larger than the 7,000 tons of the Type 052. Whether the Type 052D is this vessel, or whether something larger remains in the wings, remained unclear. Type 052D "Red Aegis" improvements over Type 052C destroyer Larger main gun: 130 mm vs. 100 mm More secure communication: Chinese Link 16 vs. Link 11/TADIL-A equivalent Larger and more advanced phased array radar: Flat AESA vs. Convex AESA radar More numerous and versatile VLS (vertical launch system): 64 versatile VLS cells vs. 48 AAW VLS cells The new destroyers are equipped with two 32-unit vertical launch systems capable of launching HQ-9B air-defense missiles, anti-ship and anti-submarine missiles. The original YJ-62 missile launchers used on the Type 052C do not appear to be present on the new destroyer. It has been speculated that the Type 052D could be equipped with a naval-style version of the DH-10 land-attack cruise missile. The new-type guided missile destroyer "Kunming" was delivered and commissioned to the Navy of the Chinese People's Liberation Army (PLAN) on 21 March 2014. The "Kunming" with hull number 172, is the new generation of China-made guided missile destroyers. It has strong capacity in air defense and naval warfare. The layout of the 052D destroyer is similar to that of the earlier 052C, but the superstructure of the 052D slopes inward at a greater angle, providing reduced radar cross-section. Some analysts have said that the overall performance of 052D destroyers is superior to that of Japan's Atago-class destroyers, South Korea's Sejong the Great-class destroyers and the U.S. Navy's Arleigh Burke-class destroyers. But compared with Arleigh Burke-class destroyers, China's type 052D destroyers are inferior in terms of quantity, displacement and ship-based guided missiles. China needs to build larger models, including a 10,000-ton guided-missile destroyer. Furthermore, the country needs an increase in the quantity of guided-missile destroyers, as China will build more aircraft carriers in the future. Since China does not currently have cruisers, larger guided-missile destroyers are needed to play the role of cruisers. Type 052D, the first of which commissioned in 2014, is a newer design than the DDG-57 Arleigh Burke, but both vessels are very good looking and capable. However, there are characteristics of the Burke IIA that are noteworthy and important, despite aesthetics. The Burke IIA has 96 VLS cells the Type 052D has 64. The Burke IIA carries two helicopters, the Type 052D carries one. The slope on the side panels of the Burke IIA provide better radar dispersion, because they are sloped more, particularly above the main deck, and also with the "raked" mast. The bow Sonar on the Burke IIA is much more powerful than that on the Type 052D. The wider beam on the Burke IIA allows for better handling, particularly in rough sea states. The AEGIS system and cooperative engagement capabilities on the Burke IIA are very well known, understood, and proven. The effectiveness of the new APARs and the combat system on the Type 052D remain unknown. About 160 meters long and with a beam of 18 meters [versus 157 and 18 meters for the DDG-51], the Type 052D is slightly larger than its predecessor, the Type 052C, and is believed to displace slightly over 6,000-7,000 tons [rather less than the 9,200 ton Arleigh Burke]. The vessel uses the Type 346 Active Phased Array Radar System and a Type 518 L-band long-range radar. The main 100mm gun on the Type 052C, which was reportedly unreliable, has been replaced by a new PJ-38 130mm gun. The vessel also has a helicopter-landing platform [and probably a hangar for two helicopters, as the Type 52C] and the Chinese Type 730 counterpart to the US Close-In Weapon System. The 130 mm gun was developed by the Institute of Mechanical and Electrical Engineering of Zhengzhou (Zhengzhou 713 Institute), and produced by by the 2nd Machinery Factory (Baotou,Inner Mongolia). The original design used a single tube

dual link ammunition handling and water-cooled systems; the barrel length (with breech) is 70 calibers. Using fully automatic loading gear teh gun has a rate of fire 40 rounds / minute. The range of non-guided shells is about 30 kilometers. The entire gun has a weight (excluding peripherals) greater than 50 tonnes, including the stealth housing. The design of this gun is thought to be based on the proven technologies of the Russian AK-130 130 mm twin-barrel gun, mainly the mechanical design, which is a weak element in Chinese ship-borne guns. The gun electrical control and aiming servo system are dependent on a new localization design. One of the most moving episodes in the Chinese blockbuster Wolf Warrior 2 is the one in which the captain of a Type 052D guided-missile destroyer shouts "Fire!" to order the launch of supersonic cruise missiles to hit rebel troops in an imaginary African nation holding Chinese hostages. However, this scenario could not have happened in real life because in the Gulf of Aden there have been no Type 052D destroyers-now considered the most capable combat ship in the People's Liberation Army Navy. Instead, the Navy has sent other vessels to the once pirate-plagued waters to protect civilian vessels for nearly 11 years. That changed as the Navy decided to dispatch a Type 052D to take part in its latest escort mission. The CNS Xining, the fifth in the Type 052D class, sailed toward the Gulf of Aden in August 2019.

Almirante Brown Class Argentinian Guided Missile Destroyer





Tiers:



Variants:

- **Almirante Brown:** Commissioned: 1983 Status: Active
- **La Argentina:** Commissioned: 1983 Status: Active
- **Heroína:** Commissioned: 1983 Status: Active
- **Sarandí:** Commissioned: 1984 Status: Active

System

Alternative Designation: Almirante Brown Class
Total Built: 4 ships total
Type: Destroyer
Builder: Blohm+Voss
In Service: 1983-Present
Crew: 200 (26 off. + 174 enl.)

Dimensions

Length, Overall: 125.9 m
Length, Perpendiculars: 119.0 m
Beam: 14.0 m
Draft, Hull: 4.3 m
Draft Sonar: 5.8 m
Displacement, Standard: 2,947 tons
Displacement, Full Load: 3,667 tons

Propulsion System

Engine Name: 2 x Olympus type TM3B gas turbines
Engine Power: 25,800 shp each
Propellers: 2 x Escher-Wyss controllable-pitch propellers
Maximum Range: 4,500 nm at 18 kts

Maximum Speed: 31 knots

Endurance: INA

Missile System

↳*Missile System #1*

Name: Quad MM-40 Exocet

Type: Anti-Ship Missile

Quantity: 2 x Quad MM-40 Exocet SSM launchers

Launcher: SSM Launcher

Missile: Exocet

Basic Load: 2

Length: 6 m

Diameter: 34.8 cm

Wingspan: 1.35 m

Weight: 780 kh

Warhead: 165 kg

Engine: solid propellant engine turbojet (MM40 Block 3 version)

Operational Range: 180 km

Flight Altitude: Sea-skimming

Speed: Mach 0.93

Guidance System: Inertial guidance and terminal active radar homing

Launch Platforms: MM38 surface-launched; AM39 air-launched; SM39 submarine-launched; MM40 surface-launched

↳*Missile System #2*

Name: Albatros (Mark 29)

Type: Surface-to-Air Missile

Quantity: 1 x Albatros (Mark 29) 8-cell launcher for Aspide SAM

Launcher: 8-cell launcher

Missile: Albatros (Mark 29) Missile

In Service: 1973-Present

Proliferation: Over 30 countries

Length: 3.72 m

Diameter: 234 mm

Wingspan: 80 cm

Weight: 220 kg

Speed: 4520 km/h (mach 3.7)

Effective Firing Range: 25 km

Warhead: 35 kg warhead

Gun Weapon System

↳*Gun Weapon System #1*

Name: Otobreda 127/54 Compact

Type: The Otobreda 127mm/54 Compact (127/54C) gun is a dual purpose naval artillery piece built by the Italian company Oto Melara. It uses the 127mm round which is also used in the 5 inch/ 54 gun, albeit that this gun calibre is measured in United States customary units rather than metric.

Caliber: 127mm

Quantity: 1 x 127-mm/54-cal Oto Melara DP

In Service: 1992-Present

Proliferation: Currently the gun is still in use by navies around the world but it is slowly being replaced by the Otobreda 127/64 for new vessels, such as the German Navy's F125-class frigate and Italian Navy's FREMM.

Length: INA

Weight: INA

Crew: Remote Control

Loading System: The gun uses an automatic loading system where 66 127mm rounds of various kinds can be stored ready-to-fire in three loader drums (each holding 22 rounds).

Elevation: −15°/+83°

Traverse: deg360

Rate of Fire: 40 rounds/min

Effective Firing Range: ±30 km (100 km with guided VULCANO ammunition)

Feed System: Magazine capacity: 66 ready rounds

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm127

Basic Load: INA

↳*Gun Weapon System #2*

Name: Bofors 40mm Gun

Type: Anti-Aircraft Gun

Caliber: 40mm

Quantity: 4 x twin 40-mm/70-cal Breda/Bofors AA Systems

Length: 6.5 m

Barrel Length: 2.2 m

Width: 1.8 m

Height: 1.9 m

Weight: 1,981 kg

Crew: 4

Elevation: −5°/+90°

Traverse: deg360

Rate of Fire: 120 round/min

Muzzle Velocity: 881 m/s

Maximum Firing Range: 7,160 m

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 40mm

Shell: Complete round: L/43 40×311mmR L/60 40×311mmR L/70 40×365mmR

Shell Weight: 0.9 kg (2 lb 0 oz)

Basic Load: INA

↳*Gun Weapon System #3*

Name: Oerlikon 20

Type: Autocannon

Caliber: 20mm

Quantity: 2 x Oerlikon 20mm Stations

Barrel Length: 2,210 mm

Weight: 68.04 kg

Barrels: Single barrel (progressive RH parabolic twist, 9 grooves)

Action: API blowback

Elevation: Manual training, typically able to depress to -15° and elevate to +90°

Traverse: Manual training, full 360°

Rate of Fire: Cyclic: 450 rounds per minute Practical: 250-320 rounds per minute

Muzzle Velocity: 820 m/s

Maximum Firing Range: HE round at 45° L70: 4,389 m (4,800 yd)

Effective Firing Range: Against low-flying aircraft (HE round) L70: 914 m (1,000 yd)

Feed System: Cylindrical magazine holding 60 rounds, Later adjusted to be a belt fed gun

↳*Ammunition Gun Weapon System #3*

Type: Rifle HE

Caliber: 20mm

Shell: 20×110mmRB

Shell Weight: 123 g

Basic Load: INA

Onboard Aviation Facilities

Facilities: Helicopter deck and hangar

Helicopters: 1 x AS-355M Fennec or SH-3D Sea King

Fire Control

FCS #1: 1 x Thales WM-25 track-while-scan for missiles

FCS #2: 1 x Thales STIR fire control

FCS #3: 2 x Thales LIROD radar/optronic GFCS control the 40-mm guns

Sonar Systems

Sonar System: 1 x STN Atlas-Elektronik KAE-80 (DSQS-21BZ) hull-mounted, medium-frequency

Radar Systems

Air and Surface Radar: 1 x Thales DA-08A air/surface search

Surface Radar: 1 x Thales ZW-06 surface search

Navigation Radar: 1 x Racal-Decca 1226 navigation

Protection

Active Protection System: Yes

Electronic Warfare Intercept: 1 x Racal Rapids intercept

Electronic Warfare Jammer: 1 x Racal Scimitar jammer

Decoy System #1: 1 x Graseby G1738 towed torpedo decoy

Decoy System #2: 2 x 20-round Oto Melara 105-mm SCLAR decoy rocket launchers

Decoy System #3: 1 x CSEE Dagaie double mounting decoy launcher

ASW Weapon System: 2 x depth charge racks [10 Mk 9 depth charges carried]

Notes:

The Almirante Brown class is a class (MEKO 360H2 type) of warships built in Germany for the Argentine Navy. They were commissioned between 1983 and 1984, after the Falklands War. The class comprises four ships; Almirante Brown, La Argentina, Heroína and Sarandí. They are classified as either frigates or destroyers by different publications. The MEKO 360 type warships are based on modular designs which allow quick changes to the vessel's armaments depending on mission requirements. The modular nature of the construction also allows the ships to be modernized or refitted with greater ease. Six vessels were initially ordered, however two ships were cancelled and replaced with orders for MEKO 140 type hulls. Ordered in 1979, construction of the ships was delayed as the British turbines were embargoed after the Falklands War. Furthermore, the acquisition of helicopters for the vessels has seen many incarnations. They were initially intended to be equipped with Westland Lynx helicopters, but the order was cancelled in 1982. The planned replacement Agusta-Bell AB 212 helicopters were not funded and instead, all of the Almirante Brown class deploy with AS 555 Fennec, while only La Argentina and Sarandí can employ SH-3D Sea King helicopters. Almirante Brown took part in Gulf War operations in 1990. All of the ships can be used as flagships. Six vessels were ordered and four vessels of a second variant, MEKO 360H2, were constructed for Argentina. They were locally named the Almirante Brown class. They are considered frigates and destroyers by different publications. The design is based on the concept of modular systems and is capable of changing the armament of the ship swiftly and can be modernized/refitted with more ease. Each ship is capable of being used as a flagship. The ships have a standard displacement of 2,900 long tons (2,900 t) and 3,360 long tons (3,410 t) at full load. The vessels are 125.9 metres (413 ft 1 in) long overall and 119.0 metres (390 ft 5 in) between perpendiculars with a beam of 15 metres (49 ft 3 in) and a draught of 5.8 metres (19 ft

0 in). The vessels are powered by a COGOG system driving two shafts composed of two Olympus TM 3B gas turbines rated at 51,800 shaft horsepower (38,600 kW) and two Tyne RM-IC gas turbines rated at 10,200 shaft horsepower (7,600 kW). The ships have a maximum speed of 30.5 knots (56.5 km/h; 35.1 mph) while using their Olympus gas turbines at 18 knots (33 km/h; 21 mph) using their Tyne turbines. The MEKOs have a maximum range of 4,500 nautical miles (8,300 km; 5,200 mi) at 18 knots. The Argentinian vessels are armed with eight Exocet surface-to-surface missiles in two quad launchers mounted centrally and one octuple launcher for Aspide surface-to-air missiles mounted aft of the superstructure. The MEKO 360H2 are also equipped with one OTO Melara 5-inch (127 mm)/54 calibre naval gun forward of the superstructure, eight Bofors 40 mm/70 calibre guns, and two triple-mounted 324 mm (13 in) ILAS torpedo tubes. The ships are equipped with a Graseby G1738 towed decoy countermeasure system, two Breda 105 mm (4 in) SCLAR chaff rocket launchers with each launcher sporting 20 tubes. For electronic support measures, the vessels are armed with the Sphinx system and the Scimitar system for electronic countermeasures. The class is equipped with two Signaal DA08A air/surface search radar operating on the F band and Signaal ZW06 surface search radar operating on I band. They have Decca 1226 navigational radar operating on the I band and their fire control systems are controlled by the Signaal SEWACO Link 10/11 system supported by Signaal STIR radar operating on the I/J and K bands, Signaal WM25 operating on I and J band, along with LIRODA radar systems that control the 40 mm gun mounts. For sub-surface search, the vessels have Atlas Elektronik 80 hull-mounted active search sonar. All of the Almirante Brown class are equipped with a helicopter deck and hangar. They all deploy with AS 555 Fennec helicopters, while only La Argentina and Sarandí can employ SH-3D Sea King helicopters. The ships have a complement of 200, including 26 officers.

Type 051G (Luda III Class) Chinese Destroyer



Tiers:

1 2 **3** 4

Variants:

- **Zhanjiang:** Commissioned: 1991 Fleet: South Sea Fleet
- **Zhuhai:** Commissioned: 1991 Fleet: South Sea Fleet

System

Alternative Designation: Type 051G; Luda III Class
Total Built: Only two vessels the Zhanjiang and the Zhuhai
Type: Destroyer
Builder: Luda Shipyard Zhonghua Shipyard Dalian Shipyard
In Service: 1991-Present
Crew: 280

Dimensions

Length: 132 m
Beam: 12.8 m
Draft: 4.6 m
Displacement, Full Load: 3,670 tons

Propulsion System

Engine Name: INA
Engine Type: 2 steam turbines
Engine Power: 72,000 shp (53,700 kW)
Maximum Range: 2,970 miles
Maximum Speed: 32 knots (59 km/h)
Endurance: INA

Gun Weapon Systems

↳*Gun Weapon System #1: System*

Name: Canon de 100mm

Type: Naval Gun

Caliber: mm100

Manufacturer: GIAT

Length: INA

Barrel Length: 55 calibres

Weight: 22 metric tons

Crew: 2 (modèle 68) ; later version entirely automatic

Elevation: 29°/s

Traverse: 40°/s

Rate of Fire: 78 round/min

Muzzle Velocity: 870 m/s

Effective Firing Range: 17,000 m (elevation 40°) Maximum practical range: 6,000 m against aerial targets 12,000 m against surface targets

↳*Gun Weapon System #1: Ammunition*

Type: Rifle

Caliber: mm100

Shell: 100 x 700mm .R

Basic Load: INA

↳*Gun Weapon System #2: System*

Name: DARDO

Type: Close-In Weapon System (CIWS)

Quantity: 1 x DARDO Close-In Weapon System (CIWS)

Length: INA

Diameter: Mount ring: 1.7 m (5 ft 7 in) Working circle: 2.902 m (9 ft 6.3 in)

Height: Enclosed turret: 2.4 m (7 ft 10 in) Type A mount: 1.3 m (4 ft 3 in) Type B mount: 0.92 m (3 ft 0 in)

Weight: Complete gun mount (less ammo): 5,500 kg (12,100 lb) Complete round (HE): 4.05 kg (8.9 lb)

Barrels: 2 × Breda-built Bofors-40 mm L/70

Elevation: Minimum −13° Maximum +85° speed: 60°/s (70°/s Fast Forty)

Traverse: Full 360° traverse, speed: 90°/s (100°/s Fast Forty)

Rate of Fire: 2 × 300 round/min 2 × 450 round/min (Fast Forty)

Maximum Firing Range: AA with HE: 8,700 m (9,500 yd)

Effective Firing Range: HE round: 4,000 m (4,400 yd)

Feed System: Magazine: 736 HE rounds (444 Type B mount) Dual feed mechanism with 736 HE and 200 APFSDS rounds (Fast Forty)

↳*Gun Weapon System #2: Ammunition*

Type: Rifle
Caliber: mm40
Shell: INA
Basic Load: INA

Missile Weapon Systems

↳*Missile Weapon Systems #1: Missile Launcher*

Name: YJ-8 Launchers
Type: Missile Launcher
Quantity: 4 x twin YJ-8 Launchers

↳*Missile Weapon Systems #1: Missile*

Type: YJ-8 Missile
Type: Surface-launched subsonic anti-ship cruise missile.
Length: 5.81 m
Weight: 815 kg
Warhead Weight: 165 kg
Engine: Rocket
Propellant: Solid Rocket
Operational Range: 42 km
Flight Altitude: 5-7 m
Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Missile Weapon Systems #2: Missile Launcher*

Name: HQ-7 SAM Launcher
Type: Missile Launcher
Elevation: INA
Traverse: INA
Radar: Type 360S E/F-band Doppler radar
Radar Detection Range: 18.4 km
Combat Management System: ZJK-4 (Thomson-CSF TAVITAC) combat management system.
Note: The system is capable of processing up to 30 targets, and tracking 12 targets simultaneously.

↳*Missile Weapon Systems #2: Missile*

Name: HQ-7

Type: Short-range air defense missile.

Length: 3 m

Diameter: 0.156 m

Wingspan: 0.55 m

Weight: 84.5 kg

Operating Altitude: 30–5,000 m

Maximum Operating Range: 12 km

Minimum Operating Range: 500 m

Speed: Mach 2.3 (750 m/s)

Guidance System: Command + electro-optical tracking

Warhead: HE-FRAG with proximity fuse

Torpedo Weapon Systems

↳*Torpedo Launcher*

Name: Yu-7 Torpedo Tubes

Quantity: INA

↳*Torpedo*

Name: Yu-7 torpedo

Type: Torpedo

Length: 2.7 m

Diameter: 324 mm

Weight: 235 kg

Warhead: high explosive

Warhead Weight: 45 kg

Effective Firing Range: 14.1 km

Propellant: Otto fuel II

Maximum Depth: 400 m

Speed: >45 kn (83 km/h)

Guidance System: active / passive acoustic homing

Steering System: CIACIO-S seeker

Onboard Aviation Facilities

Aviation Facilities: No

Aircraft Carried: No

Fire Control System

FCS Name: INA

Computerized FCS: See Weapon Systems

Combat Data System #1: ZKG-4A

Combat Data System #2: ZKG-4B

Radar Systems

Name: Type 354 radar

Type: 3-D air and surface search radar

Alternate Designation: MX902 H/LJQ-354

Proliferation: Type 354 Radars are one of the most widely deployed air and surface search naval radars in Chinese service. The Type 354 was predominantly found on major People's Liberation Army Navy (PLAN) surface combatants such as the Luda class destroyer and Jianghu class frigate in the 1980s and 1990s. By 2006 it was slowly being replaced in favour of the Type 360 radar, which in turn, itself being replaced by Type 364 radar for new vessels.

Frequency: G/H band

Beam: 1.2 × 5 deg

Pulse Width: 4 µs

Polarisation: linear

Beam width: 1.20 (horizontal); 1.30 (vertical)

PRF: 400 or 800 Hz

Scan Rate: 4–10 rpm

Resolution: 800 m (range); 1.30 (azimuth)

Range: more than 93 km on aircraft with RCS of 10 m2

Sonar Systems

Search Sonar: DUBV-23 search sonar

Depth Sonar: DUBV-43 variable depth sonar (VDS)

Protection

Active Protection System: See Weapon Systems

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

Type 051G The Type 051G was an improved variant that the last two ships, Zhanjiang and Zhuhai, were completed to. They were equipped with Type 354 3-D air and surface search radar. Four twin YJ-8 launchers replaced the HY-1/HY-2 launchers. The Soviet sonar was replaced by French DUBV-23 search sonar and DUBV-43 variable depth sonar (VDS). Zhuhai was modified in 1999. The Soviet 130 mm guns were replaced by 100 mm (4 in) guns, derived from French Creusot-Loire Compact, with automated reloaders. An HQ-7 SAM launcher replaced the "X" turret, as on the Type 051DT. Zhuhai was similarly modified. Zhanjiang and Zhuhai were equipped with the ZKG-4A and ZKG-4B combat data systems respectively. The Type 051G was also the first Chinese ship to deploy the YU-7 lightweight torpedo, and the Italian 40 mm (1.6 in) anti-aircraft gun. The Type 051G was part of the Luda III class[10], and later the Luda IV class. Note: There are no longer any Type 051 Class, Luda II Class, Type 051D Class, Type 051Z Class, or Type 051DT Class Chinese Destroyers left in active service.

Sovremenny Class (Project 956 Sarych) Russian Guided Missile Destroyer







Tiers:



Variants:

- **BOYEVOY:** Commissioned: 1986 Status: Active
- **BURNYY:** Commissioned: 1988 Status:Active
- **GREMYASHCHY:** Commissioned: 1989 Status: Refit
- **BYSTRYY:** Commissioned: 1989 Status: Active
- **RASTOROPNY:** Commissioned: 1989 Status: Non-operational
- **BEZBOYAZNENNYY:** Commissioned: 1990 Status: Refit
- **BEZURDERZHANNY:** Commissioned: 1989 Status: Active

System

Alternative Designation: Sovremenny Class; Project 956 Sarych
Type: Guided Missile Destroyer
Builder: Zhdanov Shipyard
Crew: 296 (25 off. + 271 enl.)
Accomodation: 368 (38 off. + 330 enl.)

Dimensions

Length: 156.4 m
Beam: 17.2 m
Draft: 7.9 m
Displacement, Light: 6,500 tons
Displacement, Standard: 7,940 tons
Displacement, Full Load: 8,480 tons

Propulsion System

Engine Name: 2 x TV-12
Engine Type: Geared Steam Turbines
Engine Power: 110,000 total shp
Boiler: 4 x turbo pressurised Type KVN-98/64, 640 kg/sq cm, 500 deg Celsius
Fuel Capacity: 1,740 tons + 5 tons aviation
Maximum Range: 1,345 nm at 32.7 kts, 3,920 nm at 18 kts
Maximum Speed: 63 km/h (34 knots)
Endurance: 30 days

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-630
Type: Naval Close-In Weapon System
Caliber: 30mm
Quantity: 4 x 30-mm/65 cal. (AK-630M) Gatling CIWS
Length: INA
Barrel Length: 1,629 mm
Width: 1,240 mm
Height: 1,070 mm
Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630); External nodes: 800 kg (1,800 lb) (AK-630); 2000 rounds in belt: 1,918 kg (4,228 lb)
Crew: 1
Action: Gas-operated rotary cannon
Elevation: +88° ... -12° (50°/sec)
Traverse: ±180° (70°/sec)
Rate of Fire: 4,000–5,000 rounds/min
Muzzle Velocity: 880–900 m/s
Maximum Firing Range: the projectiles self-destruct past 5,000 m
Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)
Feed System: Belt: 2,000 rounds
Sights: Radar / TV-optical

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle
Caliber: mm30
Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 16,000

↳*Gun Weapon System #2*

Name: AK-130

Type: Automatic Naval Cannon

Caliber: 130mm

Quantity: 2 x twin 130-mm/70 cal. (AK-130) DP guns

Length: 9100 mm

Barrel Length: INA

Weight: INA

Elevation: 85 degrees

Traverse: 360 degrees

Rate of Fire: 35 RPM

Maximum Firing Range: 23,000 m (surface targets) 15,000 m (aircraft) 8,000 m (missiles)

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 130mm

Cartridge: INA

Basic Load: 2,000 Rounds

Missile Weapon System

↳*Missile #1*

Name: SS-N-22 Sunburn

Type: Anti-Ship Missile

Launcher: 2 x quad P-270 Moskit SSM missile launchers

Note: SS-N-22 Sunburn is the NATO reporting name for two unrelated Soviet anti-ship missiles. Although the missiles were very different, distinguishing between them is difficult because their ship-mounted launching containers were identical. Confusion was exacerbated by the Soviet practice of mixing missile types within a class of ships. It was therefore not confirmed that the "SS-N-22" actually referenced two different missiles until after the fall of the Soviet Union.

↳*Missile #2*

Name: SA-N-7 Gadfly

Type: Surface-to-Air Missile (SAM)

Launcher: 2 x ZR-90 Uragan (SA-N-7) type MS-196 SAM missile launchers

Length: 5.55 m

Diameter: 0.40 m

Wingspan: 1.20 m

Weight: 690 kg

Engine: 1 x solid-fuel rocket

Maximum Range: 30 km

Maximum Speed: 3,680 kph, Mach 3

Maximum Altitude: 15,000 m

Minimum Altitude: 25-30 m

Maximum Load: 23 g

Sensors/Electronics: Front Dome (Orekh) H/I-band radar, said to be capable of illuminating an individual target once it is designated by D/E/F-band air search radars and associated digital computers

Torpedoes

Torpedo Tubes: 2 x twin 533-mm type DTA-53 tubes

Torpedos: INA

Basic Load: INA

Fire Control Systems

SA-N-7 Missile FCS: 6 x OP-3 (Front Dome**) fire control for SA-N-7 missiles

AK-130 Gun FCS: 1 x MR-184M Lev (Kite Screech**) fire control for 130-mm guns

AK-630 Gun FCS: 2 x MR-123 Vympel (Bass Tilt**) fire control for 30-mm CIWS

SS-N-22 Missile FCS: 1 x Mineral (Band Stand**) surface target and designation for the SS-N-22

Laser Rangfinder: 1 x Squeeze Box optronic director with laser range finder

Aircraft

Helicopters: 1 x Kamov Helix-A(Ka-27PL)** ASW; or 1 x Helix-A (Ka-27RT) targeting type

ASW Weapons

Launcher: 2 x 6-round RBU-1000 rocket launchers

Rocket Name: RGB-10

Basic Load: 48

Mines

Launcher: 2 x mine rails fitted

Mine Name: INA

Basic Load: 40

Radar Systems

3-D Air Search Radar: 1 x MR-760MA Fregat-MA (Top Plate**) 3-D air search

Navigation Radar: 3 x MR-212/201 Vaygach-U (Palm Frond**) navigation

Sonar Systems

Name: 1 x MGK-335MS Platina-S (Bull Horn**)

Type: Medium-Frequency, Hull Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: 8 x 10-tubed PK-10 fixed decoy launchers (all except BOYEVOY: none)

NBC Water Washdown System: Yes

Electronic Warfare: 2 x MP-405M Start-2 or MR-401 intercept system; 2 x MRP-11M/12M (Bell Shroud**); 2 x Bell Squat**; 4 x Foot Ball-B**

Jamming System: 1 x MR-407 jamming system

Notes:

The Sovremenny class, Soviet designation Project 956 Sarych (buzzard), is a class of anti-ship and anti-aircraft guided missile destroyers of the Soviet and later Russian Navy. The ships are named after qualities, with "Sovremenny" translating as "modern" or "contemporary". Most of the ships have been retired from active service and one converted into a museum ship in 2018, but several remain in commission with the Russian Navy. Four modified ships were delivered to the People's Liberation Army Navy, and remain in service. The Sovremenny class were guided missile destroyers, primarily tasked with anti-ship warfare, while also providing sea and air defense for warships and transports under escort. The class was designed to complement the Udaloy-class destroyers, which were fitted primarily for anti-submarine operations. The ship's combat systems can use target designation data from the ship's active and passive sensors, from other ships in the fleet, from surveillance aircraft or via a communications link from the ship's helicopter. The multi-channel defence suite is capable of striking several targets simultaneously.

Hobart Class Australian Destroyer



Tiers:



Variants:

- **Hobart:** Commissioned: 2015 Status: Active
- **Brisbane:** Commissioned: 2016 Status:Active
- **Sydney:** Commissioned: 2020 Status: Sea Trials

System

Alternative Designation: Hobart Class
Date of Introduction: 2015
Total Built: 3 ships built
Type: Destroyer
Builder: Navantia (designer) AWD Alliance (project coordinator) ASC (primary shipbuilder) Forgacs Group and BAE Systems Australia (module builders)
In Service: 2015-Present
Crew: 186 + 16 aircrew Accommodation for 234

Dimensions

Length, Overall: 146.7 m
Length, Perpendiculars: 133.2 m
Beam: 18.6 m
Draft: 7.2 m
Displacement, Full Load: 7,000 tons

Propulsion System

Diesel Engine Name: 2 x Bazan/Caterpillar diesels
Diesel Engine Power: 12,240 hp sustained
Gas Turbine Engine Names: 2 x GE LM 2500 gas turbines
Gas Turbine Engine Power: 47,328 hp sustained
Shafts: 2

Propellers: controllable-pitch propellers

Range: 5,000 nm (5,750 mi, 9,260 km) at 18 knots

Speed: 28 knots (32 mph, 52 km/h)

Communcations

Sataliete Communications: 1 x MBS-567A COMINT system

Missile Systems

↳*Missile System #1*

Name: Mk 41 Vertical Launch Systems

Type: Surface-to-Air Missile

Quantity: 48 x Mk 41 vertical launch systems

Missile Name (Primary Missile): SM-2MR

Missile Type: Surface-to-Air Missile

SM-2MR Missile Basic Load: 32

SM-2MR Missile Range: 167 km

SM-2MR Missile Speed: Mach 3

Missile Name (Secondary Missile): RIM-7 Sea Sparrow

Missile Type: Surface-to-Air Missile

RIM-7 Sea Sparrow Basic Load: 64

RIM-7 Sea Sparrow Range: 14.8 km

RIM-7 Sea Sparrow Speed: Mach 2.5

↳*Missile System #2*

Name: Quad RGM-84L Harpoon

Type: Anti-Ship Missile

Launcher: 2 x quad RGM-84L Harpoon launchers

Basic Load: 8 Harpoon Block II missiles carried

Length: 3.90 m

Diameter: 340 mm

Wingspan: 0.91 m

Weight: 531.6 kg

Range: 139-148 km

Speed: Mach 0.85

Warhead: Conventional high-explosive with some penetration capability

Warhead Weight: 227 kg

Sensors: short-pulse radar Kollsman frequency-modulated continuous wave altimeter Texas Instruments PR-53/DSQ-28 monopulse frequency-agile, jittered pulse repetition frequency active radar homing seeker switched on at pre-planned

point
Guidance System: on-board Midcourse Guidance Unit (MGU)-IBM digital computer Smiths Industries three-axis ARA Honeywell AN/APN-194
Targeting: HCLS provides targeting data; no updates once missile is launched.

Gun Weapon System

↳*Gun Weapon System #1*

Name: Mk 45 Naval Gun
Type: Naval Gun
Caliber: 127mm
Quantity: 1 x FMC 127-mm/62-cal Mk 45 Mod 2
Length: 6.86 m
Barrel Length: 6.858 m
Weight: 22,226.00 kg
Crew: 6 (gun captain, panel operator, 4 ammunition loaders, all below decks)
Elevation: −15° to +65°
Traverse: ±170° from centerline Max. traversing rate: 30°/s[
Rate of Fire: 16–20 rounds per minute automatic
Muzzle Velocity: 762.0 m/s
Effective Firing Range: 24.1 km
Feed System: 600 rounds

↳*Ammunition Gun Weapon System #1*

Type: Rfile
Caliber: mm127
Shell: 31.75 kg
Basic Load: INA

↳*Gun Weapon System #2*

Name: Typhoon Weapon Station
Type: Remote Weapon Station
Caliber: 25mm
Quantity: 2 x Rafael 25mm/75-cal Mk 25 Typhoon-G RWS
Barrel Length: INA
Weight: 1,000 kg
Elevation: -20 deg to 45 deg
Traverse: +/-160 deg

Muzzle Velocity: INA

Effective Firing Range: INA

Sensors: CCD/ICCD/FLIR

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 25mm

Basic Load: INA

↳*Gun Weapon System #3*

Name: Mk 15 Phalanx CIWS

Type: Close-In Weapon System

Caliber: 20mm

Quantity: 2 x Raytheon 20-mm Mk 15 Phalanx Block 2B CIWS

Barrel Length: 1,500 mm

Height: 4.7 m

Weight: 5,700 kg

Crew: Automated, with human oversight

Barrels: 6-barrel (progressive RH parabolic twist, 9 grooves)

Elevation: −10°/+80°

Traverse: 150° from either side of centerline (Rate of traverse: 100°/sec

Rate of Fire: 3,000 rounds/minute

Maximum Firing Range: 3.5 km

Effective Firing Range: Classified

Muzzle Velocity: 1,100 m/s

Guidance System: Ku-band radar and FLIR

↳*Ammuntion Gun Weapon System #3*

Type: Rifle

Caliber: 20mm

Shell: • Naval: Armor-piercing tungsten penetrator rounds with discarding sabots. • Land: High-Explosive Incendiary Tracer, Self-Destruct.

Basic Load: INA

Torpedo Weapon System

Torpedo Tubes: Triple 323mm Mk 32 Mod 9

Quantity: 2 x Triple 323mm Mk 32 Mod 9 fixed launchers Systems

Torpedo Name: MU90 Impact

Torpedo Type: Anti-Submarine Torpedo

Length: 2.85 m

Diameter: 323.7 mm

Weight: 304 kg

Warhead: PBX shaped charge warhead

Warhead Weight: 32.7 kg

Engine: Pump-jet Electric

Operational Range: >10 km (5.4 nmi) (max speed) >23 km (12 nmi) (min speed)

Maximum Depth: >1000 m

Speed: 29 kn (54 km/h) to well over 50 kn (93 km/h)

Guidance System: Active or passive acoustic homing

Onboard Aviation Facilities

Helicopters: 1 x MH-60R helicopter

Fire Control

Combat Management System: 1 x Lockheed Martin Aegis Baseline 7.1; Link 11/16; AN/USG-7B Cooperative Engagement Capability

Sonar Systems

Sonar System: 1 x Ultra integrated sonar suite w/Type 2150 hull-mounted and VDS w/torpedo detection

Radar Systems

Air and Surface Radar: 1 x AN/SPY-1D(V) Aegis air/surface search

Surface Radar: 1 x Northrop Grumman AN/SPQ-9B surface search

Target Radar: 3 x Raytheon SPG-62 target illuminators

Navigation Radar: 2 x L3 Radarpilot 1100 navigation

Protection

Active Protection System: Yes

EO System #1: 1 x Mk 20 EOSS

EO System #2: 2 x Sagem VAMPIR IRST

EO System #3: 2 x Ultra 2500 EO tracking systems

Electronic Warfare: 1 x ITT ES-3701 ESM and surveillance system

Decoy System #1: 4 x Mk 169 Nulka decoy launchers

Decoy System #2: 4 x Terma Mk 137 C-Guard decoy launchers for SRBOC/NATO Sea Gnat

Decoy System #3: LESCUT torpedo decoys (Basic Load: INA)

Decoy System #4: SLQ-25 Nixie torpedo countermeasures (Basic Load: INA)

Notes:

The Hobart class is a ship class of three air warfare destroyers (AWDs) being built for the Royal Australian Navy (RAN). Planning for ships to replace the Adelaide-class frigates and restore the capability last exhibited by the Perth-class destroyers began by 2000, initially under acquisition project SEA 1400, which was re-designated SEA 4000. Although the designation "Air Warfare Destroyer" is used to describe ships dedicated to the defence of a naval force (plus assets ashore) from aircraft and missile attack, the planned Australian destroyers are expected to also operate in anti-surface, anti-submarine, and naval gunfire support roles. Planning for the Australian Air Warfare Destroyer (as the class was known until 2006) continued through the mid-2000s, with the selection of the Aegis combat system as the intended combat system and ASC as the primary shipbuilder in 2005. In late 2005, the AWD Alliance was formed as a consortium of the Defence Materiel Organisation (DMO), ASC, and Raytheon. Between 2005 and 2007, Gibbs & Cox's Evolved Arleigh Burke-class destroyer concept and Navantia's Álvaro de Bazán-class frigate competed for selection as the AWD design. Although the Arleigh Burke design was larger and more capable, the Álvaro de Bazán design was selected in June 2007 as it was an existing design, and would be cheaper, quicker, and less risky to build. Three ships were ordered in October 2007, and will be assembled at ASC's facility in Osborne, South Australia, from 31 pre-fabricated modules (or 'blocks'). An option to build a fourth destroyer was included in the original contract, but has not been exercised. ASC, NQEA Australia, and the Forgacs Group were selected in May 2009 to build the blocks, but within two months, NQEA was replaced by BAE Systems Australia. Construction errors and growing delays led the AWD Alliance to redistribute the construction workload in 2011, with some modules to be built by Navantia. Increasing slippage has pushed the original planned 2014-2016 commissioning dates out by at least three years, with lead ship Hobart to be completed by June 2017, Brisbane in September 2018, and Sydney by March 2020. The AWD Alliance, Navantia, and the involved shipyards have been criticised for underestimating risks, costs, and timeframes; faulty drawings and bad building practices leading to repeated manufacturing errors; and blame-passing. The alliance concept has been panned for having no clear management structure or entity in charge, and having the DMO simultaneously acting as supplier, build partner, and customer for the ships. Each destroyer will have a length overall of 147.2 metres (483 ft), a maximum beam of 18.6 metres (61 ft), and a draught of 5.17 metres (17.0 ft). At launch, the ships will have a full-load displacement of 6,250 tonnes (6,150 long tons; 6,890 short tons). The Hobarts have been designed to allow for upgrades and installation of new equipment, with a theoretical maximum displacement of 7,000 tonnes (6,900 long tons; 7,700 short tons). The Hobarts use a more powerful propulsion system than their Spanish predecessors. The combined diesel or gas turbine (CODOG) propulsion arrangement consists of two General Electric Marine model 7LM2500-SA-MLG38 gas turbines, each generating 17,500 kilowatts (23,500 hp), and two Caterpillar Bravo 16 V Bravo diesel engines, each providing 5,650 kilowatts (7,580 hp).[4] These drive two propeller shafts, fitted with Wärtsilä controllable pitch propellers. The ships' maximum speed is over 28 knots (52 km/h; 32 mph), with a range of over 5,000 nautical miles (9,300 km; 5,800 mi) at 18 knots (33 km/h; 21 mph); although not fast enough to keep pace with an American carrier battle group, the RAN is happy with the speed/range tradeoff, as endurance is more important for Australian operating conditions. For in-harbour manoeuvring, each destroyer is fitted with a bow thruster. The standard ship's company is 186-strong, plus 16 additional personnel to operate and maintain the ship's helicopter. Additional accommodation increases the maximum potential complement to 31 officers and 203 sailors. Onboard electricity requirements (the hotel load) are supplied by four MTU prime mover diesel motors connected to Alconza alternators

Type 051B Class (Luhai Class) Chinese Destroyer






Tiers:



Variants:

- **Shenzhen:** Commissioned: Fleet: South Sea Fleet Status: Active

System

Alternative Designation: Type 051B; Luhai Class
Date of Introduction: 1999
Total Built: 1 vessel of this class
Type: Destroyer
Builder: INA
In Service: 1999-Present
Crew: 250 (40 officers)

Dimensions

Length: 155 m
Beam: 17.2 m
Draught: 6 m
Displacement: 6,100 tonnes (6,000 long tons; 6,700 short tons) tons

Propulsion System

Engine Name: INA
Engine Type: 2 Steam turbines
Engine Power: 94,000 shp (70,100 kW)
Maximum Range: 14,000 miles (23,000 km)
Maximum Speed: 31 knots (57 km/h; 36 mph)
Endurance: INA

Communications

Information Processing System: Information processing system designed by the 709th Institute (Reported speed: 10 Mbit/s)

Data Link: Data link: HN-900 (Chinese equivalent of Link 11 A/B, to be upgraded)

Communications: SNTI-240 SATCOM

Missile Weapon System

↳*Missile Weapon System #1*

Name: YJ-83

Type: Anti-Ship Missile

Launcher: INA

Length: INA

Diameter: INA

Engine: CTJ-2 turbojet

Warhead: 190 kg high-explosive fragmentation

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: 16

↳*Missile Weapon System #2*

Name: HQ-16

Type: Surface-to-Air Missile

Launcher: Vertical Launch System (VLS)

Length: INA

Diamter: INA

Operational Range: 40 km

Speed: INA

Note: HQ-16 (Hongqi-16) - Co-developed by China and Russia,believed to be based on either the SA-11 or SA-17.Credited with a range of 40 km. Also known as the HQ-16A.

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 79A

Type: Naval Gun

Caliber: 100mm

Barrel Length: INA

Weight: INA

Elevation: INA

Traverse: deg360

Rate of Fire: INA

Maximum Firing Range: INA

Note: Based on the successful performance of the automated system, the manual backup system was eliminated in this upgrade. As a result, the total weight and size of the gun mount was reduced. Beside the obvious different in size, the most obvious visual external difference between Type 79 and Type 79A is that the Type 79 version has sharp edges, thus a very boxy look like the cars of the 1970s, while Type 79A has round and curved edges, thus a rather smooth look like the cars of the 1990s.

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: 100mm

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 730 CIWS

Type: Close-In Weapon System

Caliber: 30mm

Quantity: 2 x Type 1130 CIWS

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Barrel Length: INA

Diameter: INA

Weight: INA

Barrels: 7-barrel

Crew: Automated, with human oversight

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 1–1.5 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

Radar: The TR47C radar operates in the same way of AN/APY-1/2 radar on board E-3 Sentry in that the azimuth is scanned mechanically, while the elevation is scanned electronically, incorporating a total of 169 transceivers of phased array technology that enables the radar to pick up the splashes of 30 mm rounds. Like the western CIWS, the information is processed on site, via local computers of the radar and the gun mount, thus providing faster reaction time than the Russian design in which the radar and fire control system are separately located. The system can track a sea-skimming target with 0.1 square metre radar cross section at 8 km, extended to 15 km if the radar cross section is increased to 2 square metres, and further extended to 20 km if the radar cross section is increased to 10 square metres, though the targets could not be engaged until much closer (3 km) due to the limited range of the gun.

Fire Control System: The OFC-3 system is modular design that comprises a laser range finder, a color TV camera, and an IR camera, and the laser range finder can be replaced by a laser designator (for a laser beam-riding SAM), the TV camera can be replaced by a night vision camera, and the IR camera can be replaced by an ImIR, at higher cost.

Development to incorporate the dual band IR, night vision camera, and the color TV camera is reportedly in progress. Type 730 CIWS is an autonomous closed-loop system and thus offers faster reaction time than the Russian AK-630. Type 730 CIWS is fully compatible with Chinese and European combat data systems such as ZKJ-1, ZKJ-4, ZKJ-4A-3, ZKJ-5, ZKJ-6, ZKJ-7, H/ZBJ-1, and Thomson-CSF TAVITAC, and can be directly integrated with these combat data systems without any modification.

↳ ***Ammuntiion Gun Weapon System #2***

Type: Rifle

Caliber: 30mm

Shell: INA

Basic Load: INA

Torpedo Weapon Systems

Torpedo Tubes: 6 x Torpedo Tubes

Torpedo Name: INA

Torpedo Basic Load: INA

Onboard Aviation Facilities

Facilities: Hangar accommodating 2 helicopters Landing platform for one helicopter Helicopter landing system

Helicopters: 2 x helicopters: (Kamov Ka-28 or Harbin Z-9C)

Fire Control

FCS Name: INA

Computerized FCS: Yes

FCS Radar: Type 344 fire-control radar (for 100 mm gun & SSMs)

Radar Systems

Air and Surface Radar: Type 360S air/surface search radar

Air Search Radar: Sea Eagle 3-D air search radar

Fire Control Radar: Type 344 fire-control radar (for 100 mm gun & SSMs)

Sonar Systems

Hull Mounted Sonar: Yes (Name: INA)

Towed ArrayS Sonar: Yes (Name: INA)

Protection

Active Protection System: Yes

Electronic Warfare: INA

Decoys: INA

Notes:

The Type 051B Luhai-class is a class of destroyer built by the People's Republic of China. It consists of only one ship, DD-167 Shenzhen. When Shenzhen was commissioned into the People's Liberation Army Navy Surface Force in 1998, it was then, the largest surface combatant that China had ever built. It resembles in many ways an enlarged version of the Luhu-class destroyer, and is one of the first PLAN ships with a slope-sided hull to reduce radar signature. The 051B was succeeded by the domestic Type 052B, discounting the 4 Soviet built Sovremennyy-class destroyer China purchased in the interim. Shenzhen was laid down by the Dalian Shipyard in May 1996. The Shenzhen was intended to be an experimental vessel with improvements over the Luhu-class' in terms of modular construction and stealth. The ship is powered by two indigenous steam turbine engines, due to Dalian Shipyard's experience in steam turbine construction and that Chinese domestic research and development on marine gas turbines had not yet matured. The displacement of the Luhai-class is 2,000 tons heavier than the Type 052 destroyer, Luhu-class. Shenzhen was launched in 1997, although official revelation of the ship's existence did not come until the year following its commissioning. The chief designer of this class is academic, Mr. Pan Jingfu (□□□), who is also the designer of both the Type 051B's predecessor and successor. The main purpose of the Type 051B was to gain experience in modern naval ship design and construction, and refining the knowledge and skills accumulated from the earlier Type 052, such as integrating many different foreign subsystems on the Type 052 more effectively. The ship is powered by steam turbines due to the 1989 western arms embargo and that domestic gas turbines were not ready in time. The Type 051B also employed stealth construction techniques which resulted in a smaller radar cross section in comparison to its predecessor. Analysts speculated that the ship would have been equipped with an VLS system in the forward section for air-defense SAMs. However, when the ship was finally revealed, it was still armed with the 8-cell HQ-7 SAM launcher. These SAMs lack effectiveness against sea skimming missiles with multiple approaching angles. The PLAN was unsatisfied with the design and no further ships of the class were built. At the time, area air defence for the fleet was the PLAN's priority which older systems couldn't sufficiently provide, and since the capability couldn't be served by the final vessel the gap remained open. As a result, the decision to import two pairs of Sovremennyy-class destroyer from Russia was determined to fulfil the role. However, Type 051B does have an advantage over earlier Chinese principle surface combatants and Russian ships in that it is the first Chinese naval ship to be equipped with fleet formation command and control system so it can act as a flagship of the fleet. The sole Type 051B destroyer 167 Shenzhen participated in the PLA Navy's first goodwill visit to Africa in 2000, the first visit to Europe in 2001 and the first visit to Japan in 2007. In 2004, the ship received its mid-life modernization refit, with its original 100mm main gun and the HQ-7 air defense missile system being replaced by improved models. Type 051B destroyer 167 Shenzhen visited Kochi, India for four days in August 2009, after deployment in the Gulf of Aden on anti-piracy operations. 2015 Refit and upgrades: In early 2015, the sole Type 051B destroyer was spotted at the Zhanjiang naval base undergoing work. Initially it was unclear whether this was due to a midlife refit program or decommissioning, but pictures revealed in January 2016 that the ship was being refitted with new systems. For self-defense, the four old Type 76A 37 mm AA guns were replaced with two H/PJ-11 eleven-barreled 30 mm CIWS (export designation Type 1130), one covering each side. Anti-aircraft defense is upgraded from the 8-unit HQ-7 with a 10–15 km (6.2–9.3 mi) range to a 32-cell vertical launch system (VLS) in front of the superstructure for 50–60 km (31–37 mi)-ranged HQ-16s, directed by four Type 345 (Front-Dome type) illuminators, increasing SAM coverage by 16 times. The helicopter hangar was modified to carry a single Ka-28 ASW helicopter in place of the original dual Z-9 hangar, and two new mast structures were fitted; a Type 382 Radar on the forward mast and a Type 364 targeting radar (under dome) on the aft mast. The upgrades give the Type 051B weapon and sensor capabilities similar to the Type 054A frigate. The Type 382 replaced the Type 381 singe-faced phased-array radar, and moved from the aft to the forward mast to remove the blind arc it previously exhibited, the quarterdeck was fully enclosed, and new apertures were added in the transom indicating that torpedo decoy and towed array sonar systems have been added; a variable depth sonar has not been installed. The ship completed the weapon systems upgrade in August 2016. In May 2020, it was revealed that the Type 051B had its YJ-83 subsonic ASMs replaced with 16 supersonic YJ-12 missiles.

→Frigates

Iver Huitfeldt Class Danish Frigate



Tiers:



Variants:

- **Iver Huitfeldt:** Commissioned: Status: Active
- **Peter Willemoes:** Commissioned: 2011 Status: Active
- **Niels Juel:** Commissioned: 2011 Status: Active

System

Alternative Designation: Iver Huitfeldt Class
Total Built: 3 ships built
Type: Frigate
Builder: Odense Staalskibsværft Baltija Shipbuilding Yard Loksa Shipyard
In Service: 2011-Present
Crew: 101 total + air group

Dimensions

Length: 138.70 m
Beam: 19.50 m
Draft: 6.30 m
Displacement, Standard: 4,000 tons
Displacement, Full Load: 5,850 tons

Propulsion System

Engine Name: 4 x MTU 8000 M-70 diesels
Engine Type: Diesel
Engine Power: 44,600 total bhp
Propeller: 2 variable-pitch propellers
Bow-thruster: Yes

Maximum Range: 15,000 nm at 9 knots

Maximum Speed: 28 knots

Endurance: INA

Missile Weapon System

↳*Missile Weapon System #1*

Name: BGM-109A Tomahawk Land-Attack Missile (TLAM)

Type: Long-Range Cruise Missile

Quantity: 1 x 8-tubed Lockheed-Martin Mark 41 VLS system

Manufacturer: General Dynamics (initially) McDonnell Douglas Hughes Aircraft Corporation Raytheon

Proliferation: Widely Proliferated

In Service: 1983-Present

Launcher: 8-tubed Lockheed-Martin Mark 41 VLS system

Missile Basic Load: INA

Length: Without booster: 18 ft 3 in (5.56 m) With booster: 20 ft 6 in (6.25 m)

Diameter: 0.52 m

Wingspan: 2.67 m

Weight: 2,900 lb (1,300 kg), 3,500 lb (1,600 kg) with booster

Warhead: Nuclear: W80 warhead (retired) Conventional: 1,000 pounds (450 kg) high explosive or submunition dispenser with BLU-97/B Combined Effects Bomb or PBXN

Detonation Mechanism: FMU-148 since TLAM Block III, others for special applications

Engine: Williams International F107-WR-402 turbofan using TH-dimer fuel and a solid-fuel rocket booster

Operational Range: Block II TLAM-A – 1,350 nmi (1,550 mi; 2,500 km) Block III TLAM-C, Block IV TLAM-E – 900 nmi (1,000 mi; 1,700 km) Block III TLAM-D – 700 nmi (810 mi; 1,300 km)

Flight Altitude: 98–164 ft (30–50 m) AGL

Speed: Subsonic; ~Mach 0.74. about 550 mph (480 kn; 890 km/h)

Guidance System: GPS, INS, TERCOM, DSMAC, active radar homing (RGM/UGM-109B)

Launch Platforms: Vertical Launch System (VLS) and horizontal submarine torpedo tubes (known as TTL (torpedo tube launch))

↳*Missile Weapon System #2*

Name: RIM-7 Sea Sparrow

Type: Anti-Aircraft and Anti-Ship Missile

Quantity: 2 x 12-tubed Raytheon Mk 56 VLS system

Launcher: 12-tubed Raytheon Mk 56 VLS system

Missile Basic Load: 24

Length: 3.7 m

Diameter: 20 cm

Wingspan: 1.02 m

Weight: 230 kg

Warhead: Annular blast fragmentation warhead, 90 lb (41 kg)

Detonation Mechanism: Proximity fuzed, expanding rod, with a 27 ft (8.2 m) kill radius

Engine: Hercules MK-58 solid-propellant rocket motor

Operational Range: 19 km

Speed: 4,256 km/h (2,645 mph)

Guidance System: Semi-active radar homing

Launch Platform: Ship

↳*Missile Weapon System #3*

Name: RGM-84C Block II Harpoon

Type: Anti-Ship Missile

Quantity: 2 x 8-tubed Harpoon SSM Launchers Systems

Launcher: 8-tubed Harpoon SSM Launchers Systems

Missile Basic Load: 16

Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)

Diameter: (34 cm

Wingspan: 0.91 m

Weight: 1,523 lb (691 kg) with booster

Warhead: 221 kg

Detonation Mechanism: Impact fuze

Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust

Operational Range: in excess of 150 nmi (280 km) depending on launch platform

Flight Altitude: Sea-skimming

Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)

Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing

Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

↳*Missile Weapon System #4*

Name: FIM-92 Stinger

Type: Surface-to-Air Missile

Quantity: 6 x Twin Sea Stinger SAM launchers

Launcher: Twin Sea Stinger SAM launchers

Missile Basic Load: 6

Length: 1.52 m

Diameter: 70.1mm

Weight: 15.19 kg

Crew: 1

Warhead: High explosive annular blast fragmentation

Warhead Weight: 3 kg

Engine: Solid-fuel rocket motor

Guidance System: Infrared homing

Launch Platform: MANPADS, M6 Linebacker, Multi-Mission Launcher, Eurocopter Tiger, AN/TWQ-1 Avenger, MQ-1 Predator, AH-64 Apache, T-129 ATAK

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: OTO Melara

Type: Naval Gun

Caliber: 76,,

Quantity: 2 x 76-mm/62-cal Mark 75 Oto Melara Compact DP Weapon Stations

Barrel Length: 62 caliber: 4,724.4 mm (186.00 in)

Weight: Empty: 7.5 tonnes (17,000 lb)

Crew: Remote Controlled

Elevation: −15°/+85° speed: 35°/s (acceleration: 72°/s²)

Traverse: 360° speed: 60°/s (acceleration: 72°/s²)

Rate of Fire: Compact: 85 rounds/min Super Rapid: 120 rounds/min

Muzzle Velocity: 915 m/s (3,000 ft/s)

Maximum Firing Range: HE-PFF 16,000 m SAPOMER 20,000 m VULCANO 40,000 m

Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm76

Shell: 76×636mmR cartridge weight 12.5 kilograms (28 lb) shell weight 6.3 kilograms (14 lb) propellant weight 2.35 kilograms (5.2 lb)

Shell Weight: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Rheinmetall Oerlikon Millennium Gun

Type: Close-In Weapon System (CIWS)

Caliber: 35mm

Quantity: 2 x 35-mm Oerlikon-Contraves Millennium AA

Length: 5.5 m

Width: 2.39 m

Height: 1.94 m

Weight: Gun: 450 kg Installation: 3300 kg

Crew: unmanned

Action: Gas-operated revolver cannon

Elevation: -15 / +85 degrees rate: 70 degree/s

Traverse: 360 degrees rate: 120 degrees per second

Rate of Fire: Single shot Rapid Single Shot: 200 rounds per minute Burst (automatic fire): 1000 rounds per minute

Muzzle Velocity: AHEAD: 1,050 m/s (3,445 ft/s) HEI: 1,175 m/s (3,854 ft/s) APDS/T: 1,440 m/s (4,724 ft/s)

Effective Firing Range: 3,500–5,000 m (3,800–5,500 yd)

Feed System: 252 linkless rounds in installation

↳*Ammuntiion Gun Weapon System #2*

Type: Rifle

Caliber: 35mm

Shell: 35×228mm

Shell Weight: INA

Basic Load: INA

↳*Gun Weapon System #3*

Name: AX50

Type: Anti-Material Rifle

Quantity: 7 x 12.7mm machine guns

Manufacturer: Accuracy International

Proliferation: Bangladesh: Recently started to be used by Bangladesh Army. Denmark: Awarded contract with Danish Defence. Due to be introduced into Service. Turkey: In service with Turkish Police Special Operation Department. United Kingdom: It has replaced the AW50 as the British Army's standard .50 BMG rifle. Malaysia: Used By Malaysian Army. Singapore: Employed by the Special Operations Force. Peru: used by the special forces of the navy and air force of Peru

In Service: 2010-Present

Length: 1,370 mm (53.9 in) 1,115 mm (43.9 in) folded

Barrel Length: 685.8 mm (27.0 in)

Width: 125 mm (4.92 in)

Height: 190 mm (7.48 in)

Weight: 12.5 kg (27.6 lb) (no scope/no rails, empty mag)

Action: Bolt-action

Muzzle Velocity: 900 m/s (2,953 ft/s)

Effective Firing Range: 2,500 m (2,734 yd)

Feed System: 5-round detachable box magazine

Sights: Standard: S&B 5-25×56 PM II telescopic sight

↳ ***Ammunition Gun Weapon System #3***

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: INA

Torpedo Weapon System

Torpedo Tube: 2 x twin 324-mm Mk 32 tubes

Torpedo Name: MU-90 M/04 ASW torpedoes

Torpedo Basic Load: INA

Onboard Aviation

Facilities: Aft helicopter deck and hangar

Helicopters: 1 x Agusta-Westland AW101 helicopter; or unknown no. of UAVs

Fire Control

FCS Name: See Missile and Gun Weapon Systems.

Computerized FCS: Yes

Radar Systems

Air and Surface Radar: 1 x Thales SMART-L 3D air/surface search

Phased Array Radar: 1 x Thales APAR phased array air search system

Navigation Radar: 2 x Furuno navigation

FCS Radar: 2 x Saab CEROS 200 fire-control

Sonar Systems

Hull-Mounted Sonar System: 1 x Atlas-Elektronik ASQ-94 (Thales DSQS-24C) hull-mounted towed and variable depth

Protection

Active Protection System: Yes

Electonic Warfare Intercept: 1 x ES-3701 intercept

Decoy #1: 2 x Sea Gnat DL-12T decoy/chaff launchers

Decoy #2: 2 x Sea Gnat DL-6T decoy/chaff launchers

NBC Protection: Yes

Notes:

The Iver Huitfeldt class is a three-ship class of frigates that entered service with the Royal Danish Navy in 2012 and 2013. The class is built on the experience gained from the Absalon-class support ships, and by reusing the basic hull design of the Absalon class the Royal Danish Navy have been able to construct the Iver Huitfeldt class considerably cheaper than comparable ships. Side view of frigate Niels Juel in front of green hills of Harstad port F363 Niels Juel in Harstad (Norway), June 2018 The frigates are compatible with the Danish Navy's StanFlex modular mission payload system used in the Absalons, and are designed with slots for six modules. Each of the four stanflex positions on the missile deck is able to accommodate either the Mark 141 8-cell Harpoon launcher module, or the 12-cell Mark 56 ESSM VLS. The Peter Willemoes passed the British Flag Officer Sea Training test in 2015. While the Absalon-class ships are primarily designed for command and support roles, with a large ro-ro deck, the three new Iver Huitfeldt-class frigates will be equipped for an air defence role with Standard Missiles, and the potential to use Tomahawk cruise missiles, a first for the Danish Navy. The ships were constructed in blocks in Estonia and Lithuania. These blocks were then towed to Odense where they were assembled.

Admiral Grigorovich Class Russian Frigate









Tiers:



Variants:

- **Admiral Grigorovich:** Commissioned: 2016
- **Admiral Essen:** Commissioned: 2016
- **Admiral Makarov[:** Commissioned: 2017
- **Admiral Butakov:** Commissioned: 2022
- **Admiral Istomin:** Commissioned: 2022
- **Admiral Kornilov:** Commissioned: 2020

System

Alternative designations: Project 1135.6/11356/11356M; KRIVAK IV; modified TALWAR

Total Built: 6 ships scheduled to be built

Type: Guided Missile Frigate

Crew (total): 200

Aircraft Carried: 1 × Ka-27 series helicopter

Aviation Facilities: Helipad and hangar for one helicopter

Dimensions

Length: 124.8 m

Beam: 15.2 m

Dispacement: Standard: 3,620 tons Full: 4,000 tons

Draught: 4.2 m

Automotive

Propulsion: 2 shaft COGAG; 2 DS-71 cruise gas turbines 8,450 shp (6,300 kW); 2 DT-59 boost gas turbines 22,000 shp (16,000 kW) ; Total: 60,900 shp (45,400 kW) or 2x M90FR FRU 20 (25/28) MW boost , 2x cruise M70FRU 14 MW , M70FRU2 8 MW total=56–68 MW

Maximum Speed: 30 kn (56 km/h; 35 mph)

Maximum Range: 4,850 nmi (8,980 km; 5,580 mi) at 14 kn (26 km/h; 16 mph)

Endurance: 30 days

Armament

↳*Weapon Station #1*

Name: AK-100

Type: Naval cannon

Caliber: mm100

Quantity: 1

Barrel Length: INA

Weight: 35.5 tons

Maximum Elevation: deg+85

Minimum Elevation: deg-10

Rate of Elevation: 30 degrees per second

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Traverse Rate: 35 degrees per second

Recoil: 20 in (51 cm)

Rate of Fire: 50 to 60 rounds per minute

↳*Ammunition Weapon Station #1*

Shell: INA

Caliber: mm100

Shell Weight: 26.8 kg

Type: HE anti-air or HE fragmentation varieties.

Basic Load: Typical ammo stowage: 350 rounds for a 4,000 ton class frigate

↳*Weapon Station #2*

Name: SS-N-27 Sizzler

Type: Anti-Ship Cruise Missile

Quantity: 8

Proliferation: Widely Proliferated Russia: Russian Navy uses the 3M14, 3M54, 3M54-1, 91R1, 91RT2. Submarine launched variants (entered service in 2016) are used by Kilo-class submarine, Lada-class submarine, Akula-class submarine, Oscar II-class submarine and the Yasen-class submarine. Surface ship launched variants are used by the

Gremyashchy class, Karakurt class, Buyan-M class corvettes, Gepard class, Admiral Gorshkov class and the Admiral Grigorovich class frigates. Algeria: The Algerian National Navy uses the 'Club-S' variant for their Kilo class submarines. India: The Indian Navy uses both 'Club-S' and 'Club-N' variants for the Kilo class submarines (known as the Sindhughosh Class in Indian service), the Talwar class frigates respectively. Vietnam: The Vietnam People's navy uses the 'Club-S' variant for its six Kilo class submarines. China: The People's Liberation Army Navy uses the 'Club-S' variant for its Kilo class submarines. Iran: Contradictory sources indicate that the Iranian Navy is thought to have purchased or is about to purchase 'Club-S' missiles for its three Kilo class submarines.

Manufacturer: Novator Design Bureau, KTRV, MKB Fakel, NPO Mash, Raduga, NPO Zvezda Strela (Orenburg)

In Service: 1990-Present

Length: Varies on variant, from 6.2 m to 8.9 m

Diameter: 0.533 m

Warhead: 400-500 kg HE or thermonuclear

Weight: Varies on variant, from 1,300 kg-1780 kg-2300 kg

Engine: Multi-stage solid-fuel rocket, turbojet engine for 3M-54/E/TE/E1/TE1, -14/E/TE, solid fuel rocket for 91RE1/RTE2

Operational Range: 91RE1: 50 km 3M-54E (export version): 220 km 3M-54E1/3M-14E (export version): 300 km 3M-54/3M-54T: 660 km 3M-14/3M-14T: 1,500-2,500 km Kalibr-M: 4,500 km

Flight Ceiling: 1,000 m

Flight Altitude: 50-150 m AGL 20 m over water

Speed: 0.8-2.5-2.9 Mach

Guidance System: Inertial guidance plus terminal Active radar homing, By satellites, DSMAC

Accuracy: 3 m (Club-S/Kalibr-PL)

Launch Platforms: naval ships, submarines, containers, airplanes, TEL

↳*Weapon Station #3*

Name: Kashtan CIWS

Type: close-in weapon system (CIWS) is a modern naval air defence gun-missile system deployed by the Russian Navy

Caliber: 30mm

Barrel Length: INA

Quantity: 2

Main Armament: 8 × 9M311K + 32 missiles[N 4]N Kashtan-M: 8 × 9M311-1E + 24 missiles

Secondary Armament: 2 × AO-18K autocannon Kashtan-M: 2 × AO-18KD autocannon

Barrels: 2 × 6 (guns); 2 × 4 launch tubes

Height: 2,250 mm (89 in) (above deck)

Weight: 15,500 kg (34,200 lb) (Kashtan) 12,500 kg (27,600 lb) (Kashtan-M)

Action: Gas-operated rotary cannon

Rate of Fire: Kashtan:[N 2] 9,000 rounds/min (guns) Kashtan-M:[N 2] 1–2 (salvo) missiles per 3–4 sec 10,000 rounds/min (guns)

Muzzle Velocity: 860 m/s (2,800 ft/s) (HEIF, FT) Kashtan-M: 960 m/s (3,100 ft/s) (HEIF, FT) 1,100 m/s (3,600 ft/s) (APDS-T

Effective Firing Range: By missiles: Kashtan: 1,500–8,000 m (4,900–26,200 ft) Kashtan-M: 1,500–10,000 m (4,900–32,800 ft) By guns: Kashtan: (range, altitude) 500–4,000 m (1,600–13,100 ft), 3,000 m (9,800 ft) Kashtan-M: 300–5,000 m (980–16,400 ft)

Feed System: Link-less, helical; 1000 rounds

Sights: Radar / TV-optical:[N 3] 2–3/1 m (6.6–9.8/3.3 ft) accuracy, tracks 6 targets simultaneously

Warhead: Continuous-rod w/ frag layer

Note: The weapon is a modular system consisting of a command module and typically two combat modules, as in the case of the two Sovremennyy-class destroyers Taizhou (ex-Vnushitelnyy) and Ningbo (ex-Vechnyy) in Chinese service, although the number can be as many as 8 in the case of Admiral Kuznetsov. The command module detects and tracks threats, distributes targeting data to the combat modules, and interrogates IFF of approaching threats. The command module has a 3-D target detection radar, and an all weather multi-band integrated control system. Depending on the number of installed combat modules, the system can engage multiple targets simultaneously. The combat modules automatically track using either radar, electro-optronic control system (such as FLIRs) or both, and then engages targets with missiles and guns. The combat modules are typically equipped with two GSh-30K (AO-18K) six-barrel 30 mm rotary cannons, fed by a link-less feeding mechanism, and two 9M311-1 missile launchers equipped with 4 ready-to-fire missiles each and fed by a reloading system storing 32 missiles in ready-to-launch containers. The guns used in the Kortik are the GSh-30K six-barrel 30 mm rotary cannon. Individually, each GSh-30K has a higher rate of fire compared to other guns used by other CIWS such as the GAU-8 on the Goalkeeper and the M61 Vulcan on the Phalanx. Along with a high rate of fire, the fairly heavy round (390 g or 14 oz) used by the Kortik is comparable to the DPU rounds of the GAU-8 Avenger (425 g or 15.0 oz), although the muzzle velocity (and therefore both the kinetic energy and effective range) is slightly lower, partially offsetting the high caliber and rate of fire. The missiles used in the Kortik are the 9M311 missiles, which is also used on the 9K22 Tunguska. The 9M311 is a SACLOS guided missile, however, it is steered automatically by the command module. The warhead weighs 9 kilograms (20 lb) and is either laser or radio fused. The warhead is a continuous-rod warhead with a steel cube fragmentation layer. The detonation of the warhead will form a complete circle of fragmentation that is 5 meters in radius, and damage or destroy anything in that circle. The combination of the missiles and guns, provides more comprehensive protection when compared to other CIWS utilising either missiles or guns only. The system's combined kill probability is 0.96 to 0.99

Flight Altitude: 3,500 m (11,500 ft) (Kashtan) 6,000 m (20,000 ft) (Kashtan-M)

↳*Ammunition Weapon Station #3*

Shell: HEI-Frag, Frag-T, APDS-T

Caliber: 30mm

Shell Weight: 0.39 kg (0.86 lb) (HEIF, FT)[6] 0.30 kg (0.66 lb) (APDS-T)[

Basic Load: INA

↳*Weapon Station #4*

Name: RBU-6000 Smerch-2

Type: 213 mm caliber Soviet anti-submarine rocket launcher.

Quantity: 1

Launcher Length: 2 m

Launcher Width: 1.75 m

Launcher Height: 2.25 m

Launcher Weight: 3,100 kg (empty)

Maximum Elevation: deg+65

Minimum Elevation: deg-15

Traverse Range: deg180

Traverse Left: deg90

Traverse Right: deg90

↳*Rocket Weapon Station #5*

Name: RGB-60

Type: Ballistic Anti-Submarine Rocket

Length: 1.83 m

Diameter: 0.212 m

Warhead Weight: 23 kg

Weight: 113.5 kg

Range: Ballistic 1 - 350 m to 1700 m, Ballistic 2 - 1500 m to 5500 m

Depth: 10 to 500 m

Sink Rate: 11.6m/s

↳*Weapon Station #6*

Name: DTA-52

Type: Twin 533mm fixed Torpedo Launchers

Quantity: 2

Torpedo Basic Load: INA

Maximum Effective Range: On Average, The torpedo has an effective launch range of 7km and cruising range of 10km.

Note: There is no information on the type of torpedoes used onboard this vessel.

Radars

Air and Search Radar: Fregat M2M

Surface Search Radar: 3Ts-25 Garpun-B, MR-212/201-1, Nucleus-2 6000A

Fire Control Radar: JSC 5P-10 Puma FCS, 3R14N-11356 FCS, MR-90 Orekh SAM FCS

Protection

EW Suite: TK-25-5

Air Defense System: 1 x Shtil air defense system

Countermeasures: 4 × KT-216

Sonar #1: 1 x Humsa bow-mounted

Sonar #2: 1 x SNN-137 towed-active array

Notes:

The Admiral Grigorovich class, also referred to as Krivak IV class, Russian designation Project 11356P/M, is a class of frigates built by the Yantar Shipyard in Kaliningrad for the Russian Navy. Based on the Talwar class, six ships were ordered for the Russian Black Sea Fleet under two contracts in 2010 and 2011 as a complement to the Admiral Gorshkov class frigates. By 2010-2011, it was decided the Russian Navy will procure six vessels based on the proven Talwar class design, mainly due to repeated delays with production of Admiral Gorshkov frigates and because of the urgent need for new frigates necessary for modernization of the Black Sea Fleet. The Yantar Shipyard won the contract for construction of the frigates and three vessels was to be completed in four years. Previously, six ships of the same design, known as Talwar class, were built for the Indian Navy between 1999 and 2011 by the Baltic Shipyard, Saint Petersburg and Yantar Shipyard, Kaliningrad. The lead ship, Admiral Grigorovich, was laid down on 18 December 2010 and was commissioned on 11 March 2016. Initially, Ukrainian state-owned

enterprise Zorya-Mashproekt was providing gas turbines for the Russian frigates, but after the Ukrainian crisis, Ukraine said it would no longer supply the engines. Instead, Russian manufacturer Saturn was asked to supply alternative M90FR gas turbines. Since October 2016, it was claimed the three incomplete frigates, Admiral Butakov, Admiral Istomin and Admiral Kornilov, that construction was suspended in 2015 due to Ukraine's refusal to supply gas turbine power plants, are considered to be sold to India. The Russian Navy has opposed this export. On 1 June 2017, the United Shipbuilding Corporation (USC) announced that it would resume construction of the last three frigates in 2018 and that the ships will later join the Russian Navy. The decision to resume the work was made following the preliminary testing of latest Russian gas turbine engines, the M70FRU (14 MW), M70FRU2 (6-8 MW) and M90FR (20 MW , maximal 25-28 MW), from the United Engine Corporation, built at NPO Saturn and TurboRus plants. With an access to alternative power plants, the ships were believed to remain in Russian service. However, on 27 October 2018, India's Ministry of Defence and Russia signed a US$950 million deal for delivery of two incomplete Admiral Grigorovich-class frigates to the Indian Navy. Reportedly, these are to be Admiral Butakov and Admiral Istomin frigates, previously being built for the Russian Navy. As of February 2019, the last three vessels remain without engines. On 3 November 2016, as part of Russian military intervention in the Syrian Civil War, Admiral Grigorivich was deployed to the Mediterranean Sea for the first time. On 15 November 2016, it has launched Kalibr cruise missile on IS and Al-Nusra targets in Syria's Idlib and Homs provinces, destroying ammunition warehouses, gathering and training centers and weapon production plants. Admiral Grigorivich was redeployed to the Mediterranean Sea in April 2017, following the US missile strikes against Syria. On 20 November 2018, Rosoboronexport and Goa Shipyard signed a US$500 million deal for construction of additional two Admiral Grigorovich-class frigates for the Indian Navy. The frigates are to be license-built at the Goa Shipyard in India under a technology transfer from Russia. The construction is expected to start in 2020, with first vessel to be delivered in 2026 and second in 2027.

Shivalik Class (Project 17 Class) Indian Frigate







Tiers:



Variants:

- **INS Shivalik:** Commissioned: 2010 Home Port: Visakhapatnam Status: Active
- **INS Satpura:** Commissioned: 2011 Home Port: Visakhapatnam Status: Active
- **INS Sahyadri:** Commissioned: 2012 Home Port: Visakhapatnam Status: Active

System

Alternative Designation: Shivalik class or Project 17 class
Total Built: 3 vessels built
Type: Frigate
Builder: Mazagon Dock Limited
In Service: 2010-Present
Crew: 257 men

Dimensions

Length: 142.5 m
Beam: 16.9 m
Draft: 4.5 m
Displacement, Full Load: 6,200 tonnes (6,100 long tons; 6,800 short tons) full load

Propulsion System

Diesel Engine Name: 2 × Pielstick 16 PA6 STC Diesel engines
Diesel Engine Power: 15,200 shp

Turbine Name: 2 × GE LM2500+

Turbine Power: 33,600 shp

Maximum Range: In excess of 5,000 nautical miles (9,000 km) at 18 kn (33 km/h)

Maximum Speed: 32 knots (59 km/h; 37 mph) 22 knots (41 km/h; 25 mph) (diesel engines)

Endurance: INA

Missile Weapon System

↳*Missile Weapon System #1*

Name: Barak 1

Type: Surface-to-Air Missile

Quantity: 1 x 32-cell VLS launcher

Launcher: Vertical Launch System (VLS)

Missile Basic Load: INA

Length: 2.1 m

Diameter: 177mm

Wingspan: 685 mm

Weight: 98 kg

Warhead: 22 kg blast fragmentation warhead

Detonation Mechanism: Proximity fuze

Operational Range: 0.5-12 km

Flight Altitude: 5.5 km

Speed: Mach 2.1 (720 m/s)

Guidance System: Radar CLOS guidance

Launch Platform: Surface Ship

↳*Missile Weapon System #2*

Name: 3M-54 Kalibr

Type: Cruise Missile

Quantity: 8 × VLS launchers

Launcher: Vertical Launch System

Length: Varies on variant, from 6.2 m to 8.9 m

Diameter: 0.533 m

Weight: Varies on variant, from 1,300 kg-1780 kg-2300 kg

Warhead: 400-500 kg HE or thermonuclear

Engine: Multi-stage solid-fuel rocket, turbojet engine for 3M-54/E/TE/E1/TE1, -14/E/TE, solid fuel rocket for 91RE1/RTE2

Operational Range: 50 km

Flight Ceiling: 1,000 m

Flight Altitude: 50-150 m AGL 20 m over water

Speed: 0.8-2.5-2.9 Mach

Guidance System: Inertial guidance plus terminal Active radar homing, By satellites, DSMAC

Accuracy: 3 m

Launch Platform: naval ships, submarines, containers, airplanes, TEL

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: OTO Melara

Type: Naval Gun

Caliber: 76mm

Quantity: 1 × OTO Melara 76 mm naval gun

Barrel Length: 62 caliber: 4,724.4 mm (186.00 in)

Weight: Empty: 7.5 tons

Crew: Remote Controled

Elevation: −15°/+85° speed: 35°/s (acceleration: 72°/s²)

Traverse: 360° speed: 60°/s (acceleration: 72°/s²)

Rate of Fire: Compact: 85 rounds/min Super Rapid: 120 rounds/min

Muzzle Velocity: 915 m/s

Maximum Firing Range: HE-PFF 16,000 m

Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm76

Shell: 76×636mmR cartridge weight 12.5 kilograms (28 lb) shell weight 6.3 kilograms (14 lb) propellant weight 2.35 kilograms (5.2 lb)

Basic Load: INA

↳*Gun Weapon System #2*

Name: AK-630

Type: Close-In Weapon System

Caliber: 30mm

Quantity: 2 × AK-630 CIWS Stations

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 9A4172 missiles

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Fire Control: Vympel MR-123; Vympel-A MR-123/176 5.2 tonnes (5.7 short tons); Vympel-AM MR-123-02/MR-123-03; and Vympel-AME MR-123-02/176) 1 tonne (2,200 lb) (Laska 5P-10E)

Barrels: 6

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Muzzle Velocity: 880–900 m/s

Rate of Fire: 4,000–5,000 rounds/min

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range

Effective Fring Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

↳ ***Ammunition Gun Weapon System #2***

Type: Rifle

Caliber: 30mm

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: INA

Anti-Submarine Warfare

Torpedo Tubes: 2 × 2 DTA-53-956 torpedo launchers

Torpedo Name: INA

Torpedo Basic Load: INA

Rocket Launcher: 2 × RBU-6000 (RPK-8) rocket launchers

Rocket Name: INA

Rocket Basic Load: INA

Onboard Aviation Facilities

Helicopters: 2 × HAL Dhruv or Sea King Mk. 42B helicopters

Fire Control

FCS Radar: 4 × MR-90 Orekh radar

Radar Systems

Surface Radar: 1 × MR-760 Fregat M2EM 3-D radar

FCS Radar #1: 4 × MR-90 Orekh radar

FCS Radar #2: 2 × Elta EL/M 2221 STGR

Air and Surface Search Radar: 1 × Elta EL/M-2238 STAR

Sonar Systems

Hull-Mounted Sonar: 1 × BEL APARNA HUMSA-NG (hull-mounted sonar array

Protection

Active Protection System: Yes

Electronic Warfare System: BEL Ellora electronic warfare suite

Decoy: Kavach decoy system

NBC Protection: Yes

Notes:

The Shivalik class or Project 17 class is a class of multi-role frigates in service with the Indian Navy. They are the first stealth warships built in India. They were designed to have better stealth features and land-attack capabilities than the preceding Talwar-class frigates. A total of three ships were built between 2000 and 2010, and all three were in commission by 2012. The Shivalik class, along with the seven Project 17A frigates currently being developed from them, are projected be the principal frigates of the Indian Navy in the first half of the 21st century. All ships of the class were built by Mazagon Dock Limited. The class and the lead vessel have been named for the Shivalik hills. Subsequent vessels in the class are also named for hill-ranges in India. Project 17 was conceived in the 1990s to meet the Indian Navy's need for a class of stealthy frigates that were to be designed and built in India. The Directorate of Naval Design (DND)'s specifications for the project called for a class of "5000 ton stealth frigates (Project 17) incorporating advanced signature suppression and signature management features". The first three units were formally ordered by the Indian Navy in early 1999. Shivalik's design embodies many firsts in Indian ships. Shivalik is the first Indian naval vessel to use a combined diesel or gas (CODOG) propulsion system. The CODOG gearboxes were designed and built by Elecon Engineering. An officer's cabin on the INS Shivalik The main features of the class are its stealth characteristics and land-attack capability. The ships incorporate structural, thermal and acoustic stealth features. The vessels use 10 gigabit LAN for their network. There has also been an increased emphasis on crew comfort in this class of ships with more spacious accommodation being provided. Also, INS Shivalik is the first ship in the Indian Navy with chapati- and dosa-makers on board. The Shivalik-class frigates have a length of 142.5 m (468 ft) overall, a beam of 16.9 m (55 ft) and a draft of 4.5 m (15 ft). The ships displace about 4,900 tonnes (4,800 long tons; 5,400 short tons) at normal load and 6,200 tonnes (6,100 long tons; 6,800 short tons) at full load. The complement is about 257, including 35 officers. They use two Pielstick 16 PA6 STC Diesel engines and two GE LM2500+ boost turbines in CODOG configuration providing a total of 47,370 shp (35,320 kW) of power. This allows the ships to reach a maximum speed of 32 knots (59 km/h; 37 mph).

Ahmad Yani Class Indonesian Frigate





Tiers:



Variants:

- **AHMAD YANI:** Commissioned: 1987 Status: Active
- **SLAMET RIYADI:** Commissioned: 1967 Status: Active
- **YOS SUDARSO:** Commissioned: 1967 Status: Active
- **OSWALD SIHAAN:** Commissioned: 1967 Status: Active
- **ABDUL HALIM PERDANAKUSUMA:** Commissioned: 1967 Status: Active
- **KAREL SATSUITUBUN:** Commissioned: 1968 Status: Active

System

Alternative Designation: Ahmad Yani Class

Type: Frigate

Builder: 351, 352 and 356: Netherlands Dok en Scheepsbouw Mij, Amsterdam, Netherlands 353, 354 and 355: Koninklijke Maatschappij de Schelde, Flushing, Netherlands

Crew: 180 total

Dimensions

Length: 113.38 m

Beam: 12.50 m

Draft: 4.57 m

Displacement, Standard: 2,200 tons standard

Displacement, Full Load: 2,850 tons full load

Propulsion System

Engine Name: 2 x Caterpillar type 3616 diesels (except pendant 356: 2 Caterpillar type 3212 diesels and pendant 354: 2

SEMT-Pielstick type 12 PA6B diesels).

Engine Type: Diesel

Engine Power: 14,617 total bhp (except pendant 356: 12,512 total bhp and 14,000 total bhp)

Boilers: 2 x Babcock & Wilcox 38.7 kg/sq cm, 450-deg Celsius

Maximum Range: 4,500 nm at 12 knots

Maximum Speed: 20 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: OTO Melara

Type: Naval Gun

Caliber: 76mm

Quantity: 1 x OTO Melara 76mm Naval Gun

Barrel Length: 4,724.4 mm

Weight: 7.5 tons

Crew: remote controlled

Elevation: −15°/+85° speed: 35°/s (acceleration: 72°/s²)

Traverse: 360°

Rate of Fire: Compact: 85 rounds/min Super Rapid: 120 rounds/min

Muzzle Velocity: 915 m/s

Maximum Firing Range: HE-PFF 16,000 m SAPOMER 20,000 m VULCANO 40,000 m

Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm76

Shell: 76×636mmR

Basic Load: INA

↳*Gun Weapon System #2*

Name: STK 50MG

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 4 x STK 50MG 12.7mm Heavy Machine Guns

Length: 1,778 mm

Barrel Length: 1,143 mm

Width: 190 mm

Weight: 30 kg (66.14 lb) (complete gun assembly w/o feed chute and tripod adaptor)

Barrels: Single barrel (progressive RH parabolic twist, 8 grooves)

Action: Gas-operated, rotating bolt

Rate of Fire: 400–600 rounds/min

Feed System: Single sprocket Belt-fed with dual-feed chutes

↳***Gun Weapon System #2 Ammunition***

Type: Rifle

Caliber: 12.7mm

Cartridge: 12.7×99mm NATO

Basic Load: INA

Missile Weapon System

↳***Missile #1***

Note: 2 x quad Harpoon SSM launchers [only two missiles per launcher usually carried](believed to be time expired)

↳***Missile #2***

Note: 2 x twin by Matra Simbad SAM launchers [unknown no. Mistral missiles carried]

Aviation Facilities

Helicopters: 2 x Wasp (HAS-1) ASW helicopters

Torpedoes

Torpedo Tubes: 2 x triple 324-mm (U.S. Mark 32) tubes [unknown no.U.S. Mark 46, Mod. 2 torpedoes carried]

Fire Control Systems

FCS Name:

Computerized FCS:

Battle Management System:

Radar Systems

Air Search Radar: 1 x Thales LW-03 air search

Air/Surface Radar: 1 x Thales DA-05/2 air/surface search

Navigation Radar: 1 x Decca TM-1229C navigation

Main Gun System Radar: 1 x Thales M-45 system for 76-mm guns

Gun Director: 1 x Thales LIOD Mark 2 optronic gun director (354, 353 and 356 only)

Sonar Systems

Name: 1 x Signaal CWE-610

Type: Hull Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

EW: 1 British UA-8 and UA-9 intercept (except pendant no.:355 and 356: UA-13 intercept) 2 8-round Knebworth-Corvus decoy rocket launchers

Notes:

The Ahmad Yani-class of six general-purpose frigates were acquired by the Indonesian Navy in the 1980s. They were originally built in the Netherlands for the Royal Netherlands Navy as the Van Speijk-class and were licence-built versions of the British Leander-class

Type 053H3 Class (Jiangwei II Class) Chinese Frigate





Tiers:



Variants:

- **Lianyungang:** Commissioned: 1998, Fleet: EastSouth Sea Fleet, Status: Sold to Bangladesh Navy as BNS Umar Farooq (F-16)
- **Jiaxing:** Commissioned: 1999, Fleet: East Sea Fleet, Status: Sold to Bangladesh Navy as BNS Abu Ubaidah (F-19).
- **Putian:** Commissioned: 1999, Fleet: East Sea Fleet, Status: Sold to Bangladesh Navy as BNS Khalid Bin Walid (F-20).
- **Yichang:** Commissioned: 1999, Fleet: North Sea Fleet, Status: Active
- **Huludao:** Commissioned: 2000, Fleet: South Sea Fleet, Status:Active. Ex-Yulin, Renamed to Sanya in 2008, then changed to current name in April 2013 and transferred to North Sea Fleet.
- **Sanming:** Commissioned: 2000, Fleet: East Sea Fleet, Status: Active
- **Xiangyang:** Commissioned: 2002, Fleet: East Sea Fleet, Status: Active. Ex-Xiangfan, Renamed in June 2011.
- **Huaihua:** Commissioned: 2002, Fleet: East Sea Fleet, Status: Active.
- **Luoyang:** Commissioned: 2005, Fleet: North Sea Fleet, Status: Active.
- **Mianyang:** Commissioned: 2005, Fleet: North Sea Fleet, Status: Active.
- **Zulfiquar:** F-22P Zulfiquar-class frigate, Commissioned: 2008, Fleet: INA , Status: Active.
- **Shamsheer:** F-22P Zulfiquar-class frigate, Commissioned: 2008, Fleet: INA , Status: Active.
- **Saif:** F-22P Zulfiquar-class frigate, Commissioned: 2010, Fleet: INA , Status: Active.
- **Aslat:** F-22P Zulfiquar-class frigate, Commissioned: 2013, Fleet: INA , Status: Active.

System

Alternative Designation: Type 053H3, Jiangwei II Class
Type: Frigate
Builder: Hudong Shipyard,Guangzhou Shipyard KSEW Shipyard
In Service: 14 Frigates in service 1998 - Present
Crew: 168
2015 Upgrade: A limited, mid-life upgrade was observed for the 053H3 starting in 2015. Visible difference include the replacement of the ESM/EW suite/radars to similar systems from the Type 054, replacement of the HQ-7 with the HHQ-10 short range air defense missile and replacement of the 4 x Type 76A 37mm guns with a new 2 x 30mm CIWS similar to the Gryazev-Shipunov AO-18K.

Dimensions

Length: 122 m
Beam: 12.4 m
Draft: 4.3 m
Displacement, Full Load: 2,393 tons

Propulsion System

Engine Name: CODAD, 2 shaft
Engine Type: 2 x 18E390VA diesel 2 x MTU diesel
Engine Power: 2 x 18E390VA diesel at 17,600 kW 2 x MTU diesel at 6,499 kW
Maximum Range: 5,800 miles
Maximum Speed: 16 knots (30 km/h)
Endurance: INA

Gun Weapon Systems

↳*Gun Weapon System #1: PJ33A Twin 100 mm gun, Type 79*

Name: PJ33A Twin 100 mm gun, Type 76
Type: Naval anti-aircraft and anti-surface
Caliber: mmMunition specific (see ammunition section)
Manufacturer: INA
Length: 5.8 m
Barrel Length: 4.6 m
Weight: 34 tons
Crew: INA
Elevation: -5 /85 degrees
Traverse: INA
Rate of Fire: 25 rounds per minute
Muzzle Velocity: Munition specific (see ammunition section)
Effective Firing Range: Maximum Range 22,241m, AA Ceiling: 10,000m
Notes: Basic Load: 26 ready service rounds per gun. Approximate Barrel Life 800

↳*Gun Weapon System #1, PJ33A, Ammunition: AA Grenade, AA (ZS-56), AA (ZS-56P*

Type: Rifle
Caliber: 5.3 Calibers
Shell: Anti Aircraft
Basic Load: Varies
Muzzle Velocity: 900 mps

Weight: 15.6 kg to 15.9 kg

Bursting Charge: 0.79 kg to 1.23 kg

Propellant Charge Weight: 13.2 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: HE Mod 1928*

Type: Rifle

Caliber: 5.2 calibers

Shell: High Explosive

Basic Load: Varies

Muzzle Velocity: 895 mps

Weight: 15.8 kg

Bursting Charge: 1.25 kg

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: Diving*

Type: Rifle

Caliber: 5.04 calibers

Shell: Diving (sub surface impact)

Basic Load: Varies

Muzzle Velocity: 250 mps

Projectile Weight: 15.0 kg

Bursting Charge Weight: 2.85 kg

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: Star Shell (SB-56)*

Type: Rifle

Caliber: 5.2 calibers

Shell: Star Shell (illumination)

Basic Load: Varies

Muzzle Velocity: 646 mps

Projectile Weight: 16.0 kg

Bursting Charge Weight: 0.015 kg

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: ECM (anti radar) (PB-56)*

Type: Rifle

Caliber: INA

Shell: ECM (anti-radar)(Electronic Counter Measures) (PB-56) (reflective material)

Basic Load: Varies

Muzzle Velocity: INA

Projectile Weight: INA

Bursting Charge Weight: INA

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #2: Type 76A Twin, 37mm, AA Gun*

Name: Type 76A Twin 37mm AA gun

Type: Naval Anti Aircraft

Caliber: Munition specific (see ammunition section)

Manufacturer: INA

Length: 2.729 m including flash suppressor and breech

Barrel Length: 2.315 m (62.5 calibers) without flash suppresser

Weight: 126 kg

Crew: INA

Elevation: -10 / +85 degrees

Traverse: INA

Rate of Fire: INA

Muzzle Velocity: Varies with projectile

Effective Firing Range: Ballistic range: 8,400 m, Maximum AA ceiling: 5,000 m, Effective AA Ceiling 4,000 m

Notes:

↳*Gun Weapon System #2, Type 76A, Ammunition: HE-FRAG/ HE-FRAG Tracer*

Type: Rifle

Caliber: HE FRAG: 4.7 Calibers/ HE FRAG Tracer 4.4 Calibers

Shell: HE-FRAG/ HE- FRAG Tracer

Basic Load: INA

Muzzle Velocity: 880 mps

Complete Round Weights: 1.496 kg

Projectile Weights: 0.732 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #2, Type 76A, Ammunition: AP/ AP Tracer*

Type: Rifle

Caliber: mmAP tracer: 4.5 calibers/ AP: 4.2 calibers

Shell: AP tracer/ AP

Basic Load: INA

Muzzle Velocity: 880 mps

Complete Round Weights: 1.522 kg

Projectile Weights: 0.758 kg

Propellant Charge Weight: 0.21 kg

Missile Weapon Systems

↳*Missile Weapon Systems #1: YJ-83 Missile Launcher*

Name: YJ-83 Launchers

Type: Missile Launcher

Quantity: 8 x twin YJ-83 Launchers (2 x4 cell box)

↳*Missile Weapon Systems #1: YJ-83 Missile*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Subsonic anti-ship cruise missile

Manufacturer: China Aerospace Science and Industry Corporation

In Service: 1998-Present

Length: INA

Diameter: INA

Warhead Type: High-explosive fragmentation

Warhead Weight: 190

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: INA

↳*Missile Weapon Systems #2: HQ-7 SAM Launcher*

Name: HQ-7 SAM Launcher

Type: Missile Launcher

Elevation: INA

Traverse: INA

Radar: Type 360 E/F-band Doppler radar

Radar Range: 18.4 km

Combat Management System: ZJK-4 (Thomson-CSF TAVITAC) combat management system.

Note: The system is capable of processing up to 30 targets, and tracking 12 targets simultaneously.

↳*Missile Weapon Systems #2: HQ-7 SAM*

Name: HQ-7

Type: Short-Range Air Defense Missile System.

Manufacturer: China, Company: INA

In Service: 1988-Present

Length: 3 m

Diameter: .55

Warhead Type: HE-FRAG

Warhead Weight: 15 km

Operational Range: 500-700 m

Speed: Mach 2.3 or 750 m/s

Guidance System: Command + electro-optical tracking

Basic Load: HE-FRAG with proximity fuse

Torpedo Weapon Systems

↳*Torpedo, YU-7 Torpedo*

Name: YU-7 Torpedo

Type: Torpedo

Length: 2.7 m

Diameter: 324 mm

Weight: 235 kg

Warhead: High Explosive

Warhead Weight: 45 kg

Effective Firing Range: 14.1 km

Propellant: Otto fuel II

Maximum Depth: 400 m

Speed: >45 kn (83 km/h)

Guidance System: active / passive acoustic homing

Steering System: CIACIO-S seeker

Onboard Aviation Facilities

Aviation Facilities: Helicopter Hanger

Aircraft Carried: Harbin Z-9C duties include SAR and ASW. The Z-9C can be fitted with an X-band KLC-1 surface search radar to detect surface targets beyond the range of shipborne radar systems..

Fire Control System

FCS Name: INA

Computerized FCS: See Weapon Systems

Combat Data System #1: ZKG-4A

Combat Data System #2: ZKG-4B

Sonar Systems

Search Sonar: DUBV-23 search sonar

Depth Sonar: DUBV-43 variable depth sonar (VDS)

Protection

Active Protection System: See Weapon Systems

Countermeasures: See Weapon Systems

NBC Water Washdown System: INA

Electronic Detection System: SR-210 Radar warning receiver

Electronic Identification System: Type 651A IFF

Radar Systems

↳*Radar System # 1: Type 354 radar*

Name: Type 354 radar

Type: 3-D air and surface search radar

Alternate Designation: MX902 H/LJQ-354

Proliferation: Type 354 Radars are one of the most widely deployed air and surface search naval radars in Chinese service. The Type 354 was predominantly found on major People's Liberation Army Navy (PLAN) surface combatants such as the Luda class destroyer and Jianghu class frigate in the 1980s and 1990s. By 2006 it was slowly being replaced in favour of the Type 360 radar, which in turn, itself being replaced by Type 364 radar for new vessels.

Frequency: G/H band

Beam: 1.2 × 5 deg

Pulse Width: 4 µs

Polarization: linear

Beam Width: 1.20 (horizontal); 1.30 (vertical)

PRF: 400 or 800 Hz

Scan Rate: 4–10 rpm

Resolution: 800 m (range); 1.30 (azimuth)

Range: more than 93 km on aircraft with RCS of 10 m2

Mast: INA

Antenna: INA

Notes: None

↳*Radar System #2: Type 360 Radar*

Name: Type 360 radar

Type: Air/surface search radar

Alternate Designation: SR60, H/LJQ360, Seagull-S, S-3

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: E/F-band

Beam: 1.5° × 17° (coverage to 60° elevation)

Pulse Width: 20.8 (compressed to 0.4) microseconds

Polarization: INA

Beam Width: INA

PRF: 900 pps

Scan Rate: 15 or 30 rpm

Resolution: INA

Range: 250 km, Max altitude: 10,000 m

Mast: 900 kg

Antenna: 4.3 m x 0.7 m

Notes: Phased coded burst pulse, each burst consist of 4 pulses and frequency agile transmitter. Separate IFF antenna (4 × yagi) installed on top of antenna.

↳*Radar System #3: Type 517H-1 Radar*

Name: Type 517H-1 Radar

Type: VHF Air search radar

Alternate Designation: Spider (export), SUR17B

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: A Band

Beam: INA

Pulse Width: INA

Polarization: INA

Beam Width: 5° (H), 30° (V)

PRF: INA

Scan Rate: INA

Resolution: INA

Range: 350km against 4m2 RCS target; 100km against 0.1m2 RCS Stealth aircraft, Accuracy: range error ≤200m, angle error ≤1°

Mast: INA

Antenna: INA

Notes: Non-coherent pulse compression (NCPC) system, Moving target automatically detection, Long range air surveillance Antenna : Yagi-Uda array, Rotation speed: 6RPM, Transmitter / Receiver Frequency: meter-band NF: <6dB Power Supply AC: 220VAC (150~250 VAC) Power consumption: 25kW Maximum Tracking: >20pcs <- 1m Accuracy: range error<-200m, angle

↳*Radar System #4: Type 352 Radar*

Name: Type 352 Radar

Type: Surface search radar

Alternate Designation: Square Tie, H/LJQ35

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: I - band

Beam: INA

Pulse Width: INA

Polarization: INA

Beam Width: INA

PRF: INA

Scan Rate: INA

Resolution: INA

Range: 55m - 77 km

Notes: It is analogous to the Russian MR-331 Rangout radar

↳*Radar System #5: Type 347/EFR-1 Radar*

Name: Type 347/EFR-1 Radar

Type: Fire Control Radar (Type 76A Dual 37mm AAA gun)

Alternate Designation: Rice Bowl, TRC47C

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: X Band

Beam: INA

Pulse Width: INA

Polarization: Vertical

Beam Width: 1.8°±0.2°

PRF: INA

Resolution: INA

Scan Rate: INA

Range: 30 km against 2 m² RCS aircraft ; 15 km against: 0.1 m² ASM

Mast: INA

Antenna: Circular parabolic antenna

Notes: Uses a coherent pulse doppler design Non coherent Moving Target Indicator/Detection (MTI, MTD), CFAR (Constant False Alarm Rate) Antinodding, anti clutter capability (A well advertised feature of the RTN family)

↳*Radar System #6: Racal RM-1290 Radar*

Name: Racal RM-1290

Type: Navigation

Alternate Designation: RACAL

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: J Band

Beam: 1.3 dgrees

Pulse Width: 0.05 micro seconds

Polarization: Horizontal

Beam Width: INA

PRF: 1300 hz

Scan Rate: INA

Resolution: INA

Range: INA

Notes: INA

Communications and Electronic Warfare

↳*Communications*

SATCOM: SNTI-240

Data Link: HN-900

Combat Data System: ZKJ-3C

↳*Electronic Warfare*

Electronic Intercept: RWD-8 (Jug Pair) intercept

Electronic Jamming: Type 981-3 EW Jammer

Notes:

The Type 053H3 (NATO codename Jiangwei II) were Chinese frigates that entered service with the People's Liberation Army Navy Surface Force in the 1990s and 2000s. The class comprised 10 vessels, all of which remain in active service. Four of them are sold to the Bangladesh Navy. They were a follow-on of the Type 053H2G Jiangwei I class. The Zulfiquar-class frigate used by the Pakistan Navy was based on the Type 053H3. History In the 1980s, the PLAN ordered Shanghai-based Hudong Shipyard (now Hudong-Zhonghua Shipyard) to build a replacement for the Type 053K air defence frigate. The new class was based on the Type 053H2 frigate and designated Type 053H2G. Development was carried out under Project 055. The Type 053H2G was slightly larger than the Type 053H2, and equipped with HQ-61B surface-to-air missiles (SAM). However, the HQ-61 proved unsatisfactory and the class was quickly superseded by the Type 053H3 which was an improved Type 053H2G equipped with HQ-7 SAMs. The HQ-7 was a Chinese-produced version of the French R330 Sea Crotale. Ten Type 053H3s were produced between 1996 and 2005. The most obvious visual distinction between Jiangwei I & II are: The Jiangwei II's have HQ-7 instead of HQ-61B SAMs, 8 C-802 anti-ship missiles instead of 6, and aft AAA mounts elevated compared to the Jiangwei I. The Jiangwei II class was briefly equipped with HQ-61B SAM system before being replaced by HQ-7 during upgrade, and some sources claim that the upgraded version is also called Type 057. Mid-Life Upgrade A limited, mid-life upgrade was observed for the 053H3 starting in 2015. Visible difference include the replacement of the ESM/EW suite/radars to similar systems from the Type 054, replacement of the HQ-7 with the HHQ-10 short range air defense missile and replacement of the 4 x Type 76A 37mm guns with a new 2 x 30mm CIWS similar to the Gryazev-Shipunov AO-18K.

Type 632 Class (Fulin Class) Chinese Oil Tanker




Tiers:



Variants:

- **Note:** 14 ships Built. (Names: INA)

System

Alternative Designation: Type 632 Class; Fulin Class
Total Built: 14 Built
Type: Oil Tanker
Builder: Hudong-Zhonghua Shipbuilding
In Service: 1972-Present
Crew: 30

Dimensions

Length: 66 m
Beam: 10 m
Draft: 4 m
Displacement, Full Load: 2,200 long tons

Propulsion System

Engine Name: 1 × Marine Diesel Engine
Engine Type: Diesel Engine
Engine Power: hp600
Maximum Range: 1,500 nmi (2,800 km; 1,700 mi) at 8 kn (15 km/h; 9.2 mph)
Maximum Speed: 10 knots (19 km/h; 12 mph)
Endurance: INA

Gun Weapon System

↳*System*

Name: Type 61
Type: Anti-Aircraft Gun
Caliber: 25mm
Quantity: 2 x Type 61 25mm Anti-Aircraft Gun
Barrel Length: 1.5 m
Weight: INA
Crew: 1
Barrels: Single or Dual
Elevation: -10° ~ +85°
Traverse: 360°
Rate of Fire: Compact: 800~900 round/min
Muzzle Velocity: 900 m/s
Maximum Firing Range: 3,000 m
Effective Firing Range: 2,700 m
Feed System: Magazine
Sights: Optical

↳*Ammunition*

Type: Rifle
Caliber: mm25
Shell: 25 x 218 mm SR
Shell Weight: INA
Basic Load: INA

Fire Control

Note: INA

Radar Systems

Navigation Radar: 1 x Type 756 or Fine Curve radar

Protection

Active Protection System: INA
Electronic Warfare: INA
Decoys: INA
NBC Protection: Yes

Notes:

The Type 632 tanker is a type of naval auxiliary ship currently in service with the People's Republic of China Navy (PLAN). Designed as a type that is capable of transport both water and oil, these ships entered service from 1972 onward. Type 632 tanker has received NATO reporting name as Fulin class.[2] After transferred to reserves, these ships begun to retire in the early 2010s. Type 632 tankers in PLAN service are designated by a combination of two Chinese characters followed by three-digit number. The second Chinese character is You (□), meaning oil in Chinese, or Shui (□), meaning water, because these ships are classified either as oil and water tankers. The first Chinese character denotes which fleet the ship is service with, with East (Dong, □) for East Sea Fleet, North (Bei, □) for North Sea Fleet, and South (Nan, □) for South Sea Fleet. However, the pennant numbers may have changed due to the change of Chinese naval ships naming convention.

Najin Class North Korean Frigate



Tiers:

1 2 **3** 4

System

Alternative Designation: Najin Class
Type: Frigate
Builder: Unknown, but built in North Korea (Najin Shipyards)
Crew: 180

Dimensions

Length: 100 m
Beam: 10.0 m
Draft: 2.7 m
Displacement, Full Load: 1,600 long tons

Propulsion System

Engine Name: INA
Engine Type: 2x Diesels
Engine Power: 15,000 bhp; 2 shafts
Maximum Speed: 26 knots (30 mph; 48 km/h)
Range: 4,000 nmi (4,600 mi; 7,400 km) at 14 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: INA
Type: 2 × 100 mm (4 in)/56 (single) Gun
Caliber: 100mm
Quantity: 2 × 100 mm (4 in)/56 (single) Gun
Note: Information Not Available (INA)

↳*Gun Weapon Systems #1 Ammunition*

Type: Projectile

Caliber: mm100

Cartridge: INA

Basic Load: INA

↳*Gun Weapon Systems #2*

Name: INA

Type: 57 mm Gun

Caliber: mm57

Quantity: 4x 57 mm (2 in) (twin) Gun

↳*Gun Weapon Systems #2 Ammunition*

Type: Projectile

Caliber: mm57

Cartridge: INA

Basic Load: INA

↳*Gun Weapon System #3*

Name: INA

Type: 30mm Anti-Aircraft Gun

Caliber: mm30

Quantity: twelve or four 30 mm Anti-Aircraft Gun

↳*Gun Weapon System #3 Ammunition*

Type: Rifle

Caliber: 30mm

Cartridge: INA

Basic Load: INA

↳*Gun Weapon System #4*

Name: INA

Type: 25mm Machine Guns

Caliber: 25mm

Quantity: 12 x 25mm Machine Guns

↳*Gun Weapon System #4 Ammunition*

Type: Rifle

Caliber: 25mm

Cartridge: INA
Basic Load: INA

Missile Weapon Systems

↳*Missile #1*

Name: P-15 Termit
Type: Anti-Ship Missile
Length: 5.8 m
Diameter: 0.76 m
Wingspan: 2.4 m
Weight: 2,580 kg
Warhead: 454 kg (1,001 lb) hollow charge high explosive
Operational Range: 80 km
Flight Altitude: 25-100 m
Maximum Speed: Mach 0.95
Guidance System: autopilot (inertial guidance), active radar homing, supplemented in some with infrared homing

Rocket Weapon Systems

↳*Rocket Weapon System #1 Launcher*

Name:
Type:
Quantity:
:
:
:
:
:
:

↳*Rocket Weapon System #1 Rocket*

Type:
Caliber: mm
Length:
Diameter:
:
:

:
Basic Load:

Torpedo Weapon Systems

↳*Torpedo Launcher*

Name:
Type:
Number of Tubes:
:
:
:

↳*Torpedo*

Name:
Type:
Length:
Diameter:
:
:
Basic Load:

Onboard Aviation Facilities

Facilities:
Aircraft:
Helicopters:

Fire Control Systems

FCS Name: Drum Tilt
Computerized FCS: Yes
Battle Management System: INA

Mines and Depth Charges

Depth Charges: Two RBU 1200 five-tube fixed launchers
Mines Capacity: 30 Mines

Radar Systems

Air Search Radar: Square Tie Radar

Surface Search Radar: Pot Head

Navigation Radar: Pot Drum

Sonar Systems

Name: Stag horn

Type: hull-mounted active search/attack sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

The North Korean Najin-class frigates are some of the largest vessels in the Korean People's Navy. Although they bear a striking resemblance to ex-Soviet Kola class frigates, they are unrelated to any Russian or Chinese design. The class was originally fitted with a trainable triple 21 inch torpedo launcher, which was replaced in the mid-1980s with fixed Styx missile launchers taken from Osa class missile boats. The design is inherently dangerous, and even a minor missile failure would result in significant damage to the ship. At least one Najin-class ship appears to have been upgraded with much more modern weaponry in 2014. Refitted at Namp'o, the outdated anti-ship missiles, aft 57mm dual cannon, Drum Tilt fire-control radar and surface search radar were removed, and several new systems were installed. Most clearly identifiable are two 30mm automated turrets at the aft, likely based on the Soviet AK-630 CIWS, and two Kh-35 missile racks with the capacity for about 8 missiles in place of the older Styx/HY-2 launchers. The modernization program appears to be continuing as of December 2014.

Type 054A Class (Jiangkai II Class) Chinese Frigate





Tiers:



Variants:

- **Binzhou:** Builder:INA, Launched: INA, Commissioned: 29 December 2016, Fleet: East Sea Fleet, Status: Active
- **Xuzhou:** Builder:INA, Launched: INA, Commissioned: 227 January 2008, Fleet: East Sea Fleet, Status: Active
- **Xuchang 23 June 2017 South Sea Fleet Active:** Builder: INA, Launched: INA, Commissioned: 23 June 2017, Fleet: South Sea Fleet, Status: Active
- **Yantai:** Pennant Number: 538, Builder: INA, Launched: INA, Commissioned: INA, Fleet: North Sea Fleet, Status: Active
- **Wuhu:** Pennant Number: 539, Builder: Hudong-Zhonghua, Launched: 08 June 16, Commissioned: 29 June 17, Fleet: North Sea Fleet, Status: Active
- **Yancheng:** Pennant Number: 546, Builder: INA, Launched: INA, Commissioned: INA, Fleet: North Sea Fleet, Status: Active
- **Linyi:** Pennant Number: 547, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Yiyang:** Pennant Number: 548, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Changzhou:** Pennant Number: 549, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Weifang:** Pennant Number: 550, Builder: INA, Launched: INA, Commissioned: 05 July 05, Fleet: North Sea Fleet, Status: Active
- **Hengyang:** Pennant Number: 568, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Yulin:** Pennant Number: 569, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Huangshan:** Pennant Number: 570, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Yuncheng:** Pennant Number: 571, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Hengshui:** Pennant Number: 572, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Liuzhou:** Pennant Number: 573, Builder: INA, Launched: INA, Commissioned: 05 July 05, Fleet: South Sea Fleet, Status: Active
- **Sanya:** Pennant Number: 574, Builder: INA, Launched: INA, Commissioned: , Fleet: , Status: Active
- **Yueyang:** Pennant Number: 575, Builder: INA, Launched: INA, Commissioned: , Fleet: , Status: Active
- **Daqing:** Pennant Number: 576, Builder: Huangpu, Launched: INA, Commissioned: , Fleet: , Status: Active
- **Huanggang:** Pennant Number: 577, Builder: Huangpu, Launched: INA, Commissioned: 01 Jan 15, Fleet: East Sea Fleet, Status: Active
- **Yangzhou:** Pennant Number: 578, Builder: INA, Launched: INA, Commissioned: INA , Fleet: INA , Status: Active
- **Handan:** Pennant Number: 579, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active
- **Rizhao:** Pennant Number: 579, Builder: INA, Launched: INA, Commissioned: INA, Fleet: INA, Status: Active

System

Alternative Designation: Type 054A Class; JIANGKAI II class

Date of Introduction: 2008

Total Built: 25 out of 29 built as of early 2020.

Type: Frigate

Builder: Hudong-Zhonghua Shipyard Huangpu Shipyard

In Service: 2008-Present

Crew: 165

Dimensions

Length: 134.1 m

Beam: 16.0 m

Draft: 5 m

Displacement, Full Load: 4,053 tons

Propulsion System

Engine Name: MAN 16 PA6V-280 STC diesel engines

Engine Type: Combined diesel and diesel (CODAD) system

Engine Power: hp18,880 kw Total Power

Maximum Range: km8000 mi

Maximum Speed: km/h27 kts

Endurance: km/hINA

Notes: Type 054 Frigate CODAD propulsion system consists of : 4 MAN Diesel 16 PA6V-280 STC engines

Gun Weapon Systems

↳*Gun Weapon System #1: Type 76A Twin, 37mm, AA Gun*

Name: Type 76A Twin 37mm AA gun

Type: Naval Anti Aircraft

Caliber: Munition specific (see ammunition section)

Quantity: 1

Manufacturer: INA

Length: 2.729 m including flash suppressor and breech

Barrel Length: 2.315 m (62.5 calibers) without flash suppressor

Weight: 126 kg

Crew: INA

Elevation: -10 / +85 degrees

Traverse: INA

Rate of Fire: INA

Muzzle Velocity: Varies with projectile

Effective Firing Range: Ballistic range: 8,400 m, Maximum AA ceiling: 5,000 m, Effective AA Ceiling 4,000 m

↳*Gun Weapon System #1, Type 76A, Ammunition: HE-FRAG/ HE-FRAG Tracer*

Type: Rifle

Caliber: HE FRAG: 4.7 Calibers/ HE FRAG Tracer 4.4 Calibers

Shell: HE-FRAG/ HE- FRAG Tracer

Basic Load: INA

Muzzle Velocity: 880 mps

Shell Weight: 1.496 kg

Bursting Charge Weight: 0.732 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #1, Type 76A, Ammunition: AP/ AP Tracer*

Type: Rifle

Caliber: AP tracer: 4.5 calibers/ AP: 4.2 calibers

Shell: AP tracer/ AP

Basic Load: INA

Muzzle Velocity: 880 mps

Shell Weight: 1.522 kg

Bursting Charge Weight: 0.758 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #2 : 2 × Type 730 7-barrel 30 mm CIWS guns*

Name: Type 730 CIWS

Type: Close-In Weapon Station

Caliber: 30mm

Quantity: 2 x Type 730 CIWS Stations

Barrel Length: INA

Weight: INA

Barrels: 7-barrel

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 150 m minimum, 1400 m interception, 2500 m effective against missiles (using APDS), 150-3500 meters against aircraft (using HE), 5000 meters against surface targets (using HE).

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition Gun Weapon System #2: Type 730 7-barrel 30 mm CIWS guns*

Type: Rifle

Caliber: 30mm

Shell: High Explosive (HE), Armor Piercing Discarding Sabot (APDS)

Shell Weight: INA

Basic Load: INA

Shell Weight: INA

Bursting Charge Weight: INA

Propellant Charge Weight: INA

Radar Systems

↳*Radar System #1: Type 382 Radar (NATO: Top Plate)*

Name: Type 382 Radar

Type: Air search radar

Alternate Designation: Top Plate (NATO)

Proliferation: China, Russia

Frequency: Bands: S (E/F) and C (G/H) bands

Beam: 2.7 degrees

Pulse Width: INA

Beam Width: INA

PRF: INA

Scan Rate: 30/minute

Resolution: INA

Range: 250 km

Mast: INA

Antenna: Planar array of MR-710

Notes: Radiation Power: 100 kw

↳*Radar System #2: Type 344*

Name: Type 344 Radar

Type: Fire control Radar

Alternate Designation: MR34

Proliferation: China

Frequency: I and J Band

Beam: INA

Pulse Width: INA

Beam Width: INA

PRF: INA

Scan Rate: INA

Resolution: INA

Range: INA

Mast: INA

Antenna: INA

Notes: The Type344 Radar: Uses phase scanning techniques •Uses pulse compression, MTI (Moving Target Indicator) and CFAR (Constant False Alarm Rate) •Traveling Wave Tube (TWT) amplifier •Independent search capability in 10" X 10" •Able to track both surface and airborne targets

↳*Radar System #3: Type 345 Fire Control Radar*

Name: Type 345

Type: Fire Control Radar

Alternate Designation: INA

Proliferation: INA

Frequency: Ku/J Band

Beam: INA

Pulse Width: INA

Polarization: Horizontal

Beam Width: 1.2 degrees

PRF: 3600 pps or 7200 pps

Scan Rate: INA

Resolution: ININAA

Range: 30 km against 2m2 RCS aircraft; 15 km against sea skimming targets.

Mast: INA

Antenna: 21 db gain

Notes: None

↳*Radar System #4: MR-36A*

Name: MR-36A Radar

Type: Surface search

Alternate Designation: Type 363

Proliferation:

Frequency: E/F - band

Beam: 1.65 x 8 deg

Pulse Width: 5.5 – 12 microsec

Polarization: Circular / Linear

Beam Width: INA

PRF: 2200/1100pps

Scan Rate: 15 or 24 rpm

Resolution: INA

Range: 130 km

Mast: INA

Antenna: 29.5 db

Notes: China Type 363 - (MR-36) Radar Track While Scan (TWS), Pulse-only Radar Role: Radar, Target Indicator, 2D Surface-to-Air Max Range: 129.6 km

↳*Radar System #5: Racal RM-1290 Radar*

Name: Racal RM-1290

Type: Navigation

Alternate Designation: Peoples Liberation Army

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: J Band

Beam: 1.3 degrees

Pulse Width: 0.505 microseconds

Polarization: Horizontal

Beam Width: INA

PFR: 1300 hz

Scan Rate: INA

Resolution: INA

Range: INA

Notes: INA

Missile Weapon Systems

↳*Vertical Launch System (VLS), Missile/Rocket: 1 x 32 cell VLS*

↳*VLS Missile System #1: HQ-16 Missiles*

Name: HQ-16 Missiles

Type: Surface-to-Air Missile

Quantity: 1 x 32-cell VLS System

Launcher: 1 x 32-cell Vertical Launch System

Length: INA

Diameter: INA

Speed: Mach 3

Range: 40 km

Guidance System: Semi-active radar homing

Note: HQ-16 (Hongqi-16) - Co-developed by China and Russia, believed to be based on either the SA-11 or SA-17. Credited with a range of 40 km. Also known as the HQ-16A.

↳*VLS Rocket System #2: YJ-83 Missile*

Name: YJ-83 Missile

Type: Anti-Ship Cruise Missile

Quantity: 2 x quad YJ-83 Launcher Systems

Launcher: 2 x quad YJ-83 Launchers

Length: INA

Diameter: INA

Engine: CTJ-2 turbojet

Warhead: 190 kg high-explosive fragmentation

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Note: The US military considers the C-802 and C-802A as parts of the YJ-83 family.[4] The C-802 precedes the closely related YJ-83; strictly speaking, only the C-802A is the export development of the YJ-83.[5] The C-802 is sometimes and erroneously considered the export version of the YJ-82; the two are separate developments.[6] A prospective "C-803" was erroneously promulgated as the export version of the YJ-83 by enthusiasts in the late-1990s. As yet, no such missile exists.

↳*Type 87 240mm anti-submarine rocket launcher (36 rockets carried)*

Name: Type 87

Type: Type 81G ASW Projectile

Quantity: Three 2 x 12 Rockets

Launcher: Manually reloaded

Length: INA

Diameter: INA

Engine: Rocket

Warhead: 34 kg High Explosive (HE)

Operational Range: 5 km

Speed: INA

Guidance System: FCS controlled by sonar

Note:

Torpedo Weapon Systems

↳*Torpedo, YU-7 Anti Submarine Warfare Torpedo*

Name: YU-7 Torpedo

Type: Anti Submarine Warfare (ASW) Torpedo (2 x 3 laucher)

Length: 2.7 m

Diameter: 324 mm

Weight: 235 kg

Warhead: High Explosive (HE)

Warhead Weight: 45 kg

Effective Firing Range: 14.1 km

Propellant: Otto fuel II

Maximum Depth: 400 m

Speed: >45 kts (83 km/h)

Guidance System: active / passive acoustic homing

Guidance System: CIACIO-S seeker

↳*Torpedo, Yu-8 Anti Submarine Warfare (ASW), Rocket Propelled Torpedo*

Name: YU-8 ASW Rocket Propelled Torpedo

Type: Light Torpedo

Length: Approx 1.2 m

Diameter: Approx 0.4 m

Engine: Rocket motor

Weight: Approx 0.6 ton

Warhead: Semi-armor-piercing

Warhead Weight: INA

Effective Firing Range: Approx 20 km

Propellant: Solid Fuel

Maximum Depth: INA

Speed: Supersonic

Guidance System: Inertial in flight, passive / active sonar in water

Onboard Aviation Facilities

Facilities: Helicopter Hanger

Helicopters: 1 Kamov Ka-28 'Helix' or Harbin Z-9C

Fire Control

FCS Name: See Weapon Systems

Computerized FCS: Yes

Radar FCS: 3 x Type 347G gun fire-control

Sonar Systems

Search and Attack Sonar 1: 1 x MGK-335 suite w/ Bull Horn active and Whale Tongue passive hull-mounted, medium-frequency search and attack

Search and Attack Sonar 1: H/SJG-206 is low frequency towed array sonar, the first towed sonar in China. Developed by ChinaShipbuilding Industry Corporation, it won second place in National Science & Technology Advancement Award in 2003, and it equips many Chinese primary surface combatant

Protection

Active Protection System: Yes, 1 x HZ100 shipborne ECM/ELINT system

Electronic Warfare: 1 x Type 922-1 radar warning intercept

Decoys: 2 x Type 726-4 18-tube decoy/chaff launcher

NBC Protection: Yes

ASW: 2 x six-tube Type 87 anti-submarine rocket launchers; 36 rockets carried

Communications and Electronic Warfare

↳*Communications*

Satellite Communications: SNTI-240 SATCOM

Satellite Communications: AKD5000S Ku band SATCOM

↳*Electronic Warfare*

ECM/ELINT: HZ-100 ECM & ELINT system

Missile Jamming System: Kashtan-3 missile jamming system

Notes:

The Type 054A (NATO codename Jiangkai II) frigate is a class of Chinese multi-role frigates, the first of which entered service with the People's Liberation Army Navy Surface Force in 2007. It is a development of the Type 054 frigate, using the same hull but with improved sensors and weapons. The Type 054A was first revealed while under construction at the Guangzhou-based Huangpu Shipyard in 2005. The Type 054A carries HQ-16 medium-range air defence missiles and anti-submarine missiles in a vertical launching system (VLS) system. The HQ-16 has a range of up to 50 km, with superior range and engagement angles to the Type 054's HQ-7. The Type 054A's VLS uses a hot launch method; a shared common exhaust system is sited between the two rows of rectangular launching tubes. The four AK-630 close-in weapon systems (CIWS) of the Type 054 were replaced with two Type 730 CIWS on the Type 054A. The autonomous Type 730 provides improved reaction time against close-in threats. The Type 054A retains its predecessor's stealth features, including sloped hull design, radar absorbent materials, and a clean profile. An improved variant beginning with the 17th unit launched from Huangpu Shipyard in 2009 has the seven-barrelled Type 730 CIWS replaced by the more capable 11-barrelled Type 1130, and is unofficially referred as Type 54A+. Another reported improvement over the original Type 054A includes the incorporation of variable depth sonar and towed array sonar. Type 054A frigate made its first operational deployment to the Gulf of Aden, when 570 Huangshan set sail as part of 2nd Escort Flotilla/Task Group 167 on 2 April 2009, the Escort Flotilla arrived there on 13 April 2009, and took over form 1st Escort Flotilla/Task Group 169 on 15 April 2009. Since then, 11 Type 054A have deployed to the Gulf of Aden for anti-piracy operations. In the lead-up to the Libyan civil war, 530 Xuzhou was deployed from anti-piracy operations in the Gulf of Aden to help evacuate Chinese nationals from Libya. In January 2014, 546 Yancheng was redeployed from anti-piracy operations in the Gulf of Aden to the eastern Mediterranean Sea to escort Syrian chemical weapons destined for destruction.

Type 053H1G Class (Jianghu-V Class) Chinese Frigate





Tiers:



Variants:

- **Beihai:** Commissioned: 1993 Fleet: East Sea Fleet
- **Dongguan:** Commissioned: 1993 Fleet: South Sea Fleet
- **Shantou:** Commissioned: 1993 Fleet: South Sea Fleet
- **Foshan:** Commissioned: 1994 Fleet: East Sea Fleet
- **Jiangmen:** Commissioned: 1995 Fleet: South Sea Fleet
- **Zhaoqing:** Commissioned: 1995 Fleet: South Sea Fleet

System

Alternative Designation: Type 053H1G; Jianghu-V Class
Total Built: 6 Ships
Type: Frigate
Builder: Hudong Shipyard,Guangzhou Shipyard KSEW Shipyard
In Service: 1993-Present
Crew: 160 to 200

Dimensions

Length: 103 to 112 m
Beam: 10 to 12 m
Draft: 3 to 4 m
Displacement, Full Load: 1,700 to 2,000 tons

Propulsion System

Engine Name: INA
Engine Type: Diesel
Engine Power: 16,000 to 22,000 shp
Maximum Range: 7,408 km
Maximum Speed: 34 knos
Endurance: INA

Gun Weapon Systems

↳*Gun Weapon System #1: PJ33A Twin 100 mm gun, Type 79*

Name: PJ33A Twin 100 mm gun, Type 76
Type: Naval anti-aircraft and anti-surface
Caliber: mmMunition specific (see ammunition section)
Manufacturer: INA
Length: 5.8 m
Barrel Length: 4.6 m
Weight: 34 tons
Crew: INA
Elevation: -5 /85 degrees
Traverse: INA
Rate of Fire: 25 rounds per minute
Muzzle Velocity: Munition specific (see ammunition section)
Effective Firing Range: Maximum Range 22,241m, AA Ceiling: 10,000m
Notes: Basic Load: 26 ready service rounds per gun. Approximate Barrel Life 800

↳*Gun Weapon System #1, PJ33A, Ammunition: AA Grenade, AA (ZS-56), AA (ZS-56P*

Type: Rifle
Caliber: 5.3 Calibers
Shell: Anti Aircraft
Basic Load: Varies
Muzzle Velocity: 900 mps
Weight: 15.6 kg to 15.9 kg
Bursting Charge: 0.79 kg to 1.23 kg
Propellant Charge Weight: 13.2 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: HE Mod 1928*

Type: Rifle
Caliber: 5.2 calibers
Shell: High Explosive
Basic Load: Varies
Muzzle Velocity: 895 mps
Weight: 15.8 kg
Bursting Charge: 1.25 kg
Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: Diving*

Type: Rifle

Caliber: 5.04 calibers

Shell: Diving (sub surface impact)

Basic Load: Varies

Muzzle Velocity: 250 mps

Projectile Weight: 15.0 kg

Bursting Charge Weight: 2.85 kg

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: Star Shell (SB-56)*

Type: Rifle

Caliber: 5.2 calibers

Shell: Star Shell (illumination)

Basic Load: Varies

Muzzle Velocity: 646 mps

Projectile Weight: 16.0 kg

Bursting Charge Weight: 0.015 kg

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #1, PJ33A, Ammunition: ECM (anti radar) (PB-56)*

Type: Rifle

Caliber: INA

Shell: ECM (anti-radar)(Electronic Counter Measures) (PB-56) (reflective material)

Basic Load: Varies

Muzzle Velocity: INA

Projectile Weight: INA

Bursting Charge Weight: INA

Propellant Charge Weight: 6.0 kg

↳*Gun Weapon System #2: Type 76A Twin, 37mm, AA Gun*

Name: Type 76A Twin 37mm AA gun

Type: Naval Anti Aircraft

Caliber: Munition specific (see ammunition section)

Manufacturer: INA

Length: 2.729 m including flash suppressor and breech

Barrel Length: 2.315 m (62.5 calibers) without flash suppresser

Weight: 126 kg

Crew: INA

Elevation: -10 / +85 degrees

Traverse: INA

Rate of Fire: INA

Muzzle Velocity: Varies with projectile

Effective Firing Range: Ballistic range: 8,400 m, Maximum AA ceiling: 5,000 m, Effective AA Ceiling 4,000 m

↳*Gun Weapon System #2, Type 76A, Ammunition: HE-FRAG/ HE-FRAG Tracer*

Type: Rifle

Caliber: HE FRAG: 4.7 Calibers/ HE FRAG Tracer 4.4 Calibers

Shell: HE-FRAG/ HE- FRAG Tracer

Basic Load: INA

Muzzle Velocity: 880 mps

Complete Round Weights: 1.496 kg

Projectile Weights: 0.732 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #2, Type 76A, Ammunition: AP/ AP Tracer*

Type: Rifle

Caliber: mmAP tracer: 4.5 calibers/ AP: 4.2 calibers

Shell: AP tracer/ AP

Basic Load: INA

Muzzle Velocity: 880 mps

Complete Round Weights: 1.522 kg

Projectile Weights: 0.758 kg

Propellant Charge Weight: 0.21 kg

Missile Weapon Systems

↳*Missile Weapon Systems #1: YJ-83 Missile Launcher*

Name: YJ-83 Launchers

Type: Missile Launcher

Quantity: 8 x twin YJ-83 Launchers (2 x4 cell box)

↳*Missile Weapon Systems #1: YJ-83 Missile*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Subsonic anti-ship cruise missile

Manufacturer: China Aerospace Science and Industry Corporation

In Service: 1998-Present

Length: INA

Diameter: INA

Warhead Type: High-explosive fragmentation

Warhead Weight: 190

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Basic Load: INA

↳*Missile Weapon Systems #2: HQ-7 SAM Launcher*

Name: HQ-7 SAM Launcher

Type: Missile Launcher

Elevation: INA

Traverse: INA

Radar: Type 360 E/F-band Doppler radar

Radar Range: 18.4 km

Combat Management System: ZJK-4 (Thomson-CSF TAVITAC) combat management system.

Note: The system is capable of processing up to 30 targets, and tracking 12 targets simultaneously.

↳*Missile Weapon Systems #2: HQ-7 SAM*

Name: HQ-7

Type: Short-Range Air Defense Missile System.

Manufacturer: China, Company: INA

In Service: 1988-Present

Length: 3 m

Diameter: .55

Warhead Type: HE-FRAG

Warhead Weight: 15 km

Operational Range: 500-700 m

Speed: Mach 2.3 or 750 m/s

Guidance System: Command + electro-optical tracking

Basic Load: HE-FRAG with proximity fuse

Torpedo Weapon Systems

↳*Torpedo, YU-7 Torpedo*

Name: YU-7 Torpedo
Type: Torpedo
Length: 2.7 m
Diameter: 324 mm
Weight: 235 kg
Warhead: High Explosive
Warhead Weight: 45 kg
Effective Firing Range: 14.1 km
Propellant: Otto fuel II
Maximum Depth: 400 m
Speed: >45 kn (83 km/h)
Guidance System: active / passive acoustic homing
Steering System: CIACIO-S seeker

Onboard Aviation Facilities

Aviation Facilities: Helicopter Hanger
Aircraft Carried: Harbin Z-9C duties include SAR and ASW. The Z-9C can be fitted with an X-band KLC-1 surface search radar to detect surface targets beyond the range of shipborne radar systems..

Fire Control System

FCS Name: INA
Computerized FCS: See Weapon Systems
Combat Data System #1: ZKG-4A
Combat Data System #2: ZKG-4B

Sonar Systems

Search Sonar: DUBV-23 search sonar
Depth Sonar: DUBV-43 variable depth sonar (VDS)

Protection

Active Protection System: See Weapon Systems
Countermeasures: See Weapon Systems
NBC Water Washdown System: INA
Electronic Detection System: SR-210 Radar warning receiver
Electronic Identification System: Type 651A IFF

Radar Systems

↳*Radar System # 1: Type 354 radar*

Name: Type 354 radar

Type: 3-D air and surface search radar

Alternate Designation: MX902 H/LJQ-354

Proliferation: Type 354 Radars are one of the most widely deployed air and surface search naval radars in Chinese service. The Type 354 was predominantly found on major People's Liberation Army Navy (PLAN) surface combatants such as the Luda class destroyer and Jianghu class frigate in the 1980s and 1990s. By 2006 it was slowly being replaced in favour of the Type 360 radar, which in turn, itself being replaced by Type 364 radar for new vessels.

Frequency: G/H band

Beam: 1.2 × 5 deg

Pulse Width: 4 µs

Polarization: linear

Beam Width: 1.20 (horizontal); 1.30 (vertical)

PRF: 400 or 800 Hz

Scan Rate: 4–10 rpm

Resolution: 800 m (range); 1.30 (azimuth)

Range: more than 93 km on aircraft with RCS of 10 m2

Mast: INA

Antenna: INA

Notes: None

↳*Radar System #2: Type 360 Radar*

Name: Type 360 radar

Type: Air/surface search radar

Alternate Designation: SR60, H/LJQ360, Seagull-S, S-3

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: E/F-band

Beam: 1.5° × 17° (coverage to 60° elevation)

Pulse Width: 20.8 (compressed to 0.4) microseconds

Polarization: INA

Beam Width: INA

PRF: 900 pps

Scan Rate: 15 or 30 rpm

Resolution: INA

Range: 250 km, Max altitude: 10,000 m

Mast: 900 kg

Antenna: 4.3 m x 0.7 m

Notes: Phased coded burst pulse, each burst consist of 4 pulses and frequency agile transmitter. Separate IFF antenna

(4 × yagi) installed on top of antenna.

↳*Radar System #3: Type 517H-1 Radar*

Name: Type 517H-1 Radar

Type: VHF Air search radar

Alternate Designation: Spider (export), SUR17B

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: A Band

Beam: INA

Pulse Width: INA

Polarization: INA

Beam Width: 5° (H), 30° (V)

PRF: INA

Scan Rate: INA

Resolution: INA

Range: 350km against 4m2 RCS target; 100km against 0.1m2 RCS Stealth aircraft, Accuracy: range error ≤200m, angle error ≤1°

Mast: INA

Antenna: INA

Notes: Non-coherent pulse compression (NCPC) system, Moving target automatically detection, Long range air surveillance Antenna : Yagi-Uda array, Rotation speed: 6RPM, Transmitter / Receiver Frequency: meter-band NF: <6dB Power Supply AC: 220VAC (150~250 VAC) Power consumption: 25kW Maximum Tracking: >20pcs <- 1m Accuracy: range error<-200m, angle

↳*Radar System #4: Type 352 Radar*

Name: Type 352 Radar

Type: Surface search radar

Alternate Designation: Square Tie, H/LJQ35

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: I - band

Beam: INA

Pulse Width: INA

Polarization: INA

Beam Width: INA

PRF: INA

Scan Rate: INA

Resolution: INA

Range: 55m - 77 km

Notes: It is analogous to the Russian MR-331 Rangout radar

↳*Radar System #5: Type 347/EFR-1 Radar*

Name: Type 347/EFR-1 Radar

Type: Fire Control Radar (Type 76A Dual 37mm AAA gun)

Alternate Designation: Rice Bowl, TRC47C

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: X Band

Beam: INA

Pulse Width: INA

Polarization: Vertical

Beam Width: 1.8°±0.2°

PRF: INA

Resolution: INA

Scan Rate: INA

Range: 30 km against 2 m² RCS aircraft ; 15 km against: 0.1 m² ASM

Mast: INA

Antenna: Circular parabolic antenna

Notes: Uses a coherent pulse doppler design Non coherent Moving Target Indicator/Detection (MTI, MTD), CFAR (Constant False Alarm Rate) Antinodding, anti clutter capability (A well advertised feature of the RTN family)

↳*Radar System #6: Racal RM-1290 Radar*

Name: Racal RM-1290

Type: Navigation

Alternate Designation: RACAL

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: J Band

Beam: 1.3 dgrees

Pulse Width: 0.05 micro seconds

Polarization: Horizontal

Beam Width: INA

PRF: 1300 hz

Scan Rate: INA

Resolution: INA

Range: INA

Notes: INA

Communications and Electronic Warfare

↳*Communications*

SATCOM: SNTI-240

Data Link: HN-900

Combat Data System: ZKJ-3C

↳*Electronic Warfare*

Electronic Intercept: RWD-8 (Jug Pair) intercept

Electronic Jamming: Type 981-3 EW Jammer

Notes:

Type 053H1G (Jianghu-V) Ships. Type 53HT Jianghu V Zigong - the least expensive and least powerful variant feature a reduction in missiles and no helicopter facilities.

Anzac Class Australian Frigate





Tiers:



Variants:

- **Anzac (FFH 150):** Commissioned: 1996 Status: Active
- **Arunta (FFH 151):** Commissioned: 1998 Status: Active
- **Warramunga (FFH 152):** Commissioned: 2001 Status: Active
- **Stuart (FFH 153):** Commissioned: 2002 Status: Active
- **Parramatta (FFH 154):** Commissioned: 2003- Status: Active
- **Ballarat (FFH 155):** Commissioned: 2004 Status: Active
- **Toowoomba (FFH 156):** Commissioned: 2005 Status: Active
- **Perth (FFH 157):** Commissioned: 2006 Status: Active
- **Te Kaha (F77):** Commissioned: 1997 Status: Active
- **Te Mana (F111):** Commissioned: 1999 Status: Active

System

Alternative Designation: The Anzac class (also identified as the ANZAC class and the MEKO 200 ANZ type).

Total Built: 10 Total Ships

Type: Frigate

Builder: AMECON

In Service: 1996-Present

Crew: 163 men

Dimensions

Length: 118 m

Beam: 14.8 m

Draught: 4.35 m

Displacement, Standard: 3,000 tons

Displacement, Full Load: 3,600 tons

Propulsion System

Gas Turbine: 1 × General Electric LM2500-30 gas turbine

Gas Turbine Power: 30,172 hp

Diesel Engine: 2 × MTU 12V1163 TB83 diesel engines

Diesel Engine Power: 8,840 hp each

Propeller: 2 × controllable-pitch propellers

Range: 6,000 nautical miles (11,000 km; 6,900 mi) at 18 knots (33 km/h; 21 mph)

Speed: 27 knots (50 km/h; 31 mph)

Endurance: at least 30 days

Missile Weapon System

↳*System*

Name: RIM-7 Sea Sparrow

Type: Anti-Aircraft, Anti-Missile Weapon System

Quantity: 1 × 8-cell Mark 41 Mod 5 vertical launch system, firing RIM-7 Sea Sparrow

Launcher: Mark 41 Vertical Launching System

Missile Name: RIM-7 Sea Sparrow

Basic Load: 16

Length: 3.7 m

Diameter: 20 cm

Wingspan: 1.02 m

Weight: 230 kg

Warhead: Annular blast fragmentation warhead, 90 lb (41 kg)

Detonation Mechanism: Proximity fuzed, expanding rod, with a 27 ft (8.2 m) kill radius

Engine: Hercules MK-58 solid-propellant rocket motor

Operational Range: 19 km

Speed: 4,256 km/h

Guidance System: Semi-active radar homing

Gun Weapon Systems

↳*Gun System #1*

Name: 5"/54 caliber Mark 45 gun

Type: Naval Gun

Caliber: 127mm

Quantity: 1 × 5-inch 54 calibre Mark 45 dual purpose gun Stations

Length: 8.992 m

Barrel Length: 6.858 m (270.0 in) Rifling: 5.82 m (229 in)

Weight: 21,691 kg

Barrels: Single barrel (progressive RH parabolic twist)

Elevation: −15° to +65°

Travese: ±170° from centerline Max. traversing rate: 30°/s

Rate of Fire: 16–20 rounds per minute automatic

Muzzle Velocity: 762.0 m/s

Effective Firing Range: 24.1 km

Feed System: 600 rounds (Ticonderoga class) 680 rounds (Arleigh Burke class) 475–500 rounds (other classes)

↳*Ammunition Gun System #1*

Type: Rifle

Caliber: mm127mm

Shell: 127 x 835mm .R Conventional: 31.75 kg (70.0 lb)

Basic Load: 2,000

↳*Gun System #2*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 2 × 12.7-millimetre (0.50 in) machine guns

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition Gun System #2*

Name: Rifle

Type: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 2,000 each

Torpedo Weapon System

Launcher: 2 × Mark 32 3-tube torpedo launchers,

Torpedo Name: Mark 46 torpedo

Length: 2.59 m

Diameter: 323.8 mm

Weight: 230 kg

Warhead: PBXN-103 high explosive (bulk charge); 43.9 kg

Engine: Two-speed, reciprocating external combustion

Propellant: Otto fuel II

Operational Range: 10,973 m

Maximum Depth: 366 m

Speed: >40 kn (74 km/h; 46 mph)

Guidance System: Active or passive/active acoustic homing

Launch Platform: Mark 32 Surface Vessel Torpedo Tubes, ASW Aircraft, RUM-139 VL-ASROC

Onboard Aviation Facilities

Helicopters: 1 x SH-60 Seahawk or SH-2G Super Seasprite

Fire Control

FCS Name: Saab Systems Ceros 200 Fire Control Director

Illuminator: CEAMOUNT Illuminators

Combat Data System: Saab Systems 9LV453 Mk3E

Sonar Systems

Bow Sonar: ThomsonSintra Spherion B hull-mounted bow sonar

Obstacle Sonar System: Petrel Mine and Obstacle Avoidance Sonar system

Towed Arrary Sonar: Fitted for but not with towed-array sonar

Radar Systems

Search Radar: Raytheon SPS-49(V)8 ANZ

Phased Array Radar: CEAFAR Active Phased Array Radar

Navigation Radar: Kelvin Hughes Sharp Eye Navigation Radar

Radar Intercept: Telefunken PST-1720 Telegon 10 radar intercept unit

Protection

Active Protection System: Yes

IFF: Cossor AIMS Mk XII IFF

NBC Protection: Yes

Electronic Support Measures #1: JEDS 3701 electronic support measures

Electronic Support Measures #2: Rascal Thorn modified Sceptre-A electronic support measures

Intercept: Telefunken PST-1720 comms intercept

Decoy #1: Mark 36 SRBOC launchers

Decoy #2: SLQ-25A towed torpedo decoy

Decoy #3: Nulka decoy launchers

Notes:

The Anzac class (also identified as the ANZAC class and the MEKO 200 ANZ type) is a ship class of ten frigates; eight operated by the Royal Australian Navy (RAN) and two operated by the Royal New Zealand Navy (RNZN). During the 1980s, the RAN began plans to replace the River-class destroyer escorts (based on the British Leander Class) with a mid-capability patrol frigate, and settled on the idea of modifying a proven foreign design for Australian conditions. Around the same time, the RNZN was seeking to replace their Leander-class frigates while maintaining blue-water capabilities. A souring of relations between New Zealand and the United States of America in relation to New Zealand's nuclear-free zone and the ANZUS security treaty prompted New Zealand to seek improved ties with other nations, particularly Australia. As both nations were seeking warships of similar capabilities, the decision was made in 1987 to collaborate on their acquisition. The project name (and later, the class name) is taken from the Australian and New Zealand Army Corps of the First World War. Twelve ship designs were tendered in 1986.[1] By 1989, the project had selected a proposal by Germany's Blohm + Voss, based on their MEKO 200 design, to be built in Australia by AMECON at Williamstown, Victoria. The modular design of the frigates allowed sections to be constructed at Whangarei, New Zealand and Newcastle, New South Wales in addition to Williamstown. The RAN ordered eight ships, while the RNZN ordered two and had the option to add two more. The frigate acquisition was controversial and widely opposed in New Zealand, and as a result, the additional ships were not ordered. In 1992, work started on the frigates; 3,600-tonne (3,500-long-ton) ships capable of a 27-knot (50 km/h; 31 mph) top speed, and a range of 6,000 nautical miles (11,000 km; 6,900 mi) at 18 knots (33 km/h; 21 mph). The armament initially consisted of a single 5-inch gun and a point-defence missile system, supported by a missile-armed helicopter. In addition, the ships were fitted for but not with a torpedo system, anti-ship missiles, and a close-in weapons system. The last ship of the class entered service in 2006; by this point, the RAN and RNZN had embarked on separate projects to improve the frigates' capabilities by fitting the additional weapons, along with updates to other systems and equipment. Since entering service, Anzac-class frigates have made multiple deployments outside local waters, including involvement in the INTERFET multi-national deployment to East Timor, and multiple operational periods in the Persian Gulf. As of 2014, all ten ships are in service. The RAN intends to start replacing theirs in 2024, while the RNZN ships will remain active until around 2030. The Anzac design is derived from Blohm + Voss' MEKO 200 PN (or Vasco da Gama-class) frigate, and is identified by the company as the MEKO 200 ANZ.[43] In addition to capability modifications to meet RAN and RNZN requirements, the ships were redesigned during the development phase to maximise the involvement of Australian and New Zealand industries through the use of locally sourced components: 80% of the materials (by value) was locally sourced, and within this, 20% must come from New Zealand. The Anzacs were designed to German Navy standards, except where Australian or United States standards were specifically requested. Each frigate has a 3,600-tonne (3,500-long-ton; 4,000-short-ton) full load displacement. The ships are 109 metres (358 ft) long at the waterline, and 118 metres (387 ft) long overall, with a beam of 14.8 metres (49 ft), and a draught at full load of 4.35 metres (14.3 ft). The hull and superstructure are of all-steel construction, and the ships are fitted with fin stabilisers. The frigates use a Combined Diesel or Gas (CODOG) propulsion machinery layout, with a single, 30,172-horsepower (22,499 kW) General Electric LM2500-30 gas turbine and two 8,840-horsepower (6,590 kW) MTU 12V1163 TB83 diesel engines driving the ship's two controllable-pitch propellers. Maximum speed is 27 knots (50 km/h; 31 mph), and maximum range is over 6,000 nautical miles (11,000 km; 6,900 mi) at 18 knots (33 km/h; 21 mph). The frigates' range is about 50% greater than other MEKO-type frigates, due to an enhanced fuel supply. Originally, two gas turbines were to be fitted; this layout would have provided a top speed of 31.75 knots (58.80 km/h; 36.54 mph). The starboard turbine was cancelled to save costs. The standard ship's company of an Anzac consists of 22 officers and 141 sailors. Onboard electricity requirements are met by four MTU diesel generators. Each ship can carry up to 29 cubic metres (1,000 cu ft) of dry provisions, 29 cubic metres (1,000 cu ft) of refrigerated provisions, and 54 tonnes (53 long tons; 60 short tons) of fresh water.

Admiral Gorshkov Class Russian Frigate







Tiers:



Variants:

- **Admiral Gorshkov:** Commisioned: 2018 Fleet: Northern
- **Admiral Kasatonov:** Commisioned: 2020 Fleet: Northern
- **Admiral Golovko:** Commisioned: 2021 Fleet: Northern
- **Admiral Isakov:** Commisioned: 2022 Fleet: Northern
- **Admiral Amelko:** Commisioned: 2024 Fleet: INA
- **Admiral Chichagov:** Commisioned: 2025 Fleet: INA

System

Alternative designations: Admiral Gorshkov-class frigate; Project 22350

Builders: Severnaya Verf, Saint Petersburg

Vessel Planned: 15

Type: Guided Missile Frigate

Crew: 210

Dimensions

Length: 130.0 m

Beam: 16.0 m

Draught: 4.5 m

Displacement: Standard: 4,500 tons Full: 5,400 tons

Automotive

Main Propulsion: 2 shaft CODAG; 2 10D49 cruise diesel engines 5,200 shp (3,900 kW); 2 M90FR boost gas turbines 27,500 shp (20,500 kW); Total: 65,400 shp (48,800 kW)

Maximum Speed: 29.5 knots (54.6 km/h; 33.9 mph)

Maximum Range: 4,850 nmi (8,980 km; 5,580 mi) at 14 kn (26 km/h; 16 mph)

Endurance: 30 days

Armament

↳*Weapon Station #1*

Name: A-192 Naval Gun

Caliber: 130mm

Quantity: 1 x A-192 Naval Gun

Length: m1.37

Diameter: m0.13

Weight: kg52

Targets: Targets: Aircraft, Helicopter, Missile, Surface Vessel, Land Structure - Soft, Mobile Target - Soft

Maximum Effective Range, Air Targets: km3.3

Maximum Effective Range, Surface Targets: km22.2

↳*Ammunition Weapon Station #2*

Type: FRAG

Caliber: 130mm

Cartridge: INA

Basic Load: 2,000

↳*Weapon Station #2*

Name: Kashtan Close-in Weapon System (CIWS)

Type: modern naval air defence gun-missile system deployed by the Russian Navy.

Caliber: 30mm

Quantity: 1 x Kashtan Close-in Weapon System (CIWS)

Main Armament: 8 × 9M311K + 32 missiles

Number of Missiles: 32 missiles

Secondary Armament: 2 × AO-18K Autocannon (30mm)

Length: INA

Height: 2,250 mm (89 in) (above deck)[

Weight: 15,500 kg

Barrels: 2 × 6 (guns); 2 × 4 launch tubes

Action: Gas-operated rotary cannon

Rate of Fire: 9,000 rounds/min

Muzzle Velocity: 860 m/s

Effective Firing Range, Missiles: 1,500–8,000 m

Feed System: Link-less, helical; 1000 round

Sights: Radar / TV-optical:[N 3] 2–3/1 m (6.6–9.8/3.3 ft) accuracy, tracks 6 targets simultaneously

Warhead: Continuous-rod w/ frag laye

Flight Altitude: 3,500 m (11,500 ft) (Kashtan) 6,000 m (20,000 ft) (Kashtan-M

Speed: 910 m/s

↳*Ammunition Weapon Station #2*

Shell: HEI-Frag, Frag-T, APDS-T

Caliber: mm30

Shell Weight: 0.39 kg (0.86 lb) (HEIF, FT)[6] 0.30 kg (0.66 lb) (APDS-T)

Basic Load: INA

↳*Weapon Station #3*

Name: 3S90/M-22 Uragan (SA-N-7 "Gadfly")

Type: Surface-to-air missile

Quantity: 24 x Uragan SAMs

Length: 5.55

Diameter: 0.4 m

Warhead: Frag-HE

Warhead Weight: 70 kg

Detonation Mechanism: Radar proximity fuse

Propellant: Solid propellant rocket

Operational Range: km30

Flight Altitude: m14,000

Speed: Mach 3

Guidance System: Semi-active radar homing

Note: 3S90/M-22 Uragan (SA-N-7 "Gadfly") – Naval version of the 9K37 Buk missile system with 9M38/9M38M1 missile.

↳*Weapon Station #4*

Name: Type 53

Type: 53 cm (21 inch) torpedoes

Primary Function: ASUW torpedo

Length: 7.2 m

Diameter: 2,070–2,300 kg

Weight: 2,070–2,300 kg

Range: 18,000 meters (20,000 yd)

Speed: 45 kn (52 mi/h, 83 km/h)

Guidance System: Wake homing

Warhead: 307.6 kilograms (678 lb) high explosive

Aircraft

↳*Ka-26 / 27 / 28 / 31 / 32*

Quantity: 1

↳*Ka-31 Helix / Ka-27 / Z-8 / Z-9 / Z-18*

Quantity: Up to 12

Protection

Electronic Warfare: EW Suite: Prosvet-M

Countermeasures: 2 × PU KT-308 8 × PU KT-216 2 × 5P-42 Filin

Notes:

The Admiral Gorshkov class, Russian designation Project 22350, is the newest class of frigates being built by the Severnaya Verf in Saint Petersburg for the Russian Navy. The class was designed by the Severnoye Design Bureau and incorporates use of stealth technology. So far, six vessels of the class have been ordered and scheduled for delivery by 2025. The lead ship of the class, Admiral Gorshkov, was commissioned on 28 July 2018. The Admiral Gorshkov is a new Russian class of multi-role frigates. It is a successor to the Burevestnik class (Western reporting name Krivak class). The project was approved by the Russian Naval Command in 2003. Construction of the lead ship, Admiral Gorshkov, started in 2006. It was commissioned with the Russian Navy in 2018. By of 2018 another 3 frigates of the class were under construction, plus 2 more were ordered and 2 more were planned. The Russian Navy has a requirement for 20-30 of such new frigates to fully replace the surviving Krivak class frigates and Sovremenny class destroyers. It is planned that Admiral Gorshkov class frigates will become the mainstay of the future Russian fleet. An export version of this frigate class is also being proposed for possible customers. The Admiral Gorshkov class is a perfect example of multi-role frigate. Many other frigates are focused on specific tasks, such as anti-air warfare, or anti-submarine warfare. This Russian frigate was designed to perform multiple roles, such as perform long-range attacks against surface targets and ships, conduct anti-submarine warfare, carry out escort missions and be deployed in a variety of situations that a general frigate class would not be able to fulfill. In some cases such multi-role frigates can even substitute deployment of larger destroyers. This new class of Russian frigates incorporate best weapons and sensors that the Russian industry can produce. The Admiral Gorshkov class is equipped with a 16-cell Vertical Launch System (VLS) for a mix of Kalibr-NK land attack cruise missiles (range 2 500 km), P-800 Oniks anti-ship missiles (range 300-500 km) and 91RTE2 anti-submarine missiles (missile drops torpedo 50 km away). There is another 32-cell VLS for medium-range air defense missiles. It uses the same 9M96E and 9M96E2 interceptor missiles as the S-400 land-based air defense system. These missiles are intended to defend against precision attacks and various defense suppression weapons. These missiles are designed for direct impact have a range of 40 and 120 km respectively. Their claimed kill probability is 90% against aircraft and 70% against Harpoon anti-ship missile. It has been reported that this vertical launch system can also launch a short-range missile which is likely a variant of the 9M100. Further anti-submarine/anti-shipping capabilities are provided via two quadrupple 330 mm torpedo launchers for unique Paket-NK torpedoes. These can engage both enemy submarines, as well as incoming torpedoes, thus serving a dual role. There is a 130 mm A-192M gun. It has a rate of fire of 45 rounds per minute. It can be used to engage surface targets, as well as to bombard land. Last ditch defense is provided by two Palash Close-In Weapon Systems (CIWS), mounted at the rear. These defense systems are fitted with 30 mm rapid-firing Gatling guns and 8 short-range surface-to-air missiles each. Also there are two pedestal-mounted 14.5 mm heavy machine guns. The Admiral Gorshkov class frigates have a hangar and can accommodate a single Kamov Ka-27, or similar naval helicopter. The Admiral Gorshkov class has a Combined Diesel and Gas (CODAG) propulsion. Machinery includes two cruise diesel engines, developing a combined output of 10 400 shp and two boost gas turbines, developing a combined output of 55 000 shp. The power is delivered to 2 shafts. Maximum speed is 29.5 knots (55 km/h). However construction of the third and forth ship was postponed due to problems with the engine supply. The first two ships of the Admiral Gorshkov class have Ukrainian gas turbines engines. A center of Soviet maritime gas turbine design and production was in Ukraine. After the collapse of the Soviet Union, Russia used to purchase these engines from Ukraine. However following the 2014 Russian military aggression in Ukraine, the Ukrainians refused to supply Russia with military technology. In 2014 one gas turbine engine of the second ship, Admiral Kasatonov, was transferred to the lead ship,

Admiral Gorshkov, in order to complete it. The Russian NPO Saturn has been commissioned to design new engines for the Admiral Gorshkov class frigates, allowing third and forth ship to be commissioned from 2020.

Type 054 Class (Jiangkai I Class) Chinese Frigate





Tiers:

1 **2** 3 4

Variants:

- **MAANSHAN:** Commissioned: 2005 Status: Active
- **WENZHOU:** Commissioned: 2005 Status: Active

System

Alternative Designation: Type 054 Class; JIANGKAI I class

Date of Introduction: 2005

Type: Frigate

Builder: Hudong-Zhonghua Shipyard Huangpu Shipyard

In Service: 2005-Present

Crew: 190

Dimensions

Length: 125 m

Beam: 14 m

Draft: 5 m

Displacement, Standard: 3,400 tons

Displacement, Full Load: 3,800 tons

Propulsion System

Engine Name: 2 x SEMT Pielstick 16-cylinder PA6 STC diesel; 2 x Shaanxi diesel (license-built MTU 20V 956TB82)

Engine Type: Combined diesel and diesel (CODAD) system

Engine Power: hp25,320 hp (18,880 kW) total at 1,084 rpm; 2 shafts

Maximum Range: 6,500 nm at 33.3 km/h (18 knots)

Maximum Speed: km/h33.6 km/h(30 knots)

Endurance: km/hINA

Gun Weapon Systems

↳*Gun Weapon System #1: Type 76A Twin, 37mm, AA Gun*

Name: Type 76A Twin 37mm AA gun

Type: Naval Anti Aircraft

Caliber: Munition specific (see ammunition section)

Quantity: 1

Manufacturer: INA

Length: 2.729 m including flash suppressor and breech

Barrel Length: 2.315 m (62.5 calibers) without flash suppressor

Weight: 126 kg

Crew: INA

Elevation: -10 / +85 degrees

Traverse: INA

Rate of Fire: INA

Muzzle Velocity: Varies with projectile

Effective Firing Range: Ballistic range: 8,400 m, Maximum AA ceiling: 5,000 m, Effective AA Ceiling 4,000 m

↳*Gun Weapon System #1, Type 76A, Ammunition: HE-FRAG/ HE-FRAG Tracer*

Type: Rifle

Caliber: HE FRAG: 4.7 Calibers/ HE FRAG Tracer 4.4 Calibers

Shell: HE-FRAG/ HE- FRAG Tracer

Basic Load: INA

Muzzle Velocity: 880 mps

Shell Weight: 1.496 kg

Bursting Charge Weight: 0.732 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #1, Type 76A, Ammunition: AP/ AP Tracer*

Type: Rifle

Caliber: AP tracer: 4.5 calibers/ AP: 4.2 calibers

Shell: AP tracer/ AP

Basic Load: INA

Muzzle Velocity: 880 mps

Shell Weight: 1.522 kg

Bursting Charge Weight: 0.758 kg

Propellant Charge Weight: 0.21 kg

↳*Gun Weapon System #2 : 2 × Type 730 7-barrel 30 mm CIWS guns*

Name: Type 730 CIWS

Type: Close-In Weapon Station

Caliber: 30mm

Quantity: 2 x Type 730 CIWS Stations

Barrel Length: INA

Weight: INA

Barrels: 7-barrel

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 150 m minimum, 1400 m interception, 2500 m effective against missiles (using APDS), 150-3500 meters against aircraft (using HE), 5000 meters against surface targets (using HE).

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition Gun Weapon System #2: Type 730 7-barrel 30 mm CIWS guns*

Type: Rifle

Caliber: 30mm

Shell: High Explosive (HE), Armor Piercing Discarding Sabot (APDS)

Shell Weight: INA

Basic Load: INA

Shell Weight: INA

Bursting Charge Weight: INA

Propellant Charge Weight: INA

Radar Systems

↳*Radar System #1: Type 382 Radar (NATO: Top Plate)*

Name: Type 382 Radar

Type: Air search radar

Alternate Designation: Top Plate (NATO)

Proliferation: China, Russia

Frequency: Bands: S (E/F) and C (G/H) bands

Beam: 2.7 degrees

Pulse Width: INA

Beam Width: INA

PRF: INA

Scan Rate: 30/minute

Resolution: INA

Range: 250 km

Mast: INA

Antenna: Planar array of MR-710

Notes: Radiation Power: 100 kw

↳*Radar System #2: Type 344*

Name: Type 344 Radar

Type: Fire control Radar

Alternate Designation: MR34

Proliferation: China

Frequency: I and J Band

Beam: INA

Pulse Width: INA

Beam Width: INA

PRF: INA

Scan Rate: INA

Resolution: INA

Range: INA

Mast: INA

Antenna: INA

Notes: The Type344 Radar: Uses phase scanning techniques •Uses pulse compression, MTI (Moving Target Indicator) and CFAR (Constant False Alarm Rate) •Traveling Wave Tube (TWT) amplifier •Independent search capability in 10" X 10" •Able to track both surface and airborne targets

↳*Radar System #3: Type 345 Fire Control Radar*

Name: Type 345

Type: Fire Control Radar

Alternate Designation: INA

Proliferation: INA

Frequency: Ku/J Band

Beam: INA

Pulse Width: INA

Polarization: Horizontal

Beam Width: 1.2 degrees

PRF: 3600 pps or 7200 pps

Scan Rate: INA

Resolution: ININAA

Range: 30 km against 2m2 RCS aircraft; 15 km against sea skimming targets.

Mast: INA

Antenna: 21 db gain

Notes: None

↳*Radar System #4: MR-36A*

Name: MR-36A Radar

Type: Surface search

Alternate Designation: Type 363

Proliferation:

Frequency: E/F - band

Beam: 1.65 x 8 deg

Pulse Width: 5.5 – 12 microsec

Polarization: Circular / Linear

Beam Width: INA

PRF: 2200/1100pps

Scan Rate: 15 or 24 rpm

Resolution: INA

Range: 130 km

Mast: INA

Antenna: 29.5 db

Notes: China Type 363 - (MR-36) Radar Track While Scan (TWS), Pulse-only Radar Role: Radar, Target Indicator, 2D Surface-to-Air Max Range: 129.6 km

↳*Radar System #5: Racal RM-1290 Radar*

Name: Racal RM-1290

Type: Navigation

Alternate Designation: Peoples Liberation Army

Proliferation: People's Liberation Army Navy, Pakistan Navy, Bangladesh Navy

Frequency: J Band

Beam: 1.3 degrees

Pulse Width: 0.505 microseconds

Polarization: Horizontal

Beam Width: INA

PFR: 1300 hz

Scan Rate: INA

Resolution: INA

Range: INA

Notes: INA

Missile Weapon Systems

↳*Vertical Launch System (VLS), Missile/Rocket: 1 x 32 cell VLS*

↳*VLS Missile System #1: HQ-16 Missiles*

Name: HQ-16 Missiles

Type: Surface-to-Air Missile

Quantity: 1 x 32-cell VLS System

Launcher: 1 x 32-cell Vertical Launch System

Length: INA

Diameter: INA

Speed: Mach 3

Range: 40 km

Guidance System: Semi-active radar homing

Note: HQ-16 (Hongqi-16) - Co-developed by China and Russia, believed to be based on either the SA-11 or SA-17. Credited with a range of 40 km. Also known as the HQ-16A.

↳*VLS Rocket System #2: YJ-83 Missile*

Name: YJ-83 Missile

Type: Anti-Ship Cruise Missile

Quantity: 2 x quad YJ-83 Launcher Systems

Launcher: 2 x quad YJ-83 Launchers

Length: INA

Diameter: INA

Engine: CTJ-2 turbojet

Warhead: 190 kg high-explosive fragmentation

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Note: The US military considers the C-802 and C-802A as parts of the YJ-83 family.[4] The C-802 precedes the closely related YJ-83; strictly speaking, only the C-802A is the export development of the YJ-83.[5] The C-802 is sometimes and erroneously considered the export version of the YJ-82; the two are separate developments.[6] A prospective "C-803" was erroneously promulgated as the export version of the YJ-83 by enthusiasts in the late-1990s. As yet, no such missile exists.

↳*Type 87 240mm anti-submarine rocket launcher (36 rockets carried)*

Name: Type 87
Type: Type 81G ASW Projectile
Quantity: Three 2 x 12 Rockets
Launcher: Manually reloaded
Length: INA
Diameter: INA
Engine: Rocket
Warhead: 34 kg High Explosive (HE)
Operational Range: 5 km
Speed: INA
Guidance System: FCS controlled by sonar
Note:

Torpedo Weapon Systems

↳*Torpedo, YU-7 Anti Submarine Warfare Torpedo*

Name: YU-7 Torpedo
Type: Anti Submarine Warfare (ASW) Torpedo (2 x 3 laucher)
Length: 2.7 m
Diameter: 324 mm
Weight: 235 kg
Warhead: High Explosive (HE)
Warhead Weight: 45 kg
Effective Firing Range: 14.1 km
Propellant: Otto fuel II
Maximum Depth: 400 m
Speed: >45 kts (83 km/h)
Guidance System: active / passive acoustic homing
Guidance System: CIACIO-S seeker

↳*Torpedo, Yu-8 Anti Submarine Warfare (ASW), Rocket Propelled Torpedo*

Name: YU-8 ASW Rocket Propelled Torpedo

Type: Light Torpedo

Length: Approx 1.2 m

Diameter: Approx 0.4 m

Engine: Rocket motor

Weight: Approx 0.6 ton

Warhead: Semi-armor-piercing

Warhead Weight: INA

Effective Firing Range: Approx 20 km

Propellant: Solid Fuel

Maximum Depth: INA

Speed: Supersonic

Guidance System: Inertial in flight, passive / active sonar in water

Onboard Aviation Facilities

Facilities: Helicopter Hanger

Helicopters: 1 x Ka-28 or Harbin Z-9C helicopter

Fire Control

FCS Name: See Weapon Systems

Computerized FCS: Yes

Radar FCS: 3 x Type 347G gun fire-control

Sonar Systems

Search and Attack Sonar 1: 1 x MGK-335 suite w/ Bull Horn active and Whale Tongue passive hull-mounted, medium-frequency search and attack

Search and Attack Sonar 1: H/SJG-206 is low frequency towed array sonar, the first towed sonar in China. Developed by ChinaShipbuilding Industry Corporation, it won second place in National Science & Technology Advancement Award in 2003, and it equips many Chinese primary surface combatant

Protection

Active Protection System: Yes, 1 x HZ100 shipborne ECM/ELINT system

Electronic Warfare: 1 x Type 922-1 radar warning intercept

Decoys: 2 x Type 726-4 18-tube decoy/chaff launcher

NBC Protection: Yes

ASW: 2 x six-tube Type 87 anti-submarine rocket launchers; 36 rockets carried

Communications and Electronic Warfare

↳*Communications*

Satellite Communications: SNTI-240 SATCOM

Satellite Communications: AKD5000S Ku band SATCOM

↳*Electronic Warfare*

ECM/ELINT: HZ-100 ECM & ELINT system

Missile Jamming System: Kashtan-3 missile jamming system

Notes:

The Type 054 (NATO Codename Jiangkai I) frigate is a Chinese multi-role warship that were commissioned in the People's Liberation Army Navy Surface Force in 2005. They superseded the Type 053H3 frigates. Two ships, 525 Ma'anshan, and 526 Wenzhou, were completed before production switched to the improved Type 054A frigate. The Type 054 has a stealthy hull design with sloped surfaces, radar absorbent materials, and a reduced superstructure clutter. The main anti-ship armament were YJ-83 sea-skimming anti-ship cruise missiles in two four-cell launchers. It retained the HQ-7 SAM, an improved version of the French Crotale, from the preceding Type 053H3; the HQ-7 had a ready-to-fire 8-cell launcher, with 16 stored in the automatic reloader. Short range defence was improved with four AK-630 CIWS turrets. A 100 mm main gun, also based on a French design, was mounted. Both ships were powered by four CODAD Type 16 PA6 STC marine diesel engines designed by SEMT Pielstick, each generating 6,330 hp. Licenses for the engines were sold to China in April 2002, where they were built by the Shaanxi Diesel Engine Factory. Other reports claimed each ship was powered by two (or four) Type 16 PA STC and two MTU 20V 956TB92 diesels.

→Littoral Combat Ships

Azmat Class Pakistani Fast Attack Craft






Tiers:



System

Alternative Designations: PNS Azmat (Azmat Class)
Class and Type: Fast attack craft
Builder: China State Shipbuilding Corporation, Xingang
Launched: 20 September 2011
Commissioned: 24 April 2012
Status: Active
Crew: 12-14
Mission: The fast attack craft can be deployed in maritime patrol, anti-surface warfare, anti-air warfare, search-and-rescue (SAR) and anti-piracy missions.
Pennant Number: 1013

Dimensions

Length: 62.97 m
Beam: 8.76 m
Displacement: 560 tons
Draught: 2.46m

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Number of Engines: ea4

Maximum Speed: 30 knots

Maximum Range: 1,000 nm

Propellers: Fixed Pitch Propellers (FPPs) through a pair of two propulsion shafts.

Armament

↳*Gun Station #1*

Name: AK-630

Type: Close-In Weapon System

Caliber: 30mm

Quantity: 1

Configuration: In "630", "6" means 6 barrels and "30" means 30 mm.

Mission: The system's primary purpose is defense against anti-ship missiles and other precision guided weapons. However it can also be employed against fixed or rotary wing aircraft, ships and other small craft, coastal targets, and floating mines.

Turret: It is mounted in an enclosed automatic turret

Radar: MR-123 radar and television detection and tracking.

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm (49 in) (mount ring)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Height: 1,070 mm (42 in) (above deck)

Crew: 1

Barrels: 6

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec) +90° ... -25° (60°/sec) AK-630M-2

Traverse: ±180° (70°/sec) ±180° (80°/sec) AK-630M-2

Rate of Fire: 4,000–5,000 rounds/min (AK-630M) 10,000 rounds/min (AK-630M1-2)

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime) 5,000 m (16,000 ft) (all, AK-630M-2)

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin, AK-630M) 4,000 rounds (AK-630M1-2)

Sights: Radar / TV-optical

↳*Ammunition Gun Station #1*

Shell: HEI-Frag, Frag-T

Caliber: 30×165mm AO-18

Shell Weight: 0.39 kg

Basic Load: INA

↳*Gun Station #2*

Name: INA

Type: Automatic gun

Caliber: 23mm

Quantity: 1

↳*Ammunition Gun Station #2*

Name: INA

Type: Rifle

Caliber: 23mm

Basic Load: INA

↳*Missile System*

Name: C-802

Type: Anti-Ship Cruise Missile

Manufacturer: China Aerospace Science and Industry Corporation

Proliferation: Widely Proliferated

In Service: 1998-Present

Engine: TRI 60-2 turbojet

Maximum Range: 65 nautical miles (120 km)

Guidance System: Inertial navigation/active radar homing terminal guidance

Note: The C-802 which is a export variant of the YJ-83 (NATO: CSS-N-8 Saccade)

Protection

Armor: INA

Close-In Weapon System (CIWS): Yes, the AK-630

Note: The boat's speed itself is also considered as a defense system, as it can outmaneuver older, less maneuverable anti-ship missiles.

Notes:

PNS Azmat is the lead ship of the Azmat class fast attack crafts of the Pakistan Navy and is based on the Chinese Type 037II Houjian-class missile boat. Azmat was commissioned on 24 April 2012 at Tianjin, China after being launched on 20 September 2011. It has the pennant number 1013. PNS Azmat is considered by many[citation needed] as a stealth boat, due to its hull and design, even though it was not so designed. The small fast attack craft is a green water vessel and does not have blue water capabilities, and so it is mostly used to patrol the coast, and to assist the Coast Guard in any special operations that require extensive firepower. PNS Azmat is equipped with eight C-802 anti-ship cruise missiles, carried in two quadruple missile

containers. The vessel uses a fully automatic 23 mm gun. The decision to install the 23 mm gun was due to lack of hull space, which meant less storage area for 75-100 mm rounds required for larger guns and weight requirements. Also a 23 mm gun is much easier to maintain than larger 75 mm to 100 mm guns. For its defensive capabilities, Azmat uses a CIWS. Also, the boat's speed itself is also considered as a defense system, as it can outmaneuver older, less maneuverable anti-ship missiles.

CB90 Class Swedish Fast Assault Craft





Tiers:



Variants:

- **The Strb 90 L:** The Strb 90 L is outfitted for battalion-level command and control, with computer and communications equipment and an auxiliary generator to provide electrical power when the engines are not running. The L stands for ledning (command or leadership).
- **The Strb 90 KompL:** The Strb 90 KompL is a plain Strb 90 H in which portable computer and communications equipment has been installed, allowing it to temporarily provide company-level command and control. Electrical power is provided by a rather loud portable generator installed on deck.
- **The Strb 90 HS:** is designed for overseas peace-keeping and rescue operations. It is modified to keep its crew comfortable in Mediterranean conditions, with air conditioning, an auxiliary generator, a head, and more comfortable crew stations. More importantly, it is armored, and its engines have been upgraded to compensate for the added weight.
- **Strb 90 H:** At least one Strb 90 H, pennant number 802, is equipped with a decompression chamber.
- **SB90N:** The Royal Norwegian Navy operates 20 CB90s under the designation SB90N; the N simply stands for Norsk utgave (Norwegian version). The S90N differs from the Strb 90 H in a few areas: *It is armed with only one 12.7 mm machine gun, instead of three. *The anchor winch is motorized, and the anchor is mounted at the stern, allowing a grounded S90N to tow itself afloat rather than risk damage to its impellers. It carries an auxiliary generator which provides electrical power to navigation and communications systems even when the engines are not running. The "Troops transportation room" has a higher deck height, making it possible for most people to stand without crouching. It has two water tight compartments in the bow, having an extra room for toilet and stores. It has a much more sophisticated navigation equipment based on GPS-technology delivered by Kongsberg Seatex AS.

System

Alternative Designation: CB90; Stridsbåt 90 H(alv) (Strb 90 H, literally: Combat Boat 90 Half
Total Built: +300 Total Built Greece Hellenic Coast Guard: 3 Malaysia Malaysian Navy: 5 unit CB90, 12 unit CB90HEX Mexico Mexican Navy: 48 Norway Royal Norwegian Navy: 20 Sweden Royal Swedish Navy: 147 in service, 18 on order United Kingdom Royal Navy: 4, formerly leased from the Royal Swedish Navy, used to evaluate the option of potential acquisition and returned to the Swedish Navy. United States US Navy: 6, known as 'Riverine Command Boat'
Builders: Dockstavarvet, Gotlandsvarvet
Crew: 3 (two officers and one engineer)

Passengers: Up to 21 amphibious troops with full equipment

Dimensions

Length: 15.9 m (52 ft) Overall 14.9 (48') Waterline

Beam: 3.8 m

Draught: 0.8 m

Displacement: 13,000 kg (28,660 lbs) Empty, 15,300 kg (33,730 lbs) Standard, 20,500 kg (45,190 lbs) Full load

Automotive

Propulsion: 2 × 625 bhp Scania DSI14 V8 Diesel; 2 × Kamewa FF water jets

Speed: 40 knots (74 km/h)

Range: 240 nmi (440 km) at 20 knots (37 km/h)

Armament

Note: Additionally, the CB90 carries 4 naval mines or 6 depth charges.

↳*Weapon Station #1*

Name: M2HB Heavy Machine Gun

Type: Heavy Machine Gun

Quantity: 3 x M2HB Heavy Machine Gun

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3)

Muzzle Velocity: 890 m/s

Effective Fire: 1,800 m

Maximum Firing Range: 7,400 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition, Weapon Station #1*

Cartridge: 50 BMG (12.7×99mm NATO)

Type: Rifle

Caliber: mm12.7

Basic Load: 2,000

↳*Weapon Station #2*

Name: Mk 19 Grenade Launcher

Type: Grenade Launcher

Quantity: 1 x Mk 19 Grenade Launcher

In Service: 1968-Present

Manufacturer: Saco Defense Industries (now a division of General Dynamics Ordnance and Tactical Systems), Combined Service Forces, MKEK

Length: 1,090 mm

Barrel Length: 413 mm

Width: 240.4 mm

Height: 199 mm

Weight: 35.2 kg (empty without accessories)

Action: Blowback (Advanced primer ignition)

Rate of Fire: 360–390 rpm (cyclic) 40 rpm (sustained) 60 rpm (rapid)

Muzzle Velocity: 750–790 feet per second (230–240 m/s) (average)

Effective Firing Range: 1,500 m

Maximum Firing Range: 2,212 m

Feed System: 32- or 48-grenade belt

↳***Ammunition, Weapon Station #2***

Cartridge: 40×53 mm

Caliber: 40mm

Basic Load: INA

Protection

Hull Armor: INA

Notes:

Stridsbåt 90 H(alv) (Strb 90 H, literally: Combat Boat 90 Half; the 90 refers to the year of acceptance and Half refers to the fact that it can carry and deploy a half platoon of amphibious infantry (18 men) fully equipped) is a class of fast military assault craft originally developed for the Swedish Navy by Dockstavarvet. In addition to the many variants in service with the Swedish Navy under the "Stridsbåt 90H" designation, the CB 90 has been adopted by the navies of several countries, including Norway (as the S90N), Greece, Mexico (as the CB 90 HMN), the United States (as the Riverine Command Boat) and Malaysia. Additionally, the German Navy plans to equip the Berlin-class replenishment ships with the CB90. The CB90 is an exceptionally fast and agile boat that can execute extremely sharp turns at high speed, decelerate from top speed to a full stop in 2.5 boat lengths, and adjust both its pitch and roll angle while under way. Its light weight, shallow draught, and twin water jets allow it to operate at speeds of up to 40 knots (74 km/h) in shallow coastal waters. The water jets are partially ducted, which, along with underwater control surfaces similar to a submarine's diving planes, gives the CB90 its maneuverability.

Perdana Class Malaysian Fast Attack Craft





Tiers:



Variants:

- **KD Perdana:** Pennant Number:3501 Commision Year: 1972
- **KD Serang:** Pennant Number:3502 Commision Year: 1973
- **KD Ganas:** Pennant Number: 2503 Commision Year: 1973
- **KD Ganyang:** Pennant Number:3504 Commision Year: 1973

System

Alternative Designations: Kaman; La Combattante IIa fast attack craft
Total Built: 4 vessels total
Pennant Number: 3501
Builders: CMN Lurssen
In Service: 1972-Present
Type: Fast Attack Craft
Crew: 30 (4 officers)
Sensors and processing systems: Thomson-CSF Triton; G-band Thomson-CSF Castor; I/J-band CSEE Panda optical director
Electronic warfare & decoys: Thomson-CSF DR 2000S
Minelaying Capable: Yes

Dimensions

Length: 47 m
Beam: 8 m
Displacement,: 234 tons (standard) 265 tons (full load)
Draught: 2.1 m

Automotive

Engine: 4 × MTU MD 16V 538 TB90
Number of Engines: 4
Engine Power: 12,000 hp (8,900 kW) (combined)

Propulsion: Four shafts

Maximum Speed: 36 knots (67 km/h; 41 mph) (maximum)

Range: 570 nautical miles (1,060 km; 660 mi) at 30 knots (56 km/h; 35 mph) 1,600 nautical miles (3,000 km; 1,800 mi) at 15 knots (28 km/h; 17 mph)

Armament

↳*Weapon Station #1*

Name: Bofors 57 mm L/70 naval artillery gun

Type: Dual-purpose naval guns

Quantity: 1

Caliber: 57 mm/70 caliber

Barrel Length: Bore length: 3,990 mm (157.09 in) Without flash hider: 4,045 mm (159.25 in) With flash hider: 4,345 mm (171.06 in)

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Weight: Mark 3: 14,000 kg (31,000 lb) (weight including 1,000 rounds onboard, each weighing 6.5 kg (14 lb) per complete round)

Action: Electronic firing

Elevation: Mark 1: −10°/+78° (40°/s) Mark 2: −10°/+75° (40°/s) Mark 3: −10°/+77° (44°/s)

Traverse: 360 deg

Rate of Fire: Marks 1 & 2: 55°/s Mark 3: 57°/s Mark 1: 200 rounds/min Marks 2 & 3: 220 rounds/min

Muzzle Velocity: 1,035 m/s

Effective Firing Range: 8,500 m (9,300 yd) (HE round)

Maximum Firing Range: 17,000 m (19,000 yd) (HE round at 45°)

Feed System: Magazine: Mark 1: 40 ready rounds, 128 rounds in ready racks in mount Mark 2: 120 ready rounds, up to 40 rounds in dual hoists Mark 3: 120 ready rounds, up to 40 rounds in dual hoists, 1,000 rounds in mounting

Sights: Gyro-stabilized in local control.

↳*Ammunition Weapon Station #1*

Shell: 57 mm × 438 mm 6.1 kg (13 lb) complete round 2.4 kg (5.3 lb) pre-fragmented shell

Caliber: 57 mm/70 caliber

Basic Load: 1,000

↳*Weapon Station #2*

Name: Bofors 40 mm gun

Type: Anti-Aircraft Autocannon

Quantity: 1

Caliber: 40mm

Proliferation: >60,000

Length: L/60: 6.5 m (21 ft 4 in) L/70: 6.3 m (20 ft 8 in)

Barrel Length: L/60: 2.2 m (7 ft 3 in) L/70: 2.8 m (9 ft 2 in)

Width: L/60: 1.8 m (5 ft 11 in) L/70: 2.3 m (7 ft 7 in)

Height: L/60: 1.9 m (6 ft 3 in) L/70: 2.4 m (7 ft 10 in

Crew: 4

Barrels: 1 - 2

Carriage: 522 kg (1,151 lb)

Elevation: L/60: −5°/+90° (55°/s) L/70: −20°/+80° (57°/s)

Traverse: Full 360° L/60: 50°/s L/70: 92°/s

Rate of Fire: L/60: 120 round/min L/70: 240[1]-330 round/min

Muzzle Velocity: L/60: 881 m/s (2,890 ft/s) L/70: 1,021 m/s (3,350 ft/s)

Maximum Firing Range: L/60: 7,160 m (23,490 ft) L/70: 12,500 m (41,000 ft)

↳*Ammunition Weapon Station #2*

Shell: Complete round: L/43 40×311mmR L/60 40×311mmR L/70 40×365mmR

Caliber: 40 mm L/60–70 (actual length varies from 56 to 70 calibers, based on model

Shell Weight: 0.9 kg

Basic Load: INA

↳*Weapon Station #3*

Name: Harpoon (missile)

Quantity: 4

Manufacturer: McDonnell Douglas Boeing Defense, Space & Security

Proliferation: Australia Royal Australian Navy Royal Australian Air Force Belgium Belgian Navy Brazil Brazilian Air Force Canada Royal Canadian Air Force Royal Canadian Navy Chile Chilean Navy Chilean Air Force Denmark Royal Danish Navy Egypt Egyptian Air Force Egyptian Navy Germany German Navy Greece Hellenic Navy India Indian Air Force Indian Navy Iran Islamic Republic of Iran Navy Israel Israeli Air Force Israeli Navy Japan Japan Maritime Self Defense Force Malaysia Royal Malaysian Air Force Mexico Mexican Navy Morocco Royal Moroccan Air Force Netherlands Royal Netherlands Navy Pakistan Pakistan Navy Poland Polish Navy Portugal Portuguese Air Force Portuguese Navy Qatar Qatar Air Force - Harpoon Block 2 on order for use with F-15QA South Korea Republic of Korea Air Force Republic of Korea Navy Saudi Arabia Royal Saudi Air Force Royal Saudi Navy Singapore Republic of Singapore Air Force Republic of Singapore Navy Spain Spanish Air Force Spanish Navy Republic of China Republic of China Air Force Republic of China Navy Thailand Royal Thai Navy Turkey Turkish Air Force Turkish Navy United Arab Emirates United Kingdom Royal Navy Royal Air Force United States United States Air Force United States Navy United States Coast Guard (retired)

In Service: 1977-Present

Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)

Diameter: 13.5 in (34 cm)

Wingspan: 3 ft (0.91 m)

Weight: 1,523 lb (691 kg) with booster

Warhead: 488 pounds (221 kg)

Detonation Mechanism: Impact Fuze

Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust

Operational Range: in excess of 150 nmi (280 km) depending on launch platform

Flight Altitude: Sea-skimming

Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)

Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing

Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

Notes:

The La Combattante IIa fast attack craft is a class of fast attack craft originally built for the German Navy as Type 148 Tiger-class fast attack craft. They were later transferred to the Hellenic Navy and the class was renamed Combattante IIa, as with similar French made ships. All the ships were under mid-life updates in 1980s. Two vessels in the class, P-74 and P-75, were fitted with RGM-84 Harpoon anti-ship missiles and a new ESM was fitted after transfer. A version called the Beir Grassa class, of which 10 were built and 8 were operational as of 1995, were used by the Libyan Navy. One had been sunk and another disabled during a 1986 confrontation with US forces. Iran ordered 12 ships of the same class (known in Iran as Kaman class), nine of which were delivered in 1977 and 1978, and three of which were delayed until 1981 as a result of the 1979 Islamic Revolution. The Iranian fast attack craft Paykan was sunk during Operation Morvarid in 1980, while Joshan was sunk by USS Simpson during Operation Praying Mantis in 1988. These ships are not to be confused with the new Joshan and Paykan, which were named in their memories. Iran built a heavily upgraded version of this class called the Sina class. As of 2012 Iran has built 4 Sina-class vessels and is building 5 more of this class. French-built. US-supplied Harpoon missiles have been expended, and replaced by Iranian made, medium range "Noor", anti-ship cruise missiles. Paykan was sunk during Operation Morvarid by the Iraqi Navy, in 1980, while Joshan was sunk by the American Navy, during Operation Praying Mantis, in 1988. These ships must not be confused with the new Joshan and Paykan, which are part of the Iranian Navy fleet of warships serving in the Caspian Sea.

Mandau Class Indonesian Fast Attack Craft



Tiers:

1 2 **3** 4

System

Alternative Designation: Mandau Class
Type: Fast Attack Craft
Builder: Tacoma Boatbuilding Company
Crew: 43

Dimensions

Length: 53.7 m
Beam: 8 m
Draft: INA
Displacement, Standard: 250 tons (standard)
Displacement, Full Load: 290 tons (Full)

Propulsion System

Engine Name: 1 x General Electric-Fiat LM-2500 and 2 x MTU 12V331TC81
Engine Type: Gas Turbine
Engine Power: INA
Maximum Range: 2,600 nmi (4,815 km; 2,992 mi) at 14 knots (26 km/h; 16 mph)
Maximum Speed: 41 knots (76 km/h; 47 mph)

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Bofors 57 mm L/70 naval artillery gun
Type: Naval Artillery Gun
Caliber: mm57
Quantity: 1 x Bofors 57 mm L/70 naval artillery gun

Barrel Length: 3,990 mm

Weight: 14,000 kg

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Action: Electronic firing

Elevation: −10°/+78° (40°/s)

Traverse: Full 360°:

Rate of Fire: 200 rounds/min

Muzzle Velocity: 1,035 m/s

Maximum Firing Range: 17,000 m

Effective Firing Range: 8,500 m

Feed System: 40 ready rounds, 128 rounds in ready racks in mount

Sights: Gyro-stabilized in local control.

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm57

Shell: 57 × 438 mm

Basic Load: 128 Rounds

↳*Gun Weapon System #2*

Note: 1 x 40/70 Bofors 350AFD

Missile Weapon System

↳*Missile #1*

Name: MM38 Exocet SSM

Type: Missile

Quantity: 4 x MM38 Exocet SSM

Length: INA

Diameter: INA

Weight: INA

Maximum Range: 42 km

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

ECM Suite: Yes

Radar Systems

Navigation Radar: 1 x Decca AC1229 WM2

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Mandau-class is a class of four missile-armed fast attack craft operated by the Indonesian Navy. They were built by the Korea Tacoma shipyard from 1977 to 1980. In 1975, Indonesia placed an order with the South Korean shipbuilder, Korea Tacoma International, for 4 PSK Mark 5 missile armed fast attack craft. The design was based on Korea Tacoma's PSSM patrol boat built for the Republic of Korea Navy, which in turn was based on the Asheville-class gunboat built for the US Navy. The ships are 53.58 m (175 ft 9 in) long, with a beam of 8.00 m (26 ft 3 in) and a draught of 1.63 m (5 ft 4 in). Displacement is 250 long tons (250 t) standard and 290 long tons (290 t) full load. The ships's machinery is arranged in a 2-shaft, Combined Diesel or Gas (CODOG) layout, with a single General Electric-Fiat LM2500 gas turbine rated at 25,000 shp (19,000 kW) powering the ship at high speeds, with two MTU 12V331 TC81 diesel engines rated at 1,120 bhp (840 kW) each, power the ship at lower speeds. Maximum speed is 41 kn (47 mph; 76 km/h) using the gas turbine, and 17 kn (20 mph; 31 km/h) using the diesels. Range is 2,500 nmi (2,900 mi; 4,600 km) at 17 kn (20 mph; 31 km/h). The ships are fitted with a single Bofors 57 mm SAK-57 Mk I gun forward, with a Bofors 40 mm L/70 gun aft, with two Rheinmetall 20 mm cannon providing close-in defence. Four mm 38 Exocet anti-ship missiles can be carried. The ships have a crew of 7 officers and 36 other ranks. A Racal Decca 1226 I-band surface search radar is fitted, while fire control is by a Signaal WM 28 fire control radar and a Selenia NA-18 optronic director.

Kaman Class Iranian Fast Attack Craft







Tiers:



Variants:

- **Kaman ("Bow"):** Pennant Number: P221 Commision year: 1977
- **Xoubin:** Pennant Number: P222 Commision year: 1977
- **Khadang:** Pennant Number: P223 Commision year: 1978
- **Paykan:** Pennant Number: P224 Commision year: 1978
- **Joshan:** Pennant Number: P225 Commision year: 1978
- **Falakhon:** Pennant Number: P226 Commision year: 1978
- **Shamshir:** Pennant Number: P227 Commision year: 1978
- **Gorz:** Pennant Number:P229 Commision year: 1978
- **Gardouneh:** Pennant Number: P229 Commision year: 1978
- **Khanjar:** Pennant Number:P230 Commision year: 1981
- **Neyzeh:** Pennant Number: P231 Commision year: 1981
- **Tabarzin:** Pennant Number:P232 Commision year: 1981

System

Alternative Designations: Kaman; La Combattante IIa fast attack craft
Total Built: 12 vessels total
Pennant Number: P221
Builders: CMN Lurssen
In Service: 1977-Present
Type: Fast Attack Craft
Crew: 30 (4 officers)
Sensors and processing systems: Thomson-CSF Triton; G-band Thomson-CSF Castor; I/J-band CSEE Panda optical director
Electronic warfare & decoys: Thomson-CSF DR 2000S
Minelaying Capable: Yes

Dimensions

Length: 47 m
Beam: 8 m
Displacement,: 234 tons (standard) 265 tons (full load)
Draught: 2.1 m

Automotive

Engine: 4 × MTU MD 16V 538 TB90
Number of Engines: 4
Engine Power: 12,000 hp (8,900 kW) (combined)
Propulsion: Four shafts
Maximum Speed: 36 knots (67 km/h; 41 mph) (maximum)
Range: 570 nautical miles (1,060 km; 660 mi) at 30 knots (56 km/h; 35 mph) 1,600 nautical miles (3,000 km; 1,800 mi) at 15 knots (28 km/h; 17 mph)

Armament

↳*Weapon Station #1*

Name: Bofors 57 mm L/70 naval artillery gun
Type: Dual-purpose naval guns
Quantity: 1
Caliber: 57 mm/70 caliber
Barrel Length: Bore length: 3,990 mm (157.09 in) Without flash hider: 4,045 mm (159.25 in) With flash hider: 4,345 mm (171.06 in)
Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)
Weight: Mark 3: 14,000 kg (31,000 lb) (weight including 1,000 rounds onboard, each weighing 6.5 kg (14 lb) per complete round)
Action: Electronic firing
Elevation: Mark 1: −10°/+78° (40°/s) Mark 2: −10°/+75° (40°/s) Mark 3: −10°/+77° (44°/s)
Traverse: 360 deg
Rate of Fire: Marks 1 & 2: 55°/s Mark 3: 57°/s Mark 1: 200 rounds/min Marks 2 & 3: 220 rounds/min
Muzzle Velocity: 1,035 m/s
Effective Firing Range: 8,500 m (9,300 yd) (HE round)
Maximum Firing Range: 17,000 m (19,000 yd) (HE round at 45°)
Feed System: Magazine: Mark 1: 40 ready rounds, 128 rounds in ready racks in mount Mark 2: 120 ready rounds, up to 40 rounds in dual hoists Mark 3: 120 ready rounds, up to 40 rounds in dual hoists, 1,000 rounds in mounting
Sights: Gyro-stabilized in local control.

↳*Ammunition Weapon Station #1*

Shell: 57 mm × 438 mm 6.1 kg (13 lb) complete round 2.4 kg (5.3 lb) pre-fragmented shell

Caliber: 57 mm/70 caliber

Basic Load: 1,000

↳*Weapon Station #2*

Name: Bofors 40 mm gun

Type: Anti-Aircraft Autocannon

Quantity: 1

Caliber: 40mm

Proliferation: >60,000

Length: L/60: 6.5 m (21 ft 4 in) L/70: 6.3 m (20 ft 8 in)

Barrel Length: L/60: 2.2 m (7 ft 3 in) L/70: 2.8 m (9 ft 2 in)

Width: L/60: 1.8 m (5 ft 11 in) L/70: 2.3 m (7 ft 7 in)

Height: L/60: 1.9 m (6 ft 3 in) L/70: 2.4 m (7 ft 10 in

Crew: 4

Barrels: 1 - 2

Carriage: 522 kg (1,151 lb)

Elevation: L/60: −5°/+90° (55°/s) L/70: −20°/+80° (57°/s)

Traverse: Full 360° L/60: 50°/s L/70: 92°/s

Rate of Fire: L/60: 120 round/min L/70: 240[1]-330 round/min

Muzzle Velocity: L/60: 881 m/s (2,890 ft/s) L/70: 1,021 m/s (3,350 ft/s)

Maximum Firing Range: L/60: 7,160 m (23,490 ft) L/70: 12,500 m (41,000 ft)

↳*Ammunition Weapon Station #2*

Shell: Complete round: L/43 40×311mmR L/60 40×311mmR L/70 40×365mmR

Caliber: 40 mm L/60–70 (actual length varies from 56 to 70 calibers, based on model

Shell Weight: 0.9 kg

Basic Load: INA

↳*Weapon Station #3*

Name: Harpoon (missile)

Quantity: 4

Manufacturer: McDonnell Douglas Boeing Defense, Space & Security

Proliferation: Australia Royal Australian Navy Royal Australian Air Force Belgium Belgian Navy Brazil Brazilian Air Force Canada Royal Canadian Air Force Royal Canadian Navy Chile Chilean Navy Chilean Air Force Denmark Royal Danish Navy Egypt Egyptian Air Force Egyptian Navy Germany German Navy Greece Hellenic Navy India Indian Air Force Indian Navy Iran Islamic Republic of Iran Navy Israel Israeli Air Force Israeli Navy Japan Japan Maritime Self Defense Force Malaysia Royal Malaysian Air Force Mexico Mexican Navy Morocco Royal Moroccan Air Force Netherlands Royal Netherlands Navy Pakistan Pakistan Navy Poland Polish Navy Portugal Portuguese Air Force Portuguese Navy Qatar Qatar Air Force - Harpoon Block 2 on order for use with F-15QA South Korea Republic of Korea Air Force Republic of Korea Navy Saudi Arabia Royal Saudi Air Force Royal Saudi Navy Singapore Republic of Singapore Air Force Republic of Singapore Navy Spain Spanish Air Force Spanish Navy Republic of China Republic of China Air Force Republic of China Navy Thailand Royal Thai Navy Turkey Turkish Air Force Turkish Navy United Arab Emirates United Kingdom Royal Navy

Royal Air Force United States United States Air Force United States Navy United States Coast Guard (retired)
In Service: 1977-Present
Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)
Diameter: 13.5 in (34 cm)
Wingspan: 3 ft (0.91 m)
Weight: 1,523 lb (691 kg) with booster
Warhead: 488 pounds (221 kg)
Detonation Mechanism: Impact Fuze
Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust
Operational Range: in excess of 150 nmi (280 km) depending on launch platform
Flight Altitude: Sea-skimming
Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)
Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing
Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

Notes:

The La Combattante IIa fast attack craft is a class of fast attack craft originally built for the German Navy as Type 148 Tiger-class fast attack craft. They were later transferred to the Hellenic Navy and the class was renamed Combattante IIa, as with similar French made ships. All the ships were under mid-life updates in 1980s. Two vessels in the class, P-74 and P-75, were fitted with RGM-84 Harpoon anti-ship missiles and a new ESM was fitted after transfer. A version called the Beir Grassa class, of which 10 were built and 8 were operational as of 1995, were used by the Libyan Navy. One had been sunk and another disabled during a 1986 confrontation with US forces. Iran ordered 12 ships of the same class (known in Iran as Kaman class), nine of which were delivered in 1977 and 1978, and three of which were delayed until 1981 as a result of the 1979 Islamic Revolution. The Iranian fast attack craft Paykan was sunk during Operation Morvarid in 1980, while Joshan was sunk by USS Simpson during Operation Praying Mantis in 1988. These ships are not to be confused with the new Joshan and Paykan, which were named in their memories. Iran built a heavily upgraded version of this class called the Sina class. As of 2012 Iran has built 4 Sina-class vessels and is building 5 more of this class. French-built. US-supplied Harpoon missiles have been expended, and replaced by Iranian made, medium range "Noor", anti-ship cruise missiles. Paykan was sunk during Operation Morvarid by the Iraqi Navy, in 1980, while Joshan was sunk by the American Navy, during Operation Praying Mantis, in 1988. These ships must not be confused with the new Joshan and Paykan, which are part of the Iranian Navy fleet of warships serving in the Caspian Sea.

Sina Class Iranian Fast Attack Craft





Tiers:



Variants:

- **Paykan:** Pennant Number: P224 Commission Year: 2003
- **Joshan:** Pennant Number: P225 Commission Year: 2006
- **Derafsh:** Pennant Number: P233 Commission Year: 2008
- **Separ:** Pennant Number: P234 Commission Year: 2017
- **Sina 5:** Under Construction
- **Sina 6:** Under Construction
- **Sina 7:** Under Construction
- **Sina 8:** Under Construction
- **Sina 9:** Under Construction

System

Alternative Designations: Paykan (Sina Class)
Total Built: 12 vessels total
Pennant Number: P224
Builders: CMN Lurssen
In Service: 2003-Present
Type: Fast Attack Craft
Crew: 30 (4 officers)
Sensors and processing systems: Thomson-CSF Triton; G-band Thomson-CSF Castor; I/J-band CSEE Panda optical director
Electronic warfare & decoys: Thomson-CSF DR 2000S
Minelaying Capable: Yes

Dimensions

Length: 47 m
Beam: 8 m
Displacement,: 234 tons (standard) 265 tons (full load)
Draught: 2.1 m

Automotive

Engine: 4 × MTU MD 16V 538 TB90
Number of Engines: 4
Engine Power: 12,000 hp (8,900 kW) (combined)
Propulsion: Four shafts
Maximum Speed: 36 knots (67 km/h; 41 mph) (maximum)
Range: 570 nautical miles (1,060 km; 660 mi) at 30 knots (56 km/h; 35 mph) 1,600 nautical miles (3,000 km; 1,800 mi) at 15 knots (28 km/h; 17 mph)

Armament

↳ *Weapon Station #1*

Name: Bofors 57 mm L/70 naval artillery gun
Type: Dual-purpose naval guns
Quantity: 1
Caliber: 57 mm/70 caliber
Barrel Length: Bore length: 3,990 mm (157.09 in) Without flash hider: 4,045 mm (159.25 in) With flash hider: 4,345 mm (171.06 in)
Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)
Weight: Mark 3: 14,000 kg (31,000 lb) (weight including 1,000 rounds onboard, each weighing 6.5 kg (14 lb) per complete round)
Action: Electronic firing
Elevation: Mark 1: −10°/+78° (40°/s) Mark 2: −10°/+75° (40°/s) Mark 3: −10°/+77° (44°/s)
Traverse: 360 deg
Rate of Fire: Marks 1 & 2: 55°/s Mark 3: 57°/s Mark 1: 200 rounds/min Marks 2 & 3: 220 rounds/min
Muzzle Velocity: 1,035 m/s
Effective Firing Range: 8,500 m (9,300 yd) (HE round)
Maximum Firing Range: 17,000 m (19,000 yd) (HE round at 45°)
Feed System: Magazine: Mark 1: 40 ready rounds, 128 rounds in ready racks in mount Mark 2: 120 ready rounds, up to 40 rounds in dual hoists Mark 3: 120 ready rounds, up to 40 rounds in dual hoists, 1,000 rounds in mounting
Sights: Gyro-stabilized in local control.

↳ *Ammunition Weapon Station #1*

Shell: 57 mm × 438 mm 6.1 kg (13 lb) complete round 2.4 kg (5.3 lb) pre-fragmented shell
Caliber: 57 mm/70 caliber
Basic Load: 1,000

↳ *Weapon Station #2*

Name: Bofors 40 mm gun
Type: Anti-Aircraft Autocannon

Quantity: 1

Caliber: 40mm

Proliferation: >60,000

Length: L/60: 6.5 m (21 ft 4 in) L/70: 6.3 m (20 ft 8 in)

Barrel Length: L/60: 2.2 m (7 ft 3 in) L/70: 2.8 m (9 ft 2 in)

Width: L/60: 1.8 m (5 ft 11 in) L/70: 2.3 m (7 ft 7 in)

Height: L/60: 1.9 m (6 ft 3 in) L/70: 2.4 m (7 ft 10 in

Crew: 4

Barrels: 1 - 2

Carriage: 522 kg (1,151 lb)

Elevation: L/60: −5°/+90° (55°/s) L/70: −20°/+80° (57°/s)

Traverse: Full 360° L/60: 50°/s L/70: 92°/s

Rate of Fire: L/60: 120 round/min L/70: 240[1]-330 round/min

Muzzle Velocity: L/60: 881 m/s (2,890 ft/s) L/70: 1,021 m/s (3,350 ft/s)

Maximum Firing Range: L/60: 7,160 m (23,490 ft) L/70: 12,500 m (41,000 ft)

↳*Ammunition Weapon Station #2*

Shell: Complete round: L/43 40×311mmR L/60 40×311mmR L/70 40×365mmR

Caliber: 40 mm L/60–70 (actual length varies from 56 to 70 calibers, based on model

Shell Weight: 0.9 kg

Basic Load: INA

↳*Weapon Station #3*

Name: Harpoon (missile)

Quantity: 4

Manufacturer: McDonnell Douglas Boeing Defense, Space & Security

Proliferation: Australia Royal Australian Navy Royal Australian Air Force Belgium Belgian Navy Brazil Brazilian Air Force Canada Royal Canadian Air Force Royal Canadian Navy Chile Chilean Navy Chilean Air Force Denmark Royal Danish Navy Egypt Egyptian Air Force Egyptian Navy Germany German Navy Greece Hellenic Navy India Indian Air Force Indian Navy Iran Islamic Republic of Iran Navy Israel Israeli Air Force Israeli Navy Japan Japan Maritime Self Defense Force Malaysia Royal Malaysian Air Force Mexico Mexican Navy Morocco Royal Moroccan Air Force Netherlands Royal Netherlands Navy Pakistan Pakistan Navy Poland Polish Navy Portugal Portuguese Air Force Portuguese Navy Qatar Qatar Air Force - Harpoon Block 2 on order for use with F-15QA South Korea Republic of Korea Air Force Republic of Korea Navy Saudi Arabia Royal Saudi Air Force Royal Saudi Navy Singapore Republic of Singapore Air Force Republic of Singapore Navy Spain Spanish Air Force Spanish Navy Republic of China Republic of China Air Force Republic of China Navy Thailand Royal Thai Navy Turkey Turkish Air Force Turkish Navy United Arab Emirates United Kingdom Royal Navy Royal Air Force United States United States Air Force United States Navy United States Coast Guard (retired)

In Service: 1977-Present

Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)

Diameter: 13.5 in (34 cm)

Wingspan: 3 ft (0.91 m)

Weight: 1,523 lb (691 kg) with booster

Warhead: 488 pounds (221 kg)

Detonation Mechanism: Impact Fuze

Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600 pounds (greater than 272.2 kg) of thrust

Operational Range: in excess of 150 nmi (280 km) depending on launch platform

Flight Altitude: Sea-skimming

Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)

Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing

Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

Notes:

The Iranian missile boat Paykan (Persian: پیکان) is an Iranian-made Kaman/Sina class missile boat. The Sina class is nearly identical to the Kaman class and Paykan and Joshan are both often referred to as members of the Kaman class. The La Combattante IIa fast attack craft is a class of fast attack craft originally built for the German Navy as Type 148 Tiger-class fast attack craft. They were later transferred to the Hellenic Navy and the class was renamed Combattante IIa, as with similar French made ships. All the ships were under mid-life updates in 1980s. Two vessels in the class, P-74 and P-75, were fitted with RGM-84 Harpoon anti-ship missiles and a new ESM was fitted after transfer. A version called the Beir Grassa class, of which 10 were built and 8 were operational as of 1995, were used by the Libyan Navy. One had been sunk and another disabled during a 1986 confrontation with US forces. Iran ordered 12 ships of the same class (known in Iran as Kaman class), nine of which were delivered in 1977 and 1978, and three of which were delayed until 1981 as a result of the 1979 Islamic Revolution. The Iranian fast attack craft Paykan was sunk during Operation Morvarid in 1980, while Joshan was sunk by USS Simpson during Operation Praying Mantis in 1988. These ships are not to be confused with the new Joshan and Paykan, which were named in their memories. Iran built a heavily upgraded version of this class called the Sina class. As of 2012 Iran has built 4 Sina-class vessels and is building 5 more of this class. French-built. US-supplied Harpoon missiles have been expended, and replaced by Iranian made, medium range "Noor", anti-ship cruise missiles. Paykan was sunk during Operation Morvarid by the Iraqi Navy, in 1980, while Joshan was sunk by the American Navy, during Operation Praying Mantis, in 1988. These ships must not be confused with the new Joshan and Paykan, which are part of the Iranian Navy fleet of warships serving in the Caspian Sea.

Type 062 Class (Shanghai II Class) Chinese Gunboat



Tiers:



Variants:

- **Type 062I-class gunboat:** The Type 062I-class gunboat (NATO: Shanghai III class), is the successor of the original Type 062 Shanghai I & II-class gunboats of the People's Liberation Army Navy. The Shanghai III-class gunboat is more heavily armed than its predecessor, with the 23 mm guns replacing the 14.5 mm heavy machine guns and is also substantially larger at 170 tons. Significantly more Shanghai III-class gunboats have entered service in foreign navies than in the People's Liberation Army Navy, and the ones in the Chinese inventory are mainly used for training foreign crews, and not all export boats have the same configuration due to different customers' requirements. They are primarily used for coastal and inland patrol.
- **Haizhui-class submarine chaser:** The Haizhui-class submarine chaser is based on the Type 062I-class gunboat and entered service in the early 1960s. It was a stopgap measure as a follow on class to Kronshtadt-class submarine chaser before the arrival of the Type 037 submarine chaser in the mid 1960s. Although Type 062I originated as a gunboat, the submarine chaser version was more successful in serving the People's Liberation Army Navy, actually serving operationally rather than a training vessel for foreign crews.

System

Alternative Designation: Type 062 Class; NATO: Shanghai II Class

Type: Gunboat

Builder: China; Shipyard: INA

Crew: 36

Dimensions

Length: 41 m

Beam: 5.3 m

Draft: 1.8 m

Displacement, Full Load: 170 long tons

Propulsion System

Engine Name: 2 × Chinese L-12V-180A

Engine Type: Diesel

Engine Power: 4,400 hp

Maximum Range: 1,210 km at 17 knots

Maximum Speed: km/h31

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 76A

Type: Close-In Weapon System (CIWS)

Caliber: 37mm

Quantity: 4 x Type 76A Close-In Weapon System (CIWS)

Length: INA

Weight: INA

Rate of Fire: 400 rd/min

Note: The Type 76A is a fully enclosed and fully automatic model in the Type 76 series. Unlike the Type 76F, the gun is fully automatic, with the semi-automatic operational mode and the one-man operator console removed.

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm37

Shell: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: 4 × Chinese or Soviet 23mm

Type: Heavy Machine Gun

Caliber: 23mm

Quantity: 4 × Chinese or Soviet 23mm

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 37mm

Cartridge: INA

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Name: 1 × Pot Head

Type: Surface Search Radar

Frequency: INA

Range: INA

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Type 062 gunboat is a class of gunboat of the People's Liberation Army Navy first developed and constructed in the 1950s. This unsophisticated class is relatively well-armed for its size and is the most widely built and exported Chinese naval vessel in terms of numbers. A total of 30 were built, initial boats being known as the Shanghai I class and later slightly improved boats being known as the Shanghai II class. The Shanghai I class was slightly smaller than its successor, the Shanghai II class, displacing 125 tons instead of 135 tons, and had a twin Chinese Type 66 57 mm gun mount forward. All other specifications are identical to the Shanghai II class, which replaced the 57 mm with twin 37 mm gun mounts. Some boats remained in active service well into the early 1990s in the PLA navy and longer in the case of the Korean People's Navy. The Type 062 gunboat (NATO reporting name: Shanghai I & II class), is a family of gunboats built to replace the preceding Shantou and Huangpu-class gunboats. During the late 1950s, the PLAN found they needed a more powerful gunboat, as the 50-80-ton class Shantou and Huangpu-class gunboats were too small and lacked both firepower and endurance. Several prototypes are built by different shipyards. They were the Type 0105 from Luda, the Type 0108 from Qingdao, the Type 0109 from Shanghai, and the Type 0110 from Guangzhou. Displacement of the prototypes varied from 100-150 t, speed varied from 28–30 knots (52–56 km/h; 32–35 mph), with different weapon arrangements including 57IIx1, 37IIx1, 14.5IIx2 or 37IIx2,14.5IIx2. In 1960, a hybrid of all the prototypes, Type 0111 was laid down at Dalian shipyard, Luda. Full production variants became known as the Type 062-class. A total of 30 were built, initial boats being known as the Shanghai I class and later slightly improved boats being known as the Shanghai II class. Some boats even remained in active service well into the early 1990s. The Shanghai I class was slightly smaller than its successor, the Shanghai II class, displacing 125 tons instead of 135 tons, and had a twin Chinese Type 66 57 mm gun mount forward. All other specifications are identical to the Shanghai II class, which replaced the 57 mm with twin 37 mm gun mounts. The L-12V-180 diesel engines used on the Type 062 were prone to overheat, thirsty for fuel and had a poor working life. So the smaller L-12D-6 diesel engine was introduced. The new engine was more fuel efficient and had longer life, but rated only 910 horsepower (680 kW), resulting in a maximum speed of only 28.5 knots (52.8 km/h; 32.8 mph). The low speed disappointed PLAN and thus one of the reason construction ended at 30 boats.

Type 22 Class (Houbei Class) Chinese Fast Attack Missile Boat







Tiers:



Variants:

- **Note:** Approximately 83 of these missile boats are currently in service with three flotillas having been produced over a span of seven years.

System

Alternative Designation: Type 22 Class; Houbei Class
Total Built: 83 Built
Type: Fast Attack Missile Boat
Builder: Hudong-Zhonghua Shipbuilding, Shanghai
In Service: 2004-Present
Crew: 12

Dimensions

Length: 42.6 m
Beam: 12.2 m
Draft: 1.5 m
Decks: 1
Displacement, Full Load: 220 long tons

Propulsion System

Engine Name: INA

Engine Type: 2 diesel engines

Engine Power: 6,865 hp

Maximum Range: INA

Maximum Speed: 36 knots (67 km/h; 41 mph)

Endurance: INA

Missile Weapon System

↳ ***System***

Name: C-802 Missile

Type: Anti-Ship Missile

Length: INA

Diameter: INA

Warhead: 190 kg high-explosive fragmentation

Engine: CTJ-2 turbojet

Operational Range: 120 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Missile Basic Load: 8 x C-802 Missile

Gun Weapon System

↳ ***System***

Name: AK-630

Type: Close-In Weapon System (CIWS)

Caliber: 30mm

Quantity: 1 x AK-630 Weapon System

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade)[

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm

Height: 1,070 mm

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Barrels: 6

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

↳***Ammunition***

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 4,000 Rounds

Fire Control

FCS Name: Vympel MR-123); Vympel-A MR-123/176 5.2 tonnes (5.7 short tons); Vympel-AM MR-123-02/MR-123-03; and Vympel-AME MR-123-02/176

Electro Optics: HEOS 300

Radar Systems

Navigation Radar: INA

Surface Search Radar: 1 x Type 362

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

Notes:

In April 2004, China's Quixin Shipyard in Shanghai produced the lead Houbei Type 022 wave-piercing catamaran, hull number 2208. The Type 022 was 43 meters (140 feet) long and displaces 225 tons. It was equipped with two missile launchers and has a top speed of 38 knots. The Type 022 was the PLA Navy's new-generation stealth missile fast attack craft (FAC). The boat features a unique high-speed, wave-piercing catamaran hull design with evident radar cross-section reduction design features. A number of Chinese shipyards across the country were involved in the construction of the boat. The Salvo equations are the successors to Lanchester Equations whose square law was applied to a formation of battleships. Specifically the salvo equations apply when missiles or torpedoes are fired in batches instead of “continuously.” The salvo-like phenomenon was also seen in the five big Pacific carrier battles in World War II in which each side endeavored to detect and attack first with all its air wings simultaneously in a single pulse, or “salvo,” of aircraft attacking as a coordinated unit. The salvo equations show that if a fleet has three times as many combatants, then for parity in loss ratios (in other words, which side will have ships remaining when all of the opponents are out of action), to overcome a numerical advantage each of my ships must have thrice the offensive power, thrice the defensive power, and thrice the survivability (the “staying power”). The weight of ordnance to put a warship out of action increases only as the one-third power of its displacement, making smaller missile ships a cost-effective

offensive capability. Another general property of missile warfare shown by the equations is that if ship numbers and staying power are both small, then an unstable combat situation arises, in which the shift in results of an exchange moves from total victory to total loss within a small change in the number of ships on either side. This is to an extent an artifact of the equation structure, but it is a warning that a fleet of big surface warships can be put out of action with a small number of missile hits in 21st Century combat. This first ship appears to be focused on the FAC mission, and appears to be designed for the installation of anti-ship missile launchers amidship (in the middle of the ship). But some speculated that the Chinese will soon design and build larger models that can carry UAVs and small boats for landing commandoes, as the U.S. may soon be doing. The Chinese probably already have its version of the digital connectivity which lies at the heart of the LCS program. So here is an area of military technical competition in which the Chinese are demonstrating creativity and a potential ability to match the U.S. just as it was embarking on a new direction in naval warship and combat tactics modernization. The new Chinese FAC design also demonstrates that the real naval threat from China was not aircraft carriers and large destroyers bought from Russia. The real threat was quiet diesel submarines and small ships like this new FAC. The real potential of this new design would be its use in co-ordination with their diesel subs and, possibly, theater ballistic missiles with precision guidance. A combination like that could enable the Chinese to deny the U.S. Navy the ability to safely move in some vital areas, such as the waters surrounding Taiwan First spotted under construction at Qiuxin Shipyard in Summer 2004, the vessel completed sea trials in late 2004 and was possibly commissioned in 2005. It was followed by three additional boats (2209, 2210 and 2211) in or around the 2005-06 time period. More hulls were subsequently spotted under construction at other locations starting in early 2006. The Type 022 appeared to be replacing the ageing Type 021 (Huangfeng class) missile FAC in the PLA Navy service. After several years of extensive prototype testing, Quixin then produced hulls 2209, 2210 and 2211. Many observers thought this could be only a four-ship design, such as the People's Liberation Army Navy's (PLAN's) previous five new guided-missile destroyer (DDG) designs of only one or two hulls since 1991. The startup of production for additional Type 022 hulls in Dalian, Quixin and Jiangnan shipyards in Shanghai, as well as in the Huangpu shipyard in Guangzhou, changed this precept. The large number of wave-piercing catamaran Type 022 hulls being launched several at a time at five different shipyards was a major event in PLAN shipbuilding. By early 2008 China was believed to have built as many as 40 Type 022 missile boats to replace the ageing Huangfeng class missile boats. The Type 022 Houbei PCFG appeared to be building at a rate of about 10 units per year. The August 2009 US Office of Naval Intelligence report "The People's Liberation Army Navy: A Modern Navy With Chinese Characteristics" stated " ... the PLA(N) has built up its long-range capability, it has also reinforced its coastal defense and near-littoral strengths with the introduction of the highly-capable Houbei class guided-missile patrol craft (PTG) in 2004. The Houbei utilizes a wave-piercing catamaran hullform, probably based on a commercial fastferry design, and water jet propulsion to attain considerably better seakeeping, speed, and mission flexibility than the older Gsa and Houku missile boats that they replaced. The relatively low construction, operating, and crew costs of the Houbeis have allowed China to build well over 50 by 2007, with more under construction." About the new stealth boat, the U.S. Congress submitted to Congress Armed Services Committee report entitled "China's impact on the U.S. Navy's modernization," the report said, "2004 China launched anti-ship cruise missile equipped attack boats, the boat prominent stealth performance, can quickly walk through the waves, and has a double hull shape of double hull is a more advanced hull shape design, the world's navies are trying this design approach in this area was currently a leading Australian company . " In recent years, China and Australia have engaged in production of different types of wave-piercing vessels. So far, China produced a total of several models of civilian-type Rogue boats. The general law of development of the shipbuilding industry, the continuous improvement of 022 boats will refer civilian type catamaran trends. China's missile boats have used French diesel engines, and with high-power engines the type 022 may reach 40 or more full speed. The most noteworthy was that all 022 missile boats are equipped with one-way hn900 tactical data link, which can work together to achieve the intent. It can collaborate with other frigates, missile destroyers, shore-based reconnaissance, early warning aircraft, boats and even between the implementation of the "proper reach," the distant sea offensive operations. As a result of jet propulsion, with no propeller, the 022 more than any one Chinese navy missile boats to was quiet, especially when at high speed. Chinese military's "Liberation Army Daily" reported that "China Water National Key Laboratory of acoustic vibration casing vibration and noise reduction technology research made fruitful achievements in scientific research." Military experts believe that this technology was important for high-speed vessels. Type 022 stealth missile boats with double hull shape, highlighting the invisibility. The Chinese trimaran fast attack craft (FAC) design may grow into a larger more versatile platform, similar to the U.S. Littoral Combat Ship (LCS) program. China Shipbuilding Trading Corporation (CSSC) revealed a concept for a 700 tonne derivative of the PLAN's Type 022 catamaran fast attack craft (FAC). The design was modeled in February 2017 at Abu Dhabi’s IDEX expedition, and showcased many possible features for the vessel. It was armed with a 76 mm gun and four anti-ship missile launchers. CSSC officials said the PLAN has so far shown no interest in this version and there are no plans to build it. The CSSC consortium, comprised of over a dozen Chinese industry shipbuilders, showcased designs for export vessels, mostly based on existing designs from the Chinese Coast Guard or the Navy. There was no indication that China was building an additional level of conventional missile boats, showing the 022-boat and on the basis of improvement, improved missile boats could become China's future development direction. A workshop sponsored by the Secretary of Defense’s Office of Net Assessment on retaining American influence in East Asia led to a report published in October 2011. The workshop participants advocated four force elements to reduce the chance of Chinese aggression and a shooting war. One component is a flotilla of small, highly lethal combatants that can be sent on the surface into the China Seas. Analysis at the Naval Postgraduate School and war gaming at the Naval War College independently saw the potential of such low-cost missile combatants and the need for a more detailed examination, since no such capability exists in the U.S.Navy.

BK-16 Raptor Class Russian Fast Attack Craft







Tiers:



System

Alternative Designation: Raptor; CB90 Class

Crew: 2

Passenger Capacity: 19

Dimensions

Displacement: t19.5

Length: m16.45

Width: m4

Drought: m.87

Height Over Waterline: m4.33

Automotive

Number of Engines: 2

Engine Name: INA

Engine Type: INA

Engine Power: hp780

Cruising Range: nm400

Speed, Maximum: knots42

Speed, Sustainable: knots30

Endurance: day1

Primary Weapon

↳*Remote Controlled Weapon Station (RCWS)*

Options: 7.62mm machine gun, a 12.7mm machine gun, AG-17 30mm automatic grenade launchers and 40mm grenade launchers

Auxiliary Weapon Options

All machine guns in the Russian military arsenal:

Kornet anti-tank guided missile system:

Mine countermeasures:

Fire Control of the RCWS

Type: Two-axis, gyro-stabilised sighting device equipped with surveillance cameras that have a wide and narrow field of view (FOV) and automatic target tracking system

Computerized FCS: Yes

Laser Rangefinder: Yes

Thermal Sights: Yes

RCWS Stabilization: Yes

Mobility of the RCWS: Horizontal travel angle of 360°, a vertical travel angle between -20° and 70°, and angular velocity of rotation of 60° a second

Aquisition Range: km2.5

Number of Targets System Can Track: 10

Protection

Hull Armor: AMg alloys

Superstructure Armor: AMg alloys

NBC Protection: Yes

Ballistic Protection: The weapon station offers armored protection against 7.62x54mm armor-piercing bullets

Notes:

Russia`s Kalashnikov Group has developed new fast attack craft (FAC). They were demonstrated at the Army-2017 international military-technical forum held outside Moscow from August 22-27. The company showcased the BK-16 FAC intended for offshore operations, troops transporting, fire support, counter-piracy and counter-terror missions, and search-and-rescue (SAR) operations. The hull and superstructures of the landing craft are made from AMg alloys. It has a crew of two members and can transport up to 19 servicemen. The craft features a cruising range of 400 nautical miles and an endurance of one day. The BK-16 is powered by two engines with a power output of 780 hp each. The FAC demonstrated at the Army-2017 international military-technical forum received a remote control weapon station (RCWS) with a heavy machine gun (HMG) and several medium machine guns. The type and number of weapons are mission dependent. Furthermore, the landing craft’s ability to launch and retrieve an unmanned aerial vehicle (UAV) was demonstrated during the International Maritime Defense Show (IMDS 2015) held in St Petersburg, Russia, in July 2015. The front section of the upper deck facilitates launch and recovery of light reconnaissance UAVs such as ZALA 421-16EM developed by ZALA Aero Group. The UAV provides increased situational awareness and the ability to engage targets effectively over land and sea.

Combattante IIa Class Greek Fast Attack Craft





Tiers:



Variants:

- **Ypoploiarchos Votsis:** Pennant Number: P72 Commissioned: 1973
- **Antiploiarchos Pezopoulos:** Pennant Number: P73 Commissioned: 1974
- **Plotarchis Vlachavas:** Pennant Number: P74 Commissioned: 1973
- **Plotarchis Maridakis:** Pennant Number:P75 Commissioned: 1974
- **Ypoploiarchos Tournas:** Pennant Number: P76 Commissioned: 1973
- **Plotarchis Sakipis:** Pennant Number: P77 Commissioned: 1973

System

Alternative Designations: Ypoploiarchos Votsis; La Combattante IIa fast attack craft
Total Built: 12 vessels total
Pennant Number: P72
Builders: CMN Lurssen
In Service: 1973-Present
Type: Fast Attack Craft
Crew: 30 (4 officers)
Sensors and processing systems: Thomson-CSF Triton; G-band Thomson-CSF Castor; I/J-band CSEE Panda optical director
Electronic warfare & decoys: Thomson-CSF DR 2000S
Minelaying Capable: Yes

Dimensions

Length: 47 m
Beam: 8 m
Displacement,: 234 tons (standard) 265 tons (full load)
Draught: 2.1 m

Automotive

Engine: 4 × MTU MD 16V 538 TB90
Number of Engines: 4

Engine Power: 12,000 hp (8,900 kW) (combined)

Propulsion: Four shafts

Maximum Speed: 36 knots (67 km/h; 41 mph) (maximum)

Range: 570 nautical miles (1,060 km; 660 mi) at 30 knots (56 km/h; 35 mph) 1,600 nautical miles (3,000 km; 1,800 mi) at 15 knots (28 km/h; 17 mph)

Armament

↳*Weapon Station #1*

Name: Bofors 57 mm L/70 naval artillery gun

Type: Dual-purpose naval guns

Quantity: 1

Caliber: 57 mm/70 caliber

Barrel Length: Bore length: 3,990 mm (157.09 in) Without flash hider: 4,045 mm (159.25 in) With flash hider: 4,345 mm (171.06 in)

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Weight: Mark 3: 14,000 kg (31,000 lb) (weight including 1,000 rounds onboard, each weighing 6.5 kg (14 lb) per complete round)

Action: Electronic firing

Elevation: Mark 1: −10°/+78° (40°/s) Mark 2: −10°/+75° (40°/s) Mark 3: −10°/+77° (44°/s)

Traverse: 360 deg

Rate of Fire: Marks 1 & 2: 55°/s Mark 3: 57°/s Mark 1: 200 rounds/min Marks 2 & 3: 220 rounds/min

Muzzle Velocity: 1,035 m/s

Effective Firing Range: 8,500 m (9,300 yd) (HE round)

Maximum Firing Range: 17,000 m (19,000 yd) (HE round at 45°)

Feed System: Magazine: Mark 1: 40 ready rounds, 128 rounds in ready racks in mount Mark 2: 120 ready rounds, up to 40 rounds in dual hoists Mark 3: 120 ready rounds, up to 40 rounds in dual hoists, 1,000 rounds in mounting

Sights: Gyro-stabilized in local control.

↳*Ammunition Weapon Station #1*

Shell: 57 mm × 438 mm 6.1 kg (13 lb) complete round 2.4 kg (5.3 lb) pre-fragmented shell

Caliber: 57 mm/70 caliber

Basic Load: 1,000

↳*Weapon Station #2*

Name: Bofors 40 mm gun

Type: Anti-Aircraft Autocannon

Quantity: 1

Caliber: 40mm

Proliferation: >60,000

Length: L/60: 6.5 m (21 ft 4 in) L/70: 6.3 m (20 ft 8 in)

Barrel Length: L/60: 2.2 m (7 ft 3 in) L/70: 2.8 m (9 ft 2 in)

Width: L/60: 1.8 m (5 ft 11 in) L/70: 2.3 m (7 ft 7 in)

Height: L/60: 1.9 m (6 ft 3 in) L/70: 2.4 m (7 ft 10 in

Crew: 4

Barrels: 1 - 2

Carriage: 522 kg (1,151 lb)

Elevation: L/60: −5°/+90° (55°/s) L/70: −20°/+80° (57°/s)

Traverse: Full 360° L/60: 50°/s L/70: 92°/s

Rate of Fire: L/60: 120 round/min L/70: 240[1]-330 round/min

Muzzle Velocity: L/60: 881 m/s (2,890 ft/s) L/70: 1,021 m/s (3,350 ft/s)

Maximum Firing Range: L/60: 7,160 m (23,490 ft) L/70: 12,500 m (41,000 ft)

↳*Ammunition Weapon Station #2*

Shell: Complete round: L/43 40×311mmR L/60 40×311mmR L/70 40×365mmR

Caliber: 40 mm L/60–70 (actual length varies from 56 to 70 calibers, based on model

Shell Weight: 0.9 kg

Basic Load: INA

↳*Weapon Station #3*

Name: Harpoon (missile)

Quantity: 4

Manufacturer: McDonnell Douglas Boeing Defense, Space & Security

Proliferation: Australia Royal Australian Navy Royal Australian Air Force Belgium Belgian Navy Brazil Brazilian Air Force Canada Royal Canadian Air Force Royal Canadian Navy Chile Chilean Navy Chilean Air Force Denmark Royal Danish Navy Egypt Egyptian Air Force Egyptian Navy Germany German Navy Greece Hellenic Navy India Indian Air Force Indian Navy Iran Islamic Republic of Iran Navy Israel Israeli Air Force Israeli Navy Japan Japan Maritime Self Defense Force Malaysia Royal Malaysian Air Force Mexico Mexican Navy Morocco Royal Moroccan Air Force Netherlands Royal Netherlands Navy Pakistan Pakistan Navy Poland Polish Navy Portugal Portuguese Air Force Portuguese Navy Qatar Qatar Air Force - Harpoon Block 2 on order for use with F-15QA South Korea Republic of Korea Air Force Republic of Korea Navy Saudi Arabia Royal Saudi Air Force Royal Saudi Navy Singapore Republic of Singapore Air Force Republic of Singapore Navy Spain Spanish Air Force Spanish Navy Republic of China Republic of China Air Force Republic of China Navy Thailand Royal Thai Navy Turkey Turkish Air Force Turkish Navy United Arab Emirates United Kingdom Royal Navy Royal Air Force United States United States Air Force United States Navy United States Coast Guard (retired)

In Service: 1977-Present

Length: Air-launched: 12.6 ft (3.8 m); Surface- and submarine-launched: 15 ft (4.6 m)

Diameter: 13.5 in (34 cm)

Wingspan: 3 ft (0.91 m)

Weight: 1,523 lb (691 kg) with booster

Warhead: 488 pounds (221 kg)

Detonation Mechanism: Impact Fuze

Engine: Teledyne CAE J402 Turbojet/solid propellant booster for surface and submarine launch; greater than 600

pounds (greater than 272.2 kg) of thrust
Operational Range: in excess of 150 nmi (280 km) depending on launch platform
Flight Altitude: Sea-skimming
Speed: 537 mph (864 km/h; 240 m/s; Mach 0.71)
Guidance System: Sea-skimming cruise monitored by radar altimeter / active radar terminal homing
Launch Platform: multi-platform: RGM-84A surface-launched AGM-84A air-launched UGM-84A submarine-launched

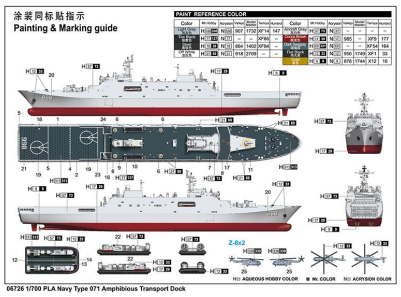
Notes:

The La Combattante IIa fast attack craft is a class of fast attack craft originally built for the German Navy as Type 148 Tiger-class fast attack craft. They were later transferred to the Hellenic Navy and the class was renamed Combattante IIa, as with similar French made ships. All the ships were under mid-life updates in 1980s. Two vessels in the class, P-74 and P-75, were fitted with RGM-84 Harpoon anti-ship missiles and a new ESM was fitted after transfer. A version called the Beir Grassa class, of which 10 were built and 8 were operational as of 1995, were used by the Libyan Navy. One had been sunk and another disabled during a 1986 confrontation with US forces. Iran ordered 12 ships of the same class (known in Iran as Kaman class), nine of which were delivered in 1977 and 1978, and three of which were delayed until 1981 as a result of the 1979 Islamic Revolution. The Iranian fast attack craft Paykan was sunk during Operation Morvarid in 1980, while Joshan was sunk by USS Simpson during Operation Praying Mantis in 1988. These ships are not to be confused with the new Joshan and Paykan, which were named in their memories. Iran built a heavily upgraded version of this class called the Sina class. As of 2012 Iran has built 4 Sina-class vessels and is building 5 more of this class. French-built. US-supplied Harpoon missiles have been expended, and replaced by Iranian made, medium range "Noor", anti-ship cruise missiles. Paykan was sunk during Operation Morvarid by the Iraqi Navy, in 1980, while Joshan was sunk by the American Navy, during Operation Praying Mantis, in 1988. These ships must not be confused with the new Joshan and Paykan, which are part of the Iranian Navy fleet of warships serving in the Caspian Sea.

→Landing Ships and Amphibious Assault Ships

Type 071 Class (Yuzhao) Chinese Amphibious Transport Dock



Tiers:

1 2 3 4

Variants:

- **Kunlun Shan:** Commissioned: 2007 Fleet: South Sea Fleet
- **Jinggang Shan[:** Commissioned: 2011 Fleet: South Sea Fleet
- **Changbai Shan:** Commissioned: 2012 Fleet: South Sea Fleet
- **Yimeng Shan:** Commissioned: 2016 Fleet: East Sea Fleet
- **Longhu Shan:** Commissioned: 2018 Fleet: East Sea Fleet

System

Alternative Designation: Type 071 (NATO reporting name: Yuzhao)

Total Built: China: 7 total to be built. Thailand: 1 total to be built.

Type: Amphibious Transport Dock

Builder: Hudong-Zhonghua Shipbuilding

In Service: 2007-Present

Crew: INA

Passenger Capacity: 600–800 troops

Endurance: 60 days

Dimensions

Length: m210 m

Beam: m28 m

Draft: m7 m

Displacement: 25,000 tons full load

Propulsion System

Engine Name: INA

Engine Type: The Type 071 LPDs are powered by integrated combined diesel and diesel (CODAD) propulsion, controlled by an automated propulsion control system. The propulsion system integrates four Shaanxi 16 PC2.6 V400 diesel engines driving two controllable pitch propellers through twin shafts.

Engine Power: Each engine produces a maximum power of 35,197kW.

Maximum Range: 10,000 nm at 18 knots

Maximum Speed: 25 knots

Endurance: km/h60

Weapon System #1

↳*System*

Name: AK-176

Type: Naval Gun

Caliber: 76mm

Quantity: 1 × AK-176 76 mm (3.0 in) Gun

Length: INA

Barrel Length: INA

Height: 2.6 Meters

Weight: 16,800 kg

Crew: 2 (4 in manual control mode)

Barrels: 1

Recoil: 380 to 500 mm

Maximum Elevation: deg+85

Minimum Elevation: deg-15

Traverse Right: deg175

Traverse Left: deg175

Rate of Fire: 120 rds/min

Muzzle Velocity: 980 m/s

Maximum Firing Range: 15.5 km

Effective Firing Range: 10 km

Feed System: 152 ready to fire rounds

↳*Ammunition*

Type: Rifle

Caliber: mm76.2

Cartridge: INA

Shell Weight: 12.4 kg

Basic Load: INA

Weapon System #2

↳*System*

Name: AK-630

Type: Naval Close-in Weapon System

Quanitity: 4 × AK-630 30mm (1.2 in) CIWS

Caliber: 30mm

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 9A4172 missiles (Vikhr-K upgrade)

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm (49 in) (mount ring)

Height: 1,070 mm (42 in) (above deck)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin,

Fire Control System: * Zavod Topaz (V. P. Yegorov): * Vympel MR-123, * Vympel-A MR-123/176 * Vympel-AM MR-123-02/MR-123-03, * Vympel-AME MR-123-02/176

Sights: Radar / TV-optical

↳*Ammunition*

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T[

Shell Weight: 0.39 kg

Basic Load: INA

Onboard Aviation Facilities

Helicopters: 4 x Z-8 Super Frelon

Boats and Landing Craft Carried

LCAC's: 4 × Type 726 Yuyi class LCAC. Landing craft on port/starboard davits.

Radars

Note: The LPD is equipped with a Type 360 (Seagull-S) air / surface search radar operating on E / F-band frequencies, a Type 364 G-band air search radar, a Type 344 I-band fire control radar and a navigation radar.

Protection

Active Protection System: Yes

Countermeasures: Countermeasures are provided by four 18-tube Type 726-4 decoy or chaff launchers.

NBC Protection: Yes

Notes:

The Type 071 (NATO reporting name: Yuzhao) is a class of Chinese amphibious transport dock ships in service with the People's Liberation Army Navy (PLAN). The Type 071 provides the PLAN with capabilities and flexibility not found in its previous landing ships. Type 071 landing platform dock (LPD) is a new class of amphibious warfare vessels built by Hudong-Zhonghua Shipbuilding, a subsidiary of China State Shipbuilding Corporation (CSSC), for the People’s Liberation Army Navy (PLAN). The Type 071 LPD is primarily deployed in amphibious landing missions and can also conduct humanitarian aid and civilian evacuation missions. The first LPD in the series, Kunlun Shan (998), was launched in December 2006 and commissioned in November 2007. Jinggang Shan (999), the second vessel in the series, was floated out in November 2010 and was inducted into service in October 2011. The third ship in class, Changbai Shan (989), was launched in September 2011 and entered service with the PLAN in September 2012. Yimeng Shan (988) was launched in January 2015 and commissioned in February 2016. A modified variant of the Type 071 LPD was offered by the China State Shipbuilding & Trading Corp (CSTC) consortium for the Royal Malaysian Navy. Type 071 LPD ships feature a unique hull platform offering a large dock space. The ship also offers a dedicated space for medical care and is equipped with a fresh water supply system. The stabilisers fitted to the vessel reduce roll and improve the stability in high sea states. The high volumes of internal space support the installation of additional communications systems, which make the ship a fleet command and control centre during amphibious operations. The Type 071 LPD has a length of 210m, beam of 28m and a draft of 7m. The full load displacement of the vessel is 25,000t. The amphibious warfare ship features a vehicle deck, well-deck, landing deck and a hanger. It can carry a combination of marines, vehicles, landing craft and helicopters. The vehicle deck can house amphibious assault vehicles including ZBD05 amphibious IFV, and ZTD-05 amphibious assault tracked armoured vehicle. The stern ramp, two side doors and ramps allow rapid loading of the vehicles and equipment. The well deck houses up to four landing craft air-cushioned (LCAC), which can transfer vehicles or marines to the shore at high speed. The LCAC are launched by flooding of the docking area. The vessel can also carry landing craft on port / starboard davits. The stern helicopter deck offers two landing spots for supporting the operations of two Z-8 (SA 321 Super Frelon) transport helicopters. The twin-door cantilever hangar can house up to four Z-8 helicopters. The LPD also has the capacity to carry a marine battalion, including up to 800 marines and associated equipment and supplies. The bow deck is installed with an AK-176 76mm naval gun system. The vessel is also armed with four 30mm AK-630 close-in weapon systems (CIWS). Countermeasures are provided by four 18-tube Type 726-4 decoy or chaff launchers.

Mistral Class French Amphibious Assault Ship






Tiers:



Variants:

- **Mistral:** Pennant Number: L9013 Name: Mistral Laid Down: 10 July 2003 Launched: 6 October 2004 Commissioned:February 2006 Home Port: Toulon
- **Tonnerre (French Navy):** Pennant Number: L9014 Name: Tonnerre Laid Down: 26 August 2003 Launched: 26 July 2005 Commissioned:December 2006 Home Port: Toulon
- **Dixmude (French Navy):** Pennant Number: L9015 Name: Dixmude Laid Down: 18 April 2009 Launched: 17 September 2010 COmmissioned: 27 December 2012 Homeport: Toulon
- **Gamal Abdel Nasser (ex-Vladivostok):**
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1010 Name: Gamal Abdel Nasser (ex-Vladivostok) Laid Down: 18 June 2013 Launched: 20 November 2014 Commisssioned: 2 June 2016 Homeport: Safaga
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1020 Name: Anwar El Sadat (ex-Sevastopol) Laid Down: 1 February 2012 Launched: 15 October 2013 Commissioned: 16 September 2016 Homeport: Alexandria

System

Alternative Designations: Mistral; BPC; NTCD
Pennant Number: L9013
Laid Down: 10 July 2003
Launched: 6 October 2004
Commissioned: February 2006
Homeport: Toulon
Builders: STX Europe DCNS
Class: Mistral class
Active: Mistral, Tonnerre, Dixmude Gamal Abdel Nasser, Anwar El Sadat
Type: Amphibious assault ship
Complement: 20 officers, 80 petty officers, 60 quarter-masters

Troops: 900 (short duration) 450 (long durations) 150 (serving as operational headquarters)

Capacity: 59 vehicles (including 13 AMX Leclerc tanks) or a 40-strong Leclerc tank battalion

Boats & landing craft carried: 4 CTM (chaland de transport de matériel) alternatively, 2 LCAC (Landing Craft, Air Cushion)

Sensors and processing systems: DRBN-38A Decca Bridgemaster E250 navigation radar MRR3D-NG air/surface sentry radar 2 optronic fire control systems

Aircraft Carried: 16 heavy or 35 light helicopters

Aviation Facilities: 6 helicopter landing spots

Dimensions

Length: m199

Beam: m32

Draught: m6.3

Dispacement, Empty: 16,500 tonnes

Dispacement, Fully Loaded: 21,300 tonnes

Automotive

Engine Name: Wärtsilä diesel-alternators 16 V32 (6.2 MW) + 1 Wärtsilä Vaasa auxiliary diesel-alternator 18V200 (3 MW)

Number of Engines: 3

Propulsion: 2 Rolls-Royce Mermaid azimuth thrusters (2 × 7 MW), 2 five-bladed propellers

Speed: 18.8 knots (35 km/h)

Range: 10,800 km (5,800 nmi) at 18 knots (33 km/h) 19,800 kilometres (10,700 nmi) at 15 knots (28 km/h)

Armament

↳*Weapon Station #1*

Name: SIMBAD-RC (Mistral Missile)

Type: Man Portable surface-to-air missile

Quantity: 2

Manufacturer: MBDA (France)

In Service: 1988-Present

Length: 1.86 m

DIameter: 90 mm

Crew: 1

Effective Firing Range: 6 km

Warhead: High Explosive with high density tungsten balls

Warhead Weight: 2.95 kg

Detonation Mechanism: Laser proximity or impact triggered

Engine: Solid Rocket Motor

Speed: m/s800

Guidance System: Infrared homing

Note: SIMBAD-RC is a naval remote controlled turret using Mistral missiles developed by MBDA

↳*Weapon Station #2*

Name: M621 (NARWHAL 20mm RWS)

Type: Automatic Cannon

Caliber: mm20

Quantity: 2

Manufacturer: Nexter Systems

Length: 2,207 mm

Width: 202 mm

Height: 245 mm

Weight: 45.5 kg

Action: Blowback operated

Rate of Fire: 800 rounds/min

Muzzle Velocity: 1,005 m/s (3,297 ft/s) (AP-T) 985 m/s (3,231.6 ft/s) (HEI and TP)

Feed System: Open-link M12 belt

↳*Ammunition Weapon Station #2*

Name: INA

Type: Rifle

Caliber: mm20

Cartridge: 20×102mm

Basic Load: INA

↳*Weapon Station #3*

: M134 Minigun

Type: six-barrel rotary machine gun with a high, sustained rate of fire (2,000 to 6,000 rounds per minute).

Caliber: 7.63mm

Quantity: 2

Barrels: 6

Length: 801.6 mm

Barrel Length: 558.8 mm

Weight: 85 lb (39 kg) (41 lb (19 kg) lightweight mod.)

Action: Electrically driven rotary breech

Rate of Fire: Variable, 2,000–6,000 rpm

Muzzle Velocity: 2,800 ft/s (853 m/s)

Maximum Firing Range: 3,280 ft (1,000 m, 1,093 yd)

Feed System: Disintegrating M13 linked belt or linkless feed; dependent on installation [500-5,000-round belt]

Sights: Dependent on installation; no fixed sights

↳*Ammunition Weapon Station #3*

Name: INA

Type: Rifle

Caliber: 7.62mm

Cartridge: 7.62×51mm NATO

Basic Load: INA

↳*Weapon Station #4*

Name: M2 machine gun or Browning .50 caliber machine gun

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 4

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min (M2HB) 750–850 rounds/min (AN/M2) 1,200–1,300 rounds/min (AN/M3

Muzzle Velocity: 890 m/s

Effective Firing Range: 1,800 m

Maximum Firing Range: 7,400 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition Weapon Station #4*

Name: INA

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: INA

Accommodations

Note: The space gained by the use of the azimuth thrusters allowed for the construction of accommodation areas where no pipes or machinery are visible. Located in the forward section of the ship, crew cabins aboard Mistral-class ships are comparable in comfort levels to passenger cabins aboard Chantiers de l'Atlantique-constructed cruise ships. The fifteen officers each have an individual cabin. Senior non-commissioned officers share two-man cabins, while junior crew and

embarked troops use four- or six-person cabins. Conditions in these accommodation areas are said to be better than in most barracks of the French Foreign Legion, and when United States Navy vice-admiral Mark Fitzgerald inspected one of the Mistral-class ships in May 2007, it was claimed that he would have used the same accommodation area to host a crew three times the size of Mistral's complement.

Notes:

The Mistral class is a class of five amphibious assault ships, also known as a helicopter carrier, of the French Navy. Referred to as "projection and command ships" (French: bâtiments de projection et de commandement or BPC), a Mistral-class ship is capable of transporting and deploying 16 NH90 or Tiger helicopters, four landing barges, up to 70 vehicles including 13 AMX Leclerc tanks, or a 40-strong Leclerc tank battalion, and 450 soldiers. The ships are equipped with a 69-bed hospital, and are capable of serving as part of a NATO Response Force, or with United Nations or European Union peace-keeping forces. Three ships of the class are in service in the French Navy: Mistral, Tonnerre, and Dixmude. A deal for two ships for the Russian Navy was announced by then French President Nicolas Sarkozy on 24 December 2010, and signed by Russian Deputy Prime Minister Igor Sechin and French Defence Minister Alain Juppé in the presence of Sarkozy on 25 January 2011. On 3 September 2014, French President François Hollande announced the postponement of delivery of the first warship, Vladivostok, due to the Russia–Ukraine crisis. On 5 August 2015, President François Hollande and Russian president Vladimir Putin announced that France would pay back payments and keep the two ships initially produced for the Russian Navy; the two ships were later sold to Egypt. Based on displacement tonnage, Mistral and Tonnerre are the largest ships in the French Navy after the nuclear-powered aircraft carrier Charles de Gaulle, for roughly the same height above water. Aviation The flight deck of each ship is approximately 6,400 square metres (69,000 sq ft). The deck has six helicopter landing spots, one of which is capable of supporting a 33-tonne helicopter. The 1,800-square-metre (19,000 sq ft) hangar deck can hold 16 helicopters, and includes a maintenance area with an overhead crane. To aid launch and recovery, a DRBN-38A Decca Bridgemaster E250 landing radar and an Optical Landing System are used. The flight and hangar decks are connected by two aircraft lifts, each capable of lifting 13 tonnes. The 225-square-metre (2,420 sq ft) main lift is located near the stern of the ship, on the centreline, and is large enough for helicopters to be moved with their rotors in flight configuration. The 120 square metres (1,300 sq ft) auxiliary lift is located aft of the island superstructure. Every helicopter operated by the French military is capable of flying from these ships. On 8 February 2005, a Westland Lynx of the Navy and a Cougar landed on Mistral. The first landing of a NH90 took place on 9 March 2006. Half of the air group of the BPCs is to be constituted of NH-90s, the other half being composed of Tigre attack helicopters. On 19 April 2007, Puma, Écureuil and Panther helicopters landed on Tonnerre. On 10 May 2007, a MH-53E Sea Dragon of the US Navy landed on her reinforced helicopter spot off the U.S. Naval Station Norfolk. According to Mistral's first commanding officer, Capitaine de vaisseau Gilles Humeau, the size of the flight and hangar decks would allow the operation of up to thirty helicopters. Mistral aviation capabilities approach those of the Wasp-class amphibious assault ships, for roughly 40% the cost and crew requirements of the American ship. Amphibious transport Mistral-class ships can accommodate up to 450 soldiers, although this can be doubled for short-term deployments. The 2,650-square-metre (28,500 sq ft) vehicle hangar can carry a 40-strong Leclerc tank battalion, or a 13-strong Leclerc tank company and 46 other vehicles. By comparison, Foudre-class ships can carry up to 100 vehicles, including 22 AMX-30 tanks, in the significantly smaller 1,000-square-metre (11,000 sq ft) deck. The 885-square-metre (9,530 sq ft) well deck can accommodate four landing craft. The ships are capable of operating two LCAC hovercraft, and although the French Navy appears to have no intention of purchasing any LCACs, this capability improves the class' ability to interoperate with the United States Marine Corps and the British Royal Navy. Instead the DGA ordered eight French-designed 59-tonne EDA-R catamarans. Command and communications Mistral-class ships can be used as command and control ships, with a 850-square-metre (9,100 sq ft) command centre which can host up to 150 personnel. Information from the ship's sensors is centralised in the SENIT system (Système d'Exploitation Navale des Informations Tactiques, "System for Naval Usage of Tactical Information"), a derivative of the US Navy's Naval Tactical Data System (NTDS). Problems in the development of the SENIT 9 revision contributed to the one-year delay in the delivery of the two ships. SENIT 9 is based around Thales' tri-dimensional MRR3D-NG Multi Role Radar, which operates on the C band and incorporates IFF capabilities. SENIT 9 can also be connected to NATO data exchange formats through Link 11, Link 16 and Link 22. For communications, the Mistral-class ships use the SYRACUSE satellite system, based on French satellites SYRACUSE 3-A and SYRACUSE 3-B which provide 45% of the Super High Frequency secured communications of NATO. From 18 to 24 June 2007, a secure video conference was held twice a day between Tonnerre, then sailing from Brazil to South Africa, and VIP visitors at the Paris Air Show. Armament As of 2008, the two Mistral-class ships were armed with two Simbad launchers for Mistral missiles and four 12.7 mm M2-HB Browning machine guns. Two Breda-Mauser 30 mm/70 guns are also included in the design, though not installed as of 2009. Incidents such as the near-loss of the Israeli corvette INS Hanit to a Hezbollah-fired anti-ship missile during the 2006 Lebanon War have shown the vulnerability of modern warships to asymmetric threats, with the Mistral-class ships considered under-equipped for self-defence in such a situation. Consequently, Mistral and Tonnerre cannot be deployed into hostile waters without sufficient escorting ships. This problem is compounded by the small number of escort ships in the French Navy; there is a five-year gap between the decommissioning of the Suffren-class frigates and the commissioning of their replacements, the Horizon-class and FREMM frigates. Following the experiences of French naval commanders during Opération Baliste, the French deployment to aid European citizens in Lebanon during the 2006 war, proposals to improve the self-defence capabilities of the two Mistral-class ships were supported by one of the French chiefs of staff, and are under active consideration as of 2008. One suggestion is to upgrade the dual-launching, manual Simbad launchers to quadruple-launching, automatic Tetral launchers. In December 2014, the French Navy awarded a contract to Airbus to study the integration of the Multiple Launch Rocket System (MLRS) with Mistrals. This is an attempt to increase the ships' naval fire support capabilities, as current 76 mm and 100 mm guns have been determined to have insufficient range and

lethality for the role. The MLRS is in service with the French Army, using a GPS-guided rocket with a range of 70 km (43 mi) and a unitary 90 kg (200 lb) high-explosive warhead. In late 2013 The French Navy equipped all three Mistral "BPC" ships with two M134 Miniguns each; intended for close-in self-defense against asymmetric threats faced during anti-piracy operations, such as speedboats and kamikaze boats. In late 2011, the French Navy selected the NARWHAL20 remote weapon station (RWS) to equip Mistral ships for close-in self-defense. Nexter Systems will deliver two NARWHAL20B guns for each ship, chambered in 20×139mm ammunition, with one gun covering the port bow and the other covering the starboard stern. The Dixmude was the first of the vessels outfitted with the cannons in March 2016. Hospital Each ship carries a NATO Role 3 medical facility, i.e., equivalent to the field hospital of an Army division or army corps, or to the hospital of a 25,000-inhabitant city, complete with dentistry, diagnostics, specialist surgical and medical capabilities, food hygiene and psychological capabilities. A Syracuse-based telemedicine system allows complex specialised surgery to be performed. The 900 m2 hospital[38] provides 20 rooms and 69 hospitalisation beds, of which 7 are fit for intensive care. The two surgery blocks come complete with a radiology room providing digital radiography and ultrasonography, and that can be fitted with a mobile CT scanner. 50 medicalised beds are kept in reserve and can be installed in a helicopter hangar to extend the capacity of the hospital in case of emergency

ENS Gamal Abdel Nasser Egyptian Amphibious Assault Ship







Tiers:



Variants:

- **Mistral:** Pennant Number: L9013 Name: Mistral Laid Down: 10 July 2003 Launched: 6 October 2004 Commissioned: February 2006 Homeport: Toulon
- **Tonnerre (French Navy):** Pennant Number: L9014 Name: Tonnerre Laid Down: 26 August 2003 Launched: 26 July 2005 Commissioned:December 2006 Home Port: Toulon
- **Dixmude (French Navy):** Pennant Number: L9015 Name: Dixmude Laid Down: 18 April 2009 Launched: 17 September 2010 COmmissioned: 27 December 2012 Homeport: Toulon
- **Gamal Abdel Nasser (ex-Vladivostok):**
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1010 Name: Gamal Abdel Nasser (ex-Vladivostok) Laid Down: 18 June 2013 Launched: 20 November 2014 Commisssioned: 2 June 2016 Homeport: Safaga
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1020 Name: Anwar El Sadat (ex-Sevastopol) Laid Down: 1 February 2012 Launched: 15 October 2013 Commissioned: 16 September 2016 Homeport: Alexandria

System

Alternative Designations: Gamal Abdel Nasser (ex-Vladivostok); BPC; NTCD
Type: Amphibious assault ship
Pennant Number: L1010
Laid Down: 18 June 2013
Launched: 20 November 2014
Commissioned: 2 June 2016
Homeport: Safaga[
Builders: STX Europe DCNS
Class: Mistral class
Active: Mistral, Tonnerre, Dixmude Gamal Abdel Nasser, Anwar El Sadat
Complement: 20 officers, 80 petty officers, 60 quarter-masters

Troops: 900 (short duration) 450 (long durations) 150 (serving as operational headquarters)

Capacity: 59 vehicles (including 13 AMX Leclerc tanks) or a 40-strong Leclerc tank battalion

Boats & landing craft carried: 4 CTM (chaland de transport de matériel) alternatively, 2 LCAC (Landing Craft, Air Cushion)

Sensors and processing systems: DRBN-38A Decca Bridgemaster E250 navigation radar MRR3D-NG air/surface sentry radar 2 optronic fire control systems

Aircraft Carried: Former Russian aircraft: 8 × Kamov Ka-52K attack helicopters (Naval version of Ka-52 which is under construction) 4 × Kamov Ka-29TB transport helicopters 4 × Kamov Ka-27P ASW helicopters

Aviation Facilities: Helicopter deck and hangar

Dimensions

Length: m200

Beam: m32

Draught: m6.3

Dispacement, Empty: 16,500 tonnes

Dispacement, Fully Loaded: 21,300 tonnes

Automotive

Engine Name: Wärtsilä diesel-alternators 16 V32 (6.2 MW) + 1 Wärtsilä Vaasa auxiliary diesel-alternator 18V200 (3 MW)

Number of Engines: 3

Propulsion: 2 Rolls-Royce Mermaid azimuth thrusters (2 × 7 MW), 2 five-bladed propellers

Speed: 18.8 knots (35 km/h)

Range: 10,800 km (5,800 nmi) at 18 knots (33 km/h) 19,800 kilometres (10,700 nmi) at 15 knots (28 km/h)

Armament

↳*Weapon Station #1*

Name: AN/TWQ-1 Avenger

Type: Surface-to-Air Missile System

In Service: 1989-Present

Manufacturer: Boeing

Proliferation: Bahrain Egypt Iraq Taiwan - Avenger batteries have been upgraded by integrating CS/MPQ-90 Bee Eye radars United States – U.S. Army and U.S. Marine Corps

Quantity: ea4

Length: 4.95 m

Width: 2.18 m

Height: 2.64 m

Crew: 2 (Basic), 3 (STC)

Weight: 3900 kg

Missile: FIM-92 Stinger missiles

Operational Range: It has an outward targeting range of up to 4,800 m and can engage low altitude enemy threats at up to 3,800 m.

↳*Weapon Station #1 Missile*

Name: FIM-92 Stinger missiles

Type: Infrared homing Surface-to-Air Missile (SAM)

Basic Load: 8 per AN/TWQ-1 Avenger Systems giving the vessel a total of 32 missiles

Warhead: High explosive annular blast fragmentation

Warhead Weight: 3 kg

Length: 1.52 m

Diameter: 70.1mm

Weight: 15.19 kg

Engine: Solid-fuel rocket motor

Guidance System: Infrared homing

Operational Range: 443 km

Accommodations

Note: The space gained by the use of the azimuth thrusters allowed for the construction of accommodation areas where no pipes or machinery are visible. Located in the forward section of the ship, crew cabins aboard Mistral-class ships are comparable in comfort levels to passenger cabins aboard Chantiers de l'Atlantique-constructed cruise ships. The fifteen officers each have an individual cabin. Senior non-commissioned officers share two-man cabins, while junior crew and embarked troops use four- or six-person cabins. Conditions in these accommodation areas are said to be better than in most barracks of the French Foreign Legion, and when United States Navy vice-admiral Mark Fitzgerald inspected one of the Mistral-class ships in May 2007, it was claimed that he would have used the same accommodation area to host a crew three times the size of Mistral's complement.

Notes:

ENS Gamal Abdel Nasser (L1010) is an Egyptian Navy amphibious assault ship, a type of helicopter carrier, of the French-designed Mistral class. It was originally built for the Russian Navy and underwent sea trials.Subsequently, the contract was cancelled by France and agreement on compensation reached with the Russian government. Egypt and France concluded the deal to acquire the two former Russian Mistral for roughly 950 million euros. Egypt is the first and to date only country in Africa and the Middle East to possess a helicopter carrier. The Russian government placed an order for the ship in 2011. The construction of the ship would be shared between the countries with France building about 60 percent and Russia 40. Work started in France, in Saint-Nazaire, on 1 February 2012 and in the Russian Baltiysky Zavod shipyard in St. Petersburg in October 2012. Russia would send its parts to France for final assembly. The ship was expected to join the Russian Navy in 2015. The ship was launched on 15 October 2013. The ship began its first sea trials on 5 March 2014. Savings in construction costs were anticipated, due to the use of commercial off the shelf (COTS) parts, rather than requiring every system to be designed to military standards. The Russian acquisition of French Mistral-class amphibious assault ships was considered to be the largest defense deal between Russia and the West since World War II. The 2014 Russian military intervention in Ukraine triggered rising international criticism. France was under political pressure from other nations to sanction Russia by cancelling or suspending delivery of the two Mistral-class vessels. On 3 September 2014, French President François Hollande released an announcement that France was suspending the delivery of Vladivostok to Russia due to the ongoing War in Donbass, Ukraine. By 13 September 2014, a partial ceasefire was in place in Ukraine. This improvement in conditions in Ukraine was sufficient for French authorities to allow Vladivostok to go to sea for her acceptance trials. French Defence Ministry sources said a decision on the delivery of Vladivostok would be taken by mid-November. On 25 November, it was announced that delivery of the two ships was to be postponed indefinitely. Russia threatened legal action over the postponement. In August 2015 the two governments reached agreement on terms for cancelling the contract; France would keep the ships and fully reimburse Russia. On 7 August 2015, a French diplomatic source confirmed that President Hollande discussed the matter with Egyptian President Abdel Fattah el-Sisi during his visit to Egypt during the inauguration of the New Suez Canal in Ismailia. Subsequently, Egypt and France concluded the deal to acquire the two former Russian Mistral for roughly 950 million euros, including the costs of training Egyptian crews. Speaking on RMC Radio, Jean-Yves Le Drian, French Defence Minister, said that Egypt had already paid

the whole price for the helicopter carriers. On 2 June 2016, DCNS delivered the first of two helicopter carriers acquired by the Arab Republic of Egypt in October 2015, the Landing Helicopter Dock Gamal Abdel Nasser. The flag transfer ceremony took place in the presence of Egyptian and French Navies' Chiefs of Staff, Admiral Rabie and Admiral Rogel, Hervé Guillou, chairman and chief executive officer of DCNS, Laurent Castaing, chairman and chief executive officer of STX France, and senior Egyptian and French officials. Before sailing to Alexandria, the helicopter carrier Gamal Abdel Nasser participated in a joint exercise between the Egyptian and French Navies. On 16 September 2016, DCNS delivered the second of two helicopter carriers, the Landing Helicopter Dock Anwar El Sadat which also participated in a joint exercise with the French Navy before arriving at its home port of Alexandria. Aircraft Since receiving its two Mistral-class carriers, Egypt had issued an international tender for the procurement of new maritime helicopters. The Egyptian Navy and Air Force studied several offers for helicopters to use on both carriers. European and Russian manufacturers entered the bidding procedure; NHIndustries and Airbus Helicopters were reported to have offered their NH90 and Tiger helicopters, while Russian Helicopters offered its Ka-52K helicopter. By May 2017, the tender had reached its final stage, Russian Helicopters stated that it would intermediary enter into pricing negotiations if the company won the tender. In June 2017, Russia announced it had won the tender for providing deck helicopters Ka-52K for the Egyptian Mistral carriers. The head of the FSVTS, Dmitry Shugayev, said that pre-contract work was underway, including final agreement on the helicopter's technical concept and other financial conditions. Egypt is likely to buy the same package intended for the Russian Navy, which includes Ka-52K attack helicopters and Ka-29/31 utility helicopters, before the contract was cancelled by France.

Hanchon Class North Korean Landing Craft Utility (LCU)



Tiers:

1 2 **3** 4

System

Alternative Designation: Hanchon Class
Type: Landing Craft Utility
Builder: North Korea; Shipyard: INA
Crew: 16
Troop Capacity: up to 200 troops for a short distances.
Cargo Capacity: two tanks

Dimensions

Length: 35.70 m
Beam: 7.90 m
Draft: 1.20 m
Displacement, Full Load: 145 tons full load

Propulsion System

Engine Name: 3 x Russian type 3D12
Engine Type: Diesel
Engine Power: 600 total bhp
Maximum Range: 600 nm at 12 knots
Maximum Speed: 10 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: KPV
Type: Heavy Machine Gun
Caliber: mm14.5

Quantity: 2 x KPV 14.5 Heavy Machine Gun

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Firing Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳***Gun Weapon Systems #1 Ammunition***

Type: Rifle

Caliber: mm14.5

Cartridge: 14.5×114 mm

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Radar Systems

Name: 1 x Zarnitsa (Skin Head**)

Type: Surface Search Radar

Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

Little is confirmed about these utility landing craft except that they have a bow ramp, two machine guns, and are believed capable of carrying two tanks or up to 200 troops for a short distances. Characteristics are estimated.

ENS Anwar El Sadat Egyptian Amphibious Assault Ship




Tiers:



Variants:

- **Mistral:** Pennant Number: L9013 Name: Mistral Laid Down: 10 July 2003 Launched: 6 October 2004 Commissioned: February 2006 Homeport: Toulon
- **Tonnerre (French Navy):** Pennant Number: L9014 Name: Tonnerre Laid Down: 26 August 2003 Launched: 26 July 2005 Commissioned:December 2006 Home Port: Toulon
- **Dixmude (French Navy):** Pennant Number: L9015 Name: Dixmude Laid Down: 18 April 2009 Launched: 17 September 2010 COmmissioned: 27 December 2012 Homeport: Toulon
- **Gamal Abdel Nasser (ex-Vladivostok):**
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1010 Name: Gamal Abdel Nasser (ex-Vladivostok) Laid Down: 18 June 2013 Launched: 20 November 2014 Commisssioned: 2 June 2016 Homeport: Safaga
- **Anwar El Sadat (ex-Sevastopol) (Egyptian Navy):** Pennant Number: L1020 Name: Anwar El Sadat (ex-Sevastopol) Laid Down: 1 February 2012 Launched: 15 October 2013 Commissioned: 16 September 2016 Homeport: Alexandria

System

Alternative Designations: Anwar El Sadat (ex-Sevastopol); BPC; NTCD
Pennant Number: L1020
Laid Down: 1 February 2012
Launched: 15 October 2013
Commissioned: 16 September 2016
Homeport: Alexandria
Builders: STX Europe DCNS
Class: Mistral class
Active: Mistral, Tonnerre, Dixmude Gamal Abdel Nasser, Anwar El Sadat
Type: Amphibious assault ship
Complement: 20 officers, 80 petty officers, 60 quarter-masters
Troops: 900 (short duration) 450 (long durations) 150 (serving as operational headquarters)
Capacity: 59 vehicles (including 13 AMX Leclerc tanks) or a 40-strong Leclerc tank battalion
Boats & landing craft carried: 4 CTM (chaland de transport de matériel) alternatively, 2 LCAC (Landing Craft, Air Cushion)
Sensors and processing systems: DRBN-38A Decca Bridgemaster E250 navigation radar MRR3D-NG air/surface sentry radar 2 optronic fire control systems
Aircraft Carried: Former Russian aircraft: 8 × Kamov Ka-52K attack helicopters (Naval version of Ka-52 which is under

construction) 4 × Kamov Ka-29TB transport helicopters 4 × Kamov Ka-27P ASW helicopters

Aviation Facilities: Helicopter deck and hangar

Dimensions

Length: m200

Beam: m32

Draught: m6.3

Dispacement, Empty: 16,500 tonnes

Dispacement, Fully Loaded: 21,300 tonnes

Automotive

Engine Name: Wärtsilä diesel-alternators 16 V32 (6.2 MW) + 1 Wärtsilä Vaasa auxiliary diesel-alternator 18V200 (3 MW)

Number of Engines: 3

Propulsion: 2 Rolls-Royce Mermaid azimuth thrusters (2 × 7 MW), 2 five-bladed propellers

Speed: 18.8 knots (35 km/h)

Range: 10,800 km (5,800 nmi) at 18 knots (33 km/h) 19,800 kilometres (10,700 nmi) at 15 knots (28 km/h)

Armament

↳*Weapon Station #1*

Name: AN/TWQ-1 Avenger

Type: Surface-to-Air Missile System

In Service: 1989-Present

Manufacturer: Boeing

Proliferation: Bahrain Egypt Iraq Taiwan - Avenger batteries have been upgraded by integrating CS/MPQ-90 Bee Eye radars United States – U.S. Army and U.S. Marine Corps

Quantity: ea4

Length: 4.95 m

Width: 2.18 m

Height: 2.64 m

Crew: 2 (Basic), 3 (STC)

Weight: 3900 kg

Missile: FIM-92 Stinger missiles

Operational Range: It has an outward targeting range of up to 4,800 m and can engage low altitude enemy threats at up to 3,800 m.

↳*Weapon Station #1 Missile*

Name: FIM-92 Stinger missiles

Type: Infrared homing Surface-to-Air Missile (SAM)

Basic Load: 8 per AN/TWQ-1 Avenger Systems giving the vessel a total of 32 missiles

Warhead: High explosive annular blast fragmentation

Warhead Weight: 3 kg

Length: 1.52 m

Diameter: 70.1mm

Weight: 15.19 kg

Engine: Solid-fuel rocket motor

Guidance System: Infrared homing

Operational Range: 443 km

Accommodations

Note: The space gained by the use of the azimuth thrusters allowed for the construction of accommodation areas where no pipes or machinery are visible. Located in the forward section of the ship, crew cabins aboard Mistral-class ships are comparable in comfort levels to passenger cabins aboard Chantiers de l'Atlantique-constructed cruise ships. The fifteen officers each have an individual cabin. Senior non-commissioned officers share two-man cabins, while junior crew and embarked troops use four- or six-person cabins. Conditions in these accommodation areas are said to be better than in most barracks of the French Foreign Legion, and when United States Navy vice-admiral Mark Fitzgerald inspected one of the Mistral-class ships in May 2007, it was claimed that he would have used the same accommodation area to host a crew three times the size of Mistral's complement.

Notes:

ENS Anwar El Sadat (L1020) is an Egyptian Navy amphibious assault ship, a type of helicopter carrier, of the French Mistral class. It was originally built in France for the Russian Navy as part of a contract for two of these warships and underwent sea trials. The contract with Russia was subsequently cancelled by France and an agreement on compensation was reached with the Russian government. Egypt and France eventually concluded a deal to acquire the two warships for roughly 950 million euros. Egypt is considered the first and only country in Africa and the Middle East to possess a helicopter carrier of such type. The Russian government placed an order for this and another warship in 2011. The construction of these ships would be shared between both countries, with France building about 60 percent and Russia 40 percent. Work started in Saint-Nazaire, France, on 18 June 2013, and in the Russian Baltiysky Zavod shipyard in St. Petersburg on 4 July 2013. Russia would send its parts to France for final assembly. The ship was originally expected to join the Russian Navy in 2015. After final assembly of the main structures in France the ship was then scheduled to go to St. Petersburg, Russia, for the outfitting of additional Russian-specific weapons and subsystems. The Russian acquisition of these two French Mistral-class amphibious assault ships was considered to be the largest defense deal between Russia and the West since World War II. In 2014, as criticism of Russian intervention in Ukraine grew, France came under increasing pressure to cancel or suspend the delivery of the two Mistral-class hulls, tentatively named Vladivostok and Sevastopol. Some commentators suggested France try to find alternative customers for the two vessels. In August, 2015, the two governments reached agreement on terms for cancelling the contract; France would keep the ships and fully reimburse Russia. On 7 August 2015, a French diplomatic source confirmed that President Hollande had discussed the matter with Egyptian President Abdel Fattah el-Sisi during his visit to Egypt for the inauguration of the New Suez Canal in Ismailia. Subsequently, in October 2015, Egypt and France concluded a deal to acquire the two formerly Russian-bound warships for roughly 950 million euros, which included the costs of training Egyptian crews. Speaking on RMC Radio, Jean-Yves Le Drian, French Defence Minister, said that Egypt had already paid the whole price for the helicopter carriers. Beginning in February 2016, 180 Egyptian sailors began training in Saint-Nazaire, France, on the newly renamed landing helicopter dock Gamal Abdel Nasser, with the support of the DCNS (Direction des Constructions Navales Services) and STX France instructors and Défense Conseil International. On 2 June 2016, DCNS delivered the first of these two helicopter carriers acquired by the Arab Republic of Egypt, Gamal Abdel Nasser. The flag transfer ceremony took place in the presence of Egyptian and French Navies' Chiefs of Staff, Admiral Rabie and Admiral Rogel, Hervé Guillou, chairman and chief executive officer of DCNS, Laurent Castaing, chairman and chief executive officer of STX France, and senior Egyptian and French officials. Gamal Abdel Nasser left Saint-Nazaire after a few days with associated support vessels. Before sailing to the vessel's home port of Alexandria, Egypt, the warship participated in a joint exercise between the Egyptian and French Navies. On 16 September 2016, DCNS delivered the second of the two helicopter carriers, Anwar El Sadat, which also participated in a joint exercise with the French Navy before arriving at its home port of Alexandria on 6 October 2016, coinciding with the country's celebrations of the 43rd anniversary of the 1973 October War against Israel. Aircraft Since receiving its two Mistral-class carriers, Egypt had issued an international tender for the procurement of new maritime helicopters. The Egyptian Navy and Air Force studied several offers for helicopters to use on both carriers. European and Russian manufacturers entered the bidding procedure;

NHIndustries and Airbus Helicopters were reported to have offered their NH90 and Tiger helicopters, while Russian Helicopters offered its Ka-52K helicopter. By May 2017, the tender had reached its final stage, Russian Helicopters stated that it would intermediary enter into pricing negotiations if the company won the tender. In June 2017, Russia announced it had won the tender for providing deck helicopters Ka-52K for the Egyptian Mistral carriers. The head of the FSVTS, Dmitry Shugayev, said that pre-contract work was underway, including final agreement on the helicopter's technical concept and other financial conditions. Egypt is likely to buy the same package intended for the Russian Navy, which includes Ka-52K attack helicopters and Ka-29/31 utility helicopters, before the contract was cancelled by France.

Nampo Class North Korean Landing Craft Utility (LCU)



Tiers:

1 2 **3** 4

System

Alternative Designation: Nampo Class
Type: Landing Craft Utility
Builder: North Korea; Shipyard: INA
Crew: 19

Dimensions

Length: 27.70 m
Beam: 6.10 m
Draft: 1.80 m
Displacement, Full Load: 82 tons full load

Propulsion System

Engine Name: 4 x type M50-F4 Engines
Engine Type: Diesel
Engine Power: 4,800 total bhp;
Maximum Range: 450 nm at 30 knots
Maximum Speed: 40 max. knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: KPV
Type: Heavy Machine Gun
Caliber: 14.5
Quantity: 2 x KPV 14.5 Heavy Machine Gun
Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Firing Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳***Gun Weapon Systems #1 Ammunition***

Type: Rifle

Caliber: mm14.5

Cartridge: 14.5×114 mm

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Radar Systems

Name: 1 x Zarnitsa (Skin Head**) or 1 x Type 351 (Pot Head**)

Type: Surface Search

Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The hull of these vessels is a modification of the CHONG-JIN Class. Some of the above are employed as patrol craft with the bow doors welded shut.

Type 072 Class (Yukan Class) Chinese Landing Ship



Tiers:

1 2 3 4

Variants:

- **Yuntai Shan:** Commissioned: 1978 Fleet:East Sea Fleet
- **Wufeng Shan:** Commissioned: 1980 Fleet: East Sea Fleet
- **Zijin Shan:** Commissioned: 1982 Fleet: East Sea Fleet

System

Alternative Designation: Type 072 Class; Yukan Class
Total Built: 3 ships total
Type: Landing Ship
Builder: Zhonghua Shipyard
In Service: 1978-Present
Crew: 130
Cargo Capacity: 10–11 tanks and 100–120 troops, or 200 troops and 82~mm anti-tank gun company, or 500 tonnes of cargo

Dimensions

Length: 120 m
Beam: 15.3 m
Draft: 2.9 m
Displacement: 3,100 tonnes (standard) 4,170 tonnes (full load)

Propulsion System

Engine Name: 2 x 12E390
Engine Type: Diesel
Engine Power: 9,600 hp each
Maximum Range: 3,000 nautical miles (5,600 km; 3,500 mi) at 14 knots
Maximum Speed: 18 knots (33 km/h; 21 mph) (maximum) 14 knots (26 km/h; 16 mph) (economical)
Endurance: INA

Gun Weapon Systems

↳*Gun Weapon Systems #1: System*

Name: Type 66 dual-57mm Naval Gun

Type: Naval Gun

Caliber: 57 mm

Quantity: 4 x Type 66 dual-57mm Naval Guns

Note: The AK-257 is a Soviet 57mm naval gun, originally a land ZIF-31 L/70 57mm (Type 66/76) cannon. During the early 1950s, development began of naval versions of the 57x348mmSR 70 calibre weapon which had entered service with the Soviet army in 1950 as the S-60. This was to be a supplementary weapon for larger warships and as the main gun armament for minesweepers and auxiliaries. The twin gun version, ZIF-31, appears to have entered service with the Project 264 Minesweepers (T58 class) and the Project 310 (Don class) submarine support ships in 1958. In 1960, two other versions of the mounting appeared; a single gun ZIF-71 for the modernised Skoryy class destroyers and the quad ZIF-75 for the Krupny/Kanin class destroyers. The ZIF designation is an industrial one and it is possible that the naval designations were AK-157 (ZIF-71), AK-257 (ZIF-31) and AK-457 (ZIF-75). In smaller warships these mountings were sometimes associated with MR-103 and in larger ones with the Yakhond (Hawk Screech) radar. The ZIF-31/71/75 mountings may not have been very successful and an improved twin mounting appeared shortly afterwards as the AK-725. The twin 57mm ZIF-31 has also been manufactured in China as the Type 66 and there is a water-cooled derivative known as the Type 76. The AK-257 is currently employed on the Grisha class Corvette.

↳*Gun Weapon Systems #1: Ammunition*

Type: Rifle

Caliber: mm57

Shell: INA

Basic Load: INA

↳*Gun Weapon Systems #2: System*

Name: Type 61 dual-25mm Naval Gun

Type: Naval Gun

Caliber: 25mm

Quantity: 4 x Type 61 duel-57mm Naval Gun

Barrel Length: 1.5 m

Weight: INA

Barrels: dual

Elevation: -10° ~ +85°

Traverse: 360°

Rate of Fire: Compact: 800~900 round/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 3,000 m

Effective Firing Range: 2,700 m

Feed System: Magazine

Sights: Optical

↳***Gun Weapon Systems #1: Ammunition***

Type: Rifle

Caliber: 25 mm

Shell: 25 x 218 mm SR

Basic Load: INA

Onboard Aviation Facilities

Facilities: No

Aircraft: No

Helicopters: No

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

The Type 072 landing ship (NATO designation Yukan class) are large landing ships built by Shanghai-based Zhonghua Shipyard (now Hudong-Zhonghua Shipbuilding) in the 1980s to replace the aging World War II-era ex-US Navy L-1511 tank landing ships in service with the PLA Navy. The Type 072 is the PLA Navy’s first indigenous large landing ship. A total of 3 Type 072 are in service all of them are in service with the East Sea Fleet of the People's Liberation Army Navy (PLAN ESF).

Type 073 Yudao-Class Chinese Landing Ship



Tiers:



Variants:

- **Type 073 Yudao-class landing ship:** Requirement of the Type 073-class landing ship was finalized in May 1965, and design work by Shanghai-based 708th Research Institute completed just 4 months later in September 1965. Preparation to build this class was completed in October 1966, and construction begun a month later in November 1966. Due to political turmoil in China at the time, namely, Cultural Revolution, it was not until almost three years later in August 1969 when the ship was launched. From November 1969 thru December 1969, extensive trials were conducted and the ship was handed over to PLAN in December 1969 for further tests. In 1970 more tests were conducted with more than 7,000 km (3,800 nmi; 4,300 mi) logged, and the longest trip was from Chongqing to Dalian. However, trials revealed that the vibration was too great at high speed, and the Type 073 did not enter production. Redesign work designated as Type 073II immediately started after the trials of the first unit ended, and the first unit entered PLAN service with pennant number 904 and was subsequently designated as Type 073I, and was later ordered to be fully converted to Type 073II standard. Due to the political turmoil at the time, conversion was not completed until 1975.
- **Type 073II Yudao-class landing ship:** Shortcomings of Type 073I exposed in trials caused a crush program to rework and redesign at Dalian Shipyard, but due to political turmoil in China at the time, it was not sufficient to correct the problem completely. Shipyard # 9308 in Anhui petitioned the 6th Machinery Industrial Ministry and Anhui provincial Defense Industrial Office to construct Type 73II LSM in 1975, which was approved in April 1976, with orders for 3 ships. Construction of the first Type 073II LSM at Shipyard # 9308 begun five months later in September 1976, and it was launched in June 1978. From 1978 to 1979, extensive trials were conducted and the ship was handed over to PLAN in early 1980, with pennant number East Transport 757 (East Transport = Dong Yun □□ in Chinese), meaning Transport 757 of East Sea Fleet of PLAN. This unit was later reassigned as # 937. The primary difference between Type 073I and Type 073II is in the engine. Additional balance weight was added to the diesel engine which solved the vibration problem, but the reliability issue of the engine remain unsolved, and as a result, Type 073II did not enter mass production, just like its predecessor Type 073I.
- **Type 073IIY Yudao-class landing ship:** As the mass production plan for Type 073II was cancelled due to reliability problem of its engine, Shipyard # 9308 begun to modify the remaining two units that were already being built, which was successfully completed in September 1985. The resulting type is Type 073IIY landing ship, with Y for Yun (□), meaning transport in Chinese. Type 073I, Type 073II, and Type 073IIY all received the NATO reporting name Yudao-class. A total of two units of Type 073IIY were completed, with pennant #s 937 and 938. The primary difference between Type 073II and Type 073 IIY includes more than 100 upgrades in addition to engine improvement.
- **Type 073III Yudeng-class landing ship:** The reliability problem of the engine of Type 073 series was not completely solved until the appearance of Type 073III landing ship, with NATO reporting name Yudeng-class. The D-39 engine that is reliable only at slower speed was replaced by a new engine that is reliable at all speeds, and displacement is also increased. Only one unit entered service, with pennant # 990 in 1991.
- **Type 073A Yunshu-class landing ship:** After the completion of the first unit (pennant # 990), it takes a decade for more units to follow, and 10 more entered service between 2001 through 2002. These later units are slightly larger in displacement at 2,000 tons, and more advanced equipment, mainly in electronics and on board machinery. This latest batch is referred to as the Type 073A landing ship (NATO reporting name: Yunshu-class). Pennant numbers; 941 (Shengzhou Hill), 942 (Lushan), 943 (Monsanto), 944 (Yushan), 945 (Huashan), 946 (Songshan), 947, 948, 949 (Hengshan), 950 (Taishan).

System

Alternative Designation: Type 073 Yudao-Class

Type: Landing Ship

Builder: Shanghai-based 708th Research Institute

In Service: INA

Crew: 75

Dimensions

Length: 69 m

Beam: 10.5 m

Draft: INA

Displacement, Full Load: 850 tons

Propulsion System

Engine Name: 2 × D-39

Engine Type: diesel

Engine Power: 2,169.2 hp

Maximum Range: 1,200 nmi (2,200 km; 1,400 mi)

Maximum Speed: 15 knots (28 km/h; 17 mph)

Endurance: INA

Main Weapon System

↳*System*

Name: Type 61

Type: Naval Gun

Caliber: 37 mm

Quantity: 2 × Type 61 twin 37 mm AAA

Note: There is no unclassified information available on the Type 61

↳*Ammunition*

Type: Rifle

Caliber: mm37

Cartridge: INA

Basic Load: INA

Auxiliary Weapon System

↳*System*

Name: Type 61

Type: Naval Gun

Caliber: mm25

Quantity: 2 × Type 61 twin 25 mm AAA

Length: INA

Barrel Length: m1.5

Weight: INA

Barrels: Single or Dual

Elevation: -10° ~ +85°

Traverse: 360°

Rate of FIre: Compact: 800~900 round/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 3,000 m

Effective Firing Range: 2,700 m

Feed System: Magazine

Sights: Optical

↳***Ammunition***

Type: Rifle

Caliber: mm25

Shell: 25 x 218 mm SR

Basic Load: INA

Fire Control System

FCS Name: INA

Computerized FCS: INA

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

Type 073 Yudao-class landing ship The Type 073 landing ship is a family of landing ships developed and operated by the People's Liberation Army Navy, it consists of several models. This article details the development of this class that begun in the 1960s. The most recent and modern model of the class is the Type 073A, which were built and commissioned in the 2000s. Requirement of the Type 073-class landing ship was finalized in May 1965, and design work by Shanghai-based 708th Research Institute completed just 4 months later in September 1965. Preparation to build this class was completed in October 1966, and construction begun a month later in November 1966. Due to political turmoil in China at the time, namely, Cultural Revolution, it was not until almost three years later in August 1969 when the ship was launched. From November 1969 thru December 1969, extensive trials were conducted and the ship was handed over to PLAN in December 1969 for further tests. In 1970 more tests were conducted with more than 7,000 km (3,800 nmi; 4,300 mi) logged, and the longest trip was from Chongqing to Dalian. However, trials revealed that the vibration was too great at high speed, and the Type 073 did not enter production. Redesign work designated as Type 073II immediately started after the trials of the first unit ended, and the first unit entered PLAN service with pennant number 904 and was subsequently designated as Type 073I, and was later ordered to be fully

converted to Type 073II standard. Due to the political turmoil at the time, conversion was not completed until 1975

Type 073III Yudeng-Class Chinese Landing Ship



Tiers:



Variants:

- **Type 073 Yudao-class landing ship:** Requirement of the Type 073-class landing ship was finalized in May 1965, and design work by Shanghai-based 708th Research Institute completed just 4 months later in September 1965. Preparation to build this class was completed in October 1966, and construction begun a month later in November 1966. Due to political turmoil in China at the time, namely, Cultural Revolution, it was not until almost three years later in August 1969 when the ship was launched. From November 1969 thru December 1969, extensive trials were conducted and the ship was handed over to PLAN in December 1969 for further tests. In 1970 more tests were conducted with more than 7,000 km (3,800 nmi; 4,300 mi) logged, and the longest trip was from Chongqing to Dalian. However, trials revealed that the vibration was too great at high speed, and the Type 073 did not enter production. Redesign work designated as Type 073II immediately started after the trials of the first unit ended, and the first unit entered PLAN service with pennant number 904 and was subsequently designated as Type 073I, and was later ordered to be fully converted to Type 073II standard. Due to the political turmoil at the time, conversion was not completed until 1975.
- **Type 073II Yudao-class landing ship:** Shortcomings of Type 073I exposed in trials caused a crush program to rework and redesign at Dalian Shipyard, but due to political turmoil in China at the time, it was not sufficient to correct the problem completely. Shipyard # 9308 in Anhui petitioned the 6th Machinery Industrial Ministry and Anhui provincial Defense Industrial Office to construct Type 73II LSM in 1975, which was approved in April 1976, with orders for 3 ships. Construction of the first Type 073II LSM at Shipyard # 9308 begun five months later in September 1976, and it was launched in June 1978. From 1978 to 1979, extensive trials were conducted and the ship was handed over to PLAN in early 1980, with pennant number East Transport 757 (East Transport = Dong Yun □□ in Chinese), meaning Transport 757 of East Sea Fleet of PLAN. This unit was later reassigned as # 937. The primary difference between Type 073I and Type 073II is in the engine. Additional balance weight was added to the diesel engine which solved the vibration problem, but the reliability issue of the engine remain unsolved, and as a result, Type 073II did not enter mass production, just like its predecessor Type 073I.
- **Type 073IIY Yudao-class landing ship:** As the mass production plan for Type 073II was cancelled due to reliability problem of its engine, Shipyard # 9308 begun to modify the remaining two units that were already being built, which was successfully completed in September 1985. The resulting type is Type 073IIY landing ship, with Y for Yun (□), meaning transport in Chinese. Type 073I, Type 073II, and Type 073IIY all received the NATO reporting name Yudao-class. A total of two units of Type 073IIY were completed, with pennant #s 937 and 938. The primary difference between Type 073II and Type 073 IIY includes more than 100 upgrades in addition to engine improvement.
- **Type 073III Yudeng-class landing ship:** The reliability problem of the engine of Type 073 series was not completely solved until the appearance of Type 073III landing ship, with NATO reporting name Yudeng-class. The D-39 engine that is reliable only at slower speed was replaced by a new engine that is reliable at all speeds, and displacement is also increased. Only one unit entered service, with pennant # 990 in 1991.
- **Type 073A Yunshu-class landing ship:** After the completion of the first unit (pennant # 990), it takes a decade for more units to follow, and 10 more entered service between 2001 through 2002. These later units are slightly larger in displacement at 2,000 tons, and more advanced equipment, mainly in electronics and on board machinery. This latest batch is referred to as the Type 073A landing ship (NATO reporting name: Yunshu-class). Pennant numbers; 941 (Shengzhou Hill), 942 (Lushan), 943 (Monsanto), 944 (Yushan), 945 (Huashan), 946 (Songshan), 947, 948, 949 (Hengshan), 950 (Taishan).

System

Alternative Designation: Type 073III Yudeng-class

Type: Landing Ship

Total Built: Only one unit entered service, with pennant # 990 in 1991.

Builder: Shanghai-based 708th Research Institute

In Service: INA

Crew: 74

Dimensions

Length: 87 m

Beam: 12.6 m

Draft: 2.25 m

Displacement, Full Load: ,460 tons normal, 1,850 tons full

Propulsion System

Engine Name: 2 × 6PA6L-380

Engine Type: diesel

Engine Power: 3,540 kW (4,750 hp) each

Maximum Range: 1,500 nmi (2,800 km; 1,700 mi) at 14 knots (26 km/h; 16 mph)

Maximum Speed: 17 knots (31 km/h; 20 mph)

Endurance: INA

Main Weapon System

↳*System*

Name: Type 76

Type: Naval Gun

Caliber: 37 mm

Quantity: 2 × Type 76 twin 37 mm AAA

Note: The Type 76 is a further development of the Type 65. The Chinese military wanted to further improve the Type 65 by incorporating a fully automatic operational mode, but political turmoil from the Cultural Revolution delayed development of the Type 65's successor until its eventual release in 1976. The Type 76 incorporated a fully automatic operational mode, though the semi-automatic operational mode was retained as a backup measure. The model's rate of fire could reach a maximum rate of 400 rounds per minute per barrel (cyclic). The gun saw military action in the 1988 Spratly Islands naval battle and received positive feedback from the Chinese navy.

↳*Ammunition*

Type: Rifle

Caliber: mm37

Cartridge: INA

Basic Load: INA

Auxiliary Weapon Systems #1

↳*Missile Launcher*

Name: Type 81H Launcher
Type: Rocket Launcher
Quantity: 1
Length: 9.8 m
Width: 3.24 m
Height: 3.50 m
Crew: 5
Barrels: 40
Traverse: 360°
Elevation: INA

↳*Rocket*

Name: Type 81H
Type: Rocket
Caliber: mm122
Length: 1.5 m
Diameter: INA
Weight: 200.0 kg
Basic Load: INA
Targets: Targets: Surface Vessel, Land Structure - Soft, Land Structure - Hardened, Mobile Target - Soft, Mobile Target - Hardened
Maximum Surface Effective Range: 9.3 km

Fire Control System

FCS Name: INA
Computerized FCS: INA

Protection

Active Protection System: INA
Countermeasures: INA
NBC Water Washdown System: INA

Notes:

The Type 073 landing ship is a family of landing ships developed and operated by the People's Liberation Army Navy, it consists of several models. This article details the development of this class that begun in the 1960s. The most recent and modern model of the class is the Type 073A, which were built and commissioned in the 2000s. Type 073III Yudeng-class landing ship. The reliability problem of the engine of Type 073 series was not completely solved until the appearance of Type 073III landing

ship, with NATO reporting name Yudeng-class. The D-39 engine that is reliable only at slower speed was replaced by a new engine that is reliable at all speeds, and displacement is also increased. Only one unit entered service, with pennant # 990 in 1991.

Teluk Semangka Class Indonesian Landing Ship Tank (LST)







Tiers:

1 2 **3** 4

Variants:

- **TELUK SEMANGKA:** Commissioned: 1981 Status: Active
- **TELUK PENYU:** Commissioned: 1981 Status: Active
- **TELUK MANDAN:** Commissioned: 1981 Status: Active
- **TELUK SAMPIT:** Commissioned: 1981 Status: Active
- **TELUK BANTEN:** Commissioned: 1982 Status: Active
- **TELUK ENDE:** Commissioned: 1982 Status: Active

System

Alternative Designation: Teluk Semangka Class

Type: Landing Ship Tank (LST)

Builder: Korea-Tacoma Shipyard, Masan, South Korea

Crew: 117 total (13 off. + 104 enl.)

Troops Capacity: 202 total (10 off. + 192 enl.)

Dimensions

Length: 100.0 m

Beam: 15.4 m

Draft: 4.2 m

Displacement, Standard: 1,800 tons standard

Displacement, Full Load: 3,770 tons full load

Propulsion System

Engine Name: INA

Engine Type: Diesel

Engine Power: 6,860 total bhp

Maximum Range: 7,500 nm at 13 knots

Maximum Speed: 15 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Bofors 40mm gun

Type: Naval Gun

Caliber: 40mm

Quantity: 3 x Bofors 40mm Naval Gun

Length: 6.5 m

Barrel Length: 2.2 m

Weight: 1,981 kg

Crew: 4

Barrels: 1 or 2

Elevation: 5°/+90° (55°/s)

Transverse: Full 360°

Rate of Fire: 120 round/min

Muzzle Velocity: 881 m/s

Maximum Firing Range: 7,160 m

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm40

Shell: 40×311mmR

Shell Weight: 0.9 kg

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Aviation Facilities

Helicopters: TELUK BANTEN and TELUK ENDE: 3 Super Puma (NAS-332) (remainder: 1 Westland Wasp)

Radar Systems

Surface Search Radar: 1 x Raytheon type surface search (all except TELUK BANTERN and TELUK ENDE) or 1 x ZW-06 surface search (TELUK BANTEN and TELUK ENDE only)

Navigation Radar: 1 x Racal-Decca type navigation

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

KRI Teluk Semangka class ships are Landing Ship Tank [LST] type vessels used to carry personnel, aid supplies and other heavy equipment to help post-disaster recovery efforts. These ships were made by South-Korea and commissioned in 1981 and 1982. The last two units have large helicopter hangars and command facilities. The KRI Teluk Ende (517) is the last ship of the Teluk Semangka class large landing ships, the final unit, is also outfitted as a hospital ship. KRI Teluk Ende-517 is named after Teluk Ende (Bay of Ende), which is also known as Baai van Endeh, Ende Baai, Hende, and Hèndé. Ende, with it's 60,000 residents is the biggest city on Flores. Located along the southern coast, it's hidden in the curve of a small peninsula. At both sides of it is a harbor. Most shipping activity is concentrated in Pelabuhan Ende, which is located at the western side and has a good view over Teluk Ende (Bay of Ende). In February 2001 Dayak mobs hunted down and killed Madurese, including women, children and the elderly. The bloody attacks by indigenous Dayaks on Madurese migrants in the river town of Sampit, Central Kalimantan, have claimed hundreds of lives, mostly Madurese. It was a mad scramble as thousands of refugees trying to escape the riot which swept Sampit rushed to board a navy ship taking them away from ethnic violence which has claimed over 210 lives. But to the dismay of some 20,000 refugees who had gathered, only one ship, KRI Teluk Sampit, was docked and ready to be boarded at Samuda, some 40-kilometers south of Sampit. The ship had a capacity of less than 2,000. The refugees, mostly Madurese migrants, must await the arrival of the KRI Teluk Ende which had also been dispatched from Surabaya, East Java. Indonesian warship KRI Teluk Ende which arrived in Surabayae on 26 February 2001 with more than 3,200 refugees who became victims of the ethnic clashes in Sampit, Central Kalimantan, returned to the troubled area the next morning. "As there had been requests for transport of more refugees, KRI Teluk Ende will return to Sampit, while KRI Teluk Sampit still remains in Surabaya for further orders," spokesman for the local naval authorities Lt Col Ditya Soedarsono said here Monday night. He said the 1,800 refugees, mostly Madurese, will also be brought to Surabaya, which is close to their hometowns in Madura. Indonesian Navy TELUK ENDE (517) was photographed at Surabaya on 27 November 2006, without red cross markings. Two Indonesian's Navy Ships, KRI KI HAJAR DEWANTARA 364 and KRI TELUK ENDE 517, made a three days goodwill visit to Brunei Darussalam from 14 to 16 April 2009. Their arrivals at Muara Port were received by senior officers of Royal Brunei Navy and officials from The Embassy of the Republic of Indonesian. In October 2010 Navy warship KRI Kalakay carryied at least six tons of basic necessaries from President Susilo Bambang Yudhoyono to Wasior in the district of Teluk Wondama in West Papua recently hit by flash floods. The Command has also sent three other warships to help overcome the impact of the disaster namely KRI Teluk Ende-517, KRI Fatahilah-361 and KRI dr Soeharto-990. KRI dr Soeharto served as a floating hospital and had much experience in carrying out humanitarian missions in a number of places in the country.

Hantae Class North Korean Landing Craft Utility (LCU)



Tiers:

1 2 **3** 4

System

Alternative Designation: Hantae Class
Type: Landing Craft Utility
Builder: North Korea; Shipyard: INA
Crew: 36
Troop Capacity: 350
Cargo Capacity: up to three tanks

Dimensions

Length: 48.00 m
Beam: 6.50 m
Draft: 2.00 m
Displacement, Standard: 200 tons standard
Displacement, Full Load: 350 tons full load

Propulsion System

Engine Name: INA
Engine Type: 2 x Diesel Engines
Engine Power: 4,350 total bhp
Maximum Range: 2,000 nm at 12 kts.
Maximum Speed: 18 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: 2M-3M
Type: Naval Gun

Caliber: mm25

Quantity: 2 x 2M-3M Naval Guns

Length: 1.50 m

Bore: mm25

Weight: 1,361 kg

Projectile Weight: 340 g

Maximum Range, Surface: 4,000 m

Effective Range, Anti-Air: 3,000 m

Effective Range, Surface: 2,300 m

Rate of Fire: 150-200 rpm per barrel

Muzzle Velocity: 900 mps

Elevation: 85 deg

Traverse: varies

Sights: open sight

Armor: mounts may be open, shielded or fully enclosed

↳***Gun Weapon Systems #1 Ammunition***

Type: Rifle

Caliber: mm25

Cartridge: INA

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Radar Systems

Name: INA

Type: Surface Search

Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

These landing craft were constructed during 1983-1984. Very little information has been confirmed on these craft.

Type 072III Class (Yuting-I Class) Chinese Landing Ship




Tiers:



Variants:

- **Emei Shan:** Commissioned: 1992 Fleet: South Sea Fleet
- **Danxia Shan:** Commissioned:1995 Fleet: East Sea Fleet
- **Xuefeng Shan:** Commissioned: 1995 Fleet: East Sea Fleet
- **Haiyang Shan:** Commissioned: 1996 Fleet: East Sea Fleet
- **Qingcheng Shan:** Commissioned: 1996 Fleet: East Sea Fleet
- **Yandang Shan:** Commissioned: 1997 Fleet: North Sea Fleet
- **Jiuhua Shan:** Commissioned: 2000 Fleet: North Sea Fleet
- **Putuo Shan:** Commissioned: 2000 Fleet: East Sea Fleet
- **Huanggang Shan:** Commissioned: 2001 Fleet: North Sea Fleet
- **Tiantai Shan:** Commissioned: 2001 Fleet: East Sea Fleet

System

Alternative Designation: Type 072III Class; Yuting-I Class

Total Built: 10 Ships

Type: Landing Ship

Builder: Hudong-Zhonghua Shipbuilding

In Service: 2092-Present

Crew: 104

Cargo Capacity: 10 × tanks or 500 tons of cargo or 250 fully equipped troops

Dimensions

Length: 119.5m

Beam: 16.4.m

Displacement: 7,000 tons

Draft: 2.8m

Propulsion System

Engine Name: 2 × 12PA6V-280MPC

Engine Type: Diesel Engine

Engine Power: 9,490 hp each

Maximum Range: 3000 nm @ 14 kt

Speed: 18 knots (33 km/h; 21 mph)

Endurance: INA

Main Weapon System

↳*System*

Name: H/PJ76F twin 37mm Naval Gun

Type: Naval Gun

Caliber: 37mm

Quanitity: 3 x Type 76 twin 37mm Naval Gun

Maximum Effective Fire: INA

Note: The H/PJ76A is a further development of Type 76A and the latest member of the Type 76 series. The most significant difference between it and its predecessor is that the H/PJ76A utilizes a large amount of glass-fiber-reinforced plastic to replace the original aluminum used in the Type 76A, thus reducing the gun's weight and maintenance cost.

↳*Ammunition*

Type: Rifle

Caliber: mm37

Basic Load: INA

Onboard Aviation Facilities

Note: Helipad for 1 medium-lift helicopter

Fire Control

Laser Target Desinator: INA

Protection

Active Protection System: INA

NBC Washdown: Yes

Notes:

The Type 072III landing ship (NATO designation Yuting-I class) is the follow-on of the Type 072II landing ships initially introduced in the 1990s by the People's Republic of China. Type 072-III features a redesigned concealed bridge, and possibly enhanced sealift capability. The main difference between Type 072III and its predecessor Type 072II is that Type 072III incorporates a helicopter platform at stern (no hangar). A total of ten ships have entered service with People's Liberation Army Navy (PLAN), and all of them were built by China Shipbuilding Shipyard (□□□□) in Shanghai, Most of Type 072III deployed in PLAN East Sea Fleet (ESF), and the remaining in PLAN North Sea Fleet (NSF) and South Sea Fleet (SSF).

Type 072A Class (Yuting II Class) Chinese Landing Ship



Tiers:



Variants:

- **Tianzhu Shan:** Commissioned: 2003 Fleet: North Sea Fleet
- **Daqing Shan:** Commissioned:2003 Fleet: North Sea Fleet
- **Baxian Shan:** Commissioned: 2003 Fleet: East Sea Fleet
- **Huading Shan:** Commissioned: 2003 Fleet: South Sea Fleet
- **Luoxiao Shan:** Commissioned: 2003 Fleet: South Sea Fleet
- **Daiyun Shan:** Commissioned: 2003 Fleet: South Sea Fleet
- **Wanyan Shan:** Commissioned: 2003 Fleet: South Sea Fleet
- **Laotie Shan:** Commissioned: 2004 Fleet: South Sea Fleet
- **Lühua Shan Or □□□ / Yunwu Shan:** Commissioned: 2004 Fleet: North Sea Fleet
- **Dabie Shan:** Commissioned: 2015 Fleet: East Sea Fleet
- **Taihang Shan:** Commissioned: 2015 Fleet: East Sea Fleet
- **Tianmu Shan:** Commissioned: 2016 Fleet: East Sea Fleet
- **Wuyi Shan:** Commissioned: 2016 Fleet: East Sea Fleet
- **Culai Shan:** Commissioned:2016 Fleet: East Sea Fleet
- **Wutai Shan:** Commissioned:2016 Fleet: East Sea Fleet

System

Alternative Designation: Type 072A Class Landing Ship; Yuting II Class
Total Built: 15 Ships
Type: Landing Ship
Builder: Dalian Shipyard & others
In Service: 2003-Present
Crew: 104
Passenger Capacity: 250 fully armed troops

Dimensions

Length: 119.5m
Beam: 16.4.m
Displacement: 3,430t (standard), 4,800t (full)
Draft: 2.8m

Propulsion System

Engine Name: 2 x PA6A280MPC Diesel Engine

Engine Type: Diesel Engine

Engine Power: hp9626 hp each

Maximum Range: 3000 nm @ 14 kt

Speed: 14 kt cruise, 21 kt max

Endurance: 20 days

Main Armament

↳*System*

Name: Type 76 twin 37mm Naval Gun

Type: Naval Gun

Caliber: 37mm

Quanitity: 1 x Type 76 twin 37mm Naval Gun

Maximum Effective Fire: INA

Note: The Type 76 twin 37mm naval gun is a small caliber naval artillery piece created by China for anti-aircraft and anti-surface purposes.

↳*Ammunition*

Type: Rifle

Caliber: mm37

Basic Load: INA

Onboard Aviation Facilities

Note: Helipad for 1 medium-lift helicopter

Fire Control

Laser Target Desinator: INA

Protection

Active Protection System: INA

NBC Waterwash down: Yes

Notes:

The Type 072A landing ship is the latest member of the Type 072 series of landing ships. A total of 15 ships have been identified, with most of them assigned to the 6th Detachment of the People's Liberation Army Navy (PLAN) South Sea Fleet at Zhanjiang. They received the NATO reporting name of Yuting II. Derived from the Type 072III, the most obvious visual difference between the Type 072A and all earlier models of the Type 072 series is that the step of the stepped superstructure on all earlier models has been eliminated. In addition, the Type 072A is designed to accommodate air-cushioned landing craft by incorporating a deck well. Like its predecessor the Type 072III, the Type 072A has a helipad but no hangar. The Type 072A is designed to carry 10 tanks, 4 landing craft, a medium helicopter and air cushioned vehicles; a total of 250 fully armed troops can be carried. The People's Liberation Army Navy (PLAN) Type 072A Yuting-II is a class of large landing ships developed as an

enlarged version of the Type 072-III landing craft adding an aft helicopter deck for a medium-sized helicopter and more room for troops. The 5,000-ton class vessels propulsion system is based on two diesel engines developing a top speed of 21 knots. These ships can transport a payload of 500 tons and are provided with one dual 37mm gun to provide fire support during landing operations. The ship accommodates up to 250 fully equipped marines. The Type 072A ships carry four landing crafts, up to 10 tanks or 16 trucks. The PLAN commissioned 15 vessels built by Dalian Shipyard between 2003 and 2016.

LCM-8 (Mike Boat) American Landing Craft Mechanized







Tiers:



System

Alternative Designation: LCM-8 (Mike Boat)
Type: Landing Craft Mechanized
Builder: INA
In Service: 1967-Present
Crew: 4-6
Cargo Capacity: 53.5 long tons (54.4 t) of cargo

Dimensions

Length: 22.265 m
Beam: 6.4 m
Draft: 1.234 m light; 1.60 m loaded
Displacement, Light: 57.8 long tons
Displacement, Full Load: 111.4 long tons

Propulsion System

Engine Name: 2-twin-pak GMC 6-71 or Gray Marine 6-71 diesel paired to 2 hydrostatic transmissions Detroit 12V-71 diesel engines
Engine Type: Diesel
Engine Power: INA
Maximum Range: INA

Maximum Speed: 12 knots (22 km/h) light 9 knots (17 km/h) loaded

Endurance: INA

Screws: 2

Main Armament

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 2

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 600 rounds each, 1,200 total

Protection

Active Protection System: No

NBC Protection: INA

Notes:

The LCM-8 ("Mike Boat") is a river boat and mechanized landing craft used by the United States Navy and Army during the Vietnam War and subsequent operations. They are currently used by governments and private organizations throughout the world. The acronym stands for "Landing Craft Mechanized, Mark 8". (The "Mike Boat" term refers to the military phonetic alphabet, LCM being "Lima Charlie Mike".) The vessel weighs 135,000 pounds (61,200 kg) and has a crew of four: a Boatswain's Mate petty officer, an Engineman petty officer, a non-rated fireman, and a seaman. US Army specifications call for a crew of six during 24-hour operations: two coxswains, two seamen and two enginemen. The LCM-8s are constructed from welded steel and powered by four 6V71 or two 12V71 diesel engines, twin propellers, and rudders. The ship can carry 60 short tons of cargo. It was designed by Marinett Marine Corp Dimensions. It has a range of 190 miles at 9kts with a full load. They were used by the United States Navy and Army during the Vietnam War. During the Vietnam War, there were two new aluminum LCM-8s on Johnston Island, which carried trucks and cargo between islands, and one being used as a rescue boat. They had the newer fluid shift transmissions, and 2-671's paired up to two props. In I Corps (the northernmost military district in Vietnam) boats

based at Da Nang, Tan My and Cửa Việt had three man crews of various rates and ranks. On U.S. Navy boats, the senior rate was usually a third class petty officer or above, and the two crewmen could be E-2, E-3 or E-4 ranks (i.e. seaman apprentice, seaman, or petty officer third class). One of the two crewmen was almost always an Engineman, and could be an ENFA, ENFN, or an EN3 in rank. The LCM-8s there all had two sets of the twin 6-71 Detroits paired up to a hydro transmission. Two air compressors, port and starboard of the engine sets, provided air pressure to operate the air cylinders that raised and lowered the bow ramp. The air cylinders were below deck in the eighth void from the bow and stretched cables attached to the ramp to raise it. Lowering the ramp was accomplished by releasing the air and allowing gravity to bring the ramp down. They also saw use during Operation Just Cause in Panama as well as Operation Desert Shield and Operation Desert Storm. Three Army LCM-8s served in the 1992–1993 US mission to Somalia (fictionalized in Christian Bauman's 2002 novel The Ice Beneath You, which is set in part on a US Army LCM-8 near Kismaayo, Somalia), and a platoon of LCM-8s from the 1098th Trans Co. deployed to Port-au-Prince for the Haitian invasion (1994). The United States Army Reserve's 464th Transportation Company assisted the United States Coast Guard in patrolling the Potomac River after the terrorist attacks on September 11, 2001. Some are currently deployed aboard Maritime Prepositioning ships to facilitate their mission of being able to unload all their cargo while still offshore with no outside assistance. The LCM-8 was constructed in Australia for the Australian Army from 1965 to 1967 and again in 1972 using a heavily modified design, crewed (four) and administered by the Royal Australian Corps of Transport and one engineer from the Royal Australian Electrical and Mechanical Engineers (RAEME). The modification of the vessels included an extended enclosed wheelhouse with full galley facilities, chart table and storage space to aid in extended operations beyond the original design parameters. A water purification system allows the vessels to be somewhat independent for longer periods of time. A fully functioning toilet (head) and shower are also installed as part of the wheelhouse extensions; external provision for bedding is also included for the full crew complement. The extension of the wheelhouse increased rigidity of the craft leading to excessive vibration and cavitation with the original three-blade propeller. Further development included a more balanced and expensive five-blade propeller, negating the vibration and cavitation of the original. The prop change found a few negative effects in the beaching performance of the vessel but over time tactics have been changed to suit the new system. The vessels are also installed with a full suite of electronics allowing the craft to navigate in all weather, day or night in military operations anywhere in the world with little to no special training requirements for an indefinite period. During the mid-1990s, the Army LCM-8 received a life of type extension with a re-engine program. The original twin-pac 6-71 two-stroke Detroit Diesel engines and Allison mechanical transmissions were replaced with 8v-92 Silver Series Detroit Diesel engines and Allison Hydraulic Transmissions thus extending the life of the craft for another 20 years. Two craft were utilized during the invasion of Iraq in 2003, patrolling the shallow waters of the Khawr Abd Allah estuary using HMAS Kanimbla as their base of operations. They were extensively used in East Timor for logistic operations in direct support of multinational peace keepers. Other deployments include peacekeeping and peace monitoring operations in Bougainville and the Solomon Islands. The LCM-8 fleet of fifteen was to be replaced by six Australian designed type LCM2000 waterjet propelled craft, however these craft were scrapped, after not meeting the required in-service specifications and being deemed not fit for use for the intended Kanimbla-class.The Army will now continue to operate the LCM-8 until 2027.

Ivan Green Class Russian Landing Ship







Tiers:



System

Alternative Designations: Project 11711 / 1171.1 / 1171.1E

Type: Landing Ship

Total Built: 4 scheduled to be built

Builders: Yantar Shipyard, Kaliningrad

Crew (total): 100

Cargo Capacity: 13 main battle tanks 40 BTR or IFV and 300 troops

Endurance: 30 days

Aviation Facilities: Hangar for 2 Ka-27 ASW or Ka-29 transport-attack helicopters

Dimensions

Length: m120

Beam: m16

Displacement: 6,600 tons full load

Automotive

Engine Name: Kolomna 10D49 diesel engine

Number of Engines: 1

Maximum Range: 3,500 nmi (6,500 km) at 16 knots (30 km/h)

Maximum Speed: 18 knots (33 km/h)

Armament

↳*Weapon Station #1*

Name: AK-630M-2 Gun

Type: fully automatic naval close-in weapon system based on a six-barreled 30 mm rotary cannon.

Caliber: 30mm

Quantity: 1

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm (49 in) (mount ring)

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb) Fire control system: (Vympel MR-123) (Vympel-A MR-123/176) 5.2 tonnes (5.7 short tons) (Vympel-AM MR-123-02/MR-123-03 and Vympel-AME MR-123-02/176) 1 tonne (2,200 lb) (Laska 5P-10E)

Crew: 1

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec) +90° ... -25° (60°/sec) AK-630M-2

Traverse: ±180° (70°/sec) ±180° (80°/sec) AK-630M-2

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime) 5,000 m (16,000 ft) (all, AK-630M-2)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin, AK-630M) 4,000 rounds (AK-630M1-2)

Sights: Radar / TV-optical

Note: AK-630M-2 Gun n 1983, a decision was made to update the design and modify the AK-630 system to include a second gun mounted above the first, which provides 10,000 rpm in total. The AK-630M1-2 "Roy" was roughly the same size and weight allowing installation in existing AK-630 mounts. Though the system proved to be successful, the AK-630M1-2 Roy was not accepted for production due to the maturity of a combined missile and gun system, then designated the 3M87 Kortik, but later called Kashtan. The single example of AK-630M1-2 Roy remains installed on the Project 206.6 class missile boat # P-44. In July 2007 at IMDS-2007, a modernized version of the AK-630M1-2 was showcased by OAO AK Tulamashzavod under the new name "Duet". Visually "Duet" differs from "Roy" in having a new mount with a stealthy low RCS design compared with the more traditional rounded AK-630 mounts. In 2012 it was announced that the new Ivan Gren-class landing ship would be armed with the modified AK-630M-2 system. It is also used by the Buyan-M-class missile corvette.

↳*Ammunition Weapon Station #1*

Shell: HEI-Frag, Frag-T

Caliber: 30mm

Shell Weight: kg0.39

Basic Load: 3,000

↳*Weapon Station #2*

Name: AK-630 gun

Type: Fully automatic naval close-in weapon system based on a six-barreled 30 mm rotary cannon.

Caliber: 30 mm

Quantity: 2

Details: See Weapon Station #1

Note: The design of the AK-630 CIWS was initiated in 1963, with the first operational prototype completed in 1964. Trials of the complete system, including radar and controls went on until 1976 when the system was accepted for service.

↳*Weapon Station #3*

Name: KPV Heavy Machine Gun

Type: Heavy Machine Gun

Caliber: 14.5mm

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: m/s1,005

Effective Firing Range: 3,000m

Maximum Firing Range: 4,000m

Feed System: 40-round belt

Sights: iron or optical

↳*Ammunition Weapon Station #3*

Cartridge: 14.5×114 mm

Caliber: 14.5

Basic Load: INA

Fire Control Station

Vympel MR-123:

Vympel-A MR-123/176:

Vympel-AM MR-123-02/MR-123-03:

Vympel-AME MR-123-02/176:

Notes:

The Ivan Gren class, Russian designation Project 11711, is a class of landing ship that is being built for the Russian Navy. The class was to be composed of two vessels, Ivan Gren and Pyotr Morgunov, but later it was announced that the Russian Navy intends to acquire several more vessels of a modified design. The vessels of the class have a displacement of 5,000–6,000 tons

and are able to carry up to 13 main battle tanks or 36 armoured personnel carriers and 300 marines. The first ship of the class, Ivan Gren, was laid down on 23 December 2004. The hull of Ivan Gren was completed by the end of November 2010. On 9 October 2010 a contract to increase work on the vessel was signed. The ship was launched on 18 May 2012 and was scheduled to be delivered to the Russian Navy by 2014. Delivery of Ivan Gren was delayed until 2015 while the second ship of the class, Pyotr Morgunov, was laid down in October 2014. Ivan Gren started its sea trials in June 2016 in the Baltic Sea. According to Russian sources, the delaying of commissioning of the lead ship was due to several design faults that includes hull stability and engine problems. On 3 May 2018, the lead ship of the class, Ivan Gren, successfully completed its sea trials held in the Baltic Sea. The warship's systems and complexes were checked by the state acceptance commission of Russia's Defense Ministry. Ivan Gren was accepted into service on 20 June 2018. Initially, there were no plans to build more ships following Pyotr Morgunov. However, in December 2018, it was reported by the head of Russia's United Shipbuilding Corporation that Russia plans to order additional two or three modified Ivan Gren-class landing ships. On 9 April 2019, Russian Defence Minister Sergey Shoygu announced two more Project 11711 landing ships will be laid down on 23 April 2019. On 23 April 2019, two modified Project 11711 landing ships, Vladimir Andreev and Vasily Trushin, were laid down during a ceremony at the Yantar Shipyard in Kaliningrad. The two new ships differ with modified superstructure, increased displacement to 7000-8000 tons and capability to carry the Kamov Ka-52K carrier-based attack helicopters. Their delivery to the Russian Navy is scheduled for 2023 and 2024, respectively.

Type 073A Yunshu-Class Chinese Landing Ship







Tiers:



Variants:

- **Type 073 Yudao-class landing ship:** Requirement of the Type 073-class landing ship was finalized in May 1965, and design work by Shanghai-based 708th Research Institute completed just 4 months later in September 1965. Preparation to build this class was completed in October 1966, and construction begun a month later in November 1966. Due to political turmoil in China at the time, namely, Cultural Revolution, it was not until almost three years later in August 1969 when the ship was launched. From November 1969 thru December 1969, extensive trials were conducted and the ship was handed over to PLAN in December 1969 for further tests. In 1970 more tests were conducted with more than 7,000 km (3,800 nmi; 4,300 mi) logged, and the longest trip was from Chongqing to Dalian. However, trials revealed that the vibration was too great at high speed, and the Type 073 did not enter production. Redesign work designated as Type 073II immediately started after the trials of the first unit ended, and the first unit entered PLAN service with pennant number 904 and was subsequently designated as Type 073I, and was later ordered to be fully converted to Type 073II standard. Due to the political turmoil at the time, conversion was not completed until 1975.
- **Type 073II Yudao-class landing ship:** Shortcomings of Type 073I exposed in trials caused a crush program to rework and redesign at Dalian Shipyard, but due to political turmoil in China at the time, it was not sufficient to correct the problem completely. Shipyard # 9308 in Anhui petitioned the 6th Machinery Industrial Ministry and Anhui provincial Defense Industrial Office to construct Type 73II LSM in 1975, which was approved in April 1976, with orders for 3 ships. Construction of the first Type 073II LSM at Shipyard # 9308 begun five months later in September 1976, and it was launched in June 1978. From 1978 to 1979, extensive trials were conducted and the ship was handed over to PLAN in early 1980, with pennant number East Transport 757 (East Transport = Dong Yun □□ in Chinese), meaning Transport 757 of East Sea Fleet of PLAN. This unit was later reassigned as # 937. The primary difference between Type 073I and Type 073II is in the engine. Additional balance weight was added to the diesel engine which solved the vibration problem, but the reliability issue of the engine remain unsolved, and as a result, Type 073II did not enter mass production, just like its predecessor Type 073I.
- **Type 073IIY Yudao-class landing ship:** As the mass production plan for Type 073II was cancelled due to reliability problem of its engine, Shipyard # 9308 begun to modify the remaining two units that were already being built, which was successfully completed in September 1985. The resulting type is Type 073IIY landing ship, with Y for Yun (□), meaning transport in Chinese. Type 073I, Type 073II, and Type 073IIY all received the NATO reporting name Yudao-class. A total of two units of Type 073IIY were completed, with pennant #s 937 and 938. The primary difference between Type 073II and Type 073 IIY includes more than 100 upgrades in addition to engine improvement.
- **Type 073III Yudeng-class landing ship:** The reliability problem of the engine of Type 073 series was not completely solved until the appearance of Type 073III landing ship, with NATO reporting name Yudeng-class. The D-39 engine that is reliable only at slower speed was replaced by a new engine that is reliable at all speeds, and displacement is also increased. Only one unit entered service, with pennant # 990 in 1991.
- **Type 073A Yunshu-class landing ship:** After the completion of the first unit (pennant # 990), it takes a decade for

more units to follow, and 10 more entered service between 2001 through 2002. These later units are slightly larger in displacement at 2,000 tons, and more advanced equipment, mainly in electronics and on board machinery. This latest batch is referred to as the Type 073A landing ship (NATO reporting name: Yunshu-class). Pennant numbers; 941 (Shengzhou Hill), 942 (Lushan), 943 (Monsanto), 944 (Yushan), 945 (Huashan), 946 (Songshan), 947, 948, 949 (Hengshan), 950 (Taishan).

System

Alternative Designation: Type 073A Yunshu-class

Type: Landing Ship

Builder: Shanghai-based 708th Research Institute

In Service: INA

Crew: 70

Cargo Capacity: 250 tons or 5 × medium tanks or 10 × amphibious light tanks or 500 fully equipped troops

Dimensions

Length: 87 m

Beam: 12.6 m

Draft: 2.25 m

Displacement, Full Load: 2,000 tons full

Propulsion System

Engine Name: 2 × 6PA6L-380

Engine Type: Diesel

Engine Power: 3,540 kW (4,750 hp) each

Maximum Range: 1,500 nmi (2,800 km; 1,700 mi) at 14 knots (26 km/h; 16 mph)

Maximum Speed: 17 knots (31 km/h; 20 mph)

Endurance: INA

Main Weapon System

↳*System*

Name: Type 76

Type: Naval Gun

Caliber: 37 mm

Quantity: 2 × Type 76 twin 37 mm AAA

Note: The Type 76 is a further development of the Type 65. The Chinese military wanted to further improve the Type 65 by incorporating a fully automatic operational mode, but political turmoil from the Cultural Revolution delayed development of the Type 65's successor until its eventual release in 1976. The Type 76 incorporated a fully automatic operational mode, though the semi-automatic operational mode was retained as a backup measure. The model's rate of fire could reach a maximum rate of 400 rounds per minute per barrel (cyclic). The gun saw military action in the 1988 Spratly Islands naval battle and received positive feedback from the Chinese navy.

Ammunition

Type: Rifle

Caliber: mm37

Cartridge: INA

Basic Load: INA

Auxiliary Weapon Systems #1

↳*Missile Launcher*

Name: Type 81H Launcher

Type: Rocket Launcher

Quantity: 1

Length: 9.8 m

Width: 3.24 m

Height: 3.50 m

Crew: 5

Barrels: 40

Traverse: 360°

Elevation: INA

↳*Rocket*

Name: Type 81H

Type: Rocket

Caliber: mm122

Length: 1.5 m

Diameter: INA

Weight: 200.0 kg

Basic Load: INA

Targets: Targets: Surface Vessel, Land Structure - Soft, Land Structure - Hardened, Mobile Target - Soft, Mobile Target - Hardened

Maximum Surface Effective Range: 9.3 km

Fire Control System

FCS Name: INA

Computerized FCS: INA

Protection

↳

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

After the completion of the first unit (pennant # 990), it takes a decade for more units to follow, and 10 more entered service between 2001 through 2002. These later units are slightly larger in displacement at 2,000 tons, and more advanced equipment, mainly in electronics and on board machinery. This latest batch is referred to as the Type 073A landing ship (NATO reporting name: Yunshu-class). Pennant numbers; 941 (Shengzhou Hill), 942 (Lushan), 943 (Monsanto), 944 (Yushan), 945 (Huashan), 946 (Songshan), 947, 948, 949 (Hengshan), 950 (Taishan).

→Corvettes

Steregushchiy Class (Project 20380 Class) Russian Corvette







Tiers:



Variants:

- **Stereguschiy (550):** Commissioned: 2007 Status: Active
- **Sobraziteliniy (531):** Commissioned: 2011 Status: Active
- **Boikiy (532):** Commissioned: 2013 Status: Active
- **Stoikiy (545):** Commissioned: 2014 Status: Active
- **Sovershenniy (333):** Commissioned: 2017 Status: Active
- **Gromkiy (335):** Commissioned: 2018 Status: Active
- **Retiviy:** Commissioned: 2020 Status: Under Construction
- **Strogiy:** Commissioned: 2021 Status: Active Under Construction
- **Aldar Tsydenzhapov:** Commissioned: 2020 Status: Under Construction
- **Rezkiy:** Commissioned: 2021 Status: Under Construction
- **Derzkiy:** Commissioned: 2022 Status: Under Construction
- **Gremyaschiy:** Commissioned: 2019 Status: Sea Trails
- **Provorniy:** Commissioned: 2019 Status: Under Constrcution
- **Derzkiy:** Commissioned: 2022 Status: Under Construction

System

Alternative Designation: Steregushchiy Class; Project 20380 Class
Total Built: 14 of 18 Vessels built
Type: Corvette
Builder: Severnaya Verf Amur Shipyard
In Service: 2007-Present
Crew: 100 men

Dimensions

Length: 104.5 m

Beam: 13 m

Draft: 3.7 m

Displacement, Standard: 1,800 tons

Displacement, Full Load: 2,200 tons

Propulsion System

Engine Name: 2 shaft CODAD, 4 Kolomna 16D49 diesels

Engine Type: Diesel

Engine Power: 23,664 hp

Maximum Range: 3,800 nmi (7,000 km; 4,400 mi) at 14 kn (26 km/h; 16 mph)[

Maximum Speed: 27 kn (50 km/h; 31 mph)

Endurance: 15 Days

Missile Weapon System

↳*Missile Weapon System #1*

Name: KH-35

Type: Anti-Ship Cruise Missiles

Quantity: 8 x Kh-35 Anti-Ship Cruise Missiles

Manufacturer: Tactical Missiles Corporation

Proliferation: Algeria Azerbaijan – Bal Coastal missile complex suspended India Iran Russia – 112 Kh-35 (3M-24) delivered in 2009-2010. The Russian Navy has deployed 4 Bal coastal missile brigades, each of 16 mobile launch systems as of October 2015. 11th Black Sea Fleet Brigade, Utash, Krasnodar 46th Separate Division of the Caspian Flotilla, Dagestan (former) 15th Black Sea Fleet Brigade, Sevastopol, Crimea 72nd Pacific Fleet Regiment, Smolyaninovo, Primorsky Krai. At least one more complex was delivered to the Western Military District in mid-2016. Two Bal missile systems delivered in 2017 and one more in November 2018 for the BSF. Two more systems in 2019 and 2020 for the PF and CFl. The Russian Air Force has acquired since 2014 an unknown number of Kh-35U missiles integrated with the Sukhoi Su-35S fighter aircraft and the Sukhoi Su-34 fighter-bombers. Venezuela – Bal Coastal missile complex being delivered. Vietnam – 198 Kh-35E missiles delivered in 2001-2015. The missile is also license-produced as KCT-15 by Vietnam. Myanmar Navy North Korea – Kh-35U derivative Kumsong GeumSeong-3 (Venus 3) □□3□ □□3□[41] mobile coastal defence (anti ship) KN-19 on a tracked chassis Ukraine – Kh-35 derivative Neptune

In Service: 2003-Present

Length: 385 cm

Diameter: 42.0 cm

Weight: 520 kg

Wingspan: 133 cm

Warhead: HE fragmentation shaped charge

Warhead Weight: 145 kg

Engine: R95TP-300 Turbojet Kh-35 / Turbofan Kh-35U 360 kgf

Propellant: kerosene

Operational Range: 130 km

Flight Altitude: 10-15 m en route and about 4 m at terminal area

Speed: Mach 0.8–Mach 0.95 (609–723 mph; 980–1,164 km/h)

Guidance System: inertial guidance and ARGS-35E X-band terminal active radar homing

Launch Platform: Tupolev Tu-142, Su-24, MiG-29M/K, Sukhoi Su-35, Su-27SM, Su-30MKI//SM, Su-34, HAL Tejas, Ka-27, Ka-28, Ka-52, T-50, also ships and boats, coastal, LACM, TEL variants

↳*Missile Weapon System #2*

Name: S-350E Vityaz 50R6

Type: Medium Range Surface-to-Air Missile System

Quantity: 12 × Redut VLS Cells

Launcher: Vertical Launch Systems (VLS)

Missile Name: 9M96E2

Missile Basic Load: 12

Length: 5.65 m

Diameter: 240 mm

Weight: 420 kg

Warhead Weight: 24 kg

Maximum Range: 120 km

Minimum Range: 1 km

Maximum Altitiude: 30 km

Minimum Altitude: 5 m

Speed: 1,800 m/s

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-100

Type: Naval Gun

Caliber: 100mm

Quantity: 1 × 100mm A-190 Arsenal

Length: INA

Weight: 35.5 tons

Elevation: -10 / +85 degrees

Rate of Elevation: 30 degrees per second

Traverse: 360 degrees

Traverse Rate: 35 degrees per second

Rate of Fire: 50 to 60 rounds per minute

Effective Firing Range: INA

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm100

Shell: INA

Shell Weight: INA

Basic Load: Typical ammo stowage: 350 rounds for a 4,000 ton class frigate

↳*Gun Weapon System #2*

Name: Kashtan CIWS

Type: Close-In Weapons System (CIWS)

Caliber: 30mm

Quantity: 1 × Kashtan CIWS-M (Project 20380)

Main Armament: 8 × 9M311K + 32 missiles

Secondary Amrament: 2 × AO-18K Autocannon

Length: INA

Height: 2,250 mm

Weight: 15,500 kg

Barrels: 2 × 6 (guns); 2 × 4 launch tubes

Action: Gas-operated rotary cannon

Rate of Fire: 9,000 rounds/min (guns) 1–2 (salvo) missiles per 3–4 sec

Muzzle Velocity: 860 m/s

Warhead: Continuous-rod w/ frag layer

Effective Firing Range: Missile: 1,500–8,000 m Gun: 500–4,000 m

Feed System: Link-less, helical; 1000 rounds

Sights: Radar / TV-optical:[N 3] 2–3/1 m (6.6–9.8/3.3 ft) accuracy, tracks 6 targets simultaneously

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 30mm

Shell: HEI-Frag, Frag-T, APDS-T

Shell Weight: 0.39 kg (0.86 lb) (HEIF, FT) 0.30 kg (0.66 lb) (APDS-T)

Basic Load: INA

↳*Gun Weapon System #3*

Name: AK-630

Type: Close-In Weapon System (CIWS)

Caliber: 30mm

Quantity: 2 × AK-630M CIWS

Main Armament: 1 or 2 x AO-18 autocannons

Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade)

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Barrels: 6

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range.

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin,

Sights: Radar / TV-optical

Fire Control System (FCS): Fire control system: Vympel MR-123; Vympel-A MR-123/176 5.2 tonnes (5.7 short tons); Vympel-AM MR-123-02/MR-123-03 and Vympel-AME MR-123-02/176) 1 tonne (2,200 lb) (Laska 5P-10E).

↳***Ammunition Gun Weapon System #3***

Type: Rifle

Caliber: 30mm

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: INA

Torpedo Weapon System

Torpedo Tubes: 2 x quadruple 330mm torpedo tubes

Torpedo Name: INA

Torpedo Basic Load: INA

Onboard Aviation Facilities

Facilities: Helicopter Hanger and Landing pad for UAV

Helicopter: 1 x Ka-27 Helicopter

UAV: 1 x Orlan-10

Fire Control

Note: See Weapon Systems

Radar Systems

Air Search Radar: Furke 2 (Furke-E, Positiv-ME1, SMILE Thales for export)

Surface Search Radar: Granit Central Scientific Institute Garpun-B/3Ts-25E/PLANK SHAVE radar Monument targeting radar

Fire Control Radar: Ratep 5P-10E Puma for A-190

Navigation Radar: Gorizont-25 integrated navigation system

Sonar Systems

Bow Mounted Sonar: Zarya-M (Zarya-ME for export) suite,

Towed: Vinyetka low frequency active/passive towed array

Protection

Electronic Warfare: TK-25E-5 ECM

Countermeasures: 4 x PK-10 decoy launchers

NBC Protection: Yes

Notes:

The Steregushchiy class (Russian: Стерегущий, lit. 'Vigilant'), Russian designation Project 20380, is the newest class of corvettes being built for the Russian Navy. Designed by the Almaz Central Marine Design Bureau, subsequent vessels were built to an improved design (Project 20381), incorporating the Poliment-Redut SAM system. The ship full displacement and dimensions are large for a corvette, thus it is designated as a frigate by NATO. The Steregushchiy class has been further developed into the Gremyashchiy class (Project 20385) and Project 20386 subclasses. The export variant is known as Project 20382 Tigr. The ships of the Steregushchiy class are multipurpose corvettes, designed to replace the Grisha class. Such ships are used for littoral zone operations, engagement of enemy submarines and surface ships, and gun support of landing operations. The first batch built at the Severnaya Verf shipyard in St. Petersburg consists of four ships. A second building line has been started at Komsomolsk. The lead ship of this second batch was named Sovershennyy. The Russian Navy has publicly announced that they expect to buy at least 30 of these ships, for all four major fleets. According to Jane's Naval Forces News, the first vessel was commissioned on 14 November 2007. An additional order of 10 corvettes was under consideration in the late 2019, according to the Deputy Commander of Pacific Fleet Igor Korolev. The ships were to be laid down at Amur Shipyard and to be commissioned into the Pacific fleet. The Steregushchiy-class corvettes have a steel hull and composite material superstructure, with a bulbous bow and nine watertight subdivisions. They have a combined bridge and command centre, and space and weight provision for eight SS-N-25 missiles. Stealth technology was widely used during construction of the ships, as well as 21 patents and 14 new computer programs. Newest physical field reduction solutions were applied too. As a result, designers considerably reduced the ship's radar signature thanks to hull architecture and fire-resistant radar-absorbent fiberglass applied in tophamper's design. The Kashtan CIWS on the first ship was replaced in subsequent vessels by 12 Redut VLS cells containing[9] 9M96E medium-range SAMs of the S-400 system. SS-N-27 (Kalibr type missiles) will be fitted to a larger domestic version, Project 20385. The export version known as Project 20382 Tigr carries either eight supersonic SS-N-26 (P-800 Oniks) anti-ship missiles or sixteen subsonic SS-N-25 'Switchblade' (Kh-35E Uran). It also carries two twin-tube launchers for 533mm heavy torpedoes. The A-190E 100mm gun first used in the Talwar-class frigates is controlled by a 5P-10E system that can track four targets simultaneously. Protection from air attacks is provided by the Kashtan CIWS and eight mounts for the SA-N-10 'Grouse' (9K38 Igla) SAM. In 2007 the Indonesian Navy made an agreement in principle (pending a full contract) for four vessels of this type to replace their ageing Dutch-built Fatahillah-class corvettes. The first was to be built in Spain and fitted out in St. Petersburg, leaving open the option of Indonesian involvement in building the subsequent ships. This agreement appears to have lapsed; in 2011 Indonesia signed a deal for two Milgem-class corvettes from Turkey. Rosoboronexport have briefed Singapore and the United Arab Emirates on the vessel. The first actual contract for the export version, Project 20382 Tigr, was signed at the 5th International Maritime Defense Show in St. Petersburg in July 2011 when Algeria ordered two ships. The cost was estimated at US$120–150 million per ship. One was to be delivered in 2014 and one in 2015.

Type 056A Class (Jiangdao II Class) Chinese Corvette





Tiers:



Variants:

- **Xinyang (501):** Launched: INA, Commissioned: March 2015, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Huangshi (502):** Launched: INA, Commissioned: March 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Suzhou (503):** Launched: May 14, Commissioned: February 15, Fleet: INA, Status: INA
- **Quinhuangdao (505):** Launched: October 14, Commissioned: October 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Datong (580):** Launched: INA, Commissioned: May 13, Fleet: INA, Status: Active Chinese PLAN
- **Yingkou (581):** Launched: INA, Commissioned: August 13, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Bengbu (582):** Launched: INA, Commissioned: February 13, Fleet: INA, Status: Active Chinese PLAN
- **Shangrao (583):** Launched: INA, Commissioned: INA , Fleet: INA, Status: INA
- **Meizhou (584):** Launched: INA, Commissioned: July 13, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Baise (585):** Launched: INA, Commissioned: July 13, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Ji'an (586):** Launched: INA, Commissioned: 2014, Fleet: INA, Status: Active Chinese PLAN
- **Jieyang (587):** Launched: INA, Commissioned: January 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Quanzhou (588):** Launched: INA, Commissioned: August 14, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Quingyuan (589):** Launched: INA, Commissioned: June 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Weihai (590):** Launched: INA, Commissioned: INA, Fleet: INA, Status: Active Chinese PLAN
- **Luzhou (592):** Launched: INA, Commissioned: June 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Huizhou (596):** Launched: INA, Commissioned: July 13, Fleet: Hong Kong Garrison, Status: Active Chinese PLAN
- **Qinzhou (597):** Launched: INA, Commissioned: July 13, Fleet: Hong Kong Garrison, Status: Active Chinese PLAN
- **Baoding (511):** Launched: INA, Commissioned: December 16, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Heze (512):** Commissioned: 2016 Status: Active Navy: Chinese
- **Hangshi (502):** Launched: INA, Commissioned: March 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Sanmenxia (593):** Launched: November 2013, Commissioned: November 14, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Zhu Zhou (594):** Launched: INA, Commissioned: November 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Shadhinota (F111):** Launched: November 14, Commissioned: December 15, Fleet: INA, Status: Active Bangladesh Navy
- **Prottoy (F112):** Launched: December 14, Commissioned: December 15, Fleet: INA, Status: Active Bangladesh Navy
- **Shiongram (F113):** Launched: February 18, Commissioned: 2019, Fleet: INA, Status: Sea trial Bangladesh Navy
- **Prottasha (F114):** Launched: April 18, Commissioned: 2019, Fleet: INA, Status: Sea trial Bangladesh Navy
- **Centenary (F91):** Launched: January 14, Commissioned: February 15, Fleet: INA, Status: Active Nigeria Navy
- **Unity (F92):** Launched: November 14, Commissioned: INA, Fleet: INA, Status: Active Nigeria Navy

System

Alternative Designation: Type 056A Class; Jiangdao Class

Type: Corvette

Builder: Hudong-Zhonghua Shipbuilding CSSC Huangpu Wenchong Shipbuilding Wuchang Shipyard Liaonan Shipyard

In Service: 2016-Present

Crew: 60 - 73 men

Note: The Type 056A is a anti-submarine warfare configuration of the Type 056 Corvette. The Type 056A includes a SJG-206 Variable-Depth, Low-Frequency, Towed Array Sonar System.

Dimensions

Length: 90 m

Beam: 11.14 m

Draft: 4.0 m

Displacement, Standard: 1 300 tons

Displacement, Full Load: 1 500 tons

Propulsion System

Engine Name: 2 SEMT Pielstick PA6-STC diesel motors

Engine Type: Diesel

Engine Power: INA

Maximum Range: 3,500 nmi at 16 kn

Maximum Speed: 25 knots

Endurance: 20 Days

Missile Weapon System

↳*Missile System #1*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Cruise Missile

Quantity: 2× 2-cell YJ-83 anti-ship missiles

Location: Amidship

Missile Basic Load: INA

Length: INA

Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: CTJ-2 turbojet

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Missile System #2*

Name: Flying Leopard 3000 Naval (FL-3000N)

Type: Surface-to-Air Missile System

Quantity: 1 × 8-cell FL-3000N SAM launcher

Location: INA

Missile Name: HHQ-10 (Red Flag 10)

Missile Basic Load: INA

Length: 2 m

Diameter: 0.12 m

Maximum Range: > 9 km for subsonic targets, > 6 km for supersonic targets

Minimum Range: < 500 meters

Guidance System: Passive RF + ImIR or ImIR only

Note: The Flying Leopard 3000 Naval (FL-3000N) was first revealed to the public at the 7th Zhuhai Airshow at the end of 2008. Although using the Flying Leopard designation, the FL-3000N is actually a different missile system than the FL-2000(V) shown earlier. In fact, the only commonality shared by both SAM system is the launcher design, and even the launchers differ in size due to the different diameters of the missiles used in the systems. Instead of using QW-1 Vanguard MANPADs, the FL-3000N system uses the HHQ-10 (Red Flag 10) naval surface to air missile developed from TY-90 missile. The diameter of the missile is enlarged by a third, but the most important design difference is its guidance system. The FL-3000N missile utilizes a combined guidance system that incorporates both passive radio frequency (RF) guidance and imaging infrared (ImIR) guidance. There are a pair of horn like protrusions mounted on the ImIR seeker at the tip of the missile, and these two protrusions are the passive RF seeker. An optional ImIR only guidance is also available and the missile is a fire and forget weapon. The fire control system (FCS) of FL-3000N can simultaneously control two launchers, and can be integrated into other FCS on board ships. Alternatively, FL-3000N is also capable being directly controlled by other FCS on board ships. The system is usually fully automatic without human intervention, but manual operation can be inserted when needed. The primary launching system of FL-3000N is a 24-cell launcher, developed from FLS-1. An optional extra magazine with automated loading system is available for larger warships when there is enough space provided. On smaller surface combatants where space is limited, the extra magazine with the automated loading system is eliminated and the reload is done manually. To further utilize confined space, an 8-cell launcher and a quadruple launcher are also available. Additionally, a single-cell launcher is available for mounting on existing naval gun mounts.

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-176

Type: Naval Gun

Caliber: 76.2mm

Quantity: 1 × AK-176 76mm. gun stations

Length: 4484 mm

Weight: 16,800 kg

Crew: 2 (4 in manual control mode)

Barrels: 1

Elevation: -15° to +85°

Traverse: ±175°

Rate of Fire: 120 rds/min

Muzzle Velocity: 980 m/s

Maximum Firing Range: 15 km

Effective Firing Range: 10 km

Feed System: 152 ready to fire rounds

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm76.2

Shell: INA

Shell Weight: 12.4 kg

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 730

Type: Close-In Weapon System (CIWS)

Caliber: 30mm

Quantity: 2 x Type 730 CIWS

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Length: INA

Weight: INA

Barrels: 7-barrel

Crew: Automated, with human oversight

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 1–1.5 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 30mm

Shell: INA

Shell Weight: INA

Basic Load: INA

Torpedo Weapon System

Torpedo Tubes: 2 × triple 324mm. torpedo tubes

Torpedo Name: INA

Torpedo Basic Load: INA

Onboard Aviation Facilities

Facilities: Helipad for 1 medium-lift helicopter

Helicopters: 1 x Z-9C Helicopter

Fire Control

FCS Name: INA

Computerized FCS: INA

Radar Systems

↳*Radar: Type 347G Naval Gun Fire Control and Tracking Radar System (NGFS)*

Name:: Type 347G Radar

Type: Monopulse Naval Gun Fire Control and Tracking Radar System (NGFS)

Alternate Designation: TR47C

Proliferation: Chinese

Frequency: X Band

Beam: INA

Pulse Width: INA

Polarization: Vertical

Beam Width: 1.8°±0.2°

PRF: INA

Scan Rate: 360° (Az); -25°~85° (El)

Resolution: INA

Range: 30 km against RCS aircraft ; 15 km against: ASM

Antenna: Circular parabolic antenna, Temp Range: -25C-+70C

Notes: Radar uses a coherent pulse doppler design. Non coherent Moving Target indicator/Detection (MTI, MTD), CFAR (Constant False Alarm Rate) Antinodding, anti clutter capability (A well advertised feature of the RTN family)

Sonar Systems

Bow Sonar: INA

Towed Array Sonar: Type 056A Sonar

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

Notes:

The Type 056A is a anti-submarine warfare configuration of the Type 056 Corvette. The Type 056A includes a SJG-206 Variable-Depth, Low-Frequency, Towed Array Sonar System. Jiangdao Type-056 Frigate/Corvette (FFL) Reputed as the new-generation “maritime cavalry”, the 056 frigate is rapidly augmenting the PLA Navy’s littoral warfare capabilities, especially in the South China Sea and East China Sea. This new class of small combatant augment the 60 HOUBEI-class wave-piercing catamaran missile patrol boats (PTG) (Type 022). The frigate was deployed primarily for patrol and escort missions as well as anti-submarine operations and sea combat tasks, independent or in coordination with other forces. Its primary duty is to patrol sea areas. The South China Sea has relatively high requirements for single patrol boats because it is far from the coast and is often choppy. Patrolling is a daily labor-intensive task, and requires a large number of soldiers. Therefore, patrol boats should be deployed in a large scale and cost less than warships. Unlike fighting, patrolling does not need too many weapons. Overall, ships designed for patrolling should have good seakeeping ability and be relatively cheap. The Type-056 frigate aimed at changing the situation of China's active-service base-defense system featuring aging military strength, single function and low combat power. The new-generation base-defense military strength commissioned in large quantities was another important platform for optimizing the equipment structure of the PLA Navy, improving the base-defense combat power as well as enhancing the PLA Navy's capability of safeguarding China's national security and territorial integrity, and defending China's maritime sovereignty and maritime rights and interests. The construction of the 056 frigate has come to an end in late 2019 and the upgrading of the domestic offshore combat system has been completed. Type 056 frigate is a type 1 light frigate developed by the Chinese Navy in the new century. According to overseas sources, it has a length of 89 meters, a width of 12 meters, a full-load displacement of 1,300 tons, diesel power, dual-axis propulsion, a maximum speed of 28 knots, and a cruising range of 3,500 nautical miles. The type 056 frigate weapon and the onboard electronic system are relatively simple. The weapon includes two double-mounted YJ-83 anti-ship missile launchers, one 8-unit red flag 10 ship-to-air missile launcher, and the main gun is a 76 mm gun. , 2 30mm single-tube remote-control naval guns, and anti-submarine weapons are two 2-unit antisubmarine torpedo launchers. Shipborne electronic systems include air / sea search radars, optoelectronic fire control systems, electronic warfare systems, and shipborne combat systems. The bow has a helicopter take-off and landing deck, which can take off and land straight -9 anti-submarine helicopters, but there is no hangar, which limits its helicopter operation capabilities. The Type 056 frigate weapon is relatively simple and mainly performs offshore patrol tasks. The PLA Navy had to build large warships if it is to go to the high sea, but large warship will be a waste of resources if it’s only used for “yard-protecing”. The PLA Navy needed vessels that are suitable for carrying out fishing protection, patrol and guarding tasks at the “house gate”, so that it can free the large combat ships from the trivial everyday maritime services and consequently ensure the combat capacity of main high-sea-going taskforces. With complete functions, the 056 guided missile frigate is capable of air defense, anti-submarine warfare, assault, and garrisoning. Such high cost effectiveness better caters to the rapidly increasing equipment manufacturing of the PLA Navy. The PLA Navy’s inshore combat tasks mainly consist of daily patrol, guarding, fishing protection, and other low-intensity and low-risk tasks. It provides the basic maritime force support for the civilian and law enforcement forces of oceanic administration and fishing affair bureau in coping with the provocations by military vessels of enemy states. Light surface vessels have to be used in the early stage of islands disputes. The flexible body and comprehensive combat capability of the 056 guided missile frigate decide that it is of best use on islands and the surrounding waters, where it can deal with all kinds of maritime crisis flexibly and make the mobilization and deployment of large vessels more effective. Designed not solely for islands disputes but for more extensive purposes such as maritime target assaulting, air defense and anti-submarine, the 056 guide missile frigate is a light maritime striking weapon platform with the highest performance-price ratio and the widest applications. It can be manufactured by a number of coastal and inland shipyards on a large scale and in large quantities and supplied to the PLA Navy incessantly. Light guide missile frigate can serve as steady support for PLA Navy’s high-sea-going maneuver combat and help free the inshore fast attack forces from everyday coast defense tasks, so as to establish a new-type inshore defensive combat system. China has an 18,000km-long coastline to guard. The new-type frigate is able to engage in low-intensity conflicts and carry out patrol, escort and fishing protection tasks in key waters. It makes the military force structure more reasonable, shows greater flexibility in carrying out combat tasks, and will soon become the main combat equipment for base defense. Moreover, the large-scale commissioning of the new-type frigate was expected to exert considerable effects on the PLAN’s combat thinking, methods of operation, training, management and application, talent cultivation and battlefield construction. The long coastline needs to be patrolled, the disputes over several islands need to be solved, and the maritime transportation routes need to be protected. Guided missile frigate is the most economic choice if those issues need to be solved by force. According to a ranking by the British website Naval Technology, the Type-056 is one of the world's 10 best modern corvettes along with Sweden's Visby class and Germany's K130 Braunschweig class. Cao Weidong, a researcher at the PLA Naval Military Studies Research Institute, said despite the Type-056 class being smaller compared with frigates, it will be as powerful as frigates in battles in coastal waters thanks to its stealth design and strong firepower. Because the ship's weapons and electronic systems are relatively simple, many international sources classify it as "corvettes" (light frigates) rather than "frigates". In fact, the Chinese Navy's original intention to develop the Type 056 frigate was also to replace the Type 037 hunting submarine, performing offshore patrol, escort, search and rescue tasks. For quite a long time, the Type 037 submarine hunting submarine has been the main battleship of the Chinese Navy's offshore

defense, and has built more than 100 ships. However, the type 037 submarine hunting ship has a small tonnage and poor long-range combat capabilities, making it difficult to perform combat missions in far-off sea areas. After the 1990s, the Chinese Navy built several 053H frigates to perform such tasks, but the 053H frigate tactical and technical indicators had fallen behind. It is difficult to meet the needs of the battlefield in the new century. In this case, the 056 frigate appeared. The first 056 frigate was started in 2011, launched in 2012, and delivered to the Navy in 2013. From a practical point of view, compared with the 037 frigate, the 056 frigate had a larger tonnage, more internal space, and can carry more supplies and materials, which is conducive to long-duty maritime operations. The crew's long-distance sea mission execution environment has been improved and efficiency has been improved. The ship was loved by the troops and became an ideal replacement for the 037 hunting submarine. Since then, the Type 056 frigate has entered a period of high-speed construction. It is reported that within about 9 years from 2011 to 2019, about 70 Type 056 frigates were built. On average, about 8 ships per year, and this speed can be said to be very amazing. Along with rapid construction, the Type 056 frigate also developed a series of improved and modified ships. For example, in use, the army found that the 30mm single-barrel remote-control naval gun was not very useful and the price was relatively expensive. Large-caliber machine guns can be used for patrol tasks. Therefore, the latest batch of 14.5-mm naval machine guns was used instead. Considering that there are many advanced AIP submarines in the first island chain, the anti-submarine type was developed for this type 056. It is the first domestic surface ship equipped with active / passive towed line sonars, improving the ship's ability to resist modern quiet submarines. In order to cooperate with the advanced underwater acoustic system, the 056 anti-submarine type has been replaced with a new type of anti-submarine missile. The new missile uses a turbojet engine with a longer range and stronger attack capabilities. Sonar, better detection performance. The 056 anti-submarine service effectively improved the Chinese Navy's offshore anti-submarine combat capabilities. Exports The Type 056 1,440-ton class corvette is available for the export market with Bangladesh having ordered at least two ships and the Nigerian Navy ordering the P18N offshore patrol vessel with a full load displacement of 1,800 tons. In October 2012, the first ship P18N in Wuhan shipyard started. In 2013, Bangladesh and China signed a purchase for a group of vessels contract, believed to consist of two frigates, two patrol boats and six large patrol boats. Type C13B [B for Bangladesh] is one of two light frigates ordered by the Bangladesh Navy in 2013. The ship was improved on the basis of Type 056. It replaced the weapon and radar system different from the domestic version and cancelled the anti-submarine capability. The most advanced frigate in the media, once known as China's export, its shape has been fully integrated with the overall trend of international light frigates. Although there is no such new trend as the chasing wind, the high cost performance has won the praise of the Bangladesh Navy. Two more ships have been added. The Thai Navy's Pattani-class OPV bears a resemblance to the subsequent Chinese Type 056 corvette / light frigate, though the later is up-gunned relative to the the Thai OPV, with four YJ-3/C803 ASM and a FL-3000N RAM launcher aft, while the former has a much taller superstructure. Built for the Royal Thai Navy by the China State Shipbuilding Corporation, each OPV cost about US$50 million. The vessels were commissioned in 2006-2007. In November 2014 China completed sea trials of a offshore patrol ship on order for the Nigerian Navy that will assist in suppressing the growing threat of piracy off West African shores. The vessel was the first of two acquired by the Nigerian Navy to bolster its maritime surveillance, patrolling, search-and-rescue and to counter piracy. The patrol ship was launched by state-owned shipbuilder China Shipbuilding & Offshore International Co (CSOC) in January 2014, and was taken for sea trials by affiliated shipyard Wuchang Shipbuilding Industry. The second patrol ship was built by CSOC in China but would be outfitted at the naval shipyard in Port Harcourt, Nigeria, in a technology transfer arrangement. According to specifications provided by CSOC, the ship has a full load displacement of 1,800 tonnes and can go 21 knots. The vessel can accommodate 75 crew, has 20 days endurance, and a standard range of 3,000 nautical miles. A computer-generated image issued by the Nigerian Navy suggested that the ship will have a helicopter hangar and landing deck. The weapons fit comprises a single 76mm NG-16-1 gun with a TR47 fire-control radar, as well as pairs of 30mm and 20mm guns. Nigerian Chief of Naval Staff Vice Admiral Dele Ezeobam told reporters in January 2014 that the F 91 would be handed over mid-2014. The Nigerian Navy is standing up to a host of challenges it faces in the Gulf of Guinea. Prior to 2009 before it commissioned the Sea Eagle-class patrol boats, the navy struggled to counter the often heavily armed pirates of West Africa. The two patrol ships is the latest in a string of measures to wrest back control of its seas from criminal groups.

Type 037I Class (Haiqing Class) Chinese Corvette



Tiers:



Variants:

- **Type 037I:** Pennant Numbers: 688, 693 , 694 and 697 Pendant No. 275/285, 290, 302, 305, 609/610, 618/622, 626/629, 636/637, 689/692, 695/699, 701, 707, 723/733 and 740/742
- **Type 037IS:** Pennant Numbers: Approx. 611–614, 619, 631, 632–635, 710–713, 743, 744, 761–763 and 786–789

System

Alternative Designation: Type 037I Class; NATO: Haiqing Class
Type: Corvette
Builder: China; Shipyard: INA
Crew: 71

Dimensions

Length: 62.8 m
Beam: 7.2 m
Draft: 2.4 m
Displacement, Standard: 395 tons
Displacement, Full Load: 478 tons

Propulsion System

Engine Name: 4 × Chinese PR 230ZC
Engine Type: Diesel
Engine Power: 4 × Chinese PR 230ZC diesel engines at 4,000 hp (2,983 kW) with 4 shafts
Maximum Range: \1,300 nmi (2,400 km) at 15 kn (28 km/h)
Maximum Speed: 28 knots (52 km/h; 32 mph)

Gun Weapon Systems

Note: The earlier boats are fitted with two manually operated twin-barrel 37 mm guns, but they have been replaced by two automatic 37 mm guns on the later variants. They also have various other mounted heavy machine guns for patrol duty. These weapons focus on a general-purpose patrol boat, with only a limited anti-submarine capability.

↳*Gun Weapon System #1*

Name: Type 76A

Type: Naval Gun

Caliber: 37mm

Quantity: 4 × Type 76A 37 mm gun (2 × 2)

Note: The Type 76A is a fully enclosed and fully automatic model in the Type 76 series. Unlike the Type 76F, the gun is fully automatic, with the semi-automatic operational mode and the one-man operator console removed. In addition to the optronic FCS found in the Type 76F, the Type 76A is linked to radar FCS. The maximum rate of fire, however, is reduced in comparison to Type 76, dropping from the original 400 rd/min/barrel to 375 rd/min/barrel. In addition to anti-aircraft and anti-surface roles, the Type 76A can also be used as a close-in-weapon system.

↳*Gun Weapon System #1 Ammunition*

Type: Rifle

Caliber: 37mm

Shell: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 69

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 4 × Type 69 14.5 mm heavy machine guns (2 × 2)

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of FIre: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Firing Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 14.5mm

Cartridge: 14.5×114 mm

Basic Load: INA

Mines

Note: 12 max. mines (two mine rails fitted)

Mortar System

Mortar Launcher: The ships are armed with two 6-tubed anti-submarine mortar launchers.

Mortar Type: Type 87 Mortar

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: No

Radar Systems

Name: 1 x Pot Head Radar

Type: Surface Search Radar

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x Tamir-11 HF

Type: Hull-Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Depth Charge Racks: 2 depth charge racks

Depth Chargers: 2 BMB-2 depth charge mortars

Notes:

The Type 037I submarine chaser (NATO reporting name: Haiqing class), is a follow-on class of submarine chasers to the preceding Type 037-class of the People's Liberation Army Navy. There are two designation sof this class, the base Type 037I and the improved Type 037IS. The earlier boats were built by the Qiuxin Shipyard of Shanghai, and later by Huangpu Shipyard. The ships are armed with two 6-tubed anti-submarine mortar launchers. The earlier boats are fitted with two manually operated twin-barrel 37 mm guns, but they have been replaced by two automatic 37 mm guns on the later variants. They also have various other mounted heavy machine guns for patrol duty. These weapons focus on a general-purpose patrol boat, with only a limited anti-submarine capability. One Haiqing class submarine chaser was purchased by the Sri Lanka Navy and was commissioned in 1996 as SLNS Parakramabahu (P351), serving in the Sri Lankan Civil War.

Buyan Class (Project 21630 Buyan) Russian Corvette







Tiers:

1 **2** 3 4

Variants:

- **Astrakhan:** Commositioned: 2006 Fleet: Caspian
- **Volgodonsk:** Commositioned: 2011 Fleet: Caspian
- **Makhachkala:** Commositioned: 2012 Fleet: Caspian

System

Alternative designations: Astrakhan; Project 21630

Builder: Almaz Shipbuilding Company Zelenodolsk Plant Gorky

Total Built: 3 Buyan Class Corvettes are in service

Type: Guided Missile Corvette

Crew (total): 29-36

Dimensions

Length: m62

Beam: m9.6

Height: m6.57

Draft: m2

Displacement: 500 tons (standard) 520 (full)

Automotive

Propulsion: 2 shaft CODAD, 4 x Zvezda M520, 14,584 shp (10,880 kW) and Kolomna Diesel, Pumpjet.

Maximum Speed: 28 knots (52 km/h; 32 mph)

Maximum Range: 1,500 nmi (2,800 km; 1,700 mi)

Endurance: 10 days

Armament

↳*Weapon Station #1*

Name: AK-100

Type: Naval Cannon

Quantity: 1 x AK-100 Unit

Caliber: mm100

Length: INA

Weight: 35.5 tons

Elevation: -10 / +85 degrees

Rate of Elevation: 30 degrees per second

Traverse: 360 degrees

Traverse Rate: 35 degrees per second

Recoil: 20 in (51 cm)

Rate of Fire: 50 to 60 rounds per minute

↳*Ammunition Weapon Station #1*

Shell: INA

Caliber: mm100

Shell Weight: 26.8 kg

Basic Load: INA

↳*Weapon Station #2*

Name: AK-630-M2 CIWS

Type: Fully automatic naval close-in weapon system based on a six-barreled 30 mm rotary cannon.

Caliber: 30mm

Quantity: 2 x AK-630-M2 CIWS Stations

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm (49 in) (mount ring)

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb) Fire control system: (Vympel MR-123) (Vympel-A MR-123/176) 5.2 tonnes (5.7 short tons) (Vympel-AM MR-123-02/MR-123-03 and Vympel-AME MR-123-02/176) 1 tonne (2,200 lb) (Laska 5P-10E)

Crew: 1

Barrels: 6 (AK-630M) 6 (× 2) (AK-630M1-2)

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec) +90° ... -25° (60°/sec) AK-630M-2

Traverse: ±180° (70°/sec) ±180° (80°/sec) AK-630M-2

Muzzle Velocity: 880–900 m/s

Rate of Fire: 4,000–5,000 rounds/min (AK-630M) 10,000 rounds/min (AK-630M1-2)

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime) 5,000 m (16,000 ft) (all, AK-630M-2)

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin, AK-630M)[10] 4,000 rounds (AK-630M1-2)

Sights: Radar / TV-optical

↳*Ammunition Weapon Station #2*

Shell: HEI-Frag, Frag-T

Caliber: mm100

Shell Weight: kg0.39

Basic Load: 3,000

↳*Weapon Station #3*

Name: BM-21 Grad

Quantity: 1 BM-21 Grad unit consists of 40 Retractable A-215 Rockets

Type: Rocket Launcher

Crew: 3

Barrel Length: m3.0

Barrels: 40

Rate of Fire: 2 rounds/s

Muzzle Velocity: m/s690

Maximum Firing Range: 20 km (12 mi) (new rockets 30–45 km)

Sights: PG-1M panoramic telescope

↳*Weapon Station #4*

Name: 3M-47 Gibka

Type: A turret for ships that is equipped with Igla missiles.

Quantity: 1 3M-47 Gibka Unit

Number of Missiles: 4

Missile Type: Surface-to-Air Missile

Missile Warhead Weight: 1.17 kg (2.6 lb) with 390 g (14 oz) explosive

Detontation Mechansim: contact and grazing fuzes

Engine: solid fuel rocket motor

Operational Range: 5.2 km

Flight Ceiling: 3.5 km

Speed: 570m/s

Guidance System: dual waveband infra-red (S-version)

↳*Weapon Station #5*

Name: DP-65

Type: 55 mm ten-barreled remotely-controlled naval grenade launcher system

Description: The DP-65 (98U) is a Russian special compact 55 mm ten-barreled remotely-controlled naval grenade launcher system based on MRG-1 seven-barrel grenade launcher. It also has a manual control mode. DP-65 uses sonar Anapa-ME for underwater target detection. DP-65 high explosive grenades RG-55M are akin to miniature depth charges equipped with jet engine with an annular stabilizer. In 1991, the DP-65 automated, small size, remotely-controlled Rocket Grenade Launcher system was developed and adopted by the Russian Navy. DP-65 can be installed directly on watercraft and on the coast. Designed to protect ships, waterworks, offshore platforms and other important marine and coastal facilities from combat divers, frogmen, and saboteurs. The grenades are believed to produce casualties to divers within 16 meters of the explosion. They are employed by Grachonok-class anti-saboteur ships.

Maximum Effective Fire: INA

↳*Weapon Station #6*

Name: KPV-14.5 Heavy Machine Gun

Type: Heavy Machine Gun

Caliber: 14.5mm

Quantity: 2 x KPV-14.5 heavy machine gun

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Effective Firing Range: 3000m

Maximum Firing Range: 4000m

Feed System: 40-round belt

Sights: iron or optical

↳*Ammunition Weapon Station #6*

Cartridge: 14.5×114 mm

Caliber: mm14.5

Basic Load: 2,000

Protection

Electronic Warfare: 2 × 10 PK-10 decoy launchers

Sensors and Processing Systems

Navigation Radar: MR-231 Navigation Radar

Phased Array Radar: 5P-26M Pozitiv-M phased array radar system (Pozitiv-ME1.2 for export)

Fire Control System: 5P-10-03 Laska fire control system (5P-10-03E for export) and the MP-123 fire control system

Sonar System: Anapa-M anti-saboteur sonar system (Anapa-ME for export)

Notes:

The Buyan class, (Russian: Буян, lit. 'Buyan'), Russian designations Project 21630 Buyan and Project 21631 Buyan-M, are series of corvettes (small artillery and missile ships in Russian classification) developed by Zelenodolsk Design Bureau for the Russian Navy. Since 2010, all subsequent vessels are being constructed as improved Project 21631 subclass, incorporating greater tonnage, stealth technology and the 3S-14 vertical launching system for either Kalibr or Oniks anti-ship cruise missiles, significantly enhancing combat capabilities. The ships are primarily designed for operations within littoral zones to protect Russia's vast coastal areas. Due to the small tonnage, they can operate even within shallow parts of oceans and seas and Russia's river system. The export variant is known as Project 21632 Tornado. In August 2010, some informations about the newly modified Project 21631, dubbed as Buyan-M, were published. The Project 21631 ships are said to be an up-to-date variant of Project 21630 Buyan small artillery ship, armed with the nuclear-capable Kalibr cruise missiles (SS-N-27 Sizzler) with a claimed range of at least 1,500 km and electronic countermeasure equipment. Ships of Project 21631 are designed to defend the national economic zones of Russia. The ships' small size and displacement enable them to operate within inland river systems, including traversing the Moscow Canal which allows them to deploy to various seas around European Russia. This is a particular advantage for the Buyan-M series, because while the Intermediate-Range Nuclear Forces Treaty (INF) prohibits long-range cruise missiles from operating on land they can operate from ships, so a river-based corvette can deploy missiles without being subject to restrictions. The lead ship of this project, Grad Sviyazhsk, was laid down on 27 August 2010 and commissioned on 27 July 2014. On 7 October 2015, corvettes Grad Sviyazhsk, Uglich, Velikiy Ustyug and Gepard-class frigate Dagestan, deployed in the Caspian Sea, launched 26 Kalibr cruise missiles at 11 terrorist targets in Syria. The missiles flew nearly 1,500 kilometres (930 mi) over Iran and Iraq and struck targets in Raqqa and Aleppo provinces (controlled by the Islamic State) as well as in Idlib province (controlled by the al-Qaeda-linked Nusra Front)According to US DoD officials, several of these cruise missiles fired from Russian ships crashed in Iran and did not make it to their intended targets in Syria. An Iranian dissident organizations's TV reported that an "unidentified flying object" crashed and exploded in a village near the Iranian city of Takab. On 20 November 2015, the same warships launched 18 Kalibr cruise missiles from the Caspian Sea at seven terrorist targets in Rakka, Idlib and Aleppo provinces. On 13 February 2016, corvette Zelenyy Dol was deployed to the Mediterranean Sea. On 19 August 2016, corvettes Zelenyy Dol and Serpukhov, deployed in the Mediterranean Sea, launched Kalibr cruise missiles at positions of Al-Nusra terrorist group in Syria. As a result of the strikes, number of terrorist facilities were destroyed, including command post and base near the village of Dar Ta Izzah and weapon production plants and warehouses in Aleppo province. On 25 October 2016, Zelenyy Dol and Serpukhov were deployed to the Baltic Sea to join a newly formed division in Kaliningrad. On 4 November 2014, during the Euronaval-2014 exhibition, it was announced Kazakhstan has sent a request for the construction of three Project 21632 Tornado small artillery/missile ships. The ships were believed to be laid down in 2015.

Type 037II Class (Houjian Class) Chinese Corvette




Tiers:

1 2 **3** 4

Variants:

- **Ships in PLAN Service::** 770 Yangjiang; 771 Shunde'; 772 Nanhai; 773 Panyu; 774 Lianjiang; 775 Xinhui
- **Ships in Pakistan Navy Service::** 1013 Azmat; 1014 Dehshat; 1027 Himmat

System

Alternative Designation: Type 037II Class; NATO: Houjian Class
Type: Corvette; Missile Boat
Builder: Qiuxing and Huangpu Shipyard
Crew: 75

Dimensions

Length: 62.8 m
Beam: 7.2 m
Draft: 2.4 m
Displacement, Standard: INA
Displacement, Full Load: 520 tons

Propulsion System

Engine Name: 2 x SEMT-Pielstick 12 PA6 280
Engine Type: Diesel
Engine Power: 2 x SEMT-Pielstick 12 PA6 280 diesel engines at 1,584 hp (1,181 kW) with 3 shafts
Maximum Range: 1,800 nmi (3,300 km; 2,100 mi) at 18 knots (33 km/h; 21 mph)
Maximum Speed: 30 knots (56 km/h)

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-176

Type: Naval Gun

Caliber: 76.2mm

Quantity: 1 × AK-176 Naval Gun

Length: 4484 mm

Weight: 16,800 kg

Crew: 2 (4 in manual control mode)

Barrels: 1

Recoil: 380 to 500 mm

Elevation: -15° to +85°

Traverse: ±175°

Rate of FIre: 120 rds/min

Muzzle Velocity: 980 m/s

Maximum Firing Range: 15.5 km

Effective Firing Range: 10 km

Feed System: 152 ready to fire rounds

Sights: INA

↳*Gun Weapon System #1 Ammunition*

Type: Rifle

Caliber: 76.2mm

Shell: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 69

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 4 × Type 69 14.5 mm heavy machine guns (2 × 2)

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of FIre: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Firing Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 14.5mm

Cartridge: 14.5×114 mm

Basic Load: INA

Missile Weapon System

↳*Missile Weapon System #1*

Name: C-802

Type: Anti-Ship Missile System

Note: The C-802 is the export version of the YJ-83

Length: INA

Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: CTJ-2 turbojet

Operational Range: 120 km

Maximum Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

Mines

Note: 12 max. mines (two mine rails fitted)

Mortar System

Mortar Launcher: The ships are armed with two 6-tubed anti-submarine mortar launchers.

Mortar Type: Type 87 Mortar

Fire Control Systems

FCS Name: INA

Computerized FCS: Yes, 1 × I-band Type 347 (Rice Lamp)

Battle Management System: No

Radar Systems

Name: 1 × I-band Type 352 (Square Tie)

Type: Surface Search Radar

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x Tamir-11 HF

Type: Hull-Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Depth Charge Racks: 2 depth charge racks

Depth Chargers: 2 BMB-2 depth charge mortars

Notes:

The Type 037II missile boat (NATO: Houjian class) is a missile equipped corvette built by Huangpu Shipyard of Guangzhou for the People's Liberation Army Navy. A total of six vessels were delivered to the PLA Navy and form the main naval defence force currently protecting Hong Kong. The original one-off design was by an American company, the H-3 group, the design was for a 245-ton boat, equipped with Harpoon SSMs, OTO Melara 76 mm guns, gas turbine engines and waterjet propulsion. However, this specifications was too complicated for China, and a major redesign was begun, resulting in a boat with C-801 SSMs, diesel engines and propellers instead. The OTO Melara 76mm gun was retained in the revised design, called in 1988 the EH-3D (and in 1996 the 520T), but failed to survive the cooling of relations with the West following the Tiananmen Square protests of 1989 and the resulting end of Western participation in Chinese military projects. The first vessel was built in 1990, as a technology demonstrator and proof-of-concept trials vessel, it fired its first C-801 missile in a 1995 exercise. Three more vessels were built in 1995/96. However, due to technological difficulties (particularly with regards the license produced SEMT diesel engines), high price, and over sophisticated design compared to the PLAN standard, further production was terminated. A fifth vessel, hull number 774, was built in 2001, as another proof of concept vessel for modified SEMT engines with new turbochargers and license produced Russian AK-176 76 mm gun. Four vessels were built for rotation, with 2 vessels being deployed to Hong Kong at a time. The fifth vessel has been involved in two navigation incidents. The first time in 2001 whilst on a pre-delivery test it was nearly sunk after a crash with a fast ferry servicing the Hong Kong-Guangzhou route. In June 2006, it crashed again, this time with a Chinese freighter, and sank immediately, 13 servicemen going missing in the accident. The vessel was later refloated and sent to the shipyard for repair. The Azmat-class vessels in service with the Pakistani Navy are based on this class. In 2012 Bangladesh contracted for two slightly modified ships.

Type 037IG Class (Houxin Class) Chinese Corvette







Tiers:

1 2 3 4

Variants:

- **Ships in PLAN Service:** Pennant Numbers: 651□656□ 751□760 and 764□767. Completed: 26 (20 PLAN + 6 Myanmar) Active: 26 (20 PLAN + 6 Myanmar) Pendant No. 275/285, 290, 302, 305, 609/610, 618/622, 626/629, 636/637, 689/692, 695/699, 701, 707, 723/733 and 740/742

System

Alternative Designation: Type 037IG Class; NATO: Houxin Class
Type: Corvette; Missile Boat
Builder: Qiuxing and Huangpu Shipyard
Crew: 71

Dimensions

Length: 62.8 m
Beam: 7.2 m
Draft: 2.4 m
Displacement, Standard: 395 tons
Displacement, Full Load: 478 tons

Propulsion System

Engine Name: 4 × Chinese PR 230ZC
Engine Type: Diesel
Engine Power: 4 × Chinese PR 230ZC diesel engines at 4,000 hp (2,983 kW) with 4 shafts

Maximum Range: 1,300 nmi (2,400 km) at 15 kn (28 km/h)

Maximum Speed: 28 knots (52 km/h; 32 mph)

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 76A

Type: Naval Gun

Caliber: 37mm

Quantity: 4 × Type 76A 37 mm gun (2 × 2)

Note: The Type 76A is a fully enclosed and fully automatic model in the Type 76 series. Unlike the Type 76F, the gun is fully automatic, with the semi-automatic operational mode and the one-man operator console removed. In addition to the optronic FCS found in the Type 76F, the Type 76A is linked to radar FCS. The maximum rate of fire, however, is reduced in comparison to Type 76, dropping from the original 400 rd/min/barrel to 375 rd/min/barrel. In addition to anti-aircraft and anti-surface roles, the Type 76A can also be used as a close-in-weapon system.

↳*Gun Weapon System #1 Ammunition*

Type: Rifle

Caliber: 37mm

Shell: INA

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 69

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 4 × Type 69 14.5 mm heavy machine guns (2 × 2)

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of FIre: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Firing Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳*Gun Weapon System #2 Ammunition*

Type: Rifle
Caliber: 14.5mm
Cartridge: 14.5×114 mm
Basic Load: INA

Missile Weapon System

↳*Missile Weapon System #1*

Name: C-802
Type: Anti-Ship Missile System
Note: The C-802 is the export version of the YJ-83
Length: INA
Weight: INA
Warhead: 190 kg high-explosive fragmentation
Engine: CTJ-2 turbojet
Operational Range: 120 km
Maximum Speed: Mach 0.9
Guidance System: Inertial navigation/active radar homing terminal guidance

Mines

Note: 12 max. mines (two mine rails fitted)

Mortar System

Mortar Launcher: The ships are armed with two 6-tubed anti-submarine mortar launchers.
Mortar Type: Type 87 Mortar

Fire Control Systems

FCS Name: INA
Computerized FCS: Yes, 1 × I-band Type 347 (Rice Lamp)
Battle Management System: No

Radar Systems

Name: 1 × I-band Type 352 (Square Tie)
Type: Surface Search Radar
Frequency: INA
Range: INA

Sonar Systems

Name: 1 x Tamir-11 HF

Type: Hull-Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Depth Charge Racks: 2 depth charge racks

Depth Chargers: 2 BMB-2 depth charge mortars

Notes:

The Type 037IG missile boat (NATO: Houxin class) were first built by Qiuxing and Huangpu Shipyard from 1991 through 1999 for the People's Liberation Army Navy (PLAN). In addition to the PLAN, 6 were exported to Myanmar: 2 in 1995, 2 in July 1996, and 2 in late 1997. This boat is the anti-ship version of the Type 037 submarine chasers, armed with missiles rather than torpedoes. It is most effectively used in conjunction with multiple missile boats to send a swarm of missiles towards its intended target and then egress from the area immediately. The swarm of anti-ship missiles will hopefully slip past the target's air defenses for at least one or possibly more hits.

Buyan-M Class (Project 21631 Buyan-M) Russian Corvette







Tiers:



Variants:

- **Uglich:** Commositioned: 2014 Fleet: Caspian
- **Velikiy Ustyug:** Commositioned: 2014 Fleet: Caspian
- **Zelenyy Dol:** Commositioned: 2015 Fleet: Baltic
- **Serpukhov:** Commositioned: 2015 Fleet: Baltic
- **Vyshniy Volochyok:** Commositioned: 2018 Fleet: Black Sea
- **Orekhovo-Zuyevo:** Commositioned: 2018 Fleet: Black Sea
- **Ingushetiya:** Commositioned: 2019 Fleet: Black Sea
- **Grayvoron:** Commositioned: 2020 Fleet: Black Sea
- **Grad:** Commositioned: 2021 Fleet: Black Sea
- **Naro-Fominsk:** Commositioned: 2022 Fleet: Black Sea
- **Stavropol:** Commositioned: 2023 Fleet: Black Sea

System

Alternative designations: Grad Sviyazhsk; Project 21631
Builder: Almaz Shipbuilding Company Zelenodolsk Plant Gorky
Total Built: 12 Buyan-M Class Corvettes are scheduled to be built.
Type: Guided Missile Corvette
Crew (total): 52

Dimensions

Length: m75
Beam: m11
Height: m6.57
Draft: m2.5

Displacement: 949 tons (full)

Automotive

Propulsion: 2 shaft CODAD, 4 x Zvezda M520, 14,584 shp (10,880 kW) and Kolomna Diesel, Pumpjet.

Maximum Speed: 26 knots (48 km/h; 30 mph)

Maximum Range: 2,300 nmi (4,300 km; 2,600 mi) at 12 knots

Endurance: 10 days

Armament

↳*Weapon Station #1*

Name: AK-100

Type: Naval Cannon

Quantity: 1 x AK-100 Unit

Caliber: mm100

Length: INA

Weight: 35.5 tons

Elevation: -10 / +85 degrees

Rate of Elevation: 30 degrees per second

Traverse: 360 degrees

Traverse Rate: 35 degrees per second

Recoil: 20 in (51 cm)

Rate of Fire: 50 to 60 rounds per minute

↳*Ammunition Weapon Station #1*

Shell: INA

Caliber: mm100

Shell Weight: 26.8 kg

Basic Load: INA

↳*Weapon Station #2*

Name: AK-630-M2 CIWS

Type: Fully automatic naval close-in weapon system based on a six-barreled 30 mm rotary cannon.

Caliber: 30mm

Quantity: 2 x AK-630-M2 CIWS Stations

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm (49 in) (mount ring)

Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb) Fire control system: (Vympel MR-123) (Vympel-A MR-123/176) 5.2 tonnes (5.7 short tons) (Vympel-AM MR-123-02/MR-123-03 and Vympel-AME MR-123-02/176) 1 tonne (2,200 lb) (Laska 5P-10E)

Crew: 1

Barrels: 6 (AK-630M) 6 (× 2) (AK-630M1-2)

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec) +90° ... -25° (60°/sec) AK-630M-2

Traverse: ±180° (70°/sec) ±180° (80°/sec) AK-630M-2

Muzzle Velocity: 880–900 m/s

Rate of Fire: 4,000–5,000 rounds/min (AK-630M) 10,000 rounds/min (AK-630M1-2)

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime) 5,000 m (16,000 ft) (all, AK-630M-2)

Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin, AK-630M)[10] 4,000 rounds (AK-630M1-2)

Sights: Radar / TV-optical

↳*Ammunition Weapon Station #2*

Shell: HEI-Frag, Frag-T

Caliber: mm100

Shell Weight: kg0.39

Basic Load: 3,000

↳*Weapon Station #3*

Name: Pantsir-M

Quantity: 1 x Pantsir-M System

Type: Ship-based CIWS/Missile launcher

Main Armament: Hermes-K missiles and 57E6 missiles

Secondary Armament: Two 30×165mm AO-18KD

Rate of Fire: 10000 rounds/minute

Maximum Firing Range: 20km

↳*Weapon Station #4*

Name: P-800 Oniks

Type: Supersonic anti-ship cruise missile

Quantity: 2 x P-800 Oniks Unit

Manufacturer: NPO Mashinostroyeniya

In Service: 2002-Present

Proliferation: Widely Proliferated Hezbollah – with diverse launching platforms. Indonesia – 4 VLS (vertical launching system) mounted on Ahmad Yani class frigate KRI Oswald Siahaan (354). Russia – 3 "Bastion-P" complexes delivered in 2010, all the complexes taken into service with the Russian Black Sea Fleet's 11th Independent Coastal Missile-Artillery Brigade stationed near Anapa and the Project 1234.7 Nakat, a one-off Nanuchka IV-class corvette commissioned in 1987 with 2x6 Oniks. The "Bastion-P" is deployed by Russian forces in Crimea. One more Bastion-P was delivered in 2015. 2 Bastion systems are in service with the Northern Fleet and at least one with Western Military District (Baltic Fleet). Two more systems entered service in 2016 with Pacific Fleet. Newest class of Russian nuclear-powered attack submarines, Yasen-class submarine, can also launch the missile. Submarine-launched variant entered service in 2016. Two Bastion missile systems delivered in 2017 and one more in 2018. Totally 4 Bal and Bastion systems in 2018. One more system delivered for the Pacific Fleet in early 2019. Totally 3 Bastion systems in 2019. Syria – 2 "Bastion-P" complexes delivered in 2011, 72 missiles. Vietnam – 2 "Bastion-P" land-based coastal defense systems delivered, 40 missiles

Length: 8.9 m

Diameter: 0.7 m

Weight: 3,000 kg

Wingspan: 1.7 m

Warhead: national ver. 300 kg semi-armour piercing HE, thermonuclear; for export 200 kg semi-armour piercing HE

Detonation Mechanism: delay fuze

Engine: Ramjet 4 tons of thrust

Propellant: kerosene liquid fuel

Operational Range: 600 km (370 mi; 320 nmi) (Oniks version for Russia) 120 to 300 km (75 to 186 mi; 65 to 162 nmi) depending on altitude (Yakhont export version)

Flight Ceiling: 14,000 m

Flight Altitude: 10 meters or higher

Speed: Mach 2

Guidance System: midcourse inertial guidance, active radar homing-passive radar seeker head

Accuracy: m1.5

Launch Platform: coastal installations, naval ships, Fixed-wing aircraft

↳*Weapon Station #5*

Name: DP-65

Type: 55 mm ten-barreled remotely-controlled naval grenade launcher system

Description: The DP-65 (98U) is a Russian special compact 55 mm ten-barreled remotely-controlled naval grenade launcher system based on MRG-1 seven-barrel grenade launcher. It also has a manual control mode. DP-65 uses sonar Anapa-ME for underwater target detection. DP-65 high explosive grenades RG-55M are akin to miniature depth charges equipped with jet engine with an annular stabilizer. In 1991, the DP-65 automated, small size, remotely-controlled Rocket Grenade Launcher system was developed and adopted by the Russian Navy. DP-65 can be installed directly on watercraft and on the coast. Designed to protect ships, waterworks, offshore platforms and other important marine and coastal facilities from combat divers, frogmen, and saboteurs. The grenades are believed to produce casualties to divers within 16 meters of the explosion. They are employed by Grachonok-class anti-saboteur ships.

Maximum Effective Fire: INA

↳*Weapon Station #6*

Name: KPV-14.5 Heavy Machine Gun

Type: Heavy Machine Gun

Caliber: 14.5mm

Quantity: 2 x KPV-14.5 heavy machine gun

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Effective Firing Range: 3000m

Maximum Firing Range: 4000m

Feed System: 40-round belt

Sights: iron or optical

↳***Ammunition Weapon Station #6***

Cartridge: 14.5×114 mm

Caliber: mm14.5

Basic Load: 2,000

Protection

Electronic Warfare: TK-25E radar jammers

Sensors and Processing Systems

Navigation Radar: MP-231-2 navigation radar

Phased Array Radar: 5P-26M1 Pozitiv-M1 phased array radar system

Fire Control System: 5P-10-03 Laska fire control system and the MP-123-02 fire control system

Sonar System: Anapa-M anti-saboteur sonar system

Notes:

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range cruise missiles from operating on land they can operate from ships, so a river-based corvette can deploy missiles without being subject to restrictions. The lead ship of this project, Grad Sviyazhsk, was laid down on 27 August 2010 and commissioned on 27 July 2014. On 7 October 2015, corvettes Grad Sviyazhsk, Uglich, Velikiy Ustyug and Gepard-class frigate Dagestan, deployed in the Caspian Sea, launched 26 Kalibr cruise missiles at 11 terrorist targets in Syria. The missiles flew nearly 1,500 kilometres (930 mi) over Iran and Iraq and struck targets in Raqqa and Aleppo provinces (controlled by the Islamic State) as well as in Idlib province (controlled by the al-Qaeda-linked Nusra Front)According to US DoD officials, several of these cruise missiles fired from Russian ships crashed in Iran and did not make it to their intended targets in Syria. An Iranian dissident organizations's TV reported that an "unidentified flying object" crashed and exploded in a village near the Iranian city of Takab. On 20 November 2015, the same warships launched 18 Kalibr cruise missiles from the Caspian Sea at seven terrorist targets in Rakka, Idlib and Aleppo provinces. On 13 February 2016, corvette Zelenyy Dol was deployed to the Mediterranean Sea. On 19 August 2016, corvettes Zelenyy Dol and Serpukhov, deployed in the Mediterranean Sea, launched Kalibr cruise missiles at positions of Al-Nusra terrorist group in Syria. As a result of the strikes, number of terrorist facilities were destroyed, including command post and base near the village of Dar Ta Izzah and weapon production plants and warehouses in Aleppo province. On 25 October 2016, Zelenyy Dol and Serpukhov were deployed to the Baltic Sea to join a newly formed division in Kaliningrad. On 4 November 2014, during the Euronaval-2014 exhibition, it was announced Kazakhstan has sent a request for the construction of three Project 21632 Tornado small artillery/missile ships. The ships were believed to be laid down in 2015.

Bung Tomo Class Indonesian Corvette





Tiers:



Variants:

- **KRI Bung Tomo (ex KDB Jerambak):** Commissioned: 2014 Status: Active
- **KRI John Lie (ex KDB Bendahara Sakam):** Commissioned: 2014 Status: Active
- **KRI Usman-Harun (ex KDB Nakhoda Ragam):** Commissioned: 2014 Status: Active

System

Alternative Designation: Bung Tomo Class'; They were originally built for the Royal Brunei Navy and named Nakhoda Ragam-class corvettes but were ultimately bought by Indonesia and renamed.
Total Built: 3 ships built
Type: Corvette
Builder: BAE Systems Marine
In Service: 2014-Present
Crew: 79 men (up to 24 passengers)

Dimensions

Length: 95 m
Beam: 12.8 m
Draft: 3.6 m
Displacement, Standard: 1,500 tons
Displacement, Full Load: 2,000 tons
Note: The ship has 12,572 cubic ft (356 cubic m) of ballast. A total of 4,767 cubic ft (135 cubic m) of fresh water and 24,791 cubic ft (702 cubic m) of fuel can be carried. Two bow thrusters permit precise maneuvering. Fin stabilizers are fitted.

Propulsion System

Engine Name: 4 x MAN B&W diesel engines

Engine Type: Diesel

Engine Power: 40,500 shp

Propellers: 2 controllable-pitch propellers

Maximum Range: 5 000 nm at 12 knots

Maximum Speed: 30 knots

Endurance: 14 days

Communications

Radio: Classified

Missile Weapon System

↳*Missile System #1*

Name: Exocet Missile

Type: Anti-Ship Missile

Quantity: 2 × 4 Exocet MM40 Block II missile launchers.

Launcher: MM40 Block II missile launchers.

Missile Basic Load: 8

Length: 6 m

Diameter: 34.8 cm

Wingspan: 1.35 m

Weight: 780 km

Warhead: 165 km

Engine: Solid propellant engine turbojet (MM40 Block 3 version)

Operational Range: 180 km

Flight Altitude: Sea-skimming

Speed: Mach 0.93 1,148 kilometres per hour (713 mph; 319 m/s)

Guidance System: Inertial guidance and terminal active radar homing

Launch Platform: multi-platform: *MM38 surface-launched *AM39 air-launched *SM39 submarine-launched *MM40 surface-launched

↳*Missile Weapon System #2*

Name: Sea Wolf Missile

Type: Surface-to-Air Missile

Quantity: 1 x VLS for Seawolf SAM Launcher

Launcher: Vertical Launching System

Missile Basic Load: 16 x Sea Wolf Missile

Length: 1.9 m

Diameter: 180 mm

Wingspan: 450 mm

Weight: 82 kg

Warhead: 14 kg (30.9 lb) HE Blast-Fragmentation

Detonation Mechanism: Direct contact/Proximity fuse activated

Engine: Blackcap solid fuel sustainer

Operational Range: 1–10 km

Flight Ceiling: 3,000 m

Speed: Mach 3 (3,675 km/h; 2,284 mph)

Guidance System: Automatic Command to Line-Of-Sight (ACLOS)

Steering System: Control surfaces

Gun Weapon Systems

↳*System*

Name: OTO Melara 76mm

Type: Naval Gun

Caliber: 76mm

Quantity: 1 x 76-mm/62-cal Oto Melara Super Rapid DP

Barrel Length: 4,724.4 mm

Weight: Empty: 7.5 tonnes (17,000 lb)

Crew: Remote Controlled

Elevation: −15°/+85°

Traverse: 360°

Rate of Fire: 85 rounds/min

Muzzle Velocity: 915 m/s

Maximum Firing Range: 16,000 m

Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

↳*Ammunition*

Type: Rifle

Caliber: mm76

Shell: 76×636mmR cartridge weight 12.5 kilograms (28 lb) shell weight 6.3 kilograms (14 lb) propellant weight 2.35 kilograms (5.2 lb)

Basic Load: INA

↳*Gun Weapon System #2*

Name: DS30M Mark 2 Automated Small Calibre Gun

Type: Naval Gun

Caliber: 30mm

Quantity: 2 x 30-mm/75-cal DS 30B AA

Note: The DS30M Mark 2 system consists of a 30mm Mark 44 Bushmaster II on a fully automated mount or manual controlled with an off-mount electro-optical director (EOD). The gun and the EOD are controlled from a remote operator console elsewhere on the ship. The "mount is a single cannon naval mount that is gyro stabilized, electrically operated and self contained gun mounting featuring a choice of cannon, control mode and sights. It has low magnetic, radar and IR signatures and excellent ergonomic availability, reliability and maintainability (ARM)." In theory "the unique dual feed system of the Bushmaster series allows the operator to select different types of ammunition for use against a variety of targets. The safety, reliability and low life-cycle costs of the Bushmaster system added to its overall value." However, photographs show only a single ammunition feed.

↳*Ammuntion Gun Weapon System #2*

Type: Rifle

Caliber: 30mm

Shell: INA

Basic Load: INA

Torpedo Weapon System

Torpedo Tubes: 2 x triple BAE Systems 324-mm Mark 32 ASW

Torpedo Name: Mark 46 Torpedo

Torpedo Basic Load: 6 x Mark 46 Torpedo

Onboard Aviation Facilities

Facilities: Flightdeck, no hangar

Helicopter: 1 x Eurocopter AS565 Panther[

Fire Control

Gun and Missile FCS: 2 x AMS-1802SW gun/missile fire control

Weapons Tracking System: 1 x Rademac 2500 surveillance and tracking system

Radar Systems

Navigation Radar: 1 x Thales Scout navigation

Air Search Radar: 1 x Alenia Marconi Systems (AMS) AWS-9 3-D air-search radar

Sonar Systems

Hull-Mounted Sonar: 1 x Thales TMS-4130C1 hull-mounted sonar

Protection

Active Protection System: Yes

Electronic Warfare: 1 x Racal Cutlass 242 intercept and Scorpion Jammer

Decoy: 1 x Super Barricade decoy rocket launcher

NBC Protection: Yes

Notes:

The Bung Tomo class is a class of three Indonesian multi role patrol corvettes. They were originally built for the Royal Brunei Navy and named Nakhoda Ragam-class corvettes but were ultimately bought by Indonesia and renamed. The class is named after Bung Tomo, a noted leader of Indonesia's independence movement. The three vessels were built by BAE Systems Marine (now BAE Systems Maritime - Naval Ships). The contract was awarded to GEC-Marconi in 1995 and the ships, a variant of the F2000 design, were launched in January 2001, June 2001 and June 2002 at the then BAE Systems Marine yard at Scotstoun, Glasgow. The customer refused to accept the vessels and the contract dispute became the subject of arbitration. When the dispute was settled in favour of BAE Systems, the vessels were handed over to Royal Brunei Technical Services in June 2007. In 2007, Brunei contracted the German Lürssen shipyard to find a new customer for the three ships; in November 2012, it was announced that Indonesia had signed a memorandum of understanding with Britain to acquire the vessels for one-fifth of the original unit cost. The ships are now in service with the Indonesian Navy. The ships were originally armed with MBDA Exocet Block II anti-ship missiles and MBDA Seawolf air defence missiles. The main gun is an Oto Melara 76 mm; the ship also carries two torpedo tubes, two 30 mm remote weapon stations and has a landing spot for a helicopter. As 2018 the MBDA Seawolf missile was out of service due to expired and there was plan to replace it with VL Mica. In late December 2014, KRI Bung Tomo was involved in search and recovery operations of the Indonesia AirAsia Flight 8501 which crashed off the Java Sea between the islands of Belitung and Borneo. Later in early January 2015, KRI Usman Harun was deployed to search for the black boxes as the ship is equipped with the Thales Underwater Systems TMS 4130C1 hull-mounted sonar. KRI Bung Tomo is named after Sutomo, the leader of Indonesian guerrillas during the Battle of Surabaya. The naming of KRI John Lie memorializes the first Chinese Indonesian to be honored as National Hero of Indonesia, who was also one of the first high ranking navy commanders during the Indonesian National Revolution. The naming of KRI Usman-Harun memorializes Harun Said and Osman Hj Mohd Ali, who were executed by Singapore after the MacDonald House bombing, creating a controversy between the two nations.

Sariwon Class North Korean Corvette





Tiers:



System

Alternative Designation: Sariwon Class
Type: Corvette
Builder: Stationed on the east coast, these ships were likely built at either Mayang-do Naval Shipyards or Bong Dao Bo Shipyards in nearby Sinpo on the mainland.
Crew: 70

Dimensions

Length: 62.10 m
Beam: 7.30 m
Draft: 2.40 m
Displacement, Standard: 450 tons standard
Displacement, Full Load: 490 tons full load

Propulsion System

Engine Name: INA
Engine Type: 2 x Diesel Engines
Engine Power: 3,000 total bhp
Maximum Range: 2,700 nm at 18 kts.
Maximum Speed: 21 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 66
Type: Naval 57mm Gun
Caliber: 57mm

Quantity: 2 x Type 66 Naval 57mm Gun

Length: 3,990 mm

Weight: 14,000 kg

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Action: Electronic firing

Elevation: −10°/+78°

Traverse: Full 360°

Rate of Fire: 200 rounds/min

Maximum Firing Range: 17,000 m

Effective Firing Range: 8,500 m

Feed System: 40 ready rounds, 128 rounds in ready racks in mount

Sights: Gyro-stabilized in local control.

↳*Gun Weapon Systems #1 Ammunition*

Type: Projectile

Caliber: mm57

Cartridge: 57 × 438 mm

Basic Load: 128

↳*Gun Weapon Systems #2*

Name: INA

Type: Anti-Aircraft Gun

Caliber: 14.5mm

Quantity: 4 x Quad 14.5mm Anti-Aircraft Gun

↳*Gun Weapon Systems #2 Ammunition*

Type: Rifle

Caliber: 14.5mm

Cartridge: INA

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: No

Radar Systems

↳***Radar #1***

Name: 1 x Type 351 (Pot Head) Radar

Type: Surface Search Radar

Range: INA

↳

Name: 1x Don-2 Radar

Type: Navigation Radar

Range: INA

Mines

Note: 30 mines

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Sariwon class corvette is a Soviet-designed corvette used by North Korea. The class is based on the Soviet Fugas-class Tral type fleet minesweepers, but were built in North Korea in the 1960s. It is believed five ships of this type are currently active in the Korean People's Navy. Stationed on the east coast, these ships were likely built at either Mayang-do Naval Shipyards or Bong Dao Bo Shipyards in nearby Sinpo on the mainland.

Diponegoro Class (SIGMA 9113 Class) Indonesian Corvette





Tiers:



Variants:

- **DIPONEGORO:** Commissioned: 2007 Status: Active
- **HASANUDDIN:** Commissioned: 2007 Status: Active
- **SULTAN ISKANDER MUDA:** Commissioned: 2008 Status: Active
- **FRANS KAISIEPO:** Commissioned: 2009 Status: Active

System

Alternative Designation: Diponegoro Class; SIGMA 9113 Class
Type: Corvette
Builder: Schelde Naval Shipbuilding, Vlissingen, Netherlands (a subsidiary of Damen Shipyards Group)
Crew: 80

Dimensions

Length: 90.71 m
Beam: 13.02 m
Draft: 3.60 m
Displacement, Standard: INA
Displacement, Full Load: 1,692 tons

Propulsion System

Engine Name: 2 x SEMT Pielstick 20PA6B STC diesels
Engine Type: Diesel
Engine Power: INA
Generators: 4 x Caterpillar 3460C diesel generators
Propellers: 2 x Rolls Royce KaMeWa controllable- pitch propellers
Maximum Range: 3,600 nm at 18 knots; 4,800 nm at 14 knots
Maximum Speed: 28 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: OTO Melara
Type: Naval Gun
Caliber: 76mm
Quantity: 1 x OTO Melara Naval Gun
Barrel Length: 4,724.4 mm
Weight: 7.5 tons
Crew: Remote Controlled
Elevation: −15°/+85° speed: 35°/s (acceleration: 72°/s²)
Traverse: 360° speed: 60°/s (acceleration: 72°/s²)
Rate of Fire: Compact: 85 rounds/min Super Rapid: 120 rounds/min
Maximum Firing Range: 915 m/s
Muzzle Velocity: HE-PFF 16,000 m SAPOMER 20,000 m VULCANO 40,000 m
Feed System: Magazine capacity: 80 ready rounds on Compact gun mount

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle
Caliber: mm76
Shell: 76×636mmR
Basic Load: INA

↳*Gun Weapon System #2*

Name: 20 mm modèle F2 gun
Type: Naval Gun
Caliber: 20mm
Quantity: 2 x 20 mm modèle F2 Naval Guns
Length: INA
Weight: 332 kg (732 lb) (without ammunition)
Action: Gas unlocked, delayed blowback
Elevation: −15° to + 65°
Rate of Fire: 720 round/min
Muzzle Velocity: 1,050 m/s
Effective FIring Range: 1,500 m (4,900 ft) against aerial targets

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 20mm

Cartridge: 20×139mm

Basic Load: INA

Missile Weapon System

↳*Missile #1*

Name: SM 39 Exocet

Type: Anti-Ship Missile

Launchers: 2 x twin MM40 Exocet Block II SSM launchers

Length: 5.80 m

Diameter: 348 mm

Wingspan: 1.14 m

Weight: 666 kg

Engine: 2 x SNPE double-base Nitramite smokeless solid-propellant rockets; 1 x Epervier booster with 2.4 sec burn; 1 x Eole V sustainer with 200-220 sec burn

Warhead: 165 kg Hexolite blast fragmentation

Speed: 1,100 kph, Mach 0.93

Maximum Range: 50 km

Minimum Range: 4 km

Peak Altitude: 50 m

Sensors/Electronics: TRT AHV-7 radio altimeter inertial navigation during first part of flight Electronique Marcel Dassault ADAC or Super ADAC I/J-band active radar homing in terminal phase that begins search approx. 5.4 nm (6.2 mi, 10 km) from target's estimated position.

Basic Load: INA

↳*Missile #2*

Name: Mistral

Type: MANPAD

Launchers: 2 x quad Tetral SATCP Mistral SAM launchers (1 forward, 1 aft)

Length: 1.86 m

Diameter: 90 mm

Weight: INA

Crew: 1

Engine: Solid Rocket Motor

Warhead: High Explosive with high density tungsten balls

Warhead Weight: 2.95 kg

Detonation Mechansim: Laser proximity or impact triggered

Maximum Speed: 800 m/s

Effective Firing Range: up to 6 km

Guidance System: Infrared homing

Basic Load: INA

Torpedoes

Note: 2 x triple 324-mm B-515 torpedo launchers [unknown no. of EuroTorp A244S Mod 3 torpedoes carried]

Fire Control Systems

FCS Name: 1 x LIROD Mark 2 tracking-surveillance fire-control

Computerized FCS: Yes

Radar Systems

Surveillance Radar: 1 x Thales MW 08 3D multi-beam surveillance

Navigation Radar: 1 x Sperry Marine BridgeMaster-E ARPA navigation

Sonar Systems

Name: 1 x Thales Kingklip medium frequency active

Type: Hull Mounted

Protection

Active Protection System: INA

Countermeasures: Yes

NBC Water Washdown System: Yes

EW: 1 x Thales DR3000 system; 1 x Racal Scorpion 2L system jammer; 2 x 12-barreled PK-16 chaff decoy rocket launchers

Notes:

Indonesia's SIGMA-class (or DIPONEGORO-class) corvettes are based on a Dutch modular design to produce three different sizes of naval patrol vessels. SIGMA is an acronym for "ship integrated geometrical modularity approach." The ships are based on a common design defined by a set of geometric parameters, which are applied throughout the entire range of the class and which provide a repetition of identical units, both in the dimensions of the ship's spaces and in the layout. The corvettes for Indonesia cost an estimated $212 million for the first two and $339 million for the second two

Kapitan Patimura Class Indonesian Corvette







Tiers:



Variants:

- **KAPITAN PATIMURA:** Commissioned: 1983 Status: Active
- **UNTUNG SUROPATI:** Commissioned: 1983 Status: Active
- **NUKU:** Commissioned: 1982 Status: Active
- **LAMBUNG MAMANGKURAT:** Commissioned: 1985 Status: Active
- **TJUT NYA DHIEN:** Commissioned: 1982 Status: Active
- **SULTAN THAHA SYAIFUDDIN:** Commissioned: 1982 Status: Active
- **SUTANTO:** Commissioned: 1981 Status: Active
- **SUTEDI SENOPUTRA:** Commissioned: 1981 Status: Active
- **WIRATNO:** Commissioned: 1981 Status: Active
- **MEMET SASTRAWIRIA:** Commissioned: 1981 Status: Active
- **TJIPTADI:** Commissioned: 1985 Status: Active
- **HASAN BASRY:** Commissioned: 1982 Status: Active
- **IMAN BONJOL:** Commissioned: 1984 Status: Active
- **PATI UNUS:** Commissioned: 1983 Status: Active
- **TEUKU UMAR:** Commissioned: 1984 Status: Active
- **SILAS PAPARE:** Commissioned: Status: Active

System

Alternative Designation: Kapitan Patimura Class

Type: Corvette

Builder: VEB Peenewerft, Wolgast, Germany

Crew: 61 (6 off. + 55 enl.)

Note: The PARCHIM-I class corvettes were the largest domestic-built combatants in the East German navy before Germany was reunified in October 1990. They were built to replace the earlier HAI-class corvettes. After unification, four of the ships saw brief service in the German navy. The sale of the entire class to Indonesia was announced in July 1992 and approved by the German Bundestag on Sept. 2, 1992.

Dimensions

Length: 75.20 m

Beam: 9.78 m

Draft: 4.40 m

Displacement, Standard: 800 tons

Displacement, Full Load: 900 tons

Propulsion System

Engine Name: 3 x Russian-built M-504A-3

Engine Type: Diesel

Engine Power: INA

Maximum Range: 1,200 nm at 20 knots; 2,200 at 14 knots

Maximum Speed: 25 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-257 DP

Type: Naval Gun

Caliber: 57mm

Quantity: 1 x AK-257 Naval Gun

Note: The AK-257 is a Soviet 57mm naval gun, originally a land ZIF-31 L/70 57mm (Type 66/76) cannon. During the early 1950s, development began of naval versions of the 57x348mmSR 70 calibre weapon which had entered service with the Soviet army in 1950 as the S-60. This was to be a supplementary weapon for larger warships and as the main gun armament for minesweepers and auxiliaries. The twin gun version, ZIF-31, appears to have entered service with the Project 264 Minesweepers (T58 class) and the Project 310 (Don class) submarine support ships in 1958. In 1960, two other versions of the mounting appeared; a single gun ZIF-71 for the modernised Skoryy class destroyers and the quad ZIF-75 for the Krupny/Kanin class destroyers. The ZIF designation is an industrial one and it is possible that the naval designations were AK-157 (ZIF-71), AK-257 (ZIF-31) and AK-457 (ZIF-75). In smaller warships these mountings were sometimes associated with MR-103 and in larger ones with the Yakhond (Hawk Screech) radar. The ZIF-31/71/75 mountings may not have been very successful and an improved twin mounting appeared shortly afterwards as the AK-725. The twin 57mm ZIF-31 has also been manufactured in China as the Type 66 and there is a water-cooled derivative known as the Type 76. The AK-257 is currently employed on the Grisha class Corvette.

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm57

Shell: 57x348mmSR

Basic Load: INA

↳*Gun Weapon System #1*

Name: AK-230

Type: Naval Gun

Caliber: 30mm

Quantity: 2 x AK-230 Naval Guns

Length: 2.140 m

Weight: 1857 kg to 1905 kg

Elevation: -12 to +87 degrees at 50 degree/s

Traverse: +180 to -180 degrees at 35 degree/s

Rate of Fire: 2,000 rpm

Effective Range of Fire: INA

↳*Gun Weapon System #2 Ammunition*

Type: Rifle

Caliber: 30mm

Shell: INA

Basic Load: INA

Missile Weapon System

Launcher: 2 x quadruple SA-N-5 or SA-N-8 SAM system

Basic Load: INA

Rocket Weapon Systems

Launcher: 2 x 12-round RBU-6000 rocket launchers

Basic Load: INA

Torpedoes

Torpedo Tubes: 4 x fixed 406-mm torpedo tubes

Fire Control Systems

FCS Name: 1 x MR-123 Vympel (Muff Cob**) fire control

Computerized FCS: Yes

Battle Management System: INA

Radar Systems

Air Surface Radar: 1 x Rubka (MR-302) (Strut Curve**) air/surface search radar

Navigation Radar: 1 x TSR-333 navigation

Sonar Systems

Name: 1 x MG-332T active search medium-frequency sonar

Type: Hull-Mounted

Note: 1 x Elk Tail high-frequency variable depth (some units only)

Protection

Active Protection System: INA
Countermeasures: Yes
NBC Water Washdown System: Yes
EW: 2 x Baklan-B (Watch Dog**) intercepts and 2 x 16-round PK-16 chaff rocket launchers
Depth Charges: 2 x depth charge racks [6 depth charges per rack]
Mines: mines can be deployed from depth charge racks

Notes:

The Parchim-class corvette (Soviet designation Project 1331M) was developed for the East German Navy in the late 1970s, and built by the Wolgast Peene-Werft. The ships were designed for coastal anti-submarine warfare. In case of an all-out NATO-Warsaw Pact war in Europe their prime targets would have been the small U-206 coastal submarines of the West German navy. The first ship, Wismar (now the Indonesian KRI Sutanto), was launched on 9 April 1981 in Rostock, and subsequently another 15 ships were built until 1986. To make production more economical, the Soviet Union agreed to purchase another 12 ships from Wolgaster Peenewerft built between 1986 and 1990, thereby effectively subsidising the East German shipbuilding industry. The ships of the Soviet Navy were named Parchim II by NATO. Though useful as a coastal ASW platform, the Soviet production of the similar but far more powerful Grisha class made this purchase even more illogical for the Soviet Navy. After German re-unification the former East German ships were sold to the TNI-AL (Indonesian Navy) in 1993. The Indonesian Navy extensively refurbished their Parchims, to the point where the refurbishing exceeded the cost of purchase. They are still in service, both in the Indonesian Navy and in the Russian Baltic Fleet. For air defence, the ships were equipped with one double-barrel AK-230 30 mm gun and one double-barrel AK-725 57 mm gun. The Ak-725 double 57 mm AA gun, designed in 1959, was directed by the ESP-72 fire control system, which received ranging and target bearing information from an MR 103 (NATO codename 'MUFF COB') radar. The MR 103 had a 1.30 m (4.3 ft) parabolic radar dish, with an optical camera system slaved to it, as a backup system in case of failure or heavy EW environment. The barrels of the gun were water-cooled and belt-fed, with each belt containing 550 rounds, but the first round had to be manually chambered. In an emergency, the turret could be manually operated with an optical fire control system. The MR 103 radar system, already outdated when the Parchims were developed, used 1950s-style electromechanical systems, built around vacuum tubes. As a result, it wasn't considered to be an effective anti-missile system, or CIWS (Close-in weapon system), as was evidenced by a Soviet training accident in 1987 when a test missile drone accidentally locked in on a small Soviet Navy training vessel. Although the ship's AK-725 system kept firing until the moment of impact, no hits were scored and the ship was destroyed by the resulting fire, allegedly killing 39 crew members. The AK-230 gun was a fully automatic, stabilized, NN-30 double-barrel, water-cooled, four-chamber revolver cannon. The guns had a 1,000 round per minute (rpm) rate of fire and were fed by independent 500 round ammunition belts. The regular associated radar system was the (NATO codename) DRUM TILT radar, which was not used in the Parchim class. According to some sources the AK-230 could not only be linked with the DRUM TILT but also with the MUFF COB radar system, but this is disputed by old East German naval sources. According to these East German sources, the AK-230 gun on the Parchim-class corvette was optically guided, thereby leaving the Parchim class without an effective CIWS, and therefore unable to counter anti-shipping missiles. There were also two SA-N-5 (Naval SA-7 or Strela II) MANPAD positions aboard the Parchims. But without an effective, radar guided SAM missile system, the Parchims were left completely vulnerable to enemy precision guided anti-shipping weapons. This was a major restriction and confined the Parchims to brown water coastal operations, close to the protective air force and air defence umbrella. The air search radar was the ubiquitous (NATO codename) STRUT CURVE radar. This radar had a 4 m (13 ft) parabolic radar dish, worked in the F-band frequency, and had a respectable 60 nautical miles (110 km) radar range against aircraft flying at 5,000 m (16,000 ft) height, and a less respectable 20 nautical miles (40 km) radar range against surface shipping or low flying aircraft. The electronic defense suite was very basic, and consisted of an IFF (Identification Friend or Foe) receiver and transmitter, and an 'ELOKA' multiband passive RWR antenna slaved to a double 16-cell chaff dispenser. All in all, air defence - or the lack of one - was a very restrictive factor in the tactical usefulness of the Parchim design.

Type 056 Class (Jiangdao Class) Chinese Corvette







Tiers:

1 2 3 4

Variants:

- **Xinyang (501):** Launched: INA, Commissioned: March 2015, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Huangshi (502):** Launched: INA, Commissioned: March 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Suzhou (503):** Launched: May 14, Commissioned: February 15, Fleet: INA, Status: INA
- **Quinhuangdao (505):** Launched: October 14, Commissioned: October 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Datong (580):** Launched: INA, Commissioned: May 13, Fleet: INA, Status: Active Chinese PLAN
- **Yingkou (581):** Launched: INA, Commissioned: August 13, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Bengbu (582):** Launched: INA, Commissioned: February 13, Fleet: INA, Status: Active Chinese PLAN
- **Shangrao (583):** Launched: INA, Commissioned: INA , Fleet: INA, Status: INA
- **Meizhou (584):** Launched: INA, Commissioned: July 13, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Baise (585):** Launched: INA, Commissioned: July 13, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Ji'an (586):** Launched: INA, Commissioned: 2014, Fleet: INA, Status: Active Chinese PLAN
- **Jieyang (587):** Launched: INA, Commissioned: January 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Quanzhou (588):** Launched: INA, Commissioned: August 14, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Quingyuan (589):** Launched: INA, Commissioned: June 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Weihai (590):** Launched: INA, Commissioned: INA, Fleet: INA, Status: Active Chinese PLAN
- **Luzhou (592):** Launched: INA, Commissioned: June 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Huizhou (596):** Launched: INA, Commissioned: July 13, Fleet: Hong Kong Garrison, Status: Active Chinese PLAN
- **Qinzhou (597):** Launched: INA, Commissioned: July 13, Fleet: Hong Kong Garrison, Status: Active Chinese PLAN
- **Baoding (511):** Launched: INA, Commissioned: December 16, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Heze (512):** Commissioned: 2016 Status: Active Navy: Chinese
- **Hangshi (502):** Launched: INA, Commissioned: March 15, Fleet: North Sea Fleet, Status: Active Chinese PLAN
- **Sanmenxia (593):** Launched: November 2013, Commissioned: November 14, Fleet: East Sea Fleet, Status: Active Chinese PLAN
- **Zhu Zhou (594):** Launched: INA, Commissioned: November 14, Fleet: South Sea Fleet, Status: Active Chinese PLAN
- **Shadhinota (F111):** Launched: November 14, Commissioned: December 15, Fleet: INA, Status: Active Bangladesh Navy
- **Prottoy (F112):** Launched: December 14, Commissioned: December 15, Fleet: INA, Status: Active Bangladesh Navy
- **Shiongram (F113):** Launched: February 18, Commissioned: 2019, Fleet: INA, Status: Sea trial Bangladesh Navy
- **Prottasha (F114):** Launched: April 18, Commissioned: 2019, Fleet: INA, Status: Sea trial Bangladesh Navy
- **Centenary (F91):** Launched: January 14, Commissioned: February 15, Fleet: INA, Status: Active Nigeria Navy
- **Unity (F92):** Launched: November 14, Commissioned: INA, Fleet: INA, Status: Active Nigeria Navy

System

Alternative Designation: Type 56 Class; Jiangdao Class
Total Built: China: 23 Vessels; Bangladesh: 4 Vessels; Nigeria: 2 Vessels
Type: Corvette
Builder: Hudong-Zhonghua Shipbuilding CSSC Huangpu Wenchong Shipbuilding Wuchang Shipyard Liaonan Shipyard

In Service: 2013-Present

Crew: 60 - 73 men

Dimensions

Length: 90 m

Beam: 11.14 m

Draft: 4.0 m

Displacement, Standard: 1 300 tons

Displacement, Full Load: 1 500 tons

Propulsion System

Engine Name: 2 SEMT Pielstick PA6-STC diesel motors

Engine Type: Diesel

Engine Power: INA

Maximum Range: 3,500 nmi at 16 kn

Maximum Speed: 25 knots

Endurance: 20 Days

Missile Weapon System

↳*Missile System #1*

Name: YJ-83 (CSS-N-8 Saccade)

Type: Cruise Missile

Quantity: 2× 2-cell YJ-83 anti-ship missiles

Location: Amidship

Missile Basic Load: INA

Length: INA

Weight: INA

Warhead: 190 kg high-explosive fragmentation

Engine: CTJ-2 turbojet

Operational Range: 180 km

Speed: Mach 0.9

Guidance System: Inertial navigation/active radar homing terminal guidance

↳*Missile System #2*

Name: Flying Leopard 3000 Naval (FL-3000N)

Type: Surface-to-Air Missile System

Quantity: 1 × 8-cell FL-3000N SAM launcher

Location: INA

Missile Name: HHQ-10 (Red Flag 10)

Missile Basic Load: INA

Length: 2 m

Diameter: 0.12 m

Maximum Range: > 9 km for subsonic targets, > 6 km for supersonic targets

Minimum Range: < 500 meters

Guidance System: Passive RF + ImIR or ImIR only

Note: The Flying Leopard 3000 Naval (FL-3000N) was first revealed to the public at the 7th Zhuhai Airshow at the end of 2008. Although using the Flying Leopard designation, the FL-3000N is actually a different missile system than the FL-2000(V) shown earlier. In fact, the only commonality shared by both SAM system is the launcher design, and even the launchers differ in size due to the different diameters of the missiles used in the systems. Instead of using QW-1 Vanguard MANPADs, the FL-3000N system uses the HHQ-10 (Red Flag 10) naval surface to air missile developed from TY-90 missile. The diameter of the missile is enlarged by a third, but the most important design difference is its guidance system. The FL-3000N missile utilizes a combined guidance system that incorporates both passive radio frequency (RF) guidance and imaging infrared (ImIR) guidance. There are a pair of horn like protrusions mounted on the ImIR seeker at the tip of the missile, and these two protrusions are the passive RF seeker. An optional ImIR only guidance is also available and the missile is a fire and forget weapon. The fire control system (FCS) of FL-3000N can simultaneously control two launchers, and can be integrated into other FCS on board ships. Alternatively, FL-3000N is also capable being directly controlled by other FCS on board ships. The system is usually fully automatic without human intervention, but manual operation can be inserted when needed. The primary launching system of FL-3000N is a 24-cell launcher, developed from FLS-1. An optional extra magazine with automated loading system is available for larger warships when there is enough space provided. On smaller surface combatants where space is limited, the extra magazine with the automated loading system is eliminated and the reload is done manually. To further utilize confined space, an 8-cell launcher and a quadruple launcher are also available. Additionally, a single-cell launcher is available for mounting on existing naval gun mounts.

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: AK-176

Type: Naval Gun

Caliber: 76.2mm

Quantity: 1 × AK-176 76mm. gun stations

Length: 4484 mm

Weight: 16,800 kg

Crew: 2 (4 in manual control mode)

Barrels: 1

Elevation: -15° to +85°

Traverse: ±175°

Rate of Fire: 120 rds/min

Muzzle Velocity: 980 m/s

Maximum Firing Range: 15 km

Effective Firing Range: 10 km

Feed System: 152 ready to fire rounds

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm76.2

Shell: INA

Shell Weight: 12.4 kg

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 730

Type: Close-In Weapon System (CIWS)

Caliber: 30mm

Quantity: 2 x Type 730 CIWS

Main Armament: 1×30 mm H/PJ-12 or H/PJ-11 Gatling gun

Length: INA

Weight: INA

Barrels: 7-barrel

Crew: Automated, with human oversight

Rate of Fire: 1,200-4,200 rounds/minute

Maximum Firing Range: 3 km

Effective Firing Range: 1–1.5 km

Feed System: Type 730: One ammunition boxes, holding 640 rounds

Guidance System: TR47C J-band radar OFC-3 electro-optical fire control system

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 30mm

Shell: INA

Shell Weight: INA

Basic Load: INA

Torpedo Weapon System

Torpedo Tubes: 2 × triple 324mm. torpedo tubes

Torpedo Name: INA

Torpedo Basic Load: INA

Onboard Aviation Facilities

Facilities: Helipad for 1 medium-lift helicopter

Helicopters: 1 x Z-9C Helicopter

Fire Control

FCS Name: INA

Computerized FCS: INA

Radar Systems

↳*Radar: Type 347G Naval Gun Fire Control and Tracking Radar System (NGFS)*

Name:: Type 347G Radar

Type: Monopulse Naval Gun Fire Control and Tracking Radar System (NGFS)

Alternate Designation: TR47C

Proliferation: Chinese

Frequency: X Band

Beam: INA

Pulse Width: INA

Polarization: Vertical

Beam Width: 1.8°±0.2°

PRF: INA

Scan Rate: 360° (Az); -25°~85° (El)

Resolution: INA

Range: 30 km against RCS aircraft ; 15 km against: ASM

Antenna: Circular parabolic antenna, Temp Range: -25C-+70C

Notes: Radar uses a coherent pulse doppler design. Non coherent Moving Target indicator/Detection (MTI, MTD), CFAR (Constant False Alarm Rate) Antinodding, anti clutter capability (A well advertised feature of the RTN family)

Sonar Systems

Bow Sonar: INA

Towed Array Sonar: Type 056A Sonar

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

Notes:

Jiangdao Type-056 Frigate/Corvette (FFL) Reputed as the new-generation “maritime cavalry”, the 056 frigate is rapidly augmenting the PLA Navy’s littoral warfare capabilities, especially in the South China Sea and East China Sea. This new class of small combatant augment the 60 HOUBEI-class wave-piercing catamaran missile patrol boats (PTG) (Type 022). The frigate was deployed primarily for patrol and escort missions as well as anti-submarine operations and sea combat tasks, independent or in coordination with other forces. Its primary duty is to patrol sea areas. The South China Sea has relatively high requirements for single patrol boats because it is far from the coast and is often choppy. Patrolling is a daily labor-intensive task, and requires a large number of soldiers. Therefore, patrol boats should be deployed in a large scale and cost less than warships. Unlike fighting, patrolling does not need too many weapons. Overall, ships designed for patrolling should have good seakeeping ability and be relatively cheap. The Type-056 frigate aimed at changing the situation of China's active-service base-defense system featuring aging military strength, single function and low combat power. The new-generation base-defense military strength commissioned in large quantities was another important platform for optimizing the equipment structure of the PLA Navy, improving the base-defense combat power as well as enhancing the PLA Navy's capability of safeguarding China's national security and territorial integrity, and defending China's maritime sovereignty and maritime rights and interests. The construction of the 056 frigate has come to an end in late 2019 and the upgrading of the domestic offshore combat system has been completed. Type 056 frigate is a type 1 light frigate developed by the Chinese Navy in the new century. According to overseas sources, it has a length of 89 meters, a width of 12 meters, a full-load displacement of 1,300 tons, diesel power, dual-axis propulsion, a maximum speed of 28 knots, and a cruising range of 3,500 nautical miles. The type 056 frigate weapon and the onboard electronic system are relatively simple. The weapon includes two double-mounted YJ-83 anti-ship missile launchers, one 8-unit red flag 10 ship-to-air missile launcher, and the main gun is a 76 mm gun. , 2 30mm single-tube remote-control naval guns, and anti-submarine weapons are two 2-unit antisubmarine torpedo launchers. Shipborne electronic systems include air / sea search radars, optoelectronic fire control systems, electronic warfare systems, and shipborne combat systems. The bow has a helicopter take-off and landing deck, which can take off and land straight -9 anti-submarine helicopters, but there is no hangar, which limits its helicopter operation capabilities. The Type 056 frigate weapon is relatively simple and mainly performs offshore patrol tasks. The PLA Navy had to build large warships if it is to go to the high sea, but large warship will be a waste of resources if it’s only used for “yard-protecing”. The PLA Navy needed vessels that are suitable for carrying out fishing protection, patrol and guarding tasks at the “house gate”, so that it can free the large combat ships from the trivial everyday maritime services and consequently ensure the combat capacity of main high-sea-going taskforces. With complete functions, the 056 guided missile frigate is capable of air defense, anti-submarine warfare, assault, and garrisoning. Such high cost effectiveness better caters to the rapidly increasing equipment manufacturing of the PLA Navy. The PLA Navy’s inshore combat tasks mainly consist of daily patrol, guarding, fishing protection, and other low-intensity and low-risk tasks. It provides the basic maritime force support for the civilian and law enforcement forces of oceanic administration and fishing affair bureau in coping with the provocations by military vessels of enemy states. Light surface vessels have to be used in the early stage of islands disputes. The flexible body and comprehensive combat capability of the 056 guided missile frigate decide that it is of best use on islands and the surrounding waters, where it can deal with all kinds of maritime crisis flexibly and make the mobilization and deployment of large vessels more effective. Designed not solely for islands disputes but for more extensive purposes such as maritime target assaulting, air defense and anti-submarine, the 056 guide missile frigate is a light maritime striking weapon platform with the highest performance-price ratio and the widest applications. It can be manufactured by a number of coastal and inland shipyards on a large scale and in large quantities and supplied to the PLA Navy incessantly. Light guide missile frigate can serve as steady support for PLA Navy’s high-sea-going maneuver combat and help free the inshore fast attack forces from everyday coast defense tasks, so as to establish a new-type inshore defensive combat system. China has an 18,000km-long coastline to guard. The new-type frigate is able to engage in low-intensity conflicts and carry out patrol, escort and fishing protection tasks in key waters. It makes the military force structure more reasonable, shows greater flexibility in carrying out combat tasks, and will soon become the main combat equipment for base defense. Moreover, the large-scale commissioning of the new-type frigate was expected to exert considerable effects on the PLAN’s combat thinking, methods of operation, training, management and application, talent cultivation and battlefield construction. The long coastline needs to be patrolled, the disputes over several islands need to be solved, and the maritime transportation routes need to be protected. Guided missile frigate is the most economic choice if those issues need to be solved by force. According to a ranking by the British website Naval Technology, the Type-056 is one of the world's 10 best modern corvettes along with Sweden's Visby class and Germany's K130 Braunschweig class. Cao Weidong, a researcher at the PLA Naval Military Studies Research Institute, said despite the Type-056 class being smaller compared with frigates, it will be as powerful as frigates in battles in coastal waters thanks to its stealth design and strong firepower. Because the ship's weapons and electronic systems are relatively simple, many international sources classify it as "corvettes" (light frigates) rather than "frigates". In fact, the Chinese Navy's original intention to develop the Type 056 frigate was also to replace the Type 037 hunting submarine, performing offshore patrol, escort, search and rescue tasks. For quite a long time, the Type 037 submarine hunting submarine has been the main battleship of the Chinese Navy's offshore defense, and has built more than 100 ships. However, the type 037 submarine hunting ship has a small tonnage and poor long-range combat capabilities, making it difficult to perform combat missions in far-off sea areas. After the 1990s, the Chinese Navy built several 053H frigates to perform such tasks, but the 053H frigate tactical and technical indicators had fallen behind. It is difficult to meet the needs of the battlefield in the new century. In this case, the 056 frigate appeared. The first 056 frigate was started in 2011, launched in 2012, and delivered to the Navy in 2013. From a practical point of view, compared with the 037 frigate, the 056 frigate had a larger tonnage, more internal space, and can carry more supplies and materials, which is conducive to long-duty maritime operations. The crew's long-distance sea mission execution environment has been improved and efficiency has been improved. The ship was loved by the troops and

became an ideal replacement for the 037 hunting submarine. Since then, the Type 056 frigate has entered a period of high-speed construction. It is reported that within about 9 years from 2011 to 2019, about 70 Type 056 frigates were built. On average, about 8 ships per year, and this speed can be said to be very amazing. Along with rapid construction, the Type 056 frigate also developed a series of improved and modified ships. For example, in use, the army found that the 30mm single-barrel remote-control naval gun was not very useful and the price was relatively expensive. Large-caliber machine guns can be used for patrol tasks. Therefore, the latest batch of 14.5-mm naval machine guns was used instead. Considering that there are many advanced AIP submarines in the first island chain, the anti-submarine type was developed for this type 056. It is the first domestic surface ship equipped with active / passive towed line sonars, improving the ship's ability to resist modern quiet submarines. In order to cooperate with the advanced underwater acoustic system, the 056 anti-submarine type has been replaced with a new type of anti-submarine missile. The new missile uses a turbojet engine with a longer range and stronger attack capabilities. Sonar, better detection performance. The 056 anti-submarine service effectively improved the Chinese Navy's offshore anti-submarine combat capabilities. Exports The Type 056 1,440-ton class corvette is available for the export market with Bangladesh having ordered at least two ships and the Nigerian Navy ordering the P18N offshore patrol vessel with a full load displacement of 1,800 tons. In October 2012, the first ship P18N in Wuhan shipyard started. In 2013, Bangladesh and China signed a purchase for a group of vessels contract, believed to consist of two frigates, two patrol boats and six large patrol boats. Type C13B [B for Bangladesh] is one of two light frigates ordered by the Bangladesh Navy in 2013. The ship was improved on the basis of Type 056. It replaced the weapon and radar system different from the domestic version and cancelled the anti-submarine capability. The most advanced frigate in the media, once known as China's export, its shape has been fully integrated with the overall trend of international light frigates. Although there is no such new trend as the chasing wind, the high cost performance has won the praise of the Bangladesh Navy. Two more ships have been added. The Thai Navy's Pattani-class OPV bears a resemblance to the subsequent Chinese Type 056 corvette / light frigate, though the later is up-gunned relative to the the Thai OPV, with four YJ-3/C803 ASM and a FL-3000N RAM launcher aft, while the former has a much taller superstructure. Built for the Royal Thai Navy by the China State Shipbuilding Corporation, each OPV cost about US$50 million. The vessels were commissioned in 2006-2007. In November 2014 China completed sea trials of a offshore patrol ship on order for the Nigerian Navy that will assist in suppressing the growing threat of piracy off West African shores. The vessel was the first of two acquired by the Nigerian Navy to bolster its maritime surveillance, patrolling, search-and-rescue and to counter piracy. The patrol ship was launched by state-owned shipbuilder China Shipbuilding & Offshore International Co (CSOC) in January 2014, and was taken for sea trials by affiliated shipyard Wuchang Shipbuilding Industry. The second patrol ship was built by CSOC in China but would be outfitted at the naval shipyard in Port Harcourt, Nigeria, in a technology transfer arrangement. According to specifications provided by CSOC, the ship has a full load displacement of 1,800 tonnes and can go 21 knots. The vessel can accommodate 75 crew, has 20 days endurance, and a standard range of 3,000 nautical miles. A computer-generated image issued by the Nigerian Navy suggested that the ship will have a helicopter hangar and landing deck. The weapons fit comprises a single 76mm NG-16-1 gun with a TR47 fire-control radar, as well as pairs of 30mm and 20mm guns. Nigerian Chief of Naval Staff Vice Admiral Dele Ezeobam told reporters in January 2014 that the F 91 would be handed over mid-2014. The Nigerian Navy is standing up to a host of challenges it faces in the Gulf of Guinea. Prior to 2009 before it commissioned the Sea Eagle-class patrol boats, the navy struggled to counter the often heavily armed pirates of West Africa. The two patrol ships is the latest in a string of measures to wrest back control of its seas from criminal groups.

Type 037 Class (Hainan Class) Chinese Corvette





Tiers:

1 2 3 4

Variants:

- **Note:** 95 HAINAN-class PATROL CRAFT (PC) Pendant No. 275/285, 290, 302, 305, 609/610, 618/622, 626/629, 636/637, 689/692, 695/699, 701, 707, 723/733 and 740/742

System

Alternative Designation: Type 037 Class; NATO: Hainan Class

Type: Corvette

Builder: China; Shipyard: INA

Crew: 78

Dimensions

Length: 58.7 m

Beam: 7.4 m

Draft: 2.2 m

Displacement, Standard: 395 tons standard

Displacement, Full Load: 430 tons full load

Propulsion System

Engine Name: 4 x Chinese built Kolumna type 9D-8

Engine Type: Diesel

Engine Power: 8,800 total bhp

Maximum Range: 1,800 nm at 14 kts.; 750 nm at 18 kts.

Maximum Speed: 28 knots

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 66

Type: Naval 57mm Gun

Caliber: 57mm

Quantity: 2 x Type 66 Naval 57mm Gun

Length: 3,990 mm

Weight: 14,000 kg

Barrels: Single barrel (progressive RH parabolic twist, 24 grooves)

Action: Electronic firing

Elevation: −10°/+78°

Traverse: Full 360°

Rate of Fire: 200 rounds/min

Maximum Firing Range: 17,000 m

Effective Firing Range: 8,500 m

Feed System: 40 ready rounds, 128 rounds in ready racks in mount

Sights: Gyro-stabilized in local control.

↳*Gun Weapon Systems #1 Ammunition*

Type: Projectile

Caliber: mm57

Cartridge: 57 × 438 mm

Basic Load: 128

↳*Gun Weapon Systems #2*

Name: Type 61M

Type: Anti-Aircraft Gun

Caliber: 25mm

Quantity: 2 x Type 61M Anti-Aircraft Gun

Length: 1.5 m

Weight: INA

Crew: 1

Barrels: Single or Dual

Elevation: -10° ~ +85°

Traverse: 360°

Rate of Fire: Compact: 800~900 round/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 3,000 m

Effective Firing Range: 2,700 m

Feed System: Magazine

Sights: Optical

↳***Gun Weapon Systems #2 Ammunition***

Type: Rifle

Caliber: 25mm

Cartridge: 25 x 218 mm SR

Basic Load: INA

Rocket Weapon Systems

Launcher: 2 x Russian 5-round RBU-1200 ASW rocket launchers

↳***Rocket #1***

Name: RGB-12 projectile

Type: Anti-Ship Rocket

Length: 1.24 m

Diameter: 251.7 mm

Weight: 73 kg

Warhead: 30 kg

Maximum Range: 400 m to 1200 m

Depth: up to 350 m

Rate of Descent: 6.25 m/s

Basic Load: 50 rockets carried]

Mines

Note: 12 max. mines (two mine rails fitted)

Fire Control Systems

FCS Name: INA

Computerized FCS: INA

Battle Management System: No

Radar Systems

Name: 1 x Pot Head Radar

Type: Surface Search Radar

Frequency: INA

Range: INA

Sonar Systems

Name: 1 x Tamir-11 HF

Type: Hull-Mounted Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: INA

Depth Charge Racks: 2 depth charge racks

Depth Chargers: 2 BMB-2 depth charge mortars

Notes:

The Type 037 corvette is a series 400–500 ton corvette type classes in service with the People's Liberation Army Navy. Unlike western navies, the People's Liberation Army Navy does not have dedicated patrol boats in its inventory. Instead, a large variety of corvette type classes, in the form of missile boats and submarine chasers fulfill the tasks of patrolling China's territorial waters. The Egyptian Navy operates eight vessels. The Type 037 submarine chaser (NATO reporting name: Hainan class), is a class of submarine chaser of the People's Liberation Army Navy. It was designed by China to replace the Soviet S.O.-1 class submarine chaser. In addition to anti-submarine warfare missions, these simple yet effective units are also capable of a wide variety of missions such as mine laying and patrol. These boats were first equipped with Soviet Tamir-11 (MG-11, NATO reporting name: Stag Hoof) hull-mounted sonars which had a typical range of 3 km (1.9 mi), but in the 1970s, they were superseded by domestic Chinese SJD-3 sonar, which is modification of original MG-11: instead of being fixed to the hull, SJD-3 has a telescoping arm, so when not in use, the sonar is stored in the hull, and when deployed, the sonar is lowered into water several meter below the hull, thus increased detection range by avoiding baffles generated by the hull. During the Sino-South Vietnamese naval clashes on 19 January 1974, two boats of this class, # 281 & # 282 (two out of the eight total in Chinese inventory) participated in the latter half of the battle, the fastest Chinese units in the conflict. Originally the units were waiting at Yongxing Island, but due to the problem of communications, they were not notified until the battle was already in progress. Over 100 were built, but as newer submarine chasers enter service, this class is steadily being decommissioned. A number of these ships have subsequently been exported to Bangladesh, Egypt, North Korea, Pakistan and Myanmar. On October 13, 2013, A North Korean Type 037 was lost off Wonsan with the loss of at least nineteen of her crew. She may have been in collision with another Korean People's Navy ship. It is understood that four Type 037 submarine chasers were modified and became known as the Type 037 Mod (NATO: Haijiu class).

→Intelligence Collection Ships

Vishnya Class (Project 864) Russian Intelligence Collection Ship





Tiers:



Variants:

- **Fedor Golovin (ex-Meridian):** Commissioned: 1985 Fleet: Baltic Fleet Status: Active
- **Kareliya:** Commissioned: 1986 Fleet: Pacific Fleet Status: Active
- **Tavriya:** Commissioned: 1987 Fleet: Northern Fleet Status: Active
- **Priazovye:** Commissioned: 1987 Fleet: Black Sea Fleet Status: Active
- **Kurily:** Commissioned: 1987 Fleet: Pacific Fleet Status: Active
- **Vasiliy Tatishchev (ex-Pelengator):** Commissioned: 1988 Fleet: Baltic Fleet Status: Active
- **Viktor Leonov (ex-Odograf):** Commissioned: 1988 Fleet: Northern Fleet Status: Active

System

Alternative Designation: Vishnya Class; Meridian Class; Project 864 Class
Total Built: 7 built
Type: Intelligence Collection Ship
Builder: Stocznia Północna, Gdańsk, Poland
In Service: 1985-Present
Crew: 151 (30 Off. + 121 Enl.)

Dimensions

Length, Overall: 94.4 m
Length, Waterline: 88.0 m
Beam: 14.6 m
Draft: 4.5 m

Displacement, Light: 2,690 tons

Displacement, Standard: 3,100 tons

Displacement, Full Load: 3,470 tons

Propulsion System

Engine Name: 2 x Cegielski-Sulzer type 12AV 25/30 diesels

Engine Type: Diesel

Engine Power: 4,400 total bhp

Propellers: 2 controllable-pitch propellers

Auxiliary Engines: 2 x 140 shp electric auxiliary low-speed drive

Maximum Range: 7,900 nm at 12.5 knots

Maximum Speed: 16 knots (30 kmh)

Endurance: 45 Days

Communications

Note: All Radio Communcation data is Classified.

Missile Weapon System

↳ ***System***

Name: 9K38 Igla (SA-16 Gimlet) Missile

Type: Surface-to-Air Missile

Quantity: 2 x quad SA-N-8 Gremlin** SAM launchers

Missile Basic Load: 16

Length: 1.67 m

Diameter: 72 mm

Weight: 10.80 kg

Warhead Weight: 1.27 kg

Engine: Two-stage, solid-propellant rocket

Maximum Range: 5,000 m

Minimum Range: 500 m

Speed: 1,870 fps (570 mps, Mach 1.7) at sea level

Maximum Altitude: (3,500 m

Minimum Altitude: 10m

Seeker: Infrared w/40-deg field of view; single channel, 3.5-5 micron

Fuze: contact and graze

Gun Weapon Systems

↳*System*

Name: AK-230

Type: Close-In Weapons System (CIWS)

Caliber: 30mm

Quantity: 2 x 30-mm/54-cal AK-230 Gatling CIWS

Length: 2.140 m

Weight: 156 kg

Elevation: -12 to +87 degrees at 50 degree/s

Traverse: +180 to -180 degrees at 35 degree/s

Rate of Firing: over 1,000 rounds per minute cyclic

Muzzle Velocity: 1,050 m/s

Note: The weapon consists of two stabilized NN-30 30 mm water-cooled four chamber revolver cannons, which are mounted inside a riveted steel turret. The gun mechanism is gas operated. The guns each weigh 155 kg and have barrels 1930 mm long, and a total length of 2670 mm. The barrels are rifled with 12 grooves. The guns each have a rate of fire of 1,000 round per minute;they are fed by independent 500-round belts of ammunition. The rounds are electrically fired; propellent gases are used to eject the spent shells and belt links into a space between the magazine and the hull. Ballistic maximum range for the weapon is about 6.7 km, but realistic ranges for engaging air targets are quoted as between 2.5 and 4 km. The weapon is remote-directed, typically by a fire-control system linked to either a Drum Tilt or Muff Cobb radar systems.

↳*Ammunition*

Type: Rifle

Caliber: mm30

Basic Load: INA

Note: The AK-230 fires specially developed 30x210B 30 mm ammunition that is electrically primed. Two rounds were developed: a high-explosive round with an impact fuze, and an armour-piercing round. The Chinese Type 69 fires only a locally produced version of the high-explosive round. Ammunition is also produced in Romania and Serbia.

Fire Control

Note: Sea Gun Weapon System

Radar Systems

Navigation Radar: 2 x Volga (Don-Kay) Navigation

Sonar Systems

Hull Sonar: 1 x Pamyat hull-mounted array

Dipping Sonar: 1 x high-frequency dipping sonar

Protection

Active Protection System: INA

Electronic Warfare: various intercept arrays

Decoys: INA

NBC Protection: Yes

Notes:

The Viktor Leonov returned to international waters off the east coast of the United States after a short stop in Cuba to refuel and resupply. The 15 March 2017 report explained the ship was spotted 23 miles southeast of a US Navy submarine base in Kings Bay in the US state of Georgia. The base is home to US Navy's Atlantic fleet of ballistic missile submarines, according to the report. As first reported by Fox News, the Russian ship SSV-175 Viktor Leonov was spotted 15 February 2017 in international waters 30 miles south of Groton, Connecticut — home to a US naval submarine base. According to the TV channel, the ship was found 70 miles off the coast of Delaware in international waters. "This is the first patrol since Donald Trump entered the office" - said the TV channel. Lt. Col. Valerie Henderson, a Defense Department spokeswoman, stated "It has not entered U.S. territorial waters. We respect freedom of navigation exercised by all nations beyond the territorial sea of a coastal State consistent with international law." US Senator Richard Blumenthal, D. Conn., a member of the Senate Armed Services Committee, told the Albany TImes Union "the presence of this spy ship has to be regarded very seriously because Russia is an increasingly aggressive adversary. It reflects a clear need to harden our defenses against electronic surveillance and cyber espionage." "The return of a Russian vessel is particularly concerning in the context of escalating Russian aggression - within days of the Russians buzzing a U.S. Navy ship in the Black Sea, as well as deploying a cruise missile in violation of our arms control treaty - which only underscores the need for an independent investigation into possible collusion between the Trump administration and Russian agents." Vishnya class SSV [Sudno Svyazyy = Communications Vessel] electronic surveillance ships are Project 864 Meridian reconnaissance ship, with a displacement of 3,470 tonnes and 94.4 meters long. Its cruising endurance is 7,000 nautical miles. Its crew consists of 146-220 people. The first two vessels belong to the Northern Fleet, the third - to the Black Sea, the fourth and fifth - to the Pacific, sixth and seventh - to the Baltic. The Russian Navy operates seven Meridian-class vessels to be replaced by the Project 18280 intelligence ship by 2020. The Vishnya class are a group of intelligence collection ships built for the Soviet Navy in the 1980s. The ships continue in service with the Russian Navy. These ships are large, purpose built ships designed for SIGINT and COMINT electronic intelligence via an extensive array of sensors. The data could be transmitted to shore via satellite link antennaes. The Project 864 are equipped with two satellite communications antennae inside radomes. The ships are armed with two AK-630 close-in weapon systems and SA-N-8 SAM launchers. The propulsion system consists of two diesel engines developing 4,400-bhp and a top speed of 16 knots. In the early 80s there were technologies that enable using special sonar to detect submarines at ultra-large distances. This led to the creation of new exploration ships, which were the name of the ship underwater situation (GRO). "Vasily Tatishchev" - one of them. Total armed Navy of the Russian Federation is the seven ships of the project 864 - "Tavria", "Victor Leonov," "Sea of Azov", "Kuril Islands", "Karelia", "Vasily Tatishchev," "Admiral Fyodor Golovin." All of them were built in Polish shipyards in Gdansk in the period from 1985 to 1990. During operation some ships of this class have visited on several fleets of the Russian Federation to undergo repairs and upgrades. The main highlight of the ships of the "Meridian" is a decoding apparatus that can intercept and listen to military communications between ships and aircraft. In addition, the board SRZK "Vasily Tatishchev" set of radio stations and radio intelligence, sonar systems, and apparatus for removing the telemetry data and trajectory of the observations. The Ministry of Defence at the end of 2014 came to revive from the reserve the medium intelligence ship "Karelia". Project documentation on modernization work was to be prepared by the summer of 2015. Currently, CER-535 "Karelia" was at the "Dalzavod" yard. According to the protocol, "51 TSKTIS" after the installation of new equipment, such as radar equipment, it will be calculated the ship's stability. Medium reconnaissance ship of the 2nd rank "Karelia" was built in Gdansk (Poland) under the project 864 "Meridian". Launched in 1987, it went into operation in 1988, and had served in the Pacific Fleet. A Russian intelligence-gathering ship accompanied by a tugboat roamed the waters off the East Coast and the Gulf of Mexico in April 2014. The Russian vessels Viktor Leonov and Nikolay Chiker have been operating beyond American territorial seas near the coast of Cuba. 'We respect the freedom of all nations, as reflected in international law, to operate military vessels beyond the territorial seas of other nations,' Pentagon spokesman Lt. Col. Tom Crosson stated. The Viktor Leonov CCB-175 was first sighted in Cuba back in February 2014, when it docked in Havana. At the time, neither Cuba nor Russia acknowledged or explained the presence of the spy ship in Havana. Pentagon officials believed the ships were part of an operation since March collecting against the US nuclear missile submarine base at Kings Bay, GA and other US military facilities. The Baltic fleet's reconnaissance ship Vasily Tatishchev left Baltiysk for the eastern part of the Mediterranean, a military source told Interfax-AVN on 05 October 2015. "The Vasily Tatishchev has left for the coast of Syria, where it will join and reinforce the Russian naval group in the eastern part of the Mediterranean. The ship will be fulfilling its mission. Its crew will monitor the situation on the airwaves both in Syria and all neighboring countries, and also over their territorial waters," the source said. The source said this approach is considered routine for Baltic fleet reconnaissance ships. "They once successfully monitored the war in Yugoslavia," the source said. The Baltic fleet press service declined to comment on the issue. In February 2016 the Ministry of Defence announced that the Russian military strengthened all kinds of intelligence in the Middle East to better defeat the terrorists. One of the elements of national technical intelligence of the Armed Forces are special reconnaissance ships of the Russian Navy. One such ship STS-201 "Sea of Azov" started getting ready for combat duty in the Mediterranean Sea. At the end of January 2016 made a reconnaissance control access to the sea. The Medium Intelligence Ship "Sea of Azov" was built in Poland, Gdansk at CVD im.Bohaterev Vesterplyati" (factory #864 / 4). The ship was laid down 08.04.1986 city, launched on 30.09.1986, entered into operation 12.06.1987 was entered into the Black Sea Fleet. Board

number - "STS-201". In 2001, the ship was named the best Russian Navy ships in the class. In 2005 the ship was "excellent" fulfill the task of three long voyage to the Mediterranean Sea, as well as was again declared the best vehicle in its class in the Navy, with the award of the prize rolling Navy. In 2006-2007. the ship's radio equipment was modernized. It is part of the 519th separate division of scout ships of the Black Sea Fleet, based at South Bay (Sevastopol).

Yantar Class Russian Intelligence Collection Ship





Tiers:



Variants:

- **Almaz:** Under Construction as of February 2020.

System

Alternative Designation: Yantar Class; Project 22010 Class
Total Built: 1 built, 1 under construction
Type: Intelligence Collection Ship
Builder: Yantar Shipyard
In Service: 2015-Present
Crew: 60

Dimensions

Length: 107.8 m
Beam: 17.2 m
Draft: INA
Displacement, Full Load: 5,736 tons

Propulsion System

Engine Name: INA
Engine Type: 2 × Electric Motors
Engine Power: 3400 hp each

Main Generators: 4 × 1600 kW diesel generators

Auxiliary Generators: 2 × 1080 kW diesel generators

Propellers: 2 azipods with fixed pitch propellers

Bow Thrusters: 2

Maximum Range: 8,000 nmi (15,000 km; 9,200 mi)

Maximum Speed: 15 kn (28 km/h; 17 mph)

Endurance: 60 days

Communications

Note: There is no unclassified information available about the Communication Systems onboard the Yantar Class Vessels.

Main Weapon System

Note: There is no unclassified information available about the Weapon Systems onboard the Yantar Class Vessels.

Onboard Aviation Facilities

Facilities: 1 x Helipad

Helicopters: 1 x Heliopter (Name: INA)

Boats and Landing Craft Carried

Autonomous Underwater Vehicles (AUV): 2 x deep-diving autonomous underwater vehicles

AUV #1: 1 Rus-class (Project 16810)

AUV#2: 1 Konsul-class (Project 16811)

Fire Control

Note: INA

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: INA

Notes:

Yantar (Янтарь) is a special purpose intelligence collection ship built for the Russian Navy. The ship has been operated by the Russian Navy's Main Directorate of Underwater Research (GUGI) since 2015 and is reportedly a spy ship. The vessel's home port is Severomorsk, where it is attached to the Northern Fleet. A sister Project 22010-class ship "Almaz" is also under construction. Yantar was designed by the CMDB Almaz Design Bureau in St. Petersburg, and the hull was laid down on 8 July 2010. It was launched in December 2012, and concluded its sea trials in May 2015. The ship has a length of 108 metres (354 ft) and a full displacement of 5,736 tons. It uses diesel-electric propulsion for a top speed of approximately 15 knots (28 km/h; 17 mph). It officially has a complement of 60. The ship was built at the Yantar Shipyard in Kaliningrad. Yantar can act as a mothership to mini-subs. The United States Navy has stated that the submersibles are able to sever cables miles beneath the ocean's surface. The submersibles are reportedly capable of operating at depths of up to 6,000 metres (20,000 ft). The submersibles are reportedly the project 16810 Rus-class submersible and the project 16811 Konsul-class submersible. According to Alexei Burilichev, head of the Russian Defense Ministry's deepwater research department, Yantar is an oceanic

research complex. Yantar has been reported in position near undersea telecommunications cables. In 2015, Yantar was spotted off the coast of Guantánamo Bay, Cuba. Summer 2016, Yantar was anchored outside the Nuuk, Greenland. In 2017, Yantar was active in the eastern Mediterranean, near an undersea cable linking Israel to Cyprus. It was also reportedly used to recover "secret equipment" from crashed Su-33 and MiG-29 aircraft. On 23 November 2017, upon an order of Russian President Vladimir Putin, Yantar and the specialists of the Russian Navy's 328th expedition search and rescue unit were sent to Argentina's coast to search for the Argentine submarine ARA San Juan that went missing on 15 November 2017. In Summer 2018, she was deployed to Mediterranean off the Syrian coast. In November 2019, Yantar visited Trinidad and Tobago.

Oste Class (Type 423 Class) German Intelligence Collection Ship







Tiers:

1 2 **3** 4

Variants:

- **Oste (A52):** Commissioned: 1988 Status: Active
- **Oker (A53):** Commissioned: 1988 Status: Active
- **Alster (A50):** Commissioned: 1989 Status: Active

System

Alternative Designation: Oste Class; Type 423 Class

Total Built: 3 ships in total built

Type: Intelligence Collection Ship

Builder: Flensburger Schiffbau-Gesellschaft, Flensburg

In Service: 1988-Present

Crew: 42 + 38 technicians

Note: All ships are currently based in Eckernförde and belong to the 1st Ubootgeschwader (1st Submarine Squadron) stationed in Eckernförde.

Dimensions

Length: 83.5 m

Beam: 14.6 m

Draft: 4.2 m

Displacement, Standard: 2,375 tons

Displacement, Full Load: 3,251 tons

Propulsion System

Main Engine Name: 2 x Deutz-MWM BV 16M 628 diesels;

Main Engine Power: 8,800 total bhp

Auxiliary Engine Name: 2 x 380-shp electric motors for low speed, quiet operations

Generators: 2 x MWM-KHD 604 V12 diesel generator sets

Maximum Range: 5,000 nm at 18 kts

Maximum Speed: 20 knots

Endurance: INA

Propellers: 2 fixed-pitch 6-bladed propellers

Communications

Note: Classified Information.

Missile Weapon System

Launcher: 2 x Stinger AAM launchers

↳*System*

Name: FIM-92 Stinger

Type: lightweight, short-range, heat-seeking, surface-to-air missile (SAM)

Quantity: 2 x Stinger AAM launchers

Missile Basic Load: INA

Length: 1.52 m

Diameter: 70 mm

Weight: 10.0 kg

Warhead Weight: 3.0 kg

Warhead Type: Penetrating high-explosive; impact fuze

Engine: 1 x Atlantic Research Mk 27 dual-thrust solid-fuel rocket

Speed: 2,445 ft/sec (745 m/sec; Mach 2.2)

Maximum range: 4.8 km

Maximum Altitude: 3,800 m

Guidance System: all-aspect passive infrared homing

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Mauser BK-27

Type: Revolver Cannon

Caliber: 27mm

Manufacturer: Mauser (now Rheinmetall)

In Service: 1977-Present

Proliferation: +3,100 built

Length: 2.31 m

Barrel Length: 27×145 mm

Weight: 100 kg

Barrels: Single barrel

Action: Revolver

Rate of Fire: 1,000–1,700 rpm

Muzzle Velocity: 1,100 m/s

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm27

Shell: 27×145 mm

Basic Load: 4,000 Rounds

↳*Gun Weapon System #2*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Quantity: 2 x 12.7mm M2 Browning Heavy Machine Guns

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: (890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition Gun Weapon System #2*

Type: Rifle

Caliber: 12.7mm

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 2,000 Rounds each

Fire Control

Note: Sea Weapon Systems.

Radar Systems

Surface Search Radar: 1 x Surface Search (Name: INA)

Ranging and Tracking Radar: 1 x Ranging and Tracking (Name: INA)

Navigation Radar: 1 x Navigation Radar (Name: INA)

Sonar Systems

Passive Array Sonar: 1 x STN Atlas Elektronik AISYS passive array

Protection

Active Protection System: INA

Electronic Warfare: 1 x 300 MHz-40 Ghz intercept suite

Decoys: INA

Countermeasures: 1 x EADS COLDS laser countermeasures system

NBC Protection: Yes

Notes:

The Oste class intelligence collection ships are officially designated as fleet service ships. This class is also referred as the Type 423. Three ships of the class were built and are currently in service with the German Navy. These are Oste, Oker and Alster. The lead ship was commissioned in 1988. They replaced the precious Type 422 class. Vessels received the same name and pennant numbers as the three Type 422 class ships they replaced. Currently all Oste class ships are assigned to the 1st submarine squadron. The Oste class are purpose-built reconnaissance and intelligence collection ships. Primary function of these vessels is strategic intelligence gathering. These were originally intended to gather data on the Soviet warships. Vessels are fitted with a wide array of electromagnetic, hydroacoustic and electro-optic sensors. Ships of this class can be also used as advanced warning units. These electronic surveillance ships carry no armament. Crew of the ship includes 36 sailors and up to 40 intelligence technicians. Accommodation for the crew was designed to civil standard, so the Oste class ships offer more comfort for the crew than other German warships. Ships are powered by two Humboldt-Deutz diesel engines, developing 4 400 hp each and delivering power to two shafts. Vessels have a range of 5 000 nautical miles (more than 9 000 km).

Yuri Ivanov Class (Project 18280 Class) Russian SIGINT Intelligence Collection Ship







Tiers:



Variants:

- **Yuriy Ivanov:** Commissioned: 2015 Fleet: Northern Fleet
- **Ivan Khurs:** Commissioned: 2018 Fleet: Black Sea Fleet
- **Note:** Two Additional Vessels are scheduled to be built.

System

Alternative Designation: Yury Ivanov Class; Project 18280 Class

Total Built: 2 built, 2 more are scheduled to be built as of 2020.

Type: SIGINT Intelligence Collection Ship.

Builder: Severnaya Verf, Sankt Petersburg

In Service: 2015-Present

Crew: 120

Note: The YURI IVANOV is reportedly equipped with equipment specifically designed to track U.S. missile defense systems. It is also said to be able to serve as a communications hub; electronic warfare platform; and conduct electronic and signals intelligence missions.

Dimensions

Length: 95.0 m

Beam: 16.0 m

Draft: 6.0 m

Displacement, Standard: 2,500 tons

Displacement, Full Load: 4,000 tons

Propulsion System

Engine Name: 2 x 5DRA Diesels
Engine Type: Diesel
Engine Power: 5,440 hp total
Shafts: 2
Endurance: INA
Maximum Range: 8,000 mi (13,000 km)
Maximum Speed: 16 kn

Gun Weapon System

↳*System*

Name: AK-630
Type: Close-In Weapon System
Caliber: 30mm
Quantity: 1 x 6-barrel 30-mm/65-cal AK-630M Gatling CIWS
Main Armament: 1 or 2 AO-18 autocannons
Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade)
Missile Basic Load: 4 x 9A4172 missiles
Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)
Width: 1,240 mm
Height: 1,070 mm (42 in) (above deck) 2,050 mm (81 in) (below deck)
Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)
Crew: 1
Barrels: 6
Action: Gas-operated rotary cannon
Elevation: +88° ... -12° (50°/sec)
Traverse: ±180° (70°/sec)
Rate of Fire: 4,000–5,000 rounds/min
Muzzle Velocity: 880–900 m/s
Maximum Firing Range: the projectiles self-destruct past 5,000 m (16,000 ft) range
Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime
Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin
Sights: Radar / TV-optical

↳*Ammunition*

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg

Basic Load: 4,000 rounds

Onboard Aviation Facilities

Faciltieis: INA

Helicopters: INA

Fire Control

Note: See Gun Weapon System

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: INA

Notes:

The first Project-18280 large reconnaissance ship Yury Ivanov has been signed over to the Russian Navy, spokesman for the St. Petersburg-based Severnaya Verf shipyard told TASS on 14 January 2015. “The vessel has already been signed over to the Navy - the acceptance act was signed at the end of last year,” the shipyard source said. The communication ship (medium reconnaissance ship, 2nd rank) of Project 18280 is the largest Russian vessel of this class. As of 2015, the Yury Ivanov was the Russian Navy's largest intelligence collection ship. Project 18280 vessels feature high versatility, automation and integration of onboard systems. A ship of the series has a displacement of about 4,000 tons, 312 feet (95 meters) long and 53 feet (16 meters) wide; with draft of 4 meters. Project 18280 has a range of 8,000 nautical miles on 16 knots cruise speed and a crew of 120. “The vessel is designed to provide communication and control of fleet forces, conduct electronic warfare, radio and electronic intelligence, tagging of surveillance components of the US missile defense system and naval SAM components,” Anatoly Shlemov, the head of the Defense Procurement and Acquisition department of the United Shipbuilding Corporation (USC), told RIA Novosti on 02 July 2015. The ships are designed to provide communications and fleet management, the SIGINT and electronic warfare. Reconnaissance ships get a large set of different equipment dedicated to the implementation of electronic intelligence. Reconnaissance complex ships are able to keep track of a large number of radio signals over a wide frequency range, and determine the location and type of their sources. Project 18280 vessels have vast pre-designed potential for further modernization of the onboard electronic equipment. In late 2015 Russia completed the transfer of its biggest intelligence-gathering ship from the Baltic to the Northern Fleet, where it will use its powerful instruments to collect secret information (including for breaking into the U.S. anti-missile system), the Northern Fleet’s press service head, Captain First Rank Vadim Serga, told journalists on 17 November 2015. The Yury Ivanov (Project 18280) had successfully passed all seaworthiness tests and was now permanently stationed beyond the Arctic Circle, at the naval base in Severomorsk. The ocean-going ship’s technical capabilities allow it to expand the scope of the Northern Fleet, not only in different areas of the world’s oceans, but also in the Arctic, according to the Ministry of Defense. This is evidenced by the permanent registration of the ship on the Kola Peninsula (in the Murmansk Region in Russia’s northwest). The intelligence collection ship is tasked with observing ballistic and cruise missile launches conducted by foreign states (including submarine launches). The Yury Ivanov is able to detect even hypersonic missiles and transmit this information to the military high command. The ship can also act as a relay for closed communication channels, and as a radio interceptor of sensitive enemy information. However, its most important function is to penetrate the U.S. missile defense system (its sea-based component, the Aegis Combat System), and provide the possibility for Russian missiles to reach the enemy target and destroy it. Given US. plans to station a missile defense system near Russia’s borders, it was planned to construct at least four ships of this type – according to the number of Russian fleets. The spy ships will join the Pacific, Baltic and Black Sea fleets. A second Project 18280 ship – the Ivan Khurs – had been already laid down at the Severniye Verfi shipyard in St. Petersburg. One vessel is being built for each of Russia’s four fleets. The lead ship of Project 1820 - Yury Ivanov (hull #787) - was laid down in late 2004 and launched in autumn 2013. The ship was commissioned with the Northern Fleet. The second vessel of the series - the Ivan Khurs ship - was laid down in November 2013 and was expected to be floated out in 2015. By July 2015 the construction of the intel-gathering ship Ivan

Khurs (Project 18280, hull #788) was nearing an end at the Northern Shipyard (Severnaya Verf) in St Petersburg. The ship's seagoing tests were expected take place in autumn 2016. The second intelligence ship Project 18280 "Ivan Khurs" was launched at the "Severnaya Verf" in St. Petersburg 16 May 2017. General Director of "Severnaya Verf" Igor Ponomarev gave the command to be launched vessel. When a ship in the submersible dock, hit the water, his board broke a bottle of champagne. Factory sea trials, "Ivan Hursa" were scheduled for September. Mooring trials will begin in late May. Until the end of this year, it should be handed over to the Navy. The second ship of the project 18280 "Ivan Khurs" was laid in autumn 2013. It was named in honor of Vice Admiral Ivan Hursa who has made an outstanding contribution to the creation and development of a permanent exploration of the Navy. State tests on the newest reconnaissance ship-vessel "Ivan Hurs" project 18280 completed 20 June 2018. The corresponding act was endorsed by Captain 1st Rank Vyacheslav Makhorin, who is the chairman of the State Acceptance Commission. As the press service of the St. Petersburg developer enterprise "Northern shipyard" reports, the ship is equipped with the most advanced electronic intelligence systems. The ship of this project will be the second in a row. The first - "Yuri Ivanov" - had been in service with the Russian Navy since 2014. It was noted that the reconnaissance ships of this project are designed to provide communication and fleet management. The reconnaissance ship was laid in November 2013, and launched in May of the past. Displacement of "Ivan Khursa" - 4 thousand tons, the range of navigation - 8 thousand nautical miles, the crew - 131 people. The reconnaissance ships of this series, in addition to the Northern Fleet, are planned to be included in the Pacific, Baltic and Black Sea fleets.

Dupuy De Lome Class French Intelligence Collection Ship







Tiers:



System

Alternative Designation: Dupuy de Lôme (A759)
Total Built: 1 Ship Built
Type: Intelligence Collection Ship
Builder: France
In Service: 2006-Present
Crew: 30 total (8 off. + 22 enl.) + 80 technicians

Dimensions

Length: 101.75 m
Beam: 15.85 m
Draft: 4.91 m
Height to Main Deck: 7.70 m
Displacement, Full Load: 3,600 tons
Displacement, Standard: 3,150 tons

Propulsion System

Engine Name: 2 x MaK 9M25 diesels
Engine Type: Diesel
Engine Power: 7,965 total bhp

Maximum Range: 3,400 nm at 16 knots

Maximum Speed: 16 knots

Endurance: 30 days

Communications

Radio: 1 x MINREM (HF/VHF/UHF analysis of communications)

Main Weapon System

Quantity: 2 x 12.7-mm machine guns

↳*System*

Name: M2 Browning

Type: Heavy Machine Gun

Caliber: 12.7mm

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed (M2 or M9 links)

↳*Ammunition*

Type: Rifle

Caliber: mm12.7

Cartridge: .50 BMG (12.7×99mm NATO)

Basic Load: 2,000 each

Radar Systems

Navigation Radar: 2 x DRBN38A navigation radars

Radar Warning Receiver: 1 x ARBR-21 radar warning receiver (D-K bands)

Protection

Active Protection System: INA

Decoys: INA

Interceptor #1: 1 x interceptor-goniometer satellite transmissions

Interceptor #2: 1 x Elite interceptor-goniometer transmissions

Interceptor #3: 1 x Egide Naval interceptor-goniometer transmissions

NBC Protection: Yes

Notes:

Dupuy de Lôme (A759), named after the 19th century engineer Henri Dupuy de Lôme, is a ship designed for the collection of signals and communications beyond enemy lines, which entered the service of the French Navy in April 2006. In contrast to Bougainville, the ship that she replaced, Dupuy de Lôme was specifically designed for sea intelligence, pursuant to the MINREM project (Moyen Interarmées Naval de Recherche ElectroMagnétique, "Joint Naval Resources for Electromagnetic Research"). Dupuy de Lôme was designed and built by Royal Niestern Sander shipyards in Delfzijl, The Netherlands with yard number 816. The Thales Naval France designed the electromagnetic intellegence part of the vessel. She provides a 350-day-operational availability a year, out of which 240 can be spent at sea. The ship is operated by two naval crews, each composed of thirty-three sailors and another thirty-three technicians, and an optional complement of up to thirty-eight specialists, depending on the mission. The specialised personnel operates under the Direction du renseignement militaire. On 21 June 2015, Dupuy de Lôme entered the Black Sea along with USS Laboon as part of NATO's presence missions following the Annexation of Crimea by the Russian Federation.

→Support Ships

Type 901 Class Chinese Fast Combat Support Ship







Tiers:



Variants:

- **Hulun Lake:** Commissioned: 2017 Fleet: INA
- **Chagan Lake:** Commissioned: 2018 Fleet: INA

System

Alternative Designation: Type 901 Class
Total Built: 2 built
Type: Fast Combat Support Ship
Builder: Guangzhou Shipyard
In Service: 2017-Present
Crew: INA

Dimensions

Length: 240 m
Beam: 31 m
Draft: 10.8m
Displacement, Full Load: 45,000 tons

Propulsion System

Engine Name: 4 × QC280 Gas Turbines

Engine Type: Gas Turbines

Engine Power: 150,000 hp

Maximum Range: INA

Maximum Speed: 25 kn (46 km/h; 29 mph)[

Endurance: INA

Gun Weapon System

↳*System*

Name: AK-630

Type: Close-In Weapon System

Caliber: 30mm

Quantity: 4 x 30mm AK-630

Main Armament: 1 or 2 AO-18 autocannons

Secondary Armament: 4 x 9A4172 missiles (Vikhr-K upgrade)

Barrel Length: 1,629 mm (64 in) (total) 1,460 mm (57 in) (rifled)

Width: 1,240 mm

Height: 1,070 mm

Weight: Gun mount: 1,000 kg (2,200 lb) (AK-630) 1,800 kg (4,000 lb) (AK-630M) 2,500 kg (5,500 lb) (AK-630M-2) External nodes: 800 kg (1,800 lb) (AK-630) 2000 rounds in belt: 1,918 kg (4,228 lb)

Crew: 1

Barrels: 6

Action: Gas-operated rotary cannon

Elevation: +88° ... -12° (50°/sec)

Traverse: ±180° (70°/sec)

Rate of Fire: 4,000–5,000 rounds/min

Muzzle Velocity: 880–900 m/s

Maximum Firing Range: the projectiles self-destruct past 5,000 m

Effective Firing Range: 4,000 m (13,000 ft) (aerial) 5,000 m (16,000 ft) (maritime)

Feed System: Belt: 2,000 rounds (additional 1,000 rounds in reserve feed bin

Sights: Radar / TV-optical

↳*Ammunition*

Type: Rifle

Caliber: mm30

Shell: HEI-Frag, Frag-T

Shell Weight: 0.39 kg (0.86 lb)

Basic Load: INA

Onboard Aviation Facilities

Facilities: Helicopter Pad

Helicopter: INA

Fire Control

Fire Control System: ZFJ-1A Fire Control System

Optical System: ZGJ-1B electro-optical system,

Radar System

Navigation Radar: Type 347 rada

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

Notes:

China has commissioned its newest and largest naval supply ship as the country tries to beef up its capacity to protect its maritime interests. The Type 901 replenishment vessel – which helps supply naval ships with oil, ammunition, food and water – was seen at a port in Zhanjiang, Guangdong province on 31 July 2017 bearing the number 965, indicating it has been commissioned into the PLA Navy. The new supply ship has almost double the displacement tonnage of the Type 903 supply ships currently being used for escort and anti-piracy missions off Somalia. China’s ambitious program to build more capable ocean-going fleet replenishment vessels is too often overlooked. In recent years, new units of the Type-903 (plus the improved 903A variant) replenishment vessels have entered service. An even more capable successor, touted the Type-901, which is said to displace some 40-45,000 tons (just slightly smaller than the new carrier itself), was at an advanced stage of construction. The class designator for the ship appeared to be Type 901. Details were initially limited, but the ship's estimated dimensions are a displacement of 40,000-45,000 tonnes and a beam of 31.5 m. Although photographs - shown on the cjdby.net website, for example - had only just emerged, the ship was at an advanced state of construction and a launch in early 2016 seemed probable. The photos showed the largely completed hull of the ship docked side-by-side with a similar-sized Type 903A, also known as the "Qiandaohu-class" replenishment ship, with a light displacement of 23,000 tonnes. The new ship appears to be a modified 903A with many different design features. China since 2008 began to develop large-scale comprehensive supply ship and rapid combat support ship. The new 40,000-ton comprehensive supply ship has been started in 2013 construction, and 50,000-ton fast combat support ship also started construction in 2014 to 2015. It is reported that China's new generation of large-scale comprehensive supply ship and fast combat support ship with a new power system, equipped with China's own development of a new generation of integrated supply system, will provide a comprehensive combat capability comparable with the US military. A new breakthrough of Chinese naval shipbuilding - the lead ship (name yet unknown putative number "956"??) was launched on 15 December 2015 and left the factory for sea trials on 19 December 2016. The PLA Navy large complex supply ship was built in Guangzhou shipyard of China Shipbuilding State Corporation (CSSC). The two-level ship can be used as a one-stop logistics center for aircraft carrier formation, capable of receiving, storing, delivering fuel, ammunition, dry goods and other supplies, with the ability to receive directly from the base and re-supply from the ship. It is said that the large-scale comprehensive supply ship will play the role of large-scale oil tanker and comprehensive supply vessel in our Navy. The rapid combat support ship is mainly for our aircraft carrier battle group service. In the next few years, with the new generation of large-scale comprehensive supply ship And fast combat support ships have been serving, China's offshore combat capability will see an unprecedented increase. The Chinese Navy has accepted the first in a class of fast, giant resupply ships that will refuel, resupply, and rearm its aircraft carriers and destroyers on the high seas. The Type 901 class was built at the Guangzhou Shipyard International (GSI) Longxue. Thirty-one-and-a-half meters wide and over 200 meters long, the first Type 901 class supply ship woulf have a full displacement of around 40,000-45,000 tons. That's a similar size to the US Navy's 49,000-ton Supply class replenishment ships, which can carry over 17,000 tons of jet and ship fuel, and 1950 tons of ammunition. The Type 901 is thought to have 4 gas turbine engines, which would give it a top speed of around 25 knots, enabling it to keep pace with Chinese aircraft carriers like the Liaoning. It will have up to five resupply gantries located midship, each of which can deploy palletized ammunition and supplies via cables, or fuel lines. This will allow the Type 901 to replenish multiple warships simultaneously while under sail, a key capability for modern navies. It will also be able to operate helicopters and drones from

its helipad and hangar. While not a combat ship, it is expected, like US Navy ships, to carry some weapons for self-defense, most likely 30mm auto-cannons used in an air defense, anti-missile role. The Type 901 will offer a great leap in capacity over the current 25,000-ton Type 903A Qiandaohu, of which the PLAN has eight. The Type 901's larger supply carrying capacity means that it can refuel and rearm Chinese warships, including destroyers and carriers, in combat operations far from the Chinese mainland. Also, its larger size gives the Type 901 a greater range than its predecessor, thus reducing the need for foreign facilities to refuel and replenish, both for the Type 901 and the warships it supports. While China's interest in building long-range carriers, destroyers and submarines and leasing foreign bases (like Djibouti) are getting a lot of attention, Beijing is also clearly at work solving the logistics challenges needed to make the PLAN a true global power. The new Type 901 replenishment ship began sea trials on 18 December 2016, according to Chinese media. The 45,000-tonne vessel, which was built at Guangzhou Shipyard International's Longxue shipyard on the Pearl River, was expected to provide logistics support to the PLAN's carrier force. Imagery of the ship's construction emerged in late 2015, before it was launched on 15 December 2015. The vessel is equipped with three gantries and a fourth high-point structure port side aft, configured with five hose rigs for liquid refuelling on the port side and four on the starboard side. The central gantry provides a transfer station for solids on each side. From official photos released 24 Mrch 2017 it can be seen that the second 901-type supply ship, which was reported in January 2017, had been hoisting. This led to speculation that it will be launched within six months. The 901-type high-speed supply ship is specialized in the aircraft carrier formation of the new supply ship, currently only the two countries have built similar ships.

Qiongsha-Class Chinese Cargo Ship



Tiers:



Variants:

- **Note:** Qiongsha class in PLAN service are designated by a combination of two Chinese characters followed by three-digit number. With the exception of the ambulance transport, the second Chinese character for all others is Yun (□), meaning transport in Chinese, because these ships are classified as cargo ship to transport solid cargo and freshwater.. The first Chinese character denotes which fleet the ship is service with, with South (Nan, □) for South Sea Fleet, because all units are in service with South Sea Fleet. However, the pennant numbers may have changed due to the change of Chinese naval ships naming convention.
- **Pennant # Nan-Yun 830:** Commissioned: 1980s Status: Active
- **Pennant # Nan-Yun 831:** Commissioned: 1980s Status: Active
- **Pennant # Nan-Yun 832:** Commissioned: 1980s Status: Active
- **Pennant # Nan-Yun 834:** Commissioned: 1980s Status: Active
- **Pennant # Nan-Yun 835:** Commissioned: 1980s Status: Active
- **Pennant # Nan-Kang 833:** Commissioned: 1980s Status: Active

System

Alternative Designation: Qiongsha-Class

Total Built: Built: 6 total

Type: Cargo Ship/Ambulance Transport

Builder: Guangzhou Shipyard International

In Service: 1980s-Present

Crew: INA

Cargo Capacity (Cargo Ship Version): Cargo capacity of the military version is identical to that of civilian version: 200 tons of solid cargo, 150 tons of freshwater.

Medical Capacity (Ambulance Ship Version): Two ships, Nan-Yun 832 and Nan-Yun 833 were converted, and this medical version is capable of handling up to 130 patient simultaneously. The passenger carrying capability no longer existed as a result of the conversion, but these ships retained the cargo carrying capacity of 350 tons. The armament is reduced by a half, from the original eight heavy machine guns to four.

Troopship (Troopship Ship Version): Some of the Qiongsha class cargo ship are converted to troopships, though the exact number remain unknown. These troopships still maintained the original cargo carrying capacity of 350 tons, but lack the emergency medical treatment capability because the clinical care facility on board the cargo version is deleted to make more rooms for additional troops, with the number of passengers carried is increased to 400.

Dimensions

Length: m86

Beam: m13.4

Draft: m3.9

Displacement, Full Load: 2,150 tons

Propulsion System

Engine Name: 3 x East German 8NVD48A-2U

Engine Type: Diesel

Engine Power: 1320 hp each

Maximum Range: 2,500 nm @ 11 knots

Maximum Speed: 16 knots

Endurance: 12 days

Gun Weapon Systems

Note: Armament: eight 14.5 mm heavy machine guns (4 for ambulance transport version)

↳*Gun Weapon Systems #1: System*

Name: KPV

Type: Heavy Machine Gun

Caliber: 14.5

Quantity: Armament: eight 14.5 mm heavy machine guns (4 for ambulance transport version)

Length: 1,980 mm

Barrel Length: 1,346 mm

Width: 162mm

Height: 225mm

Weight: 49 kg

Action: Short recoil operation

Rate of Fire: 600 rpm

Muzzle Velocity: 1,005 m/s

Maximum Effective Range: 4000m

Effective Firing Range: 3000m

Feed System: 40-round belt

Sights: iron or optical

↳*Gun Weapon Systems #1: Ammunition*

Type: Rifle

Caliber: mm14.5

Cartridge: 14.5×114 mm

Basic Load: 2,000 rounds each weapon station

Onboard Aviation Facilities

Facilities: INA

Aircraft: INA

Helicopters: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

Qiongsha (□□)-class cargo ship is a class of Chinese ship developed by China for its People's Liberation Army Navy (PLAN). These ships are mainly used for supplying garrisons in South China Sea. There are three versions of this class, including cargo ship, ambulance transport, and troopship versions. The general designers of all versions of Qiongsha class were Mr. Pan Hui-Quan (□□□) and Mr. Huang Zhong-Fu (□□□). Cargo Ship Qiongsha class cargo ship in PLAN service is directly based on Qiongsha 1 cargo ship in civilian service, which performs the same supply missions. The difference between the military and civilian version besides the fact that the military version is armed with heavy machine guns is that in addition to cargo, the civilian version also carried 219 passengers in cabins divided into two classes. The military version does not have any classification of cabins, but instead, they also act as emergency medical ships. Its secondary assignment as emergency medical provider is resulted from experience of deployment of island garrisons: once a soldier became sick, he must be transported to mainland for treatment, but even when transported by the fastest speedboat, it would still take two days to reach Hainan. Qiongsha class cargo ship is equipped with medical facility for preliminary treatment en route to mainland and thus providing better treatment. The number of passengers that can be carried is decreased accordingly. Cargo capacity of the military version is identical to that of civilian version: 200 tons of solid cargo, 150 tons of freshwater. Of the six ships of this class, all of them were built as cargo ship version to begin with, and it was only later some of them were converted to different versions. Ambulance transport Experience of deployment of Qiongsha class cargo ship revealed that the medical service was not sufficient because in addition to island garrisons, there was also a great demand from local fishermen population. Rudimentary treatment does not meet the demand, and a more dedicated version to provide better medical treatment was needed. As a result, decision was made to convert two of the six cargo ships to medical ships. Two ships, Nan-Yun 832 and Nan-Yun 833 were converted, and this medical version is capable of handling up to 130 patient simultaneously. The passenger carrying capability no longer existed as a result of the conversion, but these ships retained the cargo carrying capacity of 350 tons. The armament is reduced by a half, from the original eight heavy machine guns to four.[2] However, deployment of these ships revealed the inherent problem resulted from the original design: the cargo ship design meant that the stability of the ship in harsh sea state in poor, and in severe bad weather, the ships would move violently and some medical operations such as surgeries could not be performed. Consequently, Nan-Yun 832 was converted back into cargo ship role and only one ship Nan-Kang (□□, meaning South Health in Chinese) is left in the service to play the role of medical provider. This is why the official Chinese classification of this version is ambulance transport, instead of hospital ship, because it cannot carry out some of the medical assignment due to limitations of weather. The experience gained from these ambulance transport, however, provided valuable lessons in the development of true hospital ship, Type 920 hospital ship. Troopship Some of the Qiongsha class cargo ship are converted to troopships, though the exact number remain unknown. These troopships still maintained the original cargo carrying capacity of 350 tons, but lack the emergency medical treatment capability because the clinical care facility on board the cargo version is deleted to make more rooms for additional troops, with the number of passengers carried is increased to 400.

Type 920 Class (Daishan Dao Class) Chinese Hospital Ship







Tiers:



System

Alternative Designation: Type 920 Class; Daishan Dao Class

Total Built: 1 built

Type: Hospital Ship

Builder: CSIC (Guangzhou Shipyard International Company Limited)

In Service: 2008-Present

Crew: China did not give out any statistics, but based on Western hospital ships, the Type 920 probably has a ship crew of about 200 and a medical crew of about 600.

Capacity: She has a capacity of 300 beds, 20 ICU beds, 8 operating theatres, and can perform 40 major surgeries a day, in addition to X-ray, ultrasound, CT, hypothermia, hemodialysis, traditional Chinese medicine, and dental facilities.

Dimensions

Length: 178 m

Beam: approximately 25 metres

Draft: INA

Displacement, Full Load: approximately 14,000 tons

Propulsion System

Engine Name: INA

Engine Type: Twin Diesel engines

Engine Power: INA

Maximum Range: INA

Maximum Speed: INA

Endurance: INA

Communications

Note: She is also equipped with a remote networking and communications system to allow teleconferencing with doctors and specialists on land.

Main Weapon System

Note: In accordance with the Geneva Conventions, Daishan Dao and her crew do not carry any offensive weapons, while the ship is painted white with red crosses to mark her as a hospital ship.

Onboard Aviation Facilities

Facilities: Helicopter Hanger

Helicopter: 1 x Z-8JH (27 passengers or 15 stretchers)

Protection

Active Protection System: No

Electronic Warfare: No

Decoys: No

NBC Protection: Yes

Notes:

PLA's first new large Hospital Ship was launched in Guangzhou on 29 August 2007. In August 2008 the Type 920 Hospital ship was reported to have successfully conducted a sea trial. The PLA Navy lists this ship as "Type 920" hospital ship. The ship name is “Yushan Island”, and the number is 866. Because of the ship's function, the media reports use the term "Square Boat" and "Peace Ark" - Daishandao. This vessel was launched in the ship yard of CSIC (Guangzhou Shipyard International Company Limited), which is a subsidiary of CSSC (China State Shipbuilding Corporation). The Type 920 Hospital Ship has a transom stem, a bulbous bow, an extended deckhouse with a forward bridge. A helicopter landing deck is on the stern of the vessel. Six Large Red-crosses have been painted on the ship body. The ship is approximately 170 meters long and 25 meters in beam and about 20,000-23,000 tons displacement [other estimates place the displacement at only 14,000 tons, while Xinhua reports 10,000 tons]. China did not give out any statistics, but based on Western hospital ships, the Type 920 probably has a ship crew of about 200 and a medical crew of about 600. A hospital ship would not seem necessary equipment in an amphibious invasion to Taiwan, since the island is so close to the mainland. However, for operations in the more distant waters of the South China Sea, it would be essential. The simultaneous appearance of the large Type 920 Hospital Ship and the Type 071 Yuzhao class amphibious transport seem to mark the beginnings of a major buildup in China's ability to project power into the South China Sea. The primary mission of a U.S. Navy hospital ship is to provide rapid, flexible, and mobile acute medical care to support a Marine air/ground task force (MAGTF) deployed ashore, Army and Air Force units deployed ashore, and naval amphibious task forces and battle forces afloat. The Medical Treatment Facility provides a mobile, flexible and rapidly responsive afloat medical capability for acute medical and surgical care in support of amphibious task forces, Marine Corps, Army and Air Force elements, and forward deployed Navy elements of the fleet and fleet activities located in areas where hostilities may be imminent. As a secondary mission, they are capable of providing full hospital services for use of other government agencies involved in the support of relief and humanitarian operations worldwide. During World War II, in the final phases of the Pacific campaign, tactical doctrine for employment of Navy hospital vessels changed, allowing them to function as mobile, definitive-care combat hospitals in direct support of amphibious operations, rather than as transports only. Specially designed ships of the Haven (AH 12) class were built to support this concept. Driven by the development of China’s overall economic strength, naval equipment construction, and even the Chinese army, the team's entire equipment construction achieved rapid development. At the same time, the development of the navy also greatly improved its concept. The Central Military Commission made a major decision on the strategic transformation of the navy, that is, the navy's defense from the offshore to the defense of the sea. In the process of such a big strategic change, the naval equipment construction, including the construction of the navy's medical service, has achieved great development. Reflected in this aspect of maritime medical care. In the construction of marine medical equipment, the "one ship, five boats, four machines" marine medical three-dimensional rescue equipment system

including the first standard hospital ship in China. In 2005, the design and launch of the Chinese Navy's 920 large medical vessel was launched. In 2006, the 920 hospital ship was started and was built by Guangzhou Shipyard International. In August 2007, the 920 hospital ship was launched. In October 2008, after a series of hull and shipboard medical equipment acceptance, 866 ships were delivered to the troops. The hospital ship is a 14,000-ton large-scale professional hospital ship designed and developed by China. The ship has a total length of 178 meters, a maximum width of 24 meters and a full displacement of more than 14,000 tons. The ship has 10 departments and medical information centers such as rescue room, X-ray room, CT room, examination room and blood preparation room. The medical facilities are advanced, the nursing system is complete, and the medical equipment configuration is equivalent to the level of domestic third-class hospitals The hospital boat is the most advanced type of equipment in the entire medical system architecture. With the hospital ship, the entire chain of the marine three-dimensional rescue is complete, and the capability level is a rapid development, which has reached a considerable level. As of 2013, only a few countries in the world, such as the United States, Japan, and the United Kingdom, have hospital boats with remote medical rescue capabilities, but most of these hospital ships have been converted from civilian ships. The birth of the first domestic 10,000-ton hospital ship marked a major breakthrough in China's maritime medical support capacity building.

Type 903 Class (Fuchi Class) Chinese Replenishment Ship







Tiers:

1 **2** 3 4

Variants:

- **Qiandaohu:** Commissioned: 2004 Fleet: East Sea Fleet
- **Weishanhu:** Commissioned: 2004 Fleet: South Sea Fleet
- **Taihu:** Commissioned: 2013 Fleet:North Sea Fleet
- **Chaohu:** Commissioned: 2013 Fleet: East Sea Fleet
- **Dongpinghu:** Commissioned: 2015 Fleet: North Sea Fleet
- **Gaoyouhu:** Commissioned: 2016 Fleet: East Sea Fleet
- **Luomahu:** Commissioned: 2016 Fleet: South Sea Fleet
- **Honghu:** Commissioned: 2016 Fleet: South Sea Fleet

System

Alternative Designation: Type 903; Type 903A
Date of Introduction: 2004
Total Built: Type 903: 2 Built; Type 903A: 6 built
Type: Replenishment Ship
Builder: Huangpu Shipyard Hudong-Zhonghua Shipyard
In Service: 2004-Present
Crew: 130
Cargo Capacity: 10,500 tons of fuel oil, 250 tons of fresh water, 680 tons of cargo and ammunition

Dimensions

Length: 178.5 m
Beam: 24.8 m
Draft: 8.7 m

Displacement, Type 903: 20,500 ton

Displacement, Type 903A: 23,400 ton

Propulsion System

Engine Name: INA

Engine Type: 2 x Diesels

Engine Power: 24,000 hp

Maximum Range: 10,000 nmi at 14 kn

Maximum Speed: 20 knots

Endurance: INA

Gun Weapon System

↳*System*

Name: Type 76

Type: Twin 37mm Naval Gun

Caliber: 37mm

Note: The Type 76 twin 37mm naval gun is a small caliber naval artillery piece created by China for anti-aircraft and anti-surface purposes. The Type 76 is a further development of the Type 65. The Chinese military wanted to further improve the Type 65 by incorporating a fully automatic operational mode, but political turmoil from the Cultural Revolution delayed development of the Type 65's successor until its eventual release in 1976. The Type 76 incorporated a fully automatic operational mode, though the semi-automatic operational mode was retained as a backup measure. The model's rate of fire could reach a maximum rate of 400 rounds per minute per barrel (cyclic). The gun saw military action in the 1988 Spratly Islands naval battle and received positive feedback from the Chinese navy.

↳*Ammunition*

Type: Rifle

Caliber: mm37

Basic Load: INA

Onboard Aviation Facilities

Facilities: Hangar and flight deck

Helicopter: 1 x Z-8 helicopter or 1x Z-9 helicopter

Fire Control

Note: INA

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

Notes:

In 1996 the Thai Navy ordered the "Similan" supply ship. The ship started in 1997 mainly for serving Thai Navy's light aircraft carrier and resupply convoy. "Similan" was built by China, with a full load displacement of 23,000 tons, the hull has two central depot systems, either oil-water supplies can also be dry supplies. For vertical replenishment, a helicopter deck and hangar was installed in the rear of the ship. The ship can carry 9,000 tons of oil and water, ammunition and other supplies. Once the start of construction in Fuqing-class supply ship had already passed a quarter of a century, the Chinese finally began construction at the Shanghai East shipyard in 2002 of a new naval supply ship, similar to the Thai Navy's "Similan". Fu Chi class and "Similan" was both hull shape, the main structure is very similar. In fact, according to "Jane's warships Yearbook)), the two main hull dimensions are basically the same. Of course, on board equipment is different. , Fu Chi class and "Similan" was the same size as the main hull, but the stern of different shapes, probably because of the helicopter deck equipment is not the same. The shape of the hull below the waterline and the hull structure may be largely follows the "Similan" sign design. Because in the midships also designed the porthole, there may be a considerable portion of installed residential facilities. From the exterior view, Fu Chi class supply ship, including the bridge, helicopter base and superstructure rear chimney larger, distinct from "Similan" was almost complete absence of other large porthole design differences. Fu Chi class and "Similan" was installed in the same location two groups maritime depot system, but with the latter two groups are oil and water, dry dual-use staging systems, Fu Chi class the oil depot system is front mounted, the rear is a dry goods depot system. In addition, Fu Chi-grade oil depot system and the "Nacang" use the same model. On 29 March 2003 the PLA launched a newly designed AOR, Qiandaohu No. 886, at which time a second was reported building. Initially it was suggested that the ships were probably from the Dalian Shipyard, but later sources report they were from Hudong-Zhonghua Shipyard in Shanghai. Her sister ship Weishanhu (887) was built by Huangpu Shipyard based in Guangzhou. The first-of-class was commissioned by the East Sea Fleet in April 2004. The second hull was launched in June 2003 and commissioned by the South Sea Fleet in late 2004. This class of ship was given the reporting name Fuchi class by NATO. The ships are 171 meters long and displacing 22,000 tons at full load, with an armament of two Type 76A 37mm twin guns. The new oiler are of the same design as the Similan class (Hudong-Type R22T, named after the Similan Islands National Park off Thailand's West Coast, the best diving in Thailand) built for the Royal Thai Navy in 1995, and is comparable to the smaller French DURANCE class AOR. Like the Similan oiler, the ship has a flight deck and a hangar for one helicopter. The No. 886 class is powered by two license-built French-designed SEMT-Pielstick 12,000 brake-horsepower [BHP] diesel engines. The pair of new No. 886 class AORs brought to five the total number of PLA Navy underway supply ships. The new class followed the Fuqing class, of which two units were built, and was needed to support the new Guangzhou-class (Type 052B/C) destroyers. Japan increased its Exclusive Economic Zone (EEZ) out to 200 miles around its islands in 1996, and it overlapped China's EEZ in this area. After that began a noticeable increase in Chinese warships, research vessels and oil exploration vessels operating in and around the EEZ. China escalated its visibility when it sent a Sovremenny-Class ship, the most modern PLAN warship, into the waters of the Chunxiao oil-field on January 22, 2005. There was further escalation in September 2005 when a task group of five ships cruised Japanese EEZ oil-field waters. The flagship was Sovremenny hull 137, accompanied by Jianghu frigates 515 and 517, the 23,000-ton replenishment support ship Fuchi hull 886 and the 6,000-ton space event/intelligence ship Dongdiao, which bore hull number 851. Dongdiao, was hull number 232 when it intruded in 2000, indicating that Dongdiao had moved from the East Sea Fleet to the North Sea Fleet. Then in 2008, these ships became heavily used, supporting 13 task forces sent to the anti-piracy patrol off Somalia. Usually, one Type 903 accompanied two warships (usually a frigate and a destroyer), supplying fuel, water, food, and other supplies as needed. The replenishment ship would go to local ports to restock its depleted stores of fuel, water, food, and other necessities. China needed more Type 903s to support the growing number of long distance training operations into the Western Pacific. One new Type 903 was launched in March 2012, and a second one two months later. Both underwent fitting out and sea trials. The first one launched in 2012 completed trials in nine months and the second one was apparently on the same fast track. Both Type 903s entered service in 2013. China launched another Type 903 replenishment ship in mid-2013, around the same time the third one completed its first sea trials. China built and put into the water three more Type 903 replenishment ships in less than two years. A supply ship was commissioned for the East China Sea fleet of the People's Liberation Army (PLA) Navy on 12 September 2013. The supply ship Chaohu is a Chinese-made ocean-going vessel capable of replenishing both dry and liquid cargo, said Zhang Weidong, the ship's captain. The ship, with hull number 890, successfully completed supply missions to two naval vessels during a trial voyage conducted recently, according to military sources. Chaohu has a displacement of more than 20,000 tons and is able to sail to all kinds of sea areas except polar and ice regions, according to Zhang. Early 903 combined a number of Russian-made supply equipment, including the key horizontal supply system; the system by the Chinese Navy General Equipment Department and Russia contact, technical and price negotiations, by the China Poly Company is responsible for the purchase. Russia in addition to providing horizontal supply device, but also put forward the appearance of the supply mast and the force diagram, as well as the supply tank of the outline. The second batch of 903 type built in the 1920s (see below) began to use the Chinese-made horizontal supply device, and the first batch of 903 will also switch to domestic horizontal supply device. Compared with Thailand's Similan, 903 type of front and rear ship structure volume are slightly expanded, these signs show 903 type of living space after the increase, so speculation 903 also have to accommodate the command staff and personnel transport function; In addition, the structure of the 903 and the tin milan below the helicopter deck is also different. And the same number of the South warehouse, 903 is also equipped with a number of medical facilities and maintenance factories, both medical and repair ship part of the function. And China's second-line service ships the same, 903-type superstructure is also full of square portholes (tin Milano no). It is noteworthy that the tinmilan previously built for

Thailand in order to tie in with the same period Thailand to Spain to buy light ship, and China from the beginning of 2000 began to plan to build aircraft carrier, so the 903 type of internal support configuration may Has been considered to the needs of the ship combat group. 903-type tail with a helicopter library and flight deck, can carry a Russian-made Ka-27 transport helicopters, or two straight -9 helicopters, effective vertical filling operations. In addition, the tin milan on both sides of the stern are equipped with a boat pendant, 903 type is increased to two side of each boat pylon. Armed, the 903 has a four-door 76F double-mounted 37mm 63-speed fast gun, respectively, located in front of both sides of the bridge and helicopters on both sides of the top. Compared with the Fuqing level 76, 903 type 76F improved, with a closed turret cover, with automatic and manual operation of the two models, the maximum firing rate of 180 rounds / min, a range of 8.5km, but the ship is not set up supporting Of the radiation control radar (may only be equipped with a simple optical electronic control system), so the lack of night combat capability. On March 22, 2012, Guangzhou Shipbuilding International built the third 903 type ship. The hangar was significantly larger than the original. At the beginning of 2012, pictures on the Internet showed that the Guangzhou Shipyard International Shipyard began construction of a new oil-oil supply ship, launched on March 22, 2012, its appearance is clearly 903 type of follow-up model, called 903A, the overall configuration was roughly the same, with many details and equipment improved, the appearance can be found in the helicopter door widened, can accommodate more helicopters; the original four 76A dual-mounted 37mm cannon also replaced by four in China in the early 2010 H / PJ-17 30mm cannon (see 056 frigate one), the ship was named Taihu Lake (889); and in the same period, Shanghai and Shanghai also built a homogeneous supply ship, and in May 7, 2012 The water was named Nest Lake (890). Taihu Lake on June 18, 2013 entered the North Sea Fleet service, Chaohu No. in September 12, 2013 into the East China Sea Fleet service. On 31 May 2014, the People's Liberation Army Navy's (PLAN) fifth Fuchi class Type 903A replenishment ship was launched at the Guangzhou International Shipyard in Guangzhou, China. With a 23,000 ton displacement capable of carrying 11,000 tons of supplies, the Type 903 class is China's most modern and largest indigenous replenishment oiler ship*, which resupplies warships at sea with fuel and other supplies. This 903A ship still needs to be fitted out with refueling and cross ship transfer conveyer belts. The Fuchi class's ability to transfer fuel and dry supplies to warships on the high seas in Underway Replenishment (UNREP) missions means that PLAN warships can remain on patrol instead of returning to port for fuel and food. With the continuous service of large and medium-sized combat ships, the Chinese navy had a large number of ocean going vessels to supply and security capabilities put forward higher requirements, a large number of construction of new integrated supply ship has become a reasonable choice. On 27 December 2015, hull number 960 "Dongping Lake" ship formally entered service, so far, the Chinese Navy active duty 903A supply ship has reached 3 ships. According to the internet pictures, a follow-up of at least 3 ships with the type of ship in service, plus two aircraft 903 basic type, in shortly before July 15, 2016 China designed manufacturing new offshore supply ship Honghu ship, ship Luoma Lake into the column naming ceremony held at a naval base in Zhanjiang, Guangdong. Since then, two offshore supply ship officially joined the Navy South Sea Fleet battle sequence, but also marked the people's navy ability to carry out tasks.

Type 908 Class (Fusu-Class) Chinese Replenishment Ship



Tiers:



Variants:

- **HTMS Similan:** In January, 1993, China received the notification from Thai government, informing the former's intention to purchase a replenishment ship for its light aircraft carrier fleet. China decided to join the bid, among other western shipbuilders including DCNS, Fincantieri, BAZAN, Hyundai and Dutch Schelde shipyards, and the Chinese design would be very similar to the converted former-Soviet ship, with work on both ships would be performed simultaneously. The original chief designer of the cancelled second generation domestic Chinese replenishment ship, academician Zhang Wende (□□□), who was named as the chief designer and the program manager of the conversion project for the Chinese navy, was also assigned an additional task, as the chief designer of second ship China would be building for export to the Thai navy. China managed to beat its western competitors and won the Thai contract. Work on the ship built for the Royal Thai Navy went well and the ship was completed on August 12, 1996. Zhang Wende, the chief designer personally stayed on board the ship for twelve days during the voyage to Thailand, gathering information at the very last moment, so that it would help in the future design of the next generation Chinese replenishment ship. Whenever possible, Zhang personally operated the ship, including radars, handling boats the ship carried, and other tasks. The ship was formally accepted to the Thai naval service on September 12, 1996, and was named HTMS Similan (pennant number 187). HTMS Similan is very similar to its sister ship in Chinese service, except it uses a Chinese hull. The most important difference, however, is in upgrading its replenishment capability. Despite being able to replenish solid supplies, the capability to resupply ammo is still rather limited for the Chinese ship. The Thai ship has further overcome this problem by increasing the ammunition resupply capability. Despite the difference between two ships, most of the technologies and components, especially those core technologies for both ships remain the same, and for this reason, China has placed HTMS Similan and the Chinese ship Qinghaihu (□□□) in the same class. This class would eventually evolve into Type 903 replenishment ship (Fuchi class).

System

Alternative Designation: Type 908 Class; Fusu Class

Type: Replenishment Ship

Builder: Kherson Shipyard, refitted at Dalian Shipyard

In Service: 1993-Present

Crew: 125

Cargo Capacity: There are a total of four transfer stations, with dry cargo transfer station followed by liquid cargo transfer station, which is exactly the opposite of arrangement of other replenishment ships in Chinese service, which is the major reason for China to indigenously develop the third generation replenishment ship. A total of 9,630 tons of fuel can be carried, and with other dry cargoes such as food and ammunition, the total provision Type 908 can supply is 23,000 tons.

Dimensions

Length: 188.9 m

Beam: 25.33 m

Draft: 10.41 m

Displacement, Full Load: 37,000 tons

Propulsion System

Engine Name: 1 x Burmeister & Wain Diesel

Engine Type: Diesel

Engine Power: 10,600 hp (7,904 kW)

Maximum Range: INA

Maximum Speed: 16 knots (30 km/h; 18 mph)

Endurance: INA

Onboard Aviation Facilities

Facilities: Hangar and flight deck

Aircraft: No

Helicopters: 1 x Z-8 helicopter

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

The Type 908 (NATO reporting name Fusu-class, also known as Nancang-class) replenishment ship is a class of multi-product replenishment oilers commissioned into the People's Liberation Army Navy and the Royal Thai Navy.[1] The first Type 908 replenishment ship, Qinghaihu, was originally laid down for the Soviet Navy as a Komandarn Fedko-class merchant tanker, but construction was halted due to insufficient funds. The ship was then purchased by China as an incomplete vessel in 1993 from post-Soviet Ukraine. The ship has a near sister ship (INS Jyoti) operating with the Indian Navy. After significant refit, the ship was consecutively renamed Qinghaihu (885), formerly ex Nancang (Nanyun 953) and ex-Vladimir Peregudov. Another similar ship was built and sold to Thailand and currently in service with the Royal Thai Navy as HTMS Similan (871). The Type 908 AOR is the second generation Chinese replenishment ship that is outfitted with a total of six cranes, four oil refuelling stations, and two stores stations. This allows the ship to replenish three warships simultaneously. The ship, through her helicopter facilities, is able to replenish warships operating nearby via vertical replenishment (VERTREP). The Type 908 was the second stage in Chinese replenishment ship development and construction. Although considered somewhat successful, the first Type 905 replenishment tanker (Fuqing class) could not completely satisfy the requirements of the People's Liberation Army Navy (PLAN). One of the primary drawbacks of this class was that they are mainly for replenishment of liquid supplies, i.e. fuel and water. These ships of the first stage of the development of Chinese replenishment ships could only replenish extremely limited dry supplies, and are virtually incapable of resupply of ammunition, because the Chinese industry at the time lacked the capability to provide sounding safety measures for resupplying and storing ammunition with fuels. This is one of the two primary constrains that despite the fact that on August 28, 1977, the Central Military Commission ordered the resumption of the development of fleet replenishment ship that is capable of one-stop replenishment, (i.e. being capable of resupply ammunition, fuels, water, and solid supplies together by a single ship, a concept first pioneered by United States Navy), the project was eventually put on hold. The other primary constrain was budget constraints as Chinese economy was near the verge of total collapse resulting from the Cultural Revolution. Eventually, as the economic reform in the People's Republic of China in 1979 rapidly improved the Chinese economy, the second stage of the development of the Chinese fleet replenishment ship was resumed in 1988, after around a decade of dormancy. PLAN had a lot of expectations for the new class of ship: in addition to being capable of one-stop replenishment, the new ship was also required to be capable of serving as a hospital ship. However, to meet such high expectation of PLAN, costs was driven up multiple times. As the design was completed, the price of the proposed new ship exceeded what PLAN could afford and the project was in danger of being cancelled again. On May 1, 1993, the uncompleted former Soviet naval ship was towed to Dalian shipyard from Ukrainian Kherson shipyard. In addition to the hull and subsystems, China also purchased the design, which was immediately modified to meet the Chinese needs. Chinese

Academy of Sciences academician Zhang Wende (□□□), the original chief designer of the second generation domestic Chinese replenishment ship was named as the chief designer and the program manager of this conversion project. The deputy general designer is Mr. Huang Wei (□□), another general engineer of the 701st Institute of China Shipbuilding Industry Corporation (CSIC). On May 8, 1996, it entered Chinese service in South Sea Fleet, where it has remained until today. The pennant number was originally Nanyun (□□)-953, but later changed to 885, with name Qinghaihu (□□□), and this upgraded ship became the second generation Chinese replenishment ship, replacing the originally planned indigenous one. The conversion project was deemed successful and worthy but Chinese, who had gained important insights on Soviet design principle, core technologies, important subsystems, layout, and other expertise that were difficult for Chinese to obtain, and these valuable knowledge would later help China in designing its next generation replenishment ships. The most important gain, however, was financial. The original funding that was insufficient to develop a proposed indigenous 2nd generation Chinese replenishment ship was not only enough to buy the uncompleted former Soviet ship, but also had enough left to cover the following conversion work. One of the primary areas of improvement of the original former-Soviet design was in damage control, which was woefully inadequate (Rumored due to its original civilian merchant tanker design). Some of the interior wiring was exposed, and the ship's battle damage control system was very limited, with a near absence of internal damage limitation, insufficient fire-suppression system and water-tight locks. Incorporate the experienced gained from the rework of Type 053 frigates exported to Royal Thai Navy, the damage control of the ship was upgraded to western (mostly German and American) standards. There are a total of four transfer stations, with dry cargo transfer station followed by liquid cargo transfer station, which is exactly the opposite of arrangement of other replenishment ships in Chinese service, which is the major reason for China to indigenously develop the third generation replenishment ship. A total of 9,630 tons of fuel can be carried, and with other dry cargoes such as food and ammunition, the total provision Type 908 can supply is 23,000 tons.[

Type 904 Class (Dayun Class) Chinese General Stores Issue Ship





Tiers:



Variants:

- **Dongting Lake:** Commissioned: 1992 Fleet: South Sea Fleet
- **Jingpo Lake:** Commissioned: 1992 Fleet: South Sea Fleet
- **Fuxian Lake:** Commissioned: 2007 Fleet: South Sea Fleet
- **Junshan Lake:** Commissioned: 2015 Fleet: South Sea Fleet
- **Luguhu:** Commissioned: 2015 Fleet: South Sea Fleet

System

Alternative Designation: Type 904 Class; Type 904A Class; Type 904B Class; Dayun Class
Total Built: Type 904: 2 Built; Type 904A: 1 Built; Type 904B: 2 Built, 1 under construction
Type: General Stores Issue Ship
Builder: Jiangnan Shipyard
In Service: 1992-Present
Crew: 240
Type 904: Built by Qiuxin (□□) Shipyard of Jiangnan Shipyard in Shanghai, Type 904 (and its successor Type 904A) are frequently but erroneously referred by many as underway replenishment ships. However, this is incorrect because these ships are designed as general stores issue ships, and they lack the gentries and transfer stations, and thus are not capable of performing any underway replenishment duties. Type 904 and Type 904A are equipped with four davits each housing a small boat, with two on each side, and these boats are the primary means of transfer supplies. Type 904 and Type 904A are intended to supply garrisons on offshore islands without any port facilities. Helicopter can be carried, but it platform only, without any hangars, and helicopter is the secondary mean of transferring supplies. Specification:
Type 904A: After two Type 904 were completed, production was transferred to an improved version designated as Type 904A that is more than 50% larger in terms of displacement (up to 15000 tons), but armament was reduced by half.[2] Type 904A has been temporarily loaned to China Fishery Law Enforcement Agency as its largest patrol ship.[3] Specification: Specification (for Type 904)
Type 904B: Only a single Type 904A was built before production is switched to Type 904B, two of which are currently under

construction. The biggest difference between Type 904B and its predecessor Type 904A is the addition of hangar onboard Type 904B, where TYpe 904A only had a landing platform. Other improvements include the replacement of older twin gun mounts by new H/PJ15 single 30 mm gun mounts and more advanced electronics such as radars.

Dimensions

Length: 156.2 m

Beam: 20.6 m

Draft: 6.8 m

Displacement, Full Load: 10,975 tons

Propulsion System

Engine Name: Name

Engine Type: 2 x Diesel Engines

Engine Power: 9000 hp

Maximum Range: INA

Maximum Speed: 22 knots

Endurance: 10,000 NM

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: Type 76

Type: Twin 37mm Naval Gun

Caliber: 37mm

Quantity: 4 x Type 76 Twin 37mm Naval Guns

Note: The Type 76 twin 37mm naval gun is a small caliber naval artillery piece created by China for anti-aircraft and anti-surface purposes. The Type 76 is a further development of the Type 65. The Chinese military wanted to further improve the Type 65 by incorporating a fully automatic operational mode, but political turmoil from the Cultural Revolution delayed development of the Type 65's successor until its eventual release in 1976. The Type 76 incorporated a fully automatic operational mode, though the semi-automatic operational mode was retained as a backup measure. The model's rate of fire could reach a maximum rate of 400 rounds per minute per barrel (cyclic). The gun saw military action in the 1988 Spratly Islands naval battle and received positive feedback from the Chinese navy.

↳*Ammunition Gun Weapon System #1*

Type: Rifle

Caliber: mm37mm

Basic Load: INA

↳*Gun Weapon System #2*

Name: Type 61

Type: Twin 25mm Anti-Aircraft Gun

Caliber: 25mm

Quantity: 4 x Type 61 Twin 25mm Anti-Aircraft Gun

Barrel Length: 1.5 m

Weight: INA

Crew: 1

Barrels: Single or Dual

Elevation: -10° ~ +85°

Traverse: 360°

Rate of Fire: Compact: 800~900 round/min

Muzzle Velocity: 900 m/s

Maximum Firing Range: 3,000 m

Effective Firing Range: 2,700 m

Feed System: Magazine

Sights: Optical

↳***Ammunition Gun Weapon System #2***

Type: Rifle

Caliber: 25mm

Shell: 25 x 218 mm SR

Shell Weight: INA

Basic Load: INA

Fire Control

Note: INA

Protection

Active Protection System: INA

Electronic Warfare: INA

Decoys: INA

NBC Protection: Yes

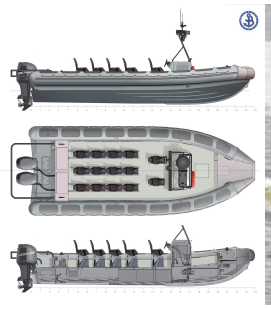
Notes:

As the 904 supply ship is emergency construction, there were many deficiencies in the design, especially in the high sea conditions, the supply capacity is very limited. Fuxianhu (888) is a fixed-point [ie, island] supply ship built by the Guangzhou Shipyard International (GSI) for the PLA Navy. The ship was launched on 25 December 2006 and commissioned by the South Sea Fleet in 2007. Fuxianhu was based on the hull design and propulsion system of the Qiandaohu (Fuchi) class fleet replenishment ship, but with a smaller displacement (~15,000 tonnes). The ship was designed to transport personnel and supplies from mainland to the remote islands in the South China Sea. Unlike the normal replenishment ship, Fuxianhu does not have the fuel and stores rigs for underway replenishment. Instead, the ship carries six four landing craft (LCVP) at amidships and two small utility boats at stern to ferry personnel and supplies between the mother ship and shore. The ship replaced the older Dayuan class supply ships built in the 1980s for the similar role. Fuxianhu has a large single-spot flight deck to support one medium-size helicopter such as Z-8 and Ka-28, but has no hanger. Its armament includes a Type 76F twin-37mm AAA gun, with a range of 8.5km for airborne targets. NATO codename is DANYAO class [Danyao = ammunition]. Support ship built at Guangzhou, and launched on 28 December 2006. The ship is equipped with two pairs of davits, capable of handling small

landing craft, and a flight deck for medium helicopters. Potential roles for the ship include resupply of the Spratly and Paracel Islands in the South China Sea. Following sea trials in 2007, the ship is reported to have been commissioned in late 2007 and to be based in the South Sea Fleet. Rather than fleet replenishment missions, this type combined with comprehensive supply ship in the Chinese Navy as an island replenishment ship, the same as a supply ship, but the primary duty is to transport goods to islands. Because this ship is built like a replenishment ship, the hull and superstructure arrangement is similar to the underway replenishment type. However, the center of the ship has boat davits, fro a total of four units are equipped with a transport craft to land supplies. As large ships cannot approach an atoll, transport craft are used for replenishment of the port facility. The ship had 76 F type 37 mm twin mount guns, and 14.5 mm twin machine guns mounted on the rear structure. Hangar with a Z-8A transport helicopter was set up, but the Fushun Lake is replaced the hangar with a helicopter flight deck. Fushun Lake is designed with emphasis on military capacities and goods transport capacity to advance base (Spratly Islands, such as personnel and supplies). Type 904B fixed-point supply ship On September 26, 2014, the Guangzhou Shipyard International Shipyard launched the first modified 904B fixed-point supply ship, its basic design and Fuxian Lake similar, but back to the helicopter hangar, to further strengthen the helicopter operating capacity; 904B in July 10, 2015 enlisted, named the mountain Hill (961). In January 2015, internet photos showed the Guangzhou Shipyard International plant there were more 904-type fixed-point supply ship in the construction. As the sovereignty issue intensified between China and Vietnam, the Philippines and other countries in the South China Sea, China also expanded the island of reefs, the island reef fixed supply demand increased, so 904B fixed-point supply ship will continue work. The biggest differences between the Type 904B supply ship Luguhu (Hull No. 962) and its predecessor Type 904A supply ship Fuxianhu are that, instead of the portal frame type platform, which is specific to the comprehensive supply ship, on the supply ship Luguhu, there are two davits mounted on each side in the middle section of the ship and a hangar which enhances the vertical replenishment capacity. The ship is designed to provide material supply for the troops stationed in the Nansha islands, and undertake such tasks as providing supply for a ship formation and maritime medical aid at a certain degree. The hull and bridge fuller, the chimney also changed from the previous two, the rear mast is between the two chimney. The installation of the helicopter hangar, apparently in order to stay away from the mainland where the vertical supply is needed. The power system may also be improved. The 904B-type transport supply ship relative to the A-type has improved performance. Sea supplies are mainly to supplement the warships in combat or sailing in the consumption of oil supplies and so on. Supply the main sub-cargo and dry goods two categories. Liquid cargo is mainly warships of diesel, aviation fuel, machine lubricants, fresh water and so on. Dry goods are mainly a variety of models of ammunition, food, machinery spare parts, spare weapons, additional soldiers, etc. Its displacement is still 15,000 tons, storage of fuel and fresh water more than 10,000 tons, food, ammunition and other materials more than 1,000 tons. The 904 B-type self-defense firepower has significantly enhanced. The ship and the ship's two 37-mm machine guns, facelift into 2011 just developed H / PJ15 single tube 30 mm hand-mounted naval gun. The gun uses the LLP12A new fire control system developed by Northern Industries 206, with radar and optoelectronic channels, equipped with automatic photoelectric guidance station, all aspects of performance are far above the 37 mm machine gun. The supply ship is also equipped with a number of 14.5 mm machine guns, used to deal with the threat of close range. The internal facilities are more complete. 904B-type superstructure is much larger, the internal space is also larger, staff living area and equipment are stronger than the older generation. It can not have a complete processing workshop, repair shop, and even a female dedicated cabin. The ship's self-defense capability is relatively weak, in fact, from the use of 904A point of view, 904B no need to focus on independent combat capability. These supply ships are basically in the first island chain within the supply activities, and these waters is basically the Chinese Air Force's combat power is easy to cover, as the comprehensive supply ship do their own work.

→Small Boats

BK-10 Class Russian Fast Attack Craft (Assault Boat)





Tiers:

1 2 3 4

System

Alternative Designation: NA
Crew: 2
Passenger Capacity: 12

Dimensions

Displacement: t4.5
Length: m10.5
Width: m3.8
Drought: m.65
Height Over Waterline: m1.37

Automotive

Number of Engines: 2
Engine Name: Mercury 300 Verado
Engine Type: Gasoline
Engine Power: hp300
Cruising Range: nm200
Speed, Maximum: knots40
Speed, Sustainable: knots28
Endurance: day1

Primary Weapon Options (As mission dictates)

Note:: There is a single mono-pod available at front and center of the BK-10.
Options: 7.62mm machine gun, 12.7mm machine gun, 40mm grenade launchers, AG-17 30mm grenade launcher

Protection

Hull Armor: AMg alloys

Superstructure Armor: NA

NBC Protection: No

Notes:

Russia`s Kalashnikov Group has developed new fast attack craft (FAC). They were demonstrated at the Army-2017 international military-technical forum held outside Moscow from August 22-27. The BK-10 assault boat is intended for carrying out patrol, sabotage and anti-sabotage operations in the coastal zone, transporting personnel of air assault groups, fire support and landing on an unequipped coast, combating piracy and terrorism, as well as medical evacuation and assistance to those in distress.

33' Riverine American 33 Foot Assault Boat





Tiers:



Variants:

- **33’ Special Operations Craft Riverine (SOCR):**

System

Alternative Designation: 33' Riverine
Type: American 33 Foot Assault Boat
Builder: INA
In Service: INA
Crew: 6
Transportability: Air Transportable Trailer

Dimensions

Length: 33 Feet
Beam: 9 Feet
Draft: 2 Feet
Displacement, Full Load: INA

Propulsion System

Engine Name: Twin Yanmar 6LY2A-STP
Engine Type: Diesel
Engine Power: hp440
Maximum Range: INA
Maximum Speed: INA
Fuel Capacity: INA

Protection

Active Protection System: Per Customer Specifications

Countermeasures: No

NBC Water Washdown System: No

Notes:

33’ Riverine Assault Boat (RAB)

Safe 25 Center Console American 25 Foot Patrol Boat



Tiers:



System

Alternative Designation: SAFE 25 Center Console

Date of Introduction: INA

Proliferation: INA

Type: 25 Foot Patrol Boat

Builder: Safe

In Service: INA

Crew: 2

Seated Positions: 6

Maximum Number of Passengers: 15

Dimensions

Length: 7.6 m

Beam: 2.6 m

Draft: 0.48 M

Height on Trailer: 3.3528 m

Displacement, Full Load: INA

Dry Weight: 2267.055 kg

Operational Load: 3172.425 kg

Cargo/Personnel Capacity-Net-Gross minus weight of heaviest engines, weight of fuel, and options: 1383.003 kg

Trailer Weight: 3575.669 kg

Propulsion System

Engine Name: INA

Engine Type: INA

Engine Power: hp500

Maximum Range: INA

Maximum Speed: Depends on Engine

Fuel Capacity: 567.812 liters

Protection

Active Protection System: No

Countermeasures: No

NBC Water Washdown System: No

Notes:

Hull & Deck 1/4” - 5086 bottom plate with SAFE Boats exclusive stringer system with angled transverse framing Pressure tested air tight hull Reinforced keel beaching plate Notched transom with speed shoe in bottom plate Performance wings below collars for increased lift and stabilization while maneuvering Fully welded performance lifting strakes Self bailing decks with high volume scupper drains Bow storage/anchor locker with aft facing door Dual aft rigging locker system with topside access Sacrificial hull anode(s) Super Structure Aluminum T-top with rain capture ring and down spouts to self-bailing deck Laminated safety glass windshield and side windows with blow-out resistant gasket Swing down radar pod Safety hand/grab rail system with black rubberized rail wrap Console & Dash Port side helm OHIP - Over Head Instrument Panel Seating, Seat Storage & Upholstery Two (2) flip up seats with seat belts mounted on bolster storage box Aft storage bolster with large aft facing gasketed aluminum doors Collar System Patented 100% foam SAFE XDR-1 Extreme Duty Reinforced Collar System with black rubstrake Available collar colors include: black, blue, gray, orange, green, red Coatings, Coverings & Lettering Black non-skid decks and gunnels Black rubberized dash skid Upholstered headliner Towing, Lifting & Attachment Points Six (6) 10" cast aluminum weld on cleats Bow and stern lifting eyes Weld on bow eye with dual SS inserts Weld on transom tie downs Fore and aft tow posts with single SS cross pin Motor guard/tow line guide Electrical System & Power Generation House battery system 12VDC - one (1) marine grade battery with switch Blue Sea 360 marine grade breaker system Backlit switch panel with marine grade switches Four (4) 12VDC power receptacles - two (2) on dash and two (2) on arch Self-parking intermittent windshield wiper system with washer Lighting LED navigation lights (running and anchor) Independently controlled interior/exterior dimmable LED walkway lights Red/white overhead dome light Four (4) flood lights - one (1) port, one (1) starboard and two (2) aft deck One (1) 12VDC rechargeable flashlight Electronics, Navigation & Communication Magnetic compass w/ dimmable back-lighting Navigation horn Safety, Rescue & Diving Equipment Two (2) fire extinguishers Life ring mount Fuel System 150 - gallon fuel tank with a formed bottom (1/4" - 5086)

Zodiac FC470 French Inflatable Boat (RIB)







Tiers:



System

Alternative Designation: Zodiac FC470

Type: Inflatable Boat (RIB)

Builder: Zodiac

In Service: INA-Present

Crew: 1

Passengers: 9

Maximum Number of Persons: 10

Maximum Payload Including Engine and Fuels: 1250 kg / 2756 lb

Fabric: * buoyancy tubes : black , 1880 dtx, polyamid, hypalon neoprene .* speed tubes : black , 940 dtx, polyamid, hypalon neoprene .* bottom : black , 940 dtx, polyamid, hypalon neoprene

Transom Black: *self-bailers, large flow w/scuppers : 2 * engine mounting plate : 1 * engine transom pad (marine plywood) : 1 *tension straps transom / floorboard : 2

Floorboard: * 4 sections rigid floorboards, anodized aluminum : 1 * longitudinal stringers, anodized aluminum : 2 *bow thrust board, marine plywood : 1

Valves: *buoyancy tube intercommunication / *inflation valves (delrin cap) : 4 *keel inflation valve (delrin) : 1 *CO2 inflating points : 2 * overpressure valves : 2 * connecting hoses from main tube to speed tubes : 2

Reinforcements: *all around rubbing strake, flat profile, black : 1 .* flat rubbing strake underneath keel, black : 1 .* flat rubbing strake underneath lower tubes, black : 1 + 1 .* anti splash triangles : 2 .* transom bottom stainless steel protection shoe : 1 . *large transom/tubes ovoid reinforcements : 1880 dtx (PY)

Handling: * lateral carrying handles (molded) : 10 * bow carrying handle (plated brass w/ black coating) : 1 *exterior lifeline (peripheric) : 1 *interior lifeline : 2 floorboard lifeline, laced on 4 D rings : 1 interior large tie down D rings (stainless steel w/ black coating) : 13

Towing and Lifting: *bow large towing D rings (stainless steel w/ black coating) : 2 *stern large towing D rings (stainless steel w/ black coating) : 2 *transom lifting points : 2 *bow thrust board-lifting points : 2

Dimensions

Overall Length: 4.70 m / 15’ 5”

Inside Length: 3.40 m / 11’ 2”

Overall Width: 1.90 m / 6’ 3”

Inside Width: 0.90 m / 2’11”

Floorboard USable Area: 2.95 m² / 31.74 sq ft

Buoyancy Tube Volume: 1860 l / 66cu ft

Weight, Empty: 146 kg / 322 lb

Folded Dimensions: bag 1 2’6”x4’11”

Propulsion System

Engine Name: INA

Engine Type: INA

Engine Power: hp65

Recommended Power: 40 hp

Maximum Range: INA

Maximum Speed: INA

Protection

Armor: None

Active Protection System: No

NBC Protection: No

Notes:

The Zodiac MILPRO FC 470 Professional is directed towards the military and professional user who doesn't need all of the features that the standard model has for mission or delivery method requirements. Cut from the same cloth and having the same overall specs as the original the pro has different paddles, pump and gauge, with a few less d-rings but saves you a substantial amount of money. If you don't need to laucnh this boat from aircraft or a submarine then the FC 470 Professional is for you.

F470 Zodiac Class American Combat Rubber Raiding Craft (CRRC)






Tiers:



System

Alternative Designation: F470 Zodiac

Type: Combat Rubber Raiding Craft (CRRC)

Family: Zodiac

Crew: ea1

Troop Compartment Capacity: ea10

Skin Type: Tear-Resistant Duratane Skin for heavy duty abuse

Time to Inflate: min2

Number of Chambers: ea8

Dimensions

Length: m4.75

Width: m1.89

Height: m0.61

Weight, Empty: kg146

Displacement (Surface): tons

Stowed Foorprint: 2 ft. 6 in. x 4 ft. 11 in.

Automotive

Engine Name: INA

Engine Type: 1 x OUtboard 2 or 4 stroke Engine with pump jet propulsion

Engine Power: hp55

Cruising Range: varies depending on fuel load and payload

Speed, Surface: kts18

Propeller: Shrouded Impeller

Maximum Payload, inlcuding fuel: kg1,250

Notes:

The F470 Zodiac can be used for over-the-horizon transportation, inserting lightly armed raiding parties or reconnaissance teams onto beaches, piers, offshore facilities and larger vessels. The CRRC can be inflated in minutes by foot pump, compressor or CO2 tank and can be deployed from shore and a variety of vessels. Additionally, it can be launched from several types of aircraft and submarines equipped with a special lockout chamber or a Dry Deck Shelter. Its chief advantages are light weight, compact size when stowed, stealth, versatility, and the safety imparted by its super-buoyant nature (which gives it the ability to operate in relatively high seas). A total of six individual airtight chambers comprise the Wing P4.7. The main hull or gunwale contains five intercommunicating chambers, which are separated by internal baffles and valves. This means that a single leak will not result in loss of pressure throughout the boat, and that air can be bled between chambers to compensate for loss in one. The final chamber is an inflatable keel tube which runs the length of the craft and gives the bottom of the hull a "V" shape, imparting directional stability and additional shock absorption. A composite decay proof "transom" board at the stern provides a mounting point for the outboard engine(s) . The deck (floor) is composed of four interlocking composite plates, which are fixed to the "thrust board" at the bow end and the transom at the stern. This rigid structure, spanning the entire internal area of the boat, prevents the hull from collapsing or "taco-ing" under power. U.S. Marines from the Battalion Landing Team 2/2 go ashore in a CRRC during a 2003 exercise. A ready-for-use craft includes an outboard engine (two in some configurations); removable composite deckplates or roll-up slatted decking; paddles; a bow line for securing the docked boat and a "righting" line which is used to flip the boat in the event of capsizing. At the bow of the boat are storage bags for equipment (foot pumps, extra lines, etc.) and a special fuel bladder, which can be of either 6- or 18-gallon capacity and which feeds the engine via a flexible hose. Deflated and rolled up, the boat and all necessary equipment can easily fit into the bed of a small pickup. Most military CRRC's use a 55 horsepower (41 kW) two-stroke engine with a pumpjet propulsor, which consists of a shrouded impeller.[4] This design reduces the risk of serious injury to personnel in the water when compared to the traditional open propeller. It also reduces the risk of the propulsion system being seriously damaged by submerged objects. A specially-trained coxswain sits at the stern (rear) of the boat and controls it via the tiller arm, attached to an outboard engine. The coxswain is considered the commander of the craft and is ultimately responsible for its operation, regardless of whether a senior-ranking individual is on board. Across from him sits the assistant coxswain, who relays hand signals from other boats and aids the coxswain as required. The remaining passengers (six raiders plus the two coxswains make up a full team) normally lay on and straddle the gunwale, keeping a low silhouette to help avoid detection and leaving room on the deck for weapons, equipment and (if necessary) additional fuel bladders.

C14 Class Russian Missile Boat





Tiers:



Variants:

- **Ships:** INA

System

Alternative Designation: China Cat
Description: Crew: 10, and passengers Displacement (tons): 20 full load Length Overall (m): 23 Height of hull (m): 3.6 Beam (m): 4 Draft (m): 1
Performance: Speed (knots): 50 Range (nautical miles): 300 Propulsion: 2 x props and 2 x diesel engines
Protection: Armor: See CB90HS variant Buoyancy: Sealed compartment in aft area NBC: Collective in forwardmid areas Auxiliary Power Unit: Yes
Fire Control: Electro-Optics: Photoelectric camera in mast substructure Sonar: INA Radar: 1 x POT HEAD light surface search
Weapons: Missile: C-701/YJ-7/TL-10A and B, Kosar in Iran Type: The C-701 is a multi-role cruise. Primary targets are light craft and patrol boats. It can also be used against land targets. The TL- 10 name series is more often referred to as specifically anti-ship. Launchers: 4 can be seen Weight (kg): 100 Dimensions (m): 2.5 length x .18 diameter Warhead: 29 kg semi-armor-piercing Speed: Mach 0.8 Range (km): .5-20 Guidance: TV guided initial version, as C-701T, TL-10A in Iran MMW-homing recent option, as C-701R, TL-10B in Iran Infrared (IR)-homing is an option not currently fielded P-hit (%): 90 Missile: C-704/JJ/FL-9/TL-6B in China, Nasr in Iran Type: Anti-ship cruise Launchers: 2 Weight (kg): 350-360 Dimensions (m): 3.5 length x .28 diameter Warhead: 30 kg SAP Speed: Mach 0.8-.9 Range (km): 4-35 Guidance: Radar-homing
Other Weapons: 1 x 12.7-mm MG (Type 89 likely). Guns are optional, and may be removed for stealth operations. A likely addition is a Chinese or Iranian MANPADS missile launcher.

Ammunition

C-701 Cruise missile: 4-8 combat load
TL-10 Anti-ship missile: 4-8 combat load
C-704 Anti-ship missile: 2-4 combat load
12.7mm linked MG ammunition if craft is equipped with HMG maritime variant.: INA
MANPADs (possible): INA

Notes:

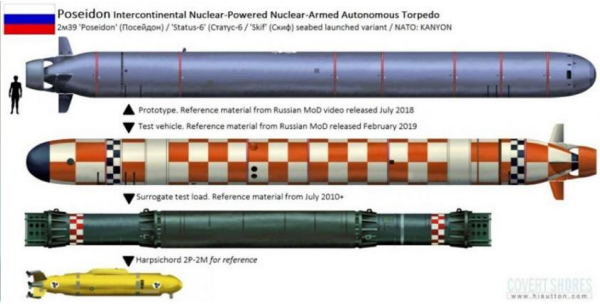
The C 14 class missile boat is a light missile boat of catamaran designed for use in the Middle East, also known as the China Cat class. The small size of the ship, along with some stealth features provide it with good protection against enemy detection, and

it can be armed with a variety of light anti-ship missiles. In addition to the low radar cross section, the boat is also extremely fast with an aluminum monohull with stepped planning. The catamaran design also provides better seaworthiness in comparison to the other boats of similar displacement with a conventional hull. The missile boats have been exported to Iran, where since 2000 it has been in service with the Islamic Revolutionary Guards Navy Corps. In Chinese service it primarily serves as a trial boat, including testing various light anti-ship missiles and other weaponry for catamarans. During the 1990s, the Chinese Navy started two indigenous fast-attack craft programs, while also considering the acquisition of Russian-built fast-attack craft. The China Cat-class 20-ton missile boat was developed for use in the Middle East, but was also to be built for Chinese naval service. In 2002 the China State Shipbuilding Corporation (CSSC) demonstrated the "China Cat" high speed boat prototype, for which Iran was the first customer. This ship uses the catarmaran hull, 23 meters long, with a water line length of 14 meters. Powered by two diesel engines, the maximum speed was approximately 50 knots. The Cat has a lightweight search radar in the mast crown, a photoelectric surveillance installment in the mast substructure platform. It was not initially clear which model missile would be carried, possibly the short-range C-701 guided missile, which the China National Precision Machinery Import & Export Corporation CMPIEC developed. CMPIEC had already completed the shipborne C-701 testing by 2000. Providing the equipment for the fast assault boat was a way to push this guided missile to exports the market. The boats delivered to Iran were equipped with this missile. In May 2002 it was reported that China had sold Iran high-speed catamaran missile patrol boats. The first of the new C-14 patrol boats was reportedly observed by US military intelligence in an Iranian port. A Chinese delegation of technicians was in Iran to help the Iranian navy train and equip the new boats. The boats for Iran were designed to carry up to eight C-701 anti-ship cruise missiles and usually had one gun. Reports appeared at the same time suggesting that the PLAN was interested in the type as well. Assuming the pre-existing force structure of 150 missile-and gun-equipped fast-attack craft, the Chinese Navy's future force could include 30 China Cat Class. As of 2008 there was no indication that the PLAN had or was looking to acquire this type.

→Autonomous Undersea Vehicle (AUVs)

Poseidon Russian Unmanned Underwater Vehicle





Tiers:

1 2 3 4

System

Alternative Designation: Status-6, Kanyon, UUV, UUD, AUV

Total Built: Not proliferated; 30-32 Poseidon UUVs are planned to be built

Primary Function: Second strike radioactive tsunami initiator and/or fleet destroyer

Crew: ea0

Delivery Vehicles: The B-90 Sarov and Zvezdochka 600 for R&D, and the Oscar-class submarines Project 09852, Belgorod, and the Project 09851, Khabarovsk. Each could carry four Poseidon UUVs for a total yield of 400 megatons

Dimensions

Length: m24

Diameter: 1.6–2 metres

Automotive

Engine Type: Low weight, compact, gas-cooled, low-power reactor

Engine Power: Nuclear

Cruising Range: km10,000

Speed, Maximum: km/h100

Maximum Depth: m1,000

Note: Typical depth of the drone may be about 50–100 meters for increased stealth features in low-speed stealth mode. Low depth in stealth mode is preferred because sound waves move to ocean floor and reduce radius of detection. Submarines use the same strategy in silent running mode.

Warhead

↳*Warhead Charachteristics*

Material: Toxic Cobalt, containing Cobalt -60

Shape: Cylinder

Diameter: m1.5

Length: m4

Volume: m37

Yield: mT~100

Size of Radioactive Area: 1700×300 kilometers.

Protection

Low-speed Stealth Mode: Yes

Silent Running Strategy: Yes

Stealth Properties: Yes

Notes:

The Poseidon, previously known by Russian codename Status-6 (Russian: Статус-6), is a nuclear-powered and nuclear-armed unmanned underwater vehicle under development by Rubin Design Bureau, capable to deliver both conventional and nuclear payloads. The Poseidon is one of the six new Russian strategic weapons unveiled by Russian President Vladimir Putin on 1 March 2018. The Poseidon is intended as an asymmetric counter to U.S. missile defense systems, such as anti-ballistic missiles, railguns, or laser weapons, ensuring Russia's capability to overcome such systems. The Poseidon warhead can contaminate a large area with radiation. According NukeMap simulations, the size of the radioactive area will be about 1700×300 kilometers. For this purpose, the Poseidon is believed to be equipped with a toxic cobalt bomb, containing cobalt-60. Poseidon appears to be a deterrent weapon of last resort. An aircraft carrier battle group would have reduced chances of defending itself against it. The drone could detonate its very large warhead at standoff range, and anti-submarine warfare units would have very little time to react because of the speed at which it travels. he Poseidon appears to be a torpedo-shaped robotic mini-submarine which can travel at speeds of 185 km/h (100 kn). More recent information suggests a top speed of 100 km/h (54 kn), with a range of 10,000 km (5,400 nmi; 6,200 mi) and a depth maximum of 1,000 m (3,300 ft). Typical depth of the drone may be about 50–100 meters for increased stealth features in low-speed stealth mode. Low depth in stealth mode is preferred because sound waves move to ocean floor and reduce radius of detection. Submarines use the same strategy in silent running mode. It is 1.6–2 metres in diameter, and 24 metres long. The warhead shown in the leaked figure is a cylinder 1.5 metres in diameter by 4 metres in length, giving a volume of 7 cubic meters. Comparing this to the volumes of other large thermonuclear bombs, the 1961 Soviet-era Tsar Bomba itself measured 8 metres long by 2.1 metres in diameter, indicates that the yield is at least several tens of megatons, generally consistent with early reports of 100 megatons. Some reports suggest the yield of the Poseidon's warhead is as low as 2 Mt. The National Interest compiled several unclassified defense sources from General Electric experts about the similar 601B project and they predicted low weight and compact gas-cooled nuclear reactor in the drone. Russian submarine designers say that a low-power reactor is preferred for Poseidon because a smaller reactor is less noisy. he development includes also use of stealth technology, to elude acoustic tracking devices.[25][30][38] Poseidon uses a silent running strategy like other submarines. Its main stealth feature is its very low speed before it reaches the target area. Its high-speed mode activates upon reaching a short finish range (2-3 kilometers), when the probability of detection of the drone is considerably higher. It could travel for weeks toward enemy port cities, reaching high-speed only in the final stage. Russian designers estimated the radius of detection of the drone will be about 2–3 km (1.2–1.9 mi) for 55 km/h (34 mph). A second important stealth feature of the drone is the special design of the pump-jet for clearance of the drone's acoustic signature to imitate the noise of civil ships. The Poseidon is a family of drones rather than a single type, with some Poseidon's designed only for destroying coastal cities and thus relying on "stealth" capabilities rather than on high speed,and other ones primarily designed to attack carrier battle groups, where the later ones may use the supercavitation, like the VA-111 Shkval torpedo, to be able to gain extremely high speed in attack mode (more than 200 km/h (120 mph)). However, supercavitation devices have not been observed on the available footage of Poseidon. Pentagon estimates maximum speed of the Poseidon about 56 kn (104 km/h; 64 mph) without the supercavitation option. wo vessels that are speculated to carry the Poseidon, the Project 09852 Oscar-class submarine Belgorod and the Project 09851 Khabarovsk submarines, are new boats deployed in 2012 and 2014, respectively. Oscar-class submarines could carry four Poseidon torpedoes at the same time for a total yield of up to 400 megatonnes. According to some reports, the Poseidon may also have a seabed or mobile sites launch option. In the seabed option, known as Skif (Скиф), Poseidon can wait on the sea floor in a special container for as long as necessary. It is known that the Russian auxiliary vessel ZVEZDOCHKA 600 (Project 20180) with ice-breaking capability is being used for testing of the Poseidon drones, thus it's believed the ship can be also used as the platform for deploying and retrieving a seabed version of the drone. The seabed launch option was patented (RU 2135929 patent) by the Poseidon designer Alexander Shalnev.

→Autonomous Surface Vehicles (ASVs)

→Hovercraft

SR.N6 Class (Winchester Class) British Hovercraft



Tiers:



Variants:

- **Kongbang-class hovercraft:** The North Korean Kongbang-class hovercraft is derived from the SR.N6. Currently the North Korean Navy fields 130 such hovercraft.

System

Alternative Designation: SR. N6; Class Winchester Class
Type: Hovercraft
Builder: British Hovercraft Corporation
Crew: 3
Passengers: 58

Dimensions

Length: 17.78 m
Beam: 7.97 m
Draft: INA
Displacement, Full Load: 10.9 tons

Propulsion System

Engine Name: 1 x Rolls-Royce Gnome turbine engine
Engine Type: Turbine Engine
Engine Power: 1,050 hp (780 kW) for lift and propulsion driving single four-bladed variable-pitch propeller
Maximum Range: 170 miles at 30 knots
Maximum Speed: 50 kn (93 km/h)

Radar Systems

Name: INA

Type: Surface Search

Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Saunders-Roe (later British Hovercraft Corporation) SR.N6 hovercraft (also known as the Winchester class) was essentially a larger version of the earlier SR.N5 series. It incorporated several features that resulted in the type becoming one of most produced and commercially successful hovercraft designs in the world. While the SR.N2 and SR.N5s operated in commercial service as trials craft, the SR.N6 has the distinction of being the first production hovercraft to enter commercial service. In comparison to the SR.N5, the SR.N6 was stretched in length, providing more than double the seating capacity. Some models of the craft were stretched further, enabling an even greater capacity. Experience gained in the development of the SR.N6 has been attributed as heavily contributing towards the design and production of the largest civil hovercraft to be ever produced, the SR.N4. Several major design features of the SR.N6 appeared on both the SR.N4 and further hovercraft designs by Saunders-Roe and its successor, the British Hovercraft Corporation. The Saunders-Roe SR.N6 (also known as the Winchester class) is a medium-sized hovercraft primarily designed for passenger service. The initial models of the type were capable of accommodating up to 38 passengers, which was greater than the maximum capacity of 18 that could be carried by the smaller SR.N5. The SR.N6 was subsequently further stretched to accommodate a further 20 passengers; this capacity upgrade let to it being considered to be more viable for commercial operations than any previous hovercraft design. By eventually increasing the capacity to 58 seats, the SR.N6 Mk.1S became the first hovercraft to be capable of transporting a typical coach load of people. In a military configuration, the SR.N6 is capable of carrying up to 55 fully equipped troops, or alternatively up to 6 tons of equipment. The SR.N6 was powered by a single marinised model of the Bristol Gnome turboshaft engine; this drove both a single rear-facing 9 ft (2.74 m) diameter 4-bladed Dowty Rotol variable-pitch propeller along with a 7 ft (2.13 m) diameter centrifugal lift fan. The Gnome engine was an expensive component for operators, leading to some establishing their own internal overhaul facilities and making arrangements with other Gnome operators, including the Royal Navy, to reduce costs from relying on costly services from Rolls-Royce Limited.[9] Around 20 per cent of the operating costs of the type have been attributed to maintenance of the 4 ft flexible skirt, which reportedly lasted for up to 500 hours, while similar cost levels have been reported for fuel. Early on, the SR.N6 was outfitted with an improved skirt, featuring fingers and forward puff ports, which resulted in improved forward control and reduced skirt wear; fingers had not been present upon the initial version of the skirt used prior to 1966. The endurance of the fingers would be progressively improved over time, issues with salt spray negatively affecting both the engine and propeller were also encountered early on. An initial experience of some components having short overhaul lifespans or being unreliable was encountered during early days. During the early years of not only the SR.N6 but other hovercraft as well, the hovercraft skirt remained an unresolved area of difficulty during this era. The SR.N6 was piloted from a forward-seated position at the front of the main passenger cabin. The pilot would exercise control over the direction of the craft via a series of control surfaces that was located immediately behind the variable pitch propeller. Early on, pilots were normally aviators which had been recruited from the Royal Air Force and Fleet Air Arm, however it has been claimed that experienced mariners would often be more skilled at operating the type, if not taking more time to adapt to its atypical form of propulsion, in part due to their familiarity at safely navigating within uncontrolled maritime environments. For navigation purposes, some SR.N6s were outfitted with onboard radar; multiple radar arrangements were used with the type, including pilots receiving radio guidance from on-shore radar operators in some circumstances.

Zubr Class (Pomornik) Russian Air-Cushion Landing Craft (LCAC)




Tiers:



System

Alternative Designation: Project 1232.2, POMORNIK-Class; DONETS'K Class Ukraine

Description: Crew: 27-31 Displacement (tons): 362; 550 with full load Length Overall (m): 56.2 Height of hull (m): 21.9 Beam (m): 22.3, 25.6 on inflated air cushion Draft (m): 1.5 when not in lift mode

Performance: Speed (knots): 60, 55 cruise Range (nautical miles): 300-400 Propulsion: 3 x variable-pitch air propellers (aka: blowers) 50,000 bhp from 5 x Ukrainian M-70 gas turbine engines Lift Engines: 4 x NO-10 engines Ship Power: 2 x 100kW gas turbine generator APUs Lift Capacity: 3 x tanks, 8 x BMP-2 IFVs, or 10 x BTR-80 APCs or up to 140 troops and 130 tons of cargo Bow and stern ramps assist loading.

Protection: The hull and super-structure have light armor plating.

Fire Control: Radar systems: Navigation radar EW station Other Fire Control: See weapons F/C

Weapons (gun systems): Name: AK-630M AD gun mount Gun: GSSh-6-30K (AO-18) Type: 6-barreled 30-mm Gatling gun Fire Control: EO camera and MR-123 fire control radar Rate of fire: 5,000 rounds/minute, in 400-rd bursts Range (m): 0-5,000 Ammunition: See above, 2,000 ready and 1,000 stowed Targets: Boats, other sea and coastal targets, aircraft, UAVs, mines

Weapons (rocket systems): Name: A-22/Ogon Ship-borne Rocket System Launcher: MS-227 Type: 22 x 140-mm launch tubes Fire Control: DVU-3-BS rangefinder sight Rate of fire: Ammunition: OF-45 140-mm Frag-HE rocket; ZZhS-45 140-mm incendiary rocket

Weapons (missile systems): SA-N-8 (aka SA-14 MANPADS) Launcher: 4-missiles Warhead: 1.0 kg Frag-HE Speed: Mach 0.56 Range (km): .6-6.0 Guidance: IR-homing P-hit (%): 50

Ammunition

2x30mm mounts: 3000 rds combat load

2x140mm rocket launchers, both frag and incendiary: 132 rds, combat load

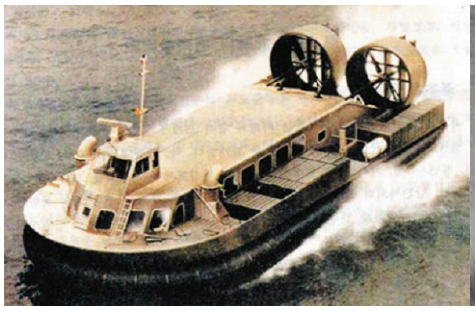
2xSA-N-8 launchers; this is the Naval variant fired from a deck mounted launcher of the SA-14/Strela 3 MANPAD: 24 rds, combat load

Notes:

The Zubr class (Project 1232.2, NATO reporting name "Pomornik") is a class of Soviet-designed air-cushioned landing craft (LCAC). This class of military hovercraft is, as of 2012, the world's largest, with a standard full load displacement of 555 tons. The hovercraft was designed to sealift amphibious assault units (such as marines and tanks) from equipped/non-equipped vessels to non-equipped shores, as well as to transport and plant naval mines. Ten Zubr-class hovercraft remain in service. There are two vessels in the Russian Navy and four with the Hellenic Navy. In 2009 China placed an order for four vessels from Ukraine [order transferred to Russia now] as part of a deal worth 315 million USD. Two updated versions of the vessels were built by Crimea's Feodosia Shipbuilding Company, followed by two advanced models of the surface warship. The purchase of HS Cephalonia (L 180) for the Hellenic Navy marked the first time a Soviet-designed naval craft had been built for a NATO member.

n June 2017 Russia announced the restarting of production of Zubr-class craft. Representatives from the Russian shipbuilding industry soon after responded by stating production could not possibly resume in 2018 and would only be possible by 2019–2021, refuting the government position. Representatives cited the lack of availability of and inability to mass-produce components, notably gas-turbine engines and reduction gears as the main obstacles. NPO Saturn (ODK GT) and Turboros developed marine gas turbine engines M70FRU (D090), FR RU, M70FRU2 (DP/DM71) along M90FR, M75RU, E70RD8 and Elektrosila, AO Zvezda, Metallist, Samara and others developed redactors and gears. High strength and buoyancy is provided by a rectangular pontoon, the main load-carrying part of the ship's hull. The superstructure built on the pontoon is divided into three compartments with two longitudinal bulkheads: combat material compartment in the midsection fitted with tank ramps, and outboard sections housing main and auxiliary propulsion units, troop compartments, living quarters, and NBC protection systems. To improve working conditions in the battle stations, troop compartments and living quarters are fitted with air-conditioning and heating-systems, sound/heat-insulating coatings, and structures made of vibration damping materials. The ship provides normal conditions for the crew to make meals and rest. Personnel are protected against the effects of weapons of mass destruction by airtight sealing of combat stations, crew and troop compartments, augmented with individual gas masks and protection suits. The ship is also protected from magnetic influence mines with an active system to compensate for the magnetic fields generated by the ship and transported materials. The central command post and MS-227 device compartments are strengthened with alloy armor. The Zubr-class landing craft has a cargo area of 400 square metres (4,300 sq ft) and a fuel capacity of 56 tons. It can carry three main battle tanks (up to 150 tonnes), or ten armoured vehicles with 140 troops (up to 131 tonnes), or 8 armoured personnel carriers of total mass up to 115 tonnes, or 8 amphibious tanks or up to 500 troops (with 360 troops in the cargo compartment). At full displacement the ship is capable of negotiating up to 5-degree gradients on non-equipped shores and 1.6 m (5 ft 3 in)-high vertical walls. The Zubr class remains seaworthy in conditions up to Sea State 4. The vessel has a cruising speed of 30–40 knots (56–74 km/h; 35–46 mph).

Kongbang Class North Korean Hovercraft





Tiers:



Variants:

- **SR.N6:** British hovercraft that the Kongbang is based off of.

System

Alternative Designation: Kongbang Class
Type: Hovercraft
Builder: North Korea; Shipyard: INA
Crew: 3
Passengers: 58

Dimensions

Length: 17.78 m
Beam: 7.97 m
Draft: INA
Displacement, Full Load: 10.9 tons

Propulsion System

Engine Name: 1 x Rolls-Royce Gnome turbine engine
Engine Type: Turbine Engine
Engine Power: 1,050 hp (780 kW) for lift and propulsion driving single four-bladed variable-pitch propeller
Maximum Range: 170 miles at 30 knots
Maximum Speed: 50 kn (93 km/h)

Radar Systems

Name: INA
Type: Surface Search
Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

Kongband Hovercraft

→Special Purpose Ships

Paluma Class (A 01) Australian Coastal Survey Ship





Tiers:



Variants:

- **HMAS Paluma:**
- **HMAS Mermaid:**
- **HMAS Shepparton:**
- **HMAS Benalla:**

System

Alternative Designation: HMAS Paluma Class
Total Built: 4 ships it total
Type: Survey Ship
Builder: Eglo, Adelaide
In Service: 1989-Present
Crew: 15

Dimensions

Length: 36.6 m
Beam: 12.8 m
Draft: 2.65 m
Displacement, Full Load: 325 tons

Propulsion System

Engine Name: 2 x Detroit 12V-92T
Engine Type: Diesel
Engine Power: INA
Maximum Range: 3,600 nautical miles
Maximum Speed: 11 knots
Endurance: INA

Gun Weapon Systems

Note: There are no weapon systems fitted onboard the Paluma Class

Onboard Aviation Facilities

Facilities: None

Aircraft: None

Helicopters: None

Radar Systems

Name: Kelvin Hughes 1007

Type: Naval/coastal surveillance and navigation radar

Frequency: 9 410 MHz

Range: 300 km

Note: The Kelvin Hughes Type 1007 family of naval radars are high-definition surface warning and navigational radar systems in service with the U.K. Royal Navy and several other world navies. The radars are available in I-band and F-band versions. It consists of a range of navigation, surface and air search equipment for naval use. It includes a choice of antennas, I-band and F-band transmitter/receivers and a range of displays. Reduced magnetic signature variants are available for use on mine countermeasures vessels. The transmitter/receivers are solid-state, with the exception of the magnetron, and operate at frequencies of 9,410 and 3,050 MHz (I- and F-Band) with a transmitter power output of 25 kW. A wide dynamic range logarithmic receiver is provided. A built-in monitoring system is included to check that the equipment is operating at peak performance. A low leakage dummy load allows for system testing during periods of radar silence. Centralised emission control circuitry enables command to inhibit transmission immediately. Sector transmission is also incorporated with direct control from the CTD main display (optional for the F-band radar). Blanking pulses are incorporated to safeguard sensitive electronic support measures equipment.

Sonar Systems

Name: Thales Petrel three-dimensional forward looking active high frequency

Type: High Frequency Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

HMAS Paluma (IV) is the first ship of the Paluma Class (SML) and the fourth to bear the name Paluma. HMAS Paluma is a custom built survey vessel, designed for surveying in the shallow coastal waters of the Great Barrier Reef and Northern Australia. She was built by Eglo Engineering of Adelaide in November 1987 and Commissioned on the 27 February 1989. Her catamaran design provides good stability in rough weather and allows her to sit well out of the water, drawing only 2.2 metres (a favourable design for operating in shoaling and reef waters). She has three sister ships: HMAS Mermaid, Shepparton (II) and Benalla (II) and operates in a pair with her sister ship HMAS Mermaid. This teaming of the two ships provides mutual support allowing them to operate safety in the remote areas they are required to survey. HMAS Paluma (IV) carries the very latest in survey equipment. Position fixing on the survey grounds is carried out by Wide Area GPS and Differential GPS navigation systems. The positional data is integrated with depth information obtained from Paluma's two echo sounders (one in each demi-hull). Each demi-hull also has a side scanning sonar in order to detect bottom features missed by the echo sounders as she steers down a survey line. All depth information is corrected for heave by heave compensators, (also one in each demi-hull). A Skipper searchlight sonar, located in the starboard demi-hull gives the Officer of the Watch early warning of dangers lying ahead of the ship.

Cheonghaejin Class South Korean Submarine Rescue Ship




Tiers:



Variants:

- **Note:** Only one ship has been built in her class, ROKS Cheonghaejin (ASR 21), in 1995.
- **ROKS Cheonghaejin:** Pennant Number: ASR 21

System

Alternative Designation: Cheonghaejin Class
Type: Submarine Rescue Ship
Builder: South Korea; Shipyard: INA
Crew: 140

Dimensions

Length: 102.8 m
Beam: 16.4 m
Draft: 4.6 m
Displacement, Full Load: 4,300 tons

Propulsion System

Engine Name: INA
Engine Type: Diesel
Engine Power: INA
Maximum Range: 4,500 nmi (8,300 km; 5,200 mi)
Maximum Speed: 18 knots (33 km/h; 21 mph)

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: K6
Type: Heavy Machine Gun

Caliber: 12.7mm

Manufacturer: ST Motiv (Daewoo)

Quantity: 6 x K6 12.7mm Heavy Machine Gun

Role: Fire Support / Suppression / Defense

Length: 1,654 mm

Barrel Length: 1,143 mm

Weight: 38 kg (83.78 lb) 58 kg (127.87 lb) with tripod and T&E (Traverse and Elevation Mechanism)

Action: Short recoil-operated

Rate of Fire: 450–600 rounds/min

Muzzle Velocity: 890 m/s

Maximum Firing Range: 7,400 m

Effective Firing Range: 1,800 m

Feed System: Belt-fed

Sights: Iron Sights

Note: The ST Motiv (Daewoo) "K6" Heavy Machine Gun (HMG) is the standard HMG of South Korean fighting forces. It is a locally-produced copy of the storied American M2 Browning Heavy Machine Gun and, therefore, utilizes the same form and function of its widely-used counterpart.

↳***Gun Weapon Systems #1 Ammunition***

Type: Rifle

Caliber: mm12.7

Cartridge: 12.7x99mm

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Battle Management System: No

Radar Systems

Name: INA

Type: Surface Search

Frequency: INA

Range: INA

Protection

Active Protection System: No

Countermeasures: INA

NBC Water Washdown System: INA

Notes:

The Cheonghaejin-class ASR (Hangul: □□□□ □□□ □□□; Hanja: □□□□□□□□□□) is a submarine rescue ship class of the Republic of Korea Navy. Only one ship has been built in her class, ROKS Cheonghaejin (ASR 21), in 1995. Its operations include rescuing trapped sailors in submarines, naval operation support for submarines, underwater research and mapping support, and recovery of sunk vessels. It is equipped with a deep submergence rescue vehicle (DSRV) that operates up to 500 metres (1,600 ft), and a rescue chamber that holds up to nine people. Once all nine Son Wonil-class submarines are delivered to the Republic of Korea Navy, another ASR ship of the same class is planned to be built. Notable operations salvaged a North Korean Yugo-class submarine in 1998 salvaged Chamsuri-class patrol boat #357 that was sunk during the naval clash in 2002 with North Korea

Alkmaar Class Dutch Minehunter





Tiers:



Variants:

- **Alkmaar:** Commissioned: 1983 Status: Decommissioned in 2000, sold to Latvia
- **Delfzijl:** Commissioned: 1983 Status: Decommissioned in 2000, sold to Latvia
- **Dordrecht:** Commissioned: 1983 Status: Decommissioned in 2000, sold to Latvia
- **Haarlem:** Commissioned: 1984 Status: Decommissioned in 2011
- **Harlingen:** Commissioned: 1984 Status: Decommissioned 2003, sold to Latvia
- **Scheveningen:** Commissioned: 1984 Status: Decommissioned 2003, sold to Latvia
- **Maasluis:** Commissioned: 1984 Status: Decommissioned in 2011
- **Makkum:** Commissioned: 1985 Status: Active
- **Middelburg:** Commissioned: 1986 Status: Decommissioned in 2011
- **Hellevoetsluis:** Commissioned: 1987 Status: Decommissioned in 2011
- **Schiedam:** Commissioned: 1986 Status: Active
- **Urk:** Commissioned: 1986 Status: Active
- **Zierikzee:** Commissioned: 1987 Status: Active
- **Vlaardingen:** Commissioned: 1989 Status: Active
- **Willemstad:** Commissioned: 1989 Status: Active

System

Alternative Designation: Alkmaar Class

Type: Minehunter

Builder: Van der Giessen-de-Noord yard in Amsterdam,

Crew: The complement of the Belgian ships varies between 33 and 46 depending on mission.

Mine Warfare System: Mine countermeasures equipment originally included two PAP-104 Mark 4 remote-controlled submersibles, EVEC 20 plot table, autopilot, Toran and Sydelis radio navigation aids, as well as the Decca HiFix Mark 6 precision navigation system. The mine-detection range of the sonar is greater than 1,640 ft (500 m). An autopilot system is provided. Starting in 1999, the class was fitted with new Consilium Selesmar NN 950 navigational radars.

Mine Identification: Atlas Seafox Mine Identification and Disposal System

ROV: Double Eagle Mk III Mod 1 ROV

Note: Beginning in 2003, the remaining Dutch Alkmaar-class minehunters were upgraded with improved electronics, including Atlas Elektronik INCMS combat data system, Thales 2022 Mk III hull-mounted sonar, Atlas Seafox Mine Identification and Disposal System and a Double Eagle Mk III Mod 1 ROV.

Dimensions

Length: 51.6 m

Beam: 9.0 m

Draft: 2.6 m

Displacement, Standard: 510 tons

Displacement, Full Load: 540 tons

Propulsion System

Engine Name: 1 x Brons-Werkspoor A-RUB 215 x 12 diesel

Engine Type: Diesel

Engine Power: 1,900 total bhp; 1 shaft

Auxiliary Power: 2 x 120-shp ACEC active rudders (for minesweeping)

Bow-Thrusters: 2 x 75-shp bow-thrusters

Maximum Speed: 15 kts (7 kts hunting)

Maximum Range: 3,500 nm at 10 kts

Endurance: 15 days

Gun Weapon Systems

↳*Gun Weapon System #1*

Name: 20 mm modèle F2 gun

Type: Naval Gun

Caliber: 20mm

Quantity: 1 x 20 mm modèle F2 gun

Length: INA

Weight: 332 kg (732 lb) (without ammunition)

Action: Gas unlocked, delayed blowback[1

Elevation: −15° to + 65°

Rate of Fire: 720 round/min

Muzzle Velocity: 1,050 m/s

Effective Firing Range: 1,500 m (4,900 ft) against aerial targets

↳*Gun Weapon Systems #1 Ammunition*

Type: Rifle

Caliber: mm20

Cartridge: 20×139mm

Basic Load: INA

Fire Control Systems

FCS Name: INA

Computerized FCS: No

Combat Data System: They are equipped with an Atlas Elektronik IMCMS combat data system.

Radar Systems

Navigation Radar: 1 x Decca TM 1229C navigation; or 1 x Consilium Selesmar NN 950 navigation radar

Sonar Systems

Hull Mounted Sonar: 1 x Thales 2022 Mk III Sonar

Minehunting Sonar: 1 x Thales PVDS Minehunting Sonar

Protection

Active Protection System: INA

Countermeasures: INA

NBC Water Washdown System: Yes

Notes:

In the Royal Netherlands Navy, the Tripartites are known as the Alkmaar class. The Alkmaars were originally of similar design to the Belgian and French versions, with a standard displacement of 520 tonnes (510 long tons) and 553 tonnes (544 long tons) at full load. The displacement later increased to 571 tonnes (562 long tons) standard and 605 tonnes (595 long tons) at full load and then 630 tonnes (620 long tons) standard and 660 tonnes (650 long tons) at full load. The 20 mm gun that was initially mounted was removed, leaving only three 12.7 mm machine guns. Beginning in 2003, the remaining Dutch Alkmaar-class minehunters were upgraded with improved electronics, including Atlas Elektronik INCMS combat data system, Thales 2022 Mk III hull-mounted sonar, Atlas Seafox Mine Identification and Disposal System and a Double Eagle Mk III Mod 1 ROV. The minehunters were constructed at the Van der Giessen-de-Noord yard in Amsterdam, a specially constructed site completed in 1978. Middelburg and Hellevoetsluis were optioned by Egypt, but due to financial issues, were instead completed for the Royal Netherlands Navy. Two ships of a modified design were built for the Indonesian Navy which led to the delay of Vlaardingen and Willemstad's construction. Ships in class (Netherlands) In 2000, three ships (Alkmaar, Delfzijl and Dordrecht) were withdrawn from service, followed by two more (Harlingen and Scheveningen) in 2003. All five were sold to Latvia with handovers beginning in 2007. Four more ships, (Haarlem, Maasluis, Middelburg and Hellevoetsluis) were decommissioned in 2011 following a series of deep budget cuts to the navy.

Land Based Electronic Warfare (EA) Systems

→Land Based Electronic Attack (EA) Systems

Optima-3 Belarusian GNSS Distributed Jamming Complex



Tiers:



System

Alternative Designations: GPS / GLONASS Jammer
Jammer Range: km100
Power Supply AC/DC: 220/24
Weight Transmitter: kg10
Frequency range:
Civilian: MHz1,575.42
Military: MHz1,227.6
Antenna and Transmitter: INA
Mount: Remote-Controlled
Fixed: Yes
Vehicle: Yes
Antenna Type: Omni directional
Transmitter: Continuous-wave with cable link to antenna
Signal: Complex frequency and interval waveform degrade the GNSS code.
Output Power: W20
Width of radiation pattern lobe: deg60 - -10
Vertical: deg40 - -10
Components: The main components are the operator's automated workstation and a control unit for each transmitter. .
Number of Transmitters: 9
Control System: ASU-PP automated control system. System status and situational awareness is monitored by the operator at the remote workstation
Command VHF: Yes

Command GSM: Yes

Control Link Range: km30-50

Command VHF: sec5

Command GSM: sec≤ 60

Operation: Designed to affect C2, maneuver and fire support activities. May affect high precision munitions.

Notes:

This variant is a remote-controlled distributed jamming system. The baseline system consists of nine transmitters (with some commonality with the Optima-2) and an ASU-PP (avtomatizirovannaya system upravleniya peredatchikami pomekh) automated control system. The number of elements is variable according to customer requirements. The ASU-PP runs off a 220 V, 50 Hz AC power supply and is used for remote activation of the distributed jammer fields. Situation data are monitored on the operator's workstation, including the jammer position information, which is shown on a terrain map. The jamming zones are presented in electronic form, showing the transmitter status and serviceability. The main elements of the Optima-3 are the operator's automated workstation and a control unit for associated command links. The workstation includes a computer with application software, LCD monitor, keyboard, mouse and uninterruptible power supply. The command link includes VHF radio and mobile telephone control equipment, a GSM antenna and a power supply unit. When controlled from a mobile telephone network (GSM-900/1800 standard), the Optima-3's remote-control range is limited only by the network coverage area, while its radio link gives a stand-off control range of 19-31 mi (30-50 km). Activation delay through the radio channel is no more than 5 seconds and less than 60 seconds through the GSM channel. The jamming subsystems includes a BPSS antenna unit, BPK power supply and control unit and BUS (blok upravleniya i svyazi) control and communications unit and jamming transmitter. Other equipment includes a directional VHF antenna with a 10-ft (3-m) long connection cable, a GSM antenna with a 3-ft (1-m) long connection cable, mains and battery power-supply cables. The Optima-3 is a dual-frequency system, with the output of its jammer reaching 20 W in each frequency. Its jamming waveform has a complex frequency and time structure that affects the GPS signal information component.

RB-531B Infauna Russian EA Jammer



Tiers:

1 2 3 4

System

Alternative Designations: None

Description: Modified BTR 80 chassis identified as the K1Sh1.

Height: m2.21

Weight: kg12,000

Length: m7.65

Crew: ea2

Troop Capacity: ea8

Combat Weight: mt14

Chassis Length Overall: m7.55

Height Overall: m2.41

Width Overall: m2.95

Ground Pressure: kg/cm2INA

Drive Formula: 8 x 8

Performance

Engine Type: INA

Cruising Range: km600

Protection: Against 5.56 ball 5.56, all-around

Speed: km/h

Max Road: 85

Max Off-Road: 60

Average Cross-Country: 40

Max Swim: 10

Fording Depths: mAmphibious

EW/JAMMING SYSTEM: INA

Frequency Jamming Range: MHz20 - 2020

Output Power: W60

Voltage Supply: V12.6

Weight of System (Separated from vehicle) (kg): 14

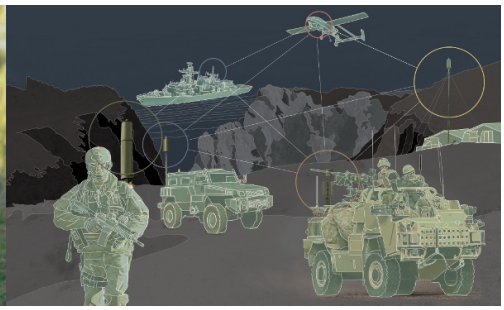
Deployment: Protects combat vehicles and troops against radio controlled mines and explosives (IEDs).

APS Capability: Softkill aerosol interference against high-precision weapons with laser and video-management systems.

Notes:

Fielded to: EW battalions in airborne forces of the Russian army. As part of the airborne forces, this system will be used to accompany initial entry troops and assist with securing key terrain to enable follow-on forces (motorized, mechanized, and armor) to deploy into combat areas.

RESOLVE British Portable Electronic (EW) System



Tiers:



System

Alternative Designation: RESOLVE EW
Microsoft Windows Capable: Yes, Windows-based analysis software (RTSAN)
Software: Mission Information System (RTMIS) software
Configurations: On-the-March/Short Halt, On-the-Move, and Static
Weight (Total): 15 kg (on-the-march configuration)
Battery Life (Standard 2590 battery): hours8-15
Intercept: 1 MHz-3 GHz
DF: 2 MHz-3 GHz
DF Accuracy: 5 deg (RMS) Typical
Wideband Stare: MHz40
Scan Rate: GHz1.5
Demodulation: AM, FM, SSB, CW
Enhanced Capabilities: Civilian Waveforms
Operating Temperature: -20° to +50° C
Note #1: THe RESOLVE is a modular system that consists of a number of nodes which can either operate as stand-alone or as a networked multi-node baseline for collaborative position fixing.
Note #2: Each Node Consists of: 1 x acquisition and Geolocation Sensor (AGS); 1 x Optional integrated EA capability; a Range of lightweight antennas; a PDA or laptop computer with modular software for operator control (for UK SEER contract these are rugged TEMPEST laptops from Secure Systems & Technologies Ltd), wireless capability for networking and signal analysis tools; and 1 x Dedicated back-pack.

↳*Acquisition and Geolocation Sensor (AGS)*

Receiver Type: two-channel wideband receiver
Frequency Range: 1 MHz to 3 GHz
Bandwith: 40 Mhz instantaneous bandwidth per channel
Burst Transmission Capable: Yes
Frequency Hopping Enabled: Yes
Software Algorithms: Roke's Software Defined Radio (SDR) algorithms
HF/VHF Frequency Range: MHz1-100
Low Noise Amplifiers: Yes
PMR Intercept Enabled: Yes
Geolocation Enabled: Yes
Low Probability of Intercept (LPI) Transmissions Capable: Yes
Signal Acquisition: Multiple simultaneous signal acquisition and processing
Two Channel DF Algorithms Enabled: Yes
Channels: Five time Multiplexed Channels
Digital Channels: Four Digital Down Converter (DDC) channels
GPS Enabled: Yes
Electronic Compass Enabled: Yes
USB 2.0 Interfacing Capable: Yes
N-Channel AGS Capable: Yes, RESOLVE provides the ability to discriminate nearby tactical HF groundwave transmissions from more distant strategic skywave and NVIS transmission

↳*Electronic Attack (EA)*

Units: Two manpack units
Frequency Range: 25 MHz to 2.5 GHz
Additional Amplifiers Capable: Yes, to achieve higher power outputs
Electronic Support (ES) Sensor Tasking and Monitoring: Yes
Electronic Attack (EA) System Cueing: Yes
Geolocation Enabled: Yes
Cellular Survey Enaabled: Yes
Wireless Network Manager: Yes
Management Information System (MIS): Yes
Geospatial Information System (GIS): Yes
COTS Target Signals Analysis packages: Yes

↳*Antennas*

QuadTac V/UHF Tactical DF Antenna Frequency: 30 MHz-3 GHz

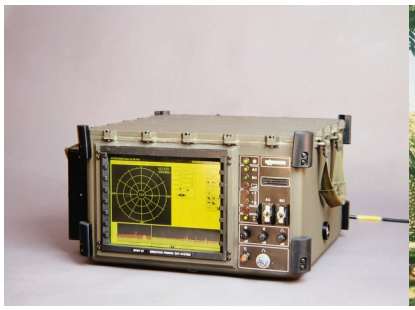
QuadTac-Mini Tactical DF Antenna Frequency: MHz30-700
MicroQuad HF/VHF Tactical DF Antenna Frequency: MHz2-100
TriQuad Tactical DF Antenna Frequency: 2 MHz-3 GHz
MastQuad V/UHF Mast Mounted DF Antenna Frequency: 30 MHz-3 GHz

↳

Notes:

The RESOLVE EW Manpack is a 100% UK state-of-the-art field proven Electronic Surveillance and Attack system. It benefits from having both the software and hardware developed in conjunction with Roke’s operational experts. RESOLVE is designed for the intercept, geolocation, exploitation and denial of tactical communications in the HF to UHF frequency bands, including ‘modern waveforms’. A single RESOLVE EW Manpack can be used in isolation to provide both full spectrum surveillance and Direction Finding (DF) capabilities. When networked with other RESOLVE systems it is then possible to position fix targets using Angle of Arrival (AOA) techniques.With fully integrated wireless network connectivity, the RESOLVE EW Manpack enables target data-fusion across the deployed baseline. This provides rapid target resolution, correlation and geolocation, through the use of the dedicated Management Information System (MIS) and Geospatial Information System (GIS) applications. RESOLVE is a modular system designed for intercept, geolocation and exploitation of tactical communications signals from 1-3,000 MHz, developed by Roke Manor Research, now Chemring Technical Solutions (TS). The system can exploit a range of signals, including Personal Mobile Radio and Cellular Communications (such as GSM). It consists of a number of nodes which can either operate as stand-alone or as a networked multi-node baseline for collaborative Position Fixing.

DFINT-3T2 Turkish Transportable Direction Finding (DF) System





Tiers:



System

Alternate Designation: DFINT-3T2 communications DF system
Type: Transportable Direction Finding (DF) System
Organization: ASELSAN A.S., Radar, Electronic Warfare and Intelligence Systems Division
In Service: 2000-present
Demodulation: AM, FM (SSB optional)
Frequency Range: MHz20-1,200
DF Accuracy: <1.5 deg RMS
LOB Resolution: deg0.1
Frequency (FFT) Resolution: 500 Hz-160 kHz selectable
Hopper Performance: better than 1,000 hops/s
Scan speed (with DF): better than 1,000 MHz/s
Power Generator Weight: kg8.8
Antenna Weight: kg10.5
Antenna Mast Weight: kg12
System Weight (Total): kg29.6
Dimensions: m6.25
GPS Receiver: External or built in
Power Generator: 220 V AC
Environment: MIL-STD-810E
Operating Temperature Range: -20 to +50°C
Storage Temperature Range: -40 to +70°C
Power Supply: 24 V DC or 110/220 V AC or Both
Monitor: 640mm x 480mm (8 colors)

Notes:

The tri-service DFINT-3T2 system is a transportable direction finding (DF) equipment that can intercept, take a bearing on, and analyse V/UHF band communications traffic. Emitter location is achieved via collaboration with other DFINT systems (with intercommunication being by radio or landline) and, according to the contractor, the equipment can handle state-of-the-art emitter types including frequency hoppers and burst transmitters. The system can be deployed with a standard lightweight, high-gain antenna, sub-band arrays and/or a range of application specific antennas that include disguised low-profile, airborne and heliborne types. In rough terrain land-based applications, the environmentally ruggedised DFINT-3T2 equipment can be deployed by a two-man team and the system presents data in either graphical or list formats.

1RL257 Krasukha-4 6x6 Mobile Russian Broadband Multifunctional Jamming Station







Tiers:



Variants:

- **Krasukha-2:** The Krasukha-2 is intended to jam AWACS at ranges of up to 250 kilometres (160 mi). The Krasukha-2 is also able to jam other airborne radars, such as radar guided missiles. The missiles, once jammed, are then provided a false target away from the original to ensure that the missiles are no longer a threat. The Krasukha-2 guards mobile high priority targets such as the 9K720 Iskander SRBM.

System

Alternative Designation: 1RL257 Krasukha-4; Krasukha-4
Type: Broadband Multifunctional Jamming Station
Manufacturer: KRET corporation, BAZ (for wheeled platform of Krasukha-4)
Family: Krasukha
In Service: 2010-Present
Chassis: Kamaz 6350 8x8 military truck chassis
Crew: ea3
Passenger Capacity: INA
Maximum Effective Range: km300
Turret Antenna: 2 Circular Antenna
Telescopic Mast: Yes, located at the rear of the vehicle
Hydraulic Stabilisers: Yes, 2 Hydraulic Stabilisers
Capability to Suppress Spy Satellites: Yes
Capability to Suppress Ground-Base Radars: Yes
Capability to Suppress Airborne Systems: Yes
Capability to Render Radio-Controlled Missile Attacks Ineffective: Yes
Note #1: A large turret is mounted at the top of a shelter mounted at the rear of an 8x8 military truck chassis.
Note #2: The Krasukha-4 system works by creating powerful jamming at the fundamental radar frequencies and other radio-emitting sources

Dimensions (Chassis)

Length: m9.3

Width: m2.5

Height: m3.25

Weight, Combat (Chassis Only): kg12,450

Automotive

Engine Name: KamAZ-740.50-360

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km1,000

Speed, Maximum Road: km/h95

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m1.4

Fording Depth: m1.75

Fire Control

Laser Target Desinator: INA

Protection

Armor: The cab can be fitted with a class 5a armour which provides a protection against firing of small arms AKM 7.62mm

Applique Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

IR Signature: INA

Notes:

The Krasukha-4 broadband multifunctional jamming station is mounted on a BAZ-6910-022 four-axle-chassis. Like the Krasukha-2, the Krasukha-4 counters AWACS and other airborne radar systems. The Krasukha-4 has the range to effectively disrupting low Earth orbit (LEO) satellites and can cause permanent damage to targeted radio-electronic devices. Ground based radars are also a viable target for the Krasukha-4. The Krasukha-4 is intended to neutralize Low-Earth Orbit (LEO) spy satellites, ground-based radars and airborne radars (AWACS) at ranges between 150 to 300 kilometers. The system is also able to cause damage to the enemy's EW (Electronic Warfare) systems and communications.

Hummel German VHF Jamming System



Tiers:



Variants:

- **Fuchs TpZ 1A1:** This version is a Hummel jammer mounted on a HELAS direction-finding vehicle.

System

Alternative Designations: Hummel
Description: Threat multi-range jammer.
Vehicle Range: km150-200
Power Supply: ac/dc6 / 15
Weight: kg8 – 12
Frequency Range: MHz1.5 - 3,000
JAMMING TRANSMITTER:
Transmit modulation: deception and burn through
FM Voice: YES
FM Telegraph / Teletype: YES
FMFacsimile: YES
AM Telegraph: YES
AM Voice: YES
PRESET FREQ: YES
BROAD JAM: YES
ATTACK JAM: YES
MANUAL JAM: YES
DECEPTION: YES
Broad jam bandwidth: up to 240 MHz, in 0.1 MHz steps, simultaneous generation of up to 16 separate broadband segments
Jamming efficiency: up to 16 simultaneously active radio nets
Mount: Fixed site, vehicle and airborne platforms available.

Antenna Type: Omni directional or directional yagi
FM Facsimile: YES
FM Morse Code: YES
AM Morse Code: YES
AM Facsimile: YES
Fast scan speed: MHz/s250 / 1000 (upgraded variant)
Passive Antennas: dipole or monopole antennas vertical or horizontal polarized omnidirectional antennas antennas for operation on the move
Amplifier types: broadband, solid-state, liquid cooled
Max output power kW into 50 Ω: kW10
Transmitter: Continuous-wave with cable link to antenna
Amplifier Power Consumption: kW25.4
Width of radiation pattern lobe: deg360
Automatic computer controlled jamming sequences: YES
High power Amplifier MAX: kWYES
“Look Through” Capability ensures jammer is only active when target signal is on the air: YES
Deception jamming: YES
Broadband TDM (barrage) jamming against simultaneous spread spectrum transmitters: YES
Programming protected frequencies: YES
Local or remote control: YES
Operation Temp: deg-25 - + 55
Storage Temp: deg-40 - +70
Frequency range: GHz6-18

Notes:

The Hummel is a tactical Very High Frequency (VHF) jammer with look through jamming capability. It is mainly intended to jam enemy multichannel links. The Hummel is the first generation of the Cicada-C family of jammers.

Meerkat-SA British Electronic Support Measures (ESM) and Electronic Intelligence (ELINT) System



Tiers:



System

Alternative Designation: Meerkat-SA

Type: Electronic Support Measures (ESM) and Electronic Intelligence (ELINT) System

Family: INA

Crew: INA

System Features: ·24hr, 365 days/year strategic Surveillance and Analysis ·Complements Radar Recognised Air and Surface picture: Identifies targets ·Early warning: Much longer detection range than target radars ·Automatic update of EOB ·Effective under local EMCON conditions ·Very high reliability + no on-site operators = low through-life costs ·Scaleable: up to 12 sensors

Sensor Features: ·Dual receivers and antennas for concurrent Surveillance and Analysis ·Optional digital receiver for increased sensitivity and in-depth ELINT collection & analysis

Surveillance Objectives: ·Monitoring cross-border activity: -assess possible military or political change -identify enemy weaknesses -counter intentions of enemies -detect incursions into EEZs ·Technical ELINT Collection (Digital Receiver Option) - precision parameter measurement,including “fingerprinting” -track movements, and/or assess the maintenance states of, specific instances of selected emitters -maintain national EW Intelligence Library Data Base for programming own Radar Warning, ESM and ECM systems (land, sea and air).

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Prime Mover: INA

Notes:

Meerkat-SA is a network of high reliability ESM-ELINT sensors under remote control that detects, identifies and locates all radar emissions. It provides a fully automatic, real-time national air and surface picture of radar activity Meerkat-SA consists of a number of remote fixed site sensors that connect to a central command & control site via a national Wide Area Network. At this site operators control the remote sensors and local processors that identify the intercepts, fuse the data and maintain a

dynamic Electronic Order Of Battle picture.

R-330K Russian Mobile Automated Control Station



Tiers:

1 2 3 4

System

Alternative Designation: R-330K

In Service: 1998-Present

Type: Mobile Automated Control Station

Manufacturer: INA

Chassis: Ural-43203

Configuration: 6x6

Crew: 4

Dimensions

Length: m7.37

Width: m2.5

Height: m4.5

Weight, Empty: tons8

Payload capacity (on road): tons6

Payload capacity (off road): tons4.5

Maximum Tow Capacity: tons12

Automotive

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Automated Jamming Station

Quantity of controlled jamming stations: Up to 4 pairs

Quantity of automated work stations: 2

Quantity of automated tasks being solved: 30

Quantity of independent channels of telecode data exchange: 4

Quantity of radio channels for voice message exchange: 4

Setup time by a 4-person crew, min: not more than 15 min

Power consumption from embedded power station or from industrial alternating-current network: 220/380V, 50 Hz, kW

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

R-330K mobile automated control station (CS) is intended for automated centralized handling of automated jamming stations (AJS) of R-325U, R-378A, R -330T, R-934B types and their modifications. Chassis: Ural-43203

Sapsan-Bekas Russian Mobile Anti-Drone System







Tiers:



System

Alternative Designation: Sapsan-Bekas

Type: Mobile Anti-Drone System

Operation: Sapsan-Bekas mobile system for detecting and disabling unmanned aerial vehicles (UAVs)

Crew: ea1

Chassis: The system is highly maneuverable since it is installed on an automobile chassis — this is a key requirement for various security agencies. Mobility is also important for civilian customers, since it allows you to quickly move the system from one facility to another

Maximum Range: The system can detect an UAV at a distance of 10 km, track its movement and disable it at a distance of over 6 km by suppressing communications and control of the UAV.

Subsystems: The device consists of three subsystems: signals detection and direction finding of drones, active radar, video and optoelectronic tracking, as well as a subsystem of radio suppression.

Monitoring: Sapsan-Bekas is capable of round-the-clock monitoring of the airspace and recognizing airborne objects using video and thermal imaging tools.

Modes of Operation: Sapsan-Bekas is capable of countering UAVs both in manual and automatic modes

Frequency Range: from 400 MHz to 6 GHz.

Friend or Foe: The system works on the “friend or foe” principle and does not affect UAVs, information about which is entered into the system’s database in advance. The subsystem can also work autonomously outside the system configuration due to a separate control panel.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

Avtomatika Concern (part of Rostec) has presented the Sapsan-Bekas mobile system for detecting and disabling unmanned aerial vehicles (UAVs) at the International Military-Technical Forum ARMY-2019. The system can detect an UAV at a distance of 10 km, track its movement and disable it at a distance of over 6 km by suppressing communications and control of the UAV. The design has much better tactical and technical characteristics compared to all similar Russian and foreign systems that are

currently available. The device consists of three subsystems: signals detection and direction finding of drones, active radar, video and optoelectronic tracking, as well as a subsystem of radio suppression. Sapsan-Bekas is capable of round-the-clock monitoring of the airspace and recognizing airborne objects using video and thermal imaging tools. “This new system by the Avomatika Concern will become a part of Rostec’s products intended for countering both civilian and military UAVs. Sapsan-Bekas is capable of countering UAVs both in manual and automatic modes in a wide frequency range — from 400 MHz to 6 GHz. The system is highly maneuverable since it is installed on an automobile chassis — this is a key requirement for various security agencies. Mobility is also important for civilian customers, since it allows you to quickly move the system from one facility to another”, said the Executive Director of Rostec, Oleg Evtushenko. The UAV radio suppression subsystem used in the Sapsan-Bekas is called Luch (Russian: ray, beam), which will also be presented for the first time in ARMY-2019. It affects the drone’s channels of navigation, control and transmission of information, simultaneously blocking eleven wave frequency bands. The system works on the “friend or foe” principle and does not affect UAVs, information about which is entered into the system’s database in advance. The subsystem can also work autonomously outside the system configuration due to a separate control panel. “One of the main advantages of the Sapsan-Bekas is its versatility and flexibility. The functionality of the system is easy to adapt to the needs of customers. For example, civilian companies, including energy companies, are mostly interested in signals intelligence equipment, and often don’t need radiolocation capabilities — the concern is ready to make a product for them in the required configuration”, said Vladimir Kabanov, CEO of the Avtomatika Concern. The company is already prepared to deliver Sapsan-Bekas to civilian customers. Before supplying to security agencies is possible, the system must first pass the testing scheduled for autumn 2019.

R-934B Russian VHF Air Communication Automated Jamming Station



Tiers:

1 2 3 4

System

Alternative Designation: R-934B

In Service: 1996-Present

Type: VHF Air Communication Automated Jamming Station

Manufacturer: INA

Chassis: Ural-43203

Configuration: 6x6

Crew: INA

Dimensions

Length: m7.37

Width: m2.5

Height: m4.5

Weight, Empty: tons8

Payload capacity (on road): tons6

Payload capacity (off road): tons4.5

Maximum Tow Capacity: tons12

Automotive

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Jamming Station

Operating Frequency Range: MHz 100 - 399,995

Transmitter Output Power: not less, W - 500

Quantity of Simultaneously Jammed Frequencies: In fixed frequencies mode – up to 4; In POFC mode - 1;

Frequency Spacing: kHz - 4,16

Root-mean-square error of direction finding, degree (not more than): 2 Deg

Frequency Range Scanning Rate (without difection finding): MHz /s 7500

Mean time of station reaction during jamming in autonomous mode (during operation by list of 200 preset frequencies in simultaneous scanning band, not more): 5 ms

Accuracy of carrier frequency definition (not more): 4 kHz

Relative frequency deviation from the nominal (not more): 3 x 10

Receiver sensitivity (not worse): mV 1,5

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

R-934B automated jamming station is intended for jamming of VHF air communication means, air guidance tactical systems and also for jamming of ground fixed and mobile communication lines, cellular and trunk networks which operate at fixed frequencies as well as in program operating frequency change (POFC) mode and short telecode data messages transfer.

EULE German Ground Based SIGINT Light Electronic Support System



Tiers:



System

Alternative Designations: Owl (English), (TMS) 210
Description: Transportable Monitoring System
Crew: 2
Receiver: 60
Power Supply: AC/DC11/ 32
Designation: ESMB
Power Supply Weight: kg36.8
Operational Frequency Ranges: MHz.9 – 3,000
DF and Intercept: MHz20 - 1300
Intercept only: MHz≥1300
FM Voice: YES
FM Telegraph / Teletype: YES
FM Facsimile: YES
FM Morse Code: YES
AM Telegraph: YES
AM Voice: YES
AM Morse Code: YES
AM Facsimile: YES
GSM: YES
Fast scan speed: GHz/s1.3
Scan Mode: Frequency, memory and radio frequency panorama
Target Data: Identifies and locates LPI, LPD emissions Frequency Hop, and Spread Spectrum
Frequency identification accuracy: ± 30MHz
Accuracy of DF, degrees: 2

ADD 195: MHz20-1300

ADD 170 UHF DF antenna for GSM: MHz800-2,000

HE 500 (MHz): MHz20-3,000

Storage: Tbyte1

LAN 500 m, (copper pair): kbps128

Serial 300m: kbps20

GSM Link: kbps10

Operations Time: hours12

Operation: 40 °C to +65 °C

Storage: -40 °C to +65 °C

Receiver Frequency Range: MHz.9 – 26,500

Dimensions

Length: 6.6 m

Width: 2.39 m

Height: INA

Weight, Combat: 14 tons

Automotive

Engine Name: Mercedes Benz

Engine Type: Diesel

Engine Power: 306 hp

Maximum Speed: 80 km/h

Maximum Range: 200 km

Fuel Capacity: INA

Protection

Hull Armor: INA

Turret Armor: INA

Applique Armor: INA

Explosive Reactive Armor: INA

Active Protection System: INA

NBC Protection: INA

Smoke Equipment: INA

Notes:

EULE German Ground Based SIGINT Light Electronic Support System

Kvant 1L222 Avtobaza Russian 6x6 Electronic Support (ES) Electronic Intelligence (ELINT) System





Tiers:



System

Alternative Designations: Kvant 1L222 Avtobaza
Description: Passive ELINT signals intercept system designed to intercept and locate pulsed airborne radars including fire control radars, terrain following radars and ground mapping radars as well as weapon (missile) data links.
Manufactuer: Kvant
In Service: 1980s-Present
Crew: ea4
Max ELINT Range: km150
Radar Detection Frequency Range: MHz8000-17544
Jamming Module Capable: Yes, capable of disrupting airborne radars including fire control radars, terrain following radars and ground mapping radars as well as weapon (missile) data links
Coverage: deg360
Number of Targets Simultaneously: ea60
Target detection/data transmission-to-APUR delay: 500 Microseconds
Probability of Radar Type Classification: 0.8 (with 1.0 being 100%)
Into/out-of-action time in minutes: not more than 25 minutes
Power Consumption: not more than 12 kilowatts

Dimensions (Chassis: Ural-4320)

Length: m7.37
Width: m2.5
Height: m4.35
Weight, Empty: tons8
Payload capacity (on road): tons6
Payload capacity (off road): tons4.5
Maximum Tow Capacity: tons12

Automotive (Chassis: Ural-4320)

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Maximum Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: Not Amphibious

Gradient: %62

Side Slope: %40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Receiver

Designation: INA

Power Supply: 6V or 15V DC

Operational Frequency Range: GHz8 – 17.5

DF and Intercept: Yes

Receive modes: INA

SLAR: Yes

PGM Targeting Radar: Yes

Nap of the Earth (NOE) Radar: Yes

Early Warning Radar: Yes

SAT Phones: Yes

Fast scan speed Targets Per Second: 15

Frequency identification accuracy: INA

Azimuth: deg.3 - .5

Elevation: deg3

Antennas

Rotating Parabolic: Yes

Azimuth: 360

Rotation Orbits per minute: 6 - 12

Local or remote control: Yes

Range of Remote Operations: m100

LAN copper twisted pair: INA

Serial 300m: kbpsINA

Radio Link: kbpsINA

Operation

Prioritization Targets: Yes

Number of Targets Monitored: 60

Local or remote control: Yes

Set Up Time: min25

Environmental conditions: INA

Operation Temperature: -45 - 40

Humidity: %98

Notes:

The Kvant 1L222 Avtobaza is an ELINT system designed to detect Side looking airborne radars, air-to-ground fire-control radars and low-altitude flight control radars, as well as to provide intelligence data for the 1L125M APUR. The ELINT system displays on the TV screen acquired targets with data on their direction finding, angular coordinates (azimuth and elevation), radiation signal parameters (carrier frequency, duration, pulse repetition frequency) and radar type classification (sidelooking, fire control, low-altitude flight control radar). The APUR automated jamming control system is fed with target data (frequency band number according to frequency assignment of jamming systems, type of emitting radars and their angular coordinates) via cable at a range of up to 100 meters. There are unconfirmed reports of the system being used in the capture of an RQ-170 UAV by the Iranian forces on 4 December 2011. There are also unconfirmed reports of it being used by the Russian forces during the Crimean Crisis in March 2014 to overtake controls of an American drone.

R-330Zh Zhitel Russian Cellular Jamming and Direction Finding System









Tiers:



System

Alternative Designation: Zhitel

Crew: ea3

Troop Compartment Capacity: NA

Maximum Effective Range: km25

Time Required to Deploy the System: minLess than 40

Power Source: Diesel electricity generators

Navigation equipment: KS-100M

Dimensions

Length: m7.36 m

Width: m2.55 m

Height: m2.71 m

Weight, Combat: kgINA

Automotive

Prime Mover: Ural-43203 (May also be on the KAMAZ-43114, 6 x 6)

Engine Name: YaMZ-236M2 / YaMZ-238M2

Engine Type: V-6 Diesel / V-8 Diesel

Engine Power: hp180 / 240

Cruising Range: kmINA

Speed, Maximum Road: km/h85

Speed, Average Cross: km/hDue to fragile state of trailer, crew avoids cross country travel

Speed Maximum Swim: km/hNA

Fording Depth: mINA

Maximum Payload: kg4,500

Protection

Armor: N/A

Applique Armor: N/A

Active Protection System: N/A

NBC Protection: Yes

Smoke Equipment: No

Basic EW Specifications

Operation frequency range: From 100 to 2000 MHz

Azimuth search coverage: -90 to 120°

Elevation search coverage: -15 to +20°

Jamming: From 1227.6 MHz; 1575.42 MHz and 1500 to 1900 MHz

Main power supply: 220/380V 50 Hz

Emergency power supply: With two batteries 6CT-190

Radar type: Phase array (4 each)

Notes:

The R-330Zh also named Zhitel is a jamming communication station designed and manufactured by the Russian Company Protek. The system is in service with the Russian army. The whole system includes one Ural-43203/KAMAZ-43114 truck and one shelter with four telescopic masts. The truck is the control center for the operators. The shelter is equipped with four telescopic active phased array transmitter antennas mounted on a four-wheel trailer. The R-330Zh is designed for detection, analysis, direction-finding and jamming of satellite and cellular phone communication systems operating in the frequency band from 100 MHz to 2,000 MHz. The jamming system provides analysis and selection of emitters' signal parameters. The R-330Zh jamming station was used by the Russian army during the Crimean crisis in March 2014. The system is designed to accomplish the following tasks: detection, direction finding, and jamming of wearable mobile stations of mobile satellite communications such as Inmarsat and Iridium; detection, direction finding, and jamming base stations of cellular communication, standard GSM 1900, consumer navigation equipment; and jamming of satellite communications systems NAVSTAR (GPS). The R-330Zh can operate in stand-alone mode as well as in pairs, both master and slave under the control of the primary R-330Zh. Because the system in the trailer is fragile, it will likely be found close to a road; it is unlikely that the system will be taken cross-country. The Zhitel system is part of the inventory of the EW brigades' REB-S battalions, and, in addition to the tasks listed above, can be used for jamming an aircraft's communication and satellite navigation (GPS, Galelo, BeiDou, etc.). T he Zhitel system attracted an extraordinary amount of attention in 2015 when it was reported by the Organization for Security and Co-operation in Europe to have been used in eastern Ukraine, supposedly to impede the use of drones by suppressing GPS signals (OSCE 2015).

Murmansk-BN Russian Long-Range Communications Jamming System






Tiers:



System

Alternative Designation: Murmansk-BN

Type: Long-Range Communications Jamming System

Manufacturer: KRET

In Service: 2016-Present

Crew: INA

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Note: Chassis not identified

Automotive

Note: Chassis not identified

Jamming System

Maximum Coverage: 3,000 km

Frequency: INA

Target: The primary target of the Murmansk-BN is the West's High Frequency Global Communications System (HFGCS).

Note: The HFGCS is a worldwide network of transmitters which provides command and control communications between ground agencies and US military aircraft and ships. Washington’s military partners in NATO are said to have access to this network.

Protection

Note: Chassis not identified

Notes:

The Murmansk-BN is a long-range communications jamming system specially designed to take out NATO and United States (US) high frequency military satellite communications. The Murmansk-BN electronic warfare (EW) system is being developed by KRET and has a maximum coverage of 3,000 kilometers (5,000 km or 8,000 km from other sources). This system was developed as part of a Russian strategic electronic warfare system and operates as a network centric capability. The primary target of the Murmansk-BN is the West's High Frequency Global Communications System (HFGCS). It was unveiled in November 2016 as the system prototype was achieving some test successes.

RP-377UVM3 Russian Man-Portable Automated Jammer



Tiers:



System

Alternate Designation: RP-377UVM3

Type: Man-Portable Automated Jammer

Manufacturer: INA

In Service: 2009-Present

Crew: 1

Dimensions

Length: mm300

Width: mm170

Height: mm162

Weight, without Battery: 7 kg

Jamming System

Frequency Jamming Range: 26MHz -1 950 MHz

Output Power: 24 W

Supply Voltage: 12.6 v

Summed Current Consumption: 8.8 A

Operating Temperature Range: -20°C - +40°C

Notes:

RP-377UVM3. The items are designed for jamming and blocking local radio communication lines and control both in stationery conditions and in movement and also for protection from radio-controlled explosive devices. The equipment can be placed in armoured vehicles, automobiles, manpacks and in case.

mobile automated KTK, radioelectronic imitation and jamming system (mobilnyi avtomatizirovannyi KTK, radioelektronnoi imitatsii i postanovki pomekh, MKTK REI PP





Tiers:

1 2 3 4

System

Alternative Designation: Tigr-M MKTK REI PP Leer-2 VPK-233114 Mobile Electronic Warfare system EW vehicle

Type: Mobile Electronic Warfare system EW vehicle

Manufacturer: designed and manufactured by two Moscow-based companies, VPK (Voyenno-promishlennaya kompaniya - Military-industrial company) for the vehicle and VNII Etalon (Vserossiyskiy naucsno-issledovatelskiy institut - Russian Scientific-Research Institute) for the Electronic Warfare (EW) system

Family: Leer

In Service: 2012-Present

Crew: 2 + 4 Soldiers

Liter/Stretcher Capacity: INA

Winch: The Leer 2 carries an electric winch with a pulling force of 4,000 kg and 20 m of wire rope

Note: This high mobility vehicle was modeled after the US HMMWV

Dimensions (Chassis: GAZ Tigr-M)

Length: m5.7

Width: m2.3

Height: m2.3

Weight, Combat: kg7,800

Automotive (Chassis: GAZ Tigr-M)

Engine Name: YaMZ-5347-10

Engine Type: Turbol-Charged Diesel

Engine Power: hp215

Cruising Range: km1,000

Speed, Maximum Road: km/h140

Speed, Maximum Off-Road: km/h80

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.4

Trench: m0.5

Fording Depth: m1.3

Note: To protect the engine from small-arms fire, the bonnet is armoured

Communications

Primary: INA

Electronic Warfare Equipment

Electronic Warfare Equipment Name: Lorandit

Mission Sets: ESM, EA

Electronic Warfare (EW) Type: The Leer 2 is a mobile technical control, electronic emulation and electronic countermeasures system Leer-2 is designed for developing radio emitters, jamming and suppressing radio-electronic means including cellular phone systems

Operate on the Move: Yes

Operate Stationary: Yes

Antennas: All the antennas of the electronic warfare system Leer-2 are mounted on a platform fitted on the vehicle roof. In static position, two telescopic antennas can also be deployed on the vehicle roof

Maximum Range: INA

EW Components: The Lorandit system of the Tigr-M MKTK REI PP includes technical control and electronic intelligence automated workstation, electronic countermeasures equipment, communication and power supply equipment and a specialized mission software

Note #1: In addition, the system can be used as part of field tests to create realistic tactical electronic situations and imitating the operation of various radio-electronic systems

Main Gun

Note: The Leer 2 is not equipped with any Armament, due to the EW equipment

Fire Control

FCS Name: INA

Computerized FCS: Yes

Gunner Sight System: PC-SU IPTSYU.201219.026

TV Camera: Yes, low-level TV camera that provides a range of detection and identification of the target sample with a narrow field of vision - not less than 2500 m

Laser Rangefinder: Yes, with a range of 100-3,000 m

Protection

Armor: The hull of Leer 2 provides protection against small-arms fire, shell fragments and IED blasts

Applique Armor: Available

Amored Hood: Yes

Doors and Windows: The hull and door windows are bulletproof and the vehicle’s spall liners protect personnel against spalls if the hull is hit by bullets or fragments and exclude ricochet from the opposite side if the hull is pierced

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes

Fire Extinguishing System: Yes

Notes:

The Leer-2 is a jamming system based on the Lorandit family of electronic warfare systems Tigr armored vehicle and capable of imitating electronic weapon systems and monitoring the electromagnetic environment during combat training. The Leer-2 is designed for developing radio emitters, jamming and suppressing radio-electronic means including cellular phone systems. In addition, the system can be used as part of field tests to create realistic tactical electronic situations and imitating the operation of various radio-electronic systems. The Leer-2 is based on the 8-ton class Tiger-M 4x4 high mobility tactical armored vehicle.

1L269 Krasukha-2 Russian 8x8 Mobile Electronic Warfare (EW) System







Tiers:



Variants:

- **1L269 Krasukha-4:** The Krasukha-4 broadband multifunctional jamming station is mounted on a BAZ-6910-022 four-axle-chassis. Like the Krasukha-2, the Krasukha-4 counters AWACS and other airborne radar systems. The Krasukha-4 has the range to effectively disrupting low Earth orbit (LEO) satellites and can cause permanent damage to targeted radio-electronic devices. Ground based radars are also a viable target for the Krasukha-4

System

Alternative Designation: 1L269 Krasukha-2
Type: 8x8 Mobile Electronic Warfare System
Manufacturer: KRET corporation, BAZ (for wheeled platform of Krasukha-4)
Family: 1L269 Krasukha
Mission: The Krasukha-2 is intended to jam AWACS at ranges of up to 250 kilometres (160 mi)
Crew: ea3
Payload Capacity: tons18-20
Chassis: BAZ-6909
Note: The Krasukha-2 guards mobile high priority targets such as the 9K720 Iskander SRBM

Dimensions (Chassis: BAZ-6909)

Length: m11.3
Width: m2.75
Height: m2.85
Weight, Empty: tons22

Automotive (Chassis: BAZ-6909)

Engine Name: YaMZ-8424.10

Engine Type: Diesel

Engine Power: hp470

Cruising Range: km1,000

Speed, Maximum Road: km/h70

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m2.0

Fording Depth: m1.2

Communications

Primary: INA

Radar Jamming System

Type: Krasukha-2

Purpose: The Krasukha-2 is intended to jam AWACS

Jamming Maximum Range: km250

Radar Guided Missile Jamming: Yes

Note: The missiles, once jammed, are then provided a false target away from the original to ensure that the missiles are no longer a threat

Protection

Armor: It is also proposed with concealed built-in internal armor

Applique Armor: Available

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: No

IR Signature: No

Notes:

The 1L269 Krasukha-2 is ground-based electronic warfare (EW) system intended to neutralize Airborne Warning and Control Systems (AWACS) by jamming its radar at ranges of up to 250 kilometers. Besides, the Krasukha-2 can provide protection to ground forces on the march by jamming any airborne radar, radar-guided weapon system or radar-guided missile. The missiles jammed by the 1L269 are unable to reach their intended target because they are provided with a false target away from the

real one. The false target is finally hit by the jammed missile or weapon system. The Russian Armed Forces use the 1L269 Krasuha-2 to protect the Iskander tactical ballistic missile units. The KRET corporation produces this EW system integrated onto a tactical truck system. The 1L269 Krasukha-2 is mounted on a BAZ-6909 Special Wheeled Chassis.

Groza R-934UM2 Russian 6x6 HF/VHF Electronic Warfare (EW) System







Tiers:

1 2 3 4

Variants:

- **R-934UM:** INA
- **R-378AM:** INA

System

Alternative Designation: Groza R-934UM2

Type: HF/VHF Electronic Warfare (EW) System

Family: R-934 Family

Crew: INA

Purpose: detecting emission sources, higher direction-finding accuracy, digital jamming signal generation, positioning and jamming of radio lines with programmed operational frequency readjustment or simultaneously 16 radio lines operating at fixed frequencies

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Prime Mover: MT-LB

Electronic Warfare System

↳*System*

Name: Groza R-934UM2

Type: Seach, Detection and Jamming

Frequency-Hopping radio Communication Links: Yes

Manufacturer: KB Radar

Radio Lines: ea16 radio lines operating at fixed frequencies
VHF/UHF Fixed-Frequency: Yes
Detector/Direction-Finder: Yes, with receiving and direction-finding antenna-feeder system
Workstations: two automated operator workstations
Channel Radio Transmitter: Nine-channel radio transmitter
Transmitting Antenna-Feeder Systems: seven transmitting antenna-feeder systems
Generators: transporter truck with two power generators and shelter

Notes:

The R-934UM2 Groza is a jamming stations is part of electronic warfare system developed by “KB Radar”. The R-934UM2 Groza is a similar to the R-934UM and R-378AM, but it enables higher speed of detecting emission sources, higher direction-finding accuracy, digital jamming signal generation, positioning and jamming of radio lines with programmed operational frequency readjustment or simultaneously 16 radio lines operating at fixed frequencies.

TRC 274 French Mobile Multirange Communications Jamming System



Tiers:



System

Alternative Designation: TRC 274

Type: Multirange Communications Jamming System

Manufacturer: INA

Chassis: INA

Crew: eaINA

HF: 1.5-30 MHz

Operation: The modular TRC 274 digital jamming system is designed to neutralise military, paramilitary and civilian communication links and networks operating in the 1.5 MHz to 1 GHz (extension up to 3 GHz if required) frequency range. The equipment comprises electronic countermeasures and support subsystems and is capable of intercepting and monitoring signals, establishing their frequencies and setting up an optimum jamming strategy based on integral emitter and jamming mode databases. TRC 274 can operate as a stand-alone unit or as part of an integrated electronic combat architecture and can identify targets via its own electronic support subsystem or from cues supplied by external battlefield electronic warfare equipments.

Jamming Functions: The system incorporates automatic jamming functions and makes use of programmable algorithms to generate the best output for the particular emitter type (fixed-frequency, frequency hopper or burst) in the particular environment (high- or low-density network).

C/UHF: 20-3000 MHz

Embedded ESM for Smart Jamming: 80 MHz bandwidth

High ECM Performances: 60 MHz bandwidth

Waveforms: Open library of jamming waveforms

Frequency Range: 1.5-1,000 MHz (1.5-30 MHz and 20-1,000 MHz sub-bands, 3 GHz option)

Output: up to 1 kW

Chirp: <1 MHz

Note: Other system features include a Windows NT man/machine interface, 100 W to 1 kW amplifier output power (other values available as options) and emitter specific jamming and deception modes.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

TRC 274 is a high performance wideband tactical jammer designed to degrade, disrupt, deny, neutralize or deceive all types of radio communications, from VHF to UHF frequency bands. HF and SHF versions are also available. It can be integrated in a comprehensive Electronic Warfare system or rely on its own ESM capacity to carry out in autonomous mode any terrestrial, naval or airborne communication jamming missions. *High performance ESM capacity to provide efficient detection of targets *Powerful up to 1kW effective power *Able to be integrated in all kinds of platforms (land, air, naval) *Compatible with mission planning solution for jamming optimization *HF: 1.5-30 MHz *V/UHF: 20-3000 MHz Multi-modes ECM capacity: *Selective jamming (spot, responsive) *Smart barrage jamming *Deception *Follower-jamming *DRFM repeater

Groza-R2 Russian Counter-Multicopter Jammer





Tiers:



System

Alternative Designation: Groza-R2
Type: Counter-Multicopter Jammer
Manufacturer: INA
Crew: ea1
Frequency Bands of Control Channels Jammed: 2400-2480 MHz 5725-5850 MHz
Frequency Band of Satellite Radio Navigation Systems Jammed: 1570-1610 MHz
Jamming Range of UAV Satellite Radio Navigation Systems: minimum 1 km
Jamming Range of UAV Control Channel: up to 1 km (when a multicopter is at least 200 m away from the operator's control console)
Output Power at Frequencies of 2.4 GHz: minimum 4 W
Output Power at Frequencies of 5.8 GHz: minimum 3 W
Output Power at Frequencies of GPS and GLONASS Satellite Radio Navigation Systems: minimum 1 W
Continuous radiation time: minimum 30 min.
Power supply: storage battery
Protection rating IP: IP54

Dimensions

Length: INA
Width: INA

Height: INA

Weight, Combat: maximum 6.5 kg

Notes:

The “Groza-R2” counter-multicopter jammer is designed for prevention of trespassing by multicopters into the territory of the protected facilities. The “Groza-R2” fulfills the following tasks: - jamming of multicopter control channels; - jamming of on-board equipment of GPS and GLONASS satellite navigation systems.

→Land Based Electronic Protection (EP) Systems

Rtut-BM 1L262E (SPR-2) Russian Mobile Electronic Warfare (EW) System





Tiers:



System

Alternative Designation: Rtut-BM; SPR-2; 1L262E

Manufacturer: KRET corporation

Crew: ea2

Chassis: MT-LB

Emplacement Time: under 10 min

Displacement Time: under 10 min

Dimensions

Length: m6.45

Width: m2.86

Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Electronic Warfare System

Coverage Radius: 400 m

Continuous Operation Time: 6 min

Protection Probability: %

Television Antenna Coverage: 500,000 square meters) or a semi-sphere of 400 meters radius.

Antenna Rotation: -/+150-degree

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: INA

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The Rtut-BM, 'Mercury-BM' in English, is an electronic warfare (EW) system intended to protect troops and equipment from artillery rockets and shells equipped with proximity fuses which explode at 3-5 meters of altitude. The Rtut-BM affects the proximity/radio-controlled fuse making it explode at higher altitudes keeping the troops and equipment safe. Besides, the system is able to neutralize radio-frequencies employed by the enemy's communications. The Rtut-BM system is deployed on an MT-LB armored vehicle fitted with a television antenna which provides coverage for an area of 50 hectares (500,000 square meters) or a semi-sphere of 400 meters radius. The antenna can rotate -/+150-degree and its jamming signal can last for six minutes. This EW system requires a crew of two-man and can be ready for jamming within 10 minutes. The KRET corporation has been manufacturing and delivering KRET systems to the Russian Armed Forces since 2011.

→Land Based Electronic Warfare Support (ES)

85V6-V (Orion) Russian Electronic Intelligence System



Tiers:



System

Alternative Designation: 85V6-V
Type: Electronic Intelligence System
Crew: INA

Dimensions (Ural 375)

Length: 7,350 mm
Width: 2,960 mm
Height: 2,980 mm
Curb Weight: 8,400 kg

Automotive (Ural 375)

Engine Name: 7.0L ZIL-375YA
Engine Type: V-8 Diesel
Engine Power: hpINA
Transmission: 5-speed manual + 2-speed transfer case
Cruising Range: INA
Speed, Maximum Road: 76 km/h
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Fuel Capacity: 79+16 gal. Fuel economy: 4.9 mpg (at 19-25 mph), 2.94 mpg (city cycle).

Electronic Warfare System

↳***System***

Name: 85V6-A Vega

Type: Electronic Intelligence System

Operating frequency band,: MHz30 - 1,700

RMS direction-finding instrument error, deg, not more than: in 30-150 MHz range: 3

RMS direction-finding instrument error, deg, not more than: in 150-1,700 MHz range: 2

Operating frequency band scanning period,: snot more than 10

Instant scan swathe: MHz6,0

Number of channels recording LF receiver output signals: 3

Number of listening channels: 1

Power consumption: kWnot more than 5

Continuous operation time,: hours24

Station deployment time: min40

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Mission: The 85V6-V ELINT system is designed to perform radio reconnaissance and location of ground, surface and airborne radio-emitting sources, disclosure of command, control and communications systems, radio control and detection of radio-emitting sources. Composition • three detection and direction-finding stations providing radio-emitting sources detection, direction finding, classification, analysis and registering • central classification and control station Each station has autonomous power supply and is accommodated in two air-conditioned box-bodies mounted on KamAZ trucks. The detection and direction-finding station is designed for all-round detection and direction finding of radio-emitting sources, radio transmission classification, signal analysis and intercept. Stations can be used both autonomously and make part of the 85V6-V ELINT system. The central automated classification and control station is designed to control operation of detection and direction-finding stations, to locate radio-emitting sources, to collect, process and display electronic situation data within coverage of the 85V6-V system. It ensures the system's autonomous operation and integration into other automated SIGINT/EW systems. The central control station executes the following operations: digital processing of bearings data, determination of radio-emitting sources coordinates, and their mapping on cartographic background; two-way coded voice/data communications between detection/direction-finding stations and SIGINT/EW system control post stationed at the range of up to 15 km; mission planning and control for up to three detection/direction finding stations; automated ELINT data collecting, processing, classification and database management; comparative electronic situation analysis for different data combinations and change dynamics; recording of operation results. In general, the 85V6-V system provides: • automatic panoramic search, detection, measurement of signal parameters and classification of types of radio transmissions; • radio-emitting source detection, direction finding and location, and position display against map background; • collection, accumulation and comparative analysis of electronic situation data for different combinations and change dynamics; • radio intercept with data recording; • technical analysis of radio-emitting source signals; • automated preparation of standardized messages. The 85V6-V system can be used both autonomously and within automated SIGINT/EW systems.

Vera-E Czech Republic Electronic Support Measures System





Tiers:



Variants:

- **Tactical PSS VERA-E:** This is a variant of the export VERA-E PSS. System components are housed in a vehicle for faster cell transfer and implementation hiding. The system usually comprises three ESM receivers arranged in an equilateral triangle, with each station covering a 120-degree, fan-shaped area, for a total of 360 degrees.
- **VERA-Next Generation (VERA-NG):** This is the successor system to the VERA-E. VERA-NG utilizes new ESM technology that uses the combined time difference of arrival (TDOA) features of the VERA-E with user-friendly features providing faster deployment, according to Jane's Defence Weekly for May 6,2009.
- **VERA-P3D:** The VERA-P3D is a commercialized variant with a shorter range. Its primary use is to monitor the response of the transmitter ground facilities at airports.
- **VERA-AP:** The VERA-AP is a commercialized variant used in long-range surveillance for air traffic and civil works. It operates in the band range from 1030-1090 Mhz.
- **VERA S/M:** The first of two mobile VERA S/M systems was delivered on Dec. 7, 2004, to the 53rd Passive Surveillance Center at the ceremony in Ceske Budejovice, Czech Republic. In 2006, the system joined a spearhead within the NATO Response Force (NRF) that is known as a Very High Readiness Joint Task Force (VJTF). It also serves as a back-up for radar systems of the Air Traffic Control Center of the Czech Republic, according to the Czech Ministry of Defense.

System

Alternative Designation: Vera-E

Type: Electronic Support Measures System

Crew: INA

Maximum Range: 450 km

Power COnsumption: 250 W

Field of View: 120-deg 360-deg (option)

Frequency Range: 1-18 GHz, 0.1-1 GHz (option), 18-40 GHz (option)

Mode Of Operation: The deployed system typically comprises a central site (containing the signal processing equipment and an ESM receiver) and two or three side sites containing only an ESM receiver. The side sites relay the signals received to the central site over a point-to-point microwave link. The central site uses the known propagation delay from the side sites to estimate the TDOA of the pulses at each site. The TDOA of a pulse between one side site and the central site locates the target on a hyperboloid. A second side site provides a second TDOA and hence a second hyperboloid. The intersection of these two hyperboloids places the target on a line, providing a 2D measurement of the target's location (no height). A third side-site provides a third hyperboloid, which, when intersected with the line provided by the other two side sites, provides a full 3D location of the target. This process is known as multilateration. The height of a target with an SSR Mode C or Mode S transponder can also be provided by decoding the Mode C or Mode S response directly, which is the normal mode of operation for the civilian VERA-AP system.

System Accuracy: System accuracy is typically better than a microwave surveillance radar, and is a function of the deployment geometry, the inherent timing accuracy of the central site, the bandwidth of the pulse being detected and the

signal-to-noise ratio. Wider separations of the side sites from the central site provide better accuracies – but at the expense of a reduced area of common coverage. Typically side sites are deployed 15-40 km from the central site, providing a reasonable compromise of coverage and accuracy. The system is generally line-of-sight limited, with a nominal range of 450 km, the normal radio horizon. Detection of targets is within a sector of approximately 120 degrees, although IFF and SSR targets are detected using a dedicated omnidirectional antenna, and hence may be seen over 360 degrees. Up to 200 targets can be automatically tracked simultaneously, with an output rate adjustable from 1 to 5 seconds.

Exploited Emitters: The current generation sensor can only detect and track pulsed emissions, due to the requirement to measure the time of arrival of pulses. The receivers operate in the frequency range of 1-18 GHz and typically exploit secondary surveillance radar (SSR) transponders, identify friend or foe (IFF) transponders, airborne radars, weather radars, tactical air navigation (TACAN) transponders, distance measurement equipment (DME) beacons, digital communications signals and pulsed jamming signals.

Dimensions

Receiving Station Length: 1.3 m

Receiving Station Width: 0.9 m

Receiving Station Weight: 120 kg

Antenna Unit Length: 2.0 m

Antenna Unit Width: 0.9 m

Antenna Unit Weight: 300 kg

Notes:

VERA-E is the export version of the military ESM version of the system, also referred to as the VERA-S/M in its national mobile version. In addition, the shorter range VERA-P3D system is marketed for highly accurate monitoring of transponder-equipped ground vehicle movement at airports. The manufacturers also market an ESM triangulation system known as BORAP. VERA - VERA passive radar (in Czech known as Věra) is an electronic support measures (ESM) system that uses measurements of time difference of arrival (TDOA) of pulses at three or four sites to accurately detect and track airborne emitters. It is reportedly able to detect military "invisible aircraft".

Borisoglebsk-2 (RB-301B) Russian Multi-Functional Electronic Warfare (EW) Weapon System






Tiers:



System

Alternative Designation: Borisoglebsk 2
Family: Borisoglebsk
Manufacturer: UIMC to the Russian armed forces
In Service: 2015-Present
Mission: esigned to disrupt communications and GPS systems
Crew: eaINA
Note: esigned to disrupt communications and GPS systems

Dimensions (Chassis: MT-LB)

Length: m6.45
Width: m2.86
Height: m1.86
Weight, Combat: kg11,000
Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive (Chassis: MT-LB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)
Engine Type: Diesel
Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Communications

↳*R-173*

Frequency Range: 30.00 - 75.99 MHz

HF Output: W30

Mudulation: FM

Display: Digital

Entry of Frequency: Touchpad

Preset Channels: 10

Digital Transmission: INA

Sensitivity: 1.5 uV

Range: K50

Operational Voltage: 27+-2v

Weight: kg43

Dimensions: mm428 × 222 × 238

Electronic Warfare System

Maximum Range: INA

Note #1: "The 'Borisoglebsk-2' when compared to its predecessors has better technical characteristics: wider frequency bandwidth for conducting radar collection and jamming, faster scanning times of the frequency spectrum, and higher precision when identifying the location and source of radar emissions, and increased capacity for suppression."

Note #2: "Borisoglebsk-2 can suppress all modern radio communications from the world’s most developed countries" (stated by Mikhail Artemov, Chief Designer of Electronic Warfare and weapon control systems)

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: PP-61AM, 2.6x

Computerized FCS: N/A

Thermal Sight Vehicle Commander: N/A

Thermal Sight Gunner: N/A

Main Gun Stabilization: N/A

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

Borisoglebsk 2 is a Russian, MT-LB ground vehicle-mounted, multi-functional electronic warfare (EW) weapon system. It was developed by Sozvezdie over a six-year period, from 2004 to 2010. The system was however not ordered, or for other reasons not manufactured or delivered, at once to the Russian military. Starting in February 2015, it has been manufactured and delivered by UIMC to the Russian armed forces. It is designed to disrupt communications and GPS systems. Borisoglebsk 2 achieved initial operating capability in 2010 but was not ordered and delivered to the Russian military until February 2015. Rossiyskaya Gazeta reported that Borisoglebsk 2 was the core system for electronic warfare in the Russian Army, controlling four types of jamming units from a single point. Experimentation and testing were conducted after the first deliveries to the Russian armed forces. The system was in active use by the summer of 2015, in eastern Ukraine. It has been claimed that the system has caused difficulties for NATO, supposedly defeating GPS and mobile telephony systems in parts of that country. The United States military commander in Europe, general Frederick Hodges stated to Defense News, that Russia is conducting electronic warfare in eastern Ukraine that even NATO would have difficulties resisting, but did not mention Borisoglebsk 2. US

advisers sent to Ukraine have learned about Russian electronic warfare from the Ukrainian Army, though Ukraine never has had access to this new EW-technology. The American advisers are nevertheless impressed even with earlier Russian EW-technology in the hands of the Ukrainian Army

RP-377L (Lorandit) Russian Compact Multifunctional Radio Monitoring, Direction-Finding and Jamming Complex



Tiers:



System

Alternative Designation: RP-377L (LORANDIT)

Type: Compact Multifunctional Radiomonitoring, Direction-Finding And Jamming Complex

Chassis: The RP-377L complex can be vehicle mounted or placed in two cases and four canvas bags, and be carried by 2-3 persons.

Crew: 2-3

Displacement: Less than 15 min

Emplacement: Less than 15 min

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Note: The RP-377L complex can be vehicle mounted or placed in two cases and four canvas bags, and be carried by 2-3 persons.

Electronic Warfare System

Frequency Range, Search and Detection: 20-2000 MHz

Frequency Range, Direction and Finding: 25-2000 MHz

RMS Direction-Finding Error: not more than 3 degrees

Instant Monitoring Bandwidth: 180-1200 kHz

Types of Searching Signals: FM, AM, SSB, FSK, PSK

Transmitter Output: greater than 100 W

Automotive

Note: The RP-377L can be vehicle mounted or carried by 2-3 people.

Notes:

The RP-377L (LORANDIT) Compact Multifunctional Radio monitoring, Direction-Finding and Jamming Complex provides for the search of, position location, and jamming of VHF/UHF radio electronic communications. The RP-377L complex can be vehicle mounted or placed in two cases and four canvas bags, and be carried by 2-3 persons. Depending on mission requirements, multiple complexes can work together, with one complex configured as a command post.

85V6-A Vega Russian Electronic Intelligence System



Tiers:

1 **2** 3 4

System

Alternative Designation: Vega 85V6-A
Type: Electronic Intelligence System
Crew: INA

Dimensions (Ural 375)

Length: 7,350 mm
Width: 2,960 mm
Height: 2,980 mm
Curb Weight: 8,400 kg

Automotive (Ural 375)

Engine Name: 7.0L ZIL-375YA
Engine Type: V-8 Diesel
Engine Power: hpINA
Transmission: 5-speed manual + 2-speed transfer case
Cruising Range: INA
Speed, Maximum Road: 76 km/h
Speed, Average Cross: INA
Speed Maximum Swim: Not Amphibious
Fuel Capacity: 79+16 gal. Fuel economy: 4.9 mpg (at 19-25 mph), 2.94 mpg (city cycle).

Electronic Warfare System

↳*System*

Name: 85V6-A Vega
Type: Electronic Intelligence System

Number of Radio emitting sources simultaneously reported to superior CP: up to 60

ELINT update rate: s10

ELINT Frequency Range, Basic: 0,2 – 18

ELINT Frequency Range, Expanded: up to 40

Scanning Range, Azimuth: deg360

Scanning Range, Elevation: deg0-20

Minimum Scan Period: s2

Above-Horizon Target Detection Range: kmnot less than 400

Number of Vehicles with Trailers: 4

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: INA

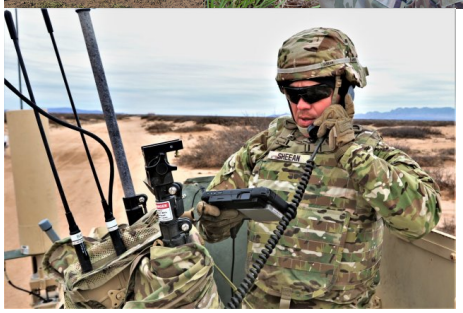
Smoke Equipment: INA

Notes:

Mission The 85V6-A Vega ELINT system is designed for detection, location, identification, classification and tracking of ground/air/maritime targets by their radio emissions. The 85V6-A Vega system can provide radio control and information support to groupings of AD, ELINT and EW units, as well as to early warning, air traffic control, and jamming source detection systems. Composition: • three signal detection/direction finding/ classification stations • ELINT system control post In combat the Vega stations are placed up to 30 km apart with the control post usually deployed near one of them.The Vega station can be used autonomously and within AD, EW, border guard and other combat units. The ELINT system's control post is designed to define planar coordinates and motion parameters of radio emitting sources based on data provided by the three stations, as well as to couple with the superior control centre. Bearings and other target data are transferred from the detection and direction finding stations to the control post via data links. Based on these data, target locations and tracks are calculated by means of triangulation and visualized on the digital map of the monitored region with false tracks eliminated by programme methods and identified with bearings of objects. Functional testing of the station is to be accomplished and ELINT summaries registered periodically.

VROD/VMAX American Versatile Radio Observation and Direction System



Tiers:

1 2 3 4

System

Alternative Designation: VROD/VMAX; Valcour Max (VROD Modular Adaptive tX)
Crew: ea1
Length: in12
Width: in5
Height: in2
Weight (with Battery): lbs22
DF Antenna Dimensions: 11in x 17in
Man-Portable: Yes
VHF Capable: Yes
Vehicle Mounted Capable: Yes
Controller Type: Android Controller with standard swipe/touch gestures (wired/wireless)
Spectrum Display: MHz10-200
RX/TX Bandwidth (Instantaneous): MHz20
Bandwidth: MHz20-40
UHF Capable: Yes
Global Position System (GPS): Yes
Wi-Fi Capable: Yes
SDR Architecture: Yes
Fast Scanning ES/EA/DF Capable: Yes

Modular Amplifiers: 5 watt and 100 watt
ECM Interoperable: Yes
Note: The software of the VROD/VMAX can be upgraded in the field by the individual user

Notes:

Description: VMAX is a low-power, wideband, fast-scanning, software defined transceiver and direction finding system that can detect, locate, monitor, and jam Radio Frequency (RF) signals. The system can be utilized in multiple configurations: man-worn/pack, vehicle based, and fixed site. Barely the size of “a lightweight backpack,” the vehicle- and -infantry portable kits come with two primary capabilities: VROD (Versatile Radio Observation & Direction) to “detect and understand” enemy electromagnetic signals, and the so-called VMAX to “search and attack” with “electronic attack effects”. Operational Relevance: Networked VROD & VMAX sensors at the squad level provides the ability to identify Signals of Interest (SOI), and leverage the system’s signal intercept, monitoring, direction finding (DF), and Time Difference of Arrival (TDOA) capabilities to provide near real time indications & warning (I&W) threat tipping, electromagnetic spectrum monitoring (ESM), and geolocation information to the operational commander.

Moskva-1 (1L265) Russian Electronic Warfare Vehicle





Tiers:



System

Alternative Designation: Moskva-1; 1L265
Type: Electronic Warfare Vehicle
Manufacturer: KRET corporation,
Family: Moskva
In Service: 2014-Present
Chassis: Kamaz 6350 8x8 military truck chassis
Crew: ea4
Passenger Capacity: INA
Maximum Effective Range (Airborne Targets): km400
Radar Type: Passive Radar, capturing a targets radiation, while remaining invisible to the enemy.
Scan Airspace: Yes
Control and Reconnaissance Command Center: Yes
Capability to detect Enemy Shells: Yes
Recongintion Module: 1L265E
Control/Radar Station: 1L266 / 1L266E
Emplacement: min45
Displacement: minINA
Operational Temperatures: 40 to 50 degrees Celsius

Dimensions (Chassis)

Length: m9.3
Width: m2.5
Height: m3.25
Weight, Combat (Chassis Only): kg12,450

Automotive

Engine Name: KamAZ-740.50-360

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km1,000

Speed, Maximum Road: km/h95

Speed, Average Cross: km/hINA

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.6

Trench: m1.4

Fording Depth: m1.75

Fire Control

Laser Target Desinator: INA

Protection

Armor: The cab can be fitted with a class 5a armour which provides a protection against firing of small arms AKM 7.62mm

Applique Armor: Available

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

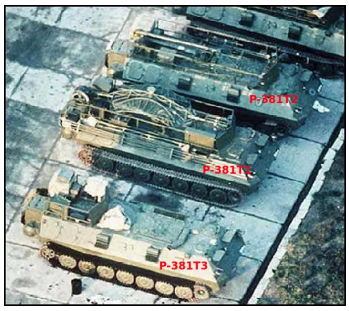
Smoke Equipment: INA

IR Signature: INA

Notes:

The Moskva-1 is a modern radar complex able to see and accompany all airborne targets at a distance of 400 km. The system analyzes the airspace and, after detecting the enemy's radio emissions, transfers the data obtained to the means of electronic warfare to the air defense and air forces to neutralize the targets.

R-381T3 Russian Automatic Data Processing Station



Tiers:

1 2 **3** 4

System

Alternative Designation: R-381T3
Type: Automatic Data Processing Station
Manufacturer: ‘Proton’ engineering bureau in Kharkov
Chassis: MT-LB
Crew: INA
Mission Intercept and DF Frequency Range: 100 to 600 MHz
Frequency Range Against Airborne Targets: 100 to 425 MHz
Receiver Range, Ground Targets: 40 km
Receiver Range, Airborne Targets: 400 km
Direction Finding Range: 30 to 40 km
Bearing Accuracy: 1.8 degrees
Displacement Time: less than 10 minutes
Emplacement Time: less than 10 minutes
Receiver: R 313 M2
Radio Relay: R 343
Communication System: R111
Fax Machine/Printer: Argon-B
Recorder: P 180 M
NVG: PNW-57E
Aiming Circle: PAB-2

Dimensions (Chassis MT-LB)

Length: m6.45
Width: m2.86
Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive (Chassis MT-LB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, NBC Ventilator FWUA-100W-12

Smoke Equipment: No

Notes:

R-381T3 Automatic Data Processing Station. The 381T3 Automatic Data Processing Station is part of the R-381T Taran Complex. The R-381T Taran complex consist of 7 vehicles: 1 x R-381T3 – automatic data processing station 4 x R-381T2 – UHF radio monitoring station (30-100 MHz) 2 x R-381T1 – VHF radio monitoring station (1.5-30 MHz), aviation radio communication monitoring (100-400 Mhz), radio relay link monitoring (300-1000 MHz) The efficient range of the complex is 40 km (100 km for aviation frequencies monitoring). Radio station detecting time is 0.3 sec. Another variant of the complex consist of 5 vehicles: x1 R-381T3 x2 R-381T2 x2 R-381T1 It is also possible to use separate stations.

AZK-7M Russian 6x6 Automatic Sound Ranging System



Tiers:



System

Alternative Designation: AZK-7M

Type: Sound Ranging System

Manufacturer: INA

Configuration: 6x6

Chassis: Ural-43203

Mission: The AZK-7M automatic sound ranging system is intended to locate artillery batteries (guns) and mortars from the sound of gunfire and adjust friendly artillery fire from the sound of shell bursts. The system provides: search, direction finding and position-finding of the acoustic signal sources in a given zone of surveillance; display of the surveillance results on the monitor of the system commander's workstation; transmission of the surveillance information to higher authorities over radio and wired links.

Crew: CPs and CPs: 5 each

AZK-7m Package: The AZK-7M consists of one central point (CP) and three base points (BP). Its equipment is installed in four Ural-43203 trucks having special K2.4322M van bodies. Three vehicles accommodate equipment of the base points and one vehicle houses the central point.

Central Points: The main functions of the central point are: to receive telecode messages with the results of the processing of acoustic signals from all the base points of the system over radio and wired links; to determine the rectangular coordinates of targets when conducting reconnaissance and the rectangular coordinates of shell bursts when adjusting artillery fire; to provide information and technical exchange over radio and wired links with two external users.

Base Point: The main functions of the base point are: to deploy two sound stations (SS) on the terrain, with each SS including three sound locators (SL) and power supply; to survey the SS; to measure the surface meteorological parameters; to receive sound signals and determine the time of their arrival at the center of each SS and bearings of detected objects from the center of each SS; to transmit telecode data messages from each SS to the CP of the system over a radio or wired link.

Localization Range, Mortars: 5-8 km

Localization Range, Artillery Guns: 12-16 km

Localization Range, Ground Burst of Shells fired by 122mm and Larger Caliber Guns: 12 km

Localization Range, Air Bursts: 12-16 km

Surveillance Frontage, Three BPs Deployed: 10-12 km

Surveillance Frontage, Two BPs Deployed: 5-6 km

Time to Locate a Target: No more than 15 seconds

Time to Deploy, using Radio Communications: 1 hour

Time to Deploy, using Wire Communications: 2 hour

Number Of External Subscribers: 2

Range of Robust Wired Communications between CP and BP: Up to 5 km

Range of Robust Radio Communications between CP and BP: On the Move: 1 KM At the Halt: 10 km

Dimensions (Chassis: Ural-43203)

Length: m7.37

Width: m2.5

Height: m4.5

Weight, Empty: tons8

Payload capacity (on road): tons6

Payload capacity (off road): tons4.5

Maximum Tow Capacity: tons12

Automotive (Chassis: Ural-43203)

Engine Name: YaMZ-740

Engine Type: Diesel

Engine Power: hp210

Cruising Range: km1,000

Speed, Maximum Road: km/h85

Speed, Average Cross: km/h50

Speed Maximum Swim: km/hNot Amphibious

Gradient: deg62

Side Slope: deg40

Vertical Step: m0.55

Trench: m1.2

Fording Depth: m1.75

Protection

Armor: INA

Applique Armor: Available to protection against small arms fire and artillery shell splinters

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Personal CBRN equipment

Smoke Equipment: No

IR Signature: No

Notes:

The AZK-7M automatic sound ranging system is intended to locate artillery batteries (guns) and mortars from the sound of gunfire and adjust friendly artillery fire from the sound of shell bursts. The system provides: search, direction finding and position-finding of the acoustic signal sources in a given zone of surveillance; display of the surveillance results on the monitor of the system commander’s workstation; transmission of the surveillance information to higher authorities over radio and wired links. The AZK-7M consists of one central point (CP) and three base points (BP). Its equipment is installed in four Ural-43203 trucks having special K2.4322M van bodies. Three vehicles accommodate equipment of the base points and one vehicle houses the central point. The main functions of the central point are: to receive telecode messages with the results of the processing of acoustic signals from all the base points of the system over radio and wired links; to determine the rectangular coordinates of targets when conducting reconnaissance and the rectangular coordinates of shell bursts when adjusting artillery fire; to provide information and technical exchange over radio and wired links with two external users. The main functions of the base point are: to deploy two sound stations (SS) on the terrain, with each SS including three sound locators (SL) and power supply; to survey the SS; to measure the surface meteorological parameters; to receive sound signals and determine the time of their arrival at the center of each SS and bearings of detected objects from the center of each SS; to transmit telecode data messages for each SS to the CP of the system over a radio or wired link.

R-381T2 Russian UHF Radio Monitoring Station





Tiers:



System

Alternative Designation: R-381T2	
Type: UHF Radio Monitoring Station	
Manufacturer: Proton’ engineering bureau in Kharkov	
Description: For intercept and direction finding units. 5 to 7 seconds for recognition of targeted voice and data transmissions.	
Chassis: KamAZ-5350	
Cab Seating: 1+2 Men	
Crew: INA	
Passenger Capacity: INA	
Configuration: 6x6	
UHF Frequency: 30-100 MHz	
Displacement Time: Less than 10 minutes	
Emplacement Time: Less than 10 minutes	
UHF Interception Range: Greater than 40 km	
Direction Finding Range: 30 - 40 km depending location and optical verification	
Average Accuracy: 1.8 deg	

Dimensions (Chassis: KamAZ-5350)

Length: m7.85	
Width: m2.5	
Height: m3.29	
Weight, Combat: tons9.2	
Maximum Load: tons6	

Automotive (KamAZ-5350)

Engine Name: KamAZ-740.13-260 Diesel

Engine Type: Diesel

Engine Power: hp260

Cruising Range: km1,000

Speed, Maximum Road: km/h100

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.6

Trench: m0.6

Fording Depth: m1.75

Maximum Load: tons6

Note #1: Engine is also equipped with cold weather starting device and can be started at temperatures down to -50°C

Note #2: Vehicle has a full-time all-wheel drive and is fitted with a central tyre inflation system

Protection

Armor: Protection from small arms fire and shell splinters.

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The R-381T2 Russian UHF Radio Monitoring Station is part of the R-381T (Taran) Automatic Radio Intelligence Complex. The R-381T Taran complex consist of 7 vehicles: 1 x R-381T3 – automatic data processing station 4 x R-381T2 – UHF radio monitoring station (30-100 MHz) 2 x R-381T1 – VHF radio monitoring station (1.5-30 MHz), aviation radio communication monitoring (100-400 Mhz), radio relay link monitoring (300-1000 MHz) The efficient range of the complex is 40 km (100 km for aviation frequencies monitoring). Radio station detecting time is 0.3 sec. Another variant of the complex consist of 5 vehicles: 1 x R-381T3 2 x R-381T2 2 x R-381T1 It is also possible to use separate stations.

Kolchuga Russian Electronic Warfare Support Measures System



Tiers:



Variants:

- **Exports:** Pakistan has expressed interest in purchasing the Kolchuga radar. Ukraine has offered it to Pakistan to counter India's Swordfish Long Range Tracking Radar. In 2002 the U.S. State Department accused Ukraine of selling Kolchuga to Iraq, based on recordings of the then Ukrainian president Leonid Kuchma supposedly made by Mykola Mel'nychenko. This was followed by political steps from United Kingdom and the United States. No material confirmation has been found in Iraq. See Cassette Scandal for further information. Unconfirmed reports in September 2006 suggested a sale was made to Iran although this was denied by the Ukrainian government. On 20th of January 2019, Ukrainian news Sources confirmed a Sale of Systems to Israel and Saudi Arabia.

System

Alternative Designation: Topaz Kolchuga

Type: Electronic Warfare Support Measures System

Crew: INA

Band: X/Ku-bands.

Mode of Operation: Kolchuga is an electronic support measures system that employs two or more sites to locate emitters by triangulation. The system is vehicle mounted and comprises a large vertical meshed reflector, with two smaller circular parabolic dishes beneath and a pair of VHF-to-microwave log periodic antennas above. The dishes may exploit amplitude monopulse techniques for improved direction finding, whilst the angled spacing of the log-periodic antenna suggests that they may use phase interferometry to improve angle measurements. Various smaller antennas, presumably for inter-site communications are to the side and rear of the dish. The detection range is one of the best in its class, but it is highly dependent on the emitted power of the transmitter being tracked, and requires satisfaction of the line of sight condition to at least two receiving sites for triangulation (compared with three sites for a multilateration system such as the VERA passive sensor). A Kolchuga complex can detect and locate air and surface targets and trace their movement to a range generally limited only by the common line-of-sight of the stations.

System Parameters: According to the manufacturer's brochure (from AIDEX 1997), the upgraded Kolchuga-M is equipped: *With four antennas in the VHF, UHF and SHF radio bands with narrow and wide beams *With parallel receivers allowing the instant discovery and analysis of signals of radio technical equipment (RTE) in the range 100 MHz -18 GHz and continual tracking across the entire band. [Other sources claim from 130MHz to 18GHz, and a 36 channel preset receiver]. *With sensitivity of approximately -145 dBW *With equipment for the analysis, processing and continual calculation and tracking of coordinates by triangulation and chronometrical-hyperbolic method. *With equipment for the identification, operative displaying of information, long term memory and recording of the results of processing. The brochure also claims that the system provides: *The detection, analysis of signals with pulsed and continuous waves and resolution of practically all known radio technical equipment (RTE) deployed on ground, sea and air platforms, including radar units of all classes, identification systems, air traffic control system and navigation systems *The composition, character of operation and flight paths of RTE in a zone 600 km deep with complete exception of blind zones and continual high accuracy *The detection of take-off of aerial targets and their formation in groups at a distance exceeding that of modern radars. *The direction of arrival of solitary and group targets and target indication to active facilities of anti-aircraft systems. Special inhibitory sorters omit up to 24 interfering signals, and tracking sorters make it possible to synchronously sort out and track signals from 32 targets

Maximum Range: INA

Maximum Altitide: INA

Target Identification: Kolchuga is able to detect and identify many types of radio devices mounted on ground, airborne, or marine objects. Target detection relies only on an emitter having sufficient power and being within Kolchuga's frequency range. Target identification, however, is more complex and is based on the measurement of different parameters of the transmitted signal—such as its frequency, bandwidth, pulse width, pulse repetition interval, etc. Kolchuga has been reported to use around forty different parameters when identifying a target. These parameters are compared to a database in order to identify both the type of emitter and, in some cases, even the specific piece of equipment (by identifying the unique signature or "fingerprint" that most transmitters have, due to the variations and tolerances in individual components). The database within Kolchuga is said to have the capacity to store around three hundred different types of emitter and up to five hundred specific signatures for each type.

Claimed Band Coverage: Claimed band coverage extents from 130 MHz (VHF) up to the X/Ku-bands.

Claimed Sensitivity: Claimed sensitivity is -110dBW to - 155 dBW. Track capability is claimed to be 32 concurrent targets.

Emplacement Time: INA

Displacement Time: INA

Speculation of Performance: Since becoming publicly known following the Cassette Scandal, the capabilities of Kolchuga have been the source of many rumours and uninformed speculation in forums such as. Many observers have a tendency to credit it with magical powers of detection. Many of these do not stand up to detailed engineering analysis, or have not been confirmed, but are recorded in this section for completeness, together with reasons for doubting the claim. Note that the material in this section should not be regarded as accurate. Claims include: *That Kolchuga has a range of 800 km. It will certainly have the sensitivity to see high power sources at such a range. However, basic line-of-sight arguments outlined in the sections above show that this would require aircraft to be flying at impractically high altitudes and/or for the Kolchuga stations to be deployed on very high mountains. The claim is thus technically possible but operationally very unlikely. *That Kolchuga can detect US stealth aircraft by their radio and radar emissions. Whilst technically possible, stealth aircraft do not radiate when in battle, so this mode of operation is militarily irrelevant. *Kolchuga is sufficiently sensitive to detect US stealth aircraft from unconventional sources of RF emissions, including radiation from exhaust trails and electromagnetic interference from the engine. (Technically the power levels of these sources are likely to be so small, if at all, that there would be insufficient energy for Kolchuga to measure these effects at one site, let alone the two or more required for triangulation. They would also be almost impossible to distinguish for normal background RF noise and would not appear like the conventional emissions types *Kolchuga is designed to receive and analyse). Kolchuga is sufficiently sensitive to operate as a bistatic radar receiver and hence exploit other transmitters in the environment. (This is likely to be true for the specific case of forward scatter in which the radar cross section of even a stealth aircraft can become very large for a few moments. However, achieving forward scatter simultaneously in two or more receivers is geometrically impossible, so triangulation would not work. Secondly, unless Kolchuga has been specifically designed to work as a bistatic radar receiver with a certain radar type—and there's no evidence of Kolchuga being deployed in conjunction with specific radar types—then it will lack the essential matched filter required to reliably detect reflected pulses in the presence of noise. Therefore, if this effect works at all, it is likely to be unreliable and fleeting). *Ukrainian sources often make claims such as "[Kolchuga] is head and shoulders above all American, Russian, French, Czech, or Brazilian developments in this field". Such claims are unsubstantiated and pure speculation, as the performance and even existence of many ESM systems are highly classified and not deducible by ELINT. It may or may not be true, but must be regarded with caution, particularly as those making the claims are often either journalists or those with an interest in exporting the system.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: There is no information on the chassis the Kolchuga is mounted on.

Protection

Armor: INA

Applique Armor: INA

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

The Kolchuga (Кольчуга Chainmail) passive sensor is an electronic-warfare support measures system developed in the Soviet Union and manufactured in Ukraine. Its detection range is limited by line-of-sight but may be up to 800 km (500 mi) for very high altitude, very powerful emitters. Frequently referred to as Kolchuga Radar, the system is not really a radar, but an ESM system comprising three or four receivers, deployed tens of kilometres apart, which detect and track aircraft by triangulation and multilateration of their RF emissions. Original Kolchuga was developed in 1980s by Rostov military institute of GRU and Topaz radioelectronics factory in Donetsk. Serial production since 1987. 44 units were produced before 1 January 1992, 14 of them left in Ukraine. After break up of Soviet Union, Kolchuga-M was modernized by the Special Radio Device Design Bureau public holding, the Topaz holding, the Donetsk National Technical University, the Ukrspetsexport state company, and the Investment and Technologies Company. It took them eight years (1993–2000) to conduct research, develop algorithms, test solutions on experimental specimens, and launch serial production. The relatively cheap Ukrainian Kolchuga-M passive radar station is able to detect and identify practically all known active radio devices mounted on ground, airborne, or marine objects.

KRTP-91 Tamara (Trash Can) Czechoslovakian Electronic Support Measures System



System

Alternative Designation: KRTP-91 Tamara; NATO: Trash Can

Type: Czechoslovakian Electronic Support Measures System

Crew: INA

Chassis: Tatra T815

Appearance: Unlike its predecessors, Tamara was a mobile system deployed on eight large Tatra T815 trucks and mounted upon a powerful 25 m hydraulic mast. Setup was completely automated and claimed to be of the order of twenty minutes from the moment of arrival at a site.

Unit: A single system is carried by eight Tatra 815 8x8 trucks (Equivalent to the MAZ-543), comprising three RS-AJ/M receiver systems with telescoping masts, and a mix of RS-KB hardware containers, RS-KM signal processing equipment container and a ZZP-5 command van.

Band: INA

Band Coverage: Cited band coverage is 820 MHz to 18 GHz.

Mode of Operation: The deployed system typically comprises a central site (containing the signal processing equipment and an ESM receiver) and two or three side sites containing only an ESM receiver. The side sites relay the signals received to the central site over a point-to-point microwave link. The central site uses the known propagation delay from the side sites to estimate the TDOA of the pulses at each site. The TDOA of a pulse between one side site and the central site locates the target on a hyperboloid. A second side site provides a second TDOA and hence a second hyperboloid. The intersection of these two hyperboloids places the target on a line, providing a 2D measurement of the target's location (no height). A third site provides a third hyperboloid and hence a measurement of height. Tamara could automatically track 23 radar and 48 IFF targets simultaneously. Its frequency band is 0.8-18 GHz. The nominal range of the system is 450 km, and it is generally limited by the radio horizon. It provides surveillance over a sector of approximately 100 degrees, with the later KRTP-91 system offering a wider 120 degree sector of surveillance.

Displacement Time: INA

Emplacement Time: INA

Deployment Distance: In a typical deployment the receivers are stationed at distances of 5 to 20 NMI.

Cited Maximum Range: cited range limit being 240 NMI and limited primarily by the curvature of the earth.

Tracked Targets: Russian sources claim that 72 targets can be tracked within a 100° angular sector, these including emitting JTIDS/Link-16 terminals. In 1991 the baseline KRTP-86 was superceded in production by improved the KRTP-91 Tamara-M.

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Automotive

Note: Tamara was a mobile system deployed on eight large Tatra T815 trucks and mounted upon a powerful 25 m hydraulic mast.

Protection

Armor: INA

Applique Armor: No

Active Protection System: No

NBC Protection: INA

Smoke Equipment: INA

Notes:

Tamara was the third generation Czechoslovak electronic support measures (ESM) system that used measurements of time difference of arrival (TDOA) of pulses at three or four sites to accurately detect and track airborne emitters by multilateration. Tamara's designations were KRTP-86 and KRTP-91 and it carried the NATO reporting name of Trash Can. The designation was derived from the Czech phrase "Komplet Radiotechnického Průzkumu" meaning "Radio Technical Reconnaissance Set". It was claimed to be the only one in the world able to detect military "invisible aircraft".

R-330B Russian VHF Frequency Jamming System





Tiers:



System

Alternative Designation: R-330B

Type: VHF Jamming System

Crew: INA

Chassis: MTLBu

Dimensions

Length: m6.45

Width: m2.86

Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Jamming System

Operational Frequency Range: 30-99.99999

Azimuth Search Coverage: 360 deg

Frequency Panoramic Scan Rate: Up to 1,900 MHz/s

RMS Direction-Finding Error: Not more than 3 deg

Transmitter Output Power: 1.0 kw

Types of Received SIgnals: AM, FM, CW, SSB, ISB, FSK, PSK, Keying, PFT

Types of Jamming Signals: Noise, Meander Type, with Random Encoding

Jamming SPectrum Width, Narrowband: 2, kHz, 10 kHz, 20 kHz, 100 kHz

Jamming SPectrum Width, Barrage: 1,000 kHz

Number of Simultaneously Jammed RF Links: up to 3

Detection-to-Suppression Time: Not more than 5 ms

Primary Weapon System on Most Variants

↳*System*

Name: PKT

Type: 7.62 mm, machine-gun

↳*Ammunition*

Type: API, API-T

Caliber: mm7.62

Muzzle Velocity: m/sINA

Basic Load: rounds1,500

Max Effective Range (Day): m1,000

Max Effective Range (On the move): m500

Maximum Aimed Range: m1,500

Min Range: kmINA

Armor Penetration: 8mm of RHA at 500m

Other Ammunition Types: Light Ball, Ball-T, Heavy Ball, Incendiary

Fire Control

Name: INA

Computerized FCS: INA

Main Gun Stabilization: INA

Range, Day Sight: m1,500

Range, Thermal Sight: N/A

Field of View: degrees23

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: Optional

NBC Protection: Yes

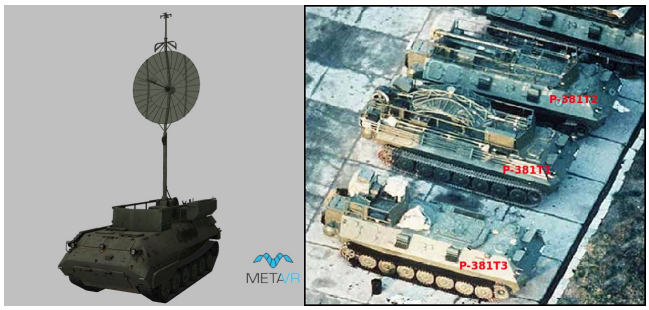
Smoke Equipment: No

Night Vision Device Capable: Yes. Some versions have spot lights.

Notes:

The upgraded R-330B/R-330T VHF jamming system is designed for detection, direction-finding and jamming of VHF communication facilities operated at tactical command level at fixed frequencies with conventional waveforms, in programmed and automatic frequency tuning modes, as well as for transmitting short encoded messages. The jamming system provides analysis and selection of emitters' signal parameters. The R-330B/R-330T VHF jamming system consists of an equipment vehicle on a wheeled (R-330T) or tracked (R-330B) chassis, a diesel electric power station mounted on a two-axle trailer (R-330T), or MT-Lbu armoured tracked chassis (R-330B), a set of operational documentation, and a single spare parts, tools and accessories set.

R-381T1 Russian VHF Radio Monitoring Station



Tiers:

1 2 **3** 4

System

Alternative Designation: R-381T1
Type: VHF Radio Monitoring Station
Manufacturer: ‘Proton’ engineering bureau in Kharkov
Chassis: MT-LB
Crew: ea2
Direction Finder Name: "Orljonok"
Frequency: 1.5-30 MHz, aviation radio communication monitoring (100-400 Mhz), radio relay link monitoring (300-1000 MHz)
Maximum Range: 40 km (100 km for aviation frequencies monitoring).
Detection Time: Radio station detecting time is 0.3 sec.
Radio: R 111
Telephone: T-219
Radio Receiver: VHF 323
Scanner: R-323 P
Recorder: P-180 M
Emplacement TIme: less than 10 minutes
Displacement Time: less than 10 minutes
NVG: PNW-57E
Aiming Circle: PAB-2
Note: set up with 250m space around the site. do not set up near utilities, train stations, bridges, multileveled large building, inside large forests or canyons.

Dimensions (Chassis MT-LB)

Length: m6.45
Width: m2.86

Height: m1.86

Weight, Combat: kg11,000

Ground Pressure: kg/cm20.46 standard track / 0.28 wide track

Automotive (Chassis MT-LB)

Engine Name: YaMZ 238 (Newer versions have the KamAZ-740.50 engine / 360 horsepower)

Engine Type: Diesel

Engine Power: hp240

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 30

Speed Maximum Swim: km/h5

Fording Depth: mAmphibious

Protection

Hull Armor: mm14

Turret Armor: mm14

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

NBC Protection: Yes, NBC Ventilator FWUA-100W-12

Smoke Equipment: No

Notes:

The R-381T1 – VHF radio monitoring station (1.5-30 MHz), aviation radio communication monitoring (100-400 Mhz), radio relay link monitoring (300-1000 MHz). The R-381T1 VHF Radio Monitoring Station is part of the R-381T Taran Complex. The R-381T Taran complex consist of 7 vehicles: 1 x R-381T3 – automatic data processing station 4 x R-381T2 – UHF radio monitoring station (30-100 MHz) 2 x R-381T1 – VHF radio monitoring station (1.5-30 MHz), aviation radio communication monitoring (100-400 Mhz), radio relay link monitoring (300-1000 MHz) The efficient range of the complex is 40 km (100 km for aviation frequencies monitoring). Radio station detecting time is 0.3 sec. Another variant of the complex consist of 5 vehicles: x1 R-381T3 x2 R-381T2 x2 R-381T1 It is also possible to use separate stations.

Air Based Electronic Warfare (EW) Systems

→Air Based Electronic Attack (EA) Systems

Leer-3 Russian 6x6 Mobile Drone-Based Electronic Warfare (EW) System





Tiers:



Variants:

- **Leer 2:**

System

Alternative Designation: Leer-3 RB-341V
Components: 1 each prime mover and control station KamAZ-5350 and 3 each Orlan-10 UAVs
Type: Electronic Warfare / Information Warfare
Crew: ea5
Maximum Range of UAV: up to 140 km from ground station, up to 600 km off-line
Maximum Jamming Range of UAV: km6

Dimensions (KamAZ-5350 Multi-Purpose Truck)

Length: m7.85
Width: m2.5
Height: m3.29
Weight, Combat: tons~9.2

Dimensions / Specifications (Orlan-10 UAV)

Take-off Weight: kg15
Payload Weight: kg6
Engine: Gasoline A-95
Launch Method: Folding catapult
Recovery Method: Parachute
Airspeed: kp/h90-150
Max Flight Duration: hours16
Max Complex Range: ~140 km from ground station
Max Altitude Above Sea Level: m5,000
Max Windspeed at Launch: m/s10
Operating Temperature Range at Launch: Degrees Celcius-30 - +40
Frequency Band: 935-960; 1805-1880
User Terminals: 3
Jamming Range: km10
Number of Communication Providers Jammed at a Time: 3

Automotive

Prime Mover: KamAZ-5350
Engine Name: KamAZ-740.13-260
Engine Type: Diesel
Engine Power: hp260
Cruising Range: km1,000
Speed, Maximum Road: km/h100
Speed, Average Cross: km/hINA
Speed Maximum Swim: km/hNA
Fording Depth: m1.75

Protection

Armor: NA
Applique Armor: The cab can be fitted with add-on armor kit. It is also proposed with concealed built-in internal armor.
Active Protection System: NA
NBC Protection: INA
Smoke Equipment: INA
IR Signature: INA

Notes:

Russia’s new drone-based electronic-warfare system, the Leer-3, RB-341V combines jammers and Orlan-10 unmanned aerial

vehicles to disable cellular networks, and allow the Russian military to send fake messages to subscribers. The Leer-3 UAV can effectively become a ‘virtual cellular station’ by sending messages and controlling a subscriber’s devices once it replaces a base station. If it manages to take the place of a cellular communications tower, it can also send audio messages and small video clips to subscribers. The Leer-3 has some psychological warfare mission implications. The Leer-3 can block enemy mobile telephones while, simultaneously, not impeding the operation of friendly mobile phones. The system can collect telephone numbers and call these numbers while blocking other phones’ signals. It may also be able to remotely connect user devices. The Leer-3 complex is composed of three Orlan-10 UAVs and a command and control post on a KamAZ-5350 truck. The unmanned aerial vehicles’ primary mission is to suppress cellular communication towers. To do this, special ‘jammers’ have been installed onboard the Orlan-10 UAVs, along with disposable jammers, which they drop onto the ground. After jamming the base stations, the Orlan-10 UAVs are able to send instant messages to subscribers given the necessary conditions. A single KAMAZ heavy truck controls three Orlan-10s, one of which acts as a communications relay while the others carry both airborne jammers and disposable jammers they drop to the ground.

J-16D Chinese Radar-Jamming Electronic Warfare Aircraft







Tiers:



Variants:

- **J-16:** Strike variant.
- **J-16D:** Electronic warfare variant. Equipped with wingtip electronic warfare pods, and no IRST or 30 mm cannon. It reportedly made its first flight in December 2015.

System

Alternate Designation(s): J-16D
Primary Function / Type: Multirole Strike Fighter
Manufacturer: Shenyang Aircraft Corporation
Crew: 2
Number of Engines: 2
Number of Hard Points: Even with a maximum load of electronic-warfare gear, the J-16 would have six of its twelve hardpoints free to carry weapons.
Note: The J-16D has had its thirty-millimeter cannon and infrared sensor removed; this is not a plane intended to get into short-range dogfights! Instead, there are several new antennas and conformal electronic-warfare arrays along the fuselage.

Dimensions

Length: 21.9 m
Width (Wing Span): 14.7 m
Height: 6.36 m
Wing Area: 62.04 m2
Empty Weight: 17,700 kg

Gross Weight: 26,000 kg

Maximum Takeoff Weight: 35,000 kg

Automotive

Engine Name: 2 × Shenyang WS-10B afterburning turbofans

Number of Engines: 2

Engine Type: Afterburning turbofans

Engine Power: 96 kN (22,000 lbf) thrust each dry, 145 kN (33,000 lbf) with afterburner

Maximum Speed: Mach 2.4

Maximum Range: 3,000 km

Combat Range: 1,500 km

Ferry Range: 4,500 km

Service Ceiling: 20,000 m

Rate of Climb: 325 m/s

Main Missile Systems

↳*Main Missile System #1*

Name: YJ-91

Type: Anti-Radiation Missile

Manufacturer: Hongdu Aviation Industry Corporation

Length: 4.7 m

Diameter: 0.3602 m

Weight: 0.6 ton

Warhead: 165 kg

Detonation Mechanism: Semi-armor-piercing and other

Engine: Ramjet

Propellant: Liquid fuel

Operational Range: 50-120 km

Maximum Speed: Mach 4.5

Guidance System: ARH / PRH

↳*Main Missile System #2*

Name: CM-103

Type: Air-to-Surface Missile

Operational Range: 99 km

Guidance System: INA

Warhead: 80 kg

Basic Load: INA

Bomb Weapon Systems

Note: Various bombs and rockets including BeiDou satellite-guided bombs and laser-guided bombs

Fire Control / Avionics

Fire Control System Type: INA

Fire Control Radar: INA

Navigation Radar: AESA radar

Protection

Stealth Properties: Yes

Heat Signature Reduction: Yes

Add on Armor: INA

NBC Protection: INA

EW Counter Measures: Electronic countermeasure (ECM) pods

Radar Jamming: If the J-16D's airframe has integrated hardware to make jamming and anti-radar missiles more effective, it probably is designed to use jammers and anti-radar missiles. Most likely, it would carry two to three jamming pods the under the wings and fuselage, each optimized versus different radar frequencies. It is thought that these jammers may also use AESA technology.

Chaffs/Flares: Yes

Note #1: New electronic-warfare pods are mounted on the wingtips that resemble the American ALQ-218 electronic support measure pods on the wingtips of the EA-18G Growler. These are electromagnetic sensors that can analyze radar frequencies and help determine the position of radar-transmitting devices—data that would be highly useful both for jamming radars and for targeting them for destruction.

Notes:

The J-16D variant—the "D" in the designation comes from the Chinese word for "electronic," diànzǐ—made its first flight on December 18, 2015. Photos were released to the public three days later. The J-16D has had its thirty-millimeter cannon and infrared sensor removed; this is not a plane intended to get into short-range dogfights! Instead, there are several new antennas and conformal electronic-warfare arrays along the fuselage. The J-16D's nose radome is reshaped, possibly to accommodate a more advanced AESA radar. Most importantly, new electronic-warfare pods are mounted on the wingtips that resemble the American ALQ-218 electronic support measure pods on the wingtips of the EA-18G Growler. These are electromagnetic sensors that can analyze radar frequencies and help determine the position of radar-transmitting devices—data that would be highly useful both for jamming radars and for targeting them for destruction. If the J-16D's airframe has integrated hardware to make jamming and anti-radar missiles more effective, it probably is designed to use jammers and anti-radar missiles. Most likely, it would carry two to three jamming pods the under the wings and fuselage, each optimized versus different radar frequencies. It is thought that these jammers may also use AESA technology. The J-16 is a twin-engine, twin-seat multi-role fighter jet that is also capable of air-to-air combat. It made its debut during the Army Day parade on July 30, 2017 at the Zhurihe military training base in North China's Inner Mongolia Autonomous Region, Before the 30 July 2017 parade, the J-16 was never shown to the public. Developed by the Shenyang Aircraft Corporation, it is based on the J-11B, a modification of Russia's Sukhoi-30MKK. Almost half of the equipment seen at the parade to mark the PLA's 90th birthday was being displayed for the first time, and all of it was indigenously made, according to the Ministry of Defence. The fighter is designed for a naval role, and will carry "stand-off" missiles that can attack ships from beyond visual range. Contracry to initial reports, it has a conventional layout, and does nto incorporate notable stealth features. The J-16, built by the Shenyang Aircraft Corporation (SAC), is reportedly a stealthy dedicated attack version of the J-11B (Su-27) multirole fighter featuring active electronically scanned array [AESA] radar and an internal weapons bay. Chinese authorities had not formally released informtion on these developments. It was rumored in November 2010 that SAC was developing a 4.5th generation heavy multi-role fighter with a conventional layout based on J-11B. First flight of this reportedly "Silent Flanker" was rumored at that time to be within 2011. According to Hui Tong, the J-16 is a version of the J-11BS comparable to American F-15E. Sort of a 'strike flanker'. "The aircraft can be viewed as an upgraded

version of Su-30MKK based on its mission and capability, which is comparable to American F-15E. First flight was rumored to be between 2011-2012. J-16 has tandem seats with a WSO sitting in the backseat. It features an enhanced fire-control system with additional AG modes. Besides PL-8 and PL-12 AAMs, it could also carry the same precision guided weapons being carried by JH-7A, such as KD-88 ASM and LS-500J LGB. Compared to JH-7A, J-16 is expected to have a more powerful radar, a greater weapon load (8t) and a longer range (4,000km). " In May 2011 China Military Report stated that "China's new 4.5 generation heavy fighter (Chinese name "Red Eagle"). August 2008 had been officially off the assembly line in Shenyang Aircraft Factory, in October 2008 in Beijing, an Air Force base in the outskirts of the first flight, October 12, 2009 conducted a second test, a complete success. J-18 is the 4.5 generation fighter aircraft are air superiority fighter heavy. Forward-swept wing fighter design using ultra-stealth characteristics, and install a laser active phased array radar, built-in weapons bay and two large thrust-vectoring engines. Service time is expected around 2015. So far there is no any official information about the machine, nor any information to prove the real existence of the aircraft. Only some information from some people speculate, and speculation of official news." In fact, the J-16 fighter's first flight had been pushed and pushed again. The main reason is that the weight of the design is overweight, but the greater headache was the funding constraints.

Y-8XZ (High New 7) Chinese Psychological Operations Aircraft




Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport

noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8XZ

Primary Function / Type: Psychological Operations Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8 factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. 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In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage.

As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

Y-8CB (High New 1) Chinese Electronic Countermeasures (ECM) Aircraft



Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14, 2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport

noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. 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System

Alternate Designation(s): Y-8CB

Primary Function / Type: Electronic Countermeasures (ECM) Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

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Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

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Number of Engines: 4

Engine Type: Turboprop

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Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

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Y-8G (High New 3) Chinese Long-Range Electronic Jamming Aircraft







Tiers:



Variants:

- **Note:** Y-8 This was the original version. It was little different from the An-12 with a slightly modified glass nose copied from the design of the H-6 bomber. The cargo hold was not pressurized. Early production variants inherited the An-12 's tail turret, which mounts a twin 23-mm cannon, but this was later removed. Y-8A This variant was transformed into a helicopter carrier, serving as a general transport. It was designed to carry S-70C helicopters between their inland bases and the frontier airfields in Tibet. The airframe was specially modified to accommodate a single S-70C helicopter. The internal cargo handling system was determined to be unnecessary and was removed. Y-8B This is the civilian version. First flight took place in 1990 and it was certified in 1993. Y-8C This variant has the pressurized cabin volume increased from 1,000 cu ft (28.3 cu m) to 7,500 cu ft (212.4 cu m). Landing gear and air conditioning are upgraded. The original inward-open two-piece cargo loading doors were replaced by a single-piece flat loading ramp similar to that of the C-130 . First flight occurred on Dec. 17, 1990. Shaanxi has also developed the Y-8CA radar testbed and Y-8CI export variant transport, the latter with Western avionics. Y-8D This is the export variant, fitted with Western avionics to meet the requirements for commercial flights. Onboard avionics include Collins flight director system (FDS), air data computer, VOR/ILS, comparing warning, TDR-90 air-traffic control receiver, VHF radio, Honeywell P-400 color weather radar, Litton LTN-311 Omega navigation system, Bendix/King HF communication, Sundsstrand universal flight data recorder (UFDR) and cockpit voice recorder (CVR). It is in service in Burma (Myanmar), Sri Lanka and Sudan. Y-8D II This is the latest export variant with avionics similar to those in the Y-8C. Y-8E This version is used for unmanned aerial vehicle (UAV) launch and control. Development began in October 1988 and the first prototype was completed in March 1990. The first UAV launch test was carried out successfully in October of that year. The aircraft entered service with the Chinese air force in late 1990. Y-8F This is a livestock transport. It was certified on Jan. 26, 1994. Y-8F100 This is a commercial freighter version of the Y-8, featuring improved avionics. The aircraft features a redesigned cargo compartment, which can carry four international standard pallets of 88 in x 108 in, or eight pallets of 88 in x 54 in, or three pallets of 96 in x 125 in. The cargo compartment is also fitted with a modernized cargo handling system, allowing fast loading/unloading. Y-8F200 This is a commercial freighter version of the Y-8C, with upgraded avionics and a redesigned cargo compartment. The cargo handling system and large flat ramp enable rapid loading and unloading. Y-8F200W This variant features a fuselage that is 7 ft 3 in (2.2 m) longer than the baseline aircraft. The aircraft can take off from gravel or snow-covered runways at altitudes up to 9,840 ft (3,000 m) above sea level. It can also operate from unprepared runways. Y-8F400 This is a modernized freighter variant with upgraded avionics. It requires a three-man flight crew instead of the original five-man crew. The original glass nose was replaced by a solid nose. The cargo compartment is equipped with a 2,000-lb (1,000-kg) payload overhead cargo system, where the cargo can be suspended from an electrically powered rail. Rollers in the floor of the cargo compartment enable quick and easy handling of cargo pallets and can be removed to leave a flat surface. The compartment is fully pressurized. Y-8F600 This is the latest variant. Developed with the assistance of Antonov in Ukraine and Pratt & Whitney Canada, the aircraft is configured as a platform for airborne early warning and other special missions. First flight on occurred on Jan. 14,

2005. The aircraft has been extensively modified and upgraded with Western technologies including turboprop engine and avionics. Development began in 1999, with Antonov and Pratt & Whitney Canada joining the program in by 2002. Under a 2002 contract, Shaanxi and Antonov are responsible for the joint design and assembly of prototypes, certification and series production. Pratt & Whitney was responsible for providing its PW150B engine. Antonov provided Shaanxi with aerodynamic research, as well as documents on aircraft maintainability and service life. The company also designed the new wing with fuel tanks. The Y-8F600 features an advanced two-man glass cockpit. The aircraft is equipped with data link, flight management and control, and near ground warning system.The transport is powered by four P&W PW150B turboprop engines. All-composite six-blade R-408 propellers are fitted. The new propulsion system provides for improved takeoff performance at hot and high conditions and high-altitude cruise performance, extended engine service life and lower engine operating and maintenance costs. Noise levels are also reduced to meet airport noise restrictions. The Y-8F600's maximum takeoff weight is increased to 65 tons. Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the undernose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. Y-8H This is an aerial survey and photography variant. Y-8J maritime surveillance aircraft These are Y-8C transports fitted with British Skymaster radars for maritime surveillance missions. China procured six to eight of the radars from Racal (now Thales) in 1996 deal worth US$66 million. At least two of the aircraft remain in Chinese naval service and are deployed at Dachang naval air base near Shanghai. The original glass nose on the Y-8 is replaced by a large radome to accommodate the radar antenna on the Y-8J. The rear cargo door and loading ramp are also removed. Y-8JB This is an electronic intelligence (ELINT) variant first seen in mid-2004 near Shanghai. A prototype first flew on Aug. 26, 2003, and four aircraft are in service with the Chinese navy. The aircraft has a large chin-mounted radome that could house a large ELINT antenna. Another SATCOM antenna may be installed inside a large semi-spherical dorsal fairing forward of the vertical tailfin providing real-time transmission to the ground base. Numerous smaller fairings can be seen on top of the cabin and along the upper sections of the aft fuselage, as well as at the nose tip. The loading ramp appears to have been sealed. The aircraft has been fitted with a BM/KZ800 ELINT system. Y-8X maritime patrol aircraft (MPA) This Y-8X is fitted with a Litton Canada APS-504 search radar, dual Litton LTN-72R inertial navigational system and a single LTN-211 Omega navigation set. The first example was delivered to the Chinese navy in late 1984, and the aircraft received national design certification in 1985. A small number have been in service since the mid-1980s. The aircraft is equipped with search radar, navigation system, self-defense electronic countermeasures (ECM) suite, optical/infrared cameras, sonobuoys and sonar receiver. The rear cargo door was removed and replaced by a large mission equipment window for sonobuoys racks and cameras. The rear turret was also removed and replaced by the sonar operator seat. A canoe-shaped fairing plus a couple of blade antennas appear to have been attached to the bottom of the middle and aft fuselage, suggesting the aircraft's electronic intelligence mission has been enhanced with a new synthetic aperture radar (SAR) capability. Y-8XZ psychological operations aircraft This version was unveiled publicly in April 2008, although it reportedly entered Chinese air force service in late 2007. The aircraft features large fairings located forward of the main landing gear compartments as well as two large plate antennas on each side of the rear fuselage. Other features include two blade antennas on both sides of the vertical tailfin, a wire antenna underneath the rear fuselage and a large SATCOM antenna on top of the rear fuselage. The Y-8XZ has high-power broadcast equipment covering AM, FM, SW, TV plus various civilian and military communication bands, and is able to jam enemy communications as well as deliver propaganda broadcasts. KJ-200 This is an airborne early warning and control aircraft based on the Y-8F600 airframe. See separate record for more information. Y-8 tanker Flight Refueling Ltd. of the U.K. studied the possibility of converting the Y-8 into an in-flight refueling aircraft. No Y-8Ts are known to be in service. Y-8 airborne early warning aircraft This is a third Chinese airborne early warning aircraft program, following the KJ-2000 and KJ-200 (see separate records); it was revealed in 2005. Based on the Shaanxi Y-8F400 airframe, the aircraft features a conventional rotodome mounted above the fuselage. At least one prototype has been built and the program may be aimed at the export market. Y-8CB This is an electronic countermeasures (ECM) variant first seen publicly in July 2005. First flight was on Jan. 26, 2000. At least four are thought to be in air force service, replacing the obsolete HD-5 ECM aircraft. Some may have been upgraded with additional equipment, including a dorsal satellite communications (SATCOM) antenna. The aircraft features a ventral canoe fairing underneath the forward fuselage, which may house a large ECM or synthetic aperture radar (SAR) antenna. An antenna array consisting of several rows of smaller ECM antennas can be seen protruding out of the rear loading ramp, which is thought to have been sealed. A few more antennas are located under the fuselage between the main landing gear cabins. The aircraft may carry the 300 and 308 systems to jam enemy communication networks and radar systems. Y-8T command post aircraft This is a command post aircraft. First flight occurred in August 2004. Three aircraft are in service with the Chinese air force. The Y-8T features a redesigned fuselage with the loading ramp and tail gun turret removed. A dorsal fairing is located aft of the wing section, which may house a SATCOM antenna. Multiple antenna arrays can be seen along the top and bottom of the fuselage, as well as on the vertical tailfin. ZDK-03 This variant, based on the Y-8F600, was designed specifically for the Pakistani air force for airborne early warning missions. It features an active electronically scanned array (AESA) radar. Islamabad has ordered four of the aircraft. The first unit was scheduled to be delivered by the end of 2010. See separate record for more information. GX-7 This is a Y-8 aircraft modified for psychological warfare missions. It is designed to broadcast messages over radio and television signals and can jam enemy communications. The GX-7 was first made public by Chinese media in July 2013. Y-8Q/Y-8GX6 This variant was first revealed in November 2011 and was reported in service in mid-2015. The Y-8Q features a redesigned wing and pressurized fuselage with composite structures; WJ-6C turboshaft

engines; and high-efficiency, six-bladed propellers. It is distinguishable from other Y-8/Y-9 variants by a large chin-mounted sea search radar; electro-optical system behind the nose wheel; and a weapons bay just ahead of the main wheels. There is also a magnetic anomaly detector (MAD) boom and domed windows in the aft fuselage for observation. A fuselage weapons bay, located ahead of the main landing gear, would likely carry torpedoes. It has been speculated that the Y-8Q has fuselage sonobuoy dispensers and hardpoints on the wings for anti-ship missiles.

System

Alternate Designation(s): Y-8G

Primary Function / Type: Long-Range Electronic Jamming Aircraft

Manufacturer: Shaanxi Aircraft Corporation

Crew: 6

Passengers: 96

Number of Engines: 4

Number of Hard Points: INA

Dimensions

Length: 34.02 m

Height: 11.16 m

Width (Wing Span): 38.00 m

Wing Area: 121.86 sq m

Cargo Area, Length: 13.5 m

Cargo Area, Width: 3.0 m

Cargo Area, Height: 2.4 m

Empty Weight: 35,500 kg

Maximum Payload Weight: 20,000 kg

Maximum Takeoff Weight: 61,000 kg

Automotive

Engine Name: 4 x Wojiang-6 turboprop

Number of Engines: 4

Engine Type: Turboprop

Engine Power: 4,250 equivalent hp each

Maximum Range: 5,615 km

Cruise Speed: 550 km/h

Maximum Speed: 662 km/h

Service Ceiling: 10,400 m

Rate of Climb: 600 m/min

Endurance: 10.5 hours

Fire Control / Avionics

FCS Name: INA

Computerized FCS: No

Navigation Radar: INA

Protection

Stealth Properties: No

Heat Signature Reduction: No

Add on Armor: No

NBC Protection: INA

EW Counter Measures: INA

Chaffs/Flares: INA

Notes:

Y-8G This variant was first revealed in April 2005. First flight took place in late 2004. Seven aircraft are known to be in service with the Chinese air force. The aircraft features two large cheek fairings of an arch shape, which might house a large ECM antenna array for long-range electronic jamming purpose. It also has a redesigned solid nose with the under nose radome removed. A large tail fairing may provide 360-degree coverage. Another cylindrical fairing can be seen on top of the vertical tailfin. The Shaanxi Y-8 or Yunshuji-8 (Chinese: □-8) aircraft is a medium size medium range transport aircraft produced by Shaanxi Aircraft Corporation in China, based on the Soviet Antonov An-12. It has become one of China's most popular military and civilian transport/cargo aircraft, with many variants produced and exported. Although the An-12 is no longer made in Ukraine, the Chinese Y-8 continues to be upgraded and produced. An estimated 169 Y-8 aircraft had been built by 2010. In the 1960s, China purchased several An-12 aircraft from the Soviet Union, along with license to assemble the aircraft locally. However, due to the Sino-Soviet split, the Soviet Union withdrew its technical assistance. The Xi'an Aircraft Company and Xi'an Aircraft Design Institute worked to reverse engineer the An-12 for local production. Design of the aircraft was completed by February 1972. Major features of the Y-8 included a glazed nose and tail turret derived from that of the H-6 bomber, a roller-type palletized-cargo-handling device instead of the overhead conveyor, and a gaseous oxygen system as opposed to a liquid oxygen system. The original Y-8 inherited the An-12's twin 23mm cannon tail turret, but this was removed on subsequent variants. The Y-8 equipped with four turboprop engines mounted under the leading edges of non-swept wings. The wings are attached high on the fuselage, and the tricycle landing gear is equipped with low pressure tires. The earliest versions used for the transportation of freight or troops had two side-hinged, inward-opening doors, while later variants used a rearward-facing ramp to facilitate loading and unloading of the payload. Some specialized versions omit the cargo ramp entirely. The Y-8 is capable of carrying troops, dropping supplies, parachute drops, and functioning as an air ambulance. It also can be used for commercial uses as a freighter. It is capable of hauling 20 tons of cargo, approximately 96 soldiers, or about 82 paratroopers in the cargo compartment which is 13.5 metres long, 3 metres wide and 2.4 metres high. It can also carry 60 severely wounded soldiers with their stretchers, 20 slightly injured soldiers and 3 medical attendants. Many variants for specialized roles have been built, but information on them can be vague or difficult to obtain due to the secretive nature of the Chinese military. The Y-8 transport aircraft was put into trial production in the Xi'an Aircraft Factory in June 1972. By December 1974, the first Chinese-assembled Y-8 conducted its maiden flight. Following trial production of the first Y-8s, operations were transferred to the Shaanxi Aircraft Factory. The Shaanxi-produced Y-8s conducted their test flights in December 1975. After a regime of 66 test flights the Y-8 was officially certified for use by the Chinese government. By 1981, the Y-8 entered serial production.[2] Mr. Ouyang Shaoxiu (□□□□) would eventually become the general designer, designing many variants of Y-8, including KJ-2000. In the early 1980s, Chinese officials saw US Army recruiting advertisements featuring parachute extraction of an Army jeep along with troops. The PLA was told to develop this kind of capability. But there were two design problems. One, Y-8 wings have very sharp leading edges, so one wing tends to stall before the other, causing the aircraft to roll inverted as it stalls. The second design flaw as that the cargo deck of the Y-8 had a 10 degree downward slope starting at the landing gear. When the PLA Air Force started to test parachute extraction, these two design flaws caused a near disaster. The aircraft was flying too fast, and when the parachute started to extract cargo from the hold, the cargo rolled on the deck until it got to the 10 degree downward slope, and there it became airborne while still inside the aircraft. The cargo hit the top of the cargo door on the way out, making it clear that the Y-8 could not do parachute cargo extraction. In 1986, two engineers from Beijing's Ministry of Aviation visited Lockheed. They could not speak very much English, and the Lockheed-Georgia sales person who met them could not speak Chinese. So for half a day, they did a point-and-grunt tour until they were lucky enough to find a Lockheed employee who could speak Chinese. The Chinese wanted to purchase Lockheed wind tunnel testing on the Y-8 in order to address the stall problem. As a result of these wind tunnel tests, conducted in 1986, Lockheed was given a contract to do a flight test series on the Y-8. Lockheed was told that flight test data was not provided by the Soviets when they helped China build the Y-8

factory. The flight test series was flown by Lockheed test pilot Hank Dees. Hank had flown the test flight series for the Lockheed L-1011 and later for China's Y-12 in Harbin. During this flight test series, Hank Dees flew the aircraft to stall speed and taught Chinese pilots how to anticipate a stall in order to prevent letting the aircraft go inverted. As a result of this test flight series, Chinese pilots started to use the 45 degree flap position. Lockheed's motive for doing flight tests was to demonstrate that China would be better off buying the C-130 rather than trying to improve the Y-8. China did buy C-130's, but the flight test series actually demonstrated that the Y-8 was a more capable aircraft than previously believed. In the late 1980s, Lockheed Martin, the American manufacturer of the C-130 Hercules, helped China to develop a pressurized cabin for the passenger version of Y-8, resulting in two versions: the first had half of the cabin pressurized and later, the second version in which the complete cabin was pressurized. In 2001 and 2002, new consulting arrangements between Antonov and Shaanxi resulted in modernized redesigns to the Y-8's wing and fuselage. As a consequence the redesign allows the Y-8's fuel capacity to be increased by 50 percent.

→Air Based Electronic Protection (EP) Systems

→Air based Electronic Support (ES) Systems

Sea Based Electronic Warfare (EW) Systems

→Sea Based Electronic Attack (EA) Systems

AN/SSQ-47B American Active Non-Directional Sonobuoy



Tiers:



System

Alternative Designation: AN/SSQ-47B
Type: Active Non-Directional Sonobuoy
Size: A
Hydrophone Depth: 18.3 or 244 m
Launch Conditions Altitude: 152 m-3,048 m
Launch Conditions Sea State: 5 (maximum)
Operating Life: 30 minutes
RF Power: 0.25 W
Sonar Modes: Automatic keyed CW
Sonar Channels: 6 (HF)
RF Channels: 12
Power Source: seawater battery
Activation Time: < 30 seconds
Scuttling Time: 1-10 hours after water entry
RF Transmsiion Channels: 12 fixed
Transmitter RF Power: 0.25 watts minimum
Operating Depth: Selectable (60 or 800 feet)
Sonar Pulse Repetition Rate: 10 seconds

Dimensions

Length: INA
Diameter: INA
Weight, Combat: 9.5 kg

Notes:

The AN/SSQ-47B active buoy, also referred to as a ranger buoy, is the predecessor of the AN/ASQ-62 family. It automatically begins pinging upon water entry, and operates from fixed RF frequency channels at an RF power output of 1/4 Watt, depth settings being 60 or 800 feet. The sonic transmissions operate on one of six sonic frequencies in the 13.0 to 19.0 kHz band with an expected life of 30 minutes.

→Sea Based Electronic Protection (EP) Systems

→Sea Based Electronic Support (ES) Systems

Land Based Sensors

LDM-2 Russian Man-Portable Laser Rangefinder





Tiers:



System

Alternative Designation: LDM-2
Type: Man-Portable Laser Rangefinder
Crew: ea1
Measurement range (at an accuracy no more than ±10 m): 50...9,000
Recognition range of “tank-sized” target and burst ranging: 4,000
Magnification: x7
Field of view: 6°
Angular resolution: 7 Seconds of Arc
Exit pupil diameter: 5 mm
Removal of exit pupil: 18 mm
Dioptric adjustment: ±4 Diopters
Operation per battery (number of shots/charge): 300
Laser wavelength: 1.54 um
Azimuth range (at accuracy of ±0-15 d.g.): from +30-00 to -30-00 deg
Elevation range (at accuracy of ±0-06 d.g.): from +3-00 to -3-00 deg

Dimensions

Length: INA
Width: INA
Height: INA

Weight, Combat: kg1.8

Notes:

The LDM-2 Laser Rangefinder Module is designed for flash ranging of terrain, target recognition and acquisition, determination of spherical coordinates with automatic determination of magnetic azimuth and elevation as well as automated transmission of the measured coordinates to external users. SYSTEM COMPOSITION *PPU-21 transmitting/receiving module *Accessory set *Transport case *Operation manual The LDM-2 Laser Rangefinder Module displays first, second and last targets (as an operator’s option) in the range of a laser beam. Mode of operation, readiness to measure a target range, azimuth and elevation, operating time, battery charge are displayed in the eyepiece.

LTSD-4-3 Russian Laser Rangefinder/Designator





Tiers:



System

Alternative Designation: LTSD-4-3
Type: Laser Rangefinder/Designator
Crew: ea2
Tank-sized target in the daytime: m5,000...7,000
Surface Target: m5,000...15,000
Night Vision, Tank-sized Target at Night: m1,000...3,000
Thermal Imager, Tank-Sized Target at Night: m3,000...4,000
Measurement Range at 5m Accuracy: m100...20,000
Boresight Magnification: x10
Field of View: 5°
Dioptric adjustment: ±5 diopters
Maximum duration of laser designation, Artillery Mode: 15 sec
Maximum duration of laser designation, Air Mode: 100 sec

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg14

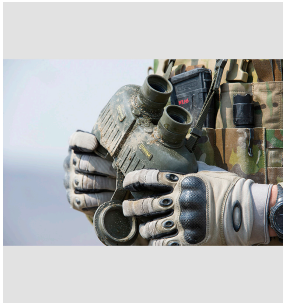
Notes:

The LTSD-4-3 Laser Rangefinder/Designator is designed for ground target reconnaissance, correction of artillery and air firing in daylight and at night including the use of high-accuracy ammunition fitted with laser homing heads when illuminating the stationary and moving targets, military equipment and offensive fortifications by a laser light from ground observation points. It may be also used in automated fire control systems. SYSTEM COMPOSITION *PP-20 transceiver *Set for fastening PP on terrain *1E77 synchronization unit *1E67M accumulator battery (2 pcs.) *Accessory set *Transport case including two flexible packs for carrying *Instruction manual

M830r LRF American 8x30 Laser Rangefinder







Tiers:

1 2 3 4

System

Alternative Designation: M830r LRF
Type: 8x30 Laser Rangefinder
Crew: ea1
Magnifaction: 8x
Ergonomic Design: shifts the center of gravity into the palms for comfortable, long-time observation and round-the-shoulder shape won't hang up on hatches and doors in urgent situations.
Floating Prism System: uses flexible silicone lens mount to absorb severe shock, impact and abuse without damage
N2 Injection system: seals 14-psi pressurized dry nitrogen into the optic, for fogproof clarity in any condition - from artic cold to desert heat.
Sports-Auto Focus System: lets you focus each eyepiece to your vision once, then keeps images razor sharp from 20 yards to infinity. No more chasing focus on moving objects.
NBR Rubber Armoring: is durable, slip-proof and noiseless to ensure secure, chassis-protecting grip in all conditions.
Makrolon Housing: is durable polycarbonate with NBR Long Life rubber armoring, creating a lightweight, rugged chassis that withstands 11 Gs of impact. Impervious to harsh conditions for generations of trusted use.
Field of View: 319 feet at 1,000 yards
Ranging Distance: 27 to 1,860 Yds.

Dimensions

Length: INA
Width: 6.7 In
Height: 4.5 in
Weight, Combat: 26.5 oz

Notes:

This compact, powerful laser rangefinder is universally suited for all military services and tactical units. It’s the perfect combination of premium Steiner binoculars with a powerful class 1/eye safe laser for determining range to targets, plus a SUMR reticle for targeting redundancy in case of battery failure or out-of-range target. No other bino/rangefinder combo will deliver the image and ranging accuracy and reliability of these military veterans. Perfect for mobile troops who travel light. Lenses and prisms are combined with state-of-the-art coatings to provide bright, crisp images at any range. Ranges can be set to meters or

yards.

FLIR Recon V American Multi-Sensor Thermal Binoculars



Tiers:



Variants:

- **Recon V Ultra Lite:** Fully operational at less than three pounds, the breakthrough Recon V Ultra Lite provides long-range target detection, recognition, recording and geo-location with an HD color camera and dual FOV thermal channels. Powered by commercially available AA batteries, the unit has a run time greater than four hours with smart power management. Combined with a highly accurate laser range finder, GPS, digital magnetic compass and intuitive user interface, targets can be quickly located 24/7.

System

Alternative Designation: FLIR Recon V
Type: Multi-Sensor Thermal Binoculars
Crew: ea1
Sensor Type: 640 x 480 InSb
Telescope: 10X Zoom 27-275mm
WFOV: 20° x 15°
NFOV: 2° x 1.5°
Display Type: OLED, Full Color
Display Resolution: 1280x720, (720p) 16:9
Frame Rate: 60Hz
Image Controls: Cal, Pol, Auto/ Man Gain, Display, Auto Focus, Palettes
Global Positioning System (GPS): C/A code
SAASM GPS: supports military GPS plug-in (optional)
Digital Magnetic Compass: 360° Az, +/- 90° El, 0.2° resolution
Laser Rangefinder (LRF): 1.54 µm, Eyesafe, class 1, 10km
Laser Pointer (LP): 852 nm, Class 3B, .5/30mW (optional)
Image Storage: Yes, 1000 png
E-Stabilization: MEMS Gyro, No image latency
Battey Type: AA Lithium

Run Type: 6 hours (Hot Swap)

External Power: 9-32VDC

Video: NTSC/ PAL & HD-SDI

Optional Accessories: Remote LRF Cable; Communications Cable; DAGR Cable

Dimensions

Length: 8.7 in

Width: 7.4 in

Height: 3.5 in

Weight, Combat: 4.25 lbs

Notes:

The Recon V is a compact and light yet rugged multi-sensor thermal binocular designed for 24/7 day and night field operations that require enhanced imagery and long standoff range. Its internal GPS, DMC, and long-range laser pointer provide accurate range to target as well as precise location. The 10x continuous zoom optics, MEMS based electronic stabilization, and high-definition color video display combine to provide unmatched image quality and flexibility. Powered by AA Li batteries, the unit has a run time of up to six hours. It’s SWaP-optimized and qualified to MIL-STD 810G for easy portability under rigorous mission demands. An intuitive interface reduces training time and simplifies usability in high-stress field operations. While operators provide mission-critical situational awareness data they remain safe by always being connected to their extended team. Features: *BEST-IN-CLASS THERMAL IMAGING Combining 640x480 MWIR image quality with industry-leading processing and a high-definition display, Recon V provides the clarity your mission demands. *POWERFUL TACTICAL CAPABILITIES Built-in stabilization, digital magnetic compass, GPS, and laser pointer provide accurate range-to-target, precise geo-location, and rock-solid imagery. *FLEXIBLE, TOUGH, AND POWERFUL SWaP-optimized and easy to use, Recon V minimizes operator fatigue and is rugged enough to survive everything your mission may throw at it. *INCREASED SITUATIONAL AWARENESS 10x continuous zoom provides long-range narrow FOV as well as wide-angle FOV for battlefield flexibility. *EASY, INTUITIVE OPERATION An intuitive interface includes electronic stabilization (E-Stab), one shot image save, auto fall-of-shot, auto image optimization, auto focus and BIT,

LPR-4 KOMZ Russian Man Portable Scout Laser Rangefinder



Tiers:



System

Weight: kg4.5
Battery Life: hrs12
Vehicle Compatible 12V, 24-27V: Yes
Operating Temperature: C-50 to +50
Handheld Operation: Yes
GLONASS: Yes
GPS: Yes
Daytime Magnification: 7x and 14x
3G Night Operation: Yes
FMV Display: Yes
Maximum Measurement Range: m2000
Minimum Measurement Range: m150

Notes:

The LPR-4 manportable scout laser instrument is designed for Army scouts to more effectively detect, identify, TV-control (automatically or manually), and pinpoint objects automatically round the clock and to automatically detect changes to the situation, process and store data on objects reconnoitered and quickly transmit the data to external devices in the digital and text forms.

RGB-3 Russian Remote Sensing System



Tiers:

1 2 3 4

System

Alternative Designation: RGB-3
Type: Remote Sensing System
Crew: INA
Power: 9.0 to 16.5 Volts (DC), 500 mA Typical Current Draw
Lenses: Four lenses (9.6 mm focal length each)
Effective Sensor Range: 425 nm to 950 nm (Filters field changeable by users)
Color Bands: Red: 570 nm – 700 nm, Green: 480 nm – 550 nm and Blue: 400 nm – 470 nm
Narrow Bands: 680 nm (NDVI Red), 700 nm (Red Edge) and 800 nm (NDVI NIR) (each 20 nm wide)
Image Memories: Four 16 GB Micro SD cards (up to ~8000 images/card)
Control Panel Buttons: Take Picture, Move System Menu Up, Down or Select
Status Indicator: System Ready (Green) / System Busy (Red)
Interface Connections: USB: USB 2.0 (Able to transfer images & data @ 60 MB/Second)
Video: NTSC Multi-IO (HDMI-Type Remote trigger, Serial (Receive, Transmit & Sync), NTSC Video
Included Software: Tetracam PixelWrench2

Dimensions

Length: 115.6 mm
Width: 80.3 mm
Height: 50 mm
Weight, Combat: 400 grams

Notes:

Based on the Micro-MCA4 architecture, the RGB+3 is a remote sensing workhorse. This system consists of four cameras: one RGB color camera that senses broad bands of red, green, and blue; and three monochrome cameras that sense the following narrow bands: 680 nm, 700 nm, and 800 nm; these are generally understood as NDVI red, the "red edge," and NDVI NIR, respectively. This configuration allows you the advantage of an RGB color camera as well as very precise analyses, such as NDVI and SAVI, via the narrow bands. The RGB+3 snap shutter sensors produce crisp images at very short exposures that are ideal for mosaic building or operation aboard fast or low-flying aircraft. The RGB+3 is equipped with standard Micro-MCA

interfacing which includes a USB 2.0 interface for rapid system configuration and image transfer, a serial interface for tagging each image with GPS coordinates, live video interfacing, and a multi-IO connector (HDMI) with links to remote controls such as a remote image trigger.

ENVG III/FWS-I American Night Vision Mobility and Targeting System



Tiers:

1 2 3 4

System

Alternative Designation: ENVG III/FWS-I
Type: Enhanced Night Vision Goggle III/ Family of Weapon Sight-Individual
Crew: ea1
Rapid Target Acquisition (RTA) Technology: Quickly locate and engage targets from any location without raising the weapon to the eye, keeping soldiers both safe and more lethal
12-micron Technology: Provides the sharpest image quality in a smaller and lighter package, allowing soldiers to identify and engage targets day or night, and in smoke, dust, haze, or fog
Intuitive Design: Easily switch between modes of use with a touch of a button, improving situational awareness, and soldier confidence.
Modes: Image overlay, picture in picture and scope only view options tailored to meet the multi-environmental conditions today’s soldier encounters
Transmission: Enables multiple units to work in close proximity without interference and jamming
Battery Life: Extends mission time without adding to pack load.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

Enhanced Night Vision Goggle III/Family of Weapon Sight-Individual ENVG III/FWS-I. In today’s battlefield environment, it is

critical for soldiers to be able to quickly locate and identify targets, especially during nighttime operations or when visibility is compromised. Currently soldiers use two different devices – night vision goggles for situational awareness and the thermal weapon sight for aiming, which impacts how quickly the soldier can acquire and engage the target. BAE Systems' ENVG III/FWS-I provides dismounted soldiers with an integrated thermal targeting system to illuminate the night. ENVG III/FWS-I eliminates the need to switch between night vision goggles and weapon mounted thermal sights when acquiring or engaging threats, improving soldier safety and mission effectiveness.

MP-DF 100 Israeli Manpack DF/COMINT system









Tiers:



System

Name: MP-DF 100
Type: Manpack DF/COMINT system
Alternative Designation: INA
GPS Enabled: Yes
Note: The MP-DF 100 can operate in two main modes: Hand-held mode or Manpack mode.

↳*MP-DF 100, Hand-Held Mode*

Frequency Range: MHz25-3,000

Weight: 14 kg excl vest
Power Consumption: 40 W (excl PDA)
SHock and Vibration: MIL-STD-810 (except PDA)
Antenna TYpe: 90 deg front sector (homing)
DF Method: sum-null comparison
Bandwidth Resolution: kHz typ25
Max Signal at Input (no damage): dBm+20

↳***MP-DF 100, Manpack Mode***

Frequency Range: MHz25-3,000
Weight: 20 kg excl vest
Power Consumption: 40 W (excl PDA)
Shock and Vibration: MIL-STD-810 (except PDA)
Antenna Type: 360 deg and +15 Elevation
DF Method: Interferometer
Accuracy: typ 4° RMS @ SNR IF=10 dB
Resolution: deg0.5
Instantaneous Bandwidth: MHz2 x 2
Max Input Signal (no damage):: dBm+20
Software Interface: wireless Bluetooth networking
Display: activity map (signal level vs frequency graph or list); DF map vs frequency (DOA vs frequency, strip graph or list); DF activity vs time at specified frequency (for net radio)

Notes:

Designed for use by ground forces gathering intelligence in the field, the MP-DF 100 manpack DF/COMINT system is used for interception and direction finding on a range of frequencies in the band from 25 to 3,000 MHz. Performing wide-spectrum scanning, the MP-DF 100 detects, locates and monitors signals of interest from specific locations. The MP-DF 100 can be configured to operate in two main modes: hand-held or manpack. These modes are differentiated by the size and type of their antennas. The hand-held mode, which uses a 90° front sector antenna and sum-null DF, enables soldiers to locate nearby emitters by advancing in the emitter's general direction and aiming the sensor in the direction of the emitter (homing mode). The manpack mode, which uses two types of small tripod-mounted antennas and interferometer-based DF, enables mapping of the direction and frequency of existing emitters in the area. This configuration, which includes GPS capabilities integrated in a PDA, can be carried in a specially-designed vest or backpack, and used as a standalone sensor or remotely controlled.

KDU-1 Polyus Russian Man-Portable Rangefinder/Goniometer





Tiers:



System

Alternative Designation: KDU-1 Polyus
Type: Man-Portable Rangefinder/Goniometer
Crew: ea1
Measurement Range at ±10 m Accuracy,: 50...9,000 m
Recognition Range of “Tank-Sized” (frontal area) Target: 4,500 m
Burst Ranging: 4,000 m
Magnification: x7
Field of View: 6°
Dioptric Adjustment: ±4 Diopters
Azimuth Range: from +30-00 to –30-00 deg
Elevation Range: from +3-00 to – 3-00 deg
Angular Accuracy: 0-04 deg
Angular Accuracy: 0-12 deg

Dimensions

Length: INA
Width: INA
Height: INA
Height of Periscope: 250 mm
Weight, Combat: kg14

Notes:

The KDU-1 rangefinder/goniometer is designed for ground target reconnaissance, correction of artillery and air firing from ground, air, ship control centers as well as for use in automated fire control systems. SYSTEM COMPOSITION *LDM-2 (1D39) laser rangefinder module *SN-3 aiming system *1D26 TR tripod *Periscope *LGK-4M laser gyrocompass *1E77 synchronization unit (2 pcs.) *1E67M accumulator battery (2 pcs.) *Accessory set *Transport case including two flexible packs for carrying *Operation manual

LTSD-4-1 Russian Laser Rangefinder/Designator



Tiers:

1 2 3 4

Variants:

- **LTSD-4 LASER RANGEFINDER/DESIGNATOR:** The LTSD-4 Laser Rangefinder/Designator is designed for ground target reconnaissance, correction of artillery and air firing in daylight and at night including the use of high-accuracy ammunition fitted with laser homing heads when illuminating the stationary and moving targets, military equipment and offensive fortifications by a laser light from ground observation points. It may be also used in automated fire control systems.

System

Alternative Designation: LTSD-4-1
Type: Laser Rangefinder/Designator
Crew: ea2
Tank-sized target in the daytime: m5,000...7,000
Surface Target: m5,000...15,000
Night Vision Device Tank-Sized Target at Night: m1,000...3,000
Thermal Imager, Tank-Sized Target at Night: m3,000...4,000
Measurement Range at 5 m Accuracy: m100...20,000
Boresight Magnification: x10
Field of View: 5°
Dioptric Adjustment: +5 diopters
Maximum duration of laser designation, Artillery Mode: 15 sec
Maximum duration of laser designation Air Mode: 100 sec
Azimuth Range: +30-00...-30-00 deg
Elevation Range: +3-00...-3-00 deg
Angular Accuracy, Magnetic Azimuth: 0-12 deg
Angular Accuracy, Elevation: 0-04 deg

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: kg20

Notes:

The LTSD-4-1 Laser Rangefinder/Designator is designed for ground target reconnaissance, correction of artillery and air firing in daylight and at night including the use of high-accuracy ammunition fitted with laser homing heads when illuminating the stationary and moving targets, military equipment and offensive fortifications by a laser light from ground observation points. It may be also used in automated fire control systems. SYSTEM COMPOSITION *PP-20 transceiver *BNV-3 night vision unit * *SN-3 aiming system *1D26 TR tripod *1E77 synchronization unit (2 pcs.) *1E67M accumulator battery (2 pcs.) *Accessory set *Transport case including two flexible packs for carrying *Instruction manual

LTSD-4 Russian Laser Rangefinder/Designator





Tiers:



System

Alternative Designation: LTSD-4

Type: Laser Rangefinder/Designator

Crew: ea2

Tank-sized target in the daytime: m5,000...7,000

Surface Target in the daytime: m5,000...15,000

Tank-Sized Target at Night using Night Vision: m1,000...3,000

Tank-Sized Target at Night using Thermal Imager: m3,000...4,000

Measurement Range at 5m Accuracy: m100...20,000

Boresight magnification: x10

Field of view: 5°

Dioptric adjustment: ±5 diopters

Maximum duration of laser designation, Artillery Mode: 15 sec

Maximum duration of laser designation, Air Mode: 100 sec

Azimuth Range: +30-00...-30-00 deg

Elevation Range: +3-00...-3-00 deg

Angular accuracy, True Azimuth: 0-04 deg

Angular accuracy, Magnetic Azimuth: 0-12 deg

Angular accuracy, Elevation: 0-04 deg

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: kg20

Height of Persciope: mm250

Notes:

The LTSD-4 Laser Rangefinder/Designator is designed for ground target reconnaissance, correction of artillery and air firing in daylight and at night including the use of high-accuracy ammunition fitted with laser homing heads when illuminating the stationary and moving targets, military equipment and offensive fortifications by a laser light from ground observation points. It may be also used in automated fire control systems.

MP007 American Man-Portable Direction Finding System







Tiers:



System

Alternative Designation: MPOO7
Type: Man-Portable Direction Finding System
Crew: ea1
DF Accuracy: Outstanding DF accuracy in compact design due to use of the correlative interferometer DF method in the range above 173 MHz
Frequency Range: Wide frequency range from 20 MHz to 6 GHz (DF mode)
Position Fixing: Realtime position fixing for detected transmitters through networking of multiple R&S®MP007 systems
Operation: Extended operating time thanks to high-power battery and optional solar module
Intergration: Integration into existing Rohde & Schwarz DF systems
Software: Tried and tested R&S®RAMON control software
Web-Based Interface: Special web-based user interface for tablets and touchscreen operation
Wireless Communications: Networking via wireless communications
Transmitters: Master/slave position fixing of fixed-frequency transmitters. Integration of R&S®MP007 into existing Rohde & Schwarz radiolocation systems

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: INA

Notes:

The R&S MP007 direction finding system is based on the R&S DDF007 portable direction finder upgrade kit in combination with the R&S®ADDx07 compact DF antennas. The result is a unique combination of functionality and performance in a system of this size. It can be used as a stationary or mobile DF station or as a portable manual direction finder, and can be reconfigured within minutes to meet the requirements of the current situation. The R&S®MP007 comes with a wide range of powerful software options and add-ons, making it an excellent choice for all applications that call for a compact and flexible yet powerful DF system. Key Facts Outstanding DF accuracy in compact design due to use of the correlative interferometer DF method in the range above 173 MHz Wide frequency range from 20 MHz to 6 GHz (DF mode) Realtime position fixing for detected transmitters through networking of multiple R&S®MP007 systems Extended operating time thanks to high-power battery and optional solar module Integration into existing Rohde & Schwarz DF systems

Flexnet French Wireless Protection and Surveillance Platform



Tiers:



System

Alternative Designation: Flexnet

Type: Wireless Protection and Surveillance Platform

Crew: ea1

Autonomous: • Long battery lifetime • Autonomous communication • No existing power or network required • Auto configuration

Intelligent: • Automatic detection • Target classification & recognition • Threat characterization • Easy to deploy and use • Remote control & setting

Scalable: • Suitable for small & large protection networks • C2 system with API for easy integration • Compatible with 3rd party sensors

Invisible: • Small & portable • Easy to hide & covert sensors • Silent secured network • Passive sensors (no signal sent to detect)

Dimensions

Length: INA

Width: INA

Height: INA

Weight, Combat: INA

Notes:

Flexnet is a modular sensor solution offering strength protection and monitoring of critical sites. Developed by Exensor, Flexnet combines a comprehensive toolbox of sensors for Military and Homeland protection applications. Launched in 2008, the Flexnet solution is a flexible and user-friendly, comprehensive surveillance solution composed of a portfolio of intelligent, wireless Unattended Ground Sensors (UGS) and cameras allowing the detection, classification, identification and tracking of moving objects on the ground. Ensuring a full 360° 24/7 perimeter protection for all kinds of security operations, the Flexnet solution is one of the most reliable sensor solutions available on the market. Thanks to its flexible toolbox architecture, the solution can easily be extended by integrating external sensors for multi-surveillance missions. Suited for harsh environmental conditions, the Flexnet wireless platform is adapted for military force protection, area surveillance as well as intelligence gathering. The Flexnet solution, developed by Exensor, is a user-friendly, flexible, comprehensive surveillance solution combining a wide range of sensors (passive infrared, seismic and acoustic, and intelligent motion cameras) with a proprietary command & control software. This self-healing Mesh network allows for detection, classification & identification of any threat. The Flexnet sensor platform is a Force Multiplier that can be used for several applications, ranging from force protection tasks, such as airbase protection, camp protection, patrol and self-protection tasks, to Intelligence Gathering, Surveillance, Reconnaissance and Target Acquisition (ISTAR) tasks.

SIMRAD GN 1/GN 2 Norwegian Night Vision Goggles







Tiers:

1 2 3 4

System

Alternative Designation: GN 1/GN 2
Type: Night Vision Goggles
Manufacturer:
Crew: ea1
Magnification: 1x
Field of View: 40 deg
Focus Range: 0.2m to infinity
Battery: 2 x 1.5V AA cells
Battery Life: >80h at 20°C
IR Source On: >40h at 20°C
IR Source: LED
Operating Temperature: –40°C to +55°C
Storing Temperature: –40°C to +65°C

Dimensions

Length: mm58
Width: mm155
Height: mm73
Weight, Combat: g390

Notes:

The GN Night Vision Goggles are among the smallest and lightest night vision goggles ever produced. Their unique design makes them comfortable and easy to use, whilst retaining a high performance night vision capability. Advanced features include *Range focus *Eyepiece focus *IR illuminator *Lightweight, ergonomic head mount or helmet mount *Flip-up mechanism *Waterproof to 10m *NATO codification *Easy and quick mounting *Compatible with 2nd or 3rd generation 18mm *image intensifier tubes Applications *Vehicle driving/commanding *Patrolling *Surveillance *Weapon handling *Parachuting *Reconnaissance *Logistical operations *Search and rescue *Map reading

LTSD-4-2 Russian Laser Rangefinder/Designator





Tiers:



System

Alternative Designation: LTSD-4-2
Type: Laser Rangefinder/Designator
Crew: ea2
Tank-sized target in the daytime: m5,000...7,000
Surface Target: m5,000...15,000
Night Vision Tank-Sized Target at Night: m1,000...3,000
Thermal Imager Tank-Sized Target at Night: m3,000...4,000
Measurement range at 5 m accuracy,: m100...20,000
Boresight Magnication: x10
Field of View: 5°
Dioptric adjustment: ±5 Diopters
Maximum duration of laser designation, Artillery Mode: 15 sec
Maximum duration of laser designation, Air Mode: 100 sec
Azimuth Range: +30-00...-30-00 deg
Elevation Range: +3-00...-3-00 deg
Angular Accuracy, Magnetic Azimuth: 0-12 deg
Angular Accuracy, Elevation: 0-04 deg

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg15.9

Notes:

The LTSD-4-2 Laser Rangefinder/Designator is designed for ground target reconnaissance, correction of artillery and air firing in daylight and at night including the use of high-accuracy ammunition fitted with laser homing heads when illuminating the stationary and moving targets, military equipment and offensive fortifications by a laser light from ground observation points. It may be also used in automated fire control systems. SYSTEM COMPOSITION: *PP-20 transceiver *BNV-3 night vision unit * *Set for fastening PP on terrain *1E77 synchronization unit *1E67M accumulator battery (2 pcs.) *LDM-2 laser rangefinder module *Accessory set *Transport case including two flexible packs for carrying *Instruction manual

PKI 9120 German Mine Detector





Tiers:



System

Alternate Designation: PKI 9120
Type: Mine Detector
Manufacturer: INA
Crew: 1
Power Supply: Power supply: 8 alkaline batteries 1,5 V type LR 14 (operating time 40 h) or 8 rech. batteries NiMH 1,2 V – 3,5 Ah (operating time 10 h) or battery pack 9,6 V – 3,8 Ah (operating time 10 h)
Operating Temperature: from -21°C to + 55°C approx.

Dimensions

Circular Search Head: 230 mm diam
Optional Search Head: 450 mm diam
Electronic Cylinder: 35 x 460 mm
Extension Rod: 25 x 600 mm
Battery Container: 30 x 360 mm
Short Version: 1000 mm and 2,1 kg
Long Version: 1700 mm and 2,4 kg
Weight in Satchel: 3,8 kg
Weight in Carrying Case: 8,5 kg

Notes:

The PKI 9120 mine detector is designed for use on all grounds even on compact soils such as volcanic soil or laterit, which makes it suitable for use everywhere in the world. In many regions mine detectors can be influenced by a mixture of soils such as laterit, magnetic rock and by soil conductivity due to monsoon rain. The wide band compensation of this PKI mine detector meets such environmental working conditions and also rejects interference from saltwater due to its pulse induction operating principle. Components subject to wear and tear can easily be exchanged without further calibration work. This eases fault definition and significantly improves equipment availability in the field. Rugged design and constructional features, coupled with various accessories make the PKI mine detector a very versatile equipment, which allows use in lying, kneeling or upright position.

Fara-1 Russian Small Arms Radar Sight





Tiers:

1 2 3 4

System

Alternative Designation: Fara-1
Type: Small Arms Radar Sight
Manufacturer: NPO Strela, Tula
Crew: ea1
Scan Sector Range: 5,000 m
Scan Sector Azimuth: 24; 45; 90; 120 deg
Moving Target Detection Range, Person: 2 km
Moving Target Detection Range, Tank: 4 km
Moving Target Location Accuracy, Range: 20 m
Moving Target Location Accuracy, Azimuth: 0-20 deg
Resolution Range: 50 m
Resolution Azimuth: 0-80 deg
Power Consumption: 12 watts
Mean Time Between Failures: 5,000 hours

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg16.5

Notes:

Russian army use also close combat, weapons equipped by radar sights along with the optoelectronic sights. Radar sights work in centimeter and millimeter wave bands that make it possible detecting targets and providing weapons guidance at any time, in all weather conditions as well as smokescreen and dustiness of atmosphere. Portable Multiple Target Surveillance and Weapon Guidance Radar «Fara-1» (1L111) is used as a radar sight in the Russian Armed Forces and was adopted in 1999. Radar Sight Fara-1 is designed for moving land objects surveillance (single person, group of people, armoured vehicles) and guidance of automatic grenade launcher AGS-17 type, single and heavy machine guns such as Pecheneg and Kord. Weapons

guidance at a moving target is fulfilled by operator at the signal maximum from the target reflection and with it the target range is determined by the radar indicator. The radar sight manpack set is a portable device carried by one person in the folded state behind an the pack. Radar sight works in continuous emission mode. Complex signal with double modulation is used for rain influence and flying birds avoidance in the radar near-field.

Air Based Sensors

Sea Based Sensors

TSM 8050A North Korean Active-Only Sonobuoy



Tiers:

1 **2** 3 4

System

Alternative Designation: TSM 8050A
Type: Sonobuoy
Maximum Range: 7.4 km
Minimum Range: 0 km
Maximum Altitude: 0 m
Minimum Altitude: 0 m

Dimensions

Length: 0.915 m
Diameter: 0.124
Weight, Combat: 18.0 kg

Notes:

TSM 8050A Active RO - Hull Sonar, Active-Only Role: Sonobuoy, Active-Only Range-Only Non-Directional Max Range: 7.4 km

Joint Readiness Training Center (JRTC)

JRTC VISMOD: T-80B Main Battle Tank (MBT)





Tiers:



Variants:

- **T-80BK:** This is the command version of the T-80B with additional communications equipment. It could not fire the Kobra guided missile.
- **T-80BV:** This is a development of the T-80B equipped with Kontakt explosive reactive armor. It had a combat weight of 93,700 lb (42,500 kg), top road speed of 44 mph (70 kph) and a road range of 230 mi (370 km). The T-80BVK is the commander's version.

System

Alternative Designation: NA

Total Built: The T-80B is the first variant produced in quantity. Russia: 5,391

Type: Main Battle Tank

Family: T-80 Series

Crew: ea3

Maximum Effective Range: m1,500

Dimensions

Length: m9.65

Width: m3.58

Height: m2.22

Weight, Combat: tons43.7

Ground Pressure: INA

Admin Note:: The dimensions provided above are the dimensions of the actual T-80B. The dimensions of the VISMOD should be provided here IOT facilitate BLUFOR range estimation.

Automotive

Engine Name: GTD-1000T

Engine Type: Gas turbine engine

Engine Power: hp1,100

Power to Weight Ratio: hp/ton25.8

Cruising Range: km335 (Actual T-80B)

Speed, Maximum Road: km/h70 (Actual T-80B)

Speed, Average Cross: 55

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m1

Trench: m2.85

Fording Depth (No Preparation): m1.8

Fording Depth (With Preparation): m5

Cold Start Ability: Yes

Deep Water Snorkel: Available

Admin Note:: Values listed above are for the actual T-80B. Where appropriate, the values of the VISMOD should be input to assist in developing ENY COAs

Communications

↳*Not provided by JRTC*

Frequency Range: MHz

HF Output: W

Modulation:

Display:

Entry of Frequency:

Present Channels:

Digital Transmition: KBaud

Sensitivity: uV

Range: km

Operational Voltage: V

Weight: kg

Size: mm

Main Gun

↳*System*

Name: L48 2A46M-1 Smoothbore Cannon

Type: 125 mm smoothbore Gun

Manufacturer: Spetstekhnika Design Bureau

Max Rate of Fire: rds/min4-6

Maximum Range: m4,000

Manually Load Time: rds/min1-2

Maximum Elevation: deg+14

Minimum Elevation: deg-5

Traverse Range: deg360

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Evacuator Type: Central Bore

Thermal Sleeve: Yes

Barrel effective Full Life Charge: rds800

Breech Mechanism: Semi-automatic horizontal sliding breech block

Mazimum Pressure: bar5,100

Loading System: Korzina electric and hydraulic automatic loading system

Carousel Reloading Time: minutes13-15

Note: The L48 2A46M-1 has been extensively developed into 10 different variations and remains the primary armament of Russian front-line tanks.

↳*Ammunition (Main Gun)*

Name: Armour-Piercing Fin-Stabilized Discarding Sabot (APFSDS)

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 36 total rounds of any 125mm Russian Projectiles

Maximum Effective Range: m1,500

Maximum Range: m5,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

Projectile Weight: kg11

Projectile Dimension: mm900

Admin Note: If not FOUO, ranges used here should match the range of the MILES system being used by the OPFOR

Anti-Tank Guided Missile

↳*System*

Name: Kobra (AT-8 Songster)

Type: SACLOS Anti-Tank Missile System

Caliber: mm125

Basic Load: rounds5

Rate of Fire: rd/min2-3

Guidance System: SACLOS Radio

Effective Firing Range: m100-4,000

Manufacturer: KB Tochmash

In Service: 1976-present

Weight: kg23.2

Warhead Weight: kg4.5

Muzzle Velocity: m/s125, which increases to 800m/s at its peak

Flight Time to a 4,000 Meter Targetsec: 9-10

Armor Penetration: 600mm of RHA

Hit Probability: %80

Note: ATGM can only be fired when the vehicle is stationary

Admin Note: If not FOUO, ranges used here should match the range of the MILES system being used by the OPFOR

Commander's Weapon / Air Defense Weapon

↳*System*

Name: NSV (Russian НСВ Никитина-Соколова-Волкова)

Type: 12.7mm Anti-Aircraft Machine Gun

Manufacturer: "Metallist", Uralsk, Kazakh SSR, Crvena ZastavaSerbia

Weight (Gun Only): kg25

Muzzle Velocity: m/s845

Max Rate of Fire: rds/min200-600

Length (Total): mm1,560

Action: Gas Operated

Feed System: 50-Round Belt

↳*Ammunition*

Type: AP-I

Caliber: mm12.7

Cartridge: 12.7×108mm

Muzzle Velocity: m/s845

Basic Load: ea500

Effective Firing Range (vs. Air Targets): m1,500

Effective Firing Range (vs. Ground Targets): m2,000

Admin Note:: If not FOUO, ranges used here should match the range of the MILES system being used by the OPFOR

Coaxial Machine Gun

↳*System*

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Manufacturer: Degtyaryov plant

Rate of Fire: rds/min200-600

Weight (Gun Only): kg9

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,250

Effective Range: m2,000

Admin Note:: If not FOUO, ranges used here should match the range of the MILES system being used by the OPFOR

Fire Control

Name: 1A33 FCS

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, the T01-KOIR

Commander Day Mode Sight: 10^0 FOV and ×5 magnification

Thermal Sight Gunner: Yes

Main Gun Stabilization: Yes, 2E26M electro-hydraulic dual plane stabilisation system

Main Gun Stabilization Deployment Time: minutes2

Range, Day Sight: m1,000

Range, Thermal Sight: m2,600

IR Searchlight: Yes, L-4A "Luna" IR Searchlight

TNPO-160 Periscopes: ea2

TNPA-65 Periscopes: ea2
Range Finder: IG42 rangefinder sight with an electronic control panel
Ballistic Computer: 1V517 tank ballistic computer
Fire Selection Panel: 1G43
Weapon Stabilizer: 2Eh46M
Input Sensors: Wind-speed, tank speed, cant, and bearing
Admin Note:: If not FOUO, the above data should match the actual capabilities of the VISMOD

Protection

Armor Type: The T-80B is protected by a third iteration Soviet laminate armor that is known as Combination K
Applique Armor: Yes, Hull side; track skirts
Explosive Reactive Armor: Yes, Kontakt-1 System
Active Protection System: Arena Available
Mine Clearing: Roller-plow available
Self-Entrenching Blade: Yes
NBC Protection: Yes, ZETS-11-2 detection system collective overpressure system
Smoke Equipment: Yes, two banks of four 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade
Smoke Grenade Range: m250-300
Smoke Screen: 30m wide and 10m high for 60 seconds per grenade.
IR Signature: The exhaust is box-shaped and designed to direct heat away from the tank
Anti-Radiation Material: Installed as a inside protective layer
Personal Breathing Apparatus: Equipment
Automatic Fire Extinguisher System: Yes
Upper Glacis: 200mm at 22 degrees
Lower Glacis: 80-100 mm at 30 deg
Side Hull Armor: 60-80mm
Rear Hull Armor: 30-40mm
Floor Hull Armor: 100mm
Front Turret Armor: 400-450mm
Side Turret Armor: 90-120mm
Rear Turret Armor: 60-90mm
Top Turret Armor: 40-50mm

Notes:

The T-80B is a front-line combat vehicle which combines operational mobility and tactical offensives and defensive capabilities. This variant features the 9K112 Kobra missile system. It also has improvements to the computerized fire-control system, including a laser rangefinder. The T-80B main battle tank is a further development of the original T-80, which was produced only in small numbers. The T-80B is the first variant produced in quantity. Small scale production of this tank commenced in 1978. At least 5,391 T-80B and improved T-80BV tanks were produced. Due to expensive maintenance the Russian Army planned to retire all T-80 series tanks by 2015. However in 2017 upgraded versions of this tank was publicly revealed.

Protection of the T-80B was improved comparing with the T-80. The tank is fitted with a composite armor at the front of the hull and turret. Its hull provides protection equivalent to 570-820mm of Rolled Homogeneous Armor (RHA) against armor piercing rounds, depending on the projectile type. Turret provides protection equivalent to 420-760mm or RHA. This tank is fitted with NBC protection and fire suppression systems. The original T-80B tanks lacked explosive reactive armor, which was fitted to improved models and were painted olive drab. Fording depths (m): 12.0 with BROD-M system. The night sight cannot be used to launch the ATGM. The day sight can be used at night for launching ATGMs if the target is illuminated. A variety of thermal sights are available. They include the Russian Agava-2, French Sagem-produced Alis and Namut sight from Peleng. There are thermal sights available for installation, which permit night launch of ATGMs. The 12.7mm MG NSVT has both remote electronically operated sight PZU-5 and gun-mounted K10-t reflex sight. The more recent BK-27 HEAT round offers a triple-shaped charge warhead and increased penetration against conventional armor and ERA. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round, has fragmentation effects. If the BK-29 HEAT-MP is used, it may substitute for FRAG-HE (as with NATO countries) or complement FRAG-HE-he. With three round (APFSDS-T, HEAT-MP, ATGMs) in the auto loader versus four, more antitank rounds would be available for the higher rate of fire. The ATGM may be launched while moving slowly. The AT-8 can be auto-loaded with the two halves mated during ramming; but the stub charge is manually loaded. The GTA-18A auxiliary power unit is used when the engine is off

JRTC VISMOD: Technical Fighting Vehicle



Tiers:

1 2 3 4

System

Crew: 2+

Description: Civilian truck modified for military use

:

↳*Dimensions and Automotive Characteristics*

Note: Varies by make and model

Armament

↳*Weapon Option 1*

Cailber/Length: mm14.5

Name: KPV-14.5

Type: Heavy machine-gun

Ammunition: 500 x 14.5mm

Rate of Fire: 600 rounds / minute

↳*Weapon Option 2*

Name: M2 Heavy Barreled Machine Gun

Type: 50 Caliber Machine Gun

Ammunition: 500 x .50mm

↳*Weapon Option 3*

Cailber/Length: mm30

Name: AGS-17

Type: Automatic grenade launcher

↳*Weapon Option 4*

Caliber: mm82

Name: 2B14 Podnos

Type: Mortar

↳*Weapon Option 5*

Name: Konkurs or Kornet

Type: Anti-tank missiles

↳*Weapon Option 6*

Name: SPG-9 (Spear)

Type: 73mm Recoilless Gun

↳*Weapon Option 7*

Name: DShK

Type: 12.7mm Heavy Machine Gun / AA Gun

Notes:

A "Technical" is a type of improvised fighting vehicle, typically a civilian or military non-combat vehicle, modified to provide an offensive capability similar to a military gun truck. It is usually an open-back civilian pickup truck or all terrain vehicle mounting a machine gun, anti-aircraft gun, recoilless rifle, or other support weapon. Due to the simplicity in which a technical can be built as well a the high maneuverability that they provide, it is likely that this weapon platform will be heavily utilized by insurgent and special purpose forces. The armor protection of a technical fighting vehicle is non-existent unless added after market. Therefore, most weapon systems can destroy a technical and all can disable them.

JRTC VISMOD: T-72 Russian Main Battle Tank (MBT)



Tiers:



Variants:

- **T-72B:** Second Russian main variant of the T-72 after the T-72A.
- **T-72B1:** In 1986, a limited production variant without an ATGM launch capability. Some do not have ERA.
- **T-72BK:** The Commander's variant with additional radios.
- **T-72BM:** Russian T-72B upgrade with 2nd gen ERA. The system is fielded, available for export, and upgraded. Tier 2 and some Tier 3 tanks can challenge US forces under favorable conditions when using modern ammunition and employed by well-trained units with sound tactics. A variety of upgrades are available for the T-72B. They include protection upgrades, such as improved ERA, APS, defensive aids suites with IR jammers, plate armor, welded turret, and grill armor around tracks and grill. Mobility upgrades include a new power train, improved steering, improved mine plows and rollers, and electronic mine spoofing system. Fire control system upgrades include new sights, gun, ammunition, and improved stabilization. With the expanding number of upgrades offered by former Warsaw Pact, Asian, Israeli, and other firms, most T-72-type tanks have some level of upgrade from the basic T-72 MBT. The more affordable upgrade approach for most countries is to execute specific upgrades during maintenance work. But this approach may result in only partially modernized tanks at any one point in the life of the vehicle, and which are not as modern as more recent competitors. An alternative is to produce modernized tanks in small numbers, resulting in high per-unit production costs.
- **T-72BU:** Upgrade variant with the fire control system from the T-80U as well as well as a variety of other changes.
- **T-72BU renamed T-90:** With the limited market for new tanks, the world tank industry has developed upgrades and whole vehicle upgrade packages to tap into the market. Older T-72 tanks can be brought up to the T-72B standard. Some approach the T-90 standard. Most T-72-type tanks fielded reflect some level of upgrade. Upgrade options are expanding from former Warsaw Pact, Asian, Israeli, and other international firms.
- **T-72S / Shilden:** Russian export T-72A upgraded to the T-72B standard. Although visually similar to T-72B, it has slightly less chassis and turret protection. Former Warsaw Pact countries such as Slovakia and Middle Eastern countries like Iran have upgraded their tanks to the T-72S standard.
- **M-84AB1:** Yugoslav upgrade to the M-84, bringing it close to the T-90, and the latest T-72B improved tanks.
- **M-95 Degman:** Croatian M-84 upgrade with box composite armor, ERA, 1200hp and thermal FCS. An export upgrade conversion, AKA M-84D, is offered for Kuwaiti M-84A tanks.
- **PT-91:** Polish upgrade tanks with ERA, Drawa improved FCS, Savan-5 thermal sight, improved gun stabilization, and countermeasures.
- **PT-91M:** Has a 1000hp engine, new guns and FCS, armor changes, and other improvements. PT-91M exported to Singapore. PT-91P is designed for export to Peru.
- **T-72M1:** Demonstrator with 2nd generation ERA and other upgrades were displayed at military shows.
- **T-72M1M:** Includes 3rd generation Relikt ERA and optional Arena Active Protection System (APS). Alternative designations: Rogata and SMT M1988. It is almost the same as the T-72S (Export), except more ERA on the side skirts.
- **AJEYA MK 2:** India is upgrading T-72A tanks close to a Bhishma (T-90S) standard.

System

Alternative Designation: NA
Manufacturer: Uralvagonzavod
Type: Main Battle Tank (MBT)

Crew: ea3

Passenger Capacity: INA

Maximum Effective Range: m500

Note #1: The T-72 Ural main battle tank was developed as a cheaper and more reliable, however less capable alternative to the T-64.

Note #2: 25,000+, one of the most widely produced post-World War II tanks, second only to the T-54/55 family. The T-72 was exported to around 30 countries.

Dimensions

Length (Gun Forward): m9.53

Length (Hull): m6.95

Width: m3.59

Height: m2.23

Weight, Combat: tons44.5

Ground Pressure: INA

Automotive

Engine Name: V-92S2F

Engine Type: V-12 diesel

Engine Power: hp780

Power to Weight Ratio: hp/ton18.8

Cruising Range: km500

Speed, Maximum Road: km/h60

Speed, Average Cross: 45

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.85

Trench: m2.8

Fording Depth: m1.2

Fording (with Preparation): m5

Transmission: Synchromesh, hydraulically assisted, with 7 forward and 1 reverse gears

Suspension: Torsion bar

Ground Clearance: m0.49

Fuel Capacity: liters1,200

Communications

R-168-100U

Name: R-168-100U

Type: VHF

Family: AKVEDUK R-168 Series

Frequency: MHz30-108

Capabilities: FH, Voice, Data

Range: km30-60

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

Automated Control and Communication: Yes

Main Gun

↳*System*

Name: 2A46M/2A46M-5

Type: 125mm Smoothbore

Max Rate of Fire: rds/min8

Manually Load Time: rds/min1-2

Sustain Rate of Fire: INA

Time the Max Rate of Fire can be Sustained: INA

Range Finder Type:

Autoloader: Yes, Carousel-Type Autoloader

Fire on the Move: Yes, Main Gun

Maximum Elevation: deg-6

Minimum Elevation: deg+14

↳*Ammunition (Option 1)*

Name: Armour-piercing fin-stabilized discarding sabot

Type: Smoothbore 125mm Projectile

Caliber: mm125

Muzzle Velocity: m/s2,050

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Effective Range: m2,000-3,000

Armor Penetration: mm1,000

Muzzle Energy: MJ15-24

↳**Projectile Dimension:** mm900

Projectile Weight: kg11

Variants: 1.1 3VBM3/3BM9/10 1.2 3VBM6/3BM12/13 1.3 3VBM7/3BM15/16 1.4 3VBM8/3BM17/18 1.5 3VBM9/3BM22/23 1.6 3VBM10/3BM29/30 1.7 3VBM11/3BM26/27 1.8 3VBM13/3BM32/33 1.9 3VBM17/3BM42 (3BM44 "Mango") 1.10 3VBM19/3BM42M (3BM44M "Lekalo") 1.11 3VBM20/3BM46 (3BM48 "Svinets") 1.12 3VBM22/3BM59 (3BM59 "Svinets-1") 1.13 3VBM23/3BM60 (3BM60 "Svinets-2") 1.14 3VBM?/3BM69 "Vacuum-1" 1.15 3VBM?/3BM70 "Vacuum-2"

Note: Entered service in 2005[5] Utilising a new sabot. Reported to be uranium alloy. For 2A82/2A82-1M cannon on T-80UM-2/T-14s.

↳*Ammunition (Option 2)*

Type: High Explosives (HE)

Purpose: High explosive fragmentation fin stabilised. General purpose rounds, for use against infantry, bunkers and light vehicles and other "soft" targets.

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s850

Max Dispersion: mrad0.23

Maximum Range: m5,000

Tungsten Rods: ea450

Charge: A-IX-2 (73% RDX, 23% aluminium powder, phlegmatized with 4% wax) 3.0 kg

Projectile Weight: kg23

Round Weight: kg33

Variants: 3VOF22/3OF19, 3VOF36/3OF26, 3VOF128/3OF82

↳*Ammunition (Option 3)*

Type: High-Explosive Anti-Tank (HEAT)

Name: 3VBK27/3BK31 "Start"

Caliber: mm125

Basic Load: 39 Total Rounds of any 125mm Russian Projectiles

Muzzle Velocity: m/s915

Max Dispersion: INA

Maximum Range: m3,000

Charge: INA

Charge Weight: kg1.62

Projectile Weight: kg18.4

Armor Penetration: Estimated at 800 mm triple charge HEAT

Variants: 3VBK7/3BK12, 3VBK10/3BK14, 3BK12M, 3BK14M, 3VBK16/3BK18, 3BK18M, 3VBK17/3BK21, 3BK21B, 3VBK21/3BK25, 3VBK25/3BK29 "Breyk", 3VBK25M/3BK29M

Tank Commander's Weapon System

↳***System***

Name: Type 54 DShK Anti-Aircraft Machine Gun
Type: 12.7 Anti-Aircraft Machine Gun
Proliferation: over 1 Million
Length (Total): mm1,625
Length (Barrel): mm1,070
Weight (Gun Only): kg34
Weight (on Wheeled Mounting): kg157
Max Rate of Fire: rds/min600
Range Finder Type: Optical
Action: Gas-Operated, Flapper Locking
Feed System: 50 Round Belt
Sights: Iron/Optical
Turret: Single seat and placed at the rear of the vehicle roof. It is sharp-pointed at the front.
Variants: DK, DShKM, DSHKS, Type 54 HMG
Fire on the Move: Yes

↳***Ammunition***

Type: Rifle
Caliber: mm12.7x108
Muzzle Velocity: m/s850
Basic Load: ea1,200
Effective Range: m2,500
Armor Penetration: API: 21 at 500 m & 13 at 1000 m (RHA)

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)
Type: mm7.62
Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.
In Service: 1961-present
Manufacturer: Degtyaryov plant
Proliferation: 1 Million +
Max Rate of Fire: rds/min650
Range Finder Type: INA
Time the Max Rate of Fire can be Sustained: INA

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length: mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳*Ammunition*

Type: Rifle

Caliber: mm7.60

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (with Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: 1A40-1

Computerized FCS: Yes

Thermal Sight Tank Commander: Yes, Type INA

Thermal Sight Gunner: 1K13-49

Main Gun Stabilization: 2Eh42-2, 2-plane

Range, Day Sight: m5,000

Range, Thermal Sight: m1,000

Infrared: Yes

Protection

Hull Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Turret Armor: Steel and composite armour with ERA, equivalent to 500-600 mm of Rolled Homogenous Armor (RHA)

Applique Armor: Available, Turret top and track skirts

Explosive Reactive Armor: Yes, Kontakt-5

Active Protection System: Yes, Arena available

Mine Clearing: Yes, Roller and plow (optional)

Self-Entrenching Blade: Yes

NBC Protection: Yes

Smoke Equipment: Yes, Grenade launcher 8x; VESS

IR Signature: INA

Automatic Fire Extinguishing Equipment.: Yes

Notes:

The T-72 is a family of Soviet main battle tanks that first entered production in 1971. About 20,000 T-72 tanks were built,making it one of the most widely produced post-World War II tanks, second only to the T-54/55 family. The T-72A version introduced in 1979 is considered a second-generation main battle tank. It was widely exported and saw service in 40 countries and in numerous conflicts. The T-72B3 version introduced in 2010 is considered a third-generation main battle tank.

JRTC VISMOD: Starstreak British Short-Range Man-Portable Air-Defense System (MANPADS)





Tiers:



Variants:

- **Starburst:** Javelin SAM launcher adapted for Starstreak LBR guidance- in production
- **Lightweight Multiple Launcher (LML):** Pedestal launcher for three missiles. The launcher can also mount on a light vehicle, e.g., TUV. A demonstrator is LML on a Panhard tactical truck.
- **Starstreak II:** Improved launcher uses Starstreak or Starstreak II missile. It has an auto-tracker for hands-free guidance. It was fielded in 2010.
- **Starstreak Lightweight Vehicle (LWV):** Land Rover truck converted into an SP SAM system with a 6-canister launcher, ADAD auto-tracker, and TV/ thermal FCS. This launcher can be mounted on other vehicles.
- **Armored Starstreak or (SP HVM):** Vehicle is a Stormer tracked APC chassis, with an 8-missile launcher. The passive IR fire control system uses ADAD, an auto-tracker and thermal sight. The launcher can be mounted on other vehicles.
- **Seastreak:** Single-stage missile naval variant in a 12-missile launcher, with mm-wave radar FCS.
- **Thor:** British Multi-Mission Air Defense System is a RWS, with 4 missile launchers, TV, FLIR, and an auto-tracker. Weighing .5 mt, it mounts on trucks, vans, TUVs, APCs, etc., with a remote operator. Designed for Starstreak, launchers, it can also mount other MANPADS, and ATGMs, such as Ingwe, TOW, HELLFIRE, Mokopa, Spike, etc.
- **Lightweight Multi-Role Missile/LMM:** A multi-role missile options with a single 3-kg tandem (HEAT/HE) warhead and proximity fuse. At 13 kg, the lower-cost missile flies 8-km at 1.5 Mach. It was due in 2013 and was successfully launched by a Camcopter S-100 UCAV variant. Other projected upgrades are semi-active laser- homing and/or dual-mode (LBR/SAL-H).
- **Low-cost air defense/anti-armor (multi-role) system.:** Optional use: as a low-cost air defense/anti-armor (multi-role) system, STARSTREAK can be employed against ground targets, such as light armored vehicles, and snipers in bunkers or buildings. The missile and its darts, with a unique combination of penetrator and following frag-he, have been successfully tested against vehicle targets. With a missile cost of 1/2 to 1/3 of competing MANPADS, the system could be used as a fire support asset to complement ATGM launchers and vehicle weapons

System

Alternative Designation: ForceSHIELD
Country of Origin: Great Britain.
Crew : ea2.0
Reaction Time : secLess than 6
Reload Time : secLess than 25 est
Time between Launches : minLess than 30 sec
Primary Targets: Fixed wing aircraft, rotary wing aircraft, cruise missiles, and vehicles
Combat Load: rounds5
Combat Load, Dismount: rounds3
Fire on Move: No

Maximum Effective Range: km7

Flight Speed: Mach 4

Dimensions

Missile Weight: kg16.8

Warhead Weight: kg0.9

Tripod Weight: kg16

Traverse Head Weight: kg19.5

Sighting System Weight: kg9

Thermal Sight Weight: kg6

Length: m1.4

Missile Diameter: mm127

Launch Tube Diameter: mm274

Fire Control System

Other: ADAD: British passive thermal IR scanners on remote tripod or vehicle mount with 240 degree FOV automatic cueing Missile team employs an azimuth plotting board (e.g. Russian 1L15-1) for direction of approach on aerial targets.

↳*Day Sight*

Name: Avimo stabilized optical sight with lead bias system

Acquisition Range : km7000+

Field of View : INA

↳*Night Sight*

Name: Thales clip-on thermal sight

Acquisition Range : km4 to 5 est

Ammunition

↳*Starstreak Missile*

Type: Three 25mm darts: Tungsten KE tip and case; HE fill

Altitude : m0-5000

Flight Time : sec5 to 7

Fuze Type: Contact with time delay

Guidance: Laser beam rider SACLOS

Penetration : mm KE120+ all LAVs (equal to 3 x 40- mm APFSD-T rds) HE detonates after for frangible effects

Probability of Hit: 60% FW, more than 95% helicopters (each dart 67% for helicopters)

Propulsion: Canister launch booster, bus missile, and 3 darts (sub-missiles)

Range, Maximum : 7000m (guided)

Range, Minimum : m300

Self-Destruct Range: km5.5

Speed : 1364m/s, Mach 4

Other: Starstreak II: Improved missile has 8-km range and better precision. Fielded 2010

Notes:

Starstreak is a British short range man-portable air-defense system (MANPADS) manufactured by Thales Air Defence (formerly Shorts Missile Systems), in Belfast. It is also known as Starstreak HVM (High Velocity Missile). After launch, the missile accelerates to more than Mach 4, making it the fastest short-range surface-to-air missile in the world. It then launches three laser beam riding submunitions, increasing the likelihood of a successful hit on the target. Starstreak has been in service with the British Army since 1997. In 2012 Thales rebranded the system under the ForceSHIELD banner. The Starstreak missile is transported in a sealed launch tube. This tube is attached to an aiming unit for firing. The operator tracks the target using the aiming unit's optically stabilized sight. The process of tracking the target allows the aiming unit to compute the right trajectory to bring the missile together with the target. The operator can indicate wind direction to the unit and, in the case of a long range target, provide superelevation. When the initial tracking is complete, the operator fires the missile by pressing a button. The missile then fires the first-stage rocket motor, which launches the missile from the tube – but burns out before leaving the tube to protect the operator. Four meters away from the operator, when the missile is a safe distance away, the second stage fires, which rapidly accelerates the missile to burn out velocity of more than Mach 4. As the second stage burns out, three dart sub-munitions are released. The dart housing is made from a tungsten alloy. The darts are each 396 millimetres (15.6 in) long with a diameter of 22 millimetres (0.87 in) and weigh about 900 grams (32 oz). Around half the weight of each dart approximately 450 g (16 oz), is its explosive charge, detonated by a delayed-action, impact activated fuze. Each dart consists of a rotating fore-body with two canard fins attached to a non-rotating rear assembly which has four fins. The rear assembly of each dart also houses the electronics that guide the missile, including a rearwards facing sensor. The darts do not home in on laser energy reflected from the target but instead the aiming unit projects two laser beams which paint a two dimensional matrix upon the target. The lasers are modulated and by examining these modulations the sub-munition's sensor can determine the dart's location within the matrix, the dart is then steered to keep it in the center of the matrix. The sub-munitions steer by briefly decelerating the rotating fore-body with a clutch. The front wings then steer the missile in the appropriate direction. The three sub-munitions fly in a formation about 1.5 meters in radius, and have enough kinetic energy to maneuver to meet a target evading at 9 g at 7,000 meters. Earlier laser guidance systems used a single beam that had to be kept on the target at all times, the missile homing in on laser energy reflected off the target, if it moved off the target, the reflection would end and guidance would be lost until the target was regained. The problem could be reduced by making the laser's beam wider, but only at the cost of lowering accuracy and reducing the amount of energy being reflected. Starstreak's system allows for the beam area to be much larger than the target while retaining pinpoint accuracy. On impact with the target, a delayed action fuse is triggered. This gives time for the projectile to penetrate the target before the explosive warhead detonates. The tungsten housing is designed to fragment and produce maximum damage inside the target. A demonstration was conducted in September 1999 that showed the missile being used against an FV432 armored personnel carrier, showing the missile's effectiveness as a surface-to-surface weapon. Each sub-munition dart travelling at 4,500 km/h (1,250 m/s, 4,100 ft/s, 2,800 mph) has comparable kinetic energy to a shell from a Bofors 40 mm gun and probably has sufficient energy to penetrate the front armor of an infantry fighting vehicle. However, it lacks the armor penetration capabilities of a purpose-built anti-tank guided missile or of a dual purpose missile (such as the Air Defense Anti-Tank System).

JRTC VISMOD: UR-77 Meteorit Russian Mine Clearing Vehicle





Tiers:



System

Alternative Designation : UR-77 mine clearing vehicle, M1979
Chassis: Based on the 2S1
Crew : ea2.0
Ground Pressure : kg/cm2INA
Troop Capacity : eaINA

↳*Dimensions*

Height, Overall : m3.1
Length, Overall : m8.4
Width, Overall : m2.8
Weight, Combat: mt15.5

↳

Automotive

Engine Name: YaMZ-238N
Engine Type: Diesel
Engine Power : hp300
Fording Depth : INA
Range, Cruising : km500
Speed, Maximum Road : km/h60.0
Speed, Maximum Off-Road: km/h30
Speed, Maximum Swim : km/h4.5
Vertical Step : INA

Communications

↳*Radio*

Name: INA

Mines

↳*Mine Clearning Equipment*

Breaching Time : min3 to 5

Charges: UZP-77, UZ-67

Length, Charge : m93.0

Type: Explosive line

Notes:

The UR-77 Meteorit (Russian: УР-77 Метеорит, lit. 'Meteorite') is a Soviet mine clearing vehicle, based on a variant of the 2S1 Gvozdika chassis. The vehicle is armed with a launcher and two mine-clearing line charges. When launched, a charge causes a shock wave that destroys or disables all the shells or mines along the area of the line charge. (with a width of 6 metres and length up to 90 metres). The vehicle has also been used offensively, where its line charge has been used to destroy entire streets in urban combat.

JRTC VISMOD: Ural-375 Russian 6x6 General-Purpose Cargo Truck





Tiers:



Variants:

- **Ural-375:** Ural-375 has an open cab roof that could be covered by a canvas - i.e.: a softtop cab rather than a hardtop.
- **Ural-375A:** Ural-375A has a fully enclosed all-steel cab, was a chassis for wagon-style body, payload 12,787 lb (5,800 kg), framework shortened to 13.2'
- **Ural-375D:** Ural-375D Most produced 375.
- **Ural-375E KET-L:** Ural-375E KET-L was a recovery vehicle equipped a front-mounted and a rear-mounted winch along with a jib crane.
- **Ural-375S:** Ural-375S was a tractor-trailer truck with framework shortened to 5.3'.
- **Ural-377:** Ural-377-civilian 6×4 truck
- **Ural-377S:** Ural-377S was a civilian 6×4 tractor-trailer.

System

Alternative Designation: NA
Type: 6x6 General-Purpose Cargo Truck
Manufacturer: Ural Automobile Plant, Miass
Cab Capacity: 1 driver, 1 passenger
Passenger Capacity: INA
Payload Capacity: 4500 kg (plus trailer: 22,050 lb, 10,002 kg)

Dimensions

Length: m7.35
Width: m2.96
Height: m2.98
Weight, Empty: t8
Payload Capacity: t5
Ford: m1.5
Ground Clearance: INA

Automotive

Engine Name: 7.0L ZIL-375YA V8

Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h76

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 65%

Side Slope: 40%

Vertical Step: m0.8

Trench: m0.7

Fording Depth: m1.2

Suspension: Solid axles, leaf springs, rear wheels at balance-cart.

Fuel Capacity: 79 gallon tank and 16 gallon tank

Fuel Economy: 4.9 mpg (19-25 mph), 2.94 mpg (city)

Protection

Armor: Protection from small arms fire and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

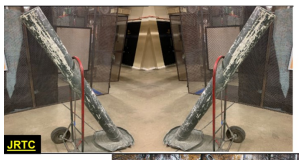
NBC Protection: INA

Smoke Equipment: No

Notes:

The Ural-375 is a general purpose 4.5 ton 6×6 truck, produced at the Ural Automotive Plant in the Russian SFSR since 1961. The Ural 375 replaced the ZIL-157 as the standard Soviet Army truck in 1979. It was itself replaced by the Ural-4320. The Soviets found the trucks an ideal platform for the BM-21 Grad rocket launcher. Other modes for the Ural-375D included troop carrier, supply carrier, etc.

JRTC VISMOD: 2B11 Russian 120mm Mortar





Tiers:



System

Alternative Designations: 2S12, Sani, Sled, M120

Crew: ea5

Components: Launch tube, bipod assembly, baseplate, and an MPM-44M optics set.

Time Required to Transition from Traveling to Firing: minsLess than 3

Dimensions of the Mortar

Combat Weight: 210kg (firing) / 297kg (traveling)

Wheeled Carriage 2L81: kg87

Baseplate: kg80

Bipod: kg55

Automotive

Engine Type: ZMZ-66, 115 hp V-8 water cooled gasoline

Cruising Range (km): 600

Max Road Speed (km/h): 87

Max Off-Road Speed (km/h): 35

Cross-Country Speed (km/h): INA

Fording Depths (m): .80

Emplacement Time (min): 3 (est)

Displacement Time (min): 3 (est)

Radio: R-123M

Vehicle Platform (chassis): GAZ-66

Combat Weight (mt): 3.64

Chassis Length Overall (m): 5.66

Height Overall (m): 2.44

Width Overall (m): 2.34

Protection

Armor Front (mm): None

Armor Side (mm): None

Armor Roof (mm): None

Self-Entrenching Blade: No

NBC Protection System: No

Smoke Equipment: No

Fire Control

Indirect Fire: INA

Collimator: INA

Fire Control Computer: None

Position Location System: None

Armament

↳*2B11*

Caliber/Length: mm120

Action: Muzzle fed, pin activated

Rate of Fire Burst (rpm): 15

Rate of Fire Normal (rpm): 10

Rate of Fire Sustained (rpm): 4 (est)

Loader Type: Manual

Traverse Left (degrees): 5 (on bipod)/360 (moving the bipod)

Traverse Right (degrees): 5 (on bipod)/360 (moving the bipod)

Traverse Total (degrees): 10 (on bipod)/360 (moving the bipod)

Elevation (degrees): +45/+80

Maximum Range: km7.1

Minimum Range: m460

Ammunition

Other Ammunition Types: All standard 120-mm mortar rounds, including Frag-HE-RA to 9,100m. See pgs 7-59-61, and -71.

↳*3OF843B*

Caliber/Length (mm): 120-mm

Type: Frag-HE

Minimum Indirect Fire Range (m): 450

Maximum Indirect Fire Range (m): 7000

Complete Projectile Weight (kg): 16.80

Muzzle Velocity (m/s): 325

Fuze Type: GVMZ-7 PD

↳***Smoke***

Caliber/Length (mm): 120-mm

Type: Smoke

Minimum Indirect Fire Range (m): 1000

Maximum Indirect Fire Range (m): 6800

Complete Projectile Weight (kg): 16.70

Muzzle Velocity (m/s): INA

Fuze Type: PD

↳***S-843***

Caliber/Length (mm): 120-mm

Type: Illumination

Minimum Indirect Fire Range (m): 1000

Maximum Indirect Fire Range (m): 5300

Complete Projectile Weight (kg): 16.80

Muzzle Velocity (m/s): INA

Fuze Type: T-1 TSQ

Notes:

The 2B11 is a 120mm mortar of Russian origin. The 2B11 has the nickname Sani and is a much improved version of the World War 2 era M43 120mm mortar. It was developed to provide a longer range and better mobility than the World War 2 era M43. The 2B11 is a muzzle loaded smoothbore mortar of a conventional design. It features a longer and stronger barrel. The 2B11 can be dismantled in a base plate, barrel and tripod, but is normally transported in an assembled state on a two wheel carriage. Some sources state that the 2S12 is the nomenclature for the system which includes one each prime mover, Ural 4x4 truck, and one each mortar, 2B11.

JRTC VISMOD: Type 63-1 Chinese 60mm Mortar



Tiers:

1 2 3 **4**

Variants:

- **Type 31:** The Type 31 is the original Chinese "copy" of the US M2, 60mm mortar which is a copy of the French Modele 1935 60mm mortar. Improvements of the Type 31 became the Type 63.
- **Type 63:** The Type 63 has a rectangular base plate in comparison to the Type 31's oval base plate.

System

Crew: ea1
Carriage: Man-portable
Emplacement Time: Less than 1 minute
Displacement Time: Less than 1 minute
Maximum Effective Range: m1,550
Action: Manually operated, pin strike
Caliber: mm60
Maximum Rate of Fire: rounds/min30

Dimensions

Length: mm610
Weight: kg12.1
Barrel Weight: kg4.1
Base Plate Weight: kg3.3
Bipod Weight: kg4.1
Sight Weight: kg.6

Mortar

↳*Ammunition*

Type: HE, Illum, Smoke, WP
Caliber: mm60

Muzzle Velocity: m/s152

Effective Range: 95m to 1550m

Fire Control

Computerized FCS: No

Direct Fire: Yes

Collimator: Yes

Sights: Adjustable elevation mechanism

Notes:

China produced a version of the US's M2 mortar, which was designated as the Type 31. Some were supplied to North Korea and North Vietnam. It was later modified as the Type 63 and then as the Type 63-1. This latter type has been produced under license by Pakistan Machine Tool Factory Limited in Pakistan and by Helwan Machine Tools Company in Egypt.

JRTC VISMOD: SA-18 Grouse (9K38 Igla) Russian Man-Portable Air-Defense Missile System (MANPADS)



Tiers:



Variants:

- **SA-N-18 Grouse Igla-1M:** Improved version of 9K38 Igla. Entered service in Soviet Military during the late 1980s.
- **Djigit/Dzhigit:** This is pedestal launcher for two 9K38 Igla missiles.
- **9K338 Igla-S:** This is a variant of the 9K38 Igla (NATO designation SA-24 Grinch**). Russia is replacing the Igla -S with the new Verba MANPAD system, which is capable of detecting its target despite interference.
- **9K310 Igla-1 (SA-16 Gimlet):** This variant was produced through a simplified production process. First identified in 1981. See separate database record.
- **9K338 Igla-S (SA-24 Grinch):** This is an upgraded variant of the 9K38/SA-18 series. It is also known informally as the Igla -Super. It has been exported to Armenia, Azerbaijan, Brazil, Iraq, Libya, Slovenia, Thailand, Venezuela and Vietnam. The Igla -S may also have been exported to unidentified nations.
- **Igla-V:** This is an air-to-air variant for helicopters.

System

Alternative Designation: 9K38 Igla 2 (Russian system designation) 9M39 Igla (Russian missile designation)

Type of Targets: Tactical aircraft, helicopter, UAV and cruise missile

Crew: ea1

Reaction Time: 5-10 Seconds

Reload Time: secs10 (each launch tube can be used up to 5 times)

Note: The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1)

Dimensions

Length, Launcher: m1.71

Diameter, Missile: mm72

Weight, Combat: See Missile Information

Missile System

↳*Missile Launcher*

Name: 9M 313–1 launching mechanism

Type: Portable Air-Defense Missile System (MANPADS)

Note: There is also a two-barrel 9K38 missile launcher called Djigit

↳***Missile***

Name: 9M39 Missile
Type: Portable Air-Defense Missile System (MANPADS)
Engine: 2 stage, solid fuel rocket motor
Length: m1.7
Diameter: mm72
Weight, Full System: kg17.9
Weight, Missile: kg10.8
Weight, Warhead: kg1.7
Warhead Type: Directed-energy blast fragmentation
Fuze Type: Delayed impact, magnetic and grazing
Speed: m/s600
Maximum Effective Range: m5,200
Maximum Target Speed, Receding: m/s360
Maximum Target Speed, Approaching: m/s320
Seeker Head Type: Nitrogen-cooled, Indium antimonide (InSb) and uncooled lead sulfide (PbS)
Seeker Scanning: FM-modulated
Maximum Altitude: m3500
Minimum Altitude: m10
Guidance System: Passive IR homing device and night vision (operating in the medium IR range)
NOTE: Missile is pitched by guidance unit over the lead point to avoid premature ground detonation when engaging targets at less than 10m. This slows engagement time.

Notes:

The SA-18 Grouse (Igla or 9K38) is a Russian made man-portable infrared homing surface-to-air missile defense system (SAM/MANPAD). This is a third-generation, man-portable, surface-to-air missile system and it is given the Russian industrial index number 9K38, for the complete system. The SA-18 Grouse with its 9M39 missile was accepted into service in the Soviet Army in 1983. The main improvements over the Igla-1 included much improved resistance against flares and jamming, a more sensitive seeker, expanding forward-hemisphere engagement capability to include straight-approaching fighters (all-aspect capability) under favorable circumstances, a slightly longer range, a higher-impulse, shorter-burning rocket with higher peak velocity (but approximately same time of flight to maximum range). The naval variant of 9K38 Igla has the NATO reporting name SA-N-10 Grouse. The Igla–1M missile consists of a Ground Power Supply Source (GPSS), Launching Tube, Launching Mechanism & Missile (9M 313–1). There is also a two-barrel 9K38 missile launcher called Djigit.

JRTC VISMOD: D-30 122mm Towed Howitzer



Tiers:



Variants:

- **D-30A:** This variant, also known as the 2A18M, features several minor improvements including a new cradle and muzzle brake and modified recoil system. It has a traveling width of 7 ft 3 in (2.2 m), height of 5 ft 11 in (1.8 m) and a rate of fire of 6-8 rds/min.
- **D-30M:** These are late production models with a new double-baffle muzzle brake, a new square (rather than round) central baseplate and a towing lunette assembly. The cradle, carriage and recoil systems have also been modified.
- **Iraqi Saddam:** This is a locally produced version of the D-30. The Iraqi weapon was slightly heavier, having a firing weight of 7,352 lb (3,335 kg) and traveling weight of 7,584 lb (3,440 kg). The Saddam fired a 48-lb (22-kg) projectile to a maximum range of 18,736 yd (17,133 m).
- **Yugoslavian D-30J:** This was a locally produced variant weighing 7,385 lb (3,350 kg) ready for firing, 7,584 lb (3,440 kg) in traveling order. Double-baffle muzzle brake is simplified. The range with the “Yugoslav” M76 HE projectile is 18,919 yds (17,300 m).
- **Egyptian SP 122:** The SP 122 combines the United Defense-produced M109A2 chassis and turret with an Egyptian made D-30 howitzer. United Defense produced 76 SP 122 systems under a US$96 million contract awarded following completion of competitive trials in 1987. Performance is similar to the standard D-30, although elevation is limited to -5 degrees (-89 mils). The last SP 122s were delivered in 1995. Egypt received a total of 124 systems.
- **Chinese Type 86:** This variant, also known as the W86, is a Chinese copy of the D-30. It is fielded by the airborne corps, marines and light/mountain infantry units in the People's Liberation Army (PLA) as a division-level general-purpose artillery weapon. The Type 86 was developed in the mid-1980s, possibly by reverse-engineering Soviet D-30s. It was adopted by the PLA as a replacement for obsolete Type 54 122-mm guns.
- **Chinese Type 85:** China has produced a self-propelled howitzer based on the marriage of the Type 85 APC chassis and the licensed produced version of the D-30. The howitzer has not been placed in a turret, but in a semi-open superstructure that uses a canvas cover for protection from inclement weather. The Type 85 SP howitzer carries 40 rounds of ammunition.
- **122-mm SH2:** This is a Chinese self-propelled artillery system utilizing the D-30.
- **122-mm Semser (sword):** Developed by Soltam for the Kazakhstan Ministry of Defense, this system utilizes a modified D-30. See separate database record.
- **122-mm D-30/04:** This is a Serbian variant of the D-30. See separate record.
- **ATMOS D-30:** This is a wheeled self-propelled artillery system using the D-30 gun developed by Soltam of Israel. It can be mounted on nearly any 6 x 6 or 8 x 8 military truck. It can also be integrated with an electronics suite, enabling accurate and semi-autonomous operation, reduced crew, increased fire power and accuracy using precise and modern tactical computers and sensors.
- **Khalifa-1:** This Sudanese army self-propelled howitzer incorporates the 122-mm D-30 into the upper part of the vehicle’s chassis.

System

Alternative Designation: NA
Manufacturer: PJSC «Plant № 9»
Crew: 5 (section of 6)

Displacement Time: min3.5

Emplacement Time: min1.5

Dimensions

Length, Chassis Overall Travel: m5.4

Length, Firing: m7.8

Height, Travel: m1.6

Height, Firing: m1.42

Width, Travel: m1.9

Width, Firing: m5.6

Weight, Combat: mt3.2

Automotive

Prime Mover: MT-LB, Ural-4320 or any appropriate vehicle

Maximum Towing Speed, Road: km/h60

Maximum Towing Speed, Off-Road: km/h25

Fording Depth: m0.5

Armament

Name: 2A18M cannon

Caliber, Type, Name: 122mm, 35.5 caliber

Rate of Fire – Burst: rpm8

Rate of Fire – Normal: rpm6

Rate of Fire – Sust: rpm4

Breech Type: Semi- Automatic Vertical Sliding Wedge

Recoil System: Hydraulic buffer and hydro-pneumatic recuperator

Muzzle Brake Type: Multi-baffle

Loader Type: Manual

Maximum Elevation: deg+70

Minimum Elevation: deg-7

Traverse Range: deg360

Traverse Left: deg360

Traverse Right: deg360

Ammunition

↳***Ammunition (Option 1)***

Name: OF-81

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: m1000

Range, Maximum: m15,300

Projectile Weight: kg21.76

Muzzle Velocity: m/s680

Fuze Type: RGM-2 PD

↳***Ammunition (Option 2)***

Name: HEAT-FS

Type: HEAT

Cailber/Length: mm122

Range, Minimum: m0

Range, Maximum: m1000

Projectile Weight: kg21.58

Muzzle Velocity: m/s740

Fuze Type: GPV-2 PIBD

↳***Ammunition (Option 3)***

Name: Frag-HE Rocket Assisted

Type: Frag-HE

Cailber/Length: mm122

Range, Minimum: INA

Range, Maximum: m21,900

Projectile Weight: kg21.76

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M-45

Collimator: K-1

Fire Control Computer: None

Gun Display Unit: None

Notes:

The D-30, also known as the M1963, replaced the older 122mm howitzer M-30 (M1938). The original D-30 was fielded in 1963 and the midlife product improvements occurred in the mid to late 1970’s. The original D-30 is in use with at least 50 different countries. The 2A18M, D-30A and D-30M are midlife product improvements of the D-30 that are currently in production. The

D-30 features a unique three-trail carriage, a conspicuous boxy shield for the recuperator above the tube, and a small protective shield between the wheels. The gun has a semiautomatic, vertically sliding, wedge-type breechblock. It is towed muzzle-first by a truck or armored tractor, at speeds up to 80 kilometers per hour, with its trails folded under the barrel. Distinctive features of the D-30 include its low mobile mounting and above-barrel recoil system. The three-legged mobile mount is unusual for field artillery, with stabilizers that are clamped together for towing and deployed when in action. A large tow linkage is fixed to the muzzle; in transport the barrel serves as a trail. Similar mounts were a feature of several 76-mm pre-war (1931–1935) universal (both field and anti-aircraft) guns designed by Leningrad's Kirov Plant (L-1, L-2 and L-3). Other examples were the 1939 French 47SA39 APX, and 1943 German 105-mm light field howitzers designs by Skoda and Krupp; neither entered service. The Bofors 105 mm L28 Light Field Howitzer 4140 was similarly arranged with four legs and did enter Swedish service. The 1930s-designed British 2-pdr. anti-tank gun was another piece featuring a three-legged mounting. Compared to the M-30, the new howitzer had a significantly longer 35 calibre gun barrel, just short of being a gun-howitzer by Soviet definition. Like other guns of the period, it had a high efficiency muzzle brake; this improved muzzle velocity by 175 m/s to a total of 650 m/s for HE, and raised maximum range by 3,500 m beyond the similar M-30. Maximum range was 2 km better than the 76 mm M1942 at 15.3 km. Weight increased by 650 kg over the M-30, to 3,150 kg; the D-30 is over twice the weight of the 76mm M1942. Accuracy improved, with mean error at about 10 km dropping from 35 m with the M-30 to just 21 m. Effective stabilisation length is a fundamental aspect of a gun mount, and legs 120° apart need to be longer than those with a smaller angle. The D-30's design minimises this problem in several ways. Trunnions are close to the ground, as a result of placing the recoil system and cradle above the barrel. The trunnions are also at the very rear of the breech; this maximises the recoil space when firing at higher elevation angles. Their rearward position also pushes the recoiling element forward on the mount, maximizing relative rearward span of the stabilizers and so stability during recoil. Additionally there is a very efficient muzzle brake, which absorbs about half the recoil. There is no mechanism to reduce recoil length as the angle of elevation increases. Some of the design decisions have a price. The muzzle brake produces about twice the overpressure in the area around the gun that is acceptable to Western armies, and is the reason it is often seen being fired with a long lanyard, which reduces rate of fire. Furthermore, the maximum elevation angle is restricted to 18° (early versions) or 22° (later versions) when the breech is over a trail leg. This is enforced by a mechanical cam that prevents the piece firing for about 60% of the total top traverse, and limits range to about 12 km, with full maximum range only possible in the central arc of about 48° between each pair of legs. The extreme rearward location of the trunnions means the elevating mass is unbalanced, requiring a strong balancing mechanism to enable manual elevation. To do this, the D-30 uses compression balancing gears. A central jack is powered by hand-operated hydraulics. This jack is lowered while the wheels are raised to permit two of the stabiliser legs to be swung 120° rearwards. The mounting is then lowered and the ends of the legs spiked to the ground. This mounting provides for quick traversing to fire in any direction. The pair of large tires are suspended on a single trailing arm; maximum towing speed is 60 km/h on the road. As was normal in Soviet designs, the tyres were filled with foam. Initially, the D-30 had no brakes and no seat for the layer—non-essential luxuries. A sliding block breech was adopted instead of the M-30's pre-1914 screw pattern, giving a slight increase in the rate of fire. It is a semi-automatic vertical sliding block breech, with a tied jaw; the block moves down to open and opens automatically ejecting the empty cartridge case as the recuperator forces the gun tube back into battery after a round is fired. The design is closely related to those of breeches on other Soviet post–World War II guns and howitzers. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope, a panoramic periscopic indirect-fire sight (dial sight) in a reciprocating mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale. The elevation leveling bubble is mounted on the dial sight mount. The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Soviet 122 mm howitzers used different ammunition to 122 mm guns, although there was some compatibility. In the case of ammunition for the D-30, the standard 122 mm howitzer shell weight of 21.8 kg was retained, with a metal cartridge case holding variable propelling charges. Cartridge and shell are loaded separately; this means that the shells have to be hand-rammed by a man to the right of the breech with a ramming rod. The D-30 could fire the older M-30 ammunition; however, new shells were also introduced, eventually including a rocket assisted projectile with a range of 21.9 km. The M-30's range of propelling charges, comprising base and eight increments, was replaced by a new set comprising base and four increments; single base propellant was retained. A more effective High Explosive (HE) shell was developed, as well as smoke, illumination and chemical filled projectiles. In keeping with Soviet doctrine, the anti-tank role is important; there is a HEAT shell capable of penetrating 460 mm of steel armour plate. The maximum rate of fire of the D-30 is 6–8 rounds per minute, and about 75 rounds per hour. There is disagreement as to whether this maximum rate of fire is achievable for indirect fire. Based on reloading speeds of similar guns using separate charges, solo re-laying, and given a stable emplacement, semi-automatic breech and no long lanyard, (examples are the 25-pdr. and 105mm L118), and assuming concurrent lay adjustment during reloads, then it probably is when in the hands of a competent detachment. However, 5-6 rounds per minute may be more realistic with a poorly trained gun crew. The D-30 is noted for simplicity of maintenance by its users; reputedly there are no special tools, all jobs can be done with a wrench and large hammer. However, like any other gun, routine maintenance is essential, and western troops in Afghanistan have reported Afghan manned D-30s having problems with shells sticking in the barrel due to lack of cleaning. A location chosen for emplacement of the D-30 should be as level as reasonably possible. Firstly, the carriage is raised via an internal hydraulic jack located under the cradle of the gun. Once the gun is at the required height, the wheels are raised via the wheel lifting lever; this allows the two split stabilizer legs to be separated from the mono stabiliser leg and brought rearward into firing configuration. The legs are then locked in place with locking pins. The carriage is lowered via the hydraulic jack so that the legs touch the ground; integral stakes are then hammered into the ground. At this point, the gun is ready for direct fire using the OP4 direct fire sight, or can be orientated and have its position fixed via the aiming circles for subsequent indirect fire using the Pantel sight.

JRTC VISMOD: TMM-1 Yugoslavian Anti-Tank Blast Mine





Tiers:



System

Country of Manufacture: Yugoslavia
# of User Countries: 2+
Emplacement Method: manual, mechanical
Diameter: mm326
Height (mm): mm90
Armor Penetration (mm)/ Kill Mechanism: Blast
Effective Range: mContact
Detectability/ Composition: Easy to detect/ metal
Anti-Handling: Probable- 2nd fuze well
Fuze Type/Self Neutralize: Pressure (130 w/pressure plate-70 w/o plate) selfdestruct
Explosive Type & Weight/Total Weight (kg): kgTNT 5.6 Total: 8.7
Operating Pressure: 130 to 420 kg
Comment: Commonly surface laid and use extensively in roadblocks. Limited underwater to .25 m

Notes:

The TMM-1 is a circular, metal-cased, Yugoslavian anti-tank blast mine. It is a direct copy of the German Tellermine 43. The mine has a central fuze well that is covered by a screw on pressure plate. Two secondary fuze well are fitted to the side and bottom of the mine allowing the installation of anti-handling devices. The mine is found in Bosnia, Croatia, and Kosovo.

JRTC VISMOD: Ural-63708 Russian Heavy Equipment Transport Truck





Tiers:

1 2 3 4

System

Alternative Designation: NA

Manufacturer: Ural

Family: Heavy Transport

Crew: 1 driver

Passenger Capacity: 5

Dimensions

Length: m10.37

Width: m2.55

Height: m3.15

Weight, Tractor: tons15

Weight, Tractor and Trailer: tons~30

Payload Capacity: tonsUp to 70

Gross Combination Weight: tonsUp to 100

Automotive

Engine Name: YaMZ

Engine Type: Diesel

Engine Power: hp600

Cruising Range: km800

Speed, Maximum Road: km/h90

Speed, Average Cross: INA

Gradient, Unloaded: %~25

Gradient, Loaded: %10-15

Side Slope, Tractor: %~30

Vertical Step: m~0.6

Trench: INA

Fording Depth, Loaded: m~0.7

Fording Depth, Tractor: mUp to 1.8

Notes:

The Ural-63708 is a new Russian tractor truck with 8x8 configuration. It is a version of the Ural-63704-0010 military truck with an added axle at the rear and fitted with a more powerful engine. It was first publicly revealed in 2016. This tractor truck is a member of Tornado-U family of military vehicles. In this case letter "U" in the designation stands for "Ural", as there is also a similar KamAZ-U family, developed by another Russian truck manufacturer KamAZ.

mobile automated KTK, radioelectronic imitation and jamming system (mobilnyi avtomatizirovannyi KTK, radioelektronnoi imitatsii i postanovki pomekh, MKTK REI PP





Tiers:



System

Alternative Designation: Tigr-M MKTK REI PP Leer-2 VPK-233114 Mobile Electronic Warfare system EW vehicle

Type: Mobile Electronic Warfare system EW vehicle

Manufacturer: designed and manufactured by two Moscow-based companies, VPK (Voyenno-promishlennaya kompaniya - Military-industrial company) for the vehicle and VNII Etalon (Vserossiyskiy naucsno-issledovatelskiy institut - Russian Scientific-Research Institute) for the Electronic Warfare (EW) system

Family: Leer

In Service: 2012-Present

Crew: 2 + 4 Soldiers

Liter/Stretcher Capacity: INA

Winch: The Leer 2 carries an electric winch with a pulling force of 4,000 kg and 20 m of wire rope

Note: This high mobility vehicle was modeled after the US HMMWV

Dimensions (Chassis: GAZ Tigr-M)

Length: m5.7

Width: m2.3

Height: m2.3

Weight, Combat: kg7,800

Automotive (Chassis: GAZ Tigr-M)

Engine Name: YaMZ-5347-10

Engine Type: Turbol-Charged Diesel

Engine Power: hp215

Cruising Range: km1,000

Speed, Maximum Road: km/h140

Speed, Maximum Off-Road: km/h80

Speed Maximum Swim: Not Amphibious

Gradient: %60

Side Slope: %40

Vertical Step: m0.4

Trench: m0.5

Fording Depth: m1.3

Note: To protect the engine from small-arms fire, the bonnet is armoured

Communications

Primary: INA

Electronic Warfare Equipment

Electronic Warfare Equipment Name: Lorandit

Mission Sets: ESM, EA

Electronic Warfare (EW) Type: The Leer 2 is a mobile technical control, electronic emulation and electronic countermeasures system Leer-2 is designed for developing radio emitters, jamming and suppressing radio-electronic means including cellular phone systems

Operate on the Move: Yes

Operate Stationary: Yes

Antennas: All the antennas of the electronic warfare system Leer-2 are mounted on a platform fitted on the vehicle roof. In static position, two telescopic antennas can also be deployed on the vehicle roof

Maximum Range: INA

EW Components: The Lorandit system of the Tigr-M MKTK REI PP includes technical control and electronic intelligence automated workstation, electronic countermeasures equipment, communication and power supply equipment and a specialized mission software

Note #1: In addition, the system can be used as part of field tests to create realistic tactical electronic situations and imitating the operation of various radio-electronic systems

Main Gun

Note: The Leer 2 is not equipped with any Armament, due to the EW equipment

Fire Control

FCS Name: INA

Computerized FCS: Yes

Gunner Sight System: PC-SU IPTSYU.201219.026

TV Camera: Yes, low-level TV camera that provides a range of detection and identification of the target sample with a narrow field of vision - not less than 2500 m

Laser Rangefinder: Yes, with a range of 100-3,000 m

Protection

Armor: The hull of Leer 2 provides protection against small-arms fire, shell fragments and IED blasts

Applique Armor: Available

Amored Hood: Yes

Doors and Windows: The hull and door windows are bulletproof and the vehicle’s spall liners protect personnel against spalls if the hull is hit by bullets or fragments and exclude ricochet from the opposite side if the hull is pierced

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes

Fire Extinguishing System: Yes

Notes:

The Leer-2 is a jamming system based on the Lorandit family of electronic warfare systems Tigr armored vehicle and capable of imitating electronic weapon systems and monitoring the electromagnetic environment during combat training. The Leer-2 is designed for developing radio emitters, jamming and suppressing radio-electronic means including cellular phone systems. In addition, the system can be used as part of field tests to create realistic tactical electronic situations and imitating the operation of various radio-electronic systems. The Leer-2 is based on the 8-ton class Tiger-M 4x4 high mobility tactical armored vehicle.

JRTC VISMOD: Ural-375 Russian 6x6 Fuel Truck





Tiers:



Variants:

- **Ural-375A:** Ural-375A has a fully enclosed all-steel cab, was a chassis for wagon-style body, payload 12,787 lb (5,800 kg), framework shortened to 13.2'
- **Ural-375D:** Ural-375D Most produced 375.
- **Ural-375E KET-L:** Ural-375E KET-L was a recovery vehicle equipped a front-mounted and a rear-mounted winch along with a jib crane.
- **Ural-375S:** Ural-375S was a tractor-trailer truck with framework shortened to 5.3'.
- **Ural-377:** Ural-377-civilian 6×4 truck
- **Ural-377S:** Ural-377S was a civilian 6×4 tractor-trailer.

System

Alternative Designation: NA
Type: 6x6 General-Purpose Cargo Truck
Manufacturer: Ural Automobile Plant, Miass
Cab Capacity: 1 driver, 1 passenger
Passenger Capacity: INA
Payload Capacity: 4500 kg (plus trailer: 22,050 lb, 10,002 kg)

Dimensions

Length: m7.35
Width: m2.96
Height: m2.98
Weight, Empty: t8
Payload Capacity: t5
Ford: m1.5
Ground Clearance: INA

Automotive

Engine Name: 7.0L ZIL-375YA V8
Engine Type: Petrol

Engine Power: hp180

Cruising Range: km750

Speed, Maximum Road: km/h76

Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Gradient: 65%

Side Slope: 40%

Vertical Step: m0.8

Trench: m0.7

Fording Depth: m1.2

Suspension: Solid axles, leaf springs, rear wheels at balance-cart.

Fuel Capacity: 79 gallon tank and 16 gallon tank

Fuel Economy: 4.9 mpg (19-25 mph), 2.94 mpg (city)

Protection

Armor: Protection from small arms fire and shell splinters

Applique Armor: INA

Active Protection System: No

Mine Clearing: No

NBC Protection: INA

Smoke Equipment: No

Notes:

The Ural-375 is a general purpose 4.5 ton 6×6 truck, produced at the Ural Automotive Plant in the Russian SFSR since 1961. The Ural 375 replaced the ZIL-157 as the standard Soviet Army truck in 1979. It was itself replaced by the Ural-4320. The Soviets found the trucks an ideal platform for the BM-21 Grad rocket launcher. Other modes for the Ural-375D included troop carrier, supply carrier, etc.

JRTC VISMOD: D-20 Russian 152mm Towed Gun-Howitzer





Tiers:



Variants:

- **Type 66:** This is the licensed version of the D-20. The improved version is known as the Type 66-1.
- **Type 83:** Self-propelled version of the Type 66, very similar in layout to the 2S3.

System

Family: D-20
Type: 152mm Towed Gun-Howitzer
Manufactuer: Artillery Plant Number 9, Yekaterinburg
In Service: 1955-Present
Crew: ea8
Emplacement Time: min2.5
Displacement Time: min2.5

Dimensions

Length, Firing: m8.69
Length, Travel: m8.10
Width, Firing: m2.32
Width, Traveling: INA
Height, Overall: m2.52
Weight, Combat: tons5.56

Automotive

Prime Mover: 6x6 or 8x8 truck
Towing Speed, Road: km/h60
Towing Speed, Off Road: km/h30

Gun-Howitzer System

↳*Cannon*

Type: Cannon
Cailber/Length: mm152
Length, Barrel: m5.195
Rate of Fire, Burst: rd/min5-6
Rate of Fire, Normal: INA
Rate of Fire, Sustained: rd/min1
Loader Type: Manual
Breech Type: Vertical semi-automatic sliding-wedge
Muzzle Brake Type: Double flared
Traverse Range: deg58
Traverse, Left: deg29
Traverse, Right: deg29
Maximum Elevation: deg+45
Minimum Elevation: deg-5
Maximum Effective Range: km17.4
Sights: PG1M indirect sight and OP4M direct fire sight.
Recoil: Hydraulic buffer and hydro-pneumatic recuperator

Ammunition

↳*Ammunition (Option 1)*

Name: OF32
Type: Frag-HE
Cailber/Length: 152mm
Weight: kg(OF25) 43.56
Range, Minimum: m4,600
Range: m17,400
Muzzle Velocity: m/s655
Fuze Type: V-90 PD

↳*Ammunition (Option 2)*

Name: BP-540
Type: HEAT
Cailber/Length: mm152
Weight: kg27
Range, Minimum: m0

Range, Maximum: m1000

Armor Penetration: INA

Muzzle Velocity: m/s655

Fuze Type: GPV-3 PD

↳*Ammunition (Option 3)*

Name: OF-96

Type: Frag-HE

Cailber/Length: mm152

Weight: kg(OF-64) 43.56

Range, Minimum: INA

Range, Maximum: m24,400

Muzzle Velocity: INA

Fuze Type: PD

Fire Control System

Indirect Fire: PG-1M Pantel

Direct Fire: OP 4M

Collimator: K-1

Notes:

The 152 mm gun-howitzer M1955, also known as the D-20, (Russian: 152-мм пушка-гаубица Д-20 обр. 1955 г.) is a manually loaded, towed 152 mm artillery piece, manufactured in the Soviet Union during the 1950s. It was first observed by the west in 1955, at which time it was designated the M1955. Its GRAU index is 52-P-546. The D-20 has a 34 calibre (5.195 m) barrel, with a double baffle muzzle brake and a semi-automatic vertical sliding-block breech, with a tied jaw and the block moving down to open. The barrel is mounted in a long ring cradle with the trunnions just forward of the breech. The recoil system (buffer and recuperator) is mounted on the cradle above the barrel. Compression balancing gear is attached behind the saddle support, passing through the complex shaped saddle to connect to the cradle just forward of the trunnions. This can be manually re-pressured by a pump below the breech. The breech has a projectile retaining catch to prevent the shell sliding out at higher elevations before it is rammed with a manual rammer. Top traverse totals 58° and the vertical elevation range is −5° to 45°. Box girder section split trail legs are hinged to the cradle support, with bolts to lock them into either the open or closed position. The cradle support also has a bolt for locking the barrel in the centre for traverse before towing the gun. Large spades are permanently fixed close to the end of each trail; these are hinged and it appears that the gun can be fired with them up or down depending on the terrain, but they are always up when the gun is towed. To assist with all-round carriage traverse, there is a pivot jack mounted at the front of the cradle support. The pivot jack is not a sole plate and the gun fires with its foam filled rubber tyred wheels supporting the gun on the ground. When the gun is brought into action, the pivot jack is folded down and adjusted to be on the ground. If a large traverse is required, small jacks on each trail leg are rotated downwards, and the trails jacked up until the main wheels are lifted clear of the ground and the bogey wheels mounted on each trail leg swung downwards and the trail jacks raised, the carriage is then traversed, and the trail jacks re-used to lift the bogey wheels and then place the piece back on its main wheels. The pivot jack is also used to secure the barrel against vertical movement when the gun is being towed. The barrel is locked in the centre for traverse with a bolt on the cradle support. The jack is folded upwards, lugs on the ring cradle engage the jack base and two tensioners fixed to the saddle support are hooked to the cradle, these are tightened to lock the cradle onto the jack base. As was normal for the period, the gun has a shield, including a folding piece below the cradle support. The centre section of the upper shield slides both up and down and folds to accommodate the barrel at higher elevation angles of fire. The shield may offer some protection against muzzle blast to the sights and layer, although it is usually shown being fired with a long lanyard, but is probably mostly for defence against machine gun fire. The non-reciprocating sights are standard Soviet pattern, designed for one-man laying. Included are a direct fire anti-tank telescope (OP4M), a panoramic periscopic indirect-fire sight, a dial sight, (PG1M) in a mounting, an angle of sight scale, and a range drum for each charge engraved with the range (distance) scale, coupled to an elevation leveling bubble mounted on dial sight mount.

The range drum enables the standard Soviet technique of semi-direct fire when the piece is laid visually on the target and the range set on the range drum. Like most Soviet artillery, the gun fires separate ammunition using metal cartridge cases that also provide obturation. The ammunition is interchangeable with that used with other 152 mm guns, although the more modern ones also have a third, much larger cartridge. The D-20 uses two types of cartridge; one has a base charge and up to five increments, the other is a single 'super' charge cartridge. The standard shell weight is 44 kg with a muzzle velocity of 655 m/s, but some projectiles are more or less than this. The basic shell is HE-Fragmentation, other projectiles include smoke, illuminating, chemical and probably incendiary. Later projectiles include bomblet, anti-personnel mine, flechette, Krasnopol precision munition, communications jammer, and extended range HE using rocket assistance (RAP). The normally maximum range is 17.4 km, RAP being greater. Two direct-fire anti-tank projectiles have been used, HEAT and APHE, the latter being 5.2 kg heavier and with a lower muzzle velocity. The maximum rate of fire is usually stated as five rounds/minute, and 65 rounds/hour sustained. In Soviet service, the unit of fire was 60 rounds. The detachment was either 8 or 10 men, probably differing between armies and the time period. In Soviet service, the 5,700 kg gun was usually towed by a URAL-375 6×6 truck or, in some regions, an AT-S or AT-L medium tractor.

JRTC VISMOD: HQ-7B (FM-90) Chinese 6x6 Short-Range Air Defense Missile System





Tiers:



Variants:

- **FM-80 / HQ-7:** Improved version with E/F band TA radar, EO range of 15km, IR localizer and HQ-7 missile range of 7km

System

Alternative Designation: HQ-7B (FM-90)
Chassis / TELAR: P4R 4x4
Crew: ea3
Target: Helicopters, fixed wing aircraft, and cruise missiles, ARM missiles, ASM missiles
In Service: 2009-Present
Note: This air defense system is widely used by the Chinese armed forces. It is also being proposed for export customers as the FM-90. This air defense system has been exported to Pakistan

↳*Dimensions*

Height: m3.41
Length: m6.22
Width: m2.72
Weight: mt15

↳*Radar #1*

Name: Mirador IV pulse doppler
Detection Range: km18.5
Function: Target acquisition, surveillance
Antenna Rotation Rate: rpm60
Altitude Coverage: m0-4,500
Target Detection: 30 targets per rotation
Multiple Target Tracking: 12 targets
Frequency Band: E

Note: A battery of HQ-7B consists of one vehicle with acquisition radar and three TELAR vehicles. Also each battery is supported by a maintenance group with 10 support vehicles

↳*Radar #2*

Name: INA, located on launcher vehicle

Function: Fire control

Targets Tracked: 1

Missile Guidance, Simultaneous: 2

Detection Range: km17

Altitude Coverage: m0-5,000

Frequency: GHz12-18

Frequency Band: J-monopulse

Associated Radar: I-band (8-10 GHz) cmd

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Range, Cruising: km600

Max Road Speed: km/h90

Gradient: %60

Side Slope: %30

Vertical Step: m0.5

Trench: m0.6

Fording: m0.8

Main Weapon System

↳*Launcher*

Name: INA

Type: TELAR Vehicle

Fire on the Move: YES

Reaction Time: sec6.5

Reload Time: min2

↳*Missile*

Name: Crotale EDIR

Type: All-weather short-range anti-air missile

Purpose: Can be used to intercept low-flight anti-ship missiles and aircraft

Manufacturer: Thales Group Samsung Group

Length: m2.35

Diameter: m0.166

Missile Weight: kg76

Warhead Type: HE-FRAG

Warhead Weight: kg13

Detonation Mechanism: Infrared fuse radio fuse

Engine: Solid-propellant fuel

Operational Range: km11

Flight Ceiling: m6,000

Speed: m/s1,200

Guidance System: Semi-active radar homing electro-optical sensors Infra-red search and track

Hit Probability: Single shot is more than 85%

Fire Control System

IFF: Yes, dipole on ACU

Countermeasures: Digital C2 and ECM

Missile Tracker: IR, for remote control

↳*Day Camera*

Specification: TV tracker, low elevation, range: 14km

↳*Optical Sight*

Specification: Back-up binocular tracker

↳*Day / Night Camera*

Specification: Thermal sight

Field of View: degrees8.1 / 2.7

Elevation: degrees5.4 / 1.8

Range: km19

Protection

Armor Protection: Protection against small arms fire and artillery shell splinters

NBC Protection: Yes

Notes:

The original HongQi 7 (HQ-7) short-range air defense missile system has been developed in China in the 1980s. It was a copy of the French Crotale. In 1978-1979 China imported some of the Thomson-CSF Crotale systems for evaluation and reverse

engineered them. First Chinese clone was produced for testing in 1983. Its production commenced in the late 1980s. Sometimes it is referred as Sino-Crotale. Its improved variant, the HQ-7A, was introduced in 1998. The HQ-7B is the latest version, based on an indigenous 6x6 armored chassis. It was first revealed somewhere in 2009. This air defense system is widely used by the Chinese armed forces. It is also being proposed for export customers as the FM-90. This air defense system has been exported to Pakistan. A TELAR vehicle carries four missiles and is fitted with engagement radar. It appears that engagement radar is similar to that of the previous HQ-7A.

JRTC VISMOD: T-90 Russian Main Battle Tank (MBT)





Tiers:



Variants:

- **T-90K:** Commander's version of the T-90, with additional communication (station R-163-50K) and navigation equipment (TNA-4-3)
- **T-90A:** Russian army version with welded turret, V-92S2 engine and ESSA thermal viewer. Sometimes called T-90 Vladimir, in honor of its chief designer Vladimir Potkin
- **T-90AK:** Command version of T-90A.
- **T-90AM:** Latest version of the T-90A.[77] The main features include the modernisation of the old turret design, which is equipped with a new advanced fire control system "Kalina" (with integrated combat information and control systems), a new automatic loader and a new upgraded gun 2A46M-5, as well as a remote-controlled anti-aircraft gun "UDP T05BV-1". The new version also includes the Relikt (Реликт (динамическая защита) ERA bricks instead of the Kontakt-5 ERA bricks.
- **T-90M:** New modernized version of T-90A. It's a program of modernization of Vladimir tanks and will include 400 tanks currently in service. Tanks will receive 2A82-1M gun (same as in T-14) and fire control system Kalina. They will be upgraded with Afghanit APS and Relikt ERA. The upgrades are also aimed at improving network-centric warfare capabilities and coordination with Armata project vehicles. The first contract was signed in 2017 and serial production started in 2018.
- **T-90S:** Export version of the T-90, later adopted by the Russian Armed Forces as the T-90A. These tanks were made by Uralvagonzavod and were updated with 1,000 hp (750 kW) engines made by Chelyabinsk Tractor Plant. These tanks carry a leaner version of the Shtora-1 passive/active protection system which lacks the infra-red dazzlers carried on the turret. Sometimes called T-90C (Cyrillic letter es looks like a Latin c). These were initially supplied with cast turrets of the early T-90, and when stocks were depleted, new, welded turrets were fabricated.
- **T-90SK:** Commander's version of the T-90S, with additional communication and navigation equipment. It differs in radio and navigation equipment and Ainet remote-detonation system for HEF rounds.
- **T-90S:** "Bhishma" – modified T-90S in Indian service.
- **T-90MS:** Also known as T-90SM is an updated version of the T-90S. It is equipped with a 1,130 hp engine, a PNM Sosna-U gunner view. a UDP T05BV-1 RWS with a 7.62 mm machine gun, GLONASS, inertial navigation systems, new Relikt explosive reactive armour (ERA) that covers more of the tank, and a steering wheel. A new removable turret bustle is included, which provides storage for eight additional rounds. The T-90MS is ready for serial production.[88] 4 video cameras provide a 360° view of the environment, while the tank is more connected to command. The T-90MS has an upgraded thermal imager that can detect tanks over 3300 meters away.
- **BREM-1M:** Armoured recovery vehicle.
- **IMR-3M:** Combat engineer vehicle.
- **MTU-90:** Bridge layer tank with MLC50 bridge.
- **BMR-3M:** Mine clearing vehicle.
- **MTU-2020:** Bridge layer tank based on the T-90A whose chassis has been extended, along with the addition of a road wheel.

System

Alternative Designation: T-90

Type: Main Battle Tank

Family: T-90 Family of Main Battle Tanks

Manufacturer: Uralvagonzavod

Generation: 3+

Status: In service

Crew: 3 (commander, gunner and driver)

Passenger Capacity: INA

Maximum Effective Range (Land): km500

Maximum Effective Range (ATGM): m5,000

Note: The T-90 is the most modern tank currently in service with the Russian Army, which has a requirement for around 1 500 of these tanks. Also currently it is the only mass-produced MBT in Russia.

Estimated Service Life: 25-30 years

Estimated out of Service Date: 2030-2040

Dimensions

Length: m9.63

Width: m3.78

Height: m2.2

Weight, Combat: tons46

Ground Pressure: INA

Automotive

Engine Name: V-92S2

Engine Type: V-12 Diesel

Engine Power: hp1,000

Auxiliary Power Unit: Yes

Gas Turbocharger: Yes

Cruising Range: km550

Speed, Maximum Road: km/h60

Speed Maximum Swim: Not Amphibious

Speed, Average Cross: 50

Power to Weight Ratio: hp/tons18.2

Suspension: Torsion bar

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.8

Trench: m2.85

Fording Depth (No Preparation): m1.2

Fording Depth (With Preparation): m5

Fuel Type: Gasoline or Kerosene

Transmission: Mechanical

Fuel Capacity: liters1,200

Communications

↳*R-168-100U*

Name: R-168-100U

Family: AKVEDUK R-168 Series

Type: VHF

Frequency: MHz30-108

Capabilities: FH, Voice, Data

Range: km30-60

Mount: Vehicle

Status: In Service

Echelon: DIV, BDE, BN

Automated Control Communication: Yes

Main Gun

↳*System*

Name: 2A46M

Type: 125 mm Smoothbore Gun

In Service: 1970 to present

Weight (2A46 125mm Gun): kg2,675

Length (2A46 125mm Gun): mm6,350

Max Rate of Fire (Autoloader): rds/min7

Max Rate of Fire (Manaul): rds/min2-3

Sustain Rate of Fire: rds/min5-7

Range Finder Type: INA

Maximum Elevation: deg+14

Minimum Elevation: deg-6

Traverse Range: deg360

Loader Type: Carousel-type autoloader

Minimum Cycle time for the Autoloader: seconds6.5

Thermal Sleeve: Light Allow

Bore Evacuator: Yes

Breech Type: semi-automatic horizontal sliding breech block via an interrupted screw thread

Breech Maximum Chamber Pressure: 6,500 bar over the 5,100 bar

Max Cycle time for a Round 180deg from the Start Position: seconds15

Carousel Reloading Time: min15

↳*Ammunition (Option 1)*

Type: 3BM42M/3BM44M, 125mm Armour-piercing fin-stabilized discarding sabot (APFSDS)

Caliber: mm125

Muzzle Velocity: m/s125

Basic Load: 44 Total rounds of any combination of 125mm Projectiles

Effective Range (Day): m2,000-3,000

Effective Range (Night): m2,000-2,600

Armor Penetration: Yes, 590-630mm at a range of 2000m

Shell Weight: kg20.4

Projectile Weight: kg7.5

Charge Weight: kg5.3

Penetration: mm/deg270/60

↳*Ammunition (Option 2)*

Type: 3BM9/3BM10, 125mm Armour-piercing discarding sabot (APDS)

Caliber: mm125

Muzzle Velocity: m/s1,715-1,800

Effective Firing Range: m3,000

Shell Weight: kg19.6

Projectile Weight: kg5.67

Charge Weight: kg5

Penetration: mm/deg140/60

↳*Ammunition (Option 3)*

Type: 3BK12M, 125mm (HEAT)

Caliber: mm125

Muzzle Velocity: m/s905-950

Effective Firing Range: m4,000

Shell Weight: kg29

Projectile Weight: kg19

Charge Weight: kg5

Penetration: mm/deg220/60

↳***Ammunition (Option 4)***

Type: 3OF19, 125mm (HE)
Caliber: mm125
Muzzle Velocity: m/s760
Effective Firing Range: m4,000
Shell Weight: kg33
Projectile Weight: kg23
Charge Weight: kg5.0
Penetration: mm/degINA

Anti-Tank Guided Missile

↳***System***

Name: 9M119 Svir, 9M119M Refleks(NATO designation AT-11 Sniper-B)
Type: Laser Beam Anti-Tank Guided Missiles
In Service: 1980's to present
Manufacturer: Degtyarev plant
Cost: $37,500
Mass: kg17.2
Diameter: mm125
Basic Load: ea6
Warhead Type: Tandem hollow-charge
Warhead Weight: kg4.5
Max Rate of Fire: INA
Operational Range: m4,000-5,000
Speed: Subsonic
Guidance System: Laser Beam Riding
Launch Platform: 125 mm smoothbore guns
Variants: 9M119M

Tank Commander's Weapon System

↳***System***

Name: 12.7mm Kord Heavy Machine Gun,
Type: 12.7mm Heavy Machine Gun
Manufacturer: V.A. Degtyarev Plant
Cartridge: 12.7×108mm

In Service: 1998-Present

Weight: kg25.5

Length: mm1,980

Max Rate of Fire: rds/min650-750

Sustain Rate of Fire: rds/min550-600

Action: Gas-operated, rotating bolt

Feed System: 50-round linked belt

Sights: Iron Sights

Variants: 6P50-1, 6P50-2, 6P50-3, 6P49

↳***Ammunition***

Cartridge: 12.7×108mm

Caliber: mm12.7mm

Muzzle Velocity: m/s860

Basic Load: ea300

Effective Range: m2,000

Loader's Weapon System

↳***System***

Name: 7.62mm PK (Kalashnikov's Machine Gun)

Type: 7.62mm Machine Gun

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Sustain Rate of Fire: rds/min500

Range Finder Type: INA

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Length (Total): mm1,203

Length (Barrel): mm605

Action: Gas-operated, open bolt

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

↳ ***Ammunition***

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s825

Basic Load: ea1,500

Effective Range (Iron Sights): m1,000

Effective Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m3,800

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Sight Tank Commander: No

Thermal Sight Gunner: No

Panoramic Commander's Sight: No

Main Gun Stabilization: Yes, 2E42-4 Zhasmin System

Note: The Fire Control System is outdated and is from the late 1990s.

Protection

Hull Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Turret Armor: Steel-composite-reactive blend APFSDS: 550 mm + 250–280 mm with Kontakt-5 = 800–830 mm HEAT: 650–850 mm + 500–700 mm with Kontakt-5 = 1,150–1,550 mm

Applique Armor: Available

Explosive Reactive Armor: Yes, Kontakt-5 explosive reactive armor blocks, equivalent to up to 500mm of steel armor

Active Protection System: Yes, the Shtora-1 countermeasures system

Mine Clearing: INA

Self-Entrenching Blade: Yes

NBC Protection: Yes, GO-27 PRKhR radiation and chemical agent detection system.

Deep Wading Kit: Available

Jammer: Yes, TShU1-7 IR jammers located either side of the main gun

Laser Radiation Sensors: Yes

IR dazzlers: Yes

Nakidka Signal Reduction Kit: Available

Smoke Equipment: Yes, banks of 81 mm Toucha 902B grenade launchers that fire the ZD-6 smoke grenade.

Grenade Maximum Range: m250-300

Smoke Screen: 30 m wide and 10 m high for 60 seconds per grenade.

Fire Suppression System: Yes, the Raduga-2 fire-suppression system

Notes:

The T-90 is a third-generation Russian battle tank that entered service in 1993. The tank is a modern variation of the T-72B and incorporates many features found on the T-80U. Originally called the T-72BU, but later renamed to T-90, it is an advanced tank in service with Russian Ground Forces and the Naval Infantry. The T-90 uses a 125 mm 2A46 smoothbore main gun, the 1A45T fire-control system, an upgraded engine, and gunner's thermal sight. Standard protective measures include a blend of steel and composite armour, smoke grenade dischargers, Kontakt-5 explosive-reactive armour and the Shtora infrared ATGM jamming system. It was designed and built by Uralvagonzavod, in Nizhny Tagil, Russia. Since 2011, the Russian armed forces have ceased any further orders for the T-90, and are instead increasing their numbers of the T-14 Armata that began production in 2016. Variants T-90: Successor to T-72BM, originally called T-72BU, with fire control and armor upgrades similar to those on the T-80U. Despite using the lower cost T-72 chassis, this tank incorporated more recent components than the T-80U and is in some ways superior. The original tank had an II night sight, not the thermal sight upgrade, and the under-powered 840hp engine. Upgrades have been added. T-90A: originally known as T-90SM or T-90M, it is now accepted for Russian service as the standard tank. T-90MS: export variant: improved armor protection and ERA; remote control weapon station on turret rook with 12.7 mm MG; traverse forward 316 degrees; elevate -10 to +45 degree. Improved fire control system for engagement of stationary and moving targets while tank is moving. TC panoramic sight for TC-gunner display linked to laser rangefinder; thermal and 4 television camera-each 95 degree wide/45 degree elev. Improved battle management and land navigation tracking system. External auxiliary diesel power unit for fuel conservation. Some reserve main gun ammo in bustle with blowout panels. Turret and hull rear with bar (lourve) armor; anti-laser warning and protection. 125 mm main gun improved accuracy with 2A46M-5 rather than previous 2A46M in T-90s. T-90S: export variant with option for upgrades. Several subsystem changes, such as upgraded FCS, new engine, removal of SHTORA-1, etc., have been added based on customer preferences, and are included in export versions of the tank. Some early T-90S have been upgraded to this standard. Most of these are being sold to India, with the 1,000hp engine upgrade, and with addition of air conditioning. T-90SK: T-90S command variant Bhishma: Indian variant produced from T-90A knockdown kits. It does not use the SHTORA-1 IRCM system. Engine is T-90A upgrade. The tank is sometimes erroneously called T-90S. Various stages of upgrades will be employed in Indian forces. Russia has provided T-90S tanks with Indian intent to upgrade almost all of its T-90 and T-90S remaining versions in knock-down kits with upgrades to meet the Bhishma standard. An issue remains of no air conditioning system in some export MBT to India cause overHEATing of system components and debilitating environment for tank crew in some environments. Project Rhino: most T-90 and T-90S tanks imported by India to be upgraded as Bhishma under this program and agreement with Russia. Other upgrade versions of the T-72 include features of the T-90A such as the improved gun stabilization, improved fire control system, improved engine, and improved ammunition such as the Ainet and the Invar. Other tanks which provide similar capabilities are the Ukrainian T-72AG and T-72mp. The Czech T-72CZM4 also has a 2nd generation thermal sight. Recent Russian tank upgrade packages for the T-72 are the T-72M1, and the T-72M1M. The above Russian upgrades are for modernizing older tanks, versus T-90/T-90A, which are newly produced tanks. Upgraded T-80U, T80UK, and T-84 tanks also have similar capabilities. Weapons & Ammunition Types And Typical Combat Load 125-mm smoothbore gun (est): 43 APFSDS-T: 14 HEAT-MP/HEAT: 3 Frag-HE: 12 Focused Frag Ainet (available) :8 ATGM: 6 Main Armament Ammunition Caliber, Type, Name: 125-mm APFSDS-T, BM-42M Maximum Aimed Range (m): 3,000-4,000 Max Effective Range (m): Day: 3,000-4000 Night: 2,600 Armor Penetration (mm KE): 590-630 at 2,000 meters 125-mm HEAT-MP, BK-29m Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 4,000 Night: 2,600 Armor Penetration (mm CE): 650-750 it has some HE effects similar to Frag-HE rounds against personnel and materiel targets. 125-mm HEAT, BK-27 Maximum Aimed Range (m): 4,000 Max Effective Range (m): Day: 3,000+ Night: 2,600 Armor Penetration (mm CE): 700-800 125-mm HE-shrapnel Focused-Fragmentation, Ainet Maximum Aimed Range (m): 5,200 Max Effective Range (m): Day: 5,000 Night: 2,600 Tactical AA Range: 4,000-5,000 Armor Penetration (mm): can defeat IFV and APC 125-mm Frag-HE-t, of-26 Maximum Aimed Range (m): 5,000 Max Effective Range (m): Day: 5,000 Night: 2,600 Armor Penetration (mm): can defeat IFV and APC. A near miss will seriously damage or destroy most IFVs and APCs. Other Ammunition Types: French Giat 125G1 APFSDS-T, Russian BM-42 and bm-32 APFSDS-T. Note: the Russians may have a version of the BM-42M with a DU penetrator. Russian BM-48 APFSDS-T penetrates 650-700 mm Sokol-1 Guided Antitank Round Antitank guided missiles: AT-11B/INVAR Warhead Type: tandem shaped charge (HEAT) Armor Penetration (mm CE): 900, 850 behind ERA Range (m): Day: 5,000 Night: 2,600 AT-11/Refleks: missile with Frag-HE warhead to 5,000 m Notes T-90AM: the Russian military decided against T90A for its forces. In SEP 2011, they displayed T-90AM as a deep modernization of T-90A. They include a low-profile turret with a bustle autoloader and blow-out panels. The new 2a82 gun fires a longer (700+ mm est) and heavier APFSDS-T round to 3,500+ m. The original version of the tank has an 840-hp diesel engine. The engine in subsequent models is upgraded. Engine options include 950, 1,000 and 1,100 hp. The original tank had an II sight from the T-80 series (Buran-PA, 800-1300 meters range). However, marketing materials feature the Agava-2 thermal sight. Recent Gen3 sights are available. These night sights permit night launch of ATGMs. Relikt 3d gen ERA is offered to replace Kontakt-5 in several upgrade packages, or as a separate upgrade. The ERA adds up to 600 mm CE protection and 300 mm KE to turret base armor protection, or about 150 mm more than Kontakt-5. Active protection systems. Arena APS is available. Defensive aides suite is Shtora-1 (laser warning receiver with gun auto-slew, LWR-directed smoke grenade launchers, and EO-IR jammer), or partial package excluding IR jammers. None is on Bhishma. The Shtora-1 IR ATGM countermeasure illuminators can be detected with night sights. Shtora-1 has no effect against most modern ATGM systems, with encoded tracker beacons. Exclusion of Shtora-1 offers more ERA on the turret front and reduces costs. Protection probably includes radar-absorbent materials and IR-resistant

paint. The T-90 may be fielded with full Shtora-1 package (laser warning receiver with auto-slew gun capability, LWR-directed smoke grenade launchers, and EO-IR jammer), with a partial package, or without Shtora-1. Shtora-1 illuminators can be used for night illumination. An improved gun, 2A46M-4, with improved accuracy and use life is available for fitting to the T-90. The BK-29 round, with a hard penetrator in the nose is designed for use against reactive armor, and as an MP round has fragmentation effects. The BK-27 HEAT round offers a triple-shaped charge warhead and 50mm more penetration. The 12.7-mm MG NSVT has both remote electronically operated sight PZU-5 with vertical stabilization, night acquisition, and a gun-mounted K10-T reflex sight.

JRTC VISMOD: GAZ-2975 Tigr Russian Combat Support Vehicle / Light Utility Vehicle





Tiers:



Parent:

GAZ-2330 Tigr Russian Light Utility Vehicle

Variants:

- **GAZ-2330:** Standard unarmoured production variant
- **GAZ - 29651 "Punisher":** A simplified version of GAZ - 2975. The result of the project " Punisher ", concludes in the creation of a family of cars with carrying capacity from 1 to 2.5 tons, allegedly became the armored vehicle Wolf.
- **Tigr-2:** GAZ-3121 "Tiger-2" - an experimental rebodied civilian style SUV, presented for the first time in September 2006 at the Moscow Motor Show in the exhibition "Russian cars". Released a small series from 2008, mainstream sales at dealers were planned to start in 2009.
- **SP46:** In 2007, a ceremonial parade variant was designed, the СП46 (SP 46) ceremonial Tigr is a two-door convertible with a removable rigid roof. It features two seats in the front and one in the back, and is finished with modern luxury car appointments. This Tigr is equipped with an automatic Allison 1000 series transmission and Cummins B205 turbo diesel. Vehicle weight was reduced to 4,750 kg (10,470 lb), as this version is unarmored.
- **STS:** The CTC (English:STS) GAZ-233014 "Tiger" - a special vehicle -The Russian Army's armored version. Winged sheathed hull of anti-splinter coating AOD based aramid fiber. 4-stroke diesel engine Cummins B 205 turbo provides a specific power of at least 205 hp. STS GAZ-233014 was accepted for the supply of units State of the General Staff of the Russian Federation Order of the Minister of Defense of the Russian Federation March 6, 2007. The STS took part in 2014, the Crimean operation.[
- **SPM-1:** GAZ-233034 Tigr is used by the Russian Interior Ministry OMON in counter-terrorism operations and territorial defense. It is armored, with IEC 50963-96 Class 3 side/rear protection and Class 5 frontal protection (GOST P 50963-96, level 1 corresponds to the STANAG 4569).
- **SPM-1 AAV:** The SPM-1 Aircraft Assault Vehicle is an SPM-1 fitted with a large remote-control hydraulic ladder system. It is designed to provide access to the second or third floors of buildings and aircraft.
- **SPM-2 "Tigr-Alpha-BB":** Special Police Vehicle SPM-2) ГАЗ-233036 Tigr-Alfa-BB (Tiger-Alpha-VV) is an SPM-1 with GOST 50963-965 level 5 ballistic protection all around (instead of a mixture of level 3 and 5).
- **R-145BMA:** This variant is designed as a command center for special events and crises. It is a SPM-2 fitted with extensive communications equipment.
- **Kornet-D:** In 2011, the Tula Instrument Design Bureau demonstrated an upgraded Kornet-EM antitank missile system. Two such units were mounted on a modified chassis of the SPM-2 Tigr.
- **"Project 420":** In early 2010, an improved Tigr armored vehicle with a 420-horsepower 5.9 litres (360.0 cu in) Cummins ISB and a Chrysler 545RFE automatic transmission was created. This engine/transmission combination was originally designed for a Dodge Ram pickup. Externally, the vehicle featured an additional air intake on the bonnet and enlarged brakes. Acceleration time to 100 km/h (62 mph) was reduced from 35 to 23 seconds compared to the standard version, and the top speed increased from 140 km/h (87 mph) to 160 km/h (99 mph).
- **Tigr-M:** During the 2010 Interpolitex exhibition, the Multi-purpose Armored Vehicle (Ru:автомобиля многоцелевого назначения (АМН)) AMS 233 114 Tigr-M was presented by the Military Industrial Company. It featured a new YaMZ-534 diesel engine, a new armored hood, air filter installation, an increase in the number of rear passenger seats (from 8 to 9) and the replacement of the bicuspid rear hatch with a large square hatch.
- **Tigr-6A SPV:** The CTC GAZ-233014 "Tiger" SPV prototype vehicle was first shown at the Bronnitsi Armored Vehicles Show on June 10, 2011. Based on the SPM-2, the SPV is designed for combat officer transport. It has a four-door station wagon body with increased GOST 6A armor protection (heavy mine protection and special shock-absorbing

seats/footrests which are not attached to the floor). As of November 2012, tests are being conducted.

- **GAZ-29751:** 3 door wagon
- **GAZ-29752:** 5-door wagon designed to carry four people and from 500 to 1000 kilograms of cargo
- **GAZ-297533:** Two door with tilt covered load platform

System

Alternative Designation: GAZ-2975 Tigr, Light Utility Vehicle

Type: 4X4 Russian Light Utility Vehicle

Family: GAZ Tigr

Crew: ea1

Passenger Capacity: ea10

Manufacturer: Arzamas Machinery Plant, GAZ, other plants across the country included ARZ plants (e.g. CARZ172) (Russia) Beijing Yanjing Motor Company (China) Minsk Wheel Tractors Plant (Belarus)

Note: The GAZ-2975 is a armored version

Dimensions

Length: m4.61

Width: m2.2

Height: m2

Weight, Combat: tons6

Maximum Load: tons1.5

Ground Clearance: mm400

Curb Weight: kg5,300

Turning Radius: m8.9

Automotive

Engine Name: GAZ-562

Engine Type: Diesel

Engine Power: hp197

Cruising Range: km900

Speed, Maximum Road: km/h140

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg40

Vertical Step: m0.4

Trench: m0.5

Fording Depth: m1.2

Transmission: GAZ JSC 5-speed manual

All Wheel Drive: Yes, Full Time

Tire Inflation System: Yes

Communications

Primary: R-173

Secondary: R-168 (VHF)

Main Gun

Note: The GAZ-2975 is equipped with a Remote Operated Weapon Station (ROWS), Shipunov 2A42, 30mm Autocannon and is mounted on a unmanned turret of the Uran-9 robotic system

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Manufacturer: Tulamashzavod

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): mm3.027

Barrel Length: mm2,416

Action: Gas Operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Gas Operated

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

↳*Ammunition*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30mm × 165mm

Muzzle Velocity: m/s960

Basic Load: ea200

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Auxiliary Weapon System

↳*System*

Name: PKP Pecheneg 7.62mm General Purpose Machine Gun
Type: General Purpose Machine Gun
Manufacturer: TsNIITochMash
Weight (without Bipod): kg8.2
Weight (with Bipod): kg8.7
Weight (with an Infantry Tripod Mount): kg12.7
Length (Total): mm1,3200
Barrel Length: mm658
Action: Gas Operated
Rate of Fire: rds/min600-800
Effective Firing Range: m1,500
Feed System: Belt feed: 100-, 200-, 250-round

↳*Ammunition*

Type: Rifle
Caliber: mm7.62
Cartridge: 7.62×54mmR
Muzzle Velocity: m/s900
Basic Load: ea1,000

Fire Control

Laser Target Desinator: No

Protection

Armor: mm5
Applique Armor: Available
Active Protection System: No
Mine Clearing: No
Self-Entrenching Blade: No
NBC Protection: Yes
Smoke Equipment: INA
IR Signature: INA

Notes:

The "Tigr" ("Tiger"), which is often referred to as the "Russian Hummer", was developed by the GAZ Automobile Works for special-purpose militia units. The GAZ-2975 Tigr was officially taken into service at the end of 2006 and manufactured in 2007.

The vehicle is intended to carry and protect personnel. It can accommodate up to 10 officers armed and in full gear. The vehicle has been field- and combat-tested before being sent to serve with OMON. Its armor can defeat 7.62-caliber ammunition and can withstand shell fragments. The vehicle was designed to transport troops and various equipment quickly on road and off-road. It has a chassis frame construction, with a traditional layout of front engine, middle crew compartment, and rear cargo area. Standard features include: power steering, independent all-wheel torsion suspension with hydraulic shock absorbers and stabilizer bars, a transfer case with a locking center differential, limited slip differentials, two-speed transfer case, automatic tire inflation, engine block heater, and electric winch. The GAZ-233001 has optional air conditioning, stereo, electric windows, and an anti-lock braking system. Armored versions of the Tigr feature 5 mm (0.20 in) (7 mm (0.28 in) for the SPM-2) heat-treated and stress-relieved armor plates. The Tigr can carry a half ton of cargo. The available engines are a Cummins 5.9 L (360 cu in) B180 turbodiesel with 180 hp (130 kW); a Cummins 5.9 L (360 cu in) B205 turbodiesel producing 180 hp (130 kW); a Cummins 5.9 L (360 cu in) B-214 turbodiesel making 215 hp (160 kW); or a GAZ-562 3.2 L (200 cu in) turbodiesel with 197 hp (147 kW). Designed for performance in mountain, arctic, and desert environments, the Tigr is capable of operating at ambient temperatures ranging from −14–50 °C (7–122 °F). Moreover, the vehicle has approach and departure angles of 52 degrees and a wading depth of 1.2 m (3.9 ft).

JRTC VISMOD: RPG-27 Russian 105mm Disposable Anti-Tank Grenade Launcher (ATGL)





Tiers:



Variants:

- **RMG Variant:** The RMG is a smaller, multipurpose variant of the RShG-1 that is optimized for the bunker buster role and defeating light vehicles and infantry in cover. As a result, its penetration performance against tank armor is reduced. The launcher carries a tandem warhead. The precursor high-explosive anti-tank (HEAT) warhead penetrates armor or other obstacles (reinforced concrete, masonry, etc.). The main warhead creates a fine explosive cloud and takes into the interior through the hole, pierced by the precursor charge. Detonation of the main warhead explosive boasts a multiple effects (high-explosive and incendiary). The RMG rocket launcher ('RMG' stands for “Reaktivnaya Mnogotselevaya Granata” or rocket-propelled multi-purpose grenade) was developed by Bazalt in the early 2000s. As is the case with disposable anti-tank rocket launchers and multi-purpose assault weapons, the designation of the new rocket launcher is the designation of its round. The design project was supervised by leading designer S. Kh. Irtuganov. Officially adopted by the Russian Government in December 2011.
- **RSHG-1:** INA

System

Alternative Designation: Tavolga (Meadow Grass)
Cailber/Length : mm105
Crew : ea1
Rate of Fire : rd/minSingle-shot disposable
Penetration: 600 - ~ 750 mm: RHA after ERA 1500 mm: Brick 3700 mm: Earth
Muzzle Velocity: m/s120
Effective Firing Range: m200

↳*Dimensions*

Length, Firing : m1.155
Length, Travel : m1.155
Weight: kg7.6

Munition

↳*Munition 1*

Cailber/Length : mm105

Muzzle Velocity : m/s120

Range, Effective : m200

Type: Tandem-HEAT

Sights

↳*Night Sights*

Available: No

↳*Sights*

Notes: (Can be used with NVG found in Hybrid Threat units). Other sights can be adapted, such as the strap-on British Ring Sight, with NVG.

Type: Raised iron peep sight

Notes:

The RPG-27 is a Soviet disposable rocket launcher. The RPG-27 shares a close resemblance with the previous RPG-26 in that it is a man-portable, disposable anti-tank rocket launcher with a single shot capacity. The RPG-27 has a larger diameter round than the RPG-26 which enables the RPG-27 to achieve higher armor penetration performance. The RPG-27 fin stabilized round is a 105 mm tandem-charge HEAT warhead with a range of 200 meters. The round has a stated penetration capability in excess of 600 mm of RHA (after ERA) and 1500 mm of brick or concrete and 3700 mm of earth. The RShG-1 is very similar in operation to the RPG-27 but carries a thermobaric warhead with a lethal radius of 10 meters and a larger range of 600 meters. Officially adopted by the Russian Government in December 2011.

JRTC VISMOD: Type 63 Chinese 107mm Multiple Rocket Launcher (MRL)





Tiers:



Variants:

- **Type 63 for mountain/airborne warfare:** This variant can be disassembled into manpack loads
- **Type 63 -1:** This variant's launcher is modified to four rows of three tubes; it has smaller road wheels. Tube construction is cast aluminum. The weight of the Type 63 -1 is reduced by 300 lb (136 kg) and it has a covered crew cabin.
- **Type 81:** This variant is a Type 63 on a turntable mounted on rear bed of 4 x 4 truck.
- **Iraqi 107-mm MRS:** The version is an Iraqi copy of the Type 63
- **South African 107-mm MRS:** South African 107-mm MRS
- **VTT-323:** The VTT-323 is the North Korean designation for the weapon.
- **107MM SP MRL 18 M1992:** North Korea Version
- **107MM SP MRL 24 M1992:** North Korea Version
- **Type 85:** This type incorporates 107-mm rockets mounted on a 0.9 m-long Type 85 single man-portable tripod launcher tube. The Type 85 is used by commandos, special operations troops and guerrillas. It can be engaged and disengaged in 30 seconds and weighs 49.6 lb (22.5 kg).
- **Single-tube launcher:** This was exported to guerrilla groups.

System

Alternative Designations: None
Manufacturer: State Factory 847
Crew: ea5
Maximum Range: HE - 8,500m; Incendiary - 7,885m
Emplacement Time: secs30
Displacement Time: INA

Dimensions

Length: m2.90
Width: m1.65
Height: m0.91
Tire Size: 126 mm x 406 mm
Weight, Combat: 602kg, 376kg unloaded

Automotive

Prime Mover: Anything

Multiple Rocket Launcher

↳*Launcher*

Type: Multiple Rocket Launcher

Caliber: 107mm

Number of Tubes: ea12

Maximum Elevation: deg+57

Minimum Elevation: deg-3

Traverse Range, Total: deg32

Traverse Right: deg16

Traverse Left: deg16

Reload Time: 3 minutes

Carriage: Split trail

↳*Ammunition (Option 1)*

Name: INA

Type: HE Projectile

Length: m0.84

Width: 170mm

Weight, Total: kg18.80

Warhead Type: HE

Warhead Weight: kg8.33

Maximum Range: m8,500

Maximum Velocity: m/s372

↳*Ammunition (Option 2)*

Name: INA

Type: Incendiary Projectile

Length: m0.92

Width: 170mm

Weight, Total: kg18.74

Warhead Type: Incendiary

Warhead Weight: kg7.54

Maximum Range: m7,885

Maximum Velocity: m/s383

Fire Control

Name: INA

Computerized FCS: No

Sights: Optical

Notes:

The Type 63 multiple rocket launcher is a towed, 12-tube, 107mm rocket launcher produced by the People's Republic of China in the early 1960s and later exported and manufactured globally. Although no longer serving with active infantry units, the Type 63 is still in People's Liberation Army service with specialized formations such as mountain infantry units and special forces detachments. The Type 63 was widely used in the PLA until the late 1980s. It was adopted as the successor of the Type 50-5, 102mm. China has also developed a Type 63 multiple rocket launcher, 130mm. The RPU-14 is a Soviet 140mm MRL of similar design to the Type 63. The launcher's 12 tubes are arranged in three removable rows of four each, mounted on a single-axle carriage with rubber tires. The Type 63 originally fired an 18.8 kilogram rocket (Type 63-2) with a 1.3 kilogram warhead. Ammunition for the Type 63 was later improved (Type 75 and Type 81 series), although the overall weight of the rocket remained the same. A fixed amount of propellant is contained in the rocket motor. The steel-cased rocket is stabilized with spin imparted by six angled nozzles in its base. Type 63 rockets may be launched without the launcher; improvised firing can employ tubing, rails or even dirt berms. The Type 63 was distributed on the basis of six per infantry regiment, or 18 per infantry division. For airborne and mountain units the lighter Type 63-I was developed. Both the Type 63 and its copies can be mounted on different kinds of armored and unarmored vehicles, for example the MT-LB, the Safir, the Mamba, the RG-32 Scout, the GAZ-66 and the M113.

JRTC VISMOD: R-1685KVE Russian Vehicle-Mounted HF Radio Set





Tiers:



System

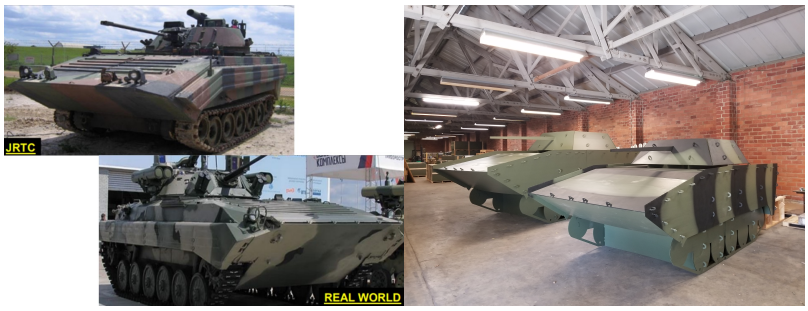
↳*Radio*

Name: R-168-5KVE
Manufacturer: Sarapul Radioplant OJSC
Type: HF
Frequency: MHz1.5-30
Capabilities: Voice Telegraph
Maximum Range: km15-300
Mount Type: Vehicle
In Service: Yes

Notes:

VHF vehicular radio set R-168-5UVE is intended for open and masked radio communication in radio networks of tactical control. There is very little information on the R-168-5UVE

JRTC VISMOD: BMP-2M Berezhok Russian Amphibious Infantry Fighting Vehicle (IFV)



Tiers:

1 **2** 3 4

Parent:

BMP-2 Russian Amphibious Infantry Fighting Vehicle (IFV)

Variants:

- **BMP-2 obr.:** Improved version with "kovriki" armour on turret front
- **BMP-2 obr. 1986:** Late-production model with new BPK-2-42 sight instead of the BPK-1-42.
- **BMP-2D:** Fitted with additional spaced type steel appliqué armour on the hull sides, under the driver's and commander's stations, and 6 mm thick appliqué armour on the turret.
- **BMP-2K:** Command variant fitted with two whip antennas mounted on the rear of the hull, one behind the turret and one on the right-hand side of the rear of the vehicle, one IFF antenna (pin stick) on the left-hand side of the rear of the vehicle and a support for a telescopic mast in the front of the IFF antenna
- **BMP-2M:** This is the general designator for upgraded (modernizirovannyj) versions
- **BMP-2M "Berezhok":** Modernized version from KBP. This version has B05Ya01 Berezhok turret equipped with 2A42 30mm autocannon, PKMT 7.62mm coaxial machine gun, AGS-30 grenade launcher, 2+2 launchers for ATGM 9M133M "Kornet-M" and new day/night sights as found on the BMD-4.
- **BMO-1:** Transport vehicle for a flamethrower squad armed with 30 RPO-A "Shmel" 93 mm napalm rocket launchers.
- **BVP-2V or VR 1p:** Former Czechoslovakia version
- **VPV:** Equipped with a powered crane with 5 tonnes capacity, heavy winch, wider troop compartment etc. Hatches on top of the turret and the troop compartment were removed.
- **BMP-2 "Sarath":** Also known as BMP-II – Indian licence-produced variant of the BMP-2,built by Ordnance Factory Medak. The first vehicle, assembled from components supplied by KBP, was ready in 1987.
- **BMP-2 Light Tank:** India Version, DRDO developed light tank on BMP-2 Chassis DRDO light tank.
- **BMP-2 UGV "Muntra" – unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and:** India Version. unmanned reconnaissance vehicle, "S" version is fitted with equipment used to detect nuclear, biological and chemical contamination while the "M" version is designed to detect mines.
- **BMP-2MD:** Finnish modernisation of the BMP-2, which includes thermal camouflage, thermal sights, anti-aircraft sight and new day/night optics for the gunner and commander, heated cabin and seats, new external storage boxes functioning also as spaced armour and new radio and communications systems

System

Alternative Designation: BMP-2M Berezhok
Type: Amphibious Infantry Fighting Vehicle (IFV)
Family: BMP-2
Manufacturer: mKurganmashzavod Joint Stock Company
Crew: ea3
Passenger Capacity: ea7

Dimensions

Length: m6.72

Width: m3.15

Height: m2.45

Weight, Combat: tons14.3

Ground Pressure: kg/m0.63

Automotive

Engine Name: UTD-23

Engine Type: Diesel

Engine Power: hp370

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Off Road: km/h45

Speed, Average Cross: km/h35

Speed Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.7

Trench: m2.5

Fording Depth: mAmphibious

Note: Initial production BMP-2 is partially amphibious, and propelled in water by its tracks

Communications

Primary: R-123M transceiver

Secondary: R-173

Main Gun

↳ ***System***

Name: Shipunov 2A42, 30mm Autocannon

Type: mm30

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.027

Barrel Length: mm2,416

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

Firing Modes: Automatic and semi-automatic

Effective Ground Engagement Range: m1,800

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartidge: mm30 × 165

Muzzle Velocity: m/s960

Basic Load: ea500 total of any combination 30mm projectile

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,260

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s1,120

Basic Load: 500 total of any combination 30mm projectile

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s855

Basic Load: ea2,000

Accuracy of fire at 300 m: mm90

Anti-Tank Guided Missile (ATGM)

System

Name: 9M133 Kornet
NATO Name: AT-14 Spriggan
Type: Anti-Tank Guided Missile (ATGM)
Manufacfturer: Degtyarev plant
In Service: 1998-present
Proliferation: 35,000 (2009)
Launcher Type: Twin launchers mounted on either side of the turret
Basic Load: ea4
Weight (with Launch Tube): kg29
Weight (with Tripod/Firing Unit): kg63.7
Length: mm1,200
Diameter: mm152
Warhead Weight: kg4.6
Detonation Mechanism: Impact Fuse
Wingspan: mm460
Propellant: Solid-fuel rocket
Operational Range (KORNET): m100-5,000
Operational Range (KORNET-EM): m10,000
Guidance system: SACLOS laser beam riding
Steering system: Two control surfaces
Accuracy: Less than 5 meters
Launch platform: Individual, vehicles, Kornet-T, Kornet-D, Bumerang-BM, Kornet-D1

Fire Control

Name: INA
Computerized FCS: Yes
Commander Periscopes: Two TNPO-170A periscopes, plus a single TKN-3B binocular rear-view prism. Additionally, the Commander has a 1PZ-3 day monocular sight
Thermal Sight Gunner: Sozh panoramic sight
Driver's Central Day Periscope: TNP-350B
Main Gun Stabilization: Yes, digital weapon stabiliser
Effective Ground Engagement Range: m1,800
Searchlight: OU-3GA2 searchlight and the FG-126 searchlight
Digital Battle Management System: Yes
Multi-Channel Optical System: Yes

Advanced Target Detection System: Yes

Laser Range Finder: Yes, PL-1 laser illuminator

Thermal Imaging System: Yes

Ballistic Computer: Yes

Protection

Hull Armor: All-welded steel that is believed to be between 5 and 19 mm thick

Turret Armor: mm23-33

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: INA

Mine Clearing: KMT-8 mine plow available

Self-Entrenching Blade: INA

NBC Protection: Collective, GO-27 Radioactive and chemical agent detector

Smoke Equipment: 6 smoke grenade launchers, VEESS

Smoke Screen: TDA System using engine

Notes:

The BMP-2M infantry fighting vehicle (IFV) is an upgraded version of the BMP-2 IFV. Designed and developed by Kurganmashzavod JSC, the IFV offers improved mobility and fire power for armed forces. The weapon system for the upgraded vehicle is provided by KBP Instrument Design Bureau. The amphibious vehicle was displayed at an international forum known as Engineering Technologies 2010 held in June 2010 and KADEX-2012, Kazakhstan. The manufacturer also demonstrated the vehicle at Comprehensive Security Exhibition 2015 in Tampere. KBP received an order from Algeria for the modernization of 360 BMP-2 vehicles to BMP-2M standard. A total of 693 BMP-2/2K vehicles of the Indian Army are also being upgraded to BMP-2M standard. The Russian Defense Ministry placed a ten-year contract with KBP for the supply of 540 modernized BMP-2M and BMD-2 airborne vehicles in 2017. The upgraded vehicle is being offered in two different configurations, which include BMP-2M (sb4-2) and BMP-2M (sb4-3). The design of the BMP-2M tracked armored fighting vehicle is based on the BMP-2 IFV, which was commissioned by the Russian Army in 1980. Combat efficiency of the vehicle has been highly improved with advanced armament, while cross-country speed has also been increased. The modernized vehicle can carry three crew members, including a driver, gunner and commander. The troop compartment offers seating for up to seven soldiers. The vehicle retains the design specifications of BMP-2, and measures 6.73m-long, 3.15m-wide and 2.45-high. The combat weight of the vehicle is approximately 16,000kg. The IFV is equipped with a KBM-2 air conditioning system to offer a comfortable environment to the crew when operating in high temperatures. The BMP-2M IFV is equipped with a Berezhok (B05S011) combat module integrating four 9M133 Kornet series anti-tank guided missiles. The missiles are launched from the twin launchers mounted on either side of the turret. The turret is also armed with a 30mm 2A42 automatic gun, a 7.62mm PKT coaxial machine gun and a 30mm AG-17 automatic grenade launcher (AGL). The 30mm cannon has the capability to fire 500 rounds of ammunition a minute, while the 7.62mm gun offers a rate of fire of 2,000 rounds a minute. The AGL can launch 250 grenades a minute for a maximum range of 1,730m. The hull of the IFV is protected by applique armor, which enables the vehicle to withstand 12.7mm B-3232 rounds and high-explosive anti-tank (HEAT) missiles. Observation and fire control The BMP-2M IFV is equipped with a multi-channel optical system for stabilization of view during firing. The vehicle has an advanced target detection system, a laser range-finder and a thermal imaging system to improve the accuracy of target detection and mission efficiency. An armament stabilizer and ballistic computer, as well as a BPK-3-42 gunner’s sight are fitted to the vehicle enable the firing of main armament. The vehicle is also installed with PL-1 laser illuminator. The target detection ranges of the vehicle during the day and night are 5,000m and 3,000m respectively.

JRTC VISMOD: BMP-1 Russian Amphibious Infantry Fighting Vehicle (IFV)



Tiers:



Variants:

- **BMP-1P:** The BMP-1P is an upgraded variant of the BMP-1 and weighed 13.4 tonnes. Protection capabilities in the BMP-1P and its sub variant BMP-1PG ('Granatomyot' - grenade launcher) were improved by fitting them with the 81 mm 902V "Tucha" smoke grenade launcher and an AGS-17 "Plamya" AGL respectively.
- **BMP-1 Ambulance (Iraq):** Evacuate wounded
- **BMP-1M:** Kliver turret & drop down gate
- **Type 86/WZ-501 (China):** Chinese BMP-1 IFV
- **BMP-1G ICV:** AT-4/AT-5 ATGM & 30-mm AGS-17 AGL
- **BMP-1 with Soviet modifications in Afghanistan:** Applique armor, AT-4 ATGM mount; some with AGS-17 30-mm AGL
- **BMP-IRM ("Zhuk"-Beetle):** Engineer recon vehicle with front mine claws; 1 MG only
- **BMP-1 with mine plow:** KMT-8 or KMT-10 mine-clearing plows attached
- **MP-31:** Modernized command vehicle
- **BMP-R (BMP M1976):** Recon vehicle with larger rear hatches & 2-man turret
- **BRM-1/BRM-1K Reconnaissance:** BMP-R with a GS-12 Tall Mike radar ILO AT-3 Sagger (see Chapter 1)
- **BREM-2:** Light recovery vehicle w/crane
- **BMP-40:** Larger turret; carries 6 soldiers, prototype model only
- **PRP-3/PRP-4 (Radar):** Artillery recon vehicle with 7.62 MG ILO 73-mm cannon
- **VP-90 (Czech Republic):** Recon with OT-64 turret; 14.5-mm & 7.62-mm MGs
- **SVO Mineclearer (Czech Republic):** Turretless BMP-1 with 24 245-mm explosive rockets
- **BMP-PP0:** Training variant w/o turret
- **Snezka (Czech Republic):** Battlefield surveillance vehicle
- **PRAM-S (Czech Republic):** SP 120-mm mortar carrier
- **BMP-1 Finnish variant:** East German vehicles with autoloaders removed
- **BMP-1 with Poyaud engine (Egypt):** 150 with replaced 10.47-liter Poyaud 6-cylinder engine
- **BMP-1 with applique armor (Iraq):** Armor added to resist 12.7-mm & 14.5-mm armor-piercing shells at 200 m
- **BMP-1A1 Ost:** In 1990, Germany created more space (6 passengers) & removed the automatic loader
- **BMP-1 with CERAWA armor (Poland):** CERAWA ERA on the glacis, hull, & turret front
- **OT-90 (Czech Republic):** OT-64 1-man turret with 14.5-mm & 7.62-mm machine guns
- **BPzV (Czech Republic):** Recon with Tall Mike radar
- **DP-90 (Czech Republic):** Recon with Tall Mike ra0T-90 maintenance variant adar
- **MU-90 (Czech Republic):** Turretless mine-laying OT-90
- **MLI-84 (Romania):** Larger & heavier w/ 12.7-mm machine gun
- **Pansarbandvgn 501 (Pbv 501 (Sweden):** East German vehicles to mechanized Swedish infantry
- **BREM-4 recovery vehicle:** No turret & crane (Czech version is the VPV)
- **BRM-23 (Bulgaria):** Recon with 23-mm cannon
- **82-mm SP Automatic mortar (Hungary):** Vasilyek mortar ILO troop compartment
- **BMP-1K / BMP-1KSh / BMP M1974 Command Vehicle:** This is the company command version of the BMP-1. It has additional communications equipment, an additional radio aerial on the right rear of the hull, a redesigned troop compartment to incorporate tables and a map board. The firing ports were eliminated. The BMP-1K has two roof hatches, each equipped with a roof-mounted TNPO-170A aiming device. The 73-mm gun is provided with 20 rounds of ready use ammunition, which is loaded manually. Two man-portable surface-to-air missiles are carried. The BMP-1K1 and K2 are equipped with two R-123M radios and a semi-telescopic antenna. The K3 features an R123M radio, R130M and a 33-ft (10-m) telescopic antenna. Another variant, the BMP-1KSh (not to be confused with the KShM) was a

regimental and divisional command post vehicle. It was similar to the BMP-1K, except that it was unarmed, has a larger Hawk Eye radio antenna and carries more radio equipment (R-137, R-140M or R-145BM, each with four or five radios). A TNA-3 navigation system is fitted. The crew is provided with a portable 7.62-mm PK machine gun for self-defense. Ref: Military Periscope, April 2016

System

Alternative Designations: BMP Model 1970, Korshun

Manufacturer: Kurganmashzavod (Soviet Union)[

Description: IFV with exit doors in the rear with space for 8 soldiers; 4 firing ports on each side; 1 firing port in left rear door

Crew: ea3

Passengers: ea8

Dimensions

Length: m6.74

Width: m2.94

Height: m2.15

Weight, Combat: tons13

Automotive

Engine Name: UTD-23 (Upgraded Engine)

Engine Type: Diesel

Engine Power: hp360

Cruising Range: km600

Speed, Maximum Road: km/h65

Speed, Average Cross: km/h45

Speed, Maximum Swim: km/h7

Gradient: deg60

Side Slope: deg30

Trench: m0.7

Vertical Step: m2.2

Fording Depth: mAmphibious

Fuel Capacity: liters462

Communications

Type: R-123M Radio

Radio Range: km16-55

Main Weapon System

↳ ***System***

Name: 2A28 Grom

Type: Smooth bore semi-automatic gun

Caliber: mm73

In Service: 1966 - Present

Manufacturer: KBP

Proliferation: INA

Weight: kg115

Length: mm1,195

Width: mm218

Height: mm322

Barrels: ea1

Maximum Elevation: deg+33

Minimum Elevation: deg-4

Traverse Range: deg40

Traverse Left: deg20

Traverse Right: deg20

Rate of Fire: rds/min8

Maximum Firing Range: m4,500

Sights: 1PN22M, 1PN22M2[

Loader Type: Autoloader

↳*Ammunition (Option 1)*

Name: PG-15V

Type: HEAT

Caliber: mm73

Muzzle Velocity: m/s665

Maximum Firing Range: m4,500

Shell Variants: PG-15V (HEAT), OG-15V (HE-FRAG), PG-15VN (HEAT-DP)

Basic Load: ea40

Wire-Guided Anti-Tank Guided Missile (ATGM)

↳*9M14 Malyutka, MCLOS Wire-Guided Anti-Tank Guided Missile (ATGM)*

Type: Manual Command to Line of Sight (MCLOS) wire-guided anti-tank guided missile (ATGM)

Manufacturer: Soviet Union, Russia as successor state and other countries under license and domestic versions

In Service: 1963-present

Proliferation: Widely Proliferated, more than 100 countries operate this ATGM

Variants: 9M14M, 9M14P1, Malyutka-2, Malyutka-2F

Weight (9M14M): kg10.9

Weight (9M14P1): kg11.4

Weight (Malyutka-2): kg12.5

Weight (Malyutka-2F): kg12

Launcher and Guidance System Weight: kg30.5

Length: mm860

Width: mm393

Diameter: mm125

Effective Firing Range: m500-3,000

Warhead Weight (9M14M, 9M14P1): kg2.6

Warhead Weight (Malyutka-2, Malyutka-2F): kg3.5

Speed (9M14M, 9M14P1): m/s115

Speed (Malyutka-2, Malyutka-2F): m/s130

Guidance system: MCLOS, SACLOS

Armor Penetration: 200mm at 60 degs

Steering: Manual via a joystick controler

Missle Load Time: sec50

Basic Load: ea4

Launcher Type: 9S415 launch rail

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: Machine Gun

Caliber: mm7.62

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea950

Accuracy of fire at 300 meters: mm90

Fire Control

Name: INA

Computerized FCS: Yes

Thermal Vehicle Commander: Yes, TKN-3B day night sight with variable magnification

Thermal Gunner: Yes, TVNE-1PA active IR night vision metascope

Main Gun Stabilization: No

Gyrocompass: Yes, GPK-59 electrical gyrocompass

Firing Ports: ea4

Day Periscopes: ea4

Search Light: OU-3GK IR search light

Search Light Range: m400

Protection

Armor (turret front): mm19-23

Applique Armor: Available

Explosive Reactive Armor: Available

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: GO-27 radioactive and chemical agent detector

Chemical Decontamination Kits: TDP chemical decontamination kits

Smoke Equipment: VEESS

Survivability Equipment: INA

Grenade Launcher: Yes, RPG-7 light grenade launcher with grenades

Scavenger System: Yes

Mine Plough: Yes, KMT-10 plough-type mine-clearing system

Notes:

The BMP-1 is a Soviet amphibious tracked infantry fighting vehicle. BMP stands for Boyevaya Mashina Pekhoty 1 (Russian: Боевая Машина Пехоты 1; БМП-1), meaning "infantry fighting vehicle". The BMP-1 was the first mass-produced infantry fighting vehicle (IFV) of the Soviet Union. It was called the M-1967, BMP and BMP-76PB by NATO before its correct designation was known. The Soviet military leadership saw any future wars as being conducted with nuclear, chemical and biological weapons and a new design, like the BMP, combining the properties of an armored personnel carrier (APC) and a light tank would allow infantry to operate from the relative safety of its armored, radiation-shielded interior in contaminated areas and to fight alongside it in uncontaminated areas. It would increase infantry squad mobility, provide fire support to them, and also be able to fight alongside main battle tanks. The BMP-1 was first tested in combat in the 1973 Yom Kippur War, where it was used by Egyptian and Syrian forces. Based on lessons learned from this conflict, and early experiences in the Soviet–Afghan War, a version with improved fighting qualities was developed, called the BMP-2. It was accepted into service in August 1980. In 1987, the BMP-3, a radically redesigned vehicle with a completely new weapon system, entered service in limited numbers with the Soviet Army. The BMP-1 is a fully amphibious tracked vehicle, with a front-engined chassis developed especially for it, a welded steel hull with a sharp, sloping front with a conspicuously ridged surface, a centrally located, flat, truncated cone turret and a troop compartment at the rear.

JRTC VISMOD: ZSU-23-4 Shilka Russian Self-Propelled 23mm Anti-Aircraft Weapon System



Tiers:



Variants:

- **ZSU-23-4V "Shilka"(1964):** Modernized variant with enhanced reliability of some details, ventilation system case located on the hull. Commander vision device was added.
- **ZSU-23-4V1 "Shilka"(1970)::** Modernized variant with enhanced reliability of some details, ventilation system case located on the hull. Commander vision device was added.
- **ZSU-23-4V1 "Shilka" (1970)::** Modernized variant with enhanced reliability of radar system and other details, ventilation system cases located on front bilges of the turret. Guidance-system computer was improved (as well as accuracy and efficiency of anti-aircraft fire on the move at 40 km/h). It is fitted with a slightly improved diesel engine V-6R-1.
- **ZSU-23-4M1 (1973)::** Armed with modernized autocannons 2A7M. The pneumatic loading was replaced with pyrotechnic loading (unreliable compressor was removed), welded tubes of coolant outlet were replaced with flexible pipes which increased autocannon barrel life from 3500 rounds to 4500 rounds.
- **ZSU-23-4M3 "Biryusa" (1977)::** Equipped with identification friend-or-foe system "Luk". All ZSU-23-4M were upgraded to ZSU-23-4M3 level during scheduled repairs. Army unofficially continued to use the name "Shilka" for all variants of ZSU-23-4.
- **ZSU-23-4M2 (1978)::** So-called "Afghan" variant. Re Equipment performed during the Soviet–Afghan War for mountain combat. The radar system was removed and a night-sight was added. Ammunition increased from 2,000 to 4,000 rounds.
- **ZSU-23-4M4 and ZSU-23-4M5 (1999)::** Modernized variants, armed with two additional paired man-portable air-defense systems "Igla" on each side of the turret and equipped with 81mm smoke grenade launchers, laser emission sensors, electro-optical vision devices (including television system for driver) and improved weapon radar system. The mechanical transmission was replaced with hydrostatic transmission, hydraulic boosters were installed. Mobility increased to the level of main battle tanks. This upgrade was first shown during the exhibition MAKS-99 in Zhukovsky and was carried out by the Minotor Service Enterprise and Peleng Joint Stock Company from the Republic of Belarus, and the Ulyanovsk Mechanical Plant of Russia. The Ulyanovsk Mechanical Plant is also offering ZSU-23-4 upgrade packages independently
- **Donets (1999):** This is a Ukrainian modernization developed by Malyshev Tank Factory in Kharkov. It has the modified turret from the ZSU-23-4, armed with two additional paired man-portable air-defense systems "Strela-10" installed on the hull of the T-80UD main battle tank. Ammunition capacity for its 23 mm autocannons is doubled.
- **ZSU-23-4M-A (2017)::** A modernisation package developed by the Arsenal Factory in Kyiv, this system features a new Rokach-AS radar, laser rangefinder, and four automatic Igla missiles.
- **ZSU-23-4MP Biała (2000)::** Polish modernized upgrade with Grom anti-aircraft missiles and fully digital passive aiming devices instead of the radar

System

Alternative Designations: Shilka
Manufacturer: Mytishchi Machine-Building Plant
Crew: ea4
Chassis: GM-575 Tracked, six road wheels, no track support rollers

Dimensions

Length: m6.54

Width: m3.3

Height: Radar up: 3.75m Radar down: 2.60m

Weight, Combat: tons20.5

Ground Pressure: INA

Automotive

Engine Name: V6R-1 Diesel

Engine Type: 6-cylinder 4-stroke airless-injection water-cooled 20-litre diesel

Engine Power: hp290

Cruising Range: km450

Speed, Maximum Road: km/h50

Speed, Average Cross: km/h35

Speed Maximum Swim: Not Amphibious

Gradient: deg60

Side Slope: deg30

Vertical Step: m1.1

Trench: m2.8

Fording Depth: m1.0

Communications

Primary: R-123

Main Armament

Name: 4 × 23 mm 2A7 autocannons (AZP-23 "Amur" quad automatic anti-aircraft gun

Caliber: 23mm

Cyclic Rate of Fire (rd/min): 850-1,000

Practical Rate of Fire (rd/min): 400, in 10-30 rd bursts

Reload Time (min): 20

Elevation: -4° to +85°

Fire on the Move: Yes

Reaction Time: sec12-18

Maximum Slant Range: km2

Maximum Firing Range: km2.5

Rate of Fire: rds/min850-1,000

Maximum Elevation: deg+85

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Main Armament Ammunition

Description: Can fire the same ammunition as ZU-23. Best mix for modern versions (ZU-23M and ZU-23M1) is 1,200 APDS-T and 1,200 FAPDS. Rounds ballistically matched. No HEI required.

Type: 23x152 HE-I, HEI-T, API-T, TP, APDS-T, FAPDS, TP

Max Effective Range (m): 2,500m, 2,000m against light armored ground targets

Max Effective Altitude (m): 1,500

Projectile Weight (kg): INA

Muzzle Velocity (m/s): 970

Fuze Type: None

Self-Destruct (sec): 11

Penetration (mm KE): 19 @ 1000m API-T

Min Altitude (m): 0

HE-I Projectile Weight (kg): 0.18

HEI-T Projectile Weight (kg): 0.19

API-T Projectile Weight (kg): 0.189

TP Projectile Weight (kg): 0.18

HE-I Fuze Type: Point detonating

HEI-T Fuze Type: Point detonating

API-T Fuze Type: Base igniting

Basic Load: ea2,000

Fire Control

Driver Periscope: BMO-190

Driver IR Periscope: INA

Commander Periscope: TPKU-2

Commander IR Periscope: TKH-ITC

IFF: INA

Radar: DOG EAR (use in OPFOR units)

Name: Sborka (9S80-1 or PPRU-M1)

Function: Target Acquisition

Detection Range (km): 20

Tracking Range (km): 13

Frequency: F/G band

Frequency Band: J

RPK-2: Optical-mechanical computing sight and part of FC subsystem

Armored Command Vehicle:

Chassis: MTLB-U

Range (km): 80 detection, 35 tracking ACV links to supported tactical unit nets.

Other Radars: Using the above ACV, if an Integrated Air Defense System (IADS) is available, ZSU-23-4 links indirectly for early warning and target acquisition data from radars.

Other Fire Control: Guns use air watches and forward observers, and are linked to AD nets

Protection

Hull Armor: Welded steel, up to 15 mm hull

Turret Armor: Welded steel, 9.2 mm (0.36 in) turret

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The Shilka ZSU-23-4 is a Self-Propelled Anti-Aircraft Gun (SPAAG) featuring a prominent radar dish that can be folded down mounted on a modified PT-76 chassis. ZSU 23-4 Shilka, is capable of acquiring, tracking and engaging low-flying aircraft (as well as mobile ground targets while either in place or on the move). Employed in pairs 200 meters apart, 400 meters behind battalion leading elements, it is commonly used to suppress ATGM launch sites, such as TOW vehicles. The armament consists of four 23mm cannon with a maximum slant range of 3,000 meters. Ammunition is normally loaded with a ratio of three HE rounds to one AP round. Resupply vehicles carry an estimated additional 3,000 rounds for each of the four ZSUs in a typical battery. Recent (October 1997) information details ZSU-23-4 updates/modernization being offered by the Ukrainians that include: a new radar system replacing the GUN DISH radar, plus a sensor pod believed to include day/night camera, and a laser rangefinder; and mounted above radar/sensor pod is a layer of six fire-and-forget SAMs, believed to be Russian SA-18/GROUSE. The radar-guided ZSU-23-4 "Shilka" SPAAG, with its four 23 mm (0.90") autocannons, was a revolutionary SPAAG, proving to be an extremely effective weapon against enemy attack aircraft and helicopters under every weather and light condition. The ZSU-23-4 has a very high density, rate and accuracy of fire, as well as the capability for each of the four autocannons to fire its own type of projectile from separate belts. While it is technically possible that each cannon shoots different type of ammunition, there were two types commonly used in late 1970s: OFZT incendiary fragmentation and BZT armor-piercing tracer, which were to be loaded in 3:1 ratio—three OFZT, then one BZT, every 10th BZT round equipped with so-called "copper remover" and marked. Operators were strongly discouraged from shooting from a single barrel. The appearance of the "Shilka" caused significant changes in NATO tactics in aircraft use at low altitude over the battlefield. Despite its present obsolescence as a modern short-range anti-aircraft weapon, the ZSU-23-4 is still deadly for enemy light armored vehicles, infantry and firing points as an infantry-support vehicle. With its high rate of accurate fire, the ZSU-23-4 can even neutralize tanks by destroying their gun sights, radio antennas, or other vulnerable parts.[3] ZSU-23-4s, especially late models, have excellent performance and good systems reliability. Based on the GM-575 tracked vehicle chassis, which used components from the PT-76 light amphibious tank, the ZSU-23-4 mounts an armored turret holding four liquid-cooled 23 mm (0.9") 2A7 autocannons linked to an RPK-2 "Tobol" radar (NATO designator: "Gun Dish"). The vehicle weighs 19 tonnes (late modifications up to 21 tonnes), has a movement range of 450 km (280 mi) and a top speed of 50 km/h (31 mph). Additional firepower of late modifications can be supplied by a roof-mounted pod of six short-range SA-18 SAMs, or side mounted SA-16s. The crew numbers four: driver, commander, gunner and radar operator. The driver's compartment is located in the nose part of the vehicle. The fighting compartment is in the center, and the engine compartment is in the rear part of the vehicle. The transmission consists of a

multi-plate metal-contact main clutch, a manual gearbox with five forward gears, two planetary two-step steering gears with locking frictions and two final drive groups. The vehicle chassis has six single rubber tired road wheels, a rear drive sprocket with detachable sprocket rings (lantern-wheel gear) and one idler wheel per side. The first and fifth left, and sixth right road wheels have hydraulic shock absorbers. The track is 11.904 m long, 382 mm (15") wide and has 93 links. Because of a large number of different pipes and tubes to detach during maintenance, the repair procedure for some of the vehicle's mechanisms is hard (for example, replacement or repair of a starter). The electric drive of an air outlet hatch of a gas turbine engine (part of the vehicle's electric power supply system) has an inconvenient location (at the bottom of the hull) which causes overheating and sometimes, jamming of the electric drive. On the other hand, the construction of the electric power supply system is very reliable. Changing the main engine oil and coolant is easy, as is replacement of fuel and oil filters, and sections of the air filter. The ZSU-23-4 can cross vertical obstacles 0.7 m (2.3') high, trenches 2.5 m (8.2') wide, has a 1.0 m (3.3') fording depth and can climb 30° gradients. The ZSU-23-4 has good maneuverability and cross-country ability, but its diesel engine's power is insufficient for a vehicle of its weight. As a result, off-road acceleration capabilities are sub-par, and the vehicle lags behind MBTs and IFVs on up-hill terrain. The ZSU-23-4 is equipped with an NBC system with an air filtration unit, fire-fighting equipment, TNA-2 navigational system, infrared vision device, R-123 radio set, R-124 intercom and electric power supply system consisting of a DGChM-1 single-shaft gas turbine engine (70 hp at 6,000 rpm) and a direct-current generator (which provides 27 V and 54 V direct current or 220 V 400 Hz alternating current).

JRTC VISMOD: Mi-24 (Hind) Attack Helicopter





Tiers:



Variants:

- **V-24:** The first version, twelve prototypes and development aircraft. The first V-24 mockup resembled the Bell UH-1A Huey. Later models resembled the future Hind-A, one of which was modified in 1975 as A-10 for speed record attempts with wings removed and faired over and with inertia-type dampers on the main rotor head. The A-10 reached a speed of 368 km/h. It was armed with GSh-23 and could carry up to six missiles or rockets.
- **Mi-24 (Hind-A):** (Hind-A) Other early versions were the armed assault helicopter, which could carry eight combat troops and three crew members. It could also carry four 57mm rocket pods on four underwing pylons, four MCLOS 9M17 Fleyta (AT-2 Swatter) anti-tank missiles on two underwing rails, free-fall bombs, plus one Afanasev A-12.7 12.7mm machine-gun in the nose. The Mi-24 was the first production model.
- **Mi-24F:** Modified Hind-A with seven reinforcing ribs on the port fuselage aft of the wing and the SRO-2M Khrom ("Odd Rods") IFF antenna relocated from the canopy to the oil cooler. The APU exhaust was also extended and angled downwards. The designation may be unofficial.
- **Mi-24 Hind-B:** The Mi-24A was the second production model. Both the Mi-24 and Mi-24A entered the Soviet Air Forces service in 1972. They Lacked the four-barrel Yak-B 12.7mm machine gun under the nose.
- **Mi-24U (Hind-C):** Training version without nose gun and wingtip stations.
- **Mi-24BMT:** Small number of Mi-24s converted into minesweepers.
- **Mi-24D (Hind-D):** The Mi-24D was a purer gunship than the earlier variants. It entered production in 1973. The Mi-24D has a redesigned forward fuselage, with two separate cockpits for the pilot and gunner. It is armed with a single 12.7mm four-barrel Yak-B machine-gun under the nose. It can carry four 57mm rocket pods, four SACLOS 9M17 Phalanga anti-tank missiles (a significant enhancement compared to the MCLOS system found on the Mi-24A), plus bombs and other weapons. One Mi-24D was sold to Poland in January 1996 and was used by the WTD 61 in Manching during 1994 for tests with the head of a MIM-23 Hawk missile in place of the chin-mounted gun. This version also had an unidentified modification in the rear cabin window on the starboard side.
- **Mi-24PTRK:** This version was the Mi-24D modification was used for testing the Shturm V missile system for the Mi-24V.
- **Mi-24DU:** Small numbers of Mi-24Ds were built as training helicopters with doubled controls.
- **Mi-24V (Hind E):** Later development which entered production in 1976 and was first seen by the west in the early 1980s. It was armed with the more advanced 9M114 Shturm (AT-6 Spiral). Eight of those missile are mounted on four outer wing pylons. It was the most widely produced version with more than 1,500 made. In Polish service this aircraft is designated Mi-24W. One Mi-24V was referred to as Mi-24T for unknown reasons.
- **Arsenal Mi-24V upgrade:** Ukrainian upgrade for Mi-24V.
- **Mi-24P Hind F:** The gunship version, which replaced the 12.7mm machine-gun with a fixed side-mounted 30mm GSh-30-2K twin-barrel auto-cannon.
- **Mi-24TECh-24:** Experimental Mi-24P to test abilities for recovery of downed aircraft.
- **Mi-24VP (Hind-E Mod):** Development of Mi-24V made in 1985 which replaced the machine-gun with twin 23mm auto-cannons in a movable turret. Entered service in 1989, but only 25 were made before production ended the same year.[2] One Mi-24VP flew with the Delta-H tail rotor of the Mil Mi-28.
- **Mi-24RKhR (Hind-G1):** NBC reconnaissance model, which is designed to collect radiation, biological and chemical samples. It was first seen during the 1986 Chernobyl disaster. Also known as the Mi-24R, Mi-24RK and Mi-24RKh (Rch).
- **Mi-24RR:** Radiation reconnaissance model derived from the Mi-24R.
- **Mi-24K (Hind-G2):** Army reconnaissance, artillery observation helicopter.
- **Mi-24VM:** Upgraded Mi-24V with updated avionics to improve night-time operation, new communications gear, shorter and lighter wings, and updated weapon systems to include support for the 9M120 Ataka, Shturm and 9K38 Igla ATGM missiles and a 23mm main gun. Other internal changes have been made to increase the aircraft life-cycle and ease maintenance.

- **Mi-24VN (Hind-E variant):** A night-attack version based on an Mi-24V in Mi-24VM Stage 1 configuration.
- **Mi-24PM:** Upgraded Mi-24P using same technologies as in Mi-24VM.
- **Mi-24PN:** PN version has a TV and a FLIR camera located in a dome on the front of the aircraft, and is armed with GSh-23L. The Russian Air Force received 14 Mi-24PNs in 2004
- **Mi-24PS:** Civil police or paramilitary version, equipped with a FLIR, searchlight, loudspeaker PA system and attachments for rappelling ropes.
- **Mi-24V Ecological Survey Version:** Environmental research modification developed by the Polyot Industrial Research Organisation.
- **Mi-24 SuperHind Mk.II:** Modern western avionics upgrade produced by South African company Advanced Technologies and Engineering (ATE)
- **Mi-24 SuperHind Mk.III:** Extensive operational upgrade of the original Mi-24 including weapons, avionics and counter measures.
- **Mi-PSV:** Experimental high-speed helicopter based on the Mi-24. PSV stands for Perspektivny skorostnoi vertolet (Перспективный скоростной вертолёт) – Prospective high speed helicopter). Single-seat streamlined cockpit, unarmed, fitted with experimental main rotors for research into high-speed flight, with a target of increasing the speed of the Mi-28N by 10% and the Mi-35M by 13%

System

Alternative Designation: Mil Mi-24 Hind

Manufacturer: Mil

Type: Attack Helicopter

Crew: ea3 (pilot, co-pilot/gunner, engineer)

Troop Capacity: ea8

Litter Capacity: ea4

Blades, Main Rotor: 5

Blades, Tail Rotor: ea3

Number of Engines: ea2

Day/Night Capable: Yes

All Weather Capable: Yes

Number of Hard Points: ea6

Inner Harg Points Capacity: kg500

Outer Hard Points Capacity: kg250

Dimensions

Length: m18.60

Width: m4.80

Height: m6.50

Weight, Combat: kg11,000

Weight, Empty: kg8,400

Main Rotor Diameter: m17.20

Disc Area: 227 m sq

Tail Rotor Diameter: m3.9

Cargo Compartment Dimensions Floor Length: m2.5

Cargo Compartment Dimensions Floor Width: m1.5

Cargo Compartment Dimensions Floor Height: m1.2

Automotive

Engine Name: 2 x Klimov TV-3-117 turboshaft

Engine Type: Diesel

Engine Power: 2,200 shaft hp each

Cruising Range: km450

Speed, Maximum: km/h320

Cruise Speed: km/h270

Internal Fuel: kg1,500

Cabin Auxiliary Fuel Tank: kg1,000

External Fuel Tanks: kg1,200

Climb Rate: 899 m/min

Ceiling, Service: m5,750

Ceiling, Hover: m3,100

Radius (Max Load) Internal Fuel: km160

Radius (Max Load) 2 External Tanks: km224

Radius (Max Load) 4 External Tanks: km288

Maximum Range with Auxiliary Fuel: km950

Maximum Range with Normal Load: km450

Max G Force: Gs1.75

Payload, Innternal Load: 8 combat troops or 4 litters

Payload, External Weapons Load:: kg1,500

Payload, External Load (no weapons): kg2,500

Communications

Radio: INA

Chin Mounted Gun

Note: The original Mi-24/Mi-25 was equipped with 1 x 4 barrel 12.7mm gun, which was later replaced with a 23mm twin-barrel cannon

↳*System*

Name: Gryazev-Shipunov GSh-23

Type: twin-barreled 23mm autocannon d

Caliber: 23mm

Manufacturer: KBP Instrument Design Bureau

In Service: 1960-Present

Weight: kg49.2

Length: mm1,387

Barrel Length: mm1,000

Barrels: ea2

Action: Gas Principle

Rate of Fire: rds/min3,400-3,600

↳***Ammunition***

Type: Autocannon Rifle Round

Caliber: mm23

Cartridge: 23x115mm

Muzzle Velocity: m/s715

Basic Load: 450

Armor Penetration: INA

Ammo Types: HEFI, HEI, APT, APE, CC

Wing Mounted Weapons

↳***Rocket System #1 Launcher***

Name: UB-32

Type: 57mm, reusable, 32-salvo rocket pod

Basic Load (UB-32 Rocket Pod): ea2-4

Launcher Length: mm2,080

Launcher Diameter: mm464

Weight, Empty: kg103

Weight, Loaded: kg264

↳***Rocket System #1 Projectile***

Name: S-5M (ARS-57) Rocket

Type: Unguided HE-FRAG

Caliber: mm55

Length: m1.4

Diameter: INA

Weight: kg5

Basic Load (S-5 Rockets): ea32

Operational Range: km3-4

Engine: Solid Rocket Motor

Speed: 300 meters in 1.1 seconds

Note #1: Produces 75 Splinters

Note #2: The S-5 is carried in rocket pods, with 4–32 rockets.

↳*Rocket System #2*

Name: S-24 Rocket

Type: Unguided high-velocity airborne rocket

Diameter: mm240

Length: m2.33

Launch Weight: kg235

Warhead Type: blast-fragmentation warhead

Warhead Weight: kg123

Operational Range: km2-3

Basic Load: ea2-4

Proximity Fuze: R-24

Fragmentation Casualty Zone Radius: m300-400

Number of Fragments: 4,000

Penetration: 30mm of armor

Note: The S-24 Warhead detones 3 meters above the ground

↳*Anti-Tank Guided Missile System*

Name: AT-2 Swatter (3M11/9M17)

Type: Anti-Tank Guided Missile (ATGM)

In Service: 1964-Present

Manufacturer: Nudelman OKB-16

Weight: kg27

Length: cm116

Diamter: mm148

Warhead Type: HEAT

Warhead Weight: kg5.4

Engine: Solid fuel rocket

Wingspan: cm68

Operational Range: km0.5-2.5

Speed: 160 m/s (360 mph)

Guidance System: Radio command

Steering System: MCLOS

Launch Platform: Mi-4, Mi-8, Mi-24, Mi-25, BRDM-1, BRDM-2

Fire Control

Fire Control System Type: INA

Fire Control Radar: Yes

Digital or Analog Cockpit: Digital

Direct Fire Control: Yes

Laser Designator: Yes

Automated Helmet: INA

Sensor Suite(s) Available: electro-optical sensor systems

Position Location System: Yes

Radar Warning System: Sirena-3M radar warning system

IR Jammer: HO Brick IR Jammer

FLIR Equipped: Yes

RWR Equipped: Yes

Air Data Sensor: Yes

Missile Guidance Transmitter: Yes

Protection

Stealth Properties: None

Heat Signature Reduction: INA

Add on Armor: INA

NBC Protection: Yes

EW: No

EW Counter Measures/CCM: No

Counter Measures (Chaff/Flares): ASO-2V flare dispensers

Notes:

Mil Mi-24 is a twin-engine combat helicopter intended for close support of ground forces, destruction of armored targets and transportation of persons or cargo. The Mi-24 is not a direct counterpart to the American AH-64 Apache, since unlike this and other Western attack helicopters it is also capable of transporting up to eight troops. As a combination gunship and troop transport, the Hind combat helicopter has no direct NATO counterpart. The combat helicopter is a flying infantry fighting vehicle, which blends features of both transport and attack helicopters. Soviet pilots called the aircraft 'letayushiy tank' or flying tank. Another common nickname is 'Krokodil' (Crocodile) - due to the helicopter's camouflage and fuselage shape and "Drinking Glass", (Stakan) because of the flat glass plates that surround the Mi-24's cockpit. The core of the aircraft was derived from the Mil Mi-8 (NATO reporting name "Hip") with two top-mounted turbo-shaft engines driving a mid-mounted 17.3 m five-blade main rotor and a three-blade tail rotor. The engine configuration gave the aircraft its distinctive double air intake. Original versions have an angular greenhouse-style cockpit; Model D and later have a characteristic tandem cockpit with a "double bubble" canopy. Other airframe components came from the Mi-14 "Haze". Two mid-mounted stub wings provide weapon hardpoints, each offering three stations, in addition to providing lift. The loadout mix is mission dependent; Mi-24s can be tasked with close air support, anti-tank operations, or aerial combat. The Mi-24 fuselage is armored and can resist impacts from 12.7 mm (0.50 in) rounds from all angles. The titanium rotor blades are resistant to 12.7 mm rounds. The cockpit is protected by ballistic-resistant windscreens and a titanium-armored tub. The cockpit and crew compartment are over pressurized to protect the crew in NBC conditions. Considerable attention was given to making the Mi-24 fast. The airframe was streamlined, and fitted with retractable tricycle undercarriage landing gear to reduce drag. At high speed, the wings provide considerable lift (up to a quarter of total lift). The main rotor was tilted 2.5° to the right from the fuselage to compensate for translating tendency at a hover. The landing gear was also tilted to the left so that the rotor would still be level when the

aircraft was on the ground, making the rest of the airframe tilt to the left. The tail was also asymmetrical to give a side force at speed, thus unloading the tail rotor. Comparison to Western helicopters As a combination of armored gunship and troop transport, the Mi-24 has no direct NATO counterpart. While the UH-1 ("Huey") helicopters were used in the Vietnam War either to ferry troops, or as gunships, they were not able to do both at the same time. Converting a UH-1 into a gunship meant stripping the entire passenger area to accommodate extra fuel and ammunition, and removing its troop transport capability. The Mi-24 was designed to do both, and this was greatly exploited by airborne units of the Soviet Army during the 1980–89 Soviet–Afghan War. The closest Western equivalent was the Sikorsky S-67 Blackhawk, which used many of the same design principles and was also built as a high-speed, high-agility attack helicopter with limited troop transport capability using many components from the existing Sikorsky S-61. The S-67, however, was never adopted for service. Other Western equivalents are the Romanian Army's IAR 330, which is a licence-built armed version of the Aérospatiale SA 330 Puma, and the MH-60 Direct Action Penetrator, a special purpose armed variant of the Sikorsky UH-60 Black Hawk. The Hind has been called the world's only "assault helicopter" due to its combination of firepower and troop-carrying capability A modified Mi-24B, named A-10, was used in several speed and time-to-climb world record attempts. The helicopter had been modified to reduce weight as much as possible—one measure was the removal of the stub wings. The previous official speed record was set on 13 August 1975 over a closed 1000 km course of 332.65 km/h (206.7 mph); many of the female-specific records were set by the all-female crew of Galina Rastorguyeva and Lyudmila Polyanskaya. On 21 September 1978, the A-10 set the absolute speed record for helicopters with 368.4 km/h (228.9 mph) over a 15/25 km course. The record stood until 1986, when it was broken by the current official record holder, a modified British Westland Lynx.

JRTC VISMOD: Skylark II Israeli Unmanned Aerial Vehicle (UAV)





Tiers:

1 **2** 3 4

Variants:

- **Skylark II LE:**

System

Alternative Designation : None
Ground Crew: 2

Dimensions

Length, Overall: m3.2
Length, Wing Span: m4.2
Weight, Takeoff: kg35
Weight, Maximum Launch: kg65

Automotive / Performance

Altitude, Operating : m150-1,525
Ceiling, Service : m4,875
Endurance : hr6
Range of Operation: km50
Speed, Cruising : km/h65
Speed, Maximum : km/h129
Engine Name: Bental Industries electric motor
Engine Power: 5.4hp, 4kW
Engine Type: Electric, battery
Ground Control: Skylark dual station ground control, color console
Propulsion: Two blade propeller

Launch and Recovery

Launch Method: HMMWV class vehicle with mounted rail launcher, or can use optional rail launcher trailer

Recovery/Landing Method: Parachute and airbag cushion

Payload

Payload User Image Capabilities: All images can be overlaid on a downlinked integrated map

Notes: Range Finder (optional)

↳*Payload 1*

Description: HD Color CCD 10x zoom lens

Type: Optical Camera

↳*Payload 2*

Description: Night FLIR thermal imaging

Type: IR Camera

↳*Payload 3*

Description: Marker

Type: Laser

Notes:

The Skylark II was unveiled in 2006. It has a range of 60 km and is designed to be operated by a two-person crew and to be deployed using HMMWV class field vehicles. In December 2007, South Korea decided to purchase the Skylark II system. Israel planned to bring the Skylark II into service by mid-2013. Skylark II is designed to support brigades and divisions. The guidance system is a Starlink air terminal with secure digital data links, redundant avionics, and autonomous flight modes. They are interoperable with other Skylarks with real-time video transfer rate of 1.5 mb per second, encrypted UHF uplink, D/E band downlink. Uses a triple sensor payload that provides high definition optical, thermal imager, and laser capabilities.

JRTC VISMOD: BMD-3 Russian Airborne Amphibious Infantry Fighting Vehicle (IFV)





Tiers:



Variants:

- **BMD-3K:** The commander variant of the BMD-3 adopted by the Russian Army in 1996. Mass production of this vehicle was never initiated.
- **2S25 Sprut-SD (Object 952):** A self-propelled anti-tank gun that entered service in 2005. This vehicle has the chassis of the BMD-3 and is operated by a crew of three. The main armament is the 125 mm 2A75 smoothbore gun which is a variant of the 2A46 smoothbore gun series used by Soviet main battle tanks since the T-64. It can fire the ammunition of the 2A46 including the 9M119 Svir. The chassis has seven road wheels on each side instead of five and the engine is now the 2V-06-2S with a power of 510 hp.
- **BTR-MD “Rakushka” (Object 955):** A multi-role transport vehicle with bigger hull and no turret. This type can be used to transport troops, fuel, ammunition and wounded personnel. It also serves as the basis for a new range of specialised vehicles for the Russian airborne forces, including a mortar platform and an ambulance.
- **BTR-MDM:** A modernized version with the same improvements as the BMD-4M.
- **RKhM-5 (Object 958):** A chemical reconnaissance vehicle introduced in 2011 and is fitted with the same specialized equipment as the BTR-80 version known as the RKhM-4. The turret has been removed; the RKhM-5 has a fixed superstructure with a machine gun turret. The hull is larger allowing it to transport troops, fuel, ammunition and wounded personnel
- **BMD-4 (Object 960):** Originally designated as the BMD-3M, this vehicle has a modified chassis with new turret known as the "Bakhcha-U". The weaponry bears greater similarity to the BMP-3. This new armament consists of: a 100 mm 2A70 rifled main gun, a 30mm 2A72 autocannon, a 7.62 mm coaxial machine gun, and new "Ramka" fire control system. The bow-mounted AGS-17 has been removed and is replaced with an AGS-30. BMD-4s are newly built or upgraded BMD-3s. The BMD-4 is no longer being purchased for the Russian troops, in favor of the BMD-4M.
- **BMD-4M:** The upgraded variant with a new chassis and the 500 hp UTD-29 engine of the BMP-3. This version will be produced by Kurganmashzavod (KTZ) instead of VgTZ. The vehicle was presented to the VDV in March 2008. According to KTZ, series production could have started in 2009. The BMD-4M was evaluated by the VDV
- **BMM-D:** A command post vehicle and a recovery vehicle. Some variants will have a longer chassis with seven road wheels and probably the same 510 hp engine as the 2S25.

System

Alternative Designation: BMD-3
Manufacturer: Volgograd tractor factory
Type: Airborne Infantry Fighting Vehicle
Family: BMD-3
Crew: ea2
Passenger Capacity: ea8
Amphibious: Yes, The BMD-3 is amphibious and propelled in the water by two water-jets mounted on both sides at the rear of the vehicle

Buoyancy Reserve: More than 30% of its own displacement

Dimensions

Length: m6.36

Width: m3.11

Height: m2.45

Weight, Combat: tons12.9-13.2

Ground Pressure: INA

Automotive

Engine Name: 2V-06 (Some models have been replaced with the BMD-4M Engine)

Engine Type: Diesel

Engine Power: hp450

Cruising Range: km500

Speed, Maximum Road: km/h71

Speed, Average Cross: 40

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m1.8

Fording Depth: Amphibious

Communications

Primary Radio: R-173

Secondary Radio: Digital R-168

Main Gun

↳*System*

Name: Shipunov 2A42, 30mm Autocannon

Type: 30mm

Manufacturer: Tulamashzavod

Max Rate of Fire (Low): rds/min200-300

Max Rate of Fire (High): rds/min550-800

Weight: kg115

Length (Total): m3.02

Barrel Length: m2.4

Barrels: ea1

Action: Gas-operated

Effective Firing Range: m2,000

Maximum Firing Range: m4,000

Feed System: Twin Feed

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Maximum Elevation: deg+75

Minumum Elevation: deg-5

↳*Ammunition (Option 1)*

Name: 3UOF8

Type: HEI

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load:

Projectile Weight: g389

Bursting Charge: g49

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

↳*Ammunition (Option 2)*

Name: M929

Type: APFSDS-T

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,260

Basic Load: ea

Projectile Weight: g235

Bursting Charge: None

Note: A sub-caliber fin-stabilized discarding sabot round with tracer from Belgian Mecar, with tungsten alloy penetrator. Penetration: 50 mm RHA steel at 60 degree impact at 1,000 m range

↳*Ammunition (Option 3)*

Name: 3UBR8

Type: APDS

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Projectile Weight: g304

Bursting Charge: None

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

Grenade Launcher

↳*System*

Name: AGS-17 Plamya, 30mm Automatic Grenade Launcher

Type: Automatic Grenade Launcher

Manufacturer: Molot plant

In Service: 1970-Present

Proliferation: Widely Proliferated

Weight: kg31

Length: mm840

Rate of Fire: rds/min400

Effective Firing Range: m8,00 - 1,700

Maximum Effective Range: m1,700

Action: Blowback

Feed system: 29 grenades belt

Sights: Adjustable iron sights, optional mount required for optical sights

Variants: AG-17A helicopter-mounted version

↳*Ammunition (Option 1)*

Name: VOG-17M

Type: 30mm Grenade

Cartridge: 30×29mm grenade

Muzzle velocity: m/s185

Warhead: High explosive fragmentation warhead.

Effective Firing Range: 8,00 - 1,700

Basic Load: ea40

↳*Ammunition (Option 2)*

Name: VOG-30

Type: 30mm Grenade

Cartidge: 30×29mm grenade

Muzzle velocity: m/s185

Effective Firing Range: 8,00 - 1,700

Basic Load: ea40

Coaxial Weapon System

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Type: 7.62mm

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

In Service: 1961-present

Manufacturer: Degtyaryov plant

Proliferation: 1 Million +

Max Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

Note: The 7.62 PKT can be controlled remotely and is slaved to the main gun,

↳*Ammunition (Option 1)*

Name: 57-N-323S

Type: Rifle

Caliber: mm7.62

Cartridge: km7.62×54mm

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳*Ammunition (Option 2)*

Name: 7N13 (AP)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

↳***Ammunition (Option 3)***

Name: 7BZ3 (API)

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mm

Muzzle Velocity: m/s834

Basic Load: ea2,500

Accuracy of fire at 300 m: mm150

Tank Commander's Weapon System

↳***System***

Name: RPK-74 (AK-47) 5.45mm Machine Gun

Type: mm5.45

Manufacturer: Vyatskiye Polyany Machine-Building Plant

In Service: 1974-Present

Proliferation=: Widely Proliferated

Max Rate of Fire: rds/min600

Weight (RPK): kg4.7

Weight (RPKS): kg5.1

Length: mm1,060

Barrel Length: mm590

Action: Gas operated, rotating bolt; closed bolt

Effective Firing Range (with sight adjustments): m100-1,000

Maximum Firing Range: m3,150

Feed system: 30-, 45-round box magazine, 100-round plastic drum magazine, belt ammunition (with side mounted belt feed device)

Sights: Iron sights: semi-shrouded front post and rear sliding tangent with an adjustable notch Sight radius: 555 mm (21.9 in)

↳***Ammunition***

Type: Rifle

Caliber: mm5.45

Cartridge: 5.45×39mm M74

Muzzle Velocity: m/s960

Basic Load: ea2,500

Anti-Tank Guided Weapon (ATGW)

Name: 9M113 Konkurs (AT-5 Spandrel)

Type: Soviet SACLOS wire-guided anti-tank missile.

Manufacturer: Tula Machinery Design Bureau (Tula KBP) – Tulsky Oruzheiny Zavod

In Service: 1974-Present

Proliferation: Algeria– used by mechanized infantry units Armenia Azerbaijan Egypt – mounted on Fahd armoured personnel carriers purchased in 1990s Belarus The launcher is been locally produced and upgraded. Bulgaria Croatia Cuba – not confirmed Czech Republic Eritrea[Finland – known as PstOhj 82M, fired from 9P135M-1 launchers (withdrawn from service) Georgia Guinea Hungary Indonesia – mounted on BVP-2 infantry fighting vehicles operated by the marine corps India – 15,000 Konkurs-M, ordered in 2008 for Rs 1,380-crore. Another 10,000 Konkurs-M ordered for US$250 million in 2012. A new contract was signed in 2019 for USD 110 mln. Iran– produced domestically as Tosan-1 Iraq Ivory Coast (reported) Kazakhstan Kyrgyzstan Morocco[Mongolia Moldova– used on BRDM-2 North Korea – produced domestically Pakistan – Used on Viper infantry fighting vehicle Peru Romania Russia – about 300 Konkurs-M complexes delivered annually in the last years (2014) Slovakia Turkmenistan Turkey Syria Ukraine Houthis – Tosan version

Varaints: 9M113M,Towsan-1, Tosan, Towsan, or M113, 9N131M1, 9N131M2-1

Weight (Missile): kg14.6

Weight (9P135 Launching Post): kg22.5

Length: mm1,150

Diameter: mm135

Warhead Weight: kg2.7

Detonation Mechanism: Contact

Engine: Solid-fuel rocket

Wingspan: mm468

Maximum Operational Range: km4

Minimum Operational Range: m70

Speed: m/s208

Guidance system: Wire-guided SACLOS

Steering system: Two control surfaces

Launch platform: Individual, vehicle

Penetration: 600mm of RHA

Basic Load: INA

Fire Control

Name: INA

Computerized FCS: INA

Thermal Sight Vehicle Commander: Yes, 1PZ-3 with a TNP-165A designator

Thermal Sight Gunner: Yes, BPK-1-42 with a TNPT-1 designator and a TKN-3B binocular sight

Main Gun Stabilization: Yes, 2E36-5

Periscopes: TNPO-170A periscopes and the TNPO-350B night vision periscope.

Protection

Hull Armor: Protection to stop up to 12.7mm rounds fired at the hull and 7.72mm rounds fired at the sides

Turret Armor: INA

Applique Armor: Available

Explosive Reactive Armor: No

Active Protection System: INA

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: Yes, three 81 mm electrically-operated smoke grenade dischargers firing forwards,

IR Signature: INA

Fire Suppression System: Yes

Notes:

The BMD-3 (Boyevaya Mashina Desanta, Russian "Боевая Машина Десанта", literally "Combat Vehicle of the Airborne") is an infantry fighting vehicle (IFV) originating from the former Soviet Union. This armored fighting vehicle is one of the lightest in its class and is intended to be a fire support platform for use by airborne and air assault units. The primary armament is a 30 mm 2A42 autocannon capable of firing different types of ammunition which include high-explosive and armor-piecing. The BMD-3 possesses multiple secondary weapons such as the 9M113 Konkurs missile and the AGS-17 grenade launcher to defeat a wide range of targets from enemy infantry to other armored fighting vehicles. The development of this 3rd generation airborne combat vehicle was initiated during the same time frame of the development of the BMP-3. However, the results of the development showed that the mass of the BMP-3 with landing facilities will significantly exceed 20 tonnes limiting an Il-76 to transporting one vehicle. In the early 1980s, the creation of an airborne combat vehicle was initiated. During the design, two options were considered for the BMD-3. The first one included a chassis weighing over 18 tonnes with a 100 mm 2A70 rifled gun and a coaxial 30 mm 2A72 autocannon. The second option was to use the combat module with a 30 mm 2A42 autocannon. Thus, an IL-76 could be loaded either with two airborne combat vehicles weighing 18 tonnes, or three airborne combat vehicles weighing 12.5 tonnes. Research showed that the latter version of the new BMD-3 ran much more efficiently. On the basis of the experience gained and the results of the research, the Council of Ministers of the USSR and the CPSU number 451-159 officially opened the ROC under the code "Bakhcha" on 20 May 1983. Work included the development of an airborne combat vehicle weighing 12.5 tonnes with the Volgograd tractor factory appointed as the head developer. One month later, an agreement was made for the tactical and technical requirements for the new BMD as well as a complete technical design stage. When developing the new BMD, the experience gained in the course of work on the BMD-1 and "Object 934" light tank was used. By 1985, the acceptance testing of three new BMD prototypes was completed. The test results revealed that all the samples exceeded the permissible mass by 190–290 kg and that the running vehicle gave numerous failures. The design bureau VgTZ fixed most of the shortcomings and were eliminated. By May 1986, the refined BMD prototypes completed preliminary tests with three more prototypes developed by the Volgograd tractor factory. These were sent to the state test for another evaluation. New samples exceeded the permissible mass by 400 kg, as they were made subject to measures of improving the reliability of the running transmission gears. The BMD state tests took place between 27 October 1986 and 27 October 1987. According to test results, two to three vehicles were completed and sent to the control tests in different climatic zones conducted from 10 July to 19 November 1988. The conclusion for the "Bakhcha" was assessed as positive with the vehicle fulfilling the tactical and technical requirements set by the airborne troops. On 10 February 1990, the USSR adopted the "Object 950" IFV into service under the designation BMD-3. The serial production of the BMD-3 was then initiated and continued until 1997. Excluding six prototypes produced before 1990, 137 BMD-3s were produced from the year of its adoption to the end of its serial production.

JRTC VISMOD: M98 American Fast Attack Vehicle / Desert Patrol Vehicle





Tiers:

1 **2** 3 4

System

Alternative Designations: Desert Patrol Vehicle, Light Strike Vehicle

Description: 4 X 4 dune buggy type vehicle with rollover frame can hold up to 4 passengers in addition to the crew.

Manufacturer: Chenowth Racing Products, Inc

Crew: 4; 1 driver, 1 gunner, and 2 passengers

Dimensions

Length: m4.08

Width: m2.11

Height: m2.01

Curb Weight: kg960

Payload Capacity: kg

Automotive

Engine Name: INA

Engine Type: Diesel

Engine Power: INA

Operational Range: km500

Speed (Max Road): km/h130

Speed (Max Off Road): km/h110

Main Weapon System

Note: 1X 12.7 mm M2 .50 caliber HMG; 1 x 5.56 mm M249 SAW LMG; 1 x 7.62 mm M60 or M240 series GPMG; or Russian / Chinese equivalent

Protection

Armor (turret front): None, relies on speed

Survivability Equipment: Off-road mobility, speed, 360°crew fire, & quick dismount for protection

Applique Armor: No

Explosive Reactive Armor: No

Active Protection System: No

Self-entrenching Blade: No

NBC Protection System: No

Smoke Equipment: INA

Notes:

The Desert Patrol Vehicle (DPV), formerly called the Fast Attack Vehicle (FAV), is a high-speed, lightly armored sandrail-like vehicle first used in combat during the Gulf War in 1991. Due to their dash speed and off-road mobility, the DPVs were used extensively during Operation Desert Storm. The first U.S. forces to enter Kuwait City were United States Navy SEALs in DPVs The DPV was built by Chenowth Racing Products, Inc. The German Volkswagen Kübelwagen was the first military Light Utility Vehicle based on the Volkswagen Beetle which uses rear-wheel rather than four-wheel drive. Volkswagen components were also the basis for the postwar dune buggy, and its layout is used in the DPV with rear-mounted air-cooled 200 hp (150 kW) Volkswagen engine. This makes the lightweight vehicle capable of accelerating from 0 to 30 mph (0–50 km/h) in only four seconds and able to travel at speeds of up to 80 mph (130 km/h). With its standard 21 gallon (79.5 litre) fuel tank, the DPV has a range of about 210 miles (338 km). An optional fuel bladder can extend the range to over 1,000 miles (1,610 km). Payload capacity is 1500 lb (680 kg). Note: The Light Strike Vehicle (LSV) is an improved version of the Desert Patrol Vehicle (DPV) it replaced. Although the conventional US military replaced its DPVs with Humvees, special operation groups adopted the LSV for its small size and high mobility. It is part of the family of Internally Transportable Light Strike Vehicles (ITV-LSV). It is used for fast hit-and-run style raids (as its name suggests), scouting missions, special forces support, and low intensity guerrilla warfare.

JRTC VISMOD: UH-72 Lakota American Light Utility Helicopter





Tiers:



Variants:

- **Armed Scout 645:** Designed to meet the U.S. Army's armed scout helicopter requirements.
- **Armed Aerial Scout 72X/72X+:** Based on the UH-72A and optimized for scout and light attack missions. The latest version, the AAS-72X+, incorporates more powerful Turbomeca Arriel 2E engines with dual-channel full authority digital engine control (FADEC), a Fenestron tail rotor for improved anti-torque, an upgraded transmission, the Helionix glass cockpit and avionics suite and a four-axis autopilot system. The improvements provide greater power, range, endurance and payload capacity when operating in 6,000 ft (1,800 m) altitude and 95 degrees F (35 degrees C) environments. The AAS-72X+ could be in service with the U.S. Army by 2016, said an EADS press release dated Oct. 29, 2012.
- **Security and Support Mission Package:** This U.S. Army variant features an MX-15 turreted electro-optical/infrared sensor and laser pointer; EuroAvionics EuroNav moving map system and two SkyQuest touch-screen displays; a video management system, SkyQuest digital video recorder plus additional avionics; and Sierra Nevada Tactilink Eagle data downlink system. A searchlight, slaved to the MX-15 turret, is mounted on the aft starboard step. It also has the same rescue hoist that equips the UH-72 medical evacuation mission package. The Army has ordered about 100 Lakotas in this configuration.

System

Alternative Designation: UH-145, UH-72A
Primary Function: Utility Helicopter
Crew: ea2
Blades, Main Rotor: ea4
Blades, Tail Rotor: ea2
Number of Engines: ea2
Day/Night Capable: Yes
All Weather Capable: Yes
Takeoff or Landing Limitations: INA

Vertical Climb Rate: m/sINA

Number of Hard Points: NA

Capacity: 8 troops or 2 stretchers and MEDEVAC crew

Service Ceiling: ft18,000

Dimensions

Length: m13

Width: m1.7

Height: m3.45

Main Rotor Diameter: m11

Disc Area: m295

Weight, Empty: kg1,792

Useful Load: kg1,793

Max Takeoff Weight: kg3,585

Automotive

Engine Name: 2 x Turbomeca Arriel IE2

Engine Type: Turboshaft

Engine Power: 738 shp each

Cruising Range: km685

Speed, Maximum: km/h269

Speed, Average: km/h

Hover Ceiling (In Ground Effect): m3,400

Hover Ceiling (Out of Ground Effect): m2,700

Notes:

The UH-72A Lakota is the U.S. Army's new light utility helicopter. Based on the commercial EC145, it is designed for homeland security, medical evacuation, passenger/logistics transportation and drug interdiction missions within the U.S. Many of the helicopters are being assigned to the National Guard, replacing older air-frames and freeing up larger helicopters for other duties, which has included deployment to Iraq and Afghanistan. Modular kits, such as MEDEVAC and external hoists, enable the Lakota helicopter to make a quick transition to different missions. The UH-72 is easily configurable for a variety of missions. The large main cabin is equipped with a sliding side door and rear clam-shell door to maximize access and space. It can carry up to eight passengers. Two stretchers can be carried for medical evacuation missions. The Lakota is equipped with twin engines turning a hinge-less rotor system with advanced composite rotor blades, which limit vibration and noise. The main and tail rotors are set high to enable loading through side and rear doors even when the blades are turning. For safety, the hydraulic and electrical systems are redundant. The helicopter is equipped with night-vision-goggle-compatible cockpit systems, and a vehicle and engine management display (VEMD) helps crew-members integrate and synthesize flight and vehicle information, reducing pilot workload. The Lakota also has a built-in air-to-ground communications system so pilots may talk directly to first responders, including police, firefighters and ambulance crews during rescue and disaster-relief operations. The Army also considered an armed version of the helicopter for reconnaissance, although that mission was for a while expected to go to the ARH-70A armed reconnaissance helicopter. However, in October 2008, the U.S. Army terminated the ARH program. Military Periscope, May 2013

JRTC VISMOD: BAT-M Russian Tracked Route-Clearing Vehicle





Tiers:

1 2 3 4

Variants:

- **BAT, BAT-2:** Based on MT-T artillery tractor

System

Alternative Designations: Dozer

↳*Description*

Crew: 2

Troop Capacity: INA

Chassis: AT-T heavy tracked artillery tractor

Combat Weight: mt26

Length Overall: m10

Height Overall: m3.5

Width Overall: m4.7

Clearance: mm425

↳*Automotive Performance*

Engine Type: V-12 diesel

HP:

Cruising Range: km500

↳*Speed (km/h)*

Max Road: km/h35

Max Off-Road: INA

Max Swim: INA

Fording Depths: m0.7

↳***Features***

Radios, Frequency, and Range: INA
Vertical Step: m1
Trench Crossing: m1.57
Time from Travel to Operating Position: min5 to 7

Notes:

In the late 40’s the Soviet troops required a heavy artillery tractor to tow their super heavy guns and the upcoming nuclear missiles. One of them was the legendary AT-T based on the very early chassis and lower hull of the T-44 and later T-54 tank with 500mm wide tracks and a 13 teeth sprocket wheel. On the basis of this very strong artillery tractor several other heavy engineer vehicles were also derived. One of them, the BAT-M (also known as a “Way Builder”), featured a huge blade that was pivoted back when marching or being transported and a 2-ton crane installed at the rear part of the vehicle. My model represents an NVA version used by the former Eastern German Army until its end in 1990, at which time they still had 158 BAT / BAT-M in service. This vehicle had a V12 Diesel Engine with a cylinder capacity of 38.800 cm3, was water cooled, with a 415 hp rating.

JRTC VISMOD: UMZ Russian 6x6 Scatterable Minelaying System





Tiers:

1 2 **3** 4

System

Alternative Designation: Multipurpose Minelayer
Chassis: ZIL-131B, KamAZ-63501, MT-Lou
Crew : ea2.0
Troop Capacity : N/A

↳*Dimensions*

Height, Overall : m2.5
Length, Overall : m7.1
Width, Overall : m3.0
Weight: mt10

Automotive

Engine Power : hp150.0
Engine Type: Gasoline
Fording Depth : m1.4
Range, Cruising : km525.0
Speed, Maximum Off-Road: km/h30.0
Speed, Maximum Road : km/h80.0
Speed, Maximum Swim : INA
Speed, Operating Minimum: km/h10.0
Speed, Operating Maximum: km/h40.0
Minefield Spacing Depth (m): m15.0
Speed, Operating Surface Laying : km/h40.0

Communications

↳*Radio*

Name: R-168

Mines

Combat Load : AP, PFM-1S: 3,200. AP, POM-2: 5,000. AT, PTM-3: 600

Minelaying Pattern: Scattered

Time Required to Load Minelayer with One Basic Mine Load : min60-90

Time Required to Load Minelayer with Crew only : mINA

Type: AP, PFM-1S; AP, POM-2; AT, PTM-3

Payload Weight : kg15000.0

Protection

NBC Protection: INA

Smoke Screening System: No

Notes:

The UMZ has been disclosed as the likely replacement for the GMZ-series. The UMZ consists of three launchers mounted on each side of the vehicle for a total of six mine launchers per vehicle. each full turn launcher is hexagonally shaped and contains 30 launch tubes totaling 180. It can fire the mines to one or both sides, or to the rear. Both AP and AT mines are launched from the 140-mm launch tubes. The UMZ uses the same mine canisters as the PKM system. Depending on the position of the launch tubes, one-, two-, or three-lane mine fields can be laid. Minefield (m): length: 1,000 to 1,200. Depth (m): 30 to 120. Max length of minefield with one basic load (m): AP, PFM-1s: 3,200. AP, POM-2: 5,000. AT, PTM-3: 600. Mine capacity: from 180 to 11,520 depending on the type of mine number of mines in one basic load: AP PFM-1s: 11,520. AP POM-2: 720. AT PTM-3: 180. Variants: although primarily mounted on the ZIL-131B, the UMZ minelaying system has been observed mounted on several different carriers such as a modified MT-Blue chassis or on a PT-S tracked amphibious personnel carrier and most recently on the KamAZ-63501 in the UMZ-K Variant.

JRTC VISMOD: 2B14 Podnos Russian 82mm Mortar



Tiers:

1 2 3 **4**

System

Alternative Designation: M82 (Bulgarian production)
Crew: 4
Displacement Time: INA
Emplacement Time: INA
Maximum Effective Range: 4.1km (5.6km for M-74 HE)
Minimum Effective Range: km0.08
Transportation: Is man portable by 3 soldiers for short distances or can be loaded into any vehicle for transportation. The mortar can also be mounted on and fired from a vehicle.

Dimensions

Length: INA
Width: INA
Height: INA
Weight, Combat: kg41.88
Weight, Barrel: kg15.7
Weight, Baseplate: kg10.5
Weight, Bipod: kg15.7
Weight, Sight: kg.9

Mortar

↳*Mortar*

Loader Type: Muzzle loaded
Max Rate of Fire: rds/min30
Sustain Rate of Fire: rds/min24
Max Elevation: deg85°

Min Elevation: deg45°

Traverse Range: ±8° (without bipod repositioning)

↳*Ammunition*

Type: HE, Illum, M-74 HE, Smoke, WP

Caliber: mm82

Muzzle Velocity: INA

Fuse Type: INA

Basic Load: INA

Effective Ranges: Minimum: 80m, Maximum: 4,100m (M-74 max range: 5,600)

Armor Penetration: INA

Weight of Round: kg3.14

Note:: Can fire all ammunition designed for earlier model 82mm Soviet / Russian mortars

Fire Control

Computerized FCS: No

Direct Fire: INA

Indirect Fire: Yes

Collimator: Yes

Notes:

The 2B14 Podnos is a Russian 82 mm mortar. The 2B14 was designed in early 1980s as a light, indirect fire weapon for the use of airborne and other light infantry forces. It was developed to replace the older M47 and is lighter and has better range than its predecessor. Despite the intent to field the 2B14 with light infantry units, the 2B14 appears to have been fielded with regular motor rifle units as well at a scale of six per battalion.

JRTC Decoy for BMP Family of Vehicles




Tiers:

1 2 3 4

System

:	
:	
:	

JRTC VISMOD: 2S6M Tunguska-M Russian 30mm Self-Propelled Anti-Aircraft System



Tiers:



Variants:

- **2S6M1:** Digital interface Ranzhir automated command-and-control system, new fire control system, new missile 9M311M with a maximum range of 10 km. Existing 2S6M Tunguska will be gradually upgraded to the new standard.

System

Alternative Designation: 2K22M, Tunguska-M
Type: tracked self-propelled anti-aircraft weapon armed with a surface-to-air gun and missile system.
Family: 2K22 Tunguska
Crew: ea4
Chassis: GM-352M tracked vehicle
Displacement Time: INA
Emplacement Time: INA

Dimensions

Length: m7.93
Width: m3.24
Height, Radar Up: m4.02
Height, Radar Down: m3.36
Weight, Combat: mt34

Automotive

Engine Name: V-46-4
Engine Type: Water-cooled V-12 turbocharged 4-cycle diesel
Engine Power: hp780
Cruising Range: km500
Speed, Maximum Road: km/h65
Speed, Average Cross: INA

Speed Maximum Swim: Not Amphibious

Fording Depth: m0.8

Obstacle Clearance, Vertical: m1

Obstacle Clearance, Horizontal: m2

Gradient: %60

Side Slope: %30

Communications

Tactical Radio: R-173

Main Weapon System

↳*System*

Name: Shipunov 2A38M

Type: Soviet/Russian 30 mm auto-cannon

Caliber: mm30

Length: m3.027

Barrel Length: mm2,416

Barrels: ea1

Weight: kg115

Action: Gas-operated

Rate of Fire, Low: 200 to 300 rds/min

Rate of Fire, High: 550-800 rds/min

Maximum Effective Firing Range: m4,000

Effective Firing Range: m2,000

Feed System: Twin Feed

Reload Time: Gun ammunition and missiles in about 16 min

Maximum Elevation: deg+87

Minimum Elevation: deg-10

Fire on the Move: Yes

↳*Ammunition*

Type: Rifle, Autocannon

Caliber: mm30

Cartridge: mm30 × 165

Muzzle Velocity: m/s960

Maximum Range: m4,000

Minimum Range: m200

Maximum Altitude: m3,000

Basic Load: INA

Ammo Types: AP-T, Frag-T, HE-I

Missile System

↳*System*

Name: SA-19/GRISON

Length: m2.83

Weight in Container: kg57

Guidance System: SACLOS

Maximum Effective Range: m8,000-10,000

Minimum Effective Range: m2,500

Speed: m/s600-900

Tracking Rate: INA

Warhead Type: Frag-HE

Warhead Weight: kg9

Fuze Type: Proximity

Self Destruct: INA

System Reaction Time: sec6-12

Fire on the Move: No (must be at a halt to fire the missile)

Fire Control

FCS Name: INA

Computerized FCS: Yes

IFF: Yes, IFF system (1RL138), operating in C-and D-band

Direct-view Optics (DVO): Yes

Rangefinder: Laser

Radar System, 1RL144M

Note: The HOT SHOT radar system, which consists of a surveillance radar with a maximum range of 18 km, and a tracking radar with a maximum range of 13 km

↳*Radar 1 (Detection)*

Name: 1RL144 Radar

Type: Detection Radar

Function: This radar provides primary search capability in addition to measurement of range and bearing

Frequency/Band: E-band

Maximum Range: km18

Antenna Location: Antenna is mounted at the rear of the turret and is folded down when not in use

Antenna Rotation: The antenna rotates at approximately 1 r/s, which gives a rapid update of the airspace around the 2S6M

Fan Beam: The TAR emits a fan beam covering 4.50 in azimuth and 150 in elevation. The beam is pointed at a constant elevation of 7.50 to permit detection of low-altitude targets.

↳*Radar 2 (Tracking)*

Name: 1RL144M

Type: Target Tracking Radar (TTR)

Function: The tracking radar constantly relays target range, elevation and bearing to the fire-control computer, and on the basis if these data the computer generated the laying commands for the weapon system.

Frequency/Band: J-band

Maximum Range: km16

Antenna Location: Antenna is mounted at the front section of the turret and has two fundamental functions that depend on whether the guns or missiles are selected.

Optical Sight: A stabilized optical sight is used as a back up tracking channel, allowing target data to be relayed to the fire-control computer. This sight is also used to calculate the deviation of a missile's flight path from the line-of-sight, these data being automatically relayed to the fire control computer and used to generate correction signals.

Gun Engagement: During a gun engagement, the TTR functions as an automatic target tracker, feeding target position data to the fire-control computer.

Missile Engagement: During missile engagement, the tracking radar locks onto the target and then lays the optical sight on the target. Subsequently the gunner assumes the target-tracking function with the electro-optic sight, and the radar is used for relaying guidance commands to the SA-19 missile.

Protection

Hull Armor: Welded steel

Turret Armor: Welded steel

Applique Armor: INA

Explosive Reactive Armor: No

Active Protection System: No

Mine Clearing: No

Self-Entrenching Blade: No

NBC Protection: Yes

Smoke Equipment: INA

Notes:

The 2S6 Tunguska 2K22 (NATO code SA-19 Grison) is a Russian-made self-propelled air defense system which combines gun and missile armament. The development of the 2S6 Tunguska began in 1970 after a request by the Russian army for a new self-propelled anti-aircraft weapon system to replace the old ZSU-23-4 self-propelled anti-aircraft gun. The first version entered service in 1986 and had four missiles, two either side, in the ready to launch position. The second version to enter service with the Russian army, and the current production model vehicle, is designated the 2S6M or 2K22M, has eight missiles, four to each side of the turret. The Tunguska vehicle uses a tracked chassis GM-352M which is also used for the ground-to-air missile system Buk-M1 SA-11 Gadfly. A typical 2K22/2K22M battery would consist of six 2S6/2S6M self-propelled air defense vehicles, six

reload vehicles and associated support and maintenance vehicles. The 2S6 Tunguska is intended to protect tank and motorized units from low-flying aircraft and helicopters, some types of cruise-missile, as well as to engage light armor ground targets and manpower of the enemy.

JRTC VISMOD: M-37 (82-BM-37) Russian 82mm Mortar



Tiers:



Variants:

- **Type 53:** Chinese production M37
- **82 Krh/37:** Finnish designation for M37
- **M41:** The M41 is a modified version of the M37 mortar. The bipod has been replaced by a T-shaped bipod with each bipod leg acting as an axle to which road wheels can be attached. The idea was to improve the mobility of the M37, but the bipod proved to be unstable.
- **M43:** The M43 is another attempt to increase the mobility of the M37. It differs from the M41 in that the bipod has dedicated feet and the wheel are permanently fixed above those feet. Just as with the M41 the M43 was discontinued in favor of the improved M37 mortar.

System

Crew: 5

Maximum Effective Range: m3,040

Minimum Effective range: m90

Sight: MPM-44

Dimensions

Length: INA

Barrel Length: 1.2 m

Weight: 56 kg

Armament

↳*System*

Alternate Designations: M1937, PM-37

Type: Mortar

Caliber: 82mm

Elevation: +45° to +85°

Traverse: 6° to 15°

Rate of FIre: Up to 25 rpm

Muzzle Velocity: 211 m/s

Maximum Firing Range: 3,040 m

↳***Ammunition***

Name: INA

Types: HE, Smoke, Flare

Caliber: 82mm

Shell: 3.05 kg

Muzzle Velocity: fps690

Notes:

The M-37 or 82-BM-37 (батальонный миномёт) is a Soviet 82 millimeter calibre mortar designed by B.I. Szayrin and accepted into service in 1937. The design of the M-37 is based on the earlier French Brandt mle 27/31 mortar with Russian modifications. The main difference between the 82-PM-37 and the earlier 82-PM-36 was the adoption of a round base-plate, revised traverse/elevation controls, simplified sights and spring-loaded shock absorbers on the bi-pod to reduce the amount of relaying needed between shots. The German designation for captured M-37 mortars was 8.2 cm GrW 274/2(r). The M-37M is an improved version with lighter base plate and a device to prevent double loading. It was produced in China by Norinco as the Type 53, in Egypt by the Helwan Machine Tools Company as the Model 69 and in Bulgaria by Arsenal as the M-82 Mod 1937.

JRTC VISMOD: GAZ-66 Russian All Purpose Cargo Truck





Tiers:



Variants:

- **GAZ-66A:** Steel Cab
- **GAZ-66B:** Canvas-top cab for air transport or air drop.

System

Ground Clearance: mm315
Number of Axles: ea2
Payload on/off Highway: kg2,000
Troop Capacity: ea2 in cab, 21 in rear
Turning Radius: m10
Curb Weight: mt3.6
Weight, Gross Vehicle: mt5.8
Wheels Central Tire Pressure Regulation System: Yes
Wheels Size: in12x18

Dimensions

Vehicle Length: m5.8
Vehicle Width: m2.3
Vehicle Height: m2.5
Wheelbase: m3.3
Curb Weight: kg3,440

Automotive

Cooling: Water
Engine Type: V8, 115hp, Gasoline
Fording Depth: m1
Fuel Capacity: liters210

Fuel capacity, Left Tank: liters105

Fuel capacity, Right Tank: liters105

Gradient, Loaded: deg39

Range, Cruising: km875

Speed: km/h95

Towing Capability, Off: kg2,000

Towing Capability, On: kg2,000

Fuel Economy: mpg9

Cargo Space

Cargo Bed Area: m26.8

Width: m2.05

Height: m.89

Length: m3.33

Notes:

The GAZ-66 is a Soviet and later Russian 4x4 all-road (off-road) military truck produced by GAZ. It was one of the main cargo vehicles for motorized infantry of the Soviet Army and is still employed in former Soviet Union countries. It is nicknamed shishiga (шишига) shehsherik (шешерик) trueman (in Siberia). Almost one million vehicles of this type were built for both military and civil use. The GAZ-66 has gained legendary status in many countries around the world due to its reliability, simplicity and off-road capability. Thanks to standard features, such as a front-mounted winch, Central Tire Inflation System (CTIS) and self-locking differentials, the GAZ-66 is extremely popular worldwide with armed forces and off-road enthusiasts. Production ceased in 1999, with the GAZ-3308 being produced instead. Besides functioning as a general cargo carrier, the GAZ-66 is used as a prime mover for 120mm mortars. The DDA-66 variant is an NBC decontamination truck.

JRTC VISMOD: MDK-3 Russian Tracked Ditching Vehicle






Tiers:



System

Alternative Designation: NA
Date of Introduction: 1982
Proliferation: INA
Crew: 2
Chassis: MT-T tracked artillery tractor
Bulldozer Blade: Yes
Crane: No
Ground Penetrating Radar: No
Mine Clearing: Limited with blade
Proofing Roller: No
Bucket Loader: No
Back-hoe Excavator: No
Scatterable Mine Dispenser: No
Ditch Trencher: Yes

Dimensions

Length: m11.75
Width: m4.6
Height: m3.25

Weight, Combat: mT39.5

Automotive

Engine Name: INA

Engine Type: INA

Engine Power: hp710

Cruising Range: km500

Speed, Maximum Road: km/h70

Speed, Average Cross: km/h35

Speed Maximum Swim: INA

Fording Depth: INA

Ditching Machine Characteristics

Maximum Digging Depth: m3

Digging Width: m3.5

Digging Capacity: m3/h400-500

Working Speed: m/h400-500

Notes:

Replaced the MDK-2M. The MDK-3 can dig antitank ditches, vehicle positions, and fighting positions. Its hourly excavation rate is 400 to 500 cubic meters per hour. The system can dig ditches 3.5 meters wide by 1.7 meters deep in a single pass. The MDK-3 cannot be airlifted by helicopter or airdropped.

JRTC VISMOD: Mi-17 (Hip H) Russian Medium Transport Helicopter



Tiers:



Variants:

- **List of Variants - See Below:** Mi-8 Hip-A Mi-8 Hip-B Mi-8T Hip-C (Transportny, transport) Mi-8TM Mi-8TV Mi-8S Hip-C (Salon) Mi-8 VIP Mi-8VZPU Hip-D Mi-8TB Hip-E Mi-8TBK Hip-F (Kommercheskiy, commercial) Mi-9 Hip-G Mi-8MPS Mi-8SMV Hip-J Mi-8P/PPA Hip-K Mi-8AMTSh/Mi-171Sh Mi-8AMTSh-V Mi-8AMTSh-VA Mi-8TG Mi-8 Rana Mi-8MTPR-1 Mi-17/Mi-8MT/Mi-8MTV/Mi-17V Hip-H Mi-17P Mi-17PI Mi-17PG Mi-17Z-II Mi-17MD Mi-17KF Mi-171 Mi-171M/Mi-171A2 Mi-17M/Mi-171V Mi-172 Mi-8MTV (Visotnii, high altitude) Mi-17 Pratap Mi-17-1VA Mi-17V5 Mi-171E Mi-171E2

System

Alternative Designation: Mi-17; Mil Mi-17; Hip H

Manufactuer: Kazan Helicopter Plant Ulan-Ude Aviation Plant

Primary Function: Armed assault-transport

Type: Medium twin-turbine transport helicopter

Crew: ea3 (2x pilots, 1x flight engineer)

Blades, Main Rotor: 5

Blades, Tail Rotor: ea3

Day/Night Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.

All Weather Capable: The Mi-8 is equipped with instruments and avionics allowing operation in day, night, and instrument meteorological conditions.

Takeoff or Landing Limitations: INA

Vertical Climb Rate: m/s9

Number of Hard Points: ea4

Standard Payload: HIP C: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Landing Gear: Fixed main gear struts run down and out from attachment points on the upper, rear fuselage. A second strut holds the wheel well away from the lower fuselage. The two-wheel nose gear is fitted under the fuselage just behind the cockpit

Dimensions

Length, with Rotors Turning: m25.2

Length, Fuelage: m18.2

Width: m2.5

Height: m5.65

Main Rotor Diameter: m21.3

Tail Rotor Diameter: m3.9

Cargo Compartment, Length: m5.3

Cargo Compartment, Width: m2.3

Cargo Compartment, Height: m1.8

Weight, Maximum Gross: kg13,000

Weight, Normal Takeoff: kg11,100

Weight, Empty: kg7,489

Automotive

Engine Name: 2 x TV3-117VM

Engine Type: Medium twin-turbine

Engine Power: hp1,900

Speed, Maximum: km/h250

Speed, Average: km/h240

Service Ceiling: m4,500

Range, Maximum Load: km350

Range, Normal Load: km460

Range, with Auxilery Fuel: km950

Fuel, Internal: 445 liters

Fuel, Internal Aux Tank: 915 liters ea

Fuel, External Fuel Tank: 45 liters in port tank, 680 liters in starboard tank

Service Ceiling, Service: m6,000

Service Ceiling,Hover (out of ground effect): m800

Service Ceiling,Hover (in ground effect): m1,900

Vertical Climb Rate: m/s9

Standard Payload: HIP H: 24 troops, or 3,000 kg internal or external loads on 4x hardpoints.

Communications

Radio: INA

Door Mounted Gun

Note: Loaded combat troops can fire personal weapons through windows from inside cabin.

Wing Mounted Weapons

Additional Armament that can be equipped on the Mi-8T: 2 - 7.62-mm or 1x 12.7-mm MG 4-6 - AT-2C Swatter or AT-3 Sagger ATGMs 4-6 - 57-mm rocket pods (16 each) 2 - 80-mm rocket pods (20 each) 4 - 250-kg bombs 2 - 500-kg bombs 2 -

12.7-mm MG pod 2 - Twin 23-mm gun pods 1,830 liters Additional fuel tanks

↳*Rocket System*

Name: UB-32 (rocket pod)

Type: 57 mm, reusable, 32-salvo rocket pod

Length, Launcher: mm2,080

Diameter, Launcher: mm464

Basic Load for the UB-32 Rocket Pod: ea4, one on each hardpoint

Number of Rockets in each UB-32 Rocket Pod: ea32

↳*Rocket*

Name: S-5 Rockets

Type: Rocket

Length, Rocket: mm2,080

Diameter, Rocket: mm481

Weight Empty: kg103

Weight Loaded: kg264

Warhead Types: produced in a variety of sub-types with different warheads, including HEAT anti-armour (S-5K), high-explosive fragmentation (S-5M/MO), smoke, and incendiary rounds

Maximum Effective Range: 3-4 km depending on the warhead and fuze

Basic Load: 32 S-5 Rockets per UB-32 Rocket Pod

Fire Control

Fire Control System Type: INA

Fire Control Radar: INA

Digital or Analog Cockpit: INA

Direct Fire Control: Yes

Laser Designator: INA

Automated Helmet: INA

Position Location System: Yes

Weather Radar: Type 8A-813

Navigation: DISS-32-90 Doppler navigation under tailboom

Protection

Armor Type: Bolt-on

Fuselage: semi-monocoque pod and boom fuselage has a nearly stepless front

Cockpit Glass: large, five-section windshield and lower nose windows

Stealth Properties: No

Heat Signature Reduction: IR over engine exhausts
Add on Armor: Available
NBC Protection: Yes
EW: INA
EW Counter Measures/CCM: INA
Counter Measures (Chaff/Flares): Yes, ASO-3 and ASO-2 chaff/flare countermeasures system
Jammer: Hot Brick IR

Notes:

The military variant Mi-17 (NATO reporting name: Hip) is a Soviet/Russian helicopter in production at two factories in Kazan and Ulan-Ude. It is known as the Mi-8M series in Russian service. It is a medium twin-turbine transport helicopter. There are also armed gunship versions. The improved version of the Mi-8 is the Mi-17 Hip multipurpose helicopter, also known as the Mi-8TMB. It is specifically designed for improved capabilities at high altitudes and in hot weather conditions. The Mi-17 is identifiable from the Mi-8 by the additional air filters on the turbine air intakes, as well as left hand side mounted tail rotor, required by the more powerful TB-3-117A turbo-shaft engines it is fitted with. The Mi-17 can climb at the rate of 8m/s. The maximum and cruise speed of the helicopter are 250km/h and 225 km/h respectively. The range of the helicopter is 465 km and the service ceiling is 6,000m. The aircraft weighs around 7,489 kg and its maximum take-off weight is 13,000kg. The Mi-8/17 have given rise to a bewildering range of versions that fulfill a wide variety of specialized roles. Dedicated combat support variants include airborne reserve command post, electronic counter measures (with onboard jammers), Communications intelligence and command relay. Other versions carry out delivery of fuel to front-line units, photo-reconnaissance, artillery fire-correction, reconnaissance, VIP transport, mine laying and mine clearing.

JRTC VISMOD: OZM-3 Russian Anti-Personnel Mine





Tiers:



System

Emplacement Method: Manual
Diameter: 75
Height: mm120
Weight: kg3.2
Armor Penetration / Kill Mechanism: Bounding fragmentation
Effective Range: mMax: 25 Lethal: 10 Min: 0 Bound height 1.5 to 2.4 m
Detectability/ Composition: Easy/metal
Anti-Handling: Possible / no 2nd fuze well
Fuze Type/Self Neutralize: Tripwire (2 to 5 kg) or cmd detonated (electrical) or pressure / Self-neutralize: no
Explosive Type & Weight/Total Weight (kg): kgTNT: .075 Total: 3
Comment: Not waterproof

Notes:

The OZM-3, OZM-4 and OZM-72 are Soviet manufactured bounding type anti-personnel mines. (fragmentation-barrier mine, in the Russian and other post-Soviet armies as informally called "frog mine" or "witch") They are normally painted olive green, and issued with a spool of tripwires and two green painted wooden or metal stakes for affixing the tripwires. Both OZM-3 and OZM-4 have cast iron fragmenting bodies while the OZM-72 also contains preformed steel fragments, and all three are issued with empty fuze wells, so a variety of fuzing options are possible. The mines can be activated by a variety of fuzes, including electronic fuzes or command initiation, although they are most commonly fitted with an MUV booby trap switch which is activated by a tripwire. On firing, a metal base plate remains in the ground, while the mine body is thrown up by a small lifting charge, but remains attached to a strong wire tether. When the end of the tether is reached at a height of approximately 0.5 m, the main charge explodes and scatters fragments of the casing across a wide area. OZM mine may sometimes be laid directly on top of an MS-3 mine. The MS-3 is an anti-handling device which closely resembles a PMN mine, except that it has a "blister" on top and operates purely as a pressure-release boobytrap. Lifting an OZM mine (without rendering safe the MS-3 placed underneath) will trigger detonation.

JRTC VISMOD: 9A51 Prima Russian 122mm Multiple Rocket Launcher System



Tiers:

1 2 **3** 4

System

Alternative Designation : 9A51

Cailber/Length : mm122

Crew : ea3

Displacement Time : min3

Emplacement Time : min3

Launch Rate, Full Salvo Time : 50 rounds in 30 seconds

Launch Rate, Singl Rocket Interval: 0.6 seconds per rocket (est)

Launcher Name: Prima

Reload Time: min10

Dimensions

Combat Weight: mT13.9

Chassis Length, Overall: m7.35

Width: m2.5

Height: m2.5

Automotive

Chassis: Ural 4320

Drive Formula: 6x6

Engine Type: KAMAZ-740, 210 hp, diesel engine

Fording Depth : m1.5

Range, Cruising : km990

Speed, Maximum Cross-Country: INA

Speed, Maximum Off-Road: km/h40

Speed, Maximum On-Road: km/h85

Fording Depth: m1.5

Trench Clearance: mUp to 1.2

Vertical Step: m0.55

Side Slope: %30

Gradient: %30

Armament

Caliber: mm122

Quantity, Tubes : ea50

Reload Time : min10

Traverse, Left : deg58

Traverse, Right : deg58

Elevation: deg0 to 55

Loader Type: Transloader, crane hoist

Munition

Available Warheads: Can fire all rockets developed for the BM-21 Grad including cluster rockets with anti-tank or anti-personnel submunitions.

↳*Munition 1*

Name: 9M53F

Caliber/Length : mm122

Type: Frag-HE

Fuze Type: Proximity

Length, Rocket : m3.03

Maximum Velocity : INA

Range, Maximum : m21,000

Range, Minimum : m5,000

Weight : kg70

Warhead Weight: kg26

Communications

↳*Radio*

Name: R-173M FM-VHF

Fire Control Systems

Collimator: K-1

Indirect Fire: PG-1M Panoramic Telescope (PANTEL)

Protection

NBC Protection: No

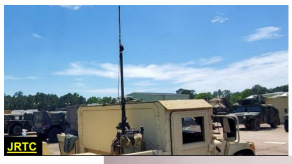
Self-Entrenching Blade: No

Smoke Equipment: No

Notes:

The Prima multiple launch rocket system is an improvement of the BM-21 Grad. It was adopted by the Soviet Army in 1988, however due to budget cuts, only a small number of these artillery systems were ever produced. Some sources claim that it is also in service with Kazakhstan. The Prima MLRS is also referred to as the 9K59, the launching vehicle is 9A51. It has 50 tubes for 122mm rockets. The older Grad has 40 tubes. It can fire all of the rockets developed for the BM-21 Grad, including cluster rockets with anti-tank or anti-personnel sub-munitions. Furthermore, new and more effective rockets have been developed for this system. The new 9M53F rocket with a separable HE-FRAG warhead is standard for this artillery system. The maximum range of fire is 21km. This and other new rockets can also be fired from improved Grad launchers. Rockets can be launched directly from the driver's cab or remotely from the vehicle. A full salvo of the Prima has 7-8 times better coverage and it spends 4-5 times less time in its firing position compared to the Grad.

JRTC VISMOD: DFINT-3T2 Turkish Transportable Direction Finding (DF) System





Tiers:



System

Alternate Designation: DFINT-3T2 communications DF system
Type: Transportable Direction Finding (DF) System
Organization: ASELSAN A.S., Radar, Electronic Warfare and Intelligence Systems Division
In Service: 2000-present
Demodulation: AM, FM (SSB optional)
Frequency Range: MHz20-1,200
DF Accuracy: <1.5 deg RMS
LOB Resolution: deg0.1
Frequency (FFT) Resolution: 500 Hz-160 kHz selectable
Hopper Performance: better than 1,000 hops/s
Scan speed (with DF): better than 1,000 MHz/s
Power Generator Weight: kg8.8
Antenna Weight: kg10.5
Antenna Mast Weight: kg12
System Weight (Total): kg29.6
Dimensions: m6.25
GPS Receiver: External or built in
Power Generator: 220 V AC
Environment: MIL-STD-810E
Operating Temperature Range: -20 to +50°C
Storage Temperature Range: -40 to +70°C
Power Supply: 24 V DC or 110/220 V AC or Both
Monitor: 640mm x 480mm (8 colors)

Notes:

The tri-service DFINT-3T2 system is a transportable direction finding (DF) equipment that can intercept, take a bearing on, and analyse V/UHF band communications traffic. Emitter location is achieved via collaboration with other DFINT systems (with intercommunication being by radio or landline) and, according to the contractor, the equipment can handle state-of-the-art emitter types including frequency hoppers and burst transmitters. The system can be deployed with a standard lightweight, high-gain antenna, sub-band arrays and/or a range of application specific antennas that include disguised low-profile, airborne and heliborne types. In rough terrain land-based applications, the environmentally ruggedised DFINT-3T2 equipment can be deployed by a two-man team and the system presents data in either graphical or list formats.

JRTC VISMOD: BMP-3 Infantry Fighting Vehicle





Tiers:



Variants:

- **BMP-3M:** KBP and Kurganmashzavod have upgraded the vehicle with a new engines and turret with a new ATGM system 9K116-3 Basnya. The upgraded vehicle is called the BMP-3M and the new Bakhcha-U turret which includes a new automatic fire control system with ballistic computer, new SOZH gunner's sight with laser rangefinder and an ATGM guidance channel, thermal imager, TKN-AI commander's vision device with laser illuminator and new ammunition loading system for ATGM.
- **BMP-3M Ataka:** BMP-3M version with a two men turret armed with 30 mm 2A72 autocannon, and 9M120-1 Ataka ATGM
- **BMMP:** Version for naval infantry, fitted with the turret of the BMP-2.
- **BMP-3K:** Tactical command variant, includes additional radio R-173, an intercom for seven users, an AB-R28 independent portable power unit, a navigation device TNA-4-6 and the "Ainet" air burst round detonation system. The BMP-3K lacks the bow machine guns and has its whip antennas mounted on the rear hull. Crew: 3+3
- **BMP-3F:** Armed with the standard 2K23 turret. Specially designed for operations at sea, with improved seaworthiness and buoyancy, capability to move afloat at sea state 3 and fire with the required accuracy at sea state 2. Compared to the basic model, the vehicle design features changes increasing floatability and vehicle stability: the self-entrenching equipment is omitted, a lightweight anti-surge vane and an air intake tube are introduced; the BMP-3F turret is also protected by anti-surge vanes. Water jet propellers develop a speed of 10 km/h when afloat. The BMP-3F design allows the vehicle to come ashore under rough sea conditions and to tow the same-type vehicle. A new main sight, the SOZH, which has an integrated laser range finder and an ATGM guidance channel, is installed. This version can endure continuous amphibious operation for seven hours with the running engine
- **BMP-3F:** Amphibious version based on BMP-3F with the original turret replaced by a smaller remote weapon station with either 7.62, 12.7 or 14.5mm machine gun. It can accommodate a crew commander, driver, gunner, and 14 troops, and can use optional ERA armor.
- **BRM-3K "Rys" (Ob.501):** Surveillance and reconnaissance variant with 1PN71 thermal sight (3.7x/11x, 3 km range), 1PN61 active-pulse night vision device (3 km range), 1RL-133-1 ("TALL MIKE") I-band surveillance radar (3 km man, 12 km vehicle), 1V520 computer and a TNA-4-6 navigation system. The armament consists of the stabilized 30 mm autocannon 2A72 (600 rounds) and a coaxial 7.62 mm machine gun (2,000 rounds) or AU-220M Baikal remote weapon station with 57 mm BM-57 autocannon and 7.62mm PKMT machine gun.
- **BMP-3 Dragoon:** New IFV version with an unmanned turret which can be armed with a variety of combat modules, including standard BMP-3's Bakhcha-U turret with a 2A70 100 mm cannon, a 2A72 30 mm autocannon and a PKTM 7.62 mm machine gun, the AU-220M Baikal remote weapon station module with a 57 mm BM-57 gun and a module with a 125 mm 2A82-1M tank gun, the new 816 h.p.
- **BREM-L "Beglianka" (Ob.691):** Armoured recovery vehicle with five-tonne crane and 20/40 metric tonne capacity winch.
- **BMP-3 Anti-Tank:** A prototype of this BMP-3 variant was completed in 1995. This turretless variant has two launchers for the AT-14 Kornet laser-beam-riding ATGM system, and is capable of feeding six missiles equipped with tandem high-explosive anti-tank (HEAT) warheads to each launcher. A related version is the Kornet self-propelled anti-tank missile complex. This variant provides a ready-round capacity of 16 missiles in two ready-launch drums. It is estimated that the vehicle has capacity for 16 reload missiles. The Kornet ATGM is designed by the KBP Instrument Design Bureau. Integration on the BMP-3 is performed by the Volsk Mechanical Plant in Saratov. Self-propelled anti-tank version with 9M123 Khrizantema (AT-15) ATGM system with radar and laser guidance. The 9P157-2 carries two 9M123 missiles on launch rails, which are extended from a stowed position; the radar is also stowed during transit. The missiles are re-loaded automatically from an internal magazine with 15 rounds (missiles are stored and transported in sealed canisters) and can also accept munitions manually loaded from outside the vehicle. Ref: Military Periscope, April 2016

- **9P163M-1 "Kornet-T":** Anti-tank version with Kornet (AT-14) missile system. Some sources call it the 9P162. The Kornet is similar in function to the Khrizantema missile system. The 9P163M-1 carries two 9M133 missiles on launch rails, which are extended from a stowed position during transit. Missiles are re-loaded automatically by the tank destroyer from an internal magazine with 16 rounds (missiles are stored and transported in sealed canisters).
- **2S18 "Pat-S" (Ob.697):** Self-propelled version of the 152 mm howitzer 2A61 "Pat-B". This was only a prototype, further development led to the 2S31 Vena.
- **DZM "Vostorg-2":** Combat engineer vehicle with a dozer blade and excavating bucket. Prototype.
- **UR-07:** Mine clearing system. The UR-07 might replace the UR-77 "Meteorit". It has the same chassis as the BMP-3 but a bigger steel hull with two launch ramps in the rear. The ramps are used to fire rockets towing hose-type mine-clearing line charges to clear mine fields.
- **UNSh (Ob.699):** Basic chassis for specialised variants.
- **Hermes or TKB-841:** Air-defence vehicle with high-velocity missiles and radar system. Prototype.[68] 2S31 Vena – Self-propelled mortar carrier equipped with a 120 mm mortar based on BMP-3 chassis. It entered production in 1996 and service in 2010.
- **2S38 ZAK-57 Derivatsiya-PVO:** Self-propelled air defense vehicle based on BMP-3 chassis fitted with a 57 mm autocannon and passive reconnaissance and target tracking equipment.[72] It is designed to shoot down unmanned aerial vehicles (UAVs), cruise missiles, air-to-surface missiles, aircraft, helicopters, and MLRS rockets.
- **UDAR UGV:** Unmanned ground vehicle based on the tracked chassis of the BMP-3 with the center hull raised to fit the DUBM-30 Epoch armed with 2A42 autocannon, 7.62mm PKMT machine gun, and Kornet-M ATGM.
- **Prokhod-1:** Unmanned mine-clearing vehicle based on the BMP-3 chassis. It is equipped with the anti-mine TMT-C trawl, and a remote weapon station turret with a 12.7mm machine gun.
- **BMP-3 with Athos Sight:** This variant is fitted with the French SAT Athos thermal imaging system. Known as the Namut, the two-axis stabilized thermal sight is mounted on the left rear of the BMP-3 turret, identical to the sight that is employed on the French Leclerc tank and which was supplied to the United Arab Emirates. The horizontal and vertical sight has magnification of 3x and 10x, with 9x6, 3x2 and 1.5x1 fields of view increasing the vehicle's three turret-mounted weapon ranges. The Namut operates in the 8 to 12 micron wavelength and operates on a 28 V power supply. The U.A.E. fields several BMP-3s with the Athos sight. Ref: Military Periscope, April 2016
- **BMP-3 multiple role chassis:** The Kurgan Machine Construction Plant offers the BMP-3 chassis minus the turret and top and front decking to serve a variety of roles, including air defense, engineering vehicles, artillery, mortar platforms and as command-and-control vehicles. Ref: Military Periscope, April 2016
- **BMP-3 with Wildcat turret:** GLS, a subsidiary of Krauss-Maffei of Germany, designed a prototype BMP-3 chassis fitted with a Wildcat turret. The modular nature of the turret allowed it to be armed with a variety of weapon systems including a 30-mm cannon and a pod of two SA-16/SA-18 missiles. An optical tracking system incorporating a FLIR, laser rangefinder and a Siemens 2D radar has also been tested. The Swedish Ericsson HARD 3-D radar system could also be incorporated onto the turret. The turret was unveiled in 2001. Ref: Military Periscope, April 2016
- **BMP-3 with Mistral SAM:** The SANTAL turret manufactured by Matra Defense of France has been offered for installation onto the BMP-3 chassis. The SANTAL turret comprises six Mistral SAMs in the ready position. Ref: Military Periscope, April 2016

System

Alternative Designation: BMP-3

Manufacturer: Kurganmashzavod

Type: Amphibious Infantry Fighting Vehicle (IFV)

Family: BMP-3

Crew: ea3

Passenger Capacity: ea7

Fighting Module: 2K23 Fighting Module

Dimensions

Length (Hull): m7.14

Width: m3.2

Height: m2.45

Weight, Combat: tons20.6

Ground Pressure: 0.63 kg/cm2

Automotive

Engine Name: UTD-29

Engine Type: 10 cylinder, 4 stroke, v-shaped, water colled diesel

Engine Power: hp500

Cruising Range: km600

Speed, Maximum Road: km/h70

Speed, Average Cross: 45

Speed Maximum Swim: km/h10

Gradient: deg60

Side Slope: deg30

Vertical Step: m0.8

Trench: m2.5

Fording Depth: mAmphibious

Communications

Primary Radio: R-173

Secondary Radio: R-173P

Main Gun

Note: The complete weapon system of the BMP-3 infantry combat vehicle is known as the 2K23 and consists of the 100 mm gun 2A70 with a 30 mm 2A72 automatic cannon (see later in this section) mounted coaxially to the right and a 7.62 mm PKT coaxial machine gun.

↳*System*

Name: 2A70 (100mm) Rifle Gun

Type: mm100

Max Rate of Fire: rds/min8-10

Loader Type: Automatic loader, manual for gun and ATGMs

Maximum Elevation: deg+60

Minimum Elevation: deg-5

Traverse Range: deg360

Traverse Left: deg180

Traverse Right: deg180

Fire on the Move: Yes

Maximum Aimed Range: INA

Maximum Effective Range (Day): m5,200

Maximum Effective Range (Night): INA

Tactical AA Range: m4,000

Armor Penetration: 25mm of RHA

↳***Ammunition***

Name: 9M117M1 Arkan

Type: Laser beam riding missile

Caliber: mm100

Muzzle Velocity: m/s330

Basic Load: ea40 Total Rounds of any 100mm Russian Projectile

Warhead Type: HEAT

Cartridge: 3UBK23-3 cartridge

Soft Launch: Yes

Motor Type: Rocket

Penetration: 650 mm of rolled homogenous armour (RHA) behind ERA or 750 mm of RHA without ERA and it has a maximum range of 4,000 m

Anti-Tank Guided Missile (ATGM)

↳***System***

Name: 9M117 Bastion (AT-10)

Type: Anti-Tank Guided Missile

Caliber: mm100

Charge Type: Reduced Explosive Charge

Muzzle Velocity: m/s400-500

Length: mm1,048

Weight: kg27

Basic Load: ea8

Rocket Motor: Ignites 1.6 seconds after firing the missile and it burns for 6 seconds

Guidance System: Beam-riding laser guidance.

Steering System: Laser sensor to detect the modulation of the light.

Flight Time (4,000 meters): seconds12

Self Destruct Time: seconds26-41

Telescopic Sight: 1K13 day/night telescopic sight (with integral 1K13BZ laser emitter)

Stabilising Fins: ea4

Searchlight: L4 IR searchlight

Effective Firing Range: m100-4,000

Warhead Type: HEAT

Penetration: mm650-750

Note: The 9M117 Bastion (AT-10) is prone to radio or optical jamming

Coaxial Weapon System

↳*System*

Name: 2A72, 30mm Automatic Cannon

Type: mm30

Max Rate of Fire: rds/min330

Maximum Effective Firing Range (Air Targets): km4

Maximum Effective Firing Range (Ground Targets): km2

Maximum Effective Firing Range (Light Armor Vehicles): km1.5

Loader Type: Dual-belt feed

Maximum Elevation: deg-5

Minimum Elevation: deg+60

Fire on the Move: Yes

Traverse Range: deg360

Traverse Right: deg180

Traverse Left: deg180

Firing Modes: Single shot, 10-round burst, or automatic mode.

↳*Ammunition (Option 1)*

Name: 3UBR8

Type: 195 AP rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s1,120

Basic Load: INA

Penetrator Type: Tungsten alloy sub-calibre penetrator

Penetration: Can defeat 28 mm of RHA set at a 60° angle from a range of 1,000 m

Note: A sub-caliber discarding sabot. No tracer. Penetration: 25mm RHA at flat angle of impact, 1500 m range 25mm thick plate at 60 degree impact, 1500 m

↳*Ammunition (Option 2)*

Name: 3UOF8

Type: 305 HE rounds

Caliber: mm30

Cartridge: 30 × 165

Muzzle Velocity: m/s960

Basic Load: eaINA

Lethal Radius: m25.95

Charge Type: A-IX-2

Note: A high-explosive incendiary round with A-670M nose fuze.The fuze produces a 0.15 millisecond delay on impact, and a self-destruct mechanism detonating the projectile after 7.5 to 14.5 seconds of flight (3900–5300 m distance from muzzle).

Commander and Driver's Weapons System

Note: The BMP-3 is equipped with a total of two 7.62mm PKT (Kalashnikov's Machine Gun)

↳*System*

Name: 7.62mm PKT (Kalashnikov's Machine Gun)

Caliber: mm7.62

Cartridge: mm7.62×54

Function: In use as a front-line infantry and vehicle-mounted weapon with Russia's armed forces.

Manufacturer: Degtyaryov plant

Rate of Fire: rds/min650

Effective Rate of Fire: rds/min250-300

Weight (Gun Only): kg9

Weight (Tripod Only): kg7.7

Action: Gas-operated, open bolt

Length (Overall): mm1,203

Length (Barrel): mm605

Feed System: Non-disintegrating metal 50 round belts in 100 and 200/250 round ammunition boxes

Sights: Tangent iron sights (default); Optical, Night-vision, Thermal and Radar sights

Effective Firing Range (With Sight Adjustments): m100-1,500

Maximum Firing Range: m4,000

↳*Ammunition*

Type: Rifle

Caliber: mm7.62

Cartridge: 7.62×54mmR km

Muzzle Velocity: m/s855

Basic Load: ea2,500

Accuracy of fire at 300 m: mm90

Fire Control

Name: 1K13-2

Computerized FCS: Yes

Thermal Sight Vehicle Commander: Optical sight 1PZ-10, a day/night vision device TKN-3MB

Thermal Sight Gunner: 1K13-2 II night channel, 5.5x

Gunner Day Sights: 1K13-2, 8x ; 1P3-10 antiaircraft, 2.6x; PPD-1 stand-by

Main Gun Stabilization: Yes, 2E52 electro-mechanical stabiliser

Stabilizer Modes: The stabiliser has three modes: automatic; semi-automatic; and guidance.

Ballistic Computer: Yes, V539 ballistic computer

Rangfinder: Laser

Infrared Searchlight: Yes, IR searchlight OU-3GA2

Cross-Wind Sensor: Yes

Minutes Of Angle (MOAs): 1.69

Protection

Armor Type: Welded of aluminum alloy armor

Hull Armor (Front): Protection against 30 mm armor-piercing rounds.

Hull Armor (Sides and Back): Protection is against 14.5 mm armor-piercing rounds.

Turret Armor: mm30-35

Applique Armor: On Turret

Explosive Reactive Armor: Available

Active Protection System: Yes, Arena active protection system

Mine Clearing: Yes, KMT-8 mine plow available

Self-Entrenching Blade: Yes

NBC Protection: Yes, Collective

Smoke Equipment: 6 VEESS

Countermeasures System: Shtora countermeasures systems

Automatic Fire Suppression System: Yes

Notes:

The BMP-3 is one of the most heavily armed infantry combat vehicles in service, fitted with several different weapon systems capable of ranging out to 5.2km. It carries a 3 man crew plus 7 infantrymen, and is capable of firing all weapons on the move with no loss of effectiveness. This makes it crucial asset for the threat. While most variants will have a 30mm auto cannon, reports indicate that a variant with a 100mm rifled gun may be in production. Although Explosive Reactive Armor is available for the BMP-3, the threat will likely not use it in environments / situations where there will be extensive use of dismounted infantry in the area in order to prevent injuring soldiers in the vicinity of the vehicle. The BMP-3 [BMP = Boyevaya Mashina Pyekhota - Infantry Fighting Vehicle], which represents a totally different design concept from BMP-1/2, is a light tank that can hold a squad of infantry. It has a 100mm main gun that fires HE to destroy buildings, can fire long-range ATGMs, a 30mm auto-cannon and a medium machine gun as a single unit in the turret. The innovative BMP-3 armament suite has been subjected to criticism in the Russian military. The performance obtained from the 500 horsepower engine powering this 20.6 ton vehicle compares favorably to the American Bradley, which has an engine of similar power. The BMP-3, first seen in public during a parade in Moscow in 1990, was built by Kurganmashzavod, developer and manufacturer of the BMP-2 infantry combat vehicle.